PARTNERS HEALTHCARE SYSTEM, INC.
DON APPLICATION # PHS-19093011-HS
ATTACHMENTS

SUBSTANTIAL CHANGE IN SERVICE
DON-REQUIRED EQUIPMENT
MASSACHUSETTS GENERAL PHYSICIANS ORGANIZATION

SEPTEMBER 30, 2019

BY

PARTNERS HEALTHCARE SYSTEM, INC.
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2. Project Description

Partners HealthCare System, Inc. ("Applicant" or "Partners HealthCare") located at 800 Boylston Street, Suite 1150, Boston, MA 02199 is filing a Notice of Determination of Need ("Application") with the Massachusetts Department of Public Health ("Department") for a change in service by the Massachusetts General Physicians Organization, Inc. ("MGPO"). The MGPO is a multi-specialty medical group and the affiliated physician organization of The General Hospital Corporation d/b/a Massachusetts General Hospital ("MGH"). As such, MGPO physicians provide various services at MGH licensed facilities as well as at its own physician practice locations. With respect to radiology services, MGPO staffs and manages the radiology department at MGH's main hospital campus located at 55 Fruit Street, Boston, MA 02114, and additionally operates as a licensed clinic providing freestanding imaging services in Waltham ("MGPO Waltham") and Chelsea ("MGPO Chelsea").[1] The proposed project is for the expansion of its existing imaging clinic through the addition of three 3T magnetic resonance imaging ("MRI") units. The new units will be located at a satellite of MGPO's existing clinic that will be established at 391 Revolution Drive, Store 1126, Somerville, MA 02145 and is referred to herein as MGPO Assembly Row ("Proposed Project").

The need for the Proposed Project is based on the existing and future needs of the Applicant's patient panel. As noted above, MGPO physicians provide MR imaging services to patients at MGH's main hospital campus, MGPO Waltham, and MGPO Chelsea.[2] All of the units at these locations are operating at/near capacity, as evidenced by historical patient and scan volume trends and long wait times for services despite extended operating hours. Moreover, population statistics project that the need for imaging services will increase through 2035 as the 65+ patient cohort grows and requires MRI services to diagnose and treat age-related conditions. The addition of three 3T MRIs at MGPO Assembly Row will allow the Applicant to meet the growing demand for MRI services, accommodate more patients in Somerville while alleviating some of the volume at MGH's main hospital campus and helping to free up resources for patients that require care in the hospital setting, and ensure that patients have timely access to imaging services that are necessary to detecting and treating a variety of conditions.

Additionally, the Proposed Project will satisfy existing and future needs of the Applicant's patient panel by providing increased access to high-quality imaging services in a community-based ambulatory care setting that is more convenient for many patients. Aggregated zip code data for the last three fiscal years demonstrates that MGH/MGPO's MRI patient panel has a similar geographic composition to the larger Partners HealthCare and MGH/MGPO patient panel, with nearly 19% of patients originating either within a four-mile radius of Somerville or along the MBTA Orange Line, upon which MGPO Assembly Row will be located. With approximately 19% of the growing demand for MRI services originating close/convenient to Assembly Row in Somerville, the Applicant determined that siting the proposed new imaging units at MGPO Assembly Row will facilitate increased access to high-quality imaging services in a community-based setting. Furthermore, the Proposed Project will allow patients the convenience of receiving care closer to their homes without the added stress of commuting into Boston (e.g., decreased travel time, availability of free parking, access along the MBTA Orange Line, etc.).

[1] In addition, MGH is licensed by the Department to operate one MRI unit at Mass General/North Shore Center for Outpatient Care, a licensed hospital satellite. However, this unit is not managed by MGPO.
[2] The Applicant notes that it received approval from the Department to implement an additional two 3T MRI units at MGPO Waltham. However, these units are not yet operational. Moreover, these units will serve a different patient population than the Proposed Project.

In terms of quality, high-quality imaging services are currently available at MGPO's existing clinic locations and the proposed MRI units at MGPO Assembly Row will also be operated under this model. MGPO participates in various quality initiatives in collaboration with the Applicant and MGH and employs quality assurance mechanisms to ensure that patients at its freestanding imaging center clinic locations receive high-quality, patient-focused imaging services that are commensurate with the care offered at MGH. Moreover, MGPO Assembly Row's imaging services will be identical to those available at MGH's main campus, will have the same advanced MRI technologies as the main campus location, and, as the affiliated physician organization of MGH, MGPO patients will have access to highly specialized, focused, and trained physicians and staff at MGPO Assembly Row.

Finally, the Proposed Project will meaningfully contribute to Massachusetts' goals for cost containment by providing high-quality imaging services in a more cost-effective setting. As the imaging services proposed for implementation at MGPO's Assembly Row clinic will be freestanding imaging center services, they will be reimbursed under the Medicare Physician Fee Schedule ("MPFS"), which rates are lower than hospital-based rates. Reimbursement at MPFS rates will allow patients additional access to imaging services in the lower-cost community setting. Accordingly, the Proposed Project will contribute positively to the Commonwealth's goals of containing the rate of growth of total medical expenses and total healthcare expenditures.

In sum, the Applicant's proposed expansion of imaging services through implementation of three 3T MRI units at MGPO's proposed Assembly Row location will allow patients in need of imaging services to receive timely care in a community setting. This expanded capacity will provide appropriate patients with an alternative convenient point of access with equally high-quality at a lower-cost, and thus will improve public health outcomes and patient experience. Accordingly, the Applicant believes the Proposed Project meets the factors of review for Determination of Need approval.

Factor 1: Applicant Patient Panel Need, Public Health Values and Operational Objectives

F1.a.i **Patient Panel:**
Describe your existing Patient Panel, including incidence or prevalence of disease or behavioral risk factors, acuity mix, noted health disparities, geographic breakdown expressed in zip codes or other appropriate measure, demographics including age, gender and sexual identity, race, ethnicity, socioeconomic status and other priority populations relevant to the Applicant's existing patient panel and payer mix.

A. Partners HealthCare Patient Panel

Partners HealthCare is a not-for-profit, integrated health care system that was formed in 1994 by an affiliation between The Brigham Medical Center, Inc. (now known as Brigham Health) and The Massachusetts General Hospital.[3] Partners HealthCare currently operates two tertiary hospitals, six community acute care hospitals, and one acute care specialty hospital in Massachusetts; one community acute care hospital in Southern New Hampshire; one facility providing inpatient and outpatient mental health services; and three facilities providing inpatient and outpatient services in rehabilitation medicine and long-term care. Partners HealthCare also operates physician

[3] The Massachusetts General Hospital is now composed of MGH, MGPO, and McLean HealthCare, Inc., The MGH Institute of Health Professions, Inc., Martha's Vineyard Hospital, Inc., Nantucket Cottage Hospital, Cooley Dickinson Health Care Corporation and Wentworth-Douglass Hospital.

organizations and practices, a home health agency, nursing homes and a graduate level program for health professionals. Partners HealthCare is a non-university-based nonprofit private medical research enterprise and its academic medical centers are principal teaching affiliates of the medical and dental schools of Harvard University. Partners HealthCare provides its services to patients primarily from the Greater Boston area and eastern Massachusetts, as well as New England and beyond. Additionally, Partners HealthCare operates a licensed, not-for-profit managed care organization that provides health insurance products to the MassHealth Program (Medicaid), Commonwealth Care (a series of health insurance plans for adults who meet income and other eligibility requirements) and commercial populations.

Partners HealthCare serves a large and diverse patient panel as demonstrated by the utilization data for the 36-month period covering Fiscal Year ("FY") 16-18 and the preliminary data available for FY19.[4] Appendix 2a provides this demographic profile for Partners HealthCare in table form. The number of patients utilizing Partners HealthCare's services has increased since FY16, with 1,380,203 unique patients in FY16, 1,409,382 unique patients in FY17 and 1,504,478 unique patients in FY18.[5] Preliminary data for FY19 indicate that from October 1, 2018 – April 30, 2019, Partners HealthCare had 1,182,064 unique patients. Partners HealthCare's patient mix consists of approximately 41.9% males and 58.1% females based on FY18 data, with gender unknown for less than 0.01% of the patient population. The Massachusetts Center for Health Information and Analysis ("CHIA") reports that Partners HealthCare's patient panel represents 19% of all discharges in the Commonwealth.[6] The system's case mix adjusted discharge rate is 23%.[7]

Partners HealthCare has seen an increase in the number of patients it serves across all age cohorts between FY16 and FY18. Current age demographics show that the majority of the patients within Partners HealthCare's patient population are between the ages of 18-64 years of age (61.2-61.7% of the total patient population). Patients that are 65 and older also make up a significant portion of the total patient population (26.8-28.6% of the total patient population). Only 10.2-11.5% of Partners HealthCare's patients are between 0-17 years of age. Preliminary data for FY19 shows similar trends with regard to increases across age cohorts and cohort distribution.

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[4] Fiscal year October 1 – September 30. While preliminary data is available for FY19, annual comparisons are calculated using data for FY16-18 as the FY19 data is only for October 1, 2018 – April 30, 2019 and is subject to change over time.

[5] Entities include: Brigham and Women's Hospital, Brigham and Women's Faulkner Hospital, Massachusetts General Hospital, Newton-Wellesley Hospital, and North Shore Medical Center; Cooley Dickinson Hospital, Martha's Vineyard Hospital, McLean Hospital, and Nantucket Cottage Hospital (post-Epic data only); Massachusetts Eye and Ear Infirmary (outpatient post-Epic data only); Spaulding Rehabilitation Hospital (Telehealth, Partners Mobile Observation Unit, Home Hospital programs for GH and BWH, Stay Connected with GH, Lifeline, and CareSage programs are not included); Brigham and Women's Physicians Organization, Massachusetts General Physicians Organization, Newton-Wellesley Medical Group, and North Shore Physicians Group; Cooley Dickinson PHO (post-Epic data only); and Partners Community Physicians Organization (pre-Epic non-risk patients not included). The methodology for aggregating Partners HealthCare's patient panel data has evolved into an automated process utilizing internal data resources. Initially, in 2017, when Partners HealthCare began developing its patient panel for Determination of Need applications, such as the Change of Ownership for Massachusetts Eye and Ear and the Substantial Capital Expansion for Brigham and Women's Hospital, staff manually aggregated the necessary data. However, since these submissions, Partners HealthCare staff have developed a new automated process that allows for the collection and amalgamation of system-wide data. This refined methodology allows staff to continuously monitor and improve the way that data are aggregated. Accordingly, between June 2018 and May 2019, staff further refined the data collection processes leading to an increase of no more than 1% in overall patient counts for the system. Staff will continue to refresh and refine the process for aggregating data across the system, leading to more exact patient panel data.

[6] *Fiscal Year 2017: Partners HealthCare System*, MASSACHUSETTS CTR. FOR HEALTH INFORMATION ANALYSIS, http://www.chiamass.gov/assets/Uploads/mass-hospital-financials/2017-annual-report/system-profiles/Partners-HealthCare.pdf (last visited Aug. 20, 2019).

[7] *Id.*

Partners HealthCare's patient panel reflects a mix of races. Data based on patient self-reporting demonstrates that in FY18, 72.6% of the total patient population identified as White; 5.5% identified as African American or Black; 4.1% identified as Asian; 1.4% identified as Hispanic/Latino; 0.1% identified as American Indian or Alaska Native; and 0.1% identified as Native Hawaiian or Other Pacific Islander. Since patients were grouped into these categories based on how they self-identified,[8] there is a portion of the patient population (16.1% in FY18) that either chose not to report their race or identified as a race that did not align with the above categories. Therefore, it is important to note that the racial composition of Partners HealthCare patient panel may be understated.

Partners HealthCare provides care to patients from a broad range of geographies including all fifty states. While Partners HealthCare's patient panel resides mainly in Eastern Massachusetts, there is a sizeable portion of the patient panel that resides outside of Massachusetts (10.5%, or 158,537 patients, in FY18). By applying the Department's Health Service Area ("HSA") categories to FY18 data, 43.4% of Partners HealthCare's patients reside in HSA 4 (652,456 patients); 16.2% reside in HSA 6 (244,040 patients); 13.6% reside in HSA 5 (205,029 patients); 6.5% reside in HSA 3 (97,667 patients); 6.0% reside in HSA 1 (90,902 patients); 3.3% reside in HSA 2 (49,437 patients); 0.003% reside in MA but outside of HSAs 1-6 (38 patients); and the origin of 6,372 patients or 0.4% of the panel is unknown.

B. MGH and MGPO Patient Panel

The Massachusetts General Hospital is one of the founding members of Partners HealthCare and MGH is the original teaching hospital of Harvard Medical School. With 1,035 licensed beds at its main hospital campus in Boston, MGH is the largest hospital in the state. In addition to its main hospital campus in Boston, MGH offers services to patients through various hospital satellite and clinic locations across Eastern Massachusetts. MGPO, also a member of Partners HealthCare and The Massachusetts General Hospital and a teaching affiliate of Harvard Medical School, is a multi-specialty medical group dedicated to excellence and innovation in patient care, teaching, and research. Consisting of 2,700 physicians, MGPO is the largest multi-specialty group in New England and one of the largest in the United States. In addition to operating multiple physician practices throughout Eastern Massachusetts, MGPO is the affiliated physician organization of MGH, and, as such, MGPO physicians provide physician services – such as primary care, specialty physician services, and advanced imaging – at licensed facilities. As discussed in further detail throughout this narrative, MGPO currently operates a licensed freestanding imaging clinic with locations in Waltham and Chelsea and proposes to expand its imaging services with implementation of the Proposed Project.

Overall Patient Panel

Appendix 2a provides the combined demographic profile for MGH and MGPO in table form. Similar to Partners HealthCare, the number of patients utilizing MGH and MGPO increased from FY16-18, with 563,459 unique patients in FY16, 563,970 unique patients in FY17, and 566,395

[8] With the exception of the category "Hispanic/Latino," the race categories shown above are based on the 1997 Office of Management and Budget standards on race and ethnicity. Patients were grouped into these categories based on their responses as follows – White: "White"; African American or Black: "African American", "Black", "Black or African American"; American Indian or Alaska Native: "American Indian", "American Indian or Alaska Native"; Asian: "Asian"; Native Hawaiian or Other Pacific Islander: "Native Hawaiian or Other Pacific Islander", "Native Hawaiian/Other Pacific Islander", "Pacific Islander"; Hispanic/Latino: "Hispanic"," Hispanic or Latino"," Latino"; Other/Unknown: All other responses.

unique patients in FY18.[9] Preliminary data indicate that through the first two quarters of FY19, MGH and MGPO had a combined 403,563 unique patients. Of these patients, approximately 44.8% are male and 55.2% are female.

In regard to age, the majority of the patients within MGH/MGPO's combined patient population are between the ages of 18-64 (59.0%, or 334,405 patients, in FY18). The next largest age cohort is patients that are 65 years and older (27.0%, or 152,871 patients, in FY18). Subsequently, 14.0% of MGH/MGPO's patients are between ages 0-17 (79,113 patients in FY18).

Moreover, MGH/MGPO's patients reflect a diversity of races. Data based on patient self-reporting demonstrate that in FY18, 73.2% of MGH/MGPO's patients identified as White; 5.2% identified as African American or Black; 5.2% identified as Asian; 0.8% identified as Hispanic/Latino; 0.1% identified as American Indian or Alaska Native; and 0.1% identified as Native Hawaiian or Other Pacific Islander. Since patients were grouped into these categories based on how they self-identified,[10] there is a portion of the patient population (15.4% in FY18) that either chose to not report their race or identified as a race that did not align with the above categories.

Finally, aggregated zip code data by HSA for FY18 demonstrates that MGH/MGPO's patient population has a similar geographic composition to the larger Partners HealthCare patient panel. This data indicates that 49.0% of MGH/MGPO's patients reside in HSA 4 (277,515 patients); 17.3% reside in HSA 6 (97,996 patients); 8.6% reside in HSA 5 (48,669 patients); 5.8% reside in HSA 3 (32,885 patients); 3.2% reside in HSA 2 (18,269 patients); 1.3% reside in HSA 1 (7,222 patients); and 0.002% reside in MA but outside of HSAs 1-6 (14 patients). Nearly 81,000 patients or 14.3% of the panel is from outside of Massachusetts, and the origin of 0.5% of the panel is unknown (2,899 patients).

MRI Patient Panel

As noted above, MGPO physicians provide a variety of services at MGH licensed facilities. With regard to radiology services, MGPO radiologists staff and manage the radiology department of MGH. Moreover, MGPO provides an array of imaging services, including MRI, at licensed clinics. Given that the Applicant seeks to implement MRI services at the proposed MGPO Assembly Row satellite, in addition to reviewing the demographic data for all MGH/MGPO patients, the Applicant also conducted a focused review of the MGH/MGPO MRI patient panel to determine the need for the Proposed Project. This demographic profile for MGPO/MGH's MRI services is provided at Appendix 2a.

As indicated in Appendix 2a, the volume of patients utilizing MGH's and MGPO's MRI services increased by 2.3% over the last three fiscal years, with 47,807 unique patients in FY16 and 48,910 unique patients in FY18. This data also demonstrates that MGH/MGPO's MRI patient population composition is analogous to the larger MGH/MGPO patient panel in terms of gender, age, and race. Like the overall MGPO/MGH patient panel, the focused MRI patient panel for MGPO/MGH is predominantly female (55.6%), with 27,203 women receiving MRI scans in FY18 compared to

[9] Only includes post-Epic data (practices have varying go-live dates).

[10] With the exception of the category "Hispanic/Latino", the race categories shown above are based on the 1997 Office of Management and Budget standards on race and ethnicity. Patients were grouped into these categories based on their responses as follows – White: "White"; African American or Black: "African American", "Black", "Black or African American"; American Indian or Alaska Native: "American Indian", "American Indian or Alaska Native"; Asian: "Asian"; Native Hawaiian or Other Pacific Islander: "Native Hawaiian or Other Pacific Islander", "Native Hawaiian/Other Pacific Islander", "Pacific Islander"; Hispanic/Latino: "Hispanic"," Hispanic or Latino"," Latino"; Other/Unknown: All other responses.

21,707 men. In regard to age, the majority of the MRI patients within MGH/MGPO's combined patient population are between the ages of 18-64 (63.5% in FY18), followed by patients ages 65+ (31.5% in FY18), and subsequently patients ages 0-17 (5.0% in FY18). Moreover, race data collected in FY18 based on patient self-reporting demonstrates that 57.0% of the combined MGH/MGPO MRI patient panel identified as White; 3.4% identified as African American or Black; 2.7% identified as Asian; 0.8% identified as Hispanic/Latino; 0.1% identified as American Indian or Alaska Native; and 0.02% identified as Native Hawaiian or Other Pacific Islander.[11]

Finally, aggregated zip code data for FY18 demonstrates that MGH/MGPO's MRI patient population is similar to the larger Partners HealthCare patient panel, as well as the overall MGH/MGPO patient panel, in terms of geographic origin. Zip code data is important when considering who utilizes MGH/MGPO's imaging services. Specifically, this data indicates that nearly 19% of MGH/MGPO's MRI patients live either within four miles of Somerville (02145) or in zip codes that are convenient to the MBTA Orange Line, along which MGPO Assembly Row will be located. Accordingly, for many patients, MGPO Assembly Row will be the most convenient option for receiving MRI services.

F1.a.ii **Need by Patient Panel:**

Provide supporting data to demonstrate the need for the Proposed Project. Such data should demonstrate the disease burden, behavioral risk factors, acuity mix, health disparities, or other objective Patient Panel measures as noted in your response to Question F1.a.i that demonstrates the need that the Proposed Project is attempting to address. If an inequity or disparity is not identified as relating to the Proposed Project, provide information justifying the need. In your description of Need, consider the principles underlying Public Health Value (see instructions) and ensure that Need is addressed in that context as well.

Through the Proposed Project, the Applicant will satisfy existing and future patient panel needs by providing increased access to timely MR imaging services for MGH/MGPO patients. As detailed in Factor F1.a.i, aggregated zip code data for the last three fiscal years demonstrates that approximately 19% of MGH/MGPO's MRI patients live within a four-mile radius of Somerville or along the MBTA Orange Line. Historical patient and scan volume trends for these MRI services indicate high utilization rates and extended wait times across MGH and MGPO's locations. Moreover, projections forecast that the need for MRI services will increase into the future, particularly as the 65+ patient population increases and requires MRI to diagnose and treat age-related conditions. With 19% of the growing demand for these imaging services originating close or convenient to Assembly Row, the Applicant determined that all patients within the Applicant's panel residing in the service area of the proposed MGPO Assembly Row freestanding imaging center satellite, including existing MGH and MGPO patients, will benefit from this expansion of MRI services within an ambulatory care community setting.

[11] With the exception of the category "Hispanic/Latino", the race categories shown above are based on the 1997 Office of Management and Budget standards on race and ethnicity. Patients were grouped into these categories based on their responses as follows – White: "White"; African American or Black: "African American", "Black", "Black or African American"; American Indian or Alaska Native: "American Indian", "American Indian or Alaska Native"; Asian: "Asian"; Native Hawaiian or Other Pacific Islander: "Native Hawaiian or Other Pacific Islander", "Native Hawaiian/Other Pacific Islander", "Pacific Islander"; Hispanic/Latino: "Hispanic"," Hispanic or Latino"," Latino"; Other/Unknown: All other responses. Since patients were grouped into these categories based on how they self-identified, there is a portion of the patient population (36.0% in FY18) that either chose to not report their race or identified as a race that did not align with the above categories.

A. Growing Demand for Imaging Technology

The use of diagnostic imaging in the United States, including imaging with MRI, has increased significantly over the last two decades.[12] Several factors have contributed to this increase, including advancements in technology (e.g., improvements in techniques, resolution, and acquisition time), expansion of clinical applications (particularly to diagnose and treat age-related conditions), and patient- and physician-generated demand.[13] The development and improvement in these advanced diagnostic imaging technologies is widely credited with leading to improved patient outcomes – through earlier and more accurate diagnoses of disease using noninvasive techniques – as well as improved patient care processes.[14]

The Applicant has been no exception to this upward trend. As set forth in Factor F.1.a.i, across MGH and MGPO there has been growth in the number of patients receiving MR imaging services over the last three fiscal years. From FY16-18, the number of MGH/MGPO patients receiving MRI scans increased by 2.3% (from 47,807 patients in FY16 to 48,910 patients in FY18). Preliminary figures for FY19 suggest that these numbers will continue to grow into the future – in the first quarter of FY19, MGH/MGPO reported 15,213 patients who received MRI scans.

In addition to patient counts, scan volumes have also grown. From FY16-18, across all MGH/MGPO locations, MRI scan volume increased by nearly 9%. This increased demand for imaging services has impacted the Applicant's existing MRI machines across its MGH and MGPO locations. Specifically, the increased utilization has resulted in capacity constraints and extended wait times. For instance, patients seeking outpatient imaging services at MGH's main campus face average wait times of twenty-three days for an MRI.[15]

To address the high demand for MRI across MGH and MGPO sites and ensure that patients have timely access to conveniently located imaging services, the Applicant proposes to expand its imaging capacity by implementing three 3T MRI units at MGPO Assembly Row. As described in greater detail in Factor F1.b.i, recent advances in 3T MRI technology, which facilitate faster scans, will result in shorter exam slots and allow for more exams to be performed during normal operating hours. In total, implementation of the new MRI units will allow for an additional 2,080 hours of MRI scans per year in year one, and by year five this will increase to 5,824 additional hours of MRI

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[12] Rebecca Smith-Bindman et al., *Rising Use Of Diagnostic Medical Imaging In A Large Integrated Health System*, 27 HEALTH AFFAIRS 1491 (2008), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2765780/pdf/nihms-137739.pdf; Rebecca Smith-Bindman et al., *Use of Diagnostic Imaging Studies and Associated Radiation Exposure For Patients Enrolled in Large Integrated Healthcare Systems, 1996–2010*, 307 JAMA 2400 (2012), *available at* https://jamanetwork.com/journals/jama/fullarticle/1182858; Robert J. McDonald et al., *The Effects of Changes in Utilization and Technological Advancements of Cross-Sectional Imaging on Radiologist Workload*, 22 ACADEMIC RADIOLOGY 1191 (2015); Michael Walter, *Feeling overworked? Rise in CT, MRI images adds to radiologist workload*, RADIOLOGY BUSINESS (Jul. 31, 2015), http://www.radiologybusiness.com/topics/quality/feeling-overworked-rise-ct-mri-images-adds-radiologist-workload; *Increases in Imaging Procedures, Chronic Diseases Spur Growth of Medical Imaging Informatics Market*, IMAGING TECHNOLOGY NEWS (Oct. 28, 2016), https://www.itnonline.com/content/increases-imaging-procedures-chronic-diseases-spur-growth-medical-imaging-informatics-market.

[13] *Rising Use Of Diagnostic Medical Imaging In A Large Integrated Health System*, *supra* note 12; *Use of Diagnostic Imaging Studies and Associated Radiation Exposure For Patients Enrolled in Large Integrated Healthcare Systems, 1996–2010*, *supra* note 12; McDonald et al., *supra* note 12; Walter, *supra* note 12; *Increases in Imaging Procedures, Chronic Diseases Spur Growth of Medical Imaging Informatics Market*, *supra* note 12.

[14] *Rising Use Of Diagnostic Medical Imaging In A Large Integrated Health System*, *supra* note 12; *Use of Diagnostic Imaging Studies and Associated Radiation Exposure For Patients Enrolled in Large Integrated Healthcare Systems, 1996–2010*, *supra* note 12; McDonald et al., *supra* note 12; Walter, *supra* note 12; *Increases in Imaging Procedures, Chronic Diseases Spur Growth of Medical Imaging Informatics Market*, *supra* note 12.

[15] Wait times were calculated based on a Monday – Friday schedule between 8am – 5pm. The third available appointment time was utilized as the trigger.

scans annually. These newly-available scan hours made possible by the implementation of MRI technology at MGPO Assembly Row will not only benefit MGPO patients – who will enjoy increased access to timely MRI services in the community – but will also benefit patients that are currently seen at MGH. Specifically, the Proposed Project will provide all MGH/MGPO patients with additional access to expedited imaging services in a convenient community-based ambulatory care setting, allowing them to determine where they will receive their MRI scans. The anticipated transfer of utilization to the proposed new MGPO Assembly Row MRI units will relieve some of the capacity constraints and wait times currently experienced at MGH's main campus, thereby freeing up hospital resources for more critical patients that require immediate attention and access to imaging technology. In turn, this will result in shorter wait times to the next available appointments across MGH's and MGPO's imaging locations as demand continues to grow into the future and will ensure that patients receive care at the location best-suited to meet their specific medical needs.

B. An Aging Patient Population Needs Access to Local Imaging Services

The Proposed Project also will allow the Applicant, and specifically MGPO, to address the needs of an aging patient panel and the need for improved access to MR imaging services. According to the University of Massachusetts' Donahue Institute's ("UMDI") *Long-Term Population Projections for Massachusetts Regions and Municipalities*, the statewide population is projected to grow a total of 11.8% from 2010 through 2035.[16] An analysis of UMDI's projections shows that the growth of the Commonwealth's population is segmented by age sector, and that within the next 20 years, the bulk of the state's population growth will cluster around residents that are age 50 and older.[17] Moreover, between 2015 and 2035, the Commonwealth's 65+ population is expected to increase at a higher rate compared to all other age cohorts.[18] By 2035, the 65+ age cohort will represent approximately a quarter of the Massachusetts population.[19]

The general trend of growth appears consistent across the counties where Partners HealthCare's affiliates are located. Moreover, MGH/MGPO's patient panel data indicates an 14.6% increase in MRI patients 65+ from FY16-18. This compares to an 2.6% decrease in MGH/MGPO MRI patients ages 18-64 and a 1.2% decrease in patients ages 0-17 during the same period. As the number of patients that fall into the 65+ age cohort for MGPO, MGH, and Partners HealthCare continues to grow, the demand for MRI services is expected to increase as well.

Literature on patterns of MRI use indicate that imaging rates tend to be higher among older adults.[20] According to a study published in 2013, average utilization rates were approximately 24,

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[16] UNIVERSITY OF MASSACHUSETTS DONAHUE INSTITUTE, LONG-TERM POPULATION PROJECTIONS FOR MASSACHUSETTS REGIONS AND MUNICIPALITIES 11 (Mar. 2015), *available at* http://pep.donahue-institute.org/downloads/2015/new/UMDI_LongTermPopulationProjectionsReport_2015%2004%20_29.pdf. The Massachusetts Secretary of the Commonwealth contracted with the University of Massachusetts Donahue Institute (UMDI) to produce population projections by age and sex for all 351 municipalities. *Id.* at 7. Within the past five years, Massachusetts has been experiencing an increase in the population growth rate per year due to high immigration and low domestic outflow, which is expected to slow down in 2030. *Id.* at 12.

[17] *Massachusetts Population Projections – EXCEL Age/Sex Details*, UNIVERSITY OF MASSACHUSETTS DONAHUE INSTITUTE (2015), http://pep.donahue-institute.org/downloads/2015/Age_Sex_Details_UMDI_V2015.xls. This data has been extracted for counties where current Partners HealthCare's hospitals and affiliates are located. *Id.*

[18] UNIVERSITY OF MASSACHUSETTS DONAHUE INSTITUTE, *supra* note 16, at 14. The report uses the cohorts as defined by the U.S. Census Bureau 2010 Census Summary, which are 0-19, 20-39, 40-64, and 65+. *Id.* Figure 2.5 in the report illustrates the increase in the 65+ age cohort from 2015 to 2035. *Id.*

[19] *Id.*

[20] *Rising Use Of Diagnostic Medical Imaging In A Large Integrated Health System*, *supra* note 12; Kathleen Lang et al., *National trends in advanced outpatient diagnostic imaging utilization: an analysis of the medical expenditure panel*

72, 159, and 240 per 1,000 persons for ages <18, 18-44, 45-54 and 65+ years, respectively.[21] The high MR imaging rates among older adults are likely related to the modality's ability to diagnose and treat age-related conditions. Specifically, MRI has proven effectiveness in the fields of neurology, oncology, cardiology and orthopedics among others.[22] Analysis of MGH/MGPO patient panel data from FY16-18 indicates that the top diagnoses for patients seeking MRI services include neurologic, oncologic and cardiovascular conditions, as well as conditions affecting the musculoskeletal system. The capability of MRI in these fields is particularly important for older adults as research studies and their findings demonstrate that the prevalence of cancer increases with age, and that age is also a leading risk factor for cardiovascular disease and certain neurological and musculoskeletal disorders.[23]

The projected increase in the older adult population in tandem with the volume of older adults seeking MRI scans necessitates the need for additional imaging capacity for MGH/MGPO patients. Accordingly, to ensure that MGH/MGPO's aging patient panel has timely access to high-quality MRI services with proven effectiveness in the fields of neurology, oncology, orthopedics and cardiology, the Applicant seeks to expand MRI capacity in the community through the addition of three 3T MRI units at a new MGPO Assembly Row satellite location.

C. Providing Imaging Services in a Community Setting

Finally, the Proposed Project will allow more patients the convenience of receiving services in an ambulatory care setting close to home and easily accessible by public transit. As discussed in Factor F1.a.i, zip code data demonstrates that approximately 19% of MGH/MGPO's MRI patients live either within four miles of Somerville or in zip codes that are convenient to the MBTA Orange Line. With 19% of the growing demand for MR imaging services originating close/convenient to Assembly Row in Somerville, the Applicant determined that siting the proposed new MRI units at Assembly Row would allow patients improved access to high-quality imaging services in a cost-effective and convenient community setting. Specifically, siting the proposed MRI units at MGPO Assembly Row rather than expanding capacity at MGH's main campus in Boston will provide appropriate patients with increased access to an alternative community-based point of care, allow patients to avoid unnecessary travel barriers to obtaining care (e.g., driving to Boston, expensive parking, etc.), and offer the opportunity for a greater number of patients to receive care close to home at MGPO Assembly Row's convenient, easily navigable location along the MBTA Orange Line and off of Interstate 93 in Somerville. By expanding capacity at MGPO Assembly Row and allowing for a greater number of appropriate patients to receive imaging services in the

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survey, 2000-2009, 13 BMC MED. IMAGING 40 (2013), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4222739/.

[21] Lang et al., *supra* note 20.

[22] Lawrence N. Tanenbaum, *3T MRI in clinical practice*, 34 APPLIED RADIOLOGY 8 (2005), *available at* https://appliedradiology.com/articles/3t-mri-in-clinical-practice; *Magnetic Resonance Imaging (MRI)*, RADIOLOGYINFO.ORG, https://www.radiologyinfo.org/en/submenu.cfm?pg=mri (last visited Apr. 12, 2019) [hereinafter *MRI*].

[23] WORLD HEALTH ORGANIZATION, WORLD REPORT ON AGEING AND HEALTH (2015), *available at* http://apps.who.int/iris/bitstream/10665/186463/1/9789240694811_eng.pdf; Nathan A. Berger et al., *Cancer in the Elderly*, 117 TRANSACTIONS OF THE AM. CLINICAL AND CLIMATOLOGICAL ASSOCIATION 147 (2006), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1500929/pdf/tacca117000147.pdf; *Ischemic Heart Disease: Risk Factors,* NAT'L HEART, LUNG & BLOOD INSTITUTE, https://www.nhlbi.nih.gov/health-topics/ischemic-heart-disease (last visited Apr. 12, 2019); *Atherosclerosis: Risk Factors,* NAT'L HEART, LUNG & BLOOD INSTITUTE, https://www.nhlbi.nih.gov/health-topics/atherosclerosis (last visited Apr. 12, 2019); MARTA KOWALSKA ET AL., *Chapter 5: Aging and Neurological Diseases, in* SENESCENCE: PHYSIOLOGY OR PATHOLOGY (Jolanta Dorszewska & Wojciech Kozubski eds., 2017), *available at* https://www.intechopen.com/books/senescence-physiology-or-pathology/aging-and-neurological-diseases; Ramon Gheno et al., *Musculoskeletal Disorders in the Elderly*, 2 J. CLINICAL IMAGING SCI. 1 (2012), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3424705/.

community, the Applicant will also be able to help free up resources at MGH's main campus for acute patients that require fast access to MRI technology.

F1.a.iii **Competition:**
Provide evidence that the Proposed Project will compete on the basis of price, total medical expenses, provider costs, and other recognized measures of health care spending. When responding to this question, please consider Factor 4, Financial Feasibility and Reasonableness of Costs.

The Proposed Project will compete on the basis of price, total medical expenses ("TME"), provider costs and other recognized measures of health care spending, as the Applicant is seeking to implement additional imaging modalities to meet the current and projected demand for imaging services in a cost-effective community-based setting. As discussed in Factors F1.a.i and F1.a.ii, data from FY16-18 indicate a greater than 2% increase in MRI patient volume and an approximately 9% increase in MRI scan volume across the MGH/MGPO locations. Notwithstanding efforts to address this increased demand, including offering extended imaging hours, the existing machines at the MGH/MGPO locations are operating at capacity. Moreover, preliminary figures for FY19, as well as the projected increase in older adults requiring imaging services for age-related conditions, suggest that demand for MGH/MGPO's MRI services will continue to increase into the future. The Proposed Project will allow the Applicant to meet demand for imaging services, relieve capacity constraints on the existing units at MGH and MGPO's locations and ensure that the Applicant's patients have timely access to MRI imaging services in the community.

By providing access to MRI services at MGPO Assembly Row, the Applicant will be able to shift appropriate patients out of the hospital setting to the lower-cost community-based ambulatory care setting and create reductions in overall cost of care and TME. The imaging services proposed for implementation at MGPO Assembly Row will be freestanding clinic services, as opposed to hospital-based services, and will be reimbursed at MPFS rates.[24] As asserted by the Health Policy Commission ("HPC") in issue seven of its DataPoints series entitled *Variation in Imaging Spending*, imaging spending in Massachusetts is driven in large part by the setting of care for services, with imaging tests performed in hospital outpatient departments ("HOPDs") or other facilities costing more than the same tests performed in office settings or non-facility settings, such as freestanding imaging centers. Consequently, in 2015, if Massachusetts Medicare beneficiaries had received specific high-cost imaging procedures in non-facility settings, Medicare spending would have been reduced by $27 million (6%) for these imaging procedures.[25] Given that the imaging services at MGPO Assembly Row's freestanding imaging center will be reimbursed at substantially lower MPFS rates, the proposed addition of MRI capacity at MGPO Assembly Row's more cost-effective setting will have a negligible to positive impact on the overall health care market. Specifically, by shifting appropriate MRI imaging patients to a lower-cost setting in the community, the Applicant will be able to free up imaging resources at MGH for critical patients that require quick access to care in a hospital setting, more effectively manage utilization and resources across its MGH and MGPO imaging locations, and thereby affect cost reductions in overall care and ultimately TME. These cost efficiencies will be created without sacrificing quality.

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[24] *Your top 10 site-neutral payment questions for imaging, answered*, ADVISORY BOARD (Dec. 4, 2017), https://www.advisory.com/research/imaging-performance-partnership/the-reading-room/2017/12/site-neutral.
[25] *HPC Data Points, Issue 7: Variation in Imaging Spending*, MASSACHUSETTS HEALTH POLICY COMMISSION, https://www.mass.gov/service-details/hpc-datapoints-issue-7-variation-in-imaging-spending (last visited Apr. 12, 2019).

F1.b.i **Public Health Value /Evidence-Based:**
Provide information on the evidence-base for the Proposed Project. That is, how does the Proposed Project address the Need that Applicant has identified.

Factor F1.a.ii describes how the addition of three 3T MRI units at MGPO Assembly Row will meet the Applicant's patient panel need. As provided in greater detail below, the Proposed Project is further supported by extensive evidence-based literature related to the efficacy of MRI technology – and, more specifically, 3T MRI technology – and the benefits associated with receiving imaging care at ambulatory care community-based locations. As an overview, this review focuses on clinical applicability, quality of care, comprehensive access, efficiency and convenience. Cost-savings are also associated with imaging care in ambulatory care community settings; however, these points are addressed in Factors F1.a.iii and F2.a.

A. MRI as an Imaging Modality

MRI is well-established non-invasive imaging system that has gained widespread acceptance in several fields of medicine.[26] MRI is a technology that uses a powerful magnetic field and pulses of radio waves to create detailed images of the body's internal organs, tissues, and structures.[27] During an MRI, a patient is placed at the center of an extremely strong magnetic field and bodily tissue information is obtained by measuring how atoms respond to pulses of radiofrequency energy sent from a scanner.[28] MRI images provide anatomical information, as well as functional information, that can be used to help diagnose a variety of conditions, as well as plan for, guide, and monitor treatment.[29] As MRI relies on a magnetic field and radio frequencies and does not use ionizing radiation, there are no known health hazards, making MRI a safe alternative to many other imaging methods.[30]

B. Clinical Applications of 3T MRI

Over the last four decades, technical and engineering advances have yielded MRI systems with higher field strengths, and today most clinical MRIs operate at field strengths of 1.5T or 3T.[31] Clinical application of higher magnetic field strengths, such as 3T, has several advantages. Most notably, increased magnetic field strength is associated with better diagnostic image quality (i.e. higher resolution images, better contrast between different tissues, and increased ability to image smaller structures with improved resolution).[32] Additionally, as compared to 1.5T MRI, 3T allows

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[26] *Magnetic Resonance Imaging (MRI)*, NAT'L INST. OF BIOMEDICAL IMAGING & BIOENGINEERING, https://www.nibib.nih.gov/science-education/science-topics/magnetic-resonance-imaging-mri (last visited Jun. 24, 2019); *MRI*, *supra* note 22.

[27] NAT'L INST. OF BIOMEDICAL IMAGING & BIOENGINEERING, *supra* note 26; *MRI*, *supra* note 22; Tanya Lewis, *What is MRI (Magnetic Resonance Imaging)?*, LIVE SCIENCE (Aug. 11, 2017), https://www.livescience.com/39074-what-is-an-mri.html.

[28] NAT'L INST. OF BIOMEDICAL IMAGING & BIOENGINEERING, *supra* note 26; Lewis, *supra* note 27.

[29] NAT'L INST. OF BIOMEDICAL IMAGING & BIOENGINEERING, *supra* note 26; Lewis, *supra* note 27.

[30] Chris Weller, *Cancer Detection With MRI As Effective as PET-CT Scan, But With Zero Radiation Risks,* MED. DAILY (Feb. 18, 2014), http://www.medicaldaily.com/cancer-detection-mri-effective-pet-ct-scan-zero-radiation-risks-269528; *Radiation-Emitting Products – MRI (Magnetic Resonance Imaging): Benefits and Risks,* U.S. FOOD & DRUG ADMIN., https://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/MedicalImaging/MRI/ucm482765.htm (last updated Dec. 9, 2017); *MRI*, *supra* note 22.

[31] Beth W. Orenstein, *4T, 7T, 8T, and Beyond — High-Field MR Research Seeks a Closer Look Inside the Human Body*, 10 RADIOLOGY TODAY 16 (2009), *available at* http://www.radiologytoday.net/archive/050409p16.shtml.

[32] Tanenbaum, *supra* note 22; *Why the 3 Tesla MRI is the Best Scanner for Diagnostic Imaging*, RADIOLOGY AFFILIATES IMAGING (Sep. 12, 2016),

for faster scan times, which provides convenience for both physicians and patients and increases availability of the resource.[33]

Research into the various uses and benefits of 3T MRI is extensive, with studies focusing on specific diseases, as well as parts of the body that may benefit from this higher-strength imaging modality. As discussed in Factor F1.a.ii and shown in Appendix 2a, some of the most prevalent conditions for which MGH/MGPO patients seek MRI services involve the brain, spine, breast, prostate, heart and musculoskeletal system, among other parts of the body. The higher resolution of the 3T MRI produces more detailed images, which are beneficial when diagnosing neurologic, oncological, and musculoskeletal, and cardiovascular conditions affecting these areas of the body.[34]

Brain Imaging and Neurologic Conditions

As it relates to brain imaging, MRI is the modality of choice as it provides the most sensitive imaging of the head and can help diagnose brain tumors, stroke, and infections, among a number of other conditions.[35] Specifically, MRI offers exceptional anatomical and functional detail that can be used to describe the shape, size, and integrity of gray and white matter structures in the brain and detect pathological changes.[36] For instance, MRI is used to determine the exact location of a lesion to establish a plan for treatment/biopsy planning; evaluate mass effect on the brain, ventricular system, and vasculature; and suggest a possible diagnosis.[37] In addition to conditions affecting the brain, MRI also demonstrates clinical utility in diagnosing a wide spectrum of spinal and musculoskeletal conditions due to its ability to noninvasively display high definition images of the bones, cartilage, muscles, tendons, ligaments, and joints.[38] MRI is often used to obtain better images of a bone mass first seen on an x-ray, can show if the mass is a tumor, an infection, or some other damage, and can also help make a specific diagnosis when a lesion is indeterminate or shows signs of aggressiveness.[39] MRI scans have the ability to show the extent of a tumor, the

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https://4rai.com/blog/why-the-3-tesla-mri-is-the-best-scanner-for-diagnostic-imaging.

[33] Tanenbaum, *supra* note 22; *Why the 3 Tesla MRI is the Best Scanner for Diagnostic Imaging*, *supra* note 32.

[34] Tanenbaum, *supra* note 22; *Why the 3 Tesla MRI is the Best Scanner for Diagnostic Imaging*, *supra* note 32.

[35] *Magnetic Resonance Imaging (MRI) – Head,* RADIOLOGYINFO.ORG, https://www.radiologyinfo.org/en/info.cfm?pg=headmr (last updated Feb. 5, 2019); M. Symms et al., *A review of structural magnetic resonance neuroimaging*, 75 J. NEUROLOGY, NEUROSURGERY & PSYCHIATRY 1235 (2004), *available at* http://jnnp.bmj.com/content/jnnp/75/9/1235.full.pdf; *What is fMRI?*, UC SAN DIEGO CTR. FOR FUNCTIONAL MRI, http://fmri.ucsd.edu/Research/whatisfmri.html (last visited Jun. 24, 2019); Marc C. Mabray et al., *Modern Brain Tumor Imaging,* 3 BRAIN TUMOR RESEARCH & TREATMENT 8 (2015), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4426283/.

[36] Symms et al., *supra* note 35; *What is fMRI?*, *supra* note 35.

[37] Mabray et al, *supra* note 35.

[38] Gail Dean Deyle, *The role of MRI in musculoskeletal practice: a clinical perspective*, 19 J. MANUAL & MANIPULATIVE THERAPY 152 (2011), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3143009/; Maravi et al., *Role of MRI in Orthopaedics*, 21 ORTHOPAEDIC J. M.P. CHAPTER 74 (2015), *available at* https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=2ahUKEwiS093T19PaAhWEIOAKHcguA_UQFjABegQIABA8&url=http%3A%2F%2Fwww.ojmpc.com%2Findex.php%2FOJMPC%2Farticle%2Fdownload%2F31%2F25&usg=AOvVaw3hriKb3xbWliXUT_yczE1K; Apostolos H. Karantanas, *What's new in the use of MRI in the orthopaedic trauma patient?*, 45 INT'L J. CARE INJURED 923 (2014), *available at* https://www.injuryjournal.com/article/S0020-1383(14)00023-0/pdf; Filippo Del Grande, *Getting the Most Out of 3 Tesla MRI of the Spine*, 29 RHEUMATOLOGY NETWORK (Mar. 3, 2012), *available at* http://www.rheumatologynetwork.com/articles/getting-most-out-3-tesla-mri-spine.

[39] *Tests for Bone Cancer,* AM. CANCER SOC'Y, https://www.cancer.org/cancer/bone-cancer/detection-diagnosis-staging/how-diagnosed.html (last updated Feb. 5, 2018); *Tests for Osteosarcoma,* AM. CANCER SOC'Y, https://www.cancer.org/cancer/osteosarcoma/detection-diagnosis-staging/how-diagnosed.html (last updated Jan. 30, 2018); Duarte Nascimento et al, *The role of magnetic resonance imaging in the evaluation of bone tumours and tumour-like lesions,* 5 INSIGHTS IMAGING 419 (2014), *available at* https://link.springer.com/content/pdf/10.1007%2Fs13244-014-0339-z.pdf.

marrow inside the bone, and the soft tissue around a tumor, and is the preferred modality to determine if a tumor has grown.[40] In all of these areas of the body, the improved resolution and clarity of the 3T MRI has the added benefit of allowing radiologists to identify smaller lesions and anatomical structures that cannot be seen with less powerful machines, such as a 1.5T MRI.[41]

Oncology

In addition to the brain and spine, MRI is important in cancer diagnosis, staging, and treatment planning in other areas of the body.[42] Specifically, 3T MRI creates detailed images that can show the difference between normal and abnormal tissue, and therefore, is the preferred imaging modality for the prostate and breast.[43] Prostate MRI at 3T has advantages including increases in spatial resolution and high local staging accuracy, is considered to be superior to 1.5T MRI in detecting and locating lesions, and has the potential to improve the prostate cancer detection rate on first biopsy.[44] Moreover, because the magnet is so powerful, prostate cancer screening on the 3T MRI does not require use of the invasive endorectal coil that scans on the 1.5T MRI machines often involve, and therefore provides greater patient comfort.[45] In the breast, multiple studies have shown that MRI is the most sensitive means of assessing the extent of malignancy in women diagnosed with breast cancer.[46] The higher magnetic field strength allows for improvements in spatial and temporal resolution and the greater spectral separation of fat and water at 3T imaging enables superior fat suppression, further aiding in the visualization of enhancing lesions.[47] These studies suggest that 3T MRI is more accurate for pre-operative assessment of breast cancer extent, and therefore, that 3T MRI can be a valuable guide to surgical planning and a valuable tool in improving treatment outcomes.[48]

Orthopedics/Musculoskeletal System

MRI also plays a role in the diagnosis and treatment of a wide spectrum of orthopedic conditions due to its ability to display high definition images of the musculoskeletal system, including bones, cartilage, muscles, tendons, ligaments, and joints.[49] While orthopedic/musculoskeletal MRIs are clinically useful among all age groups, they demonstrate particularly utility in older adults who

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[40] *Tests for Osteosarcoma, supra* note 39; Nascimento et al, *supra* note 39; *MRI for Cancer*, AM. CANCER SOC'Y, https://www.cancer.org/treatment/understanding-your-diagnosis/tests/mri-for-cancer.html (last updated May 16, 2019).
[41] Tanenbaum, *supra* note 22; *Why the 3 Tesla MRI is the Best Scanner for Diagnostic Imaging, supra* note 32.
[42] *MRI for Cancer, supra* note 40.
[43] Jurgen J. Futterer & Jelle O. Barentsz, *3T MRI of prostate cancer*, APPLIED RADIOLOGY (Feb. 12, 2009), https://www.appliedradiology.com/articles/3t-mri-of-prostate-cancer; Reni S. Butler et al., *3.0 Tesla vs 1.5 Tesla breast magnetic resonance imaging in newly diagnosed breast cancer patients*, 5 WORLD J. RADIOLOGY 285 (2013), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3758496.
[44] Futterer & Barentsz, *supra* note 43; Jie Chen et al., *3-Tesla magnetic resonance imaging improves the prostate cancer detection rate in transrectral ultrasound-guided biopsy*, 9 EXPERIMENTAL & THERAPEUTIC MED. 207 (2015), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4247284/.
[45] *Magnetic Resonance Imaging (MRI) – Prostate*, RADIOLOGYINFO.ORG, https://www.radiologyinfo.org/en/info.cfm?pg=mr_prostate (last updated Jul. 16, 2018); *Non-Invasive 3T MRI Scan Could Be a Game-Changer in Prostate Health*, SOUTH JERSEY RADIOLOGY ASSOCIATES (Jun. 9, 2016), https://www.mdtmag.com/article/2016/06/non-invasive-3t-mri-scan-could-be-game-changer-prostate-health; Sangeet Ghai & Masoom A. Haider, *Multiparametric-MRI in diagnosis of prostate cancer*, 31 INDIAN J. UROLOGY 194 (2015), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4495493/; Futterer & Barentsz, *supra* note 43.
[46] Butler et al., *supra* note 43; Habib Rahbar et al., *Accuracy of 3T versus 1.5T breast MRI for pre-operative assessment of extent of disease in newly diagnosed DCIS*, 84 EUROPEAN J. RADIOLOGY 611 (2015), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4348176/.
[47] Butler et al., *supra* note 43; Rahbar, *supra* note 46.
[48] Rahbar et al., *supra* note 46.
[49] Maravi et al., *supra* note 38; Deyle, *supra* note 38.

experience orthopedic/musculoskeletal issues at high rates.[50] Specifically, evidence indicates that older age is correlated with increased bone fragility, loss of cartilage resilience, reduced ligament elasticity, and loss of muscular strength, among other issues; and that age-related orthopedic/musculoskeletal issues, including osteoarthritis, degenerative disc disorders, fractures and injuries from falls, have a great impact on the older adult population and result in increased health care utilization.[51] Special attention is required in this older adult population in order to decrease morbidity and mortality and MRI holds great potential in this regard.[52]

Cardiovascular Conditions

Finally, MRI is valuable in the diagnosis and management of a variety of conditions affecting the cardiovascular system.[53] Cardiac MRIs allow for gold standard level imaging of cardiac structure, and are designed to provide accurate assessments of morphology, volumes and flow quantification, myocardial perfusion, and tissue characterization.[54] While MR imaging of the cardiovascular system can be used for all age cohorts, it is particularly important for older adults. Age-related cardiovascular conditions for which MRI is clinically beneficial include myocardial viability and perfusion, congenital heart disease, pericardial disease, aortic disease, cardiac masses, atherosclerosis, and coronary artery disease.[55]

C. Value of Imaging in an Ambulatory Care Community Setting

MGPO's proposed addition of three 3T MRIs at the new Assembly Row satellite will translate into increased productivity and more patients receiving timely access to quality care at a convenient location close to home. Further details on these benefits, which are supported by evidence-based literature, are provided below.

High-Quality Care

Ambulatory care – i.e. personal health care consultation, treatment, surgery, or other health care services provided by health care professionals in outpatient settings – is quickly emerging as one of the fastest growing segments of the U.S. health care market.[56] An important reason for the

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[50] Karantanas, *supra* note 38; Gheno et al., *supra* note 23.

[51] Gheno et al., *supra* note 23; AJ Freemont & JA Hoyland, *Morphology, mechanisms and pathology of musculoskeletal ageing*, 211 J. PATHOLOGY 252 (2007); Faranak Aminzadeh & William Burd Dalziel, *Older Adults in the Emergency Department: A Systematic Review of Patterns of Use, Adverse Outcomes, and Effectiveness of Interventions*, 39 ANNALS EMERGENCY MED. 238 (2002), *available at* https://pdfs.semanticscholar.org/e64f/9f138604121ed5fb7b176d92fbd9e61fbb90.pdf.

[52] Gheno et al., *supra* note 23.

[53] Constantin B. Marcu et al., *Clinical applications of cardiovascular magnetic resonance imaging*, 175 CMAJ 911 (2006), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1586078/.

[54] *Id.*; F. Alfayoumi, *Evolving clinical application of cardiac MRI*, 8 REVIEWS IN CARDIOVASCULAR MED. 135 (2007), *available at* https://www.ncbi.nlm.nih.gov/pubmed/17938613; Wen-Yih Isaac Tseng et al., *Introduction to Cardiovascular Magnetic Resonance: Technical Principles and Clinical Applications*, 32 ACTA CARDIOLOGICA SINICA 129 (2016), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4816912/; Matthias G. Friedrich, *The Future of Cardiovascular Magnetic Resonance Imaging*, 38 EUROPEAN HEART J. 1698 (2017), *available at* https://academic.oup.com/eurheartj/article/38/22/1698/3861988.

[55] Marcu et al., *supra* note 53; Tseng et al., *supra* note 54; W.P. Bandettini & A.E. Arai, *Advances in clinical applications of cardiovascular magnetic resonance imaging*, 94 HEART 1485 (2008), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2582334/; Justin D. Anderson & Christopher M. Kramer, *MRI of Atherosclerosis: Diagnosis and Monitoring Therapy*, 5 EXPERT REVIEW OF CARDIOVASCULAR THERAPY 69 (2007), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3938864/.

[56] BERNARD J. HEALEY & TINA MARIE EVANS, *Chapter 5: Ambulatory Care Services, in* INTRODUCTION TO HEALTH CARE SERVICES: FOUNDATIONS AND CHALLENGES (Jossey-Bass 1st ed. 2014); HARRY A. SULTZ & KRISTINA M. YOUNG, *Chapter 4: Ambulatory Care, in* HEALTH CARE USA (Jones and Bartlett Publishers 6th ed. 2009); *Helping you choose: Quality*

expansion of ambulatory care lies in the fact that compared with the traditional hospital care settings, ambulatory care settings – including medical offices and clinics, diagnostic imaging centers, ambulatory surgery centers, and hospital outpatient departments – provide similar quality services.[57] While some ambulatory care settings are general practice, others have evolved to meet the needs of patients with specialized medical requirements.[58] Lending to advances in technology that have made it more possible to perform diagnostic and interventional tests and procedures in the outpatient setting, many – like MGPO – have expanded to offer a range of services such as diagnostic imaging.[59] Moreover, physicians in these settings have the opportunity to advance knowledge and care in their specialty areas, and their patients benefit from having excellent access to highly trained professionals who have researched and developed innovative ways to diagnose and care for the patients' conditions.[60]

The MRI services that the Applicant proposes to provide at the new MGPO Assembly Row location will be identical to those a patient can access at the main campus and will adhere to strict quality standards. Specifically, MGPO will follow a robust Clinical Quality Assurance Program at the new Assembly Row location that has MGH oversight. This Program, which is currently in place at MGPO's existing clinic locations, will utilize input from the Applicant, MGH, and the Department of Imaging in order to develop efficient and effective procedures to ensure patients receive high-quality, patient-focused imaging and related diagnostic and support care. MGPO will also utilize the Clinical Quality Assurance Program to provide necessary oversight to its imaging services at MGPO Assembly Row, including supervising clinical service provision and conducting any necessary quality reviews, and all staff members will be informed of quality assurance protocols and procedures as well as acceptable practice standards. Combined with the fact that the new imaging services will have the same advanced technologies as the main campus location, as well as highly specialized, focused, and trained physicians and staff, these quality assurance mechanisms ensure that imaging patients will receive excellent medical care at MGPO Assembly Row's outpatient imaging setting.

Convenience for Patients and Families

Another important reason for the expansion of ambulatory care lies in the fact that ambulatory care locations provide enhanced convenience for patients and their families.[61] Two factors frequently lacking on hospital campuses and the large building complexes associated with them are convenient location and easily accessible facilities and services.[62] This is of particular concern in large urban settings, such as Boston, where inner-city congestion, traffic, and parking play a role in reducing accessibility.[63] Ambulatory care locations, such as the proposed MGPO site at Assembly Row, are preferred by patients and families as they are more accessible and offer an opportunity to bypass the hassles of dealing with a large, complex hospital campus.[64] Generally, and as will be the case at MGPO Assembly Row, patients enter the easily navigable facility from

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ambulatory care, THE JOINT COMMISSION, https://www.jointcommission.org/assets/1/6/HYC_ahc.pdf (last visited Jun. 24, 2019); *Ambulatory Care*, AGENCY FOR HEALTHCARE RESEARCH & QUALITY, https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/ambulatory-care/index.html (last updated Feb. 2018).

[57] HEALEY & EVANS, *supra* note 56; SULTZ & YOUNG, *supra* note 56; *Helping you choose: Quality ambulatory care*, *supra* note 56; *Ambulatory Care*, *supra* note 56.

[58] HEALEY & EVANS, *supra* note 56.

[59] HEALEY & EVANS, *supra* note 56.

[60] HEALEY & EVANS, *supra* note 56.

[61] HEALEY & EVANS, *supra* note 56.; SULTZ & YOUNG, *supra* note 56.

[62] HEALEY & EVANS, *supra* note 56; SULTZ & YOUNG, *supra* note 56.

[63] HEALEY & EVANS, *supra* note 56; SULTZ & YOUNG, *supra* note 56.

[64] HEALEY & EVANS, *supra* note 56; SULTZ & YOUNG, *supra* note 56.

the free parking lot/garage, which eliminates the need for the ill, injured, or elderly patient to walk through a maze of hallways to reach the correct hospital department.[65] Moreover, patients and their families benefit from the accessibility of these services within the community; MGPO Assembly Row is conveniently located right off Interstate 93 in Somerville, is easily accessible by the MBTA Orange Line Assembly Row station, and brings world-class care to communities north of Boston as well as communities east and south of the city that are located along or convenient to the Orange Line.[66] From MGH's point of view, the availability of outpatient ambulatory care at the Assembly Row site also serves to alleviate some of the volume at the main Boston campus and free up hospital resources for the more critical cases that require the immediate attention of medical personnel and quick access to diagnostic MRI technology.[67]

F1.b.ii **Public Health Value/Outcome-Oriented:**
Describe the impact of the Proposed Project and how the Applicant will assess such impact. Provide projections demonstrating how the Proposed Project will improve health outcomes, quality of life, or health equity. Only measures that can be tracked and reported over time should be utilized.

A. Expansion of Imaging Capacity in the Community Setting: Improving Health Outcomes and Quality of Life

The Applicant anticipates that the Proposed Project will provide patients with improved access to high-quality MRI services, which in turn will improve health outcomes and quality of life. Research indicates that delayed access to quality health care negatively affects patient satisfaction as well as health outcomes due to delays in diagnosis and treatment.[68] Given that quality of life is a multidimensional concept that includes aspects of physical health, delayed access to care also results in decreased quality of life.[69] Through the addition of 3T MRI capacity at MGPO's proposed Assembly Row site, the Applicant endeavors to improve access to time-effective high-quality imaging services, and thereby enhance patient satisfaction, health outcomes, and quality of life for MGPO and MGH patients alike.

Improved Access

With respect to MGPO patients, by adding MRI capacity at Assembly Row, the Applicant will address the patient panel need by providing increased access to conveniently located high-quality imaging services that are necessary for diagnosing and treating a variety of conditions. It is often difficult for patients to travel to Boston for imaging services. Time spent on travel, as well as monies spent on costly parking, may add unnecessary stress to a patient. Accordingly, through the addition of imaging capacity at Assembly Row, appropriate patients will be able to receive conveniently-located imaging services close to home without the challenges associated with traveling to Boston. These benefits are particularly important with regard to the older adult patient population, which is projected to grow into the future. As the 65+ patient population continues to increase, so too will the demand for MRI services to detect and treat age-related conditions. Ultimately, convenient and ready access to cost-effective care, particularly for elderly patients, is

[65] HEALEY & EVANS, *supra* note 56; SULTZ & YOUNG, *supra* note 56.
[66] HEALEY & EVANS, *supra* note 56; SULTZ & YOUNG, *supra* note 56.
[67] HEALEY & EVANS, *supra* note 56.
[68] Julia C. Prentice & Steven D. Pizer, *Delayed Access to Health Care and Mortality*, 42 HEALTH SERVICES RESEARCH 644 (2007), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1955366/.
[69] *Health-Related Quality of Life & Well-Being*, HEALTHYPEOPLE.GOV, https://www.healthypeople.gov/2020/topics-objectives/topic/health-related-quality-of-life-well-being (last visited Jun 24, 2019).

critical to facilitate timely initiation of treatment that will impact overall health outcomes and quality of life.

The proposed implementation of MRI services at Assembly Row will also benefit patients that seek imaging care at MGH's main campus in Boston. By shifting appropriate patients to MGPO Assembly Row, the Applicant will be able to increase availability for MRI services at MGH. Being that timely access to high-quality care directly impacts quality outcomes, by improving wait times associated with MRI services at MGH, the Applicant will be able to ensure improved care outcomes and likewise improved quality of life.

High-Quality Care

In addition to improving access, the Proposed Project will also ensure provision of high-quality care. High-quality services are currently available at MGPO's existing clinic locations and the new MRI services at the proposed Assembly Row satellite will follow similar care models. Presently, high-quality patient outcomes are achieved through utilization of multi-focused quality assurance programs and mechanisms – e.g., participation in MGH's Clinical Quality Assurance Program and utilization of Safety Officers and Quality Directors – that assess the clinical appropriateness, safety, and quality of all services offered to the Applicant's patients. These programs and mechanisms, which MGPO Assembly Row will participate in, address a range of clinical and operational aspects to ensure achievement of high-quality clinical outcomes.

Additionally, MGPO Assembly Row will utilize an integrated electronic health record ("EHR") system that has embedded in it a picture archiving and communication system ("PACS") – a technology for storing, retrieving, and sharing images produced by medical imaging technologies, such as MRI. Because MGPO is the affiliated physician organization of MGH and a member of Applicant, each patient presenting at MGPO Assembly Row will have a unique Partners HealthCare EHR number, allowing integration of medical information, including imaging results, to the EHR. Research indicates that access to integrated health information technology systems, including PACS information, directly effects health outcomes as access to a single, fully integrated health record improves care coordination by care teams across the primary and specialty fields.[70] Thus, availability of these integrated EHR services for MGPO Assembly Row patients following implementation of the Proposed Project will lead to improved health outcomes and better quality of life.

MGPO Assembly Row will also follow quality assurance mechanisms made capable through the EHR to ensure proper utilization of MRI exams. Like at its existing imaging clinic locations, physician orders for MRI tests at MGPO's Assembly Row satellite location will be placed through electronic Radiology Order Entry forms in Epic, which use a programmed clinical decision support mechanism to guide physicians in determining the most appropriate exam based on a patient's medical history and indication. The decision support system utilized by MGPO, ACR Select, delivers Appropriate Use Criteria authored by leading medical specialty societies directly into the EHR workflow at the point of care. This capability improves performance and efficiency by guiding clinicians to the right exam and reducing the number of exams needed to reach a diagnosis, and ultimately empowers quality improvement efforts through improved patient care and population health. Physicians also have access to the Queriable Patient Inference Dossier ("QPID"), which can search and retrieve data based on clinical concepts. QPID aggregates EHR data across

[70] Isla M. Hains et al., *The impact of PACS on clinician work practices in the intensive care unit: a systematic review of the literature*, 19 J. AM. MED. INFORMATION ASS'N 506 (2012), *available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3384105/.

health care networks, prepares the information for rapid searching, and integrates search tools into a web-accessible search system that can be used to extract detailed information from a single patient's record or be run against an entire care unit census. In the realm of radiology, QPID searches have been developed to pre-screen patients scheduled for imaging for possible contraindications and the system also has the ability to alert physicians if duplicated imaging studies exist as new orders are submitted.

Finally, MGPO will employ various quality assurance mechanisms at its Assembly Row location that are aimed at peer review and monitoring. One example of a quality improvement mechanism utilized by MGPO at its existing imaging clinic locations which will also be utilized at the proposed Assembly Row satellite location is "Grapevine," an online forum for consensus-based peer review of physician work output that allows radiologists to meet online or in person to review randomly selected cases. Grapevine facilitates improved clinical outcomes by enhancing the opportunity to engage in thoughtful and accurate review of cases that may not otherwise be possible due to scheduling and other conflicts. MGPO also utilizes a system called CQI to perform quality assurance checks of MRI scans in real-time. CQI sends instant quality assurance information to the imaging area's managers, which enables managers to address quality concerns and provide immediate feedback to scanning technologists. As a result of these processes, MGPO will assure its ability to provide high-quality, patient-focused imaging and related diagnostic and support care to patients at its new Assembly Row imaging clinic satellite location.

B. Assessing the Impact of the Proposed Project

To assess the impact of the proposed Project, MGPO has developed the following quality metrics and reporting schematic, as well as metric projections for quality indicators that will measure patient satisfaction, access and quality of care. The measures are discussed below:

1. **Patient Satisfaction:** Patients that are satisfied with care are more likely to seek additional treatment when necessary. MGPO staff will review overall ratings of care with imaging services via Press Ganey Survey scores.

   Measure: Overall rating of Care – Response Options, include: Very Good, Good, Fair, Poor and Very Poor.

   Projections: Baseline: 88% Year 1: 88% Year 2: 90% Year 3: 92%

   Monitoring: Any category receiving a less than "Good" rating will be evaluated and policy changes instituted as deemed appropriate.

2. **Access – Wait Times:** The Proposed Project seeks to ensure access to MRI services. Accordingly, MGPO will track the time to appointment. This information will be obtained via the EHR system, Epic.

   Measure: Time interval (in days) from when the case was initiated for scheduling in Epic to the next available appointment.

   Projections: Baseline: 4 days Year 1: 2 days Year 2: 2 days Year 3: 1 day

   Monitoring: This data will be reviewed quarterly by clinical staff.

3. **Quality of Care – Reporting of Critical Value Results:** MGPO adheres to MGH's Communication of Critical Results Policy, which defines the requirement and process for verifiable and timely communication of critical test results to the responsible physician. To facilitate timely reporting and communication of critical test results, radiologists currently use a home-grown system called Important Findings Alert ("IFA"). IFA works in combination with PowerScribe 360, which is a widely used real-time radiology reporting and communication platform that enables quick, efficient generation of high-quality reports and delivery of communications concerning critical test results. Specifically, radiologists use PowerScribe 360 to embed specific text in their reports, and IFA analyzes all reports and, if it detects the specific text indicating critical tests results, triggers an alert to the responsible physician. Pursuant to MGH's Communication of Critical Results Policy, when an alert regarding a critical test results is triggered, the responsible physician is notified via "verifiable and timely communication." Examples of verifiable communication are by telephone or in person. Subsequently, this communication is documented.

   Measure: Number of radiologists conducting critical value reporting on cases being interpreted.

   Projections: Baseline: 100% Year 1: 100% Year 2: 100% Year 3: 100%

   Monitoring: MRI scans will be forwarded to the film library and follow-up will be conducted to the referring physician. The radiologist will be available to answer any questions.

F1.b.iii **Public Health Value /Health Equity-Focused:**
For Proposed Projects addressing health inequities identified within the Applicant's description of the Proposed Project's need-base, please justify how the Proposed Project will reduce the health inequity, including the operational components (e.g. culturally competent staffing). For Proposed Projects not specifically addressing a health disparity or inequity, please provide information about specific actions the Applicant is and will take to ensure equal access to the health benefits created by the Proposed Project and how these actions will promote health equity.

A. Non-Discrimination

To ensure health equity to all populations, including those deemed underserved, the Proposed Project will not affect accessibility of MGPO's services for poor, medically indigent, and/or Medicaid eligible individuals. MGPO does not discriminate based on ability to pay or payer source and this practice will continue following implementation of the Proposed Project. As further detailed throughout this narrative, the Proposed Project will increase access to high-quality MRI services for all of the Applicant's, MGH's and MGPO's patients in a number of ways.

B. Culturally-Appropriate Care and Language Access

The Applicant has also adopted the Culturally and Linguistically Appropriate Service ("CLAS") standards set forth by the U.S. Department of Health and Human Services Office of Minority Health for all practice sites, which adoption will be extended to MGPO Assembly Row upon licensure. MGPO strives to provide effective, understandable, and respectful care with an understanding of patients' cultural health beliefs and practices and preferred languages. To this end, MGPO has arrangements to offer ongoing education and training in culturally and linguistically appropriate areas for staff at all levels and across all disciplines.

In 2009, MGPO provided cultural competence training for physicians through its Quality Incentive Program, which is designed to reward performance on important quality, safety and educational goals. Approximately 1,000 of 1,200 eligible physicians elected to complete the two-hour, continuing medical education-accredited Quality Interactions program, and training was accomplished in three months. Results demonstrated an average pretest score of 43%, and an average post-test score of 86%, and over 85% of physicians who completed the program felt they had a better understanding of disparities and cultural competence, and the skills they learned who help them improve care to their patients.

Today, training for all staff on linguistically and culturally appropriate care is conducted via a HealthStream Module. This module is part of a larger interprofessional curriculum, *Providing Safe, Effective Care for Patients with Limited English Proficiency ("LEP")*, that was developed by the MGH Disparities Solution Center in collaboration with the MGH Institute of Health Professions and with support from the Josiah Macy Jr. Foundation. This program consists of three e-learning modules that address the evidence of disparities and high rate of medical errors for patients with LEP, provide training on concrete skills for working with professional interpreters as integral members of the care team, and explore how systems of care can be improved for patients with LEP. Following a successful pilot with 2014, the module for working with interpreters was implemented as part of MGPO's mandatory training requirements in fiscal years 2016 and 2017 for physicians, researchers, trainees, physician assistants, nurse practitioners, and ambulatory nurses. A total of 6,914 MGH/MGPO employees have been trained as of October 2018. In 2017, all three modules were adapted for broader implementation throughout the Applicant's system. Modules are assigned to providers, frontline staff, and non-patient facing employees based on the content that is most relevant to their roles to ensure appropriate training for all staff.

The MGH/MGPO Diversity and Inclusion Committee, which comprises senior department leadership and Diversity and Inclusion leadership/subject matter experts, also supports these efforts. The Committee's goals include: (1) Setting overarching diversity goals and priorities and assessing performance toward achieving these goals; (2) Providing strategic guidance and oversight for diversity programming; (3) Ensuring that the relevant aspects related to the diversity of MGH/MGPO patients, workforce and community are incorporated into the implementation plans for strategic initiatives; and (4) Advising on the allocation of resources for diversity efforts and initiatives. Accordingly, the Committee is central in leading efforts to provide respectful care to all patients.

In regard to interpreter services, MGPO offers telephonic interpreting, video remote interpreting, and onsite interpreting to patients and their families. The telephonic interpreting service option provides patients with access to qualified interpreters in just seconds and support for more than 200 languages (99.85% language availability). Video interpreting is available to the LEP and the Deaf and Hard-of-Hearing. One-touch access to trained professional video interpreters facilitates full understanding through spoken and visual communication that delivers real-time, full-motion, high-quality video images and audible transmission of voices. Finally, onsite interpreting services, including in American Sign Language and spoken languages, can be scheduled by appointment and in emergency same-day situations. These services, which are currently available at MGPO's existing imaging clinic locations and will be in place at its Assembly Row satellite following implementation of the Proposed Project, further health equity by ensuring that all patients have meaningful access to robust health services regardless of any language limitations.

C. Screening and Social Determinants of Health

Partners HealthCare

Finally, the Applicant highlights its screening program for the social determinants of health ("SDoH"). Currently, each of the acute care hospitals within the Partners HealthCare has a screening and referral program for SDoH. While variation exists amongst the hospitals as to the populations that are screened and the logistics for screening, at a minimum, all of the Applicant's 133 primary care practices that are participating in the MassHealth Accountable Care Organization ("ACO") Program, are screening patients for SDoH needs.

All of the Partners HealthCare hospitals and practices conducting SDoH screens utilize a similar screening tool. This tool explores eight domains of SDoH needs (housing, food insecurity, violence, etc.), inquiring if patients have issues with any of the domains and whether they would like assistance. Screens are conducted via iPads that are linked to the Partners HealthCare EHR system, Epic. If the hospital or practice is not on the Epic system, the screening tool is available in an alternate electronic form via iPads or on a paper-based form. The SDoH screening tool is currently available in eight different languages, the most common languages spoken by the Applicant's patients.

When a patient has a positive SDoH screen, varying staff at each hospital or practice follow-up with the patient, such as a social worker or community health worker. These staff members confirm that a request for assistance has been made by the patient. Upon confirmation, the staff member may assist the patient directly or refer the patient to a community-based organization that may be able to provide specific services or supports. The patient's SDoH need(s) and circumstances determine the intensity of follow-up that is provided.

SDoH screens are tracked in a patient's EHR in the Epic system. Tracking includes whether a SDoH screen was conducted, if there were positive responses indicating the patient needs assistance, and if the patient was provided with written support materials ("Tip Sheets") or referred to a support person. Moreover, case managers and other staff assisting patients with SDoH needs may provide notes in the Epic system as to where the patient is in the process of accessing resources to address his/her SDoH needs. Currently, Partners HealthCare is working to implement a data exchange system with external community-based partners that will enable the Applicant's practices and providers to understand the final disposition of the patient if referred to an external organization for support.

The long-term goal is to implement a SDoH program for all patients. However, the Applicant is being thoughtful about the implementation of a universal SDoH screening program, recognizing that there is a limited amount of capacity within the community-based organizations that patients will be "linked" to for services and understanding a staggered approach to implementation is best, so as to not overwhelm the available resources. Accordingly, Partners HealthCare is monitoring available patient data on SDoH needs to better understand what the most common needs are among patients, so the organizations can build a strategy to create more capacity for community-based partners.

MGPO Assembly Row

In regard to specific SDoH screening processes, as discussed above, this responsibility lies with a patient's primary care physician ("PCP") and his/her staff, as risk holder. MassHealth ACO patients that are seeking specialty services are referred to these services by their PCP. If a SDoH is known at the time of referral, the PCP's staff will work the patient to address any needs. For

example, if a MassHealth ACO patient does not have transportation to or from an imaging appointment, the PCP staff will ensure a patient has a voucher and that transport is scheduled.

However, the Applicant recognizes that patients may present outside the PCP to a specialty service, such as MGPO's proposed Assembly Row imaging clinic. If, on the day of an appointment, a patient makes his/her ongoing needs known to staff within a specialty clinic (such as when receiving radiology services), staff will assist the patient in accessing necessary SDoH resources. Specifically, staff members will confirm that a request for assistance has been made by the patient and will help in linking the patient with a social or community health worker who may assist the patient directly or refer the patient to a community-based organization that may be able to provide specific services or supports. The patient's SDoH need(s) and circumstances determine the intensity of follow-up that is provided. These patients also are referred back to their PCP for further assistance with SDOH needs.

Clinical social workers, who are licensed mental health professionals, offer a combination of private and confidential counseling and direct connection with the network of community resources. Specifically, these social workers assess patients with social, emotional, interpersonal and socioeconomic issues and subsequently work with patients and their families to: deal with crisis; cope with illness and other life stressors; identify and solve problems with relationships; enhance communication with the medical treatment team to enable patients and families to be active partners in their own health care; and access hospital and community services. To assure delivery of comprehensive patient/family focused care, the social workers collaborate with and share information, as appropriate, with providers and staff across the Applicant's system as well as with programs in the larger community. These services help to eliminate health care disparities that exist for individuals with social, emotional, interpersonal and socioeconomic issues by ensuring that patients have access to resources around SDoH issues and will allow MGPO Assembly Row staff to guarantee equal access to the benefits created by the Proposed Project.

F1.b.iv Provide additional information to demonstrate that the Proposed Project will result in improved health outcomes and quality of life of the Applicant's existing Patient Panel, while providing reasonable assurances of health equity.

The Proposed Project will facilitate improved health outcomes and quality of life indicators for the Applicant's patient panel by allowing patients in need of 3T MRI services to receive care in a community setting. These new imaging services will provide an alternative point of access with equally high-quality at a lower-cost. Moreover, services provided in this setting will be more convenient for patients and clinicians, allowing for improved access to timely imaging care. Combined with the fact that MGPO does not discriminate and offers a variety of services to address SDoH and health care disparities (e.g., CLAS standards, interpreting services, and social services), the Applicant anticipates that the Proposed Project will result in improved patient care experiences and quality outcomes while assuring health equity.

F1.c Provide evidence that the Proposed Project will operate efficiently and effectively by furthering and improving continuity and coordination of care for the Applicant's Patient Panel, including, how the Proposed Project will create or ensure appropriate linkages to patients' primary care services.

The Proposed Project will ensure continuity of care, improved health outcomes, and enhanced quality of life by providing case management/social work support as well as integration and coordination of care for the Applicant's patients. First, as noted above, MGPO Assembly Row staff

will utilize processes already in place at MGPO's existing clinic locations for linking imaging patients with case management/social work support to ensure patients have access to resources around SDoH issues. Social workers collaborate, as appropriate, with providers and staff across the Partners HealthCare system and with programs in the community. Providing patients with linkages to these necessary contacts and services ensure appropriate care management and provides the patient with the resources for leading a better life.

In addition, patients at MGPO Assembly Row will benefit from integrated medical records. As discussed in Factor F1.b.ii, because MGPO is the affiliated physician organization of MGH and a member of Applicant, all MRI results for tests performed at MGPO Assembly Row will be integrated into the Partners HealthCare EHR. Studies show that integrated health information technology systems directly affect health outcomes as access to a single, fully integrated health record improves care coordination. This is true of the system used by the Applicant, which not only enables imaging results to be available to primary care and specialty physicians across the system, but also includes capabilities that facilitate clinical decision support, peer review, and monitoring. In sum, the availability of these integrated record services ensure that patients at MGPO Assembly Row will benefit from appropriate care coordination, better outcomes, and improved quality of life.

F1.d **Provide evidence of consultation, both prior to and after the Filing Date, with all Government Agencies with relevant licensure, certification, or other regulatory oversight of the Applicant or the Proposed Project.**

Since a broad range of input is valuable in the planning of a project, the Applicant carried out a diverse consultative process with individuals at various regulatory agencies regarding the Proposed Projects. The following individuals are some of those consulted regarding this Project:

- Margo Michaels, MPH, Director, Determination of Need Program, Department of Public Health
- Rebecca Rodman, Esq., Deputy General Counsel, Department of Public Health
- Ben Wood, Director, Office of Community Health Planning and Engagement, Department of Public Health

F1.e.i **Process for Determining Need/Evidence of Community Engagement:**
For assistance in responding to this portion of the Application, Applicant is encouraged to review *Community Engagement Standards for Community Health Planning Guideline.* With respect to the existing Patient Panel, please describe the process through which Applicant determined the need for the Proposed Project.

Based upon the need for patients to receive timely and cost-effective imaging services, the Applicant, MGH, and MGPO staff developed a plan to expand MGPO's existing imaging clinic through the implementation of MRI services at a satellite to be established at Assembly Row. In contemplation of this expansion and given that the Proposed Project will impact patients currently seen at MGH by allowing the Applicant to shift appropriate patients out of the hospital setting to MGPO Assembly Row's community-based ambulatory care setting for imaging services, leadership sought feedback from an MGH service-line Patient Family Advisory Council ("PFAC") known as the Cancer Center PFAC ("CC PFAC"). Leadership determined it was appropriate to engage this targeted PFAC as it represents MGH's widely used oncology service, the proposed MRI units at the MGPO Assembly Row satellite will introduce standard cancer imaging services to the location, and the Applicant anticipates that the Cancer Center will be a primary source of referral for MRI services at MGPO Assembly Row.

All of MGH's PFACs bring together patients, family members, staff and clinicians in an ongoing effort to improve care and the patient and family experience. Consistent with this mission, the CC PFAC was formed in 2001 to advance patient experience and promote patient and family involvement. The CC PFAC has an enterprise-wide focus, including operations and services across MGH's main campus and satellite locations. It is dedicated to fostering a partnership between patients, families, and staff to support the Applicant, MGH and MGPO in meeting their strategic goals and initiatives. The CC PFAC is comprised of a dedicated group of patient and family members who have experienced many different aspects of care and who volunteer their time, with their expertise and input, to make care better. Additionally, other key stakeholders from the hospital staff sit on the CC PFAC. The Council meets monthly throughout the year with agenda items prioritized by staff members based on topics discussed at CC PFAC meetings and requests from Cancer Center and MGH-wide staff that wish to consult the Council.

On February 13, 2019, Jeremy Herrington, Director of Clinical Operations for MRI & Off-Campus Imaging at MGH, met with the CC PFAC to discuss the need for MRI services at the proposed Assembly Row site and the community benefit associated with this expansion. Overall feedback from the meeting was very positive and supportive of the plan. There were no concerns expressed by this group. Please see Appendix 2b to review the PFAC meeting materials.

F1.e.ii **Please provide evidence of sound Community Engagement and consultation throughout the development of the Proposed Project. A successful Applicant will, at a minimum, describe the process whereby the "Public Health Value" of the Proposed Project was considered, and will describe the Community Engagement process as it occurred and is occurring currently in, at least, the following contexts: Identification of Patient Panel Need; Design/selection of DoN Project in response to "Patient Panel" need; and Linking the Proposed Project to "Public Health Value".**

To ensure sound community engagement throughout the development of the Proposed Project, the Applicant in conjunction with MGPO took the following action:

- Presentation to CC PFAC on February 13, 2019. For detailed information on this meeting, see Appendix 2b.

Factor 2: Health Priorities

Addresses the impact of the Proposed Project on health more broadly (that is, beyond the Patient Panel) requiring that the Applicant demonstrate that the Proposed Project will meaningfully contribute to the Commonwealth's goals for cost containment, improved public health outcomes, and delivery system transformation.

F2.a. **<u>Cost Containment:</u>**
Using objective data, please describe, for each new or expanded service, how the Proposed Project will meaningfully contribute to the Commonwealth's goals for cost containment.

The goals for cost containment in the Commonwealth center around providing low-cost care alternatives without sacrificing high-quality. In fact, the HPC, Massachusetts' independent state agency that develops policy to reduce health care cost growth and improve the quality of patient care, has a stated goal of bettering health and care at a lower cost across the Commonwealth. The Proposed Project seeks to align with these goals and meaningfully contribute to cost

containment in Massachusetts by providing high-quality imaging services for patients in a cost-effective community-based setting.

As previously discussed, the 3T MRI services proposed for implementation at MGPO's new Assembly Row freestanding imaging center will be provided at MPFS rates rather than hospital-based rates. Because MPFS rates are substantially lower than hospital-based rates, the proposed addition of MRI capacity at MGPO's new Assembly Row satellite clinic will have a negligible to positive impact on the Massachusetts health care market. Specifically, by shifting appropriate MRI patients from MGH to MGPO's lower-cost Assembly Row setting, the Applicant will achieve cost reductions in care. Accordingly, the Proposed Project will lower costs, as well as overall TME and total health care expenditures, and will meaningfully contribute to the Commonwealth's goals for cost containment.

F2.b. **Public Health Outcomes:**
Describe, as relevant, for each new or expanded service, how the Proposed Project will improve public health outcomes.

The need to develop MRI services at MGPO's proposed Assembly Row site to improve public health outcomes is demonstrated by historical volume trends which indicate high utilization rates for imaging services, and by population projections which suggest that imaging demand will grow into the future particularly as the 65+ patient population increases and requires MRI to diagnose and treat age-related conditions. To address the projected demand in MRI services in the state, increased capacity is required. The expansion of imaging services at MGPO Assembly Row will improve public health outcomes as patients will have access to high-quality 3T MRI services in the community. This convenient access to imaging services will allow patients to schedule imaging appointments in a timely manner and avoid unnecessary travel barriers to obtaining care (driving to Boston, expensive parking, etc.), and will promote creation of better patient care experiences. Moreover, the availability of MRI services at Assembly Row will alleviate some of the volume currently experienced at MGH's main Boston campus and free up hospital resources for critical patients that need fast access to imaging technology. This will result in shorter wait times across MGH's and MGPO's imaging locations and will ensure that each patient receives care at the location best-suited to meet his/her individual medical needs.

F2.c. **Delivery System Transformation:**
Because the integration of social services and community-based expertise is central to goal of delivery system transformation, discuss how the needs of their patient panel have been assessed and linkages to social services organizations have been created and how the social determinants of health have been incorporated into care planning.

As outlined in Factor F.1.b.iii, the Applicant, MGH and MGPO have numerous programs in place to ensure linkages to social service organizations. For instance, patients visiting MGPO Assembly Row will have access to clinical social workers available through the Applicant's system as necessary. These clinical social workers will assess patients with SDoH issues (i.e., patients with social, emotional, interpersonal and socioeconomic issues) in areas such as: adjustment to chronic and catastrophic illness; adjustment to procedures and treatment; ability to follow medical regimen; family functioning and communication; social and/or financial concerns; personal safety including abuse, neglect, violence; mental illness/emotional distress; substance abuse; adjustment to loss/bereavement; cultural, religious, and language needs; and occupation and/or school performance. Following assessment, social workers will work with patients and their families to implement interventions to help deal with crisis; cope with illness and other life

stressors; identify and solve problems with relationships; enhance communication with the medical treatment team to enable patients and families to be active partners in their own healthcare; and access hospital and community services. Interventions may include, as appropriate: psychotherapy; psychosocial counseling (e.g., adjustment to illness, bereavement); crisis intervention; care coordination; brief therapy; relaxation/guided imagery; cognitive/behavioral therapy; personal safety planning; information and referral; psychoeducation; stress management; advocacy; programs (e.g., Violence Intervention Advocacy Program, Network for Patients and Families, etc.); and consultation. Social workers will collaborate and share information, as appropriate, with providers and staff across the Applicant's system as well as community programs to assure delivery of comprehensive patient/family focused care.

Factor 5: Relative Merit

F5.a.i **Describe the process of analysis and the conclusion that the Proposed Project, on balance, is superior to alternative and substitute methods for meeting the existing Patient Panel needs as those have been identified by the Applicant pursuant to 105 CMR 100.210(A)(1). When conducting this evaluation and articulating the relative merit determination, Applicant shall take into account, at a minimum, the quality, efficiency, and capital and operating costs of the Proposed Project relative to potential alternatives or substitutes, including alternative evidence-based strategies and public health interventions.**

Proposal: The Proposed Project is for the licensure of a satellite clinic of MGPO at Assembly Row to provide MRI services via three 3T MRI units.

Quality: Studies have shown that patients receiving care in ambulatory care settings – including medical offices and clinics, diagnostics imaging centers, ambulatory surgery centers, and hospital outpatient departments – have high-quality outcomes, similar to patients who obtain these services in the inpatient setting. Given specialization by clinicians and their level of experience in specific fields, care is effective, timely and seamless in these ambulatory care settings. Moreover, MGPO Assembly Row will follow various quality assurance programs and utilize various quality assurance mechanisms to ensure patients receive high-quality, patient-focused imaging and related diagnostic and support care.

Efficiency: Both care and operating efficiencies may be created through the shift of appropriate patients to MGPO Assembly Row. This shift allows a greater number of appropriate patients to receive imaging services in a more cost-effective community setting and also allows MGH to free up hospital resources for critical patients that require immediate attention of medical personnel and quick access to MRI technology. In turn, this will allow for effective management of utilization and resources, lower costs, and higher-quality outcomes.

Capital Expense: There are capital expenses associated with the implementation of three 3T MRIs. The total capital expenditure cost for this model is $14,983,573.

Operating Costs: The first-year incremental operating expense of the Proposed Project is $5,492,776. By Year 5, after full "ramp-up" of the expanded imaging capacity, operating costs are estimated at $12,892,128.

List alternative options for the Proposed Project:

Option 1

Alternative Proposal: The first alternative for the Proposed Project would be to forego any expansion MRI technology and sustain the current fleet of MRI units across MGPO and MGH's locations.

Alternative Quality: This is not a feasible solution, as demand for services, wait times, patient experience, and convenience would not be addressed and would have a negative impact on MGPO and MGH patients alike.

Alternative Efficiency: This alternative would be inefficient because it would not provide additional access to services.

Alternative Capital Expenses: Although this alternative will allow the Applicant to forego construction costs, it will have an overall negative impact on access, efficiency, quality of care, and patient and provider satisfaction.

Alternative Operating Costs: There would be no operating costs associated with sustaining the current fleet of MRI units across MGPO and MGH's locations and foregoing any expansion at the proposed MGPO Assembly Row site. However, this alternative will not afford the Applicant with any operational efficiencies as the current MGH and MGPO machines will continue to operate near-capacity thereby leading to inefficient and ineffective patient access.

Attachment/Exhibit

2

Attachment/Exhibit

A

Table 1: PHS Patient Panel

	FY16		FY17		FY18		FY19YTD	
	Count	%	Count	%	Count	%	Count	%
PHS Total	1,380,203		1,409,382		1,504,478		1,182,064	
Gender								
Female	807,014	58.5%	821,100	58.3%	874,594	58.1%	691,057	58.5%
Male	572,742	41.5%	587,998	41.7%	629,748	41.9%	490,882	41.5%
Other/Unknown	447	0.0%	284	0.0%	136	0.0%	125	0.0%
Age								
0-17	140,527	10.2%	153,413	10.9%	173,386	11.5%	134,115	11.3%
18-64	844,879	61.2%	867,566	61.6%	927,594	61.7%	732,660	62.0%
65+	394,438	28.6%	388,198	27.5%	403,456	26.8%	315,263	26.7%
Unknown	359	0.0%	205	0.0%	42	0.0%	26	0.0%
Race								
American Indian or Alaska Native	1,517	0.1%	1,597	0.1%	1,887	0.1%	1,451	0.1%
Asian	55,128	4.0%	58,210	4.1%	62,248	4.1%	49,541	4.2%
Black or African American	79,476	5.8%	81,160	5.8%	83,262	5.5%	65,493	5.5%
Hispanic/Latino	24,148	1.7%	22,726	1.6%	21,231	1.4%	17,346	1.5%
Native Hawaiian or Other Pacific Islander	1,024	0.1%	1,127	0.1%	1,131	0.1%	831	0.1%
Other/Unknown	209,781	15.2%	217,873	15.5%	242,613	16.1%	169,365	14.3%
White	1,009,129	73.1%	1,026,689	72.8%	1,092,106	72.6%	878,037	74.3%
Patient Origin								
HSA_1	12,711	0.9%	13,672	1.0%	90,902	6.0%	76,463	6.5%
HSA_2	47,712	3.5%	47,880	3.4%	49,437	3.3%	38,026	3.2%
HSA_3	91,544	6.6%	95,405	6.8%	97,667	6.5%	82,037	6.9%
HSA_4	620,714	45.0%	633,792	45.0%	652,456	43.4%	541,719	45.8%
HSA_5	205,542	14.9%	213,440	15.1%	205,029	13.6%	134,865	11.4%
HSA_6	246,715	17.9%	246,855	17.5%	244,040	16.2%	196,902	16.7%
In MA but not in HSA 1-6	88	0.0%	63	0.0%	38	0.0%	20	0.0%
Outside of MA	146,467	10.6%	151,535	10.8%	158,537	10.5%	108,377	9.2%
Unknown	8,710	0.6%	6,740	0.5%	6,372	0.4%	3,655	0.3%

Date Pulled: May 22, 2019

Table 2: MGH/MGPO Patient Panel

	FY16		FY17		FY18		FY19YTD	
	Count	%	Count	%	Count	%	Count	%
PHS Total	563,459		563,970		566,395		403,563	
Gender								
Female	312,816	55.5%	312,521	55.4%	312,490	55.2%	223,918	55.5%
Male	250,568	44.5%	251,410	44.6%	253,880	44.8%	179,619	44.5%
Other/Unknown	75	0.0%	39	0.0%	25	0.0%	26	0.0%
Age								
0-17	69,165	12.3%	74,832	13.3%	79,113	14.0%	57,908	14.3%
18-64	333,594	59.2%	333,376	59.1%	334,405	59.0%	235,284	58.3%
65+	160,658	28.5%	155,755	27.6%	152,871	27.0%	110,370	27.3%
Unknown	42	0.0%	7	0.0%	6	0.0%	1	0.0%
Race								
American Indian or Alaska Native	564	0.1%	536	0.1%	586	0.1%	391	0.1%
Asian	27,499	4.9%	28,455	5.0%	29,452	5.2%	21,447	5.3%
Black or African American	30,747	5.5%	30,329	5.4%	29,657	5.2%	21,219	5.3%
Hispanic/Latino	4,875	0.9%	4,785	0.8%	4,517	0.8%	3,196	0.8%
Native Hawaiian or Other Pacific Islander	263	0.0%	290	0.1%	289	0.1%	219	0.1%
Other/Unknown	75,575	13.4%	79,586	14.1%	87,364	15.4%	60,170	14.9%
White	423,936	75.2%	419,989	74.5%	414,530	73.2%	296,921	73.6%
Patient Origin								
HSA_1	6,440	1.1%	6,679	1.2%	7,222	1.3%	5,112	1.3%
HSA_2	17,851	3.2%	18,104	3.2%	18,269	3.2%	12,864	3.2%
HSA_3	32,227	5.7%	32,518	5.8%	32,885	5.8%	23,758	5.9%
HSA_4	267,359	47.4%	271,086	48.1%	277,515	49.0%	208,156	51.6%
HSA_5	57,704	10.2%	56,042	9.9%	48,669	8.6%	31,049	7.7%
HSA_6	104,126	18.5%	100,131	17.8%	97,996	17.3%	71,650	17.8%
In MA but not in HSA 1-6	28	0.0%	17	0.0%	14	0.0%	5	0.0%
Outside of MA	74,116	13.2%	76,177	13.5%	80,926	14.3%	49,499	12.3%
Unknown	3,608	0.6%	3,216	0.6%	2,899	0.5%	1,470	0.4%

Date Pulled: April 11, 2019

Table 3: MGH/MGPO MRI Patient Panel

	FY16		FY17		FY18		FY19YTD	
	Count	%	Count	%	Count	%	Count	%
PHS Total	47,807		45,554		48,910		15,213	
Gender								
Female	20,996	43.9%	19,600	43.0%	21,707	44.4%	6,983	45.9%
Male	26,811	56.1%	25,954	57.0%	27,203	55.6%	8,230	54.1%
Other/Unknown	-	0.0%	-	0.0%	-	0.0%	-	0.0%
Age								
0-17	2,472	5.2%	2,319	5.1%	2,442	5.0%	713	4.7%
18-64	31,881	66.7%	30,273	66.5%	31,045	63.5%	9,621	63.2%
65+	13,454	28.1%	12,962	28.5%	15,423	31.5%	4,879	32.1%
Unknown	-	0.0%	-	0.0%	-	0.0%	-	0.0%
Race								
American Indian or Alaska Native	30	0.1%	28	0.1%	34	0.1%	8	0.1%
Asian	1,439	3.0%	1,256	2.8%	1,339	2.7%	379	2.5%
Black or African American	1,724	3.6%	1,603	3.5%	1,651	3.4%	502	3.3%
Hispanic/Latino	437	0.9%	352	0.8%	386	0.8%	120	0.8%
Native Hawaiian or Other Pacific Islander	8	0.0%	10	0.0%	10	0.0%	1	0.0%
Other/Unknown	15,068	31.5%	16,308	35.8%	17,608	36.0%	5,477	36.0%
White	29,101	60.9%	25,997	57.1%	27,883	57.0%	8,725	57.4%
Patient Origin								
W/in 4 miles of 02145 or along Orange Line	8,788	18.4%	8,880	19.5%	9,139	18.7%	2,615	17.2%
All other zip codes	39,019	81.6%	36,674	80.5%	39,771	81.3%	12,598	82.8%

Table 4: MGH/MGPO MRI Prevalence

Most Prevalent (Top 10) ICD 9/10 Codes of Patients Seeking MRI Services		
FY16	FY17	FY18
C79.51	C79.51	M54.9
M89.8X8	R51	I63.9
R51	M54.9	R42
R42	R42	G93.89
R60.0	I63.9	M47.812
G93.89	R60.0	C79.31
I63.9	C71.9	M47.816
M54.9	Z01.818	C79.51
Z01.818	G95.9	M48.02
R53.1	R93.0	D35.2

PHS Panel Notes:

FY19 displays YTD data, capturing Oct 2018-April 30, 2019

Entities include -

- Massachusetts General Hospital
- Brigham and Women's Hospital
- Newton Wellesley Hospital
- North Shore Medical Center
- Brigham and Women's Faulkner Hospital
- Martha's Vineyard Hospital[1]
- Nantucket Cottage Hospital[1]
- Cooley Dickinson Hospital[1]
- Massachusetts Eye and Ear Infirmary[2]
- Spaulding Rehabilitation Hospital[3]
- McLean Hospital[1]
- Massachusetts General Physicians Organization
- Brigham and Women's Physicians Organization
- North Shore Physicians Group
- Newton Wellesley Medical Group
- Cooley Dickinson PHO[1]
- Partners Community Physicians Organization[4]

1. Only includes post-Epic data
2. Outpatient post-Epic data only. Does not include inpatient data
3. Telehealth, Partners Mobile Observation Unit (PMOU), Home Hospital (HH) programs for GH and BWH, Stay Connected with GH , Lifeline, CareSage programs are not included
4. Pre-Epic non-risk patients not included

The methodology for aggregating Partners HealthCare's patient panel data has evolved into an automated process utilizing internal data resources. Initially, in 2017, when Partners HealthCare began developing its patient panel for Determination of Need applications, such as the Change of Ownership for Massachusetts Eye and Ear and the Substantial Capital Expansion for Brigham and Women's Hospital, staff manually aggregated the necessary data. However, since these submissions, Partners HealthCare staff have developed a new automated process that allows for the collection and amalgamation of system-wide data. This refined methodology allows staff to continuously monitor and improve the way that data are aggregated. Accordingly, between June 2018 and May 2019, staff further refined the data collection processes leading to an increase of no more than 1% in overall patient counts for the system. Staff will continue to refresh and refine the process for aggregating data across the system, leading to more exact patient panel data.

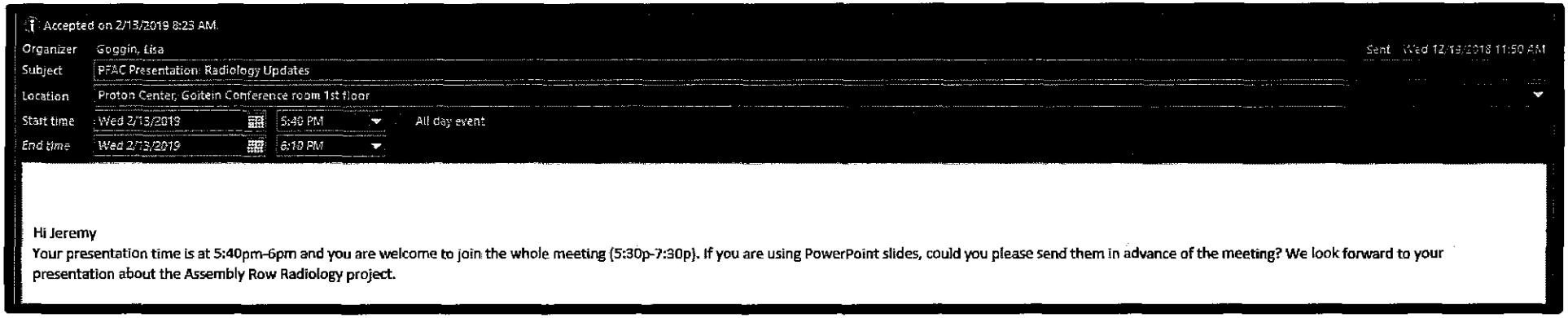
MGH/MGPO Panel Notes:

Data include MGH and MGPO. Only includes post-Epic data (Practices have varying go-live dates).

In FY16, there was an EHR conversion and a technology overhaul. This resulted in a change in how data is collected. The FY16 data reported for the MGH/MGPO MRI patient panel was obtained by merging Legacy and Epic data. Accordingly, there may be a slight overcounting in FY16.

Attachment/Exhibit

B


Accepted on 2/13/2019 8:23 AM.
Organizer Goggin, Lisa
Sent Wed 12/19/2018 11:50 AM
Subject PFAC Presentation: Radiology Updates
Location Proton Center, Goltein Conference room 1st floor
Start time Wed 2/13/2019 5:40 PM All day event
End time Wed 2/13/2019 6:10 PM
Hi Jeremy
Your presentation time is at 5:40pm-6pm and you are welcome to join the whole meeting (5:30p-7:30p). If you are using PowerPoint slides, could you please send them in advance of the meeting? We look forward to your presentation about the Assembly Row Radiology project.

Attachment/Exhibit

3

Attachment/Exhibit

A

Partners HealthCare System, Inc.

Analysis of the Reasonableness of Assumptions Used For and Feasibility of Projected Financials of Partners HealthCare System, Inc. For the Years Ending September 30, 2019 Through September 30, 2023

TABLE OF CONTENTS

BERNARD L. DONOHUE, III, CPA

One Pleasure Island Road
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August 20, 2019

Mr. Brian Huggins
Partners HealthCare System, Inc.
399 Revolution Drive STE 645
Somerville, MA 02145

RE: Analysis of the Reasonableness of Assumptions and Projections Used to Support the Financial Feasibility and Sustainability of the Proposed Expansion of Imaging Services at MGPO Assembly Row

Dear Mr. Huggins:

I have performed an analysis of the financial projections prepared by Partners HealthCare System, Inc. ("Partners HealthCare") detailing the projected operations of Partners HealthCare including the projected operations of Massachusetts General Physicians Organization, Inc., ("MGPO") Assembly Row in Somerville, MA. This report details my analysis and findings with regards to the reasonableness of assumptions used in the preparation and feasibility of the projected financial information of Partners HealthCare as prepared by the management of Partners HealthCare ("Management"). This report is to be included by Partners HealthCare in its Determination of Need ("DoN") Application – Factor 4(a) and should not be distributed or relied upon for any other purpose.

I. EXECUTIVE SUMMARY

The scope of my analysis was limited to the five year consolidated financial projections (the "Projections") prepared by Partners HealthCare as well as the actual operating results for Partners HealthCare for the fiscal years ended 2017 and 2018 ("Base Budget"), and the supporting documentation in order to render an opinion as to the reasonableness of assumptions used in the preparation and feasibility of the Projections with regards to the impact of capital projects involving and ancillary to the MGPO MRI imaging clinic in Somerville, MA.

The impact of the proposed capital projects at MGPO Assembly Row, which are the subject of this DoN application, represent a relatively insignificant component of the projected operating results and financial position of Partners HealthCare. As such, I determined that the Projections are not likely to result in a scenario where there are insufficient funds available for capital and ongoing operating costs necessary to support the ongoing operations of Partners HealthCare. Therefore, it is my opinion that the Projections are financially feasible for Partners HealthCare as detailed below.

II. RELEVANT BACKGROUND INFORMATION

Refer to Factor 1 of the application for description of proposed capital projects at MGPO Assembly Row and the rationale for the expenditures.

III. SCOPE OF REPORT

The scope of this report is limited to an analysis of the Projections, Base Budget and the supporting documentation in order to render an opinion as to the reasonableness of assumptions used in the preparation and feasibility of the Projections with regards to the impact of certain capital projects involving and ancillary to MGPO Assembly Row. My analysis of the Projections and conclusions contained within this report are based upon my detailed review of all relevant information (see Section IV which references the sources of information). I have gained an understanding of Partners HealthCare and MGPO Assembly Row through my review of the information provided as well as a review of Partners HealthCare website, annual reports, and the DoN application.

Reasonableness is defined within the context of this report as supportable and proper, given the underlying information. Feasibility is defined as based on the assumptions used, the plan is not likely to result in insufficient "funds available for capital and ongoing operating costs necessary to support the proposed project without negative impacts or consequences to [Partners HealthCare] existing patient panel" (per Determination of Need, Factor 4(a)).

This report is based upon historical and prospective financial information provided to me by Management. If I had audited the underlying data, matters may have come to my attention that would have resulted in my using amounts that differ from those provided. Accordingly, I do not express an opinion or any other assurances on the underlying data presented or relied upon in this report. I do not provide assurance on the achievability of the results forecasted by Partners HealthCare because events and circumstances frequently do not occur as expected, and the achievement of the forecasted results are dependent on the actions, plans, and assumptions of management. I reserve the right to update my analysis in the event that I am provided with additional information.

IV. PRIMARY SOURCES OF INFORMATION UTILIZED

In formulating my opinions and conclusions contained in this report, I reviewed documents produced by Management. The documents and information upon which I relied are identified below or are otherwise referenced in this report:

1. Five-Year Pro-Forma Statements for the fiscal years ending 2019 through 2023, provided May 17, 2019 and updated August 15, 2019;

2. Multi-Year Financial Framework of Partners HealthCare System, Inc. for the fiscal years ending 2019 through 2023 prepared as of December 6, 2018;

3. Audited Financial Statements of Partners HealthCare System, Inc. and Affiliates as of and for the years ended September 30, 2018 and 2017;

4. Company website – www.Partners HealthCare.org;

5. Various news publications and other public information about the Company;

6. Determination of Need Application Instructions dated March 2017; and

7. Draft Determination of Need Factor 1, provided August 19, 2019.

V. REVIEW OF THE PROJECTIONS

This section of my report summarizes my review of the reasonableness of the assumptions used and feasibility of the Projections. The Projections are delineated between five categories of revenue and six general categories of operating expenses of Partners HealthCare as well as other non-operating gains and losses for the Organization. The following table presents the Key Metrics, as defined below, of Partners HealthCare which compares the results of the Projections for the fiscal years ending 2019 through 2023 to Partners HealthCare historical results for the fiscal year ended 2018.

	Partners, as reported	Change in Key Metric of pro forma results compared to prior year				
	2018	**2019**	**2020**	**2021**	**2022**	**2023**
EBIDA ($)	1,164,519	19,481	120,000	52,931	42,330	57,971
EBIDA Margin (%)	8.8%	0.0%	0.5%	0.0%	-0.1%	0.0%
Operating Margin (%)	2.3%	-0.2%	0.3%	0.1%	0.0%	0.1%
Total Margin (%)	6.2%	-1.7%	0.5%	0.0%	0.0%	0.1%
Total Assets ($)	18,303,531	781,560	858,959	634,906	912,685	945,156
Total Net Assets ($)	8,972,581	742,000	767,000	794,410	821,219	850,190
Unrestricted Cash Days on Hand (days)	212.2	5.0	(6.4)	(13.7)	2.6	7.1
Unrestricted Cash to Debt (%)	132.5%	5.1%	-0.7%	0.5%	5.3%	8.2%
Debt Service Coverage (ratio)	6.5	(1.8)	1.2	(2.7)	3.2	0.3
Debt to Capitalization (%)	43.3%	-2.3%	-1.8%	-2.8%	-1.5%	-1.4%

The Key Metrics fall into three primary categories: profitability, liquidity, and solvency. Profitability metrics, such as EBIDA, EBIDA Margin, Operating Margin, Total Margin, and Debt Service Coverage Ratio are used to assist in the evaluation of management performance in how efficiently resources are utilized. Liquidity metrics, such as Unrestricted Days Cash on Hand, and Unrestricted Cash-to-Debt measure the quality and adequacy of assets to meet current obligations as they come due. Solvency metrics, such as Debt to Capitalization, and Total Net Assets, measure the company's ability to service debt obligations. Additionally, certain metrics can be applicable in multiple categories.

The following table shows how each of the Key Metrics are calculated.

Key Metric	Definition
EBIDA ($)	(Earnings before interest, depreciation and amortization expenses) - Operating gain (loss) + interest expense + depreciation expense + amortization expense
EBIDA Margin (%)	EBIDA expressed as a % of total operating revenue. EBIDA / total operating revenue
Operating Margin (%)	Income (loss) from operations / total operating revenue
Total Margin (%)	Excess (deficit) of revenue over expenses / total operating revenue
Total Assets ($)	Total assets of the organization
Total Net Assets ($)	Total net assets of the organization (includes unrestricted net assets, temporarily restricted net assets and permanently restricted net assets)
Unrestricted Cash Days on Hand (days)	(Cash & cash equivalents + investments + current portion investments limited as to use + investments limited as to use - externally limited funds) / ((Total operating expenses - non recurring charges - depreciation & amortization) / YTD days)
Unrestricted Cash to Debt (%)	Unrestricted Cash-to-Debt (%) - (Cash & cash equivalents + investments + current portion investments limited as to use + investments limited as to use - externally limited funds) / (Current portion of long-term obligations + long-term obligations)
Debt Service Coverage (ratio)	Debt service coverage ratio (ratio) - (Excess (deficit) of revenue over expenses + depreciation expense + amortization expense + interest expense) / (Principal payments + interest expense)
Debt to Capitalization (%)	Debt to Capitalization (%) - (Current portion of long-term obligation + long-term obligations) / (Current portion of long-term obligations + long-term obligations + unrestricted net assets)

In preparing the Key Metrics, Management noted the following:

- Partners HealthCare has a balloon payment on long-term debt maturing in fiscal year ending 2021 and prepared the Projections to include the balloon payment.

1. Revenues

The only revenue category on which the proposed capital projects would have an impact is net patient service revenue. Therefore, I have analyzed net patient service revenue identified by Partners HealthCare in both their historical and projected financial information. Based upon my analysis of the projected results from Fiscal Year 2019 through Fiscal Year 2023, the proposed capital projects would represent approximately 0.057% (about 6 one-hundredths of 1%) of Partners HealthCare operating revenue beginning in FY 2021 to 0.09% (about one-tenth of 1%) in FY 2023. The first year in which revenue is present for the proposed capital projects is FY 2021.

It is my opinion that the revenue growth projected by Management reflects a reasonable estimation based primarily upon the organization's historical operations.

2. Operating Expenses

I analyzed each of the categorized operating expenses for reasonableness and feasibility as it relates to the projected revenue items. I reviewed the actual operating results for Partners HealthCare for the years ended 2017 and 2018 in order to determine the impact of the proposed capital projects at MGPO Assembly Row on the consolidated entity and in order to determine the reasonableness of the Projections for the fiscal years 2019 through 2023. Based upon my analysis of the projected results from Fiscal Year 2019 through Fiscal Year 2023, the proposed capital projects would represent approximately 0.042% (about 4 one-hundredths of 1%) of Partners HealthCare operating expenses beginning in FY 2021 to 0.064% (about 6 one-hundredths of 1%) in FY 2023.

It is my opinion that the growth in operating expenses projected by Management reflects a reasonable estimation based primarily upon the organization's historical operations.

3. Non-Operating Gains/Expenses and Other Changes in Net Assets

The final categories of Partners HealthCare Projections are various non-operating gains/expenses and other changes in net assets. The items in these categories relate to investment account activity (realized and unrealized), philanthropic and academic gifts, benefit plan funded status, fair value adjustments and other items. Because many of these items are unpredictable, nonrecurring, or dependent upon market fluctuations, I analyzed the non-operating activity in aggregate. Based upon my analysis, there were no non-operating expenses projected for the proposed capital projects at MGPO Assembly Row. Accordingly, it is my opinion that the pro-forma non-operating gains/expenses and other changes in net assets are reasonable.

4. Capital Expenditures and Cash Flows

I reviewed Partners HealthCare capital expenditures and cash flows in order to determine whether Partners HealthCare anticipated reinvesting sufficient funds for technological upgrades and property, plant and equipment and whether the cash flow would be able to support that reinvestment.

Based upon my discussions with Management and my review of the information provided, I considered the current and projected capital projects and loan financing obligations included within the Projections and the impact of those projected expenditures on Partners HealthCare cash flow. Based upon my analysis, it is my opinion that the pro-forma capital expenditures and resulting impact on Partners HealthCare cash flows are reasonable.

VI. FEASIBILITY

I analyzed the projected operations for Partners HealthCare and the changes in Key Metrics prepared by Management as well as the impact of the proposed capital projects at MGPO Assembly Row upon the Projections and Key Metrics. In performing my analysis, I considered multiple sources of information including historical and projected financial information for Partners HealthCare. It is important to note that the Projections do not account for any anticipated changes in accounting standards. These standards, which may have a material impact on individual future years, are not anticipated to have a material impact on the aggregate Projections.

Because the impact of the proposed capital projects at MGPO Assembly Row represents a relatively insignificant portion of the operations and financial position of Partners HealthCare, I determined that the Projections are not likely to result in insufficient funds available for capital and ongoing operating costs

necessary to support the proposed projects. Based upon my review of the Projections and relevant supporting documentation, I determined the projects and continued operating surplus are reasonable and based upon feasible financial assumptions. Therefore, the proposed capital projects at MGPO Assembly Row are financially feasible and within the financial capability of Partners HealthCare.

Respectively submitted,

Bernard L Donohue, III, CPA

Bernard L. Donohue, III, CPA

Attachment/Exhibit

B

Factor 4: Financial Feasibility and Reasonableness of Expenditures and Costs

Applicant has provided (as an attachment) a certification, by an independent certified public accountant (CPA) as to the availability of sufficient funds for capital and ongoing operating costs necessary to support the Proposed Project without negative impacts or consequences to the Applicant's existing Patient Panel.

F4.a.i **Capital Costs Chart:**

For each Functional Area document the square footage and costs for New Construction and/or Renovations.

		Present Square Footage		Square Footage Involved in Project				Resulting Square Footage		Total Cost		Cost/Square Footage	
				New Construction		Renovation							
Add/Del Rows	Functional Areas	Net	Gross	Net	Gross	Net	Gross	Net	Gross	New Construction	Renovation	New Construction	Renovation
	MRIs / Equipment Rooms / Control Rooms					2,200	4,115	2,200	4,115		$12,378,768.00		$3,008.21
	MRI Support (Holding Bays/Corridor/Clean/Soiled/Storage)					800	1,500	800	1,500		$531,468.00		$354.31
	Patient Support Spaces (Waiting/Toilets/Changing)					720	1,350	720	1,350		$1,062,937.00		$787.36
	Infrastructure (Elec/Data/Oxygen/Vac)					150	285	150	285		$265,734.00		$932.40
	Staff Support Areas (Lounge/Reading/Consult/Office)					400	750	400	750		$265,749.00		$354.33
	Total:					4,270	8,000	4,270	8,000		$14,504,656.00		$1,813.08

* Please note that the Applicant submits the F4.a.i Capital Costs Chart in Excel format to address the calculation related to Total Cost/Square Footage. The Department of Public Health's ("Department") Capital Costs Chart included in the Determination of Need ("DoN") Application auto-calculates Total Cost/Square Footage using a summation formula, such that the total is a sum of the cost/square footage for the various functional areas. For example, using the Department's Capital Costs Chart included in the DoN Application, the auto-calculated Total Cost/Square Footage for Renovation for the Proposed Project is a sum of the renovation cost/square footage for the MRIs / Equipment Rooms / Control Rooms ($3,008.21) + MRI Support ($354.31) + Patient Support Spaces ($787.36) + Infrastructure ($932.40) + Staff Support Areas ($354.33) = $5,436.61. A more accurate Total Cost/Square Footage is reached using the following calculation: Total Cost / Total Resulting Gross Square Footage. In the case of Total Cost/Square Footage for Renovation, this calculation is as follows: $14,504,656.00 / 8,000 = $1,813.08. This total is reflected in the Capital Costs Chart above.

Attachment/Exhibit

4

Attachment/Exhibit

A

CHNA/CHIP Self Assessment Form Attachments

Attachment A: Section 8 – Additional Names for the CHNA/CHIP Advisory Committee

First Name	Last Name	Title/Organization
Kathy	Betts	CHA Department of Community Health Improvement (CHI); CHAC; BCPH
Lisa	Brukilacchio	CHA Department of Community Health Improvement - Somerville Health Agenda; CHAC
John	Brusch, MD	CHA Primary Care Center at Cambridge Hospital; CHAC; BCPH
Mary	Cassesso	CHA Foundation; CHAF; CHAC; BCPH
Sandy	Cohen, MSW, MPH	CHA Outpatient Psychiatry Department
Linda	Cornell	Visiting Nurse Association of Eastern Massachusetts
Chris	Fischer, MD	CHA Emergency Department
Andre	Green	School Committee Member - Ward 4
Brian	Green, MD	Chairman, Somerville Board of Health; CHA Somerville Hospital Primary Care
Cathy	Haines	CHA Patient and Family Advisory Council
Cindy	Hickey	City of Somerville - Council on Aging
Stephanie	Hirsch	Somerville Alderman-at-Large
Kim	Keough	CHA Strategic Planning, Branding & Marketing; CHAF; BCPH
Cortni	Kerr Desir	City of Somerville - SomerStat
Miles	Lang-Kennedy (Staff)	CHA Communications

Kathy	McGilvray	CHA Board of Trustees, Massachusetts Housing Investment Corporation (MHIC)
Kirsten	Meisinger, MD	CHA Union Square Family Health
David	Osler, MD	CHA Broadway Care Center, Somerville Pediatrics
Alex	Pirie	Immigrant Service Providers Group/Health; CHAC; BCPH
Sarah	Primeau (Staff)	CHA Community Relations; PFAC; BCPH; CHAC
Denise	Provost	State Representative
Lisa	Robinson	City of Somerville Department of Health and Human Services - Shape Up Somerville
Thalia	Tringo	CHA Foundation Board Member, Thalia Tringo & Associates Real Estate
Ruth	Faris	Social Worker; Former CHA BOT

Attachment B: Section 8a – Determination of Need – Community Advisory Committee Members

Constituency	Organization	Contact Name	Title
Local Public Health	Somerville Health & Human Services	Doug Kress	Director
	Board of Health	Brian Green	Chair
Municipal	Mayor's Office	Emily Monea	Chief of Staff
	Library	Cathy Piantagini	Director
	City Councilor	Stephanie Hirsch	Councilor at Large
Education	Superintendent's Office	Mary Skipper	Superintendent
	Somerville Family Learning Collaborative	Nomi Davidson	Director
	SCALE/Adult Ed	Lisa Cook	Director
Housing	Somerville Homeless Coalition	Michael Libby	Director
	Preservation of Affordable Housing	Cory Main	Senior Vice Pres.
Social Services	Community Action Agency of Somerville	David Gibbs	Director
	WIC	Maria Bettencourt	Director
Transportation and Planning	Office of Strategic Planning/Transportation and Infrastructure	Brad Rawson	Director
Private Sector/Business	VNA of Eastern MA	Linda Cornell	CEO/Pres
	Forge	Tucker Lewis	Owner
	Private practice	Ruth Faris	
	Bent Electric	Tom Bent	Owner
Community Health Centers	CHA Broadway Care Center	Jess Blau	Medical Director
	CHA Pediatrics	Greg Hagan	Director of CHA Pediatrics
	CHA Patient & Family Advisory Council	Alexandra Hollencamp 7 Brian Perry	Members
	CHA Central St/Mental Health	Emily Bendetto	Program Manager, Integration

Community Based Organizations	The Welcome Project	Ben Echevarria	Director
	Immigrant Service Providers Group	Alex Pirie	Coordinator

Attachment/Exhibit

B

Community Health Needs Assessment & Implementation Strategy
Cambridge Health Alliance (2016-2019)

Executive Summary

Cambridge Health Alliance (CHA) has a long history of serving the local communities where we provide health care, traditionally serving vulnerable populations of low income residents, immigrants and those who speak languages other than English. When Cambridge Hospital purchased Somerville hospital, to become the Cambridge Health Alliance, the Somerville Community Health Agenda role at CHA was created to facilitate collaborative initiatives to improve the health of residents in Somerville, now part of the Community Health Improvement Department. In partnership, the Community Health Improvement leadership and the CHA Chief Community Officer, now guide CHA's community health needs assessment and population and community health improvement efforts. This team assesses unique health needs and challenges of CHA cities, collaborating alongside community members and city leaders to develop programs and provide leadership on health improvement initiatives. Over the past 3-5 years, there has been an increased commitment to advancing health equity as well as shifting the structure and timing of the Wellbeing report framework to be in closer alignment with other health care systems and shifting state regulatory guidelines to better inform work in all of our communities. The CHA Strategy for a Healthy Somerville process built on the Wellbeing report assessment process, complimenting the work of the Wellbeing Report assessment by working with the City and the community to identify healthcare priorities and develop a 5 year Community Health Improvement Plan.

Community Health Needs Assessment and Community Health Improvement Plan

In Somerville, the Cambridge Health Alliance (CHA) has recently coordinated a multi-phase community assessment including The Wellbeing of Somerville Report 2017 engagement process (2016-2018 CHNA phase) followed by the CHA's Strategy for a Healthy Somerville 5 year community health improvement planning process (2018-2019 CHIP phase). Community engagement is a key element of CHA's work, including these efforts which involved approximately 1,679 people in exploring questions of how to improve the health of residents of Somerville.

Community Involvement
1,022 surveys completed
133 residents participated in focus groups
31 Stakeholder interviews
493 people attended community meetings

Although CHA is exempt from the Affordable Care Act of 2010 requirements to conduct a CHNA every three years, there is a foundation with a long history of community involvement in periodic reviews of health data, with related prioritization and selected recommendations and actions to improve health at the local level. Given the changes in the healthcare industry and federal and state regulatory landscape, CHA has recently been exploring and piloting collaborative efforts

with other regional health care/hospital systems to create community health needs assessments across all CHA core communities in closer approximation to the ACA/ACO/DPH guidelines for future assessment.

Priorities and Strategies

Priorities that arose consistently throughout the Wellbeing community health needs assessment process (CHNA) included:

- Mental Health issues (including depression, stress, anxiety, suicidality, social isolation)
- Substance Use (Opioids, Alcohol)
- Obesity/Nutrition and Physical Activity and related chronic diseases (diabetes and heart disease)
- Social Determinants of Health (affordable housing, food access, employment/jobs, access to early education and care, etc.)

The process of community health improvement planning (CHIP) that continued with the development of the CHA Strategies for a Healthy Somerville echoed needs and strategies identified through the Somerville assessment, including:

- Access to Healthcare, including Navigation supports and education to address health literacy challenges, including urgent care
- Increased Access to Mental Health and improved continuum of care for Substance Use Treatment
- Better leverage technology to improve customer service and strengthen the continuum of care.
- Social Determinants of Health (SDOH) (housing, education, access to healthcare) and connections to population health goals such as stress, healthy child development, obesity and equity & inclusion for all

Strategies to address these priority issues include continuing to work with the City of Somerville to address the influencers of health. To be successful, this work requires a multi-pronged approach that intervenes at all levels from the individual to community, from direct services to policy solutions. CHA backbone support and technical assistance for building capacity and impact of community coalitions engaged in access, mental health, substance use and SDOH issues will be strengthened. Screenings of our patients for social determinants of health will continue to be expanded, having initially started with all MassHealth patients. We are working on quality improvement efforts within our CHA systems, including improving technology tools, and partnering closely with local and regional service providers on closing the loop on successful referrals to ensure that basic needs of patients are met to better promote lifelong health and wellbeing. Patient Navigator, Patient Resource Coordinators and Community Health Workers will be engaged to deepen health access promotion and education initiatives in primary care, mental and behavioral health/substance use treatment, as well as transition from ED to Urgent Care at Somerville Hospital, while addressing cultural barriers for immigrants in accessing the U.S. health care system.

Prior investments in community and clinical work

In the early years of the Somerville Community Health Agenda (SCHA), starting in 2000, the work focused on periodic community health needs assessments with the first Wellbeing of Somerville Report completed in 2002. Working with local agencies and the City, the process and the final report spurred development and implementation of strategies to address identified needs, largely through coalition and capacity building, creating significant infrastructure capacity and sustained positions within the local public health department. Current Somerville Health and Human Service Department positions addressing substance use, youth mental health, obesity prevention and healthy built communities were created through grant funding supported by SCHA staff in collaboration with the City and local partners. SCHA served as the backbone organization for the Shape Up Somerville Steering Committee from 2003-2011, with a heavy emphasis on built environment strategies (farmers markets, local trails, community paths) as well as policy changes (purchasing of produce from local farmers). SCHA has provided leadership for coalitions such as mental health and suicide prevention, having facilitated the introduction and evaluation of Mental Health First Aid as a tool to address both community education and stigma.

The CHA Community Health Improvement Department works to improve community health through collaborative relationships. Programs and clinical services include Health Improvement Team, WIC, Sexual and Reproductive Health, Teen Health Center at Somerville High School, Healthcare for the Homeless and HIV outreach. Examples of recent CHI initiatives addressing population needs include:

- Developing a program to address dental health needs of unaccompanied minors at Somerville High School, in collaboration with Forsyth Kids and other partners,
- Piloting a basic needs support staff at the Somerville Library,
- Partnering with MOAR and Somerville Overcoming Addiction local programs,
- Collaboration with Mayor and Superintendent's Community Cabinet to address gaps and equity in early education and care, out of school time and integrated health,
- Development of food security screening in CHA clinics, with referral system to Project Bread, sharing food access resources and community access opportunities, such as the Somerville Food Resource Guide and Come to the Table monthly meal,
- Piloting self-care workshops for providers serving largely immigrant populations (front line staff in community service organizations, medical interpreters, etc.) as part of
- Convening the CHA Community Health Advisory Committee to collectively address emerging issues, such as engaging service providers in preparation of community specific SDOH "Tip Sheets" for CHA patients based on best referral connections where they live, presentation by Health Care for All followed by letter writing activity on the impact of public charge for immigrant residents in our communities.

The CHA Foundation raises more funds each year to strive to address the population health concerns facing our patients and communities. Funding helps to support local community based organizations, to address gaps in resources such as access to health care or food, substance use recovery, and supporting immigrant needs and research on the impacts of federal regulation changes. The Somerville Health Foundation, endowed by a former city resident,

provides $25-$35K in funds to support primary and preventative health projects each year in small grants, administered through CHA Community Health Improvement with a board composed of CHA Board members from Somerville and a Mayoral appointee.

Progress on 2011 Wellbeing report recommendations and implementation plan
Multi-sector community coalitions engaged in addressing respective needs and recommendations from the 2011 report. In the summer of 2015, CHA partnered with the Somerville Health and Human Services Department to review recommendations from the 2011 Wellbeing Report. A Tufts Community Health intern conducted interviews with key stakeholders from CHA, City of Somerville and other 29 community based organizations to gain information on the progress of the recommendations. These interviews were supplemented with web research. The 2011 Well Being report was divided into 13 leading health indicators and determinants of health with a total of 103 recommendations. The report addressed these topic areas, listing accomplishments to date with discussion of work remaining.

Selected key points of progress and emerging trends for community health included:

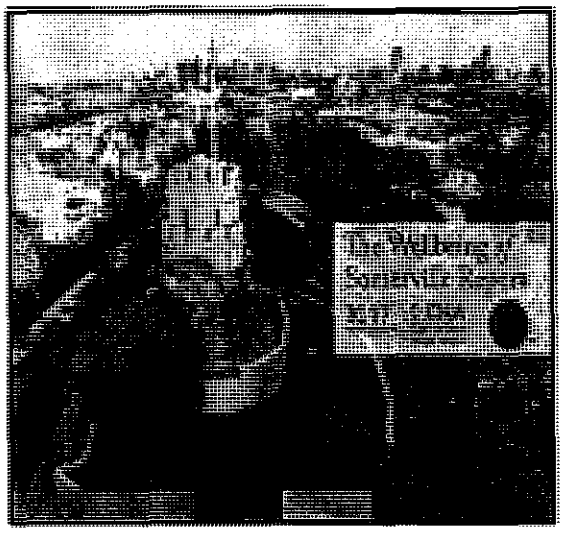
- Access to Care
    - CHA launched system in 2015 to make set appointments for assistance with Health Safety Net Coverage, in response to community needs
    - Volunteer Health Advisors (VHA) program partnering with Welcome Project English Language Learner classes with health screenings and education
    - CHA recognized as Leader in LGBT Healthcare Equality in 2013
    - Needs: more collaborations with English Language classes. Attention to new emerging immigrant groups and related service needs, ie. increase in Nepali population
- Tobacco
    - CHA became tobacco free in 2012 and offers smoking cessation supports.
    - City BOH updated regulations restricting sale of tobacco to include e-cigarettes, e-cigars, hookah and other similar products AND prohibit sales of tobacco products in health institutions including pharmacies and drug stores.
    - Somerville joined the Metro Boston Tobacco Free Community Partnership in 2012, to lower smoking prevalence.
    - Need: Follow rise in use of new emerging products. Address settings of exposure for children.
- Substance Use
    - CHA developed the Community Centered Health Home to increase health access for patients in substance use and opioid treatment programs.
    - Somerville Cambridge Elder Services offering Learn to Cope support network
    - Somerville received new BSAS funding in 2015 for opioid prevention.
    - Somerville Cares About Prevention used CHNA 17 funding to address positive youth behaviors and social media, produced PSAs with SCATV.
    - Need: Continue to address rise in opioid deaths and overdoses. Change peer perceptions in youth. Advocate for Addiction Specialist at Police Dept.
- Mental Health
    - Mental Health First Aid training expanded to police and youth.
    - Local Crisis Intervention Team created with NAMI.
    - Teen Empowerment launched Mental Wellness Ambassadors Program in 2015.
    - CHA working towards integration of mental and behavioral health in primary care settings.
    - Needs: More education and promotion of multilingual services. Challenges persist related to referrals and follow up for services, as well as screening. Better knowledge and understanding of risk factors for both parents and youth, especially related to transition points.
- Physical Activity and Nutrition/Food Security

    - CHA staff convened the Somerville Food Security Coalition, partnering with the Somerville Homeless Coalition, serving as backbone organization and supervising students to build capacity and resources such as the coalition's website, Food Resource Guides, and monthly Come to the Table meal with pop-up pantry.
    - CHA piloted the Hunger Vital Signs Food Security Screening in clinics, collaborating with Project Bread's Food Source Hotline for referral to local resources for patients who screen positive. Grants obtained to provide emergency food and/or grocery gift cards in clinics.
    - Since 2010, bicycle counts in the city increased over 80%. Somerville cited as Silver Level Bicycle Friendly Community in 2014.
    - PEP grant provided resources for increased physical activity for school kids.
    - Emerging Leaders, collaboration between CHA/SUS/Groundwork Somerville/Welcome Project, offered leadership development for low-income Spanish and basic English-speaking residents. Spurred increased focus on housing as linked to health and added key information to Food Resource Guide
    - Somerville Mobile Farmers Market started in 2011 increases access to fresh produce for low income and public housing residents.
    - Need: More work on barriers to physical activity and healthy food. Better engage immigrant and low income communities in decision making. Funding to support sustainability of PEP resources.
- Chronic Disease
    - CHA cancer disparities grant project funded by MA-DPH.
    - Somerville Health Foundation provides funding to nonprofits to support preventative services and programs that improve the health of Somerville residents
- Community
    - Somerville was named an All-American City in 2015, finalist in 2014.
    - SomerViva is the City immigrant outreach program to help connect residents with city services, engage them in public life and celebrate diverse cultures.
    - Somerville Community Health Agenda at CHA digitally shares monthly Somerville Health Happenings to share opportunities and resources to improve health of all Somerville residents.

Community Health Needs Assessment Process

The 2017 Wellbeing report participatory process was organized somewhat differently than past community health needs assessments, to ensure engagement of varied community stakeholder groups across the entire life span, from prenatal to older adults. A health equity lens was applied throughout to highlight both unique challenges and opportunities across the age spectrum, influenced by work in the national maternal-child health and health equity realms.

The goals of the **Wellbeing of Somerville Report 2017** were to serve as a community building process of engaging broad participation in exploring data together not just to inform, but to inspire action to improve community health, to serve as a catalyst for ongoing examination and exploration of how to create a healthier community for all. This report aimed to raise awareness and stimulate a call to action to benefit those most impacted by health disparities and inequities to improve health and wellbeing across the lifespan with a special focus on those populations most impacted by specific health and systemic issues influencing health.



The goals for **CHA's Strategy for a Healthy Somerville** (2018-2019) process were to collaboratively develop a Somerville community health improvement plan to inform CHA's service and population health strategic actions to improve care and service to the community, in partnership with the City and other stakeholders. This effort was built upon the Wellbeing of Somerville Report 2017, as the comprehensive community health assessment bringing together health and social determinants of health data from across the city.

Target Population

These efforts focused on the community of Somerville, Massachusetts and Somerville residents who receive care through CHA. Exploration of health needs focused on low-income populations, immigrants/foreign born residents, and populations speaking languages other than English at home. The Wellbeing Report worked to increase attention to the very youngest and oldest residents, who were not as visible or well represented in past community health needs assessment processes. CHA continues to provide care for many Somerville residents among these most vulnerable populations.

Assessment Process

The **Wellbeing of Somerville 2017 report** was the result of contributions from across the city of Somerville. It was shaped through the engagement of community members, agencies and service providers, municipal employees including planning staff, clinical staff, community based organizations, education, private sector, public health workers and academic interns. This was the fourth such report created over the past two decades of collaborative community health assessments in the City. Starting in 1994, the Somerville Hospital and the Somerville Health Department had utilized MAPP (Mobilizing for Action through Planning & Partnerships) framing to create a forum for community engagement in assessment, prioritization of strategic issues and goals, and planning for implementation and evaluation. Upon the creation of the Cambridge Health Alliance in 1996, this process took place every 4-6 years, evolving into a periodic participatory community process of developing a Wellbeing of Somerville report, with prior reports produced in 2001, 2006 (with a youth focus), and 2011 with an added focus on SDOH.

Development of these reports and the related priorities and planning has always included broad community outreach and engagement. Local health data, as well as other primary source data, has been shared with stakeholder groups to analyze together, to identify priorities and to determine strategies for collaborative health improvement plans. Community coalitions have been both an outcome of prior assessments, providing leadership development opportunities, as well as serving as key participants in guiding the iterative assessment processes and implementation of plans. The CHA Wellbeing of Somerville Report process also served as the model for the expansion of community health needs assessments in Everett and Malden.

Development of the 2017 Wellbeing Report started in 2015 with a review of the plans for action from the 2011 report and continuing during 2016 and 2017. The coordination of the effort was led by the Somerville Community Health Agenda of the Community Health Improvement Department at Cambridge Health Alliance in collaboration with the City of Somerville Health and Human Services Department, with data support from the Institute of Community Health. The report is the result of collaboration and contributions from a broad group of partners and advisory group who participated in numerous discussions and/or focus groups to select data points of interest and determine priority areas of community health focus for the community of Somerville. In developing this report, diverse partners also assisted with collecting and analyzing secondary data related to public health from a variety of lenses.

A series of meetings were held from 2016 through spring of 2017 to engage age specific multi-sector stakeholder groups in exploring data, trends, impact and subsequent priorities and recommendations for community wide improvement. Community stakeholder groups for meetings/focus groups included such organizations as the Early Childhood Advisory Council, the Immigrant Service Providers, Shape Up Somerville Steering Committee, Somerville Youthworkers Network and an informal gathering of Somerville Senior Providers. These sessions provided valuable insights and feedback, as well as provocative questions to help direct exploration of data and recommendations. Additional support members provided missing data (school, police, etc) as need arose. Interns researched regional and national data and trends, as well as SDOH information.

Over 80 community members spent an evening together in late April 2017 providing diverse perspectives on prioritizing the most pressing issues impacting the health of Somerville residents across the lifespan and strategies to improve the health of all residents. This larger community meeting sought input across ages in one space and time, engaging each participant to also rotate through deeper exploration in two different age groups to produce broader community comments on concerns and hopes for the community, and to provide ranking of recommendations raised by the community. Agency and community partners from educators to engineers served as readers and editors, to ensure both accuracy and accessibility of the data and information contained in the report. In addition, many talented and dedicated academic interns from local universities assisted with the development of this report, from reviewing progress on all the recommendations from the 2011 report to final editing assistance. Numerous

community stakeholders were actively involved in reviewing draft versions of the final report, which was also vetted through CHA and City leadership.

The November 2017 community launch event, including interactive exercises for attendees to continue to engage with the data and priorities to consider actions to improve health for all, served as the beginning of continued community engagement moving towards a CHIP. During the process of the Wellbeing report process, the local public health department in Somerville was considering applying for national certification which requires completion of a CHIP. The Wellbeing Report was considered the local CHNA, with the intention that it would serve as the foundation for deeper exploration and development of a CHIP. (See the inside cover of the Wellbeing of Somerville Report 2017.) The Somerville Health & Human Services and CHA Community Health Improvement staff committed to continue to move forward toward that goal, starting with reflection on the process, evaluating how to more broadly share the outcomes of the Wellbeing report and to reach deeper into the community for engagement, sparked by the energy of the launch event. In 2017, a fall semester class at Harvard, working with Somerville Health & Human Services and CHA Community Health Improvement, engaged students in interviews with community agency stakeholder and presentations & discussions with community coalitions and/or City staff on potential actions to address the several priority areas raised in the Wellbeing process (housing affordability, food security, and healthy aging).

During 2018, Somerville Health & Human Service and CHA-CHI staff hosted 7 focus groups and numerous interactive presentations at a wide range of venues to actively engage community stakeholders with the assessment findings. In Summer 2018, a student team helped create one-page documents summarizing the findings of the Wellbeing report in easy to read formats that were shareable at focus groups and events, and with special interest groups such as parents, teachers, English Language Learners, older adults, or youth. Opportunities were sought to particularly engage with low income, elderly, and immigrants and those whose primary language is other than English or agencies providing services to these populations to increase access to the health assessment data and engage community members in genuine exploration, discussion and planning to improve health and wellbeing for all. "Bingo" type games were developed to encourage greater engagement (triggering some providers to integrate the report

into their youth programming). Questions included how health care and service organizations adjust to changing demographics and needs, ways to support health across the lifespan, and how to equitably balance varied needs across all ages and all backgrounds of a diverse population. This work set the stage for the planning phase.

Community Health Improvement Plan Process-CHA Strategy for a Healthy Somerville
In 2018, it was mutually agreed between CHA and the City, that CHA would embark on the more formal aspects of moving towards a community health improvement plan in partnership, with CHA leading the effort. This effort built upon the Wellbeing of Somerville Report 2017, as a comprehensive community health assessment bringing together health and social determinants of health data from across the city. The **CHA Strategy for a Healthy Somerville** process officially kicked off by convening a Somerville/CHA Healthcare Advisory Group of more than 30 members, comprised of providers, nurses, educators and recovery experts, to offer feedback and suggestions on how CHA can best meet the health needs of an ever-changing community. This new Advisory Board met 4 times between February and May 2018 with participants from the Wellbeing community health assessment, Community Health Center providers, Education, and Service Providers, Private/Business, and representatives with disabilities. The membership of the team included the following constituencies: Local public health (Director and Chair of Board of Health), Elected officials (State Representative, City Councilor), Education (School Board member, teacher, parent, Tufts), City (SomerStat, Council on Aging, Shape Up Somerville), Housing (MCIH, Assisted Living provider), Social Services (COHR, VNA), Private Sectors (realtor), Health Center Providers (CHA Primary Care, Pediatrics, ED, Psych), CBOs (Immigrant Service Providers Group, the Welcome Project). To facilitate this effort, CHA hired Cynthia Baratta, an independent consultant, to manage the project, facilitate meetings, and submit a report.

The group met at the centrally located Lowell Street Assisted Living facility of the VNA of Eastern Massachusetts in Somerville. At the first meeting an overview of CHA services and the Wellbeing of Somerville Report 2017 were presented by City and CHA officials, followed by group discussion of the key questions below. Subsequent meetings of the Advisory group explored responses to these questions in more depth through additional data and information on local health access, mental health, substance use treatment and technology. Included in these meetings were presentations requested by the group such as data on the utilization of the Somerville Hospital Emergency Department.

- What are the major health care service needs of the residents of Somerville?
- How well do CHA's services align with the needs of the community?
- Where should our focus be?
- In what ways might CHA adapt and evolve its services to respond to the changes in demographics and health status in Somerville?
- In what areas should CHA focus its limited investment resources to sustain its mission of improving the health of the community and its longstanding dedication to vulnerable populations?

In addition, five Community "Listening Sessions" were held in various neighborhoods throughout Somerville during March-April. The Listening Sessions were well-advertised on the city's website, in several publications, and through digital communications and flyers through community partners. Over 40 people participated in these sessions, notes taken from each were analyzed for themes and incorporated into our findings. It should be noted that two of the sessions were impacted by weather-related issues. One session of the CHA Population Health Board Committee, which includes some community representation, also participated in this same process.

In this same time frame, a health needs and health care services survey (translated into 4 languages and available electronically and in hard copy) was also widely distributed to Somerville residents through CHA, City and community links, with 1,040 responses submitted during March and April of 2018 (1,022 were complete surveys, with 16% of respondents speaking another language other than English at home.) The consultant for the CHIP process helped the Advisory Group to analyze the feedback from the Advisory Group meetings, the community listening sessions and the survey results to collectively determine priorities that were most frequent and persistent. These priorities were revised based on Advisory Group feedback to become: 1) health education/literacy, 2) access/navigation/urgent care, 3) mental health, 4) technology, 5) healthy aging and 6) stress as reported secondary to lack of access to basic social determinants of health.

In Fall 2018, the Harvard class again worked with local public health and CHA staff to interview key stakeholders in the City and Community based organizations to more deeply explore the issue of stress, which arose as a top health concern outcome from the surveys. The team made recommendations for policy and practices that could address systemic stressors in the community which stakeholder interviews connected to mental health impacts of limited access to SDOH (housing, healthcare, food) and stresses on staff trying to help address these needs.

A second round of 3 community listening sessions in June & July presented the **CHA Strategy for a Healthy Somerville 5 year plan** to the community, sharing the CHIP priorities and the CHA proposed approaches to address these priorities as identified through the community health needs assessment and health improvement planning processes. Participation included elected officials from the City and State, Local Public Health and planning staff, seniors, residents and community-based organizations. A significant element of this last round of meetings was the proposal by CHA to close the Emergency Department and provide Urgent Care services, based on findings from analysis of utilization data and community conversations and survey responses.

CHA and the City are moving forward to implement the recommended action steps and will be measuring the completion of these steps. Data and recommendations from the Wellbeing Report are informing several Somerville policy formulating initiatives such as the Community Cabinet/By All Means, SomerLearning 2030, and SomerVision 2040, continuing to integrate community health improvement into the fabric of the City of Somerville.

Timeline for Community Engagement in the Wellbeing of Somerville 2017 process & CHA Strategy for a Healthy Somerville process	
Review of 2011 report and planning	May-August 2015
Convening Advisory Group (members actively involved in stakeholder groups, periodic reviews and data support)	April 2016-November 2017
Stakeholder meetings	July 2016-May 2017
Community wide meeting	April 2017
Wellbeing of Somerville Report 2017 Launch	November 2017
WB report focus groups	January-August 2018
CHA Strategy for a Healthy Somerville- Advisory Meetings	February- May 2018
Community Listening Sessions 2018	March-April 2018
Community Survey Collection	March-April 2018
Listening Sessions/Recommendations	June-July 2018

Data collection

For the **Wellbeing report (CHNA)**, data collection included retrieval of available demographic (ACS-US Census) and public health data (MA-DPH, MA-PRAM, CDC 500 Cities, MA Healthy Aging) CHA data with assistance from the Institute of Community Health (ICH). In addition, data was collected from Somerville Police, Somerville Public Schools, Somerville Health and Human Services (YRBS data), state and local service providers (DCF, Project Bread).

For the **CHA Strategies for a Healthy Somerville (CHIP)** process, in an effort to reach out broadly to the community, a survey was conducted March 3rd to April 24th, 2018 asking Somerville residents a wide range of questions about their impressions of top local health issues, health care access and service needs and their personal experiences. The survey was translated and made available in 4 languages and was widely available at various city and community locations, as well as being distributed at CHA practice sites, social service program sites, community events and on social media and various websites. Over 1,000 responses were received. A summary of this data, a copy of the survey, and respondents quotes are available.

CHA/Somerville Community Survey Demographics 2018 (n=1,022 complete surveys)
• CHA Patients: 32%
• English speakers: (all) 84.5%; CHA Patients - 68.9% (Surveys transmitted (via online or printed version) in languages other than English – 28 Haitian, 24 Portuguese and 16 Spanish)

• Race/Ethnicity: North American or European: Complete Survey - 68.2%; CHA Patients - 47.6% (U.S. Census/ACS Demographics and Housing Estimates (2012-2016), 75.6% White)
• Gender: Complete Survey - 74.2% female; CHA Patients - 77% female (U.S. Census/ACS Demographics and Housing Estimates (2012-2016) illustrates a breakdown of 50.5% female)
• Over 60% employed full or part time for both groups
• Ages: Complete Survey - 40-64 (41.7%), 25-39 (41%), 65+ (11.3%); CHA Patients - 40-64 (34.9%), 25-39 (48.9%), 65+ (4.6%)

Overview of Methodology

1. Community Participation: Community engagement and participation was involved throughout both processes. The Wellbeing of Somerville process was kicked off by a Committee that provided guidance for traditional assessment methods, as well as how to augment prior processes to be more inclusive of the full life span, as well as low income and immigrant and ethnic populations. Members provided the backbone for organizing or hosting the multiple meetings across the production of the final report and follow up focus groups for iterative engagement. Stakeholder interviews provided deeper insights. Close to 500 different people attended the range of community meetings held. The launch event for the Wellbeing report held in November 2017 was a City wide celebration of a shared effort. The CHA Strategy for Healthy Somerville involved community members on the Advisory group, as well as through two series of listening sessions, for which community partners helped to recruit diverse participation.
2. Focus Groups/Community meetings: Over 130 residents participated in focus groups and 493 in community meetings. Interpretation was offered where indicated. Workshops and interactive sessions for diverse groups of residents allowed the community to dive into the community health needs assessment findings after the Wellbeing report was released, to more deeply involve more residents and to encourage ongoing collaboration with the CHIP and future strategies. Weather was a factor in several early spring meeting dates for the CHIP process.
3. Survey: A community wide survey of perceived health issues for one's self, family and community and health care service needs was translated into Spanish, Portuguese and Haitian Creole. In 2018, survey responses were received from 1,400 residents; 1,022 were complete and able to be utilized for data analysis.
4. Demographic data, including SDOH: Data was gathered from the U.S. Census, MA Department of Education. SDOH data was gathered from multiple sources as indicated in Appendix A of the Wellbeing Report.
5. Public Health data: Public health data was sourced from the U.S. Census, MA Department of Public Health, Somerville and MA Youth Risk Behavior Surveys, MA PRAMS, CDC Healthy Cities, MA Healthy Aging report.
6. SDOH data: In addition, data was collected from Somerville Police, Somerville Public Schools, Somerville Health and Human Services (YRBS data), state and local service providers (DCF, Project Bread).

7. CHA patient data: Aggregate data was pulled for patients living in Somerville zip codes (02143, 02144 and 02145). Data was utilized to provide a local snapshot of health issues identified as priorities through the Wellbeing and CHA Strategy for a Healthy Somerville. Trend data was also explored to offer insights into community utilization of services such as the Emergency Department.

Limitations

For the Wellbeing report process, there was a commitment to engaging community participation to represent the entire lifespan, as it had been noted that prior assessments did not cover early childhood or older adults as there was not as much data available. The outreach and engagement opportunities were developed with this goal, creating a broad net of community members invested in the report. Early childhood and school age, as well as older adults, proved easy to engage. Young adults, who make up such a significant percentage of the population were much more challenging to reach, so we recruited City Health and Human Resource staff who fit that demographic. Low income and non-English speakers were specifically included across the age span, though again more challenging for young adult age range. Data sourcing for SDOH required engaging schools, police and other community based partners to augment the typical public health data available. To address challenges of physical and/or language access, meetings were held in community-based locations and simultaneous interpretation services were available.

Strong efforts were made to have CHA Strategy for a Healthy Somerville data collection and community listening sessions reflect both the CHA patient population and the vulnerable populations of Somerville. Outreach for the survey included community health workers with a range of linguistic and cultural experience spending time in primary care clinics and sending staff to novel community settings to engage young adults and men in the survey population. Engaged community members tended to be female, English speaking and Northern American/European; the CHA patient participants/Somerville residents in the survey were more representative of the language and race/ethnicity mix of both the clinical and community populations.

Key Findings from the Wellbeing of Somerville Report 2017:

It was clear from community meetings and stakeholder gatherings/focus groups that Somerville is considered a good community to live, work, play, raise and family and grow old. We learned that the population of Somerville is largely young adults (32% between 25-34 years of age) and continues to be more diverse than the state average (25% non-native born vs. 93%) and that the school population shows much more diversity than the overall population. Discussions among residents and providers, both old timers and new-comers, provided opportunities to talk frankly about what makes a city healthy for all. Changes in the community since the last assessment primarily centered on the rapid rise in cost of housing and the resulting shifts in the City and changes in the built environment such as new parks and development at Assembly Square. Topics that arose in multiple settings centered on issues threatening equity of lifelong health outcomes based on influencers such as poverty, trauma exposure, immigration status, and race/ethnicity.

When the community was challenged to find common health supporting themes from analyzing the data and from scanning community assets and resources, several areas emerged that were determined to impact individuals across the life span: accessing health promoting resources, strengthening social networks and support systems, promoting mental health and substance use prevention, increasing opportunities for healthy eating and physical activity, and addressing inequities in social influencers of health including affordable and safe housing, food, income, education, and safety. These became the focus areas for considering system wide policies and practice opportunities, as well as indications for programmatic priorities to be shared across multiple sectors. The interrelated nature of the influencers of lifelong health and the collective challenge to build resilience across many sectors were major learnings for many individuals and groups involved in the process.

Major Findings from CHA Strategy for a Healthy Somerville:

1. Health Education

A recurring theme from our Listening Sessions was the challenge of health "literacy," or the degree to which patients understand how to use their health care system. There is a clear need to provide appropriate education to patients around health care services. For example, this is particularly evident in patients' difficulty deciding between Emergency and Urgent Care facilities, understanding how Primary Care teams are structured, and accessing needed Mental/Behavioral Health services. A common theme of participants in both the survey and in the Listening Sessions was not knowing the difference between Emergency and Urgent Care, and in many cases, they are not even sure it is their choice to make. In addition, patients often do not understand that Primary Care practices are organized in teams so that multiple team members are available to help, and many practices have off-hours access.

Specifically, CHA could better support its patients in understanding Primary Care, Urgent Care, Emergency Care, Mental and Behavioral Health Services and Cultural barriers in accessing the U.S. health care system.

2. Access, Navigation, and Urgent Care

Both access (entry to the system) and navigation (finding your way around in the system) are issues for patients of CHA. Patients need to know who to see, when to see them, how to get there, and how to navigate their health care teams. We heard this consistently from providers as well as participants of the Listening Sessions. Participants in the Listening Sessions and the Advisory Group noted that there are long delays in making appointments (for both primary care and specialty care) across all health care systems. Additionally, when asked about emergency care, participants in the Listening Sessions and Advisory Group meetings noted the need for timely, efficient, and affordable access to care. When described, Urgent Care services were discussed and explained as an option.

At the request of the Advisory Group, data was provided by CHA regarding the utilization of the ED at Somerville Hospital. This data shows low utilization and low acuity, consistent with the experience described by many members of the Advisory Group. (See Appendix E for data presented by a CHA ED physician to the Advisory Group). This information makes a compelling

case to reach out to the community and to consider an informed decision about the ongoing operation of the ED.

3. Mental Health

As a broad category, Mental Health was a major concern. The survey results show that approximately 47% of CHA patients identified Mental Health as the issue of greatest concern to them (37% of non-CHA patients). In addition, 33% of CHA patients identified it as the issue of greatest concern to their families (30% of non-CHA patients), and 49% of CHA patients identified it as the issue of greatest concern to the community (53% of non-CHA patients). Within the category of Mental Health, we identified two specific groups: those who need treatment for serious mental illness (i.e. bipolar, schizophrenia) and those who need treatment for behavioral health issues often related to substance use (i.e. opioids, tobacco, vaping, "Juuling"). More discussion was devoted to behavioral health issues, rather than serious mental illness. Participants emphasized the importance of services that span the continuum of care in treating mental health issues, as well as the need for culturally-competent care in dealing with these and other health issues across all immigrant populations.

We heard favorable feedback during Listening Sessions and Advisory Group meetings on CHA's treatment of serious mental illness. However, an effective substance use continuum of care remains an issue that the health care industry, community, and payors have not addressed sufficiently. CHA cannot provide all the needed services in this area, but it must be one of many organizations working together to address this critical issue.

4. Technology

The use of technology in health care is growing and changing at a fast pace. CHA has had considerable success in implementing its electronic medical record (EMR) and now needs to leverage this experience to improve both the delivery of care and customer service. The need is to focus on ways to utilize technology for better access and convenience for CHA patients (i.e. scheduling by text) and to use evolving technologies such as telemedicine and remote access to strengthen the continuum of care for all populations.

5. Healthy Aging

The needs of the older population in Somerville seem to be well met, based on the input we received during a Listening Session with seniors. Participants in CHA's Elder Service Plan (ESP) are particularly satisfied with the services they receive. They have good access to needed health care, dental services, and related support services. This is an example of a successful "wrap-around" array of services, and perhaps should be considered a model for other populations (i.e. new families and teenagers). Interestingly, the survey results indicate that although CHA patients are happy with their care and did not list aging as a concern, a majority of non-CHA patients ranked aging as a major concern.

6. Stress

More than half of survey respondents identified stress as their greatest health concern. Additionally, among CHA patients taking the survey, 46% identified stress as the issue of greatest concern to their families and 41% said it was the greatest health concern in the community. In the Listening Sessions, attendees noted that the stress they feel is often related

to the social determinants of health such as the need for safe and affordable housing, access to healthy food, financial concerns, consistent employment, education, affordable day care, etc.

In addition to the major findings outlined above, there were other concerns that received significant attention in these discussions, including the need for more dental services, better use of technology in the delivery of care, the need to address domestic and gun violence in the community, and the expansion of Maternity/Pediatric services to meet the needs of the changing demographics in Somerville.

Factors that influence health
Forces at work in Somerville that are impacting health that were identified throughout include: the rapid increase in cost of housing making it more challenging for many residents to access safe and affordable housing, growing economic divide, health disparities by race/ethnicity, regulatory shifts impacting residents with non-resident status, and stressors often related to social determinants of health. Across the life spectrum, multiple issues were commonly raised such as: the high cost of childcare, access to health care, food security, need for more mental health services, support of lifelong protective factors from prenatal to older adults, impact of digital devices, and social isolation.

Rating of issues impacting health of self, family and community
Results from the 2018 Somerville surveys indicated the following rating of issues of health issues of greatest concern impacting one's own health, family and community.

Top 3 health issues:	1st	2nd	3rd
Own Health	Stress (56%)	Mental Health (41%)	Weight (31%)
Family's Health	Stress (50%)	Mental Health (33%)	Aging (24%)
Community Health	Mental Health (53%)	Substance Use (49%)	Food Access/Security (31%)

Identified Priorities from the Wellbeing of Somerville 2017 report, the following areas were identified as recommended priorities:

1. Access to health promoting resources for all
2. Strengthening Social Networks and Support Systems
3. Promotion of Mental Health and Substance Use Prevention
4. Increased opportunities for Healthy Eating and Physical Activity to prevent chronic disease (diabetes, heart disease)
5. Address disparities in Social Determinants of Health (housing, income/poverty, food, education, safety)

Recommendations from CHA Strategies for a Healthy Somerville:
Through community meetings, surveys and the Advisory Taskforce, the following recommendations were identified related to 4 major service gaps identified in Somerville:

1. Access, Navigation and Health Education

2. Improved Access to Mental Health and Substance Use Treatment
3. Urgent Care Access, including Navigation
4. Use of Technology for Patient and Community Engagement

Recommended CHIP Strategies:
The Somerville/CHA Health Care Advisory Group reached consensus on the following specific recommendations that were presented to Mayor Joseph Curtatone, CEO Patrick Wardell, and the CHA Board and that will be addressed collaboratively in the context of the Wellbeing report findings especially as related to stress and social determinants of health impacts:

1. Health Education/Access and Navigation

- Provide easy-to-read handouts in multiple languages to explain how to use the health care system, including when to use the ED vs. Urgent Care, and reduce stressors (time, confusion, expense). Special emphasis on immigrant and older residents.
- Evaluate and expand training for CHA phone staff and MAs in helping patients to access services, including providing a scripted explanation on when to use the ED vs. Urgent Care.
- Through visual aids, make use of the time patients spend in Waiting Rooms as an opportunity to provide information about CHA services.

2. Mental Health/Behavioral Health

- Improve the continuum of care by addressing existing geographic gaps, as well as identifying the gaps in care thus supporting substance use patients throughout the entire recovery spectrum.
- Provide more "Patient Resource Coordinators" and "Navigators" to provide needed support to patients who may be getting lost in the gaps.
- Provide and distribute information to patients, providers, and partners regarding who to call at the first signs of needed help and promote the use of existing resources. Examples of such resources are the Hot Line available in multiple languages and state-wide Emergency Services Programs which provide mobile crisis teams offering community-based emergency services to individuals as an alternative to hospital EDs.

3. Urgent Care

- Establish a CHA Urgent Care service in Somerville to address the issues of access, convenience, and affordability and to support the continuity of care.
- Assess the potential to locate Urgent Care services at Somerville Hospital, including engaging the Somerville community in a genuine, transparent process that balances the need for Emergency Services and Urgent Care in the community. This consideration was introduced by the Facilitator and evolved after much discussion and review of the data presented.
- The transformation of the ED to an Urgent Care center must involve the Somerville community in an open process. This was an emotional discussion for the Advisory Group, yet the group recognized that the data supports this recommendation.

- CHA should continue the analysis on future demand and utilization of services to ensure that it is well-positioned to meet community needs.

4. Technology

- As part of a Health Education strategy, leverage technology to enhance customer service, especially improved access and convenience for CHA patients (such as remote appointments, group appointments, scheduling by text, etc.).
- CHA has been a leader in implementing an EMR (EPIC) and in providing interpreter services technology. As a next step, CHA needs to leverage emerging technologies such as telemedicine to improve the delivery of care for all populations. This is happening within Harvard Vanguard, BIDMC, and other systems.

Supporting Documents available:

*Note that Committee lists are noted by * within other folders*

- Wellbeing report Advisory Committee
- WB Committee and support team and focus group committees/contact
- CHA Strategy for a Healthy Somerville Advisory Taskforce
- DON Advisory list

Wellbeing of Somerville 2017 Report Community Meetings, examples:

1. Sign-up Sheet from April 2016 meeting
2. Somerville Food Security Coalition and Shape Up Somerville Steering Committee joint mtg report- July 21, 2016
3. Notes Early Childhood Advisory Council- Jan 10, 2017
4. Notes from WB presentation/discussion with Somerville YouthWorkers Network- Jan 19, 2017
5. Notes from SomerStat/Health Stat meeting- March 21, 2017
6. Community Meeting April 27, 2017: 1)notes by life stages, 2) rough notes & participant survey questions, 3)Orientation and schedule for volunteers, 4) invitation.
7. Health and Human Services WB focus for All Staff meeting May 2017

Wellbeing of Somerville 2017 report development

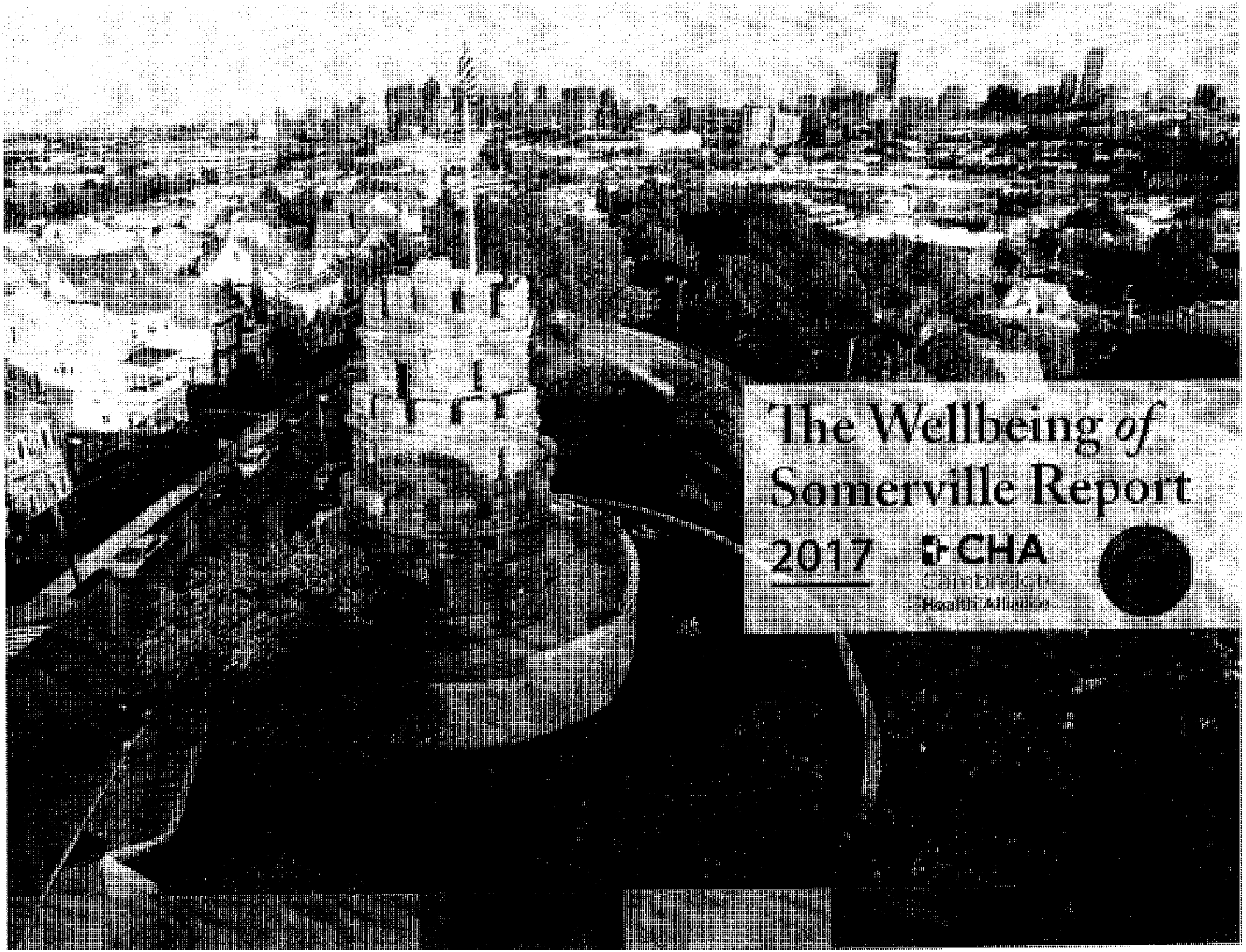
- 2011 Review
    - PPT presentation on review
    - Assessment report on 2011 WB recommendations
- WB Committees
    - WB Advisory Committee*
    - WB Advisory and Support Team & Focus Group contacts*
- WB Focus Groups 2018
    - Jan 2018 OST Focus group notes
    - Feb 2018 ECAC Focus group notes
    - July 2018 Women's Commission notes
    - WB report- teach it forward worksheet
    - WB Bingo example for Early Childhood
    - WB Bingo for Womens' wellbeing
- WB report One-page documents
    - PDF of all pages combined
- WB Nov 2018 launch event
    - WB Som 2017 Launch PPT images
    - WB Report Press release
- Assessing the Wellbeing of Our Communities CHA presentation (2018)
- Somerville Health Happenings example from August 2019

CHA Strategy for a Healthy Somerville

- CHA Strategy Committee
    - Invitation letter to Committee members
    - Advisory group*
    - DON Advisory Group*
- CHA Strategy reports from consultant
    - Final Report Somerville Strategy June 2018
- Meetings CHA Strategy
    - Advisory Meetings schedule and attendance
    - Listening Sessions flyer and sign in sheets (2018)
    - Community Listening Sessions (2019)
    - Presentations for 2019 Community Sessions
- Somerville Surveys 2018
    - Somerville Survey reports
    - Somerville surveys (4 languages)

Attachment/Exhibit

C


The Wellbeing of Somerville Report
2017
CHA
Cambridge
Health Alliance

Guiding Questions

The Wellbeing Report provides data about the health of our community's residents. This data and related information, based on life stages, is intended to spark conversation towards identifying priorities and developing a community health improvement plan. To facilitate this ongoing process, we encourage readers and the broader community to engage with the following questions as overarching considerations for the future of Somerville. As you read about each life stage, or walk down a Somerville street or strategize on the role you and/or your organization fulfill in the city, please be guided by the following:

- How can a community access current, reliable and timely data to inform dialogue, deliberation and planning to improve health and wellbeing for all?
- As the city's demographics evolve, how can services and resources adapt to meet these changes?
- How, as a community, can we plan, program and fund efforts to improve health outcomes across key life stages from prenatal to older adult in ways that recognize that many indicators are universal and interconnected across the lifespan?
- How does Somerville equitably balance the varied needs across all ages and all backgrounds of a diverse population?
- What are opportunities to actively build individual, family and community resiliency and optimism?
- What is YOUR contribution to ensuring that Somerville's environment is a healthy and welcoming place to live, learn, work, play, raise a family and age?

Welcome Readers!

You are invited into a wealth of data and information on the following pages. Please take a moment to scan the Guiding Questions to the left to help frame your exploration. To better understand the report, take a moment to read the Introduction and Data Guide pages during.

The core of the report brings together data and research related to health and social determinants throughout the life cycle, from before birth to end of life. Each of the life stage chapters ends with a page of recommendations to stimulate community dialogue and action to improve the health of residents of all ages.

For those with just a short amount of time, the Introduction offers a brief snapshot of some of the lessons learned through the process of developing the report. The Data Guide provides a more in-depth look at some of the different data points for those interested in further exploration. Be sure to also read the Data Source, Limitations and Glossary.

Enjoy learning about Somerville's health and wellbeing!

Cover photo by Eric Kilby - https://creativecommons.org/licenses/by-sa/2.0/legalcode

Dear Somerville Residents,

The City of Somerville in partnership with Cambridge Health Alliance (CHA) is pleased to present you the *Wellbeing of Somerville Report 2017*. This report represents a multi-organizational effort to gather, analyze and summarize data on the health status and conditions that impact health for the residents of Somerville. This data will be used to inform planning, programming, and budgeting to improve current and future action that will have a positive impact on the health of Somerville residents.

City-specific data combined with additional data available through multiple sources inform this assessment. In the *Wellbeing of Somerville Report 2017* you will find data on key indicators, organized by the stages of life, exploring factors that influence life long health and wellbeing of individuals and the community — creating a snapshot of health in our community, in the current context. Our goal with this assessment is not to prioritize health issues — that activity is part of our key next steps.

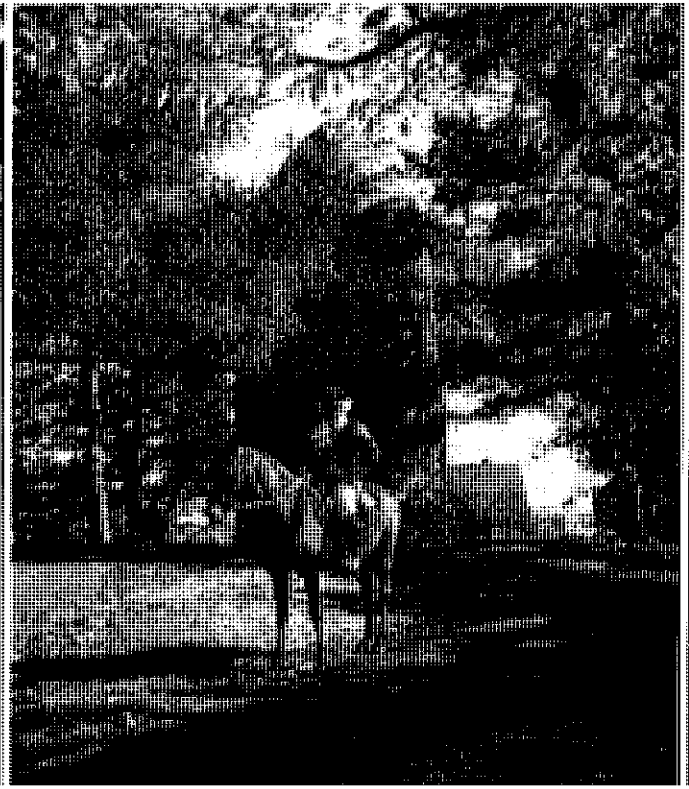
Somerville has a long term commitment to using data to inform decision making and innovation. This approach has helped to create a highly desirable community in which to live, work, play, raise a family and grow old. Following the release of this report, we will collectively continue to engage community members and stakeholders through additional opportunities for feedback and comments.

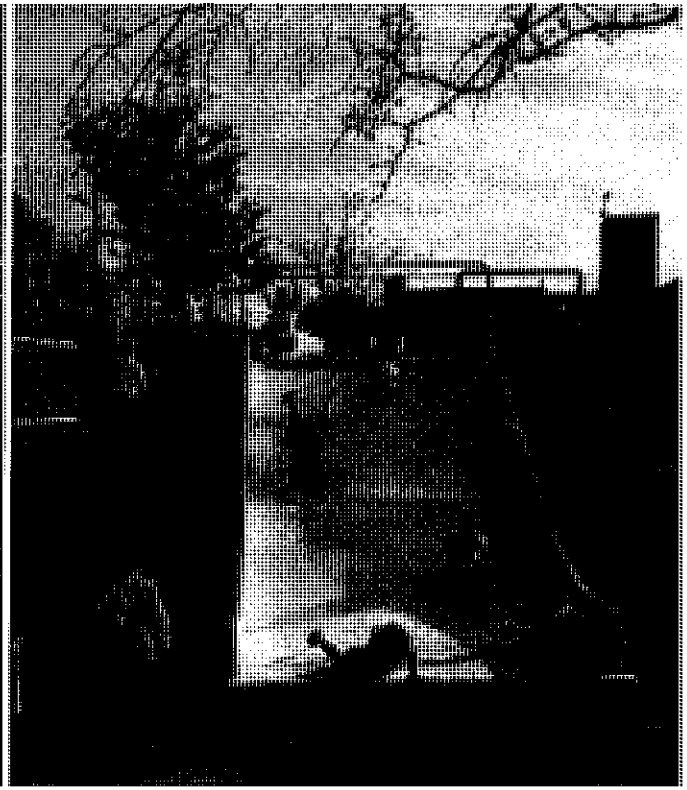
Working from this assessment, the City of Somerville's Health & Human Services (HHS) Department will convene a Community Health Improvement Planning process, gathering community input to identify both priority areas for action as well as agencies and partners to collectively address these issues. This will be part of a multi-year process for HHS working toward national accreditation. These conversations will also inform the ongoing Population Health and Community Health Improvement work at CHA, as part of the commitment to improving the health of Somerville residents.

Public health is a shared responsibility. Improving the health of our community will not happen overnight, nor will it happen when incredible institutions work alone. We must work together, across many sectors to shift factors that influence health and wellbeing across the lifespan. Local health providers, City administrators, community agencies and concerned individuals in Somerville have a strong tradition of collaborative action to create a healthier community for all. We hope you find this report informative and that it inspires you to participate in the City's Community Health Improvement Planning Process and CHA's Population Health efforts in the future.

Joseph A. Curtatone
Mayor
City of Somerville

Patrick R. Wardell
Chief Executive Officer
Cambridge Health Alliance





The Wellbeing *of* Somerville Report

2017 CHA Cambridge Health Alliance

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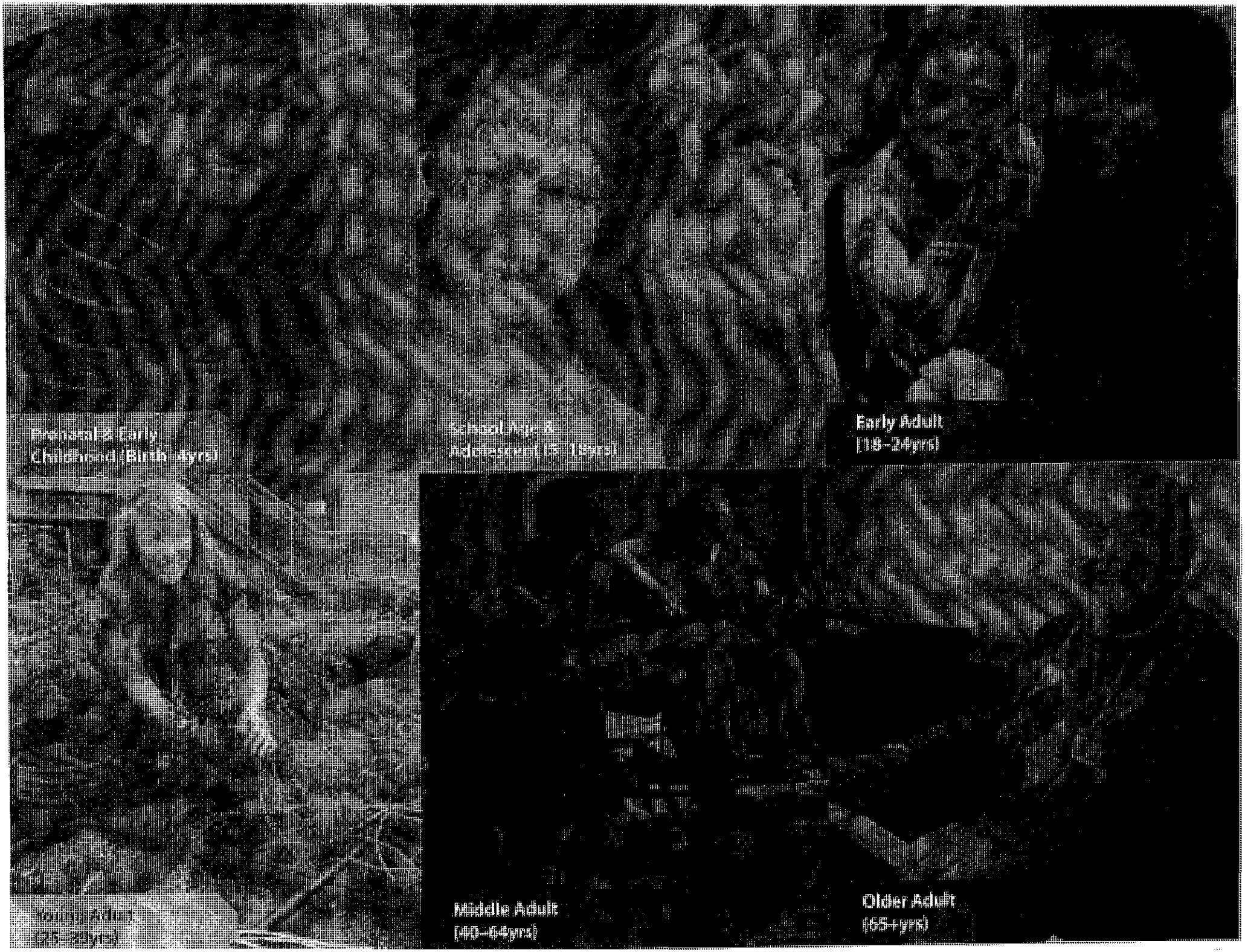

Prenatal & Early Childhood (Birth-4yrs)
School Age & Adolescent (5-18yrs)
Early Adult (18-24yrs)
Young Adult (25-39yrs)
Middle Adult (40-64yrs)
Older Adult (65+yrs)

Introduction and User Guide

What is the Wellbeing of Somerville Report?

Somerville has a long-term commitment to using data to inform decision making and innovation. This approach has helped to create a highly desirable community in which to live, work, play, raise a family and grow older. For decades, local health providers, city administrators, community agencies and concerned individuals have had a tradition of gathering periodically to review available health-related data, analyzing the data and developing recommendations for future collaborative action based on discussion and dialogue.

The Wellbeing of Somerville Report is the result of such a process. The intention is to provide a tool for local leaders, community agencies and other stakeholders to learn together about the public health issues of the community. The purpose is not just to inform, but to inspire action. Key recommendations listed may help guide Population Health efforts at Cambridge Health Alliance and a Community Health Improvement Planning process to be led by the City of Somerville Health and Human Services Department, as well as community led initiatives.

Why create the Wellbeing of Somerville Report 2017?

Opportunities for better health begin where we live, learn, work and play, according to the Association for Maternal and Child Health Programs. This is a natural complement to the overarching Somerville vision, which often adds related language - "and a good place to raise a family and grow older." This vision of urban living also complements the World Health Organization's broad definition of health, put forward in 1946, as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity."

The past century has seen monumental improvements in the overall health and life expectancy of individuals in the U.S. and around the world. However, at the beginning of the 21st century, there are still substantial gaps in health and wellbeing for many vulnerable groups, including here in Somerville. These gaps have the potential to widen in the face of uncertain economic and political times and result in continued social inequities. Research suggests that certain populations are at a greater risk for certain ailments as a result of their race, social

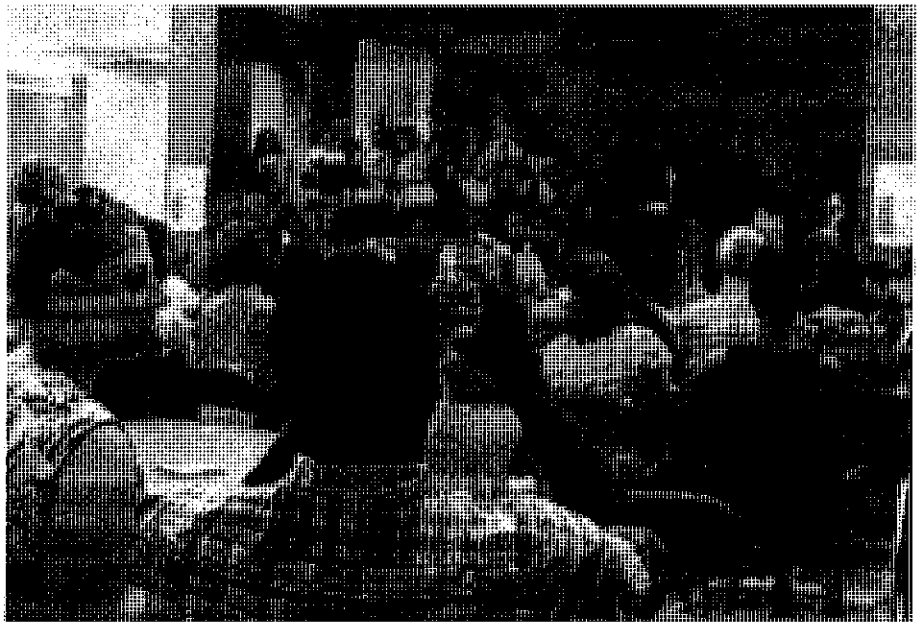
"One who has health has hope and one who has hope, has everything."

–Arabic Proverb

connectivity, neighborhood, economic status and education. These social phenomena can impact an individual's access to preventative care, health education and health resources, leading to physical and mental health concerns.

Somerville is a unique city with a lively and diverse population that is dynamic and shifting over time. Even here in Somerville, despite concentrated efforts, the data indicates there are continued health disparities based on race/ethnicity and socioeconomic status. This 2017 report examines public health topics included in the national Life Course Maternal and Child Health Indicators and Healthy People 2020 goals, as well as social determinants of health topics. It raises policy or programming opportunities to help address gaps, with an increased focus on decreasing social inequities. An ever-growing body of research makes a strong case that reducing social inequities is good for everyone.

The partners who created the Wellbeing of Somerville Report 2017 are committed to promoting a healthy community - a place where every resident can thrive. A healthy community fosters interaction between people from all walks of life, representing diverse lifespan and healthspan experiences.



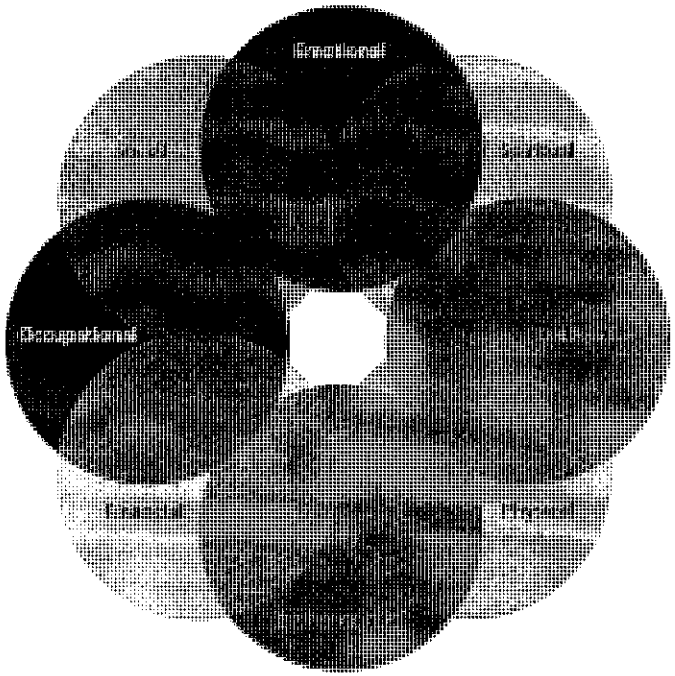
There is also a hope that the very process itself, of gathering data and convening groups across the city to discuss what the data means and to propose potential next steps, helps to raise awareness and stimulate a call to action to benefit those most impacted by health disparities and inequities. Equity has been defined as the "just and fair inclusion into a society in which all can participate, prosper, and reach their full potential." Eliminating systemic barriers requires sustained systemic changes. How can we in Somerville come together to end persistent differences in who is most impacted by specific health issues? How can we commit existing resources to activities that will move the entire population towards improved health and wellbeing across the lifespan? The process of creating this report is only one step in trying to answer such questions, hopefully serving as a catalyst for ongoing examination and exploration of how to create a healthier community for all.

What is Wellbeing?

Wellbeing is comprised of numerous dimensions that influence an individual's quality and duration of life. This is broader than just the traditional definition of health. Wellness is achieved through the interaction of physical, mental and social factors that help people to thrive and flourish. There are many models of wellbeing, or wellness. Topics included in a national measure of wellbeing, the Gallup Sharecare Wellbeing Index project which has surveyed Americans since 2008, include: a sense of purpose, social relationships, financial security, relationship to community and physical health.

The Eight Dimensions of Wellness, are highlighted in the Wellness Wheel in Image 1, as promoted by the National Substance Abuse and Mental Health Services Administration (SAMHSA). The interconnectedness of factors that impact wellness has strong correlations with

IMAGE 1: The Wellness Wheel



both health across the lifespan and the impacts of social determinants of health. Strategies to promote wellness need to be inclusive of the full range of factors, helping to develop strengths and assets around the Wellness Wheel. Initiatives such as SAMSHA's wellness efforts recognize the ability to develop and hone resilience skills. At some time in most people's lives, there will be stressors or trauma; resilience is the capacity to adjust and adapt to the impact of resulting difficult circumstances. If some dimensions of an individual's life are well developed and supportive, that can help offset challenges in other domains as they arise. Also, such frameworks can assist communities in selecting strategies and approaches that can address the holistic nature of wellbeing, recognizing the importance of where a person "lives, works and plays" in supporting or challenging one's ability to achieve and sustain health and wellbeing. Individual, family and community engagement are central to this work.

Changes in the health care environment since the 2011 report:

Since the development of the 2011 report, there have been significant changes in the health care landscape nationally. The passage of the Patient Protection and Affordable Care Act (ACA) was signed into law in March 2010 with two major aims - to expand health insurance coverage and to reform the delivery system for health care in the U.S. The law brought into motion changes that increased the number of people covered by health care insurance at the national and the local level. This was partly made possible by federal subsidies and the expansion at the state level of Medicaid programs to include coverage for adults at 138% or less of the federal poverty level. Also, young adults were allowed to be covered under their parents' coverage as dependents up to age 26.

The impacts on the healthcare system are aimed at achieving the goals of improving health outcomes, while lowering costs and improving health insurance access. Some of the strategies put into action by the ACA include: changes to the reimbursement system; linking payment to providers of health services to performance measures; changes in how health care delivery is organized, with the advent of Accountable Care Organizations intended to provide integrated comprehensive services at a set cost for a defined population, initially beneficiaries of Medicare, and later expanded to Medicaid (known as MassHealth in Massachusetts); and changing the future health care workforce through investments such as the National Health Service Corps to increase the number and distribution of primary care providers. At the time of this publication, the future of the ACA has been the topic of debate at the national level and its future is uncertain.

Socioeconomic factors and the contexts of people's lives influence their health and are critical to changing population health outcomes. Social determinants of health are increasingly part of discussions in varied service sectors committed to promoting health and wellbeing.

The passage of the Affordable Care Act triggered changes in health care delivery that increased the number of people covered by health care insurance at the national and the local level. Additionally, the ACA has impacted how the health care system interacts with communities, initiating a shift to a broader definition of population health, not focused exclusively on patients covered by a provider or insurer. (National Academies Press)

This approach to population health is emerging with more emphasis on the health outcomes of the residents in a particular geographic area. Related strategies expand expectations of who needs to be engaged in addressing the root causes of poor health outcomes, recognizing the role of multiple stakeholders such as schools, organizations in the community and business in tackling the issues that create barriers to health for all.

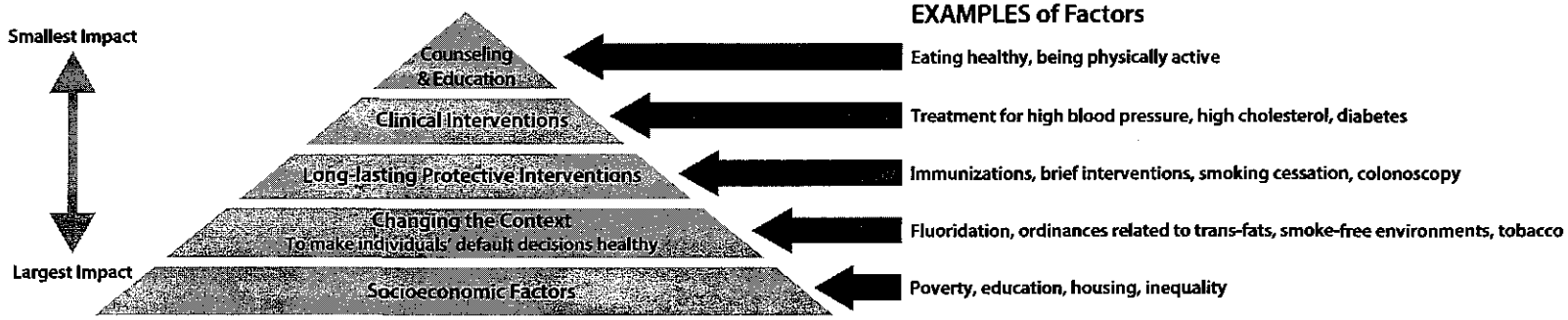
The City of Somerville has taken some early steps towards this expanded view of population health. Partnerships with healthcare providers such as CHA and other community providers will continue to be critical to meeting the needs of the local population and improving community health.

The reality of how these two approaches work together to improve health outcomes for a population, such as the residents of Somerville, is still a work in progress, yet very relevant to moving recommendations of this report into plans of action with the necessary players and resources to best meet needs and improve community.

The Center for Disease Control (CDC) Health Impact Pyramid (Image 2) is one model that looks at multiple factors that affect health. In keeping with the estimate that only 10-20% of health outcomes are attributable to health care from the medical system, the pyramid emphasizes the greater impact of strategies that impact closer to the base of the pyramid, such as addressing socioeconomic factors. Each level provides opportunity for some impact, moving towards policy changes and investments that can impact the foundations of health and wellbeing and address the issues of inequity.

Socioeconomic factors and the contexts of people's lives influence their health and are critical to changing population health outcomes. The role of social determinants of health is increasingly part of discussions in health care systems, the education system and other service sectors committed to promoting health and wellbeing. Residents are unlikely to be able to directly control many determinants of their health such as how many sidewalks, bike paths or playgrounds, healthy food sources or major highways are in close proximity to their homes. The need for policies and programs that address both these determinants and societal level factors such as poverty and racism, requires collective action by community leaders and policy makers.

IMAGE 2: Center for Disease Control Health Impact Pyramid: Factors that Affect Health



Why the new focus on health across the life stages?

The literature related to Life Course Theory provides perspectives for exploring the health and wellbeing of Somerville residents. The Association of Maternal & Child Health Programs (AMCHP) facilitated a national effort to develop a set of Life Course Indicators (LCI). These indicators span the course of life, from prenatal onward, looking at issues that influence health outcomes including a wide range of elements beyond biological factors, expanding to include community and societal risk and protective forces, as well as policies. This approach is inclusive of the cumulative social and environmental elements across a person's lifetime of experience, providing insights into the connections between health and one's childhood experiences, as well as offering a window into the additive effect of inequities (AMCHP).

For instance, research shows that both positive and negative childhood experiences influence health throughout life. The impacts of adverse childhood experiences (ACEs) are connected to a long list of possible negative health outcomes, increasingly recognized as a public health issue (CDC). Healthy communities can support resiliency in children through nurturing relationships and by tackling systemic inequality.

The life course approach provides a way to strategize effective actions to improve health over the entire lifetime. It also promotes an integrated, holistic and innovative way to look at health and ways that a community can promote health through interventions ranging from before birth to older adults. National health data indicates that some health issues such as infectious disease management have seen improvements, but that health disparities have become persistent and have not been shifted within the present paradigm. This approach also highlights that in order to promote health and wellbeing, health care and public health need to join forces with other providers and perhaps new stakeholders to reduce health inequities through structural systemic changes in existing systems that hinder equal opportunity for optimal health for all.

Life Course Indicators span the course of life, from prenatal onward, looking at issues that influence health outcomes including a wide range of elements beyond biological factors. This approach is inclusive of the cumulative social and environmental elements across a person's lifetime of experience providing insights into the connections between health and one's childhood experiences, as well as offering a window into the additive effect of inequities (AMCHP).

Across the life course, interventions can be specifically tailored to each age group to provide the most successful prevention approaches possible. Early prevention and intervention have become core to promoting public health. There are certain determinants of health which are risk factors and others which are considered protective factors for health outcomes. Family and community risk and protective factors can increase or decrease the odds of poor health outcomes. Risk factors and protective factors are cumulative, meaning that individuals with more risk factors are more likely to have multiple or worse negative health outcomes, while those with many protective factors are at a reduced risk for negative outcomes. Individual risk factors can have multiple outcomes. For example, an adverse experience such as the observation of or experience of abuse is associated with later anxiety as well as depression and substance abuse.

The ability to live a full life across the lifespan, beyond the absence of disease, is increasingly referred to as healthspan. The formal definition of healthspan is "the period of a person's life during which they are generally healthy and free from serious or chronic illness" (Macmillan Dictionary). Recommendations for community action, related to addressing health needs from a life course perspective, and to promote quality of life for all, tend to focus on the following strategies (AMCHP):

- Addressing alignment and organization and delivery of both individual and population-based health services
- Exploring linkage of health services with other services and supports such as education, social services and community support networks
- Promoting transformation of multiple environments to promote health, including social, economic and physical environments

"Knowing is not enough; we must apply. Willing is not enough; we must do." – Goethe

Throughout the following chapters, public health data is interspersed with information available on various social factors that impact health and health equity. These include topics such as access to healthcare, education, economic stability, neighborhood and built environment and social and community context. Please note the following related to data when reading:

- Bulleted narrative related to data will be presented in sans-serif font.
- Public health data, even when available, is often on a delayed release timeline and can be outdated by the time it is officially reported, so it may tell the story of trends or health in the past better than in the present moment.
- Multiyear average estimates are utilized across the book; based on larger sample sizes they are therefore more reliable and give more precise estimates when analyzing data for smaller populations.
- When local data is not available, regional, state or national measures are utilized to better understand the topic's impact. For some data, age ranges available may not exactly correspond to the report age ranges.
- Charts depicting data are illustrative of only some of the information on any particular topic. Bullet points following a data chart are not necessarily directly related to that chart, but will be thematically or topically related. In a series of bullets, if the data source is the same, it will only be listed for the first item. In some charts, data has been rounded.

With the exception of the Demographics chapter, information is generally located in the life stage where it was seen to have the most potential impact. Please explore at least several of the life stage chapters to gain a sense of the range of factors impacting health across the lifespan.

Health indicators that are a subset of either the Life Course indicators (LC) or the CDC Healthy People 2020 (HP2020) indicators and are often noted as such by reference numbers included in the text. These reference numbers allow those who would like to more fully explore the impact of these factors on lifelong health and wellbeing to do so with ease by reading the related national documents.

The appendices include; Appendix 1 for data sources, Appendix 2 with full citations for sources and Appendix 3 provides a glossary of related terms. Readers are also encouraged to scan the glossary before beginning to read the Report to become familiar with relevant terms and concepts. For more in-depth information on some of these topics, links are provided for further exploration. The companion electronic version of the report, to be found on the websites of the Somerville Community Health Agenda and the Somerville Health and Human Services Department, will provide hyperlinks to resources for additional knowledge and context.

A final note from the authors: Readers are encouraged to become fully engaged in their own personal health to ensure lifelong wellbeing, as well as engaging in the health of the community, to help build and sustain a great place to live, work, play, raise a family and age in place. To continue discussion on topics introduced in the report and/or to participate in action planning to implement any of the range of recommendations, please contact the Director of the Somerville Community Health Agenda at Cambridge Health Alliance or the Director of the City of Somerville's Health and Human Services Department.

Demographics

Introduction

Somerville is located directly northwest of Boston, in Middlesex County, Massachusetts. In 2017, Somerville celebrated its 175th anniversary as an independent community, having been incorporated in 1842 after first being settled in 1629 as part of Charlestown. The 2016 estimated population was 81,322, an increase from the 2010 estimated population of 75,754. Due to its size of 4.1 square miles, Somerville is the most densely populated city in New England.

The city of Somerville has one of the largest populations of young adults in the country, with 32.3% of the population between the ages of 25-34. It has a long history as a gateway city, serving as home to various immigrant populations, reflected in the community's value of diversity. This trend continues with only 75.3% of Somerville's citizens native-born in the U.S., significantly lower than the state average of 93% native-born.

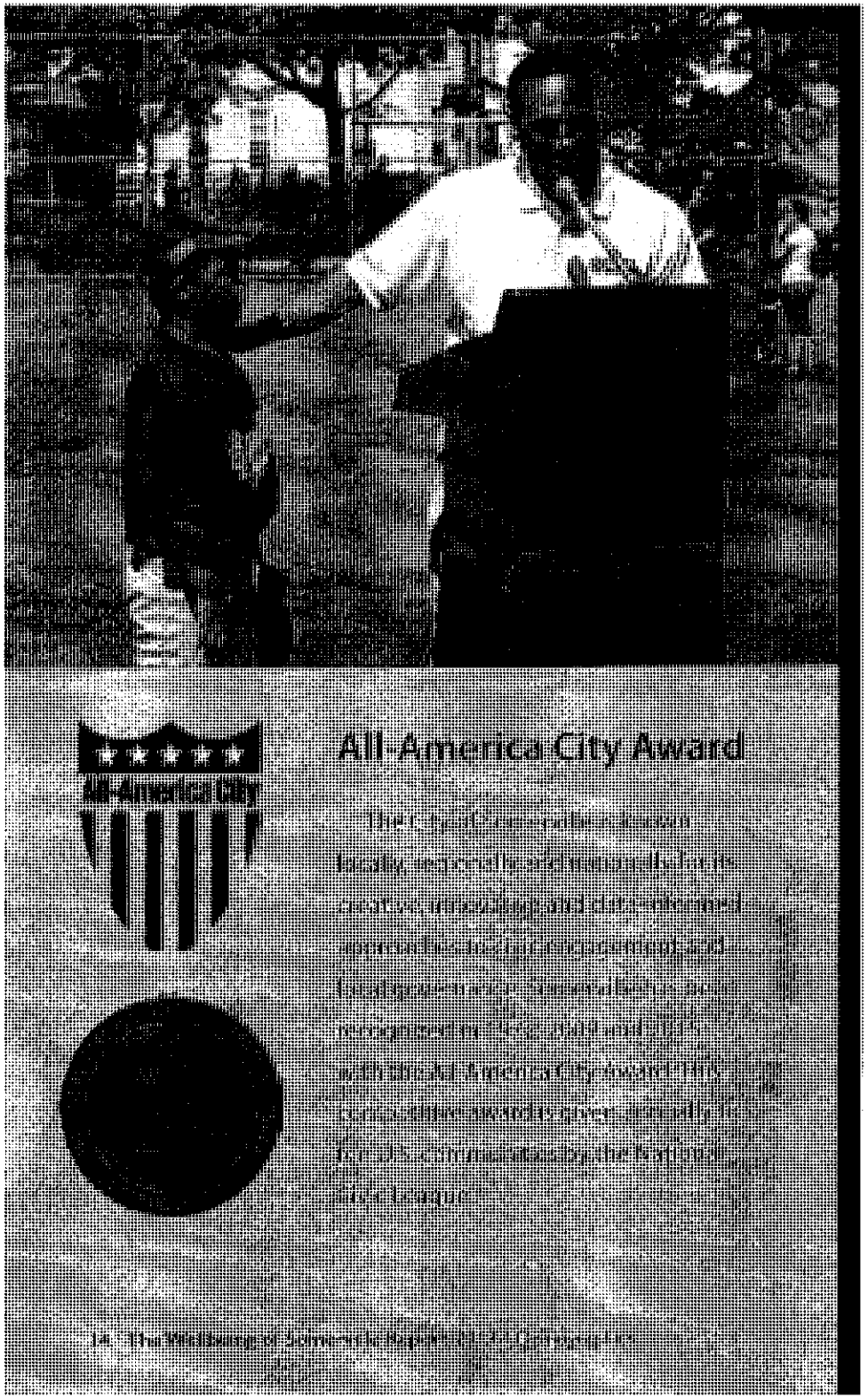
Since the 1800s, Somerville has been an industrial city, which supported a densely populated community with good local jobs and influenced the housing construction and infrastructure development. Building on a history including brickyards and a Ford Assembly plant, Somerville is once again fostering new business and development in technology, creative arts and health care. The residential and commercial development at Assembly Row, Brickbottom, Union Square, the old Ames Envelope site and the Green line transit extension are examples of more recent economic, community and infrastructure growth.

Changes in the housing market, especially between 2011-2017, have had a big influence on demographics. Somerville has historically been an affordable place to live, with convenient access to Boston, a key factor in its early and ongoing status as a "gateway" city, attracting new residents from all over the world. As the Greater Boston area has begun experiencing increased housing costs, so has Somerville. Since 2000, single-family home sales have increased in price by 112% while median rent has increased by 43%. Coupled with rising costs, the vacancy rates of 0.3% for ownership and 2% for rental units increases the pressure on finding affordable housing in Somerville.

The rapid escalation in home values has coincided with a higher percentage of Somerville residents of greater financial means. Newcomers are buying and renting properties at prices not previously

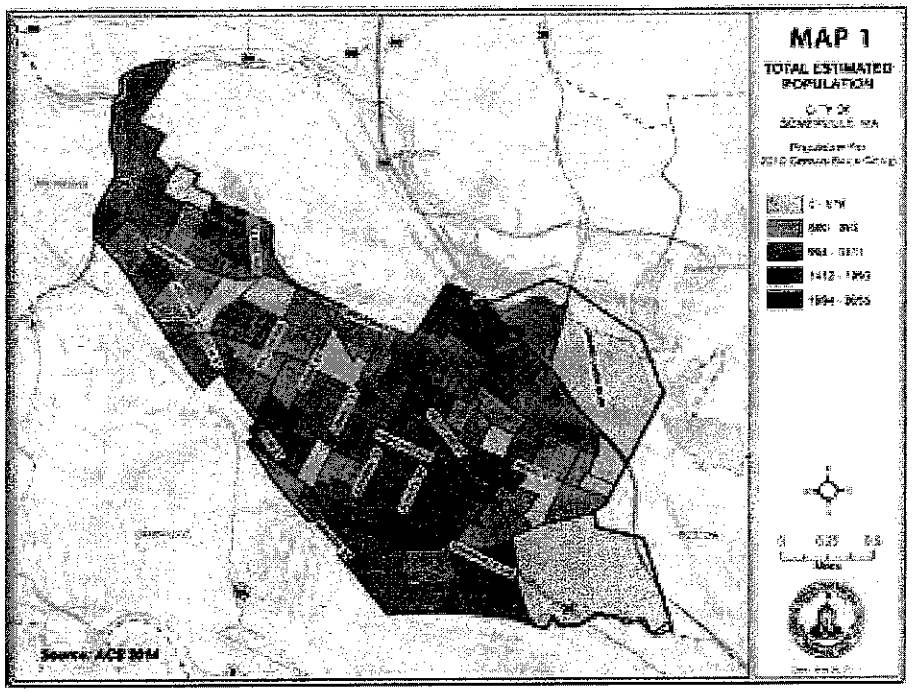
Somerville has one of the largest populations of young adults in the country, with 32.3% of the population between the ages of 25-34. It has a long history as a gateway city, serving as home to various immigrant populations, reflected in the community's value of diversity.

Demographics



seen in Somerville, yet they devote a lower percentage of their income to housing than has been the norm in the city. The median income for Somerville, as reported in the ACS (2011-2015), is $73,106 with 14.7% percent of people living in poverty. An estimated 22.7% of children under 18 were living below the poverty level, as were 14.2% of people 65 and over. An estimated 17% of families with children and 43.2% of families with a female householder and no husband present had incomes below the poverty level. With a limited supply of subsidized housing units for low-income individuals and families, the result of high housing costs has been a decrease in the percentage of housing available to residents (and potential residents) with moderate incomes and resources. Concurrent with these housing changes have been changes to the local retail environment, including the rise in specialty stores, restaurants, social and fitness establishments.

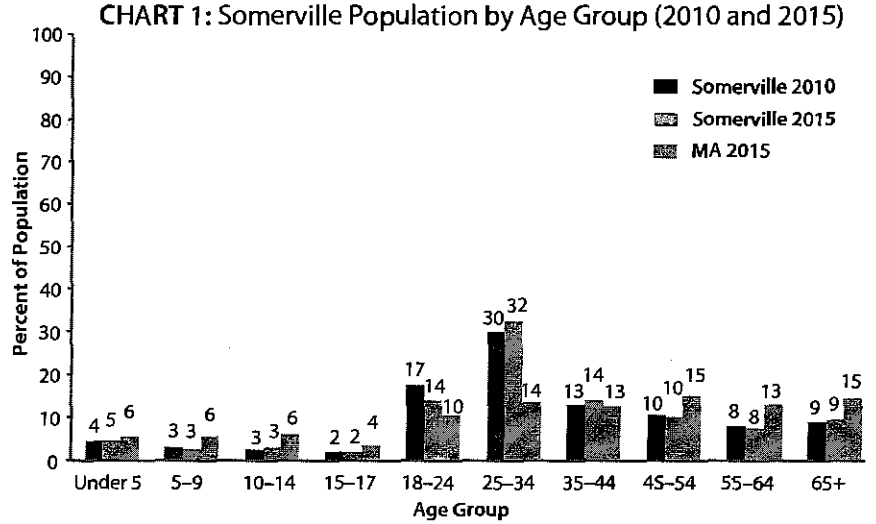
Population Data



A population density map of Somerville (Map 1) indicated the highest density was near Porter Square, Union Square and in the Mystic housing area of Winter Hill. Changes in the city since 2014, particularly in areas such as Assembly Row, where new housing units are being added, will continue to influence the distribution of the city's population.

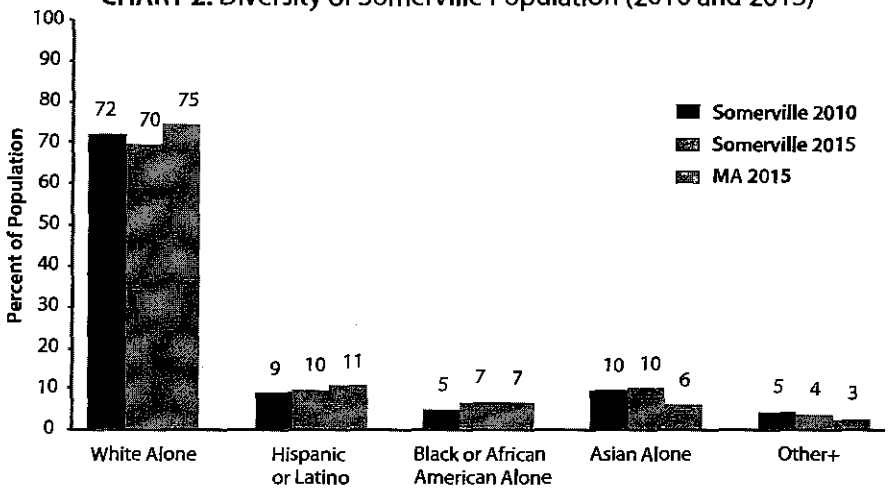
- Somerville is home to one of the largest populations of young adults in the country, with the 25-34 age group representing 32.3% of the total population (compared to just 13.6% statewide). Chart 1 shows this has increased from 2010 to 2015 (American Community Survey (ACS)).
- Reflected in Chart 1, the proportion of the Somerville population that was between the ages of 18–24 decreased by 19% from 2010 to 2015, from 17.4% to 14.1% of the total population, the largest change among all the age groups.
- Compared to the Massachusetts population, Somerville has a lower proportion of residents under the age of 18 and over the age of 45.
- Based on 2015 data, there were children under the age of 18 in 12.5% of Somerville households, with a range of family types.
- Based on the most recent ACS estimates from 2016, the population continues to increase each year, to a total of 81,322, an increase from the 2010 estimated population of 75,754.
- Between 2010 and 2015, the proportion of Somerville residents identifying as White decreased by 3%, while the proportion of residents identifying as Black increased by 39%, the proportion identifying as Hispanic or Latino increased by 10% and the proportion of those identifying as Asian increased by 5% (American Community Survey).
- The foreign-born population of the city as of 2015 was 24.7% of the estimated total. The top five countries of birth for foreign-born Somerville residents in 2015 were Brazil, Portugal, China, India, and El Salvador.

CHART 1: Somerville Population by Age Group (2010 and 2015)



Sources: Somerville and MA ACS (5-yr estimates)

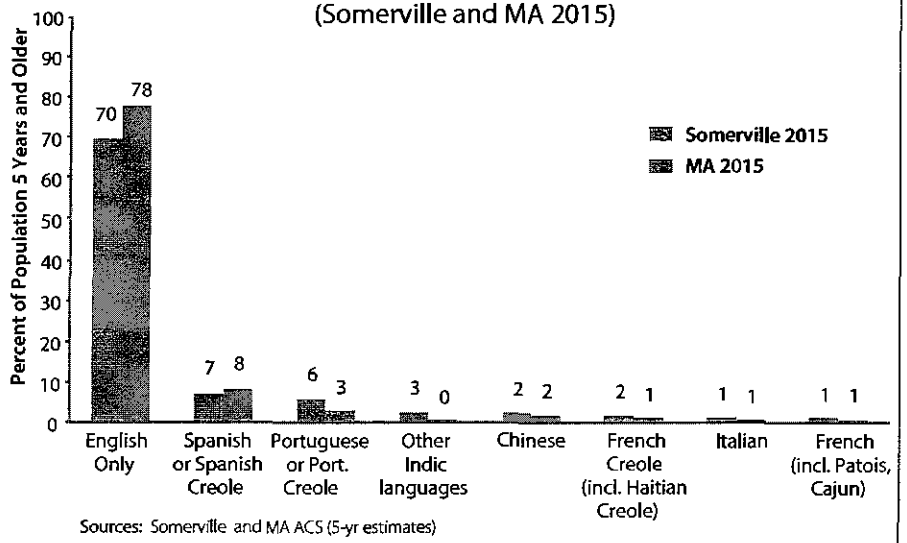
CHART 2: Diversity of Somerville Population (2010 and 2015)



Other+ includes: American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, Some Other Race, and Two or More races

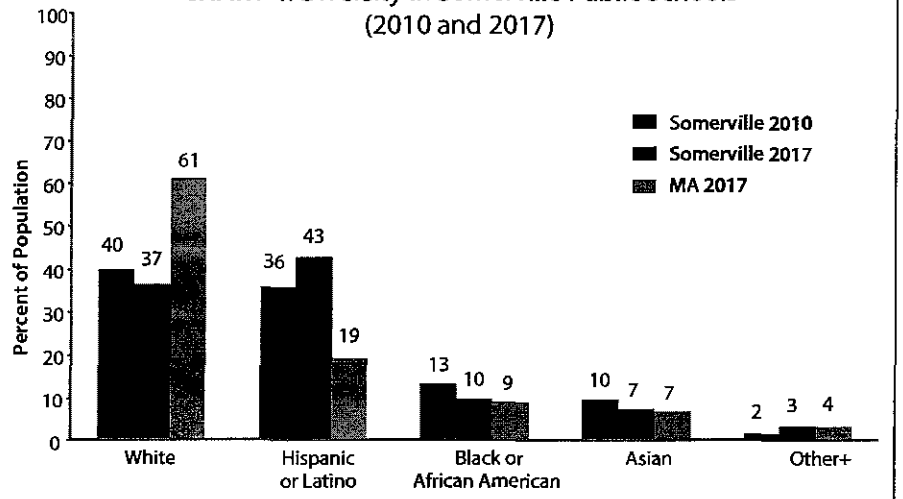
Sources: Somerville and MA ACS (5-yr estimates)

CHART 3: Leading Languages Spoken at home (Somerville and MA 2015)



Sources: Somerville and MA ACS (5-yr estimates)

CHART 4: Diversity in Somerville Public Schools (2010 and 2017)



Other+ includes: American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, Some Other Race, and Two or More races

Source: MA Department of Elementary and Secondary Education

- Generally, Somerville has a greater diversity of languages spoken at home than the rest of the state. Spanish and Portuguese are the leading non-English languages spoken in Somerville as seen in Chart 3. Since 2010 the percentage of Somerville residents speaking Spanish and Portuguese at home has shown some decrease (American Community Survey).

- Chart 4 highlights the demographics of the Somerville school population, dramatically different than the overall city population. The White population in Somerville Public Schools was 37% in 2017, with a rise in the Hispanic/Latino population to 43%, much higher than the state level of 19% (MA Department of Elementary and Secondary Education 2017).

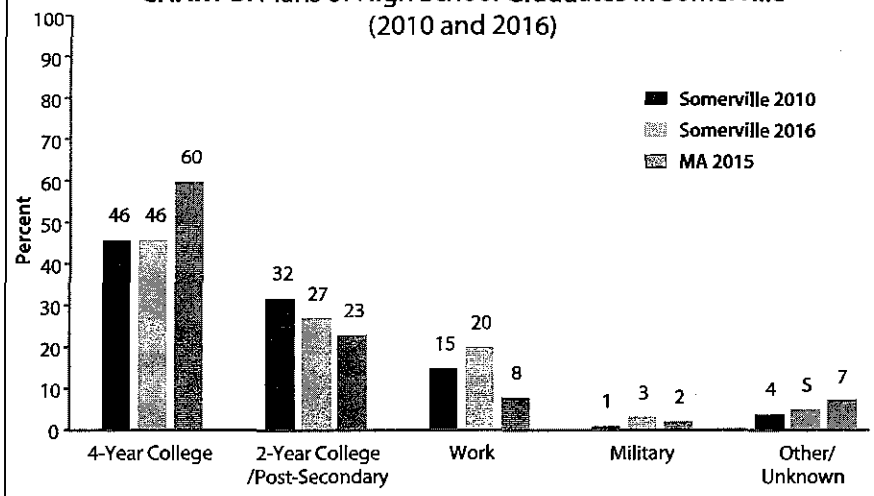
- Of the 4,931 students enrolled in the Somerville Public School System, 60% are designated as "high need" (including a number of variables), 39% are economically disadvantaged, and 49% speak a language other than English at home.

- Compared to Massachusetts' students as a whole, Somerville students are much more racially and ethnically diverse.

- According to Somerville Public Schools, over 51 languages are spoken in students' homes. Spanish is the most common non-English language, spoken at home by 27% of students in 2016, followed by Portuguese (9.3%) and Other Language (12%) (Somerville Public Schools 2016).

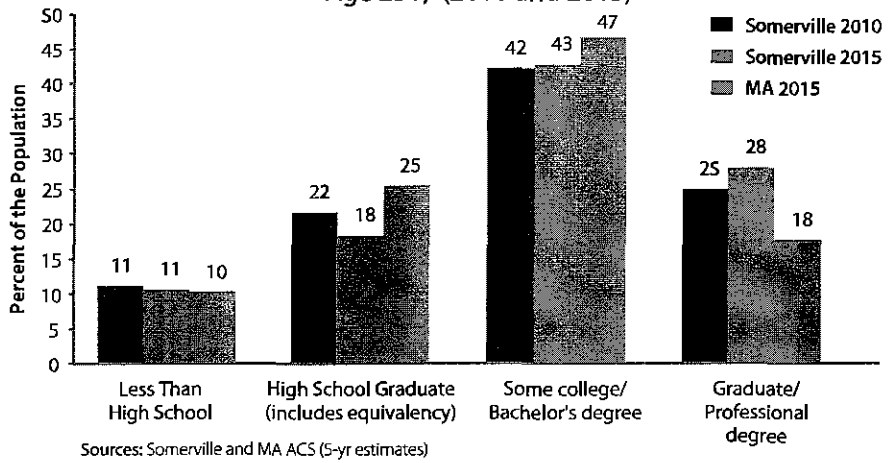
- During the 2016 school year 19% of the students were identified as English Language Learners (MA Department of Elementary and Secondary Education 2017).

CHART 5: Plans of High School Graduates in Somerville (2010 and 2016)



Source: MA Department of Elementary and Secondary Education, School and District Profiles

CHART 6: Highest Educational Attainment in Somerville Age 25+, (2010 and 2015)



Sources: Somerville and MA ACS (5-yr estimates)

Education

- Chart 5 shows no change in the percent of Somerville high school students planning to attend a 4-year college upon graduating between 2010 and 2016; however, fewer students planned on attending a 2-year college in 2016 than 2010, opting to enter the workforce or join the military instead (MA Department of Elementary and Secondary Education 2010 and 2016).

- Compared to Massachusetts, fewer Somerville graduates plan to pursue a 4-year degree. More Somerville youth are opting to attend a 2 year-program, enter the work force or join the military.

- The percentage of residents who are high school graduates or higher is 89.3%, while 10.7% of Somerville residents over the age of 25 do not have a high school diploma or equivalent (American Community Survey).

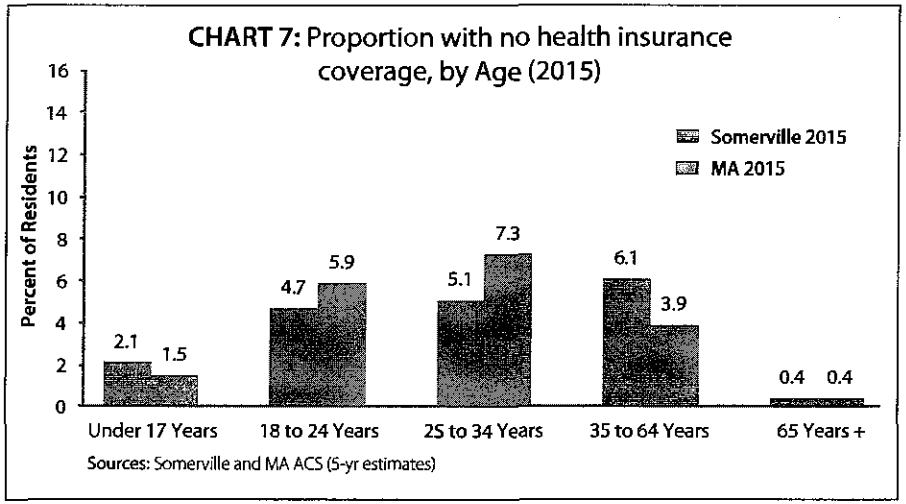
- Fewer Somerville residents than Massachusetts residents reported their highest education as some college or completion of a bachelor's degree, as seen in Chart 6, yet the percentage of Somerville residents 25+ who obtained a graduate or professional degree by 2015 was notably higher than the state percentage.

- The percent of the Somerville population 25+ who had obtained a graduate or professional degree rose by 12% between 2010 and 2015, while the percent who did not pursue some college after graduating high school (or obtaining an equivalent degree) decreased by 15%.

In Somerville, 8% of residents report having a disability, defined as a physical or mental impairment that has a substantial and long term adverse effect on the ability to carry out normal day to day activities. The likelihood of having a disability varies by age; 3% of people under 18 years old, 5% of people 18 to 64 years old and increasing to 38% percent of those 65 and over (ACS).

Access to Health Care

Overall, Somerville residents have a high rate of health insurance coverage. The Affordable Care Act provided additional options, though the future political and financial sustainability of those options is unclear at the time of this publication. MassHealth, the Massachusetts Medicaid program, provides health insurance coverage for low-income individuals, including children, pregnant women, individuals with disabilities, and seniors. Health Safety Net covers some healthcare for uninsured residents.



Health Insurance Coverage

- In Somerville, as of 2015, residents 35-64 were the least likely to have health Insurance, with 6.1% having no health coverage, higher than the state level for this age range, as in Chart 7 (American Community Survey).

- Overall, the rates of health insurance coverage have improved, though there are still residents who are uninsured. Slightly fewer Somerville residents of all ages had some health coverage than MA residents (95.5% with coverage in Somerville versus 96.4% covered in Massachusetts).

Economic Stability

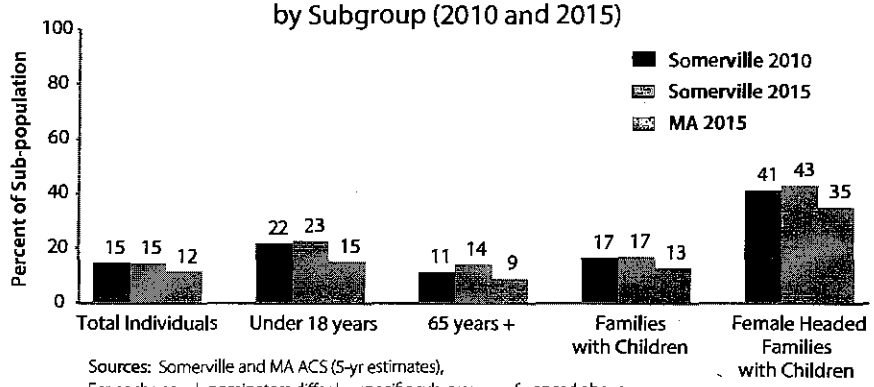
In the decade between 2005 and 2015, Somerville experienced more job growth, 24.5%, compared to 12.2% in other cities in the Metro North Boston area. Somerville continues to have one of the lowest unemployment rates in the Boston area, according to the Executive Office of Labor and Workforce Development. Somerville's unemployment rate is consistently below the Massachusetts and national rates, and the spread has increased over time. The number of jobs in Somerville has more than recovered after falling during the recession. Weekly wages are also on the rise. Recent development in Somerville has provided new economic growth.

A recent study by the Federal Reserve Bank of Boston noted that over 80% of Somerville residents with jobs do not work in Somerville. Nearly 30% commute to Boston, and just over 20% work in Cambridge. In a draft accessed in July 2017 of the Community Action Agency of Somerville's 2018-2020 Community Assessment Report and Strategic Plan (CARSP), it was noted that underemployment is a major challenge for low-income Somerville residents and that many are unemployed or underemployed because of a need for education or training. This is particularly, true for those who do not speak fluent English.

Poverty Data

- Somerville residents 65 years or older saw the highest increase in poverty between 2010 and 2015, though still lower than the poverty rates for residents under 18 years, families with children and female-headed families with children, as seen in Chart 8 (American Community Survey).
- The poverty rate overall in Somerville stayed the same between 2010 and 2015 at 14.7%. The poverty rate in Somerville is higher than in MA overall.
- State data from 2016 related to determining the SNAP food gap, based on a calculator from the Food Bank of Western Massachusetts, indicates that of Somerville residents who had MassHealth coverage, 54.7% lived in zip code 02145 (eastern side of the city), 27.2% in 02143 (central) and 18% in 02144 (West Somerville).
- According to the ACS 2011-2015 five year estimates, the Median Household Income in Somerville was $73,106. For 2006-2010, the Median Household Income was $61,731 (in 2010 dollars) or adjusted for inflation, 2010 Median Household Income was $67,098.80 (in 2015 dollars).

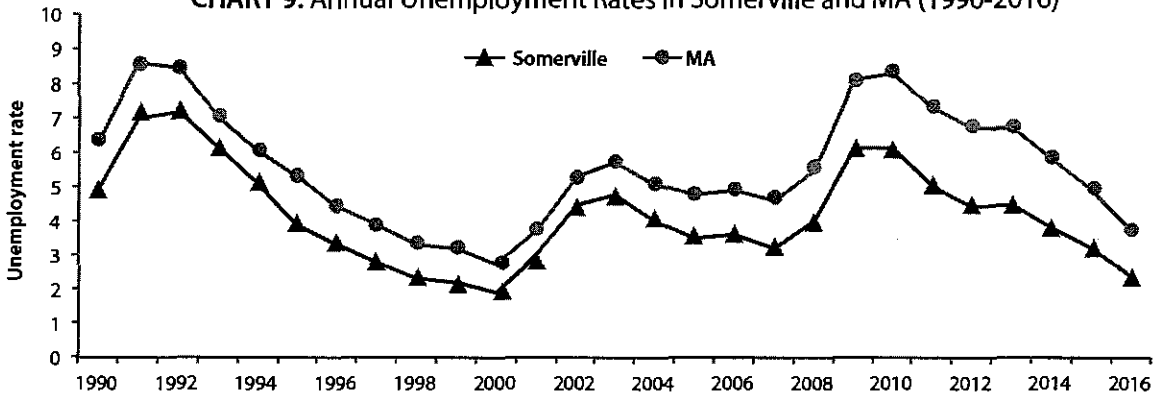
CHART 8: Trend in Poverty Rate for Somerville Residents, by Subgroup (2010 and 2015)



Sources: Somerville and MA ACS (5-yr estimates),
For each year, denominators differ by specific sub groups referenced above

- Of individuals identifying as "White alone", 11.8% were living in poverty, compared to 19% of Asians, 26% of Hispanics/Latinos, and 36.6% of African Americans, based on data available through 2015.
- Female-headed families with children are disproportionally impacted, with the highest rates of poverty at 43.2% based on 2015 data, a 2.6% increase since 2010 and consistently higher than the state rate.

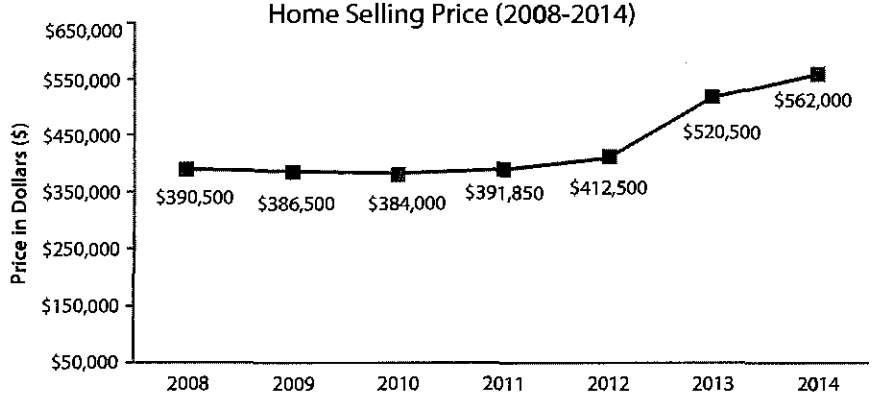
CHART 9: Annual Unemployment Rates in Somerville and MA (1990-2016)



Source: United States Department of Labor, Bureau of Labor Statistics
Annual rates for Somerville and MA are not seasonally adjusted

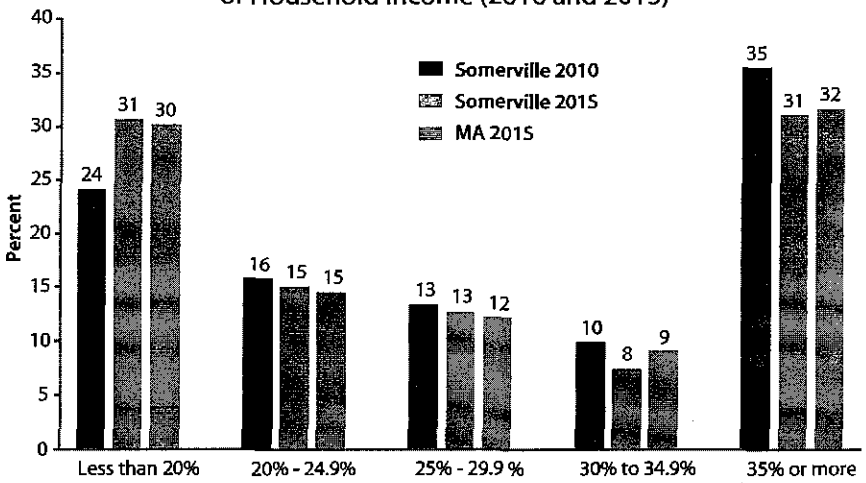
- In 2016, the unemployment rate in Somerville was 3.7%, the lowest it has been since 2000. Since at least 1990, the unemployment rate has been lower in Somerville than in MA, but has followed a similar trend (U.S. Department of Labor).

CHART 10: Trend in Median Single Family Home Selling Price (2008-2014)



Source: The Greater Boston Housing Report Card

CHART 11: Somerville Housing Costs* as a Percentage of Household Income (2010 and 2015)



*Costs are defined as mortgage owner costs or rental payments
Sources: Somerville and MA ACS (5-yr estimates)

Housing/Housing Security

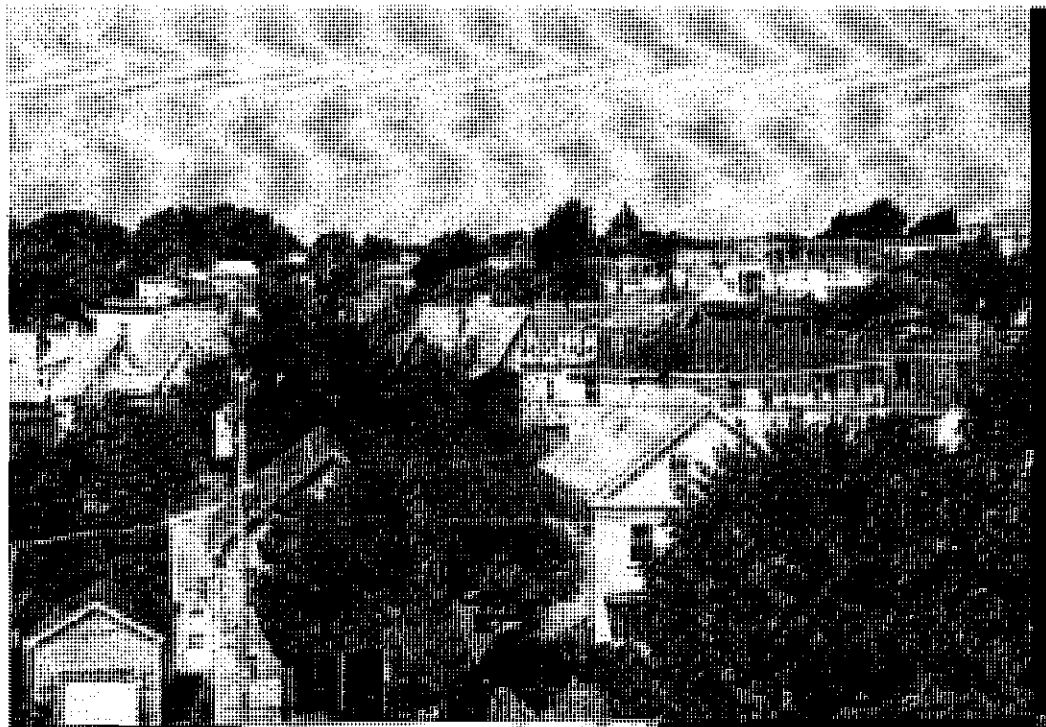
Somerville has 33,720 housing units, 65.2% of which were built prior to 1940. Rental units comprise 66% of the units; with 34% of housing units occupied by the property owners. According to the Assessor's classifications for housing structure types, as of Nov 2016, there were: 2,347 single families, 5,119 condos, 5,140 two-families, 2,305 three-families, and 663 buildings with 4+ apartments. There are 3,430 designated affordable units in Somerville. Of these, 112 are for homeowners, with the remaining 3,066 available as rental units. Low and moderate income Somerville households are challenged to affordable rental units that are of sufficient size for families. Extremely low vacancy rates also make finding housing more difficult.

- The average single-family home sale price in Somerville was similar for all years between 2009 and 2012, but then began to increase rapidly. In 2014, the median home selling price was $562,000, a 44% increase from 2008 (The Greater Boston Housing Report Card 2009, 2010, 2011, 2012, 2013, 2014-2015).

- Historically, since 2000, single-family home sales have increased in price by 112%. Median rent has also increased by 43% since 2000.

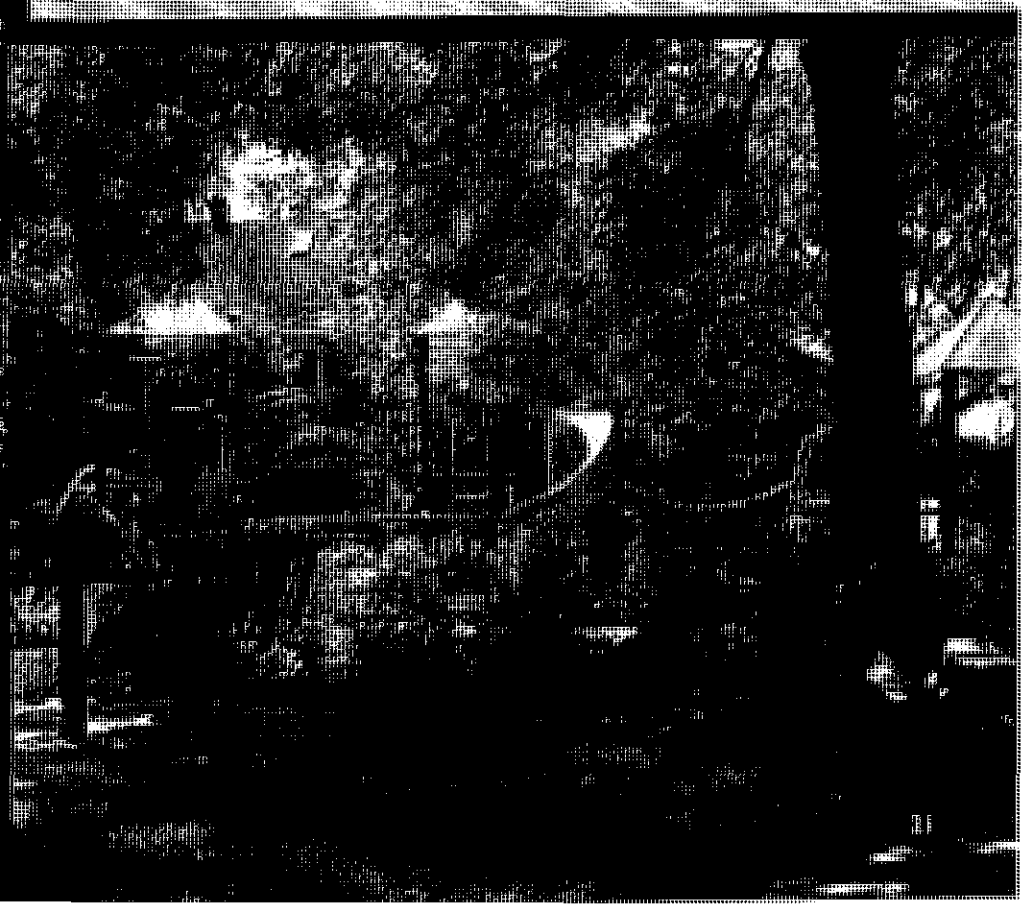
- From 2010 to 2015, the Somerville housing cost as a percentage of household income became more similar to the overall MA housing cost as a percentage of household income. This shift may reflect the increase in median income and the wealth gap, partially indicated by the higher numbers at the low and high end of the scale in the above chart (American Community Survey).

- As reported in the Somerville Housing Needs Assessment, 39.1% of renter households in Somerville were rent-burdened, defined as households paying more than 30% of gross income towards housing. Just over thirty eight percent (38.1%) of owner households were cost-burdened.



SomerVision

In 2013, residents and City staff completed a three-year public process to create SomerVision, a comprehensive plan—a blueprint for a 25-year strategy to make Somerville an even more exceptional place to live, work, play, raise a family and grow older.



Prenatal and Early Childhood

Introduction

The health of a mother prior to pregnancy, defined as maternal health, along with her access to early and adequate prenatal care are important to the life long health trajectory of the child. Scientific evidence continues to reinforce the early years as critical to setting the foundation for health and wellbeing throughout life.

Access to health care for infants, toddlers and their caregivers including mental and dental health, helps support normal development and growth. Limited healthcare access, life stressors and environmental factors such as exposure to secondhand smoke can play a role in influencing the physical and mental development in a child's lifespan. Early screening, referrals and services are pivotal to ensuring that every child has healthy early childhood experiences and equitable access to care. Quality, affordable child care provides grounding for early childhood education and allows parents to participate in the labor force. It also prepares children for kindergarten entry with the physical, social and behavioral skills necessary to thrive.

Work by Harvard's Center on the Developing Child has correlated resiliency with the prevalence of positive experiences, which can reduce effects of trauma, and as a predictor for stability in adulthood. This research indicates that even one caring, trusted adult who provides a safe haven in a child's early life can greatly improve the odds a child can build resilience and thrive. For a child experiencing significant levels of stress, life can be overwhelmingly difficult. An adult buffer can help mitigate the impacts of persistent stress levels that can become toxic, impacting the developing brain, normal growth and learning. Similarly, social networks can support families with young children by providing insights and guidance on normal development and coping mechanisms. Moreover, nurturing relationships and family friendly social networks can provide the security of having a safety net of support - bringing to life the old adage that "it takes a village to raise a child."

"If we want to shape the future, to truly improve the world, we have 1,000 days to do it, mother by mother, child by child, for what happens in those 1,000 days through pregnancy to the second birthday determines, to a large extent, the course of a child's life, his or her ability to grow, learn, work, succeed and by extension, the long-term health, stability and prosperity of the society in which that child lives."

–Roger Thurow, Author of "The First 1,000 Days: A Crucial Time for Mothers and Children and the World"

Children birth to 4 years of age comprised 4.8% of Somerville's total population according to American Community Survey's most recent 5-year averages, a 9.1% increase since 2010.

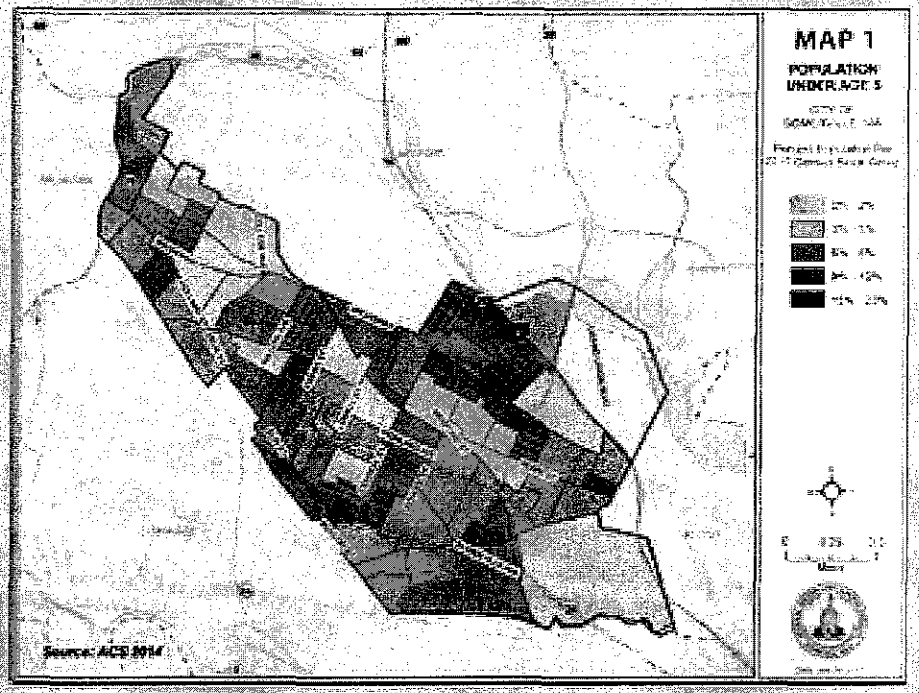
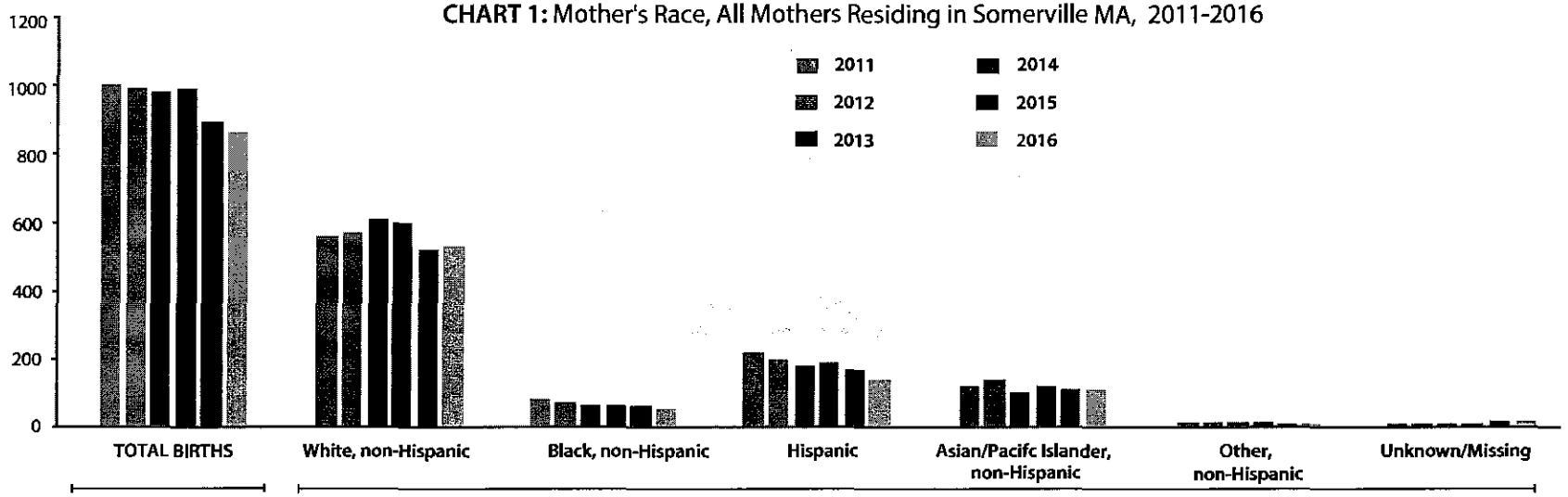


CHART 1: Mother's Race, All Mothers Residing in Somerville MA, 2011-2016



Source: Registry of Vital Records and Statistics, Massachusetts Department of Public Health

Demographics, age specific

Children birth to 4 years of age comprised 4.8% of Somerville's total population according to American Community Survey's (ACS) most recent 5-year averages, a 9.1% increase since 2010. In the map to the left, ACS data indicates the distribution of children age birth to 4 across the city, with the largest density in the areas near Union Square and East Somerville/Winter Hill.

Prenatal Care and Birth

In this report, local data on births refer to women living in Somerville at the time they gave birth, regardless of where the child was born. Some specific data sets from 2010-2016 were available from the state as well as from a comprehensive state report on 2015 data, released in March of 2017 (MA DPH, Registry of Vital Records and Statistics, Bureau of Health Statistics, Research and Evaluation and MA Births 2015 State Report). The number of births in Somerville increased by 15% from 2004 to 2014, with 849 births in 2004 to a high of 978 in 2014. Rates decreased in 2015 (876) and in 2016 (848) (MA DPH, Registry of Vital Records and Statistics). The vast majority of births to mothers residing in Somerville occur in the young adult age span of 25-40 years (MA DPH, Registry of Vital Records and Statistics).

- In 2016, of the total births, 61.6% of Somerville births were to mothers who identified as White, non-Hispanic, 16.2% Hispanic/Latino, 13.3% Asian, and 5.7% Black, non-Hispanic (MA DPH, Registry of Vital Records and Statistics, Bureau of Health Statistics, Research and Evaluation).
- Of the total Somerville births where only the mother is listed on the birth certificate, there has been a decrease from 58 in 2010 to 38 in 2016.
- In 2015, over one fifth of mothers were unmarried.
- Between July 2015 and June 2016 210 births out of a total of 1,151 births at CHA's Cambridge Hospital and Birth Center were to women living in Somerville. This represents 18.2% of all births at CHA and roughly a quarter of total Somerville births. For the same time period in 2016-2017, there were 182 births at CHA to women living in Somerville, representing 15.5% of total births at CHA and approximately one fifth of total Somerville births.

Preterm (LC-55) and low weight births are national indicators of maternal and child life course health. Preterm refers to babies born 3 or more weeks early or less than 37 weeks gestation. Low birth weight refers to less than 5.5 pounds at birth, which is more common in babies born prematurely. Local data was not available on multiple births, which may result in lower birth weights and are more prevalent in mothers who have received fertility treatments. The state rate in 2015 for fertility enhancing drug use was 13.4% of total births, with multiple births higher in mothers over 35 statewide.

- In 2015, the percentage of children who were born premature was 10.3% in Somerville (90 of 876 births). In MA, the rate was lower at 8.4% in the same year. Of Somerville teen mothers, ages 15-19, 8.3% of their babies were born prematurely, lower than the overall city and state levels (MA DPH, MA Births 2015).
- In 2015, 10.4% of all births to Somerville mothers (91 out of 876) were reported to be low birth weight. The Massachusetts low birth rate for all births in the same year was lower at 7.8%.
- Of teen mothers, ages 15-19, the low birth weight rate was 16.7% for Somerville, higher than the 9.1% for the state.

Adequate prenatal care helps to insure healthy birthweights and establish the foundation for future wellbeing. The term is defined by what is called the Kotelchuck scale, measuring if prenatal care was initiated by the 4th month of pregnancy and that 80% or more of expected prenatal visits were received; it does not refer to the quality of care received. The measure is based on reporting from Massachusetts hospitals where births occur.

- The Massachusetts Births 2015 Report indicated that 87.1% of all mothers residing in Somerville at the time of their child's birth received adequate prenatal care, an improvement from prior years (MA DPH, MA Births 2015).

- In 2015, 27.3% of Somerville mothers' prenatal care was provided by public health insurance, compared to 37.6% statewide. This was a decrease from the Somerville percentage of 30.8% in 2012, when the state percentage was 39.3%.

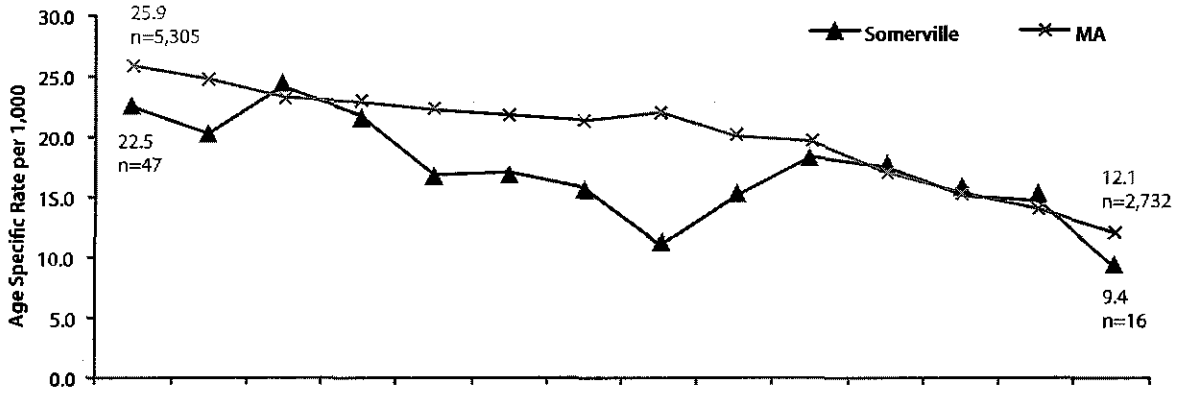
- Statewide 2015 data indicated that 66.7% of Somerville teen mothers under 18 were reported to have received adequate or better prenatal care. Teen mothers in Somerville had consistently lower rates of adequate prenatal care over most of the last two decades, relative to other age groups (MA DPH, Registry of Vital Records and Statistics).

Based on 2010-2013 available data, mothers in Somerville were reported to have received adequate prenatal care at rates higher than statewide. In the same period Black, non-Hispanics received the lowest level of prenatal care among Somerville mothers, however it was still higher than the state levels (MA DPH, Registry of Vital Records and Statistics). In Massachusetts as a whole, there was a steady decline in adequate prenatal care for all races between 2012 and 2015 (MA DPH, MA Births).

Reducing the rate of fetal and infant mortality (death within the first year of life) (MICH-1) has been a prime driver in maternal and child health efforts nationally. This includes deaths due to Sudden Infant Death Syndrome (SIDS), sometimes known as crib death, defined as "unexplained death, usually during sleep, of a seemingly healthy baby less than a year old." Babies under the age of one should sleep on their back at all times, without blankets or toys, on a firm surface to reduce the risk of Sudden Infant Death. In 2012, Somerville's infant mortality rate was 2.1 deaths per 1,000 births, less than half the infant mortality rate of Massachusetts (4.3 deaths per 1,000 live births) in the same year. The infant mortality rate in Somerville has been, on average, lower than the state since 2000 (MA DPH, Registry of Vital Records and Statistics).

- According to Chart 2, since 2000, births among teens ages 15-19 have overall declined in both Somerville and Massachusetts. After a brief rise in 2007-2009, Somerville birth rates once again declined to 9.4 per 1,000 live births to teens, or 16 births by 2013 (MA DPH, Registry of Vital Records and Statistics).

CHART 2: Teen Birth Rate Somerville and MA, Trend (2000-2013)



Source: Registry of Vital Records and Statistics, Bureau of Health Statistics, Research and Evaluation, MDPH

- The Massachusetts Birth 2015 Report reveals the teen birth rate in Somerville declined even more, to 7.0 per 1,000 live births or 12 babies born to teens ages 15-19 in 2015 (5.5 per 1,000 births) (MA DPH, MA Births 2015).

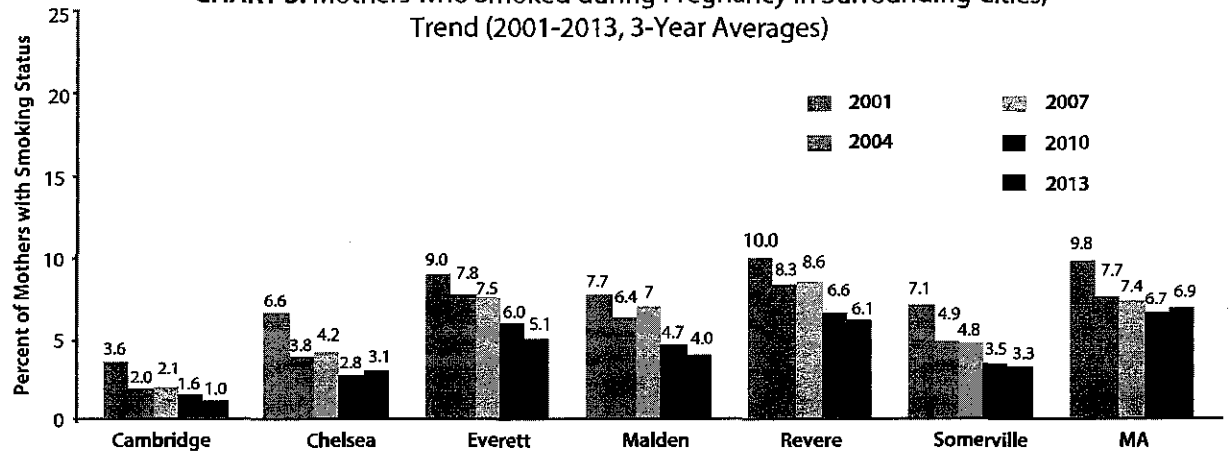
- The Massachusetts state report for 2015 reported that 58.3% of births to teen mothers in Somerville were Hispanic/Latino, compared to 8.35% White and 33.3% Black.

- Teen pregnancies among Somerville high school students were highest among Hispanic/Latino students in both 2014 and 2016. Relatedly, Hispanic/Latino students self-reported in the Somerville High School Youth Risk Behavior Survey (YRBS) that, in those same years, 4.7% (2014) and 2.1% (2016) had carried a child or gotten someone else pregnant (Somerville HS YRBS 2014 and 2016).

Stressors during Pregnancy (LC-56) can impact development in utero, as well as after birth. Maternal psychological stress triggers a hormonal response that increases the risk of preterm birth and which may also put a child at a higher risk for heart disease and hypertension later in life. The impact of stress on a mother can be passed between generations, as a person who was born preterm is considered to be more likely to give birth preterm, according to the Association of Maternal and Child Health Programs. While some stressors can be extremely personal, like the death of a relative or loss of a job, others are systemic or physiological. For example, the Great Recession from 2007 to 2009 was a burden to many expecting mothers, and those in Somerville were no exception. More recently, expecting mothers may be concerned about immigration status, job security, or access to health care. Experiences of racism and inequity are also particularly detrimental to the health of an expecting mother and her baby.

During the Zika virus scare in 2015-2016, there were concerns at the federal and state level about travel to areas with reported incidence of Zika. The World Health Organization declared a global health emergency and the U.S. Center for Disease Control issued travel warnings for pregnant women, or those of child-bearing age who might plan to become pregnant. Maternal stress caused by lack of clear information and fears heightened by media coverage were reported by staff in clinical and service settings working with local expecting mothers at the time.

CHART 3: Mothers who Smoked during Pregnancy in Surrounding Cities, Trend (2001-2013, 3-Year Averages)



Source: Registry of Vital Records and Staistics, Bureau of Health Statistics, Research and Evaluation, MDPH

As depicted in Chart 3, smoking rates among pregnant women in all surrounding cities declined markedly between 2001 and 2013, to percentages generally lower than the state (MA DPH, Registry of Vital Records and Statistics).

Diabetes during pregnancy (LC-49) is a stressor for both mother and baby, whether a pre-existing condition or developing during pregnancy. According to the 2011 MA Pregnancy Risk Assessment Monitoring System (PRAMS) report, about 2% of MA mothers had type 1 or 2 diabetes prior to becoming pregnant. More recent state data from 2015 indicates that 4.7% of pregnancies in Somerville resulted in gestational diabetes (MA DPH, MA Births 2015).

Smoking during pregnancy can increase the risk of preterm labor and low birth weight. Exposure to secondhand smoke is also one of the life course indicators for future health. The percentage of infants whose mothers smoked during pregnancy in Massachusetts has declined steadily for decades to a 2015 statewide level of 5.5%; with higher rates in expecting mothers who were White, non-Hispanic (MA DPH Registry of Vital Records and Statistics). Recent research indicates the remaining population that smokes has been persistent, particularly in conjunction with mental health issues. A new study indicates that smoking rates remain higher in lower income households (Cigarette Smoking, CDC, 2017). Smoking cessation campaigns and no-smoking policy changes have reduced smoking rates. Local policies include Somerville public housing becoming smoke-free in September 2016.

Protective Factors

Breastfeeding naturally supports early nutritional needs adding protection against infectious diseases and childhood obesity. Increasing the proportion of infants who are breastfed is important to improving the health of the next generation and is one of the Maternal and Child Health indicators. It is a recommendation of the American Academy of Pediatrics (AAP) that babies be exclusively breastfed for the first 6 months of a child's life (AAP, 2012). Currently, breastfeeding support (LC-04) is measured nationally by the percentage of babies born in Baby Friendly Hospitals that elect to follow ten "Steps to Successful Breastfeeding" (www.babyfriendlyusa.org). Locally, the CHA Cambridge Birth Center, Boston Medical Center, Melrose-Wakefield and Mass General have this certification. CHA operates the local WIC program in Somerville, which provides extensive breastfeeding support. The City of Somerville is breastfeeding friendly, offering lactation spaces at City Hall and the Annex buildings for staff and visitors. For Somerville new mothers, the intention to breastfeed, based on response at time of birth, varied by age of mother with lower rates for teen mothers (78.6%) and higher rates for mothers over 30 years (94.3%) in 2011-2013. Data on how many Somerville mothers actually initiated or continued is not collected (MA DPH, Registry of Vital Records and Statistics).

There can be many barriers to women initiating and maintaining breastfeeding, including current federal employment policies in the U.S. that do not provide the type of paid time off for new moms found commonly in European countries. This lack of time off requires many mothers to return to work soon after birth, making it even more challenging to breastfeed. Workers at higher wage jobs are more likely to have paid maternity leave which allows for more opportunity to breastfeed. Not all civilian workers in the U.S. have this benefit, one that has also been demonstrated to promote bonding between parent and child, an experience key to getting a healthy start. Taking unpaid leave is not a viable option for many and even then, the Family and Medical Leave Act which was established to help protect the right of unpaid time to care for family members, is only accessible to 60% of American

workers as there are limitations in the application of the regulations to all work settings (Desilver, 2017). The needs of lactating mothers are also more likely to be provided for in work settings that have higher paying jobs and less likely in minimum wage work environments.

Access to Health Care

Health Insurance Coverage

In 2015, only 1.1% of Massachusetts children did not have health care insurance coverage. At that time, over 355,000 low income children in the state were covered by Medicaid (The Kaiser Family Foundation, 2015). MassHealth is the Massachusetts Medicaid program, providing health insurance coverage for low income individuals, including children, pregnant women, individuals with disabilities, elderly parents and other adults.

Primary Care Provider

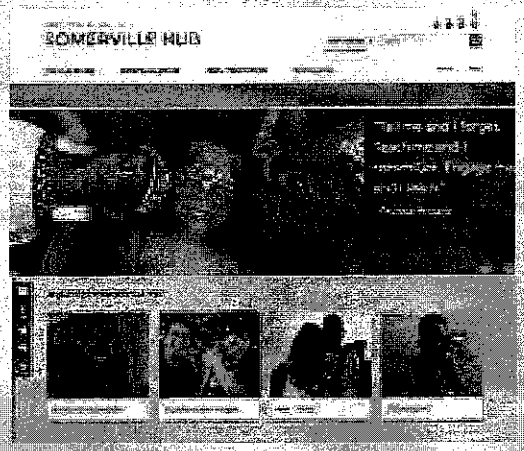
Kindergarten registration requires a pre-enrollment physical, another important opportunity for parents or guardians to connect with a primary care provider about their child's growth and development. In 2016, CHA was the primary medical provider for 1,440 Somerville children under the age of 4. CHA is a safety net hospital, meaning that it provides care for those who are low income, uninsured or who might otherwise have barriers to health care.

Immunizations

For newborns, breast milk can help protect against many diseases because it contains antibodies passed from the mother directly to the infant. If breastfeeding is not an option, and as children age, vaccines can help protect babies and small children from disease and are important public health tools available for preventing disease. Vaccinations not only protect children from developing serious diseases but also protect the community by reducing the spread of infectious disease.

The Somerville Hub

The Somerville Hub, initially developed as an online resource for parents and guardians of young children was expanded to include resources from early childhood through the teen years. It includes information on childcare options, as well as downloadable resources such as the Shape Up Under 5 materials related to Eat, Play and Sleep tips for children under 5 and their caretakers. Information on how to access Somerville programs, family services and family-friendly places in the city is also available. Walk-in service is available at 42 Prescott Street or by calling 617-625-6600 x6965. http://somervillehub.org



Immunizations are given on varied timelines, starting at birth and continuing throughout one's life. The Centers for Disease Control and Prevention (CDC) has guidelines for when vaccines be given to children during infancy and early childhood. Well-child visits with a child's medical provider are spaced at appropriate intervals to support the immunization schedule, eventually transitioning to annual visits.

WIC and dental access program

The CHA Cambridge/Somerville Women, Infants and Children (WIC) Program recognized that parents were waiting too long to take their children to the dentist for a check-up. Some parents don't understand the importance of early dental care, and others don't have the resources to see a dentist. Starting in July, 2017, the WIC Program partnered with Brian Swann, DDS, MPH, Chief of Oral Health at CHA to provide free dental screening for WIC families at the Somerville WIC office. This clinic, staffed by Cambridge Health Alliance/Harvard School of Dental Medicine residents, provides all family members early screening, referrals and important education about dental health and its impact on overall health.

Children age four or older who are in daycare, preschool or kindergarten must have proof that they have received a booster dose of Poliovirus vaccine (IPV), two age appropriate doses of Measles, Mumps, Rubella vaccine (MMR), three doses of Hepatitis vaccine (HBV), two doses of Varicella (chicken pox) vaccine, and a booster dose of Diphtheria, Tetanus, Acellular, and Pertussis vaccine (DtaP). The Kindergarten immunization rate for Somerville in 2016-17 was 97.7%, based on data collected by the public schools.

Oral Health

The most common infectious disease of early childhood is dental caries, or tooth decay. Early childhood caries are caused by a bacterial interaction with sugary foods and the enamel of a young child's teeth. The effects tend to be most prevalent among children without early and consistent access to preventative dental health care. The health impacts range from the need for dental surgery to negative effects on diet, sleep, and learning. Some studies indicate that the incidence of dental caries in young children, 2-5 years of age, may be as high as a quarter of all children (Berkowitz, 2003). Preschool programs, such as Somerville's Head Start, promote early dental hygiene and care with young children and their parents through screening and follow-up.

Behavioral and Mental Health

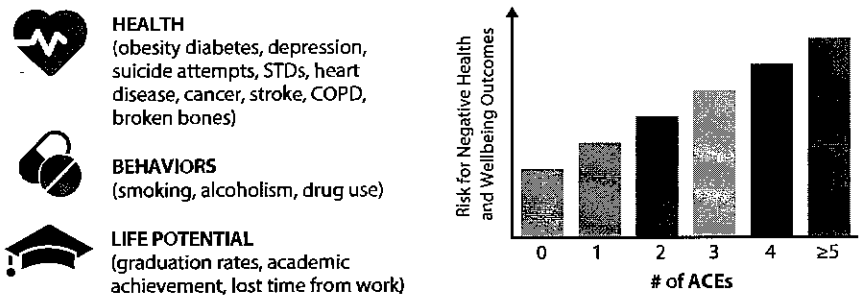
Early Prevention

Prenatal to early childhood is a vital life stage, as the brain develops more neurological synapses and connections than at any other time in life. The important early phases of language acquisition are supported by the creation of these multiple synapses, which create the neural pathways and interconnections needed to develop language and other important skills acquired early in life.

Adverse childhood experiences (ACEs) are stressful or traumatic events in a child's life. When children are exposed to chronic stressful events, their brain development can be disrupted. As a result, the child's cognitive functioning or ability to cope with negative or disruptive emotions may be impaired. There are numerous factors that constitute ACEs and have been widely studied (Substance Abuse and Mental Health Services Administration, 2017). The list includes:

- physical, sexual, or emotional abuse
- physical or emotional neglect
- victim of or witness to violence at home or in neighborhood
- mental illness or substance misuse within the household
- parental separation or divorce or an incarcerated household member
- unfair treatment due to race or ethnicity

Image 1: Lasting Effects of Adverse Childhood Experiences (ACEs)



As shown in Image 1, research indicates that higher prevalence of ACEs (LC-02) can be associated with higher risks for health issues later in life such as risky health behaviors, chronic health conditions, limited life potential and earlier death. Communities can help support safe, stable, nurturing relationships and proactive environments to protect children from maltreatment and promote a context in which they can thrive.

Enhancing protective factors can positively influence a young child's development and can mitigate the effects of ACEs. Successful early child development includes gaining the ability to understand and manage emotions, to interact well with others, to share, to follow directions, to recognize "right" and "wrong" and to demonstrate imaginative play, skills critical to positive outcomes at any age. Development of self-regulation skills has lifelong benefits. Programs such as Al's Pals or Second Step are used by a number of Somerville preschool providers, including the public schools, to help build these crucial skills and to develop a culture of understanding and caring. A preventative measure for overall childhood health is to educate the public, providers and parents on the importance of developmental milestones, helping set children on a successful and healthy lifelong path.

Early and periodic screening (LC-19) can help identify risk factors and developmental delays early in life, increasing the likelihood of key interventions during a child's formative years. Most children have regular well child visits with a Pediatrician or other Primary Care Provider, where screenings are done regularly in the health care office. For instance, children ages Birth to 5 seen at CHA for well child care are screened at each visit with a validated behavioral/developmental screener called the Parents' Evaluation of Developmental Status (PEDS). In addition, all children are screened using a validated tool for Autism Spectrum Disorder, the Modified Checklist for Autism in Toddlers (M-CHAT), at 18 and 24 months.

Results from these screening tools, combined with clinician concern or specific medical diagnoses (e.g., prematurity) result in referrals to an Early Intervention (EI) program in the 0-3 age group, or income eligible programs such as Early Head Start. For 4-5 year olds, the same process results in a referral to the Somerville Public Schools for an educational evaluation and Individualized Education Plan (IEP), according to federal and state policies that support children who have special learning needs. Early Intervention services for 470 Somerville children in 2016-2017 were provided by two local providers, the Guidance Center/Riverside and Eliot. Such services are provided largely in the family's home, offering developmental supports through professionals such as Speech, Physical or Occupational Therapy and Social Work.

In the community, the Somerville Family Learning Collaborative (SFLC) provides free developmental screenings for children 1 month to 5 years, using the "Ages and Stages" system. This SFLC program also offers resources and strategies to support families in becoming their child's first teacher. For children over 3, the Somerville Public Schools provides screening and assessment when it is suspected that a child may have a disability that would interfere with participation in regular education programs, in accordance with the federal Individuals with Disabilities Act (IDEA 2004) and state regulations on Special Education 603 CMR 28.00.

Postpartum Depression

The MA Department of Public Health collects data on postpartum depression, defined as "clinically significant physical, emotional and behavioral changes presenting in childbearing women following delivery." It can manifest in the form of anxiety, depression, despair and/or somatic symptoms that persist for a minimum of two weeks. Data shows that nationally, nearly 1 in 5 women will experience depression or anxiety in pregnancy or postpartum. Higher prevalence has been noted in unmarried mothers or those with less than a college education. In Massachusetts, MotherWoman is a nonprofit, with local branches in the state working to support moms, build community safety nets and promote related public policy, such as the 2017 MA Pregnant Workers Fairness Act: Eliminating Pregnancy Discrimination.

Reporting from CHA to the Massachusetts Department of Public Health in 2016 indicated that of the total of 865 women from the area who had postpartum visits at CHA, 93.2% were screened for postpartum depression and 4.6% screened positive, indicating the need for further investigation and/or treatment.

Substance Use Disorder/Addiction

Public health literature draws linkages between adverse childhood experiences and the incidence of mental health issues, such as depression, and substance use disorders later in life. Recommendations for prevention focus on helping children develop social/emotional awareness and coping skills early in life as a means of reducing future risky behaviors such as substance use.

Directly addressing parents' substance use can have positive impacts for children. Local programs such as CASPAR's New Day program and the Parenting Journey's Sober Parenting program strive to provide supports for pregnant women and new moms or for parents who are actively working towards recovery, therefore also supporting the future health of their young children. Research findings encourage an increased focus on identifying pregnant women at risk for alcohol and/or other substance use or depression and connecting them to treatment and other services.

Physical Health and Development

As children grow, opportunities to play help build social-emotional skills and establish lifelong habits of healthy eating and physical activity. Play and exercise build strength in large muscles necessary for activities such as running, core muscles that help sustain postures required to sit in a chair and small muscles like those that are used to hold tools to draw, write and manipulate small objects. Somerville has a wealth of parks and opportunities for children to play, though the utilization of these recreational opportunities may not be universal. Active play time for some young children is limited by factors such as parents' work hours or immigrant families' fears of safety in public settings. "Small Steps: Eat, Play, Sleep" is a local effort to promote lifelong habits of healthy eating, physical activity and adequate rest, geared to children Birth to 5. Free resources with evidence-based suggestions for eating, playing, sleeping and reducing screen time are provided for Birth to 9 months, 9 months to 3 years and 3-5 years, all available for download online at the Somerville Hub.

Obesity

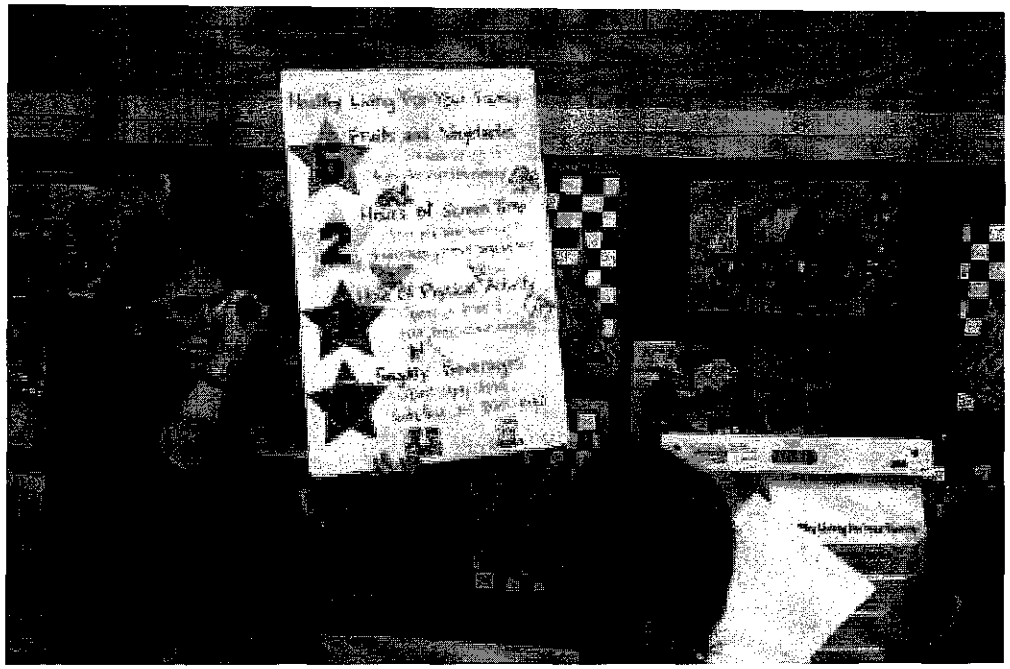
Childhood Obesity (LC-32A) is closely linked to physical health and has social-emotional implications such as increased risk for bullying and decreased social interactions. Massachusetts data from 2014, specific to 2-4-year-old WIC participants, reported 16.6% of children in the program were obese, with improvement noted in the past decade with rates leveling off or slightly decreasing (The State of Obesity, 2016).

- Between 2013-2015, of the 1,101 CHA patients aged 2-5 years who lived in Somerville who had an office visit with a body mass index (BMI) measurement, 32.2% of the children were overweight (BMI percentile ≥ 85% and <95%) or obese (BMI percentile > 95%) (CHA).

- Of these, the percentages for overweight/obese were highest for children whose records indicated ethnicity as Portuguese/Azorean (63.6%), Latino -Central American/Mexican (46.6%), Other Latinos (40.5%) and African American (38.5%).

- For obese children aged 2-5, 15.2% of the total, the highest percentages were 25.7% in Latinos from Central America/Mexico, 20.4% of Latinos from the Caribbean, 17.5% of Other Latinos, and 17.2% of African American children.

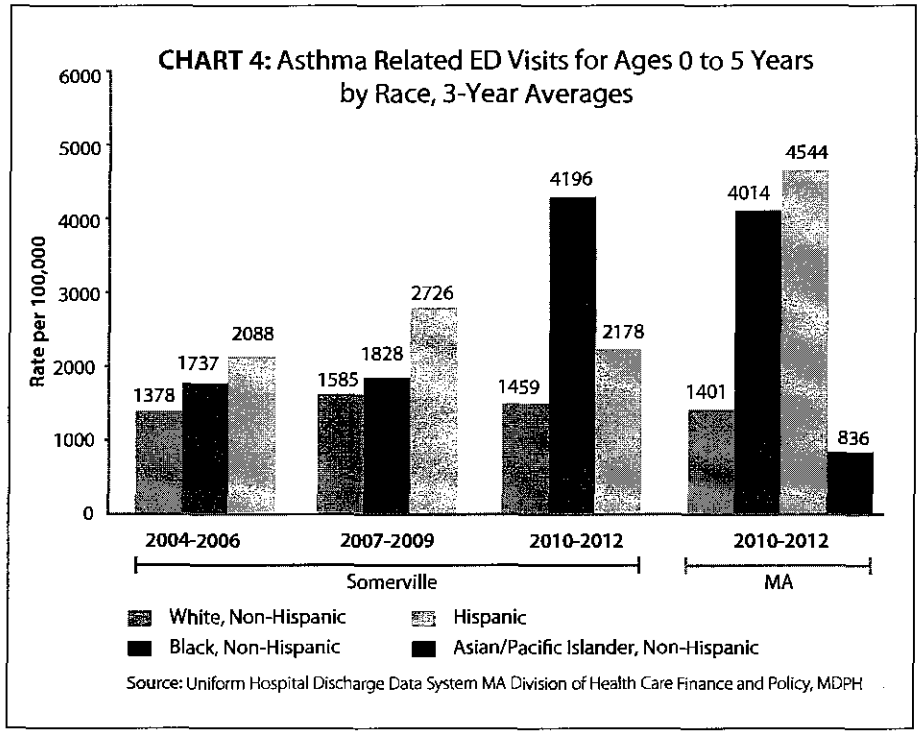
The American Academy of Pediatrics (AAP) recommendations for beverages for toddlers and preschool age do not include fruit juice or sugar sweetened beverages (AAP, 2017). Further research indicates that beverages consumed during pregnancy also have an impact. A recent study showed that children of mothers with a higher consumption of sugar sweetened beverages during the second trimester of pregnancy had higher obesity levels, even when controlling for children's intake (Gillman et al., 2017). Each additional serving per day for a mother, during pregnancy, appeared to account for ½ pound of additional weight by age 8. A report in the International Journal of Epidemiology implicated diet or artificially sweetened beverage consumption by pregnant women with gestational diabetes as potentially linked to the 50% higher



risk of being overweight or obese for their children by age 7, in comparison to those born to mothers with gestational diabetes who drank water instead of diet beverages (Zhu et al., 2017).

Sleep and Screen Time

Babies and toddlers need lots of sleep: 12-16 hours per day before the age of 1 year, 11-14 hours including naps from 1-3 years and 10-13 hours from 3-5 years (Paruthi et al., 2016). In addition to suggestions for developing healthy sleep habits, guidelines for making decisions related to exposure to screen time are important for the parents of very young children. The proliferation of smartphones, tablets and multiple viewing options has increased the time children spend looking at electronic devices. The American Academy of Pediatrics recommends that screen time should be avoided for children under 18 months (with the exception of video-chatting). Parents of children 18-24 months of age are encouraged to limit screen time and to be present with the child. From 2-5 years, the suggested limit is 1 hour per day of "high quality programming" (AAP, 2016). Tools such as the Family Media Plan online toolkit can help families to set healthy media habits early in life.



Respiratory Health

Utilization of emergency department visits for asthma (LC-38) is another early childhood health indicator. Improving asthma management is focused on reducing critical episodes that require emergency care. The Canadian Childhood Asthma Primary Prevention Study utilized an intervention that included reduction of home allergens and environmental tobacco smoke prenatally, encouraged breastfeeding, and home interventions prior to birth that tracked a birth cohort for 7 years, finding significantly less asthma diagnosis and or related symptoms (Chan-Yeung, et al.).

- Based on the data in Chart 4, an average over the period of 2010-2012, asthma related emergency department visits for Somerville children under 5 were highest for Black children, almost double the rate for Hispanics/Latino and three times the rate for White children. Data on Asian/Pacific Islander, non-Hispanic was not available for Somerville indicating lower than reportable levels (MA DPH, Uniform Hospital Discharge Data System, Massachusetts Division of Health Care Finance and Policy).
- Reflected in Chart 4, there was a decrease in the rate of asthma related emergency department visits by young Hispanic/Latino children between 2007-2009 and 2010-2012.

Education

A mother's education level at birth is a health indicator (LC-21) for the child in later life, with links to socioeconomic position throughout early childhood. Between 2010 and 2016, the percentage of births to Somerville mothers with some post high school level education increased from 32.3% to 44.8%, while the percentage with less than a high school or high school only education background decreased from 31.4% to 12.8% (MA DPH, Registry of Vital Statistics).

Early Childhood Development (EMC-1) objectives for young children include increasing the proportion of children who are ready for school in all five domains of healthy development: physical development, social-emotional development, approaches to learning, language and cognitive development. The Somerville Public Schools, in collaboration with community partners, are working toward a strategic continuum of early childhood education services. A multi-sector Early Education Steering Committee helps guide the movement towards universal Kindergarten readiness. This includes attention to issues including systemic equity, access, multilingual capacity and culturally responsive teaching, community engagement and support and high quality educational programming.

In Somerville, there are a range of programs aimed at early learning opportunities, such as the following:

- Head Start, offered by the Community Action Agency of Somerville, provided services for 195 children ages 3-5 in 2016-2017.
- SomerBaby's goal is to welcome new babies to Somerville. The pilot City program provided welcome baby bags, useful baby supplies, community resources, and a home visit for up to 100 new parents in the city in the first year, in collaboration with local providers.
- The Riverside Somerville Early Head Start program served at least 107 children in 2016-2017.
- The Parent Child Home Program of Somerville Family Learning Collaborative (SFLC), a home visiting program with a goal of preparing children to enter school "ready to learn," served 41 children in 2016-2017. Parents learn to promote language and literacy development skills during these home visits. This program is particularly focused on serving families that may be dealing with multiple factors such as poverty, language barriers or other forces that can impede a child's normal development.
- The Informal Providers Home Visiting Program served another 65 children.
- The Somerville Family Learning Collaborative (SFLC) Playgroups served 570 families in 2016-2017.

Additional initiatives in the city are focused on fostering early development and learning. Increasing the proportion of parents who use positive communication with their child (EMC-2.2) and who read to their young child (EMC-2.4) are goals of programs like Project READ at CHA and the SFLC Family Talk Somerville campaign launched in Fall 2017. Such efforts promote "Serve and Return" interactions, those back and forth exchanges between a young child and caring adults that facilitate neural development leading to language and other learning.

Quality and affordable child care and preschool have been consistently identified as a top priority for Somerville parents and children. Affordability is a challenge for many families, as can be finding programs that provide care for the hours that working parents need to make an income to support their family. Somerville has seen an increase in center-based child care businesses in the city, with a range of affordability. Another option is family based childcare, both formal and informal, offered in a provider's home. Family based childcare arrangements expand the local capacity to address the diverse language, cultural and scheduling needs of families. In the 2016-17 school year, 93% of young children had early education and/or care experiences outside the home before entering Somerville Public School Kindergarten. More detailed information about the range of childcare options for Somerville families is available at the Somerville Hub.

Massachusetts had the highest cost of infant and toddler care in the U.S., according to a Child Care Aware 2015 report (Parents and the High Cost of Child Care, 2015), with full time care often rivaling or exceeding the amount families pay for housing.

Economic Stability

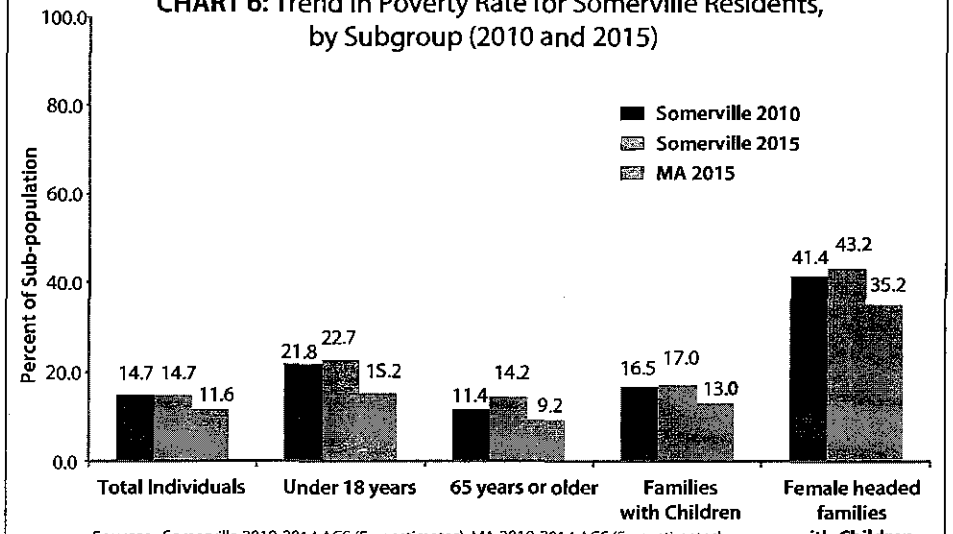
Research shows a direct correlation between low income and low birth weights in the U.S., compared to the United Kingdom, Canada and Australia. The impact in the U.S. was more pronounced than in other countries, which all have stronger national government support for healthcare (Martinson and Reichman, 2016). Income distribution is an area which has seen significant change in the country, and locally, over the past decade, with more economic growth for the wealthy. In 2017, the poverty threshold was $24,600 for a family of four (US Census Bureau, 2017). This is the minimum income that the federal government considers necessary to meet basic needs and is adjusted for family size to determine poverty rate. The official poverty definition refers to money income and does not include noncash benefits such as subsidized housing, health care or Supplemental Nutrition Assistance Program (SNAP). Significantly for Somerville and the region, it is not adjusted based on geographical variations in cost of living. U.S. data from 2011-2015 for Somerville indicates the overall poverty rate was 14.7% (American Community Survey).

According to ACS 2011-2015 five year estimates, the Median Household Income in Somerville was $73,106. For the five years prior, the Median Household Income was $61,731 (in 2010 dollars). Adjusted for inflation, 2010 Median Household Income was $67,098.80 (American Community Survey). Chart 6 is repeated from Demographics, as poverty is such a critical issue impacting early development.

- 43.2% of Somerville female-headed families with children and with no husband present were living in poverty, a 2.6% increase since 2010, consistently higher than the state rate.

- 22.7% of Somerville children under 18 were living in poverty as of 2015, an 8.2% increase since 2010 and higher than the state rate of 15.2%

CHART 6: Trend in Poverty Rate for Somerville Residents, by Subgroup (2010 and 2015)



Sources: Somerville 2010-2014 ACS (5-yr estimates), MA 2010-2014 ACS (5-yr estimates)
For each year, denominators differ by specific sub groups referenced above

Housing

Safe, affordable and accessible housing is increasingly a more challenging goal to achieve in Somerville. The population has shifted as both rents and the cost of purchasing a home have risen dramatically over recent years. Stable and safe housing is a strong facilitator of childhood health and wellbeing. According to the SomerVision Comprehensive Plan, over 60% of the Somerville housing stock was constructed prior to 1940, posing higher risk for environmental safety concerns such as lead and state of disrepair or aging systems as the housing stock gets older. Also, the number of units that can support families has shifted over the past decades with the rise of condominium conversions and few new units being constructed with 3 or more bedrooms, adequate for larger families.

Somerville has two public housing locations for families and individuals, both federal and state funded, at Mystic View and Clarendon Hill. For Senior and Disabled Housing, there are nine public housing locations in Somerville. Staff from local agencies report that families are doubling up and becoming overcrowded in order to afford to remain in Somerville.

According to the City of Somerville's 2015 Sustainable Neighborhoods report, the 40R statute is being utilized to require that at least 20% of all housing units developed in the city's overlay district be affordable to households below 80% of area median income (AMI). With the City's SomerVision Comprehensive Plan for 6,000 new housing units by 2030, this would equate to an additional 1,200 permanently affordable units in the city.

Employment and Living Wage Jobs

Increasing costs of housing, as well as health care and child care, have outpaced increases in income over the past decade. Paid parental leave policies can provide a brief respite for new parents, yet many parents have no paid time off when a child is born. Infant care is very challenging to arrange and afford for many families, requiring creative juggling, often engaging several generations and a patchwork of arrangements. The state of Massachusetts has passed a Pregnant Workers Fairness Act that support protective factors for the future health of today's young infants. The Act requires "reasonable accommodations" for pregnant women, time off after childbirth and accommodations to support breastfeeding.

- According to the 2017 Living Wage Calculator, to support a family of two adults and two children at a living wage in the Boston-Cambridge-Newton metropolitan area requires two adults making $17.27/hour each.
- Massachusetts had the highest cost of infant and toddler care in the U.S., according to a Child Care Aware 2015 report (Parents and the High Cost of Child Care, 2015), with full time care often rivaling or exceeding the amount families pay for housing.
- Full day tuition for center-based care in Somerville averages $25,000 for infants and $16,000 for preschool age children.

Food Security

Food Security (LC-09) is increasingly recognized as a positive predictor of healthy child development. Food insecurity in the home is acknowledged as an indicator of potential risks. The Massachusetts statewide level of food insecurity was reported at 9.6% as of 2015, but was 19.9% for households with children under 6 years old, according to Project Bread. Early nutrition is critical for setting a foundation for life-long health and learning. Before birth, the mother's diet influences the development of the unborn child, including neurodevelopment. In young children, nutrients and minerals provide the fuel for the growing brain, which is rapidly developing in this life stage. The study of epigenetics looks at how the expression of an individual's genes are impacted by external factors. Research indicates that factors such as mother's diet and nutrition during pregnancy and her weight status can impact future health outcomes over generations.

Financial stressors make it more challenging to support a diversity of foods in a child's early years, potentially limiting food options. Programs like WIC provide nutritional couseling and access to healthy foods and assistance with breastfeeding to address the income inequities that can lead to disparities in development in early childhood. WIC has been shown to be a cost-effective strategy to address both immediate nutrition needs of children as well as to impact later health and academic achievement (Carlson and Neuberger, 2017). Massachusetts Pregnancy Risk Assessment Monitoring System (PRAMS) data, though the most recent data is from 2011, demonstrated at that time the highest usage of WIC at the state level was among mothers under 20 years old (90.4%), living at or below 100% of the federal poverty level (86.9%), with less than a high school education (81.9%), on Medicaid (81.3%), unmarried (80.3%), Hispanic/Latino (79.7%), or born outside the US (56.7%) (MA PRAMS, 2011).

- In 2016-2017, CHA piloted the use of a validated food security screening tool, the Hunger-Vital Signs, at Somerville Pediatrics. An average of 20-25% Somerville children's households met the criteria for food insecurity during the pilot. In addition to immediate resources, referrals were made directly to Project Bread's hotline service for follow up phone calls to connect families to available resources, including SNAP benefits (CHA).

- WIC Nutrition Services (LC-18), are provided locally by CHA through Somerville and Cambridge offices. The WIC Somerville case load as of June 14, 2017, was 1,834. Massachusetts data on pregnant mothers from 2015 indicates that statewide, 33.8% received WIC supports during their pregnancy. Of those, 72.5% were Hispanic/Latino, 61.9% Black, 24.9% Asian and 18.9% White (MA DPH, MA Births 2015).

- The statewide calculator for SNAP gap estimates that as of 2016 data, 61% of those who are income eligible for SNAP in Somerville are not accessing these available financial benefits. Various reasons for this gap include the fear of accessing government resources, which also impacts WIC participation for families with young children (Food Bank of Western MA, 2017).

Natural and Built Environment

Neighborhoods that are usually or always safe, as well as neighborhoods that are supportive, are two of the National Survey of Children's Health set of indicators. From 2010-2012, Massachusetts was on par with the national data sets for these indicators.

Somerville data indicates that overall crime decreased, with 739 arrests in 2016 compared to 967 in 2010 (Somerville Police Department).

Transportation

Attention to walkability, increasing safety and public mobility access for young families is part of the overall city approach to making sure that Somerville is a great place to live, work and raise a family. In collaboration with local organizations and the City, WalkBoston created a number of walking maps and a map of parks to inspire residents to get out and explore nearby resources across the city by foot or by bike.

According to the 2012 SomerVision Comprehensive Plan, 30% of Somerville commuters utilize public transportation. Increasingly, young

families are attracted to Somerville for its rich mix of bike and pedestrian infrastructure and public transit that can reduce the need for car travel for the able bodied. The extension of the MBTA Green Line and the Community Path will provide additional transit options, bringing the transit network close to home for 85% of city residents.

Access to Nature and Open Space

As the positive social, emotional and health benefits for children connecting to nature become better recognized, communities like Somerville make efforts to address related challenges in the urban environment. There are 32 playgrounds, including tot lots, in the City, as part of the overall open space resources. Neighborways is a community based initiative reclaiming neighborhood street space to facilitate safe fun for all ages, with an emphasis on the younger generation. The Somerville Recreation Department and sports leagues increasingly offer organized outdoor time opportunities for all ages of children.

Environmental Health

The drinking water supply for Somerville is provided through the Massachusetts Water Resources Authority (MWRA) system, which also provides the sewage disposal systems. The drinking water is sourced from Quabbin Reservoir in Western Massachusetts, traveling through a series of tunnels and pipes, including treatments such as added fluoride, along the way. The water is tested regularly, and results are publicly available. The incidence of contaminated water in Flint, Michigan in 2015 raised public attention to safe drinking water issues. In Massachusetts, some residences still have old pipes, containing lead, so it is recommended to let water run a few minutes to flush the pipes before collecting water for drinking or cooking.

Lead poisoning has declined in the United States in recent decades due to efforts to increase awareness, reduce exposure and lead contamination and screening policies. Children are exposed to lead by inhaling

lead dust, eating soil or paint chips that contain lead or drinking contaminated water. Lead is not easily absorbed through the skin. The cases of elevated blood lead levels among children in Somerville have declined from 5.17% in 2001 to 1.01% in 2013 (three-year average estimates) (MA DPH, Registry of Vital Records and Statistics). In Somerville, 57 units of Somerville housing have been de-leaded since 2012, with financial assistance through city grant funding from the federal government. Somerville was awarded continued funding to support lead abatement in 2017.

Poor air quality can cause high blood pressure and other health issues among pregnant women as well as low birth weight, premature births, and behavioral problems for young babies. Living within 100 feet of major highways can have negative health impacts, such as asthma, due to air pollution. Overall, children are more vulnerable to such pollutants in the environment. Locally, Tufts University has partnered with local activists and the City to better understand where and when the impacts from Route 93 are the greatest and has explored ways to mitigate the exposures to ultra-fine particles as part of the Community Assessment of Freeway Exposure and Health Study (CAFEH).

Climate Change

The global increase in number of days per year that qualify as heat waves has special implications for very young children.

Young children are more vulnerable to extreme heat, poor air quality and insect-borne diseases. One reason for this is their limited ability to communicate when overheating or when left in dangerous situations; each year in the U.S., close to forty children die from heat exposure, typically in cars (Willingham, 2017). In addition to greater physical frailty, children are less self-sufficient, more reliant on adults for transportation and other needs and less likely to cope emotionally during a disaster or climate event. These impacts on children often have a ripple effect on families and economics. If school is closed or daycares are unable to function due to weather, parents need to find alternative childcare options. This may impact the ability of parents to go to work and, therefore, impact the family's income, as well as the productivity of the businesses where parents are employed.

Insect-borne diseases, such as Lyme disease and West Nile virus, are on the rise in Massachusetts (MA DPH).

Insect-borne diseases, such as Lyme disease and West Nile virus, are on the rise in Massachusetts. Research indicates that increases in temperature linked to climate change are projected to cause a correlating increase in the risk of insect-borne diseases. Lyme disease can reportedly also be transmitted to children in utero or through breastfeeding. Impacts to children's health can include a wide range of ongoing physical, behavioral and cognitive problems.

Social and Community Context

Social and community supports are integral to health and wellbeing, from when parents are expecting a child, through the growth and development of that child and into adulthood. The World Health Organization defines a healthy community as, "... one that is continually creating and improving those physical and social environments and expanding those community resources that enable people to mutually support each other in performing all the functions of life and in developing to their maximum potential."

Race

The prenatal period is an especially vulnerable time for women and babies of color. Experiencing stress uniquely tied to racial discrimination and/or lacking access to culturally responsive health care and other core service needs during pregnancy poses health risks to both mother and

baby over the short and long term. According to the 2011 Massachusetts Pregnancy Risk Assessment Monitoring System Report (PRAMS) report, overall, about 3% of Massachusetts mothers reported "feeling stressed due to their race/ethnic background," 3% of mothers reported "feeling emotionally upset as a result of how they were treated by others," and about 3% reported "experiencing physical symptoms related to treatment based on their race/ethnic background." Minority mothers reported more negative experiences due to racism.

Research in recent years is suggesting that intergenerational stress can negatively affect the health of newborn babies, based initially on empirical evidence from Holocaust survivors. This work is based on genetics, environment, parenting, and social learning, and is demonstrating that stress can cause detrimental biological changes across generations as transmitted via gametes, the gestational uterine environment, and early postnatal care (Bowers and Yehuda, 2017).

Social Safety Network/Social Support

Social supports and resultant safety networks can generate from varied sources. Extended family and/or close friends may offer companionship, wisdom, solace and assistance. There has been a rise of "blended" families, with adults bringing children into the home from different marriages, and grandparents living with younger generations or, in some instances, raising grandchildren on their own. For some families with young children, a faith-based community may provide both spiritual and social supports. For others, support may manifest through virtual communities. One local media venue, the SomervilleMoms listserv, has grown since forming in 2003 to include almost 5,000 members, providing a forum for sharing parenting topics, with a Somerville focus.

Literature raises the concern that social media connections may not be protective against social isolation. Interventions such as home visiting programs have been demonstrated to help support new parents, connecting them to resources promoting positive parenting and child development.

Social media

Family service providers report high usage of screen time and social media by parents/guardians and a rise in screen time for infants and toddlers, which the providers observe as changing the levels of direct interaction between children and adults. Initiatives such as the Talk Time campaign launched in Fall 2017 are geared to promote authentic interaction between parents and children as an alternative to screen time while building protective emotional connections and promoting early literacy.

Strategies for creating social media plans and screen-free times for adults as well as children can help promote greater interpersonal interactions and connections. Social media can have positive impacts on building community connections, essential to creating social networks and support systems.

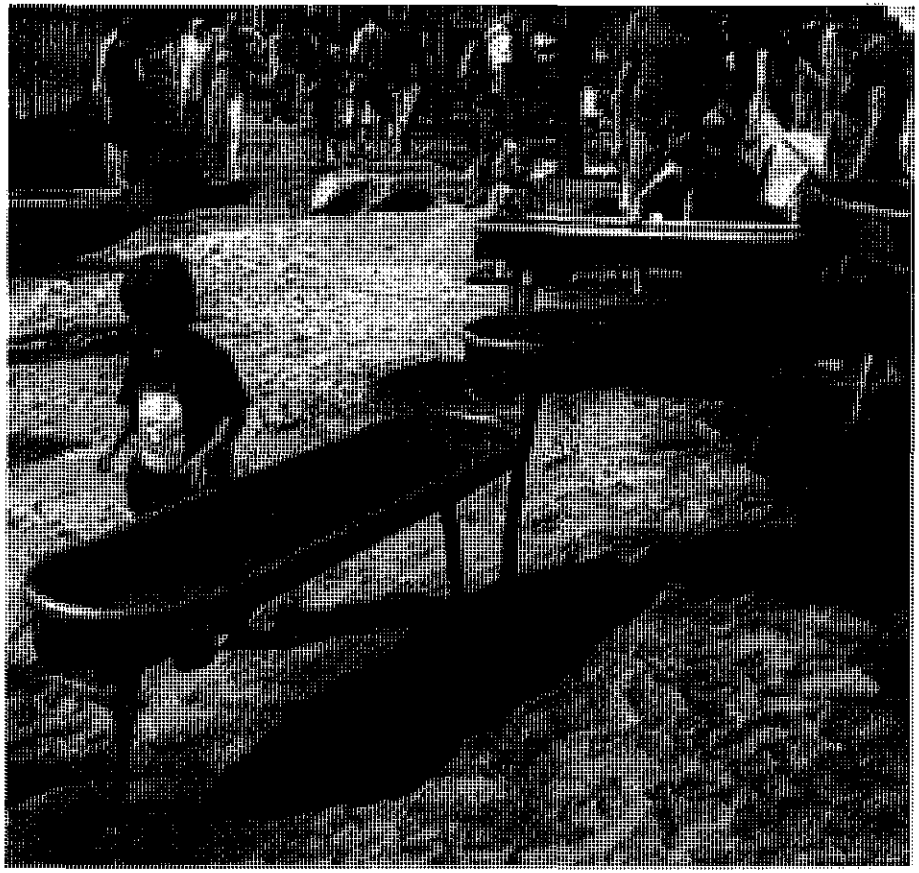
Violence

Abuse or a history of domestic violence in the home of a young child is one of the adverse childhood experiences that has been shown to increase risk for health and wellbeing in later life stages. The Somerville Police Department tracks how many domestic assault calls involve youth. From 2010-2016, the range varied from a low of 13% in 2010, to a high of 25% in 2013 and was most recently at 18% in 2016, which equals 35 cases in 2016 that involved youth (of any age).

Community Engagement

Parents of young children benefit from meeting with other parents, especially as many of them do not have the close familial support that past generations took for granted. Some families do have grandparents nearby, who can assist with childcare and child rearing. Opportunities such as programming for children at the public library or SFLC Playgroups and Parent Groups provide positive development time for infants and toddlers, while also creating community for parents.

Another important aspect of the work of the Somerville Family Learning Collaborative is leadership development for parents and guardians. These opportunities include skills building on how to advocate for your child, English as a Second Language classes, and parent forums. A number of community organizations, such as Parenting Journey, Mystic Learning Center and The Welcome Project also offer opportunities for parents to be actively engaged in learning about and promoting their own health and wellbeing as they also facilitate the positive development of their children.



Recommendations for Prenatal & Early Childhood

Birth–Age 4

■ Increase access to health promoting resources for all women of child-bearing age, new parents, infants and toddlers

- Increase percentage of all pregnant women receiving early and adequate prenatal care, specifically engaging pregnant teens
- Reduce teen pregnancy with sensitivity to culturally diverse teens
- Support programs, policies and legislation that maximize the vital role that fathers and male role models have in children and families' lives

■ Create lifelong habits to promote mental and behavioral health and prevent Adverse Childhood Experiences.

- Identify, engage and support parents with depression, with an emphasis on postpartum depression
- Support professional development and models and providers of care to enhance recognition of factors that positively impact ongoing child development and increase resiliency
- Create a system of care for prenatal and early childhood mental health

■ Facilitate a community with strong social networks and support systems

- Increase access to, and use of, high-quality, full-day, year-round early care and education
- Expand parenting opportunities for families
- Bring people and other cultural assets into settings where families with young children gather, such as libraries, parks, playgrounds, and recreation programs
- Increase knowledge and skills necessary to foster healthy development and build social networks for caregivers

- Create a Prenatal-Early Childhood Forum to integrate services of health, non-profit, school and social providers
- Increase early screening and referral to early intervention and connection to supportive community activities for all families

■ Create lifelong habits to promote physical health for all children

- Promote breastfeeding, including evidence-based strategies to facilitate breastfeeding early in life
- Use the Strengthening Families Protective Factors framework to inform policies, practices and programs that support parents and their young children
- Promote access to and education of the Early Head Start/Head Start programs
- Develop partnerships between local organizations and medical providers to promote physical activity and healthy eating habits for young children

School Age/Adolescent

Introduction

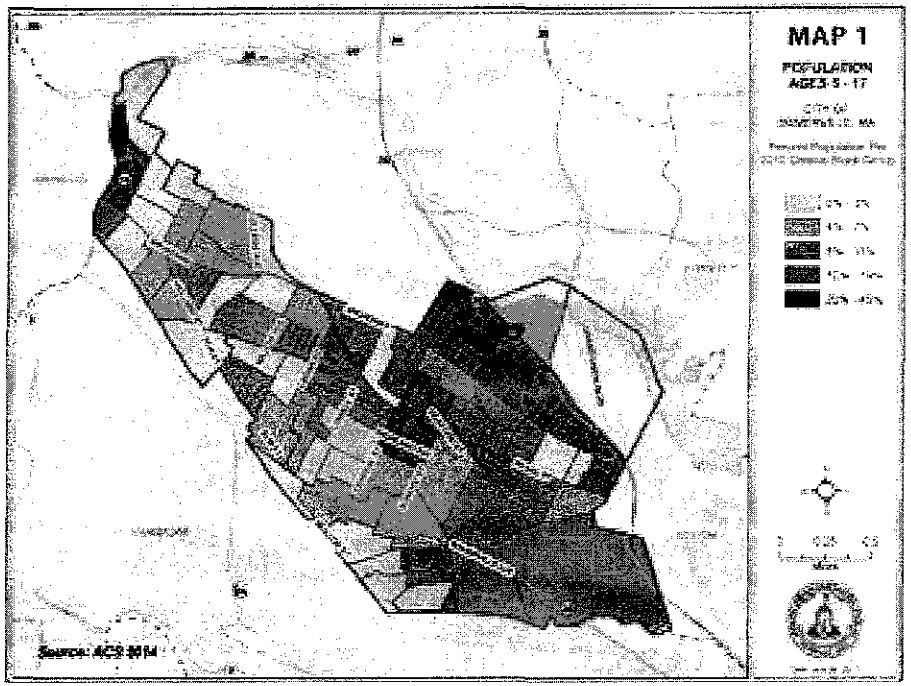
Following the earliest years of life, the time between the ages of 5-18 years continues to be a period of rapid growth and development. Coinciding with grades K-12 in the public school system, this life stage is exciting and ever-changing. As a result of both the growth and developmental changes within the brain, children and teenagers experience transformative increases in multiple capacities. These changes impact fine and gross motor skills, cognitive abilities to process and respond to information and awareness of and ability to engage with the world around oneself. Even in the presence of adversity, children and adolescents often flourish. This is a testament to the resiliency of youth and a reminder of how much is at stake in supporting the positive development of the next generation. Moving into the pre-adolescent and adolescent years is also when much of individuals' sexual maturation occurs. Experiences during this life stage are both informed by the early years and often predictive of later years.

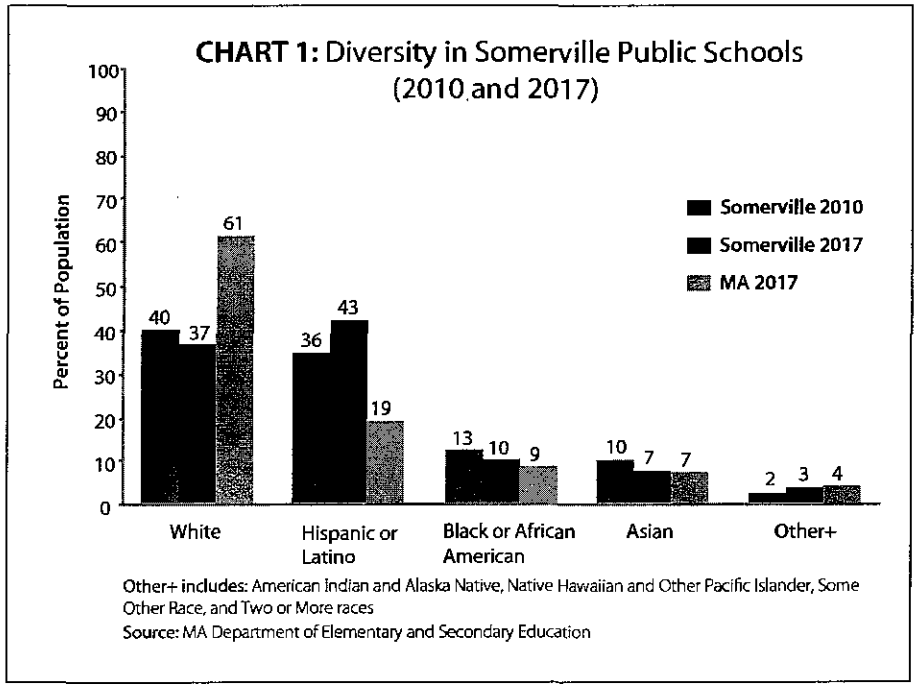
As children and teens continue the journey begun at birth toward greater independence, good health provides them with the confidence and ability to take appropriate risks, experiences essential to growth and development. Having safe, enriching places to be with their families and also without their primary caretakers continues to be very important, as risks for accidents, injuries and abuse (at one's own hand or that of others') remain high during these years.

For many, the school age years mark the beginning of spending greater amounts of time with people outside of immediate family, offering opportunities for new challenges and new risks. With school, friends and the community taking on larger roles in shaping these young people's experiences, wholesome and safe social and built environments are integral to child and teenage health and wellbeing. Access to health care of all kinds (preventative, primary, emergency, dental and behavioral) supports and reinforces messages and modeling youth are receiving and helps to ensure positive development. These diverse forms of support also play key roles in helping children and teens practice habits that can influence health and wellbeing through the rest of their lives.

Given that having success in academic realms such as literacy and numeracy are key indicators of later self-sufficiency, wellbeing and behaviors that contribute positively to society, the school age years are optimal ones to highlight various ways that health, education and social interactions intersect.

Coinciding with grades K-12 in the public school system, this life stage is exciting and ever-changing. As a result of both the growth and developmental changes within the brain, children and teenagers experience transformative increases in multiple capacities.





Demographics, age specific

According to 2015 U.S. data, 2.8% of the city population was 5-9 years, 3% was 10-14 years and 4.8% was 15-19 years (American Community Survey). As indicated on the map, the highest concentration of youth (5-17 years) is found in census blocks where family public housing is located. A number of census blocks have less than 3% of their population in this life stage group.

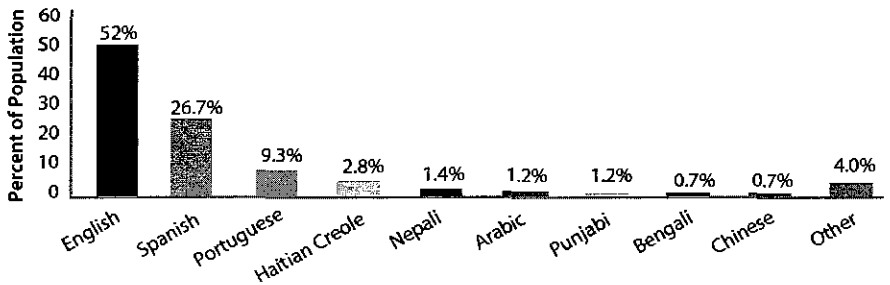
The racial/ethnic demographics of the Somerville school age population are more diverse than the overall population in the city. The capacity of local service organizations to meet changing language and cultural needs is compounded by the growing disparity in wealth. This can impact the perception of need in a community like Somerville, at the same time that the support needs for some residents are on the rise. Chart 1 above is repeated from the Demographics chapter, due to its relevance to the school age experience in Somerville.

- According to Chart 1, between 2010 and 2017, the Hispanic/Latino student population increased from 36% to 43% to become the largest ethnic group in Somerville Public Schools (Massachusetts Department of Elementary and Secondary Education (MA DESE)).

- Additional data, not reflected in Chart 1, shows that the English Language Learners population in Somerville grew from 16.0% in 2010 to 19.2% in 2017, compared to 9.5% of MA students in 2017. The percentage of Somerville students' whose first language was not English, at 49.3%, was more than double the percentage at the state level (20.1%) in 2017.

- Chart 2 reflects languages spoken at home for all Somerville Public School students (Somerville Public School 2017 student data). High School specific data shows that Spanish is the most common non-English language, spoken at home by 26% of the High School students in 2016, followed by Portuguese (10%) and Another Language (10%) (Somerville High School (HS) Youth Risk Behavior Survey (YRBS), 2016).

CHART 2: Somerville Public School Students Languages Spoken at Home



Source: Somerville Pulbic Schools, 2017 student data

- The Massachusetts Department of Elementary and Secondary Education (DESE) reports that 21.7% of Somerville students had a disability in the 2016-17 school year, compared to 17.4% at the state level. Students with disabilities may be living with a range of limited abilities including mobility, hearing, or vision impairment, learning disabilities, chronic health disorders, psychological disorders, autism spectrum disorders and more (MA DESE).

- Moreover, additional DESE data shows that 60.2% of Somerville students were classified as high needs in the 2016-2017 school year, higher than the 45.2% state average. A high needs classification includes students with disabilities, English Language Learners, students who are homeless or in the foster system, those who perform far below grade level and students who otherwise are in need of special assistance and support (MA DESE and U.S. Department of Education).

Access to Health Care

Health Insurance Coverage

Nationally, 6.1% of adolescents age 12-17 do not have health insurance coverage (Centers for Disease Control, 2017). The Healthy People 2020 (HP 2020) national target is 100% of Americans having insurance coverage. U.S. census data from the 2010-2015 ACS 5-year estimates, indicates that in Somerville, 2.1% of children under 18 did not have health insurance. Somerville Public School (SPS) data indicates that, in 2016-2017, 14% of students did not have health care coverage at the time of enrollment into the schools. Of those with health insurance, 45% had coverage from MassHealth and 40% had private care coverage. Students and families enrolling in Somerville Public Schools are provided assistance with identifying and securing health care coverage. Health insurance provides a financial safety net for emergency situations and allows individuals to seek regular, primary care, which is essential for early identification, prevention and management of many long-term chronic illnesses.

Primary Care Provider

A national indicator for school age health is the proportion of children and youth who have a specific source of ongoing care (AHS-5.2). Based on 2015 data, 95.6% of youth across the U.S. have a specific source of ongoing care, approaching the 2020 target of 100%.

Those who do have access to a primary care provider should have an annual checkup. HP 2020 aims to increase the proportion of adolescents who have had a wellness checkup in the past 12 months (AH-1) to at least 75.6%. By 2015 that goal had already been surpassed as nationally, 79.5% of adolescents were reported to have had a wellness checkup in the last year. An option for Somerville students age 12 and above is the CHA Teen Connection, providing a range of clinical services for students at the school-based clinic within Somerville High. For some students, this center can serve as their medical home.

- As of 2015, CHA was the primary care provider for 3,270 of Somerville school age children 6-18, potentially representing health care coverage for over 65% of Somerville Public School students.

- In Somerville, the rate for wellness visits is higher than the national rate. In 2015, 91.6% of middle school students self-reported having had a checkup in the last year, and in 2016, 93% of high school students reported the same (Somerville MS and HS YRBS).

On average 92.4% of Somerville Public School students have full compliance with immunizations.

Immunizations

Up to date vaccinations help prevent the occurrence and spread of childhood diseases. Routine vaccinations are also an indicator of health access among youth, and the HP 2020 goals state a desire to increase routine vaccination coverage levels for adolescents (IID-11). In Somerville, like most communities, parents are required to provide documentation that their school-aged children have received required vaccinations before starting school. This includes children who attend public schools or state-licensed child care centers, family day care homes and developmental centers (and some private schools). Based on the guidelines of the Center for Disease Control (CDC), schools must enforce immunizations requirements, maintain records on all enrolled children and submit reports to the state health department. Children who have not received all required vaccinations or a valid exemption may be prohibited from attending school.

CDC vaccination guidelines include: Poliovirus vaccine (IPV), two doses of Measles, Mumps, Rubella vaccine (MMR), three doses of Hepatitis vaccine (HBV), two doses of Varicella (chicken pox) vaccine, and a booster dose of Diphtheria, Tetanus, Acellular and Pertussis vaccine (DtaP). In addition, children who are 11 or older and are entering the sixth grade must have proof they have received all of the above, and additionally at this age, children also need proof of receiving the meningococcal (meningitis) vaccine and the Tetanus Diphtheria Acellular Pertussis vaccine (Tdap).

On average 92.4% of Somerville Public School students have full compliance with immunizations and physicals. The rate of compliance can vary throughout the year as immunizations are time sensitive.

Oral Health

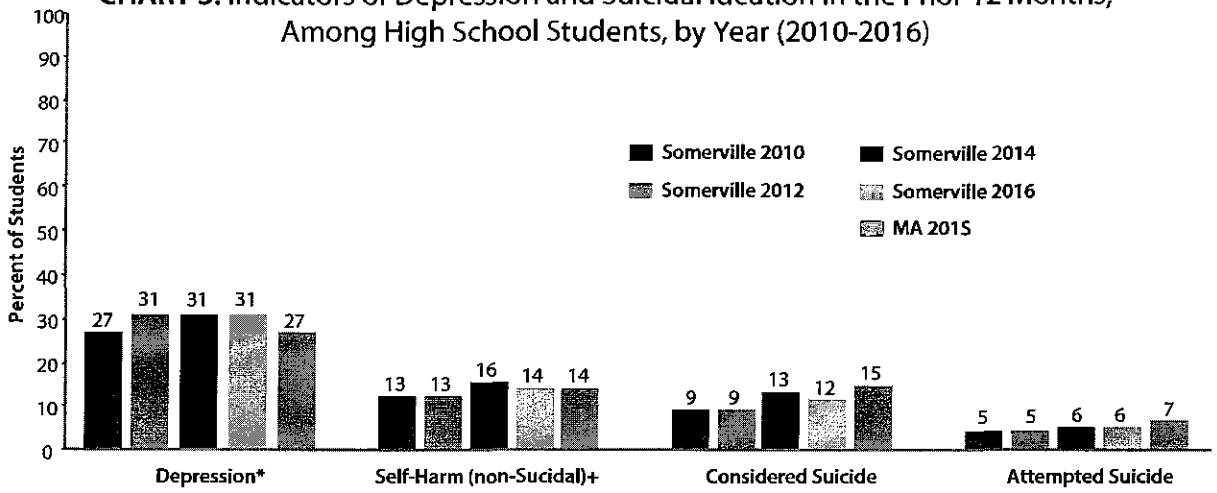
The Healthy People 2020 goals related to dental health care access (OH-7-9) include: 1) Increasing the proportion of children and adolescents who have access and used the oral health care system in the past year, 2) increasing the proportion of low income children and adolescents who received any preventive dental service during the past year, and 3) increasing the proportion of school-based health centers with an oral health component. Dental health access is challenging; even when insurance coverage is technically available, such as through MassHealth. Accessing services is very limited and often prohibitively expensive. In response to specific oral health needs identified in the High School, CHA's Teen Connection is partnering with SPS, Forsyth Institute, CHA Dental Services and Harvard Dental School to offer screenings, treatments, referrals and navigation support for more complex dental needs.

- In 2015-2016, 844 Somerville Public School students were referred by the school nurse to a pro-bono dental provider to receive dental screenings at the school, and when possible, sealants. Of these, 13% or 113 students had dental needs that required additional treatment (Somerville Public Schools).

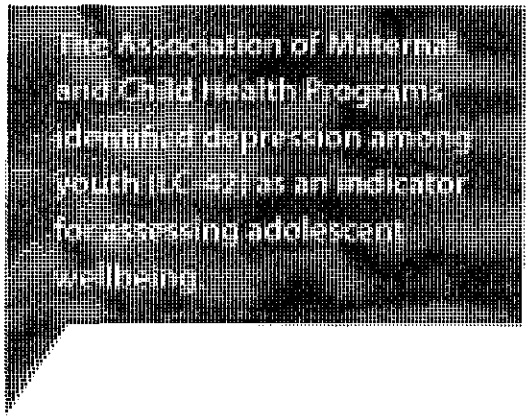
Behavioral and Mental Health

The Association of Maternal and Child Health Programs identified depression among youth (LC-42) as an indicator for assessing adolescent wellbeing. A related behavioral health indicator is the suicide attempt rate among teens, and the Healthy People 2020 goal includes reducing suicide attempts by adolescents (MHMD-2 and LC-45). The national target for 2020 is that less than 1.7% percent of high school students attempt suicide and require medical attention as a result. Unfortunately, the percentage has increased to 2.8% nationally in 2015. Somerville does not have a measure of suicide attempts which require medical attention, but in 2016, 5.5% of high school students self-reported having attempted suicide, an increase since 2012 (4.5%) (Somerville HS YRBS).

CHART 3: Indicators of Depression and Suicidal Ideation in the Prior 12 Months, Among High School Students, by Year (2010-2016)



Sources: Somerville High School (HS) Youth Risk Behavior Survey (YRBS) and MA HS YRBS
* Defined as feeling sad or hopeless almost every day for at least 2 weeks in a row
+ MA self harm data is reported for 2013



- According to Chart 3, in 2016, 31.2% of Somerville high school students felt depressed, defined as feeling sad or hopeless almost every day for two weeks or more in a row, at some point during the prior 12 months (Somerville HS YRBS 2016).

- Additional high school health survey data, not reflected in the chart, shows that between 2012 and 2016, worry about school and social issues increased among Somerville high school students, while worry about family and gangs decreased.

- Self-harm, defined as hurting or injuring one's self on purpose, is similar to state rates, being reported at a low of 12.6% in 2012 to a high of 15.7% in 2014 for Somerville high school students. Females have almost double the rates of self harm in Somerville and statewide. In both 2014 and 2016, high school students who identified as White, Hispanic/Latino, or Other had higher rates of self-harm than Blacks or Asians. Students who self identified as transgender in the 2016 survey also appeared to be more likely to report self-harm.

- The percent of Somerville middle school students who self-reported they had seriously considered suicide was 12.2% in 2015, while 3.0% of Somerville middle schoolers attempted suicide (Somerville Middle School (MS) YRBS, 2015).

- 16% of Hispanic/Latino Somerville middle school students seriously considered suicide in 2015, compared to 12% among all Massachusetts Hispanic/Latino middle school students in 2013 (Somerville MS YRBS 2015 and MA YRBS 2013.)

It is of great importance to promote positive social and emotional learning during this life stage to facilitate positive mental health in school and out of school. This could be in the form of group counseling,

the strengthening of youth-serving agencies, mentoring programs, education programs on drugs and alcohol and screening/brief interventions for children with early signs of emotional distress. Such programs can help increase school achievement and high school graduation rates, ultimately improving mental wellbeing throughout one's life. The City Health and Human Services Department includes a Clinical Youth Specialist who works closely with the Somerville Public Schools on assessments and access to further supports.

Substance Use Disorder/Addiction

Alcohol

Alcohol is the most commonly used and abused substance among youth in the United States. During the teen years, significant changes occur in the body, including the formation of new networks to the brain. Alcohol use during this time may affect brain development. Further, engagement in binge drinking as a teenager can lead to alcohol dependence later in life, and HP 2020 has set a goal that by 2020 fewer than 8.6% of adolescents ages 12-17 report binge drinking in the prior month.

- Among Somerville high school students, 7.9% of students engaged in binge drinking in the 30 days prior to being surveyed (Somerville HS YRBS, 2016).

- Since 2002, Somerville has seen a significant reduction in binge drinking. The high levels at that time (26.3%) triggered a strategic community wide campaign to address underage drinking, which appears to have been successful.

Illicit Drugs

Illicit drug use and dependence is a national crisis that is hitting Massachusetts particularly hard. In 2016, there were 1,933 confirmed opioid-related deaths (and an estimated 136 more) in MA, and 21 of those deaths were in Somerville (MA DPH, Current Statistics, Overdose Death Data). An important step in preventing opioid dependence later in life is to avoid any illicit drug use in adolescence. One Healthy People 2020 objective is to increase the proportion of adolescents who perceive great risk associated with substance abuse (SA-4) to at least 54.3%, based on a survey question asking how much people risk harming themselves.

- In Somerville in 2016, 89.4% of high school students perceived moderate or great risk associated with illegal drugs other than marijuana, indicating that Somerville is succeeding at substance abuse education for youth. Part of this effort comes from peer support for sobriety through Somerville Cares About Prevention (Somerville HS YRBS, 2016).

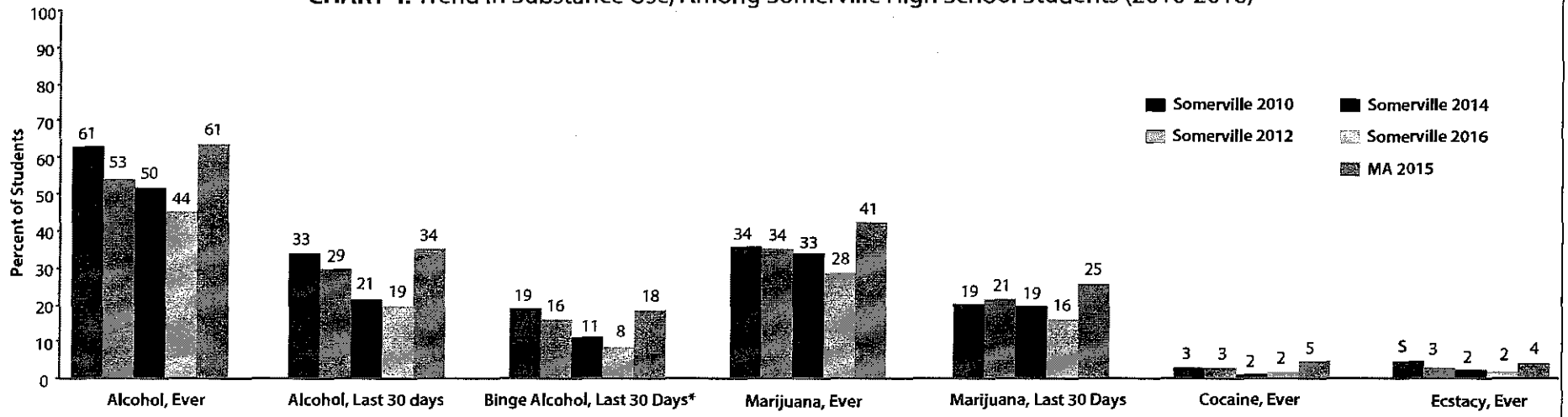
- As seen in Chart 4, use of all substances among Somerville high school students decreased between 2010 and 2016. Substance use rates for Somerville students in 2016 were lower than the statewide rates in 2015 (Somerville HS YRBS 2016, MA HS YRBS 2015).

- Substances which were used least frequently were not included in the graph above, but the data from 2016 indicates that only 0.5% of Somerville high school students had ever tried methamphetamines and 0.1% had used heroin or taken steroids without a prescription.

- Based on results from the 2016 high school Youth Risk Behavior Survey, 12.9% of Somerville 9th graders reported using a substance in the past 30 days for 2016. This was also the initial year of use of a substance use screening tool with high school students. The results were in a similar range as the YRBS data, with 15.4% of Somerville 10th graders reporting using a substance in the past year. The screening uses an evidence-based tool to prevent substance abuse, SBIRT, standing for Screening, Brief Intervention and Referral to Treatment.

- According to the 2016 YRBS, a higher percentage of females used marijuana "in the past 30 days" than males. However, more males reported using other types of illicit drugs than females.

CHART 4: Trend in Substance Use, Among Somerville High School Students (2010-2016)



Sources: Somerville High School (HS) Youth Risk Behavior Survey (YRBS), MA Youth Health Survey, and MA HS YRBS
*Binge drinking defined as 5 or more drinks in a row or within a couple of hours

Abuse of prescription drugs is also a risk factor for drug dependence and mental health disorders later in life.

- 2.9% of females and 1.2% of males self reported using anti-anxiety or anti-depression prescription medication without a prescription in 2016 (Somerville HS YRBS, 2016).

- 1.9% of Somerville high school boys and 1.7% of girls reported they had taken stimulants without a doctor's prescription in 2016.

Tobacco

Tobacco use starting in the teen years can lead to debilitating chronic disease later in life. Life Course Indicators and Healthy People 2020 goals both identify tobacco use among adolescents as a predictor of future health status. HP 2020 set a target to reduce the use of tobacco products by adolescents (TU-2.1) to less than 21% of those in grades 9-12 reporting tobacco use in the prior 30 days, and that target has been well-surpassed, nationally (17% in 2015). The Center for Disease Control notes correlations between educational levels and tobacco use, with more education serving as a protective factor, with higher rates of smoking in those without a high school education. Males are more likely to use tobacco delivery products (cigarettes and e-cigarettes) than females.

- In 2016, 14% of Somerville students had ever smoked a cigarette, and only 5.3% reported smoking a cigarette in the last 30 days. In 2016, Somerville increased the tobacco purchasing age to 21, including the purchase of e-cigarettes, which should further decrease the percent of high school students who use tobacco regularly (Somerville HS YRBS, 2016).

- In 2016, 6.8% of Somerville high school students were currently using e-cigarettes, much lower than the rate for Massachusetts high school students at 23.7%.

Physical Education Program grant (PEP)

Between 2014 and 2017, Somerville was the recipient of the Carol M. White Physical Education Program (PEP) grant for $1.4 million over three years to improve physical education programming and school nutrition in Somerville. The grant provided opportunities for increasing physical activity and healthy eating before, during and after school with a mission of creating a culture of healthy living among Somerville Public Schools (SPS) students and their families. Programs and initiatives included the BOKS before school program, Playworks recess program, SPARK curriculum, Wayfinder Adventures, cooking clubs, National Nutrition Month celebrations, the 5-2-1-0 healthy message campaign and much more. Post-three data for the grant showed improvements in measures including the number of students who engaged in the recommendation of 60 minutes of daily physical activity (29%) and the number of students attaining age-appropriate fitness levels (30%). A sustaining outcome of this grant was the development of a new public school position in 2017—the District Wellness Coordinator.

Physical Health

Childhood is a time of on-going physical growth and development. Good physical health at a young age can be a protective factor against many health problems in the future, such as diabetes, cardiovascular disease and respiratory difficulties. Regular well-child visits and recommended immunizations can help to support both physical and behavioral health, as these latter two health components become increasingly more integrated within the health care system.

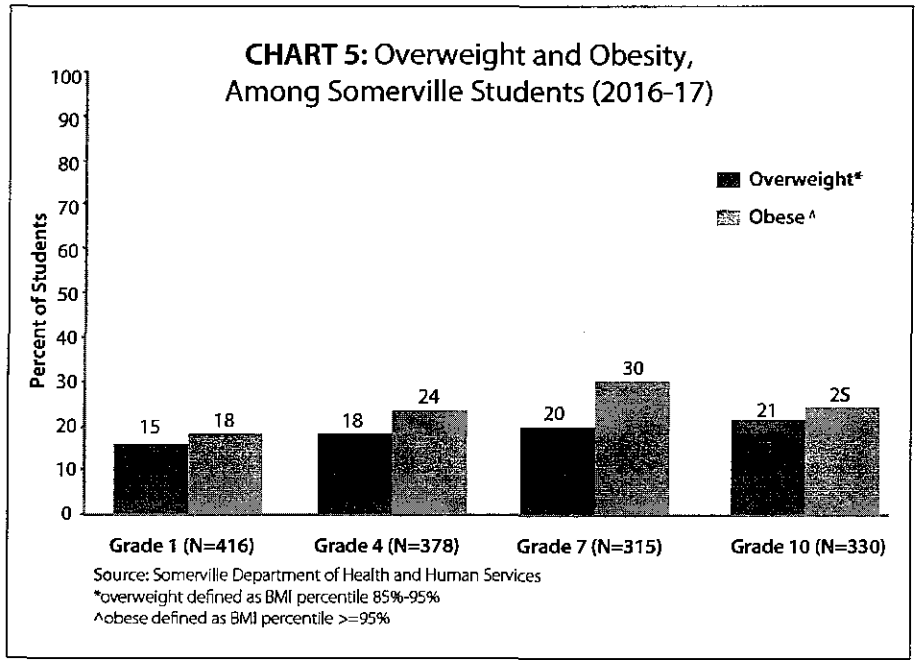
Obesity

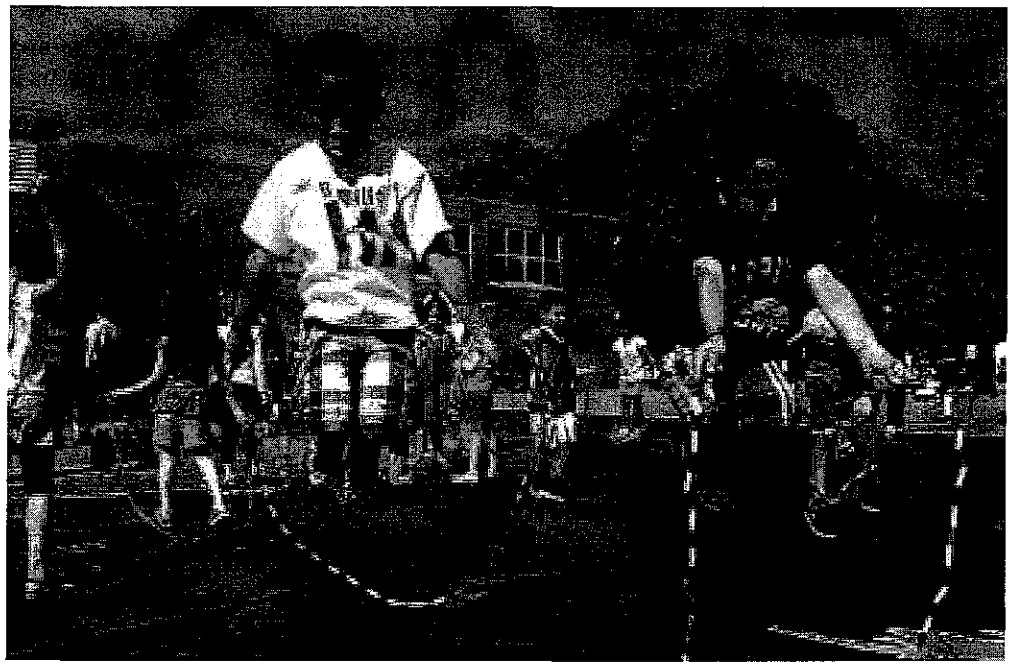
The obesity related life course indicator (LC-32) highlights the risk of various illnesses later in life as a result of childhood obesity. Obesity in childhood and adolescence can increase the risk of type II diabetes, heart disease, hypertension and depression and is considered a strong predictor of obesity later in life. Improvements in obesity rates can improve overall community health and quality of life (AMCHP). The Healthy People 2020 objectives include reducing the proportion of children age 6-11 and adolescents age 12-19 who are considered obese (NWS-10). The Office of Disease Prevention and Health Promotion (ODPHP) data indicates that nationally between 2011 and 2014, 17.5% of children age 6-11 and 20.5% of adolescents age 12-19 were considered obese.

- According to data related to Chart 5, in the 2016-17 school year, on average, 18.5% of a total of 1,439 Somerville students in grades 1, 4, 7, and 10 were considered overweight and 24% obese, higher than the state rates of 16% and 15.3%, respectively (MA DPH, The Status of Childhood Weight and Somerville Dept. of Health and Human Services).

- In the 2016-17 school year, data shows the percentage of overweight students slowly increasing with each grade, with obesity peaking at 7th grade and decreasing by 10th grade.

- In every grade recorded, more male students were obese than female.





Somerville specific trends over the past 10 years follow the national trend of leveling off of youth obesity. National data reveals a higher rate of overweight and obesity for non-Hispanic Black and Hispanic youth compared to non-Hispanic White. Further analysis is needed of Somerville student data to assess if the same disparities exist. Data from CHA patients in this age group show that the highest percentage of obesity is among youth of Central American/Mexican heritage.

Engaging in healthy eating habits can reduce the risk for children of becoming overweight or obese.

- Surveys of Somerville High School students show that more African American or Black students reported drinking 4-5 sugar sweetened beverages per day than any other group in 2016, and their reported consumption rose by 46% between 2014 and 2016, possibly due to the addition of sweetened teas and coffees to the survey question's definition in 2016.
- Consumption of sweetened beverages declined among Somerville high school students in 2016, with 36% of high school students reporting that they did not consume a sweetened beverage on the day prior to taking the survey, a 33% improvement since 2006 (Somerville HS YRBS, 2016).
- In 2015, 50.5% of Somerville middle school students reported eating breakfast daily, up from 41.6% in 2007, at least in part due to school policy changes providing breakfast before school (Somerville MS YRBS, 2015.)

Additionally, to increase consumption of fruits and vegetables, the public schools have participated in the national Farms to Schools movement and set up salad bars and offer fruit or vegetable snacks. Between 2003 and 2015, there was a 37% increase in middle school students reporting they had eaten 3 servings of vegetables during the previous day (from 8.4% to 11.5%) and a 13% decrease in the percent of students who reported having had no servings of vegetables on the day prior (from 37.2% to 32.4%) (Somerville MS YRBS).

Much of a student's opportunity for physical activity during the day comes during school hours or through school sponsored programs. It is important that there is enough time and structure before, during and after the school day for students to get adequate amounts of physical activity. Tufts research published in 2010 (Tovar, et al., 2010) indicated that Somerville children not in organized summer activities were at higher risk for summer weight gain.

Research indicates that physical activity helps to improve student attention and performance. Setting a lifelong habit of exercise is one of the most protective factors for future health.

- According to Chart 6, male Somerville high school students have, on average, increased their daily participation in physical activity; however, the rate of female students who participated in 60+ minutes of physical activity each day remained relatively stagnant and lower than state levels (Somerville HS YRBS, 2016.)

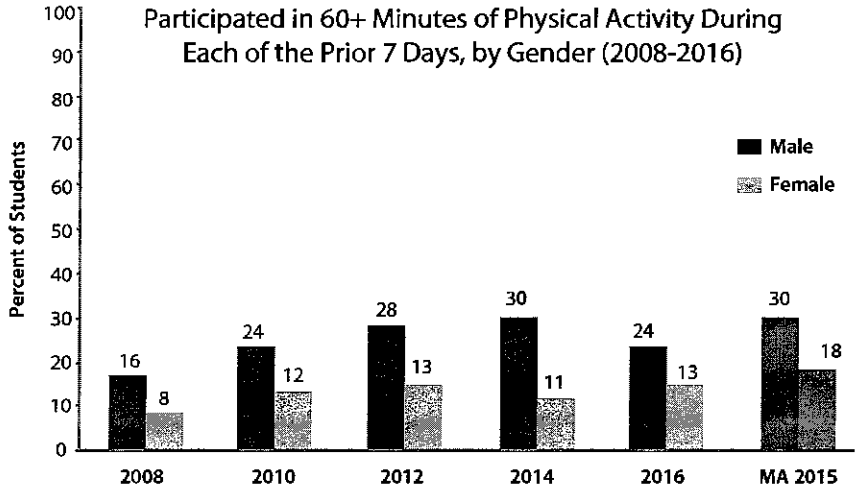
- Somerville HS health data shows, when reviewed by race, that daily physical activity was lowest among Hispanic/Latino (16.8%) and White, non-Hispanic (18.4%) high school students in Somerville.

- Participation on a sports team, was reported by 53.5% of high school students during the 2015-16 school year, including 50.0% of female students and 57.4% of males.

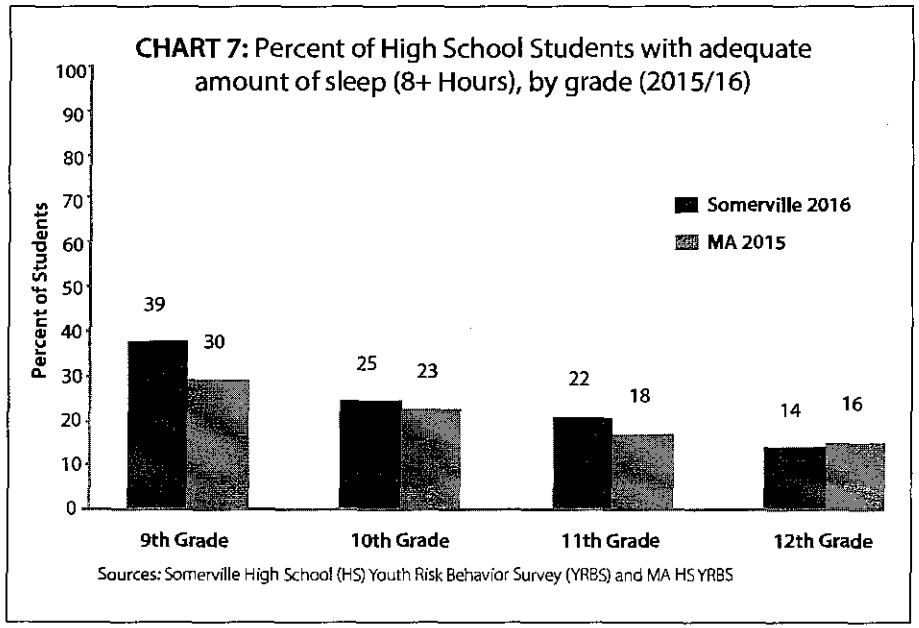
- K-8 students in Somerville Public Schools receive 40 minutes/week of Physical Education (PE). High School students have PE 4 days a week for half of the school year during their Sophomore and Senior years (Somerville Public Schools).

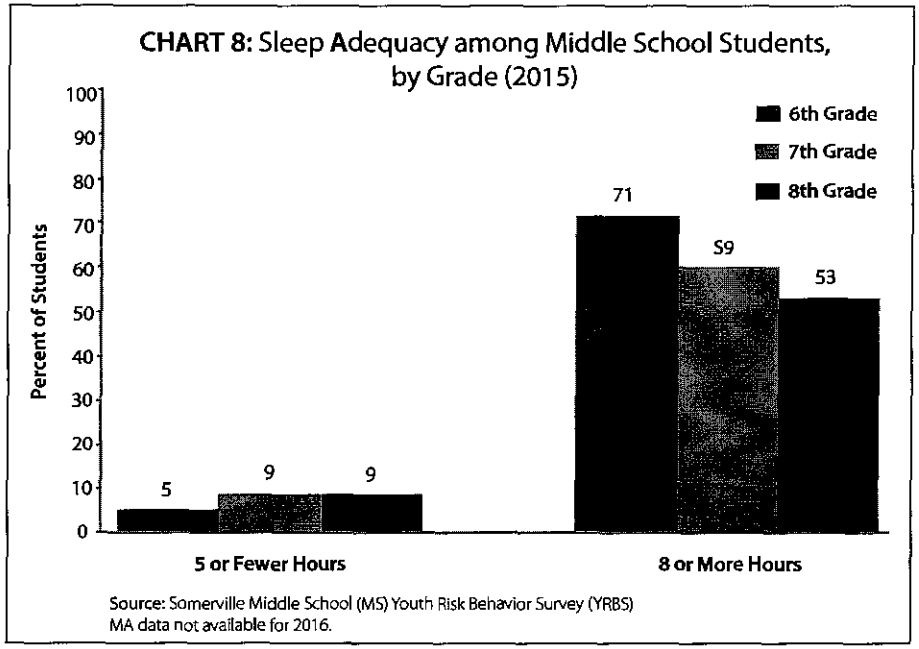
- Recess time varies, depending on age group and size of school, averaging 15-20 minutes per day for K-8.

CHART 6: Percent High School Students Who Participated in 60+ Minutes of Physical Activity During Each of the Prior 7 Days, by Gender (2008-2016)



Sources: Somerville High School (HS) Youth Risk Behavior Survey (YRBS) and MA HS YRBS





Sleep

The most recent guidelines from the American Academy of Sleep Medicine, published in 2016, recommend that children age 6-12 get 9 to 12 hours of sleep per night, while teenagers 13-18 should sleep 8 to 10 hours (Paruthi et al., 2016). The related Healthy People 2020 goal (SH-3) targets the proportion of students in grades 9-12 who get sufficient sleep of 8+ hours a night, hoping to increase the percentage to 33.1% by 2020. However, between 2009 and 2015 studies have shown a decrease in this measure nationally, from 30.9% to 27.3%. Sufficient sleep is important for adolescent health, and multiple studies show a correlation between insufficient sleep and obesity (Morissey, et al., 2016).

- According to Charts 7 and 8, adequate sleep decreases as students get older. Between 6th and 12th grade Somerville students there was an 80% decrease in the number of students reporting that they get 8+ hours of sleep, on average (Somerville HS and MS YRBS).

- Annual trend data for sleep among Somerville high school students shows that there was a decrease from 29.2% of students getting at least 8 hours of sleep in 2012 to 26.4% in 2016.

Somerville High School's day begins at 7:55am and Somerville K-8 schools begin at 8:10, which may be a barrier to adequate sleep for youth, as some students spend time in the evenings participating in extracurricular activities, completing homework and taking part in other non-school activities. Research shows that schools that changed their starting time for teenagers increased weeknight sleep duration, improved attendance and reduced motor vehicle crashes among teenagers (Wheaton, et al., 2016).

Sexual Health and Education

Education on safe sex practices and the burden of teen pregnancies can be integral for reducing sexually transmitted infections (STIs) and unintended pregnancies. Racial and economic disparities exist in data on teen birth rates and risky sexual activity. In order to reduce the negative outcomes of sexual intercourse among adolescents, it is recommended as an HP 2020 goal to increase the proportion of male and female adolescents 15-17 who have never had sexual intercourse (FP-9).

- Overall, a slightly larger percent of Somerville high school students reported having had sexual intercourse compared to Massachusetts high school students, as noted in Chart 8, although the prevalence of sexually active high school students has declined citywide and statewide over the last 10 years (Somerville YRBS, 2016 and MA YRBS, 2015.)

- Teen pregnancies among Somerville high school students were highest among Hispanic/Latino students in 2014 and 2016, with 4.7% and 2.1% of Hispanic students reporting, respectively, having carried a child or gotten someone else pregnant. (Somerville HS YRBS, 2014 & 2016)

- The total number of births to women age 15-19 is decreasing. In 2014 number of births to women under 19 living in Somerville was 22; in 2016 there were 16 births (MA DPH, MA Births).

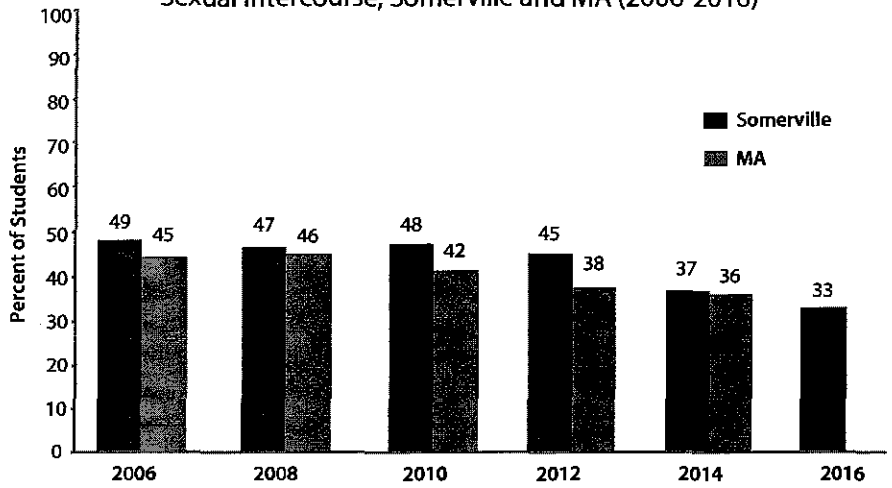
Of the 274 Somerville high school students who reported having ever had sexual intercourse in 2016, 44.4% had been sexually active by the age of 14 (Somerville HS YRBS, 2016).

When students engage in sexual intercourse, it is important that they protect themselves from STIs and from unintended pregnancy. It is also important that they are educated about sexual health and management of STIs or pregnancy, should those arise. There has been an overall increase in the rate of new cases per year of chlamydia, gonorrhea and syphilis among all Somerville residents since 2005, with rates consistently higher than the state overall.

- In 2016, 60.4% of sexually active high school students reported having used a condom the last time they had intercourse, a 15.4% drop from 2014 (71.4%). Condom use is associated with the prevention of both STIs and unplanned pregnancy (Somerville YRBS, 2016).

- The CHA COPE program for pregnant and parenting teens at the Somerville High School served 19 students in 2014-15 and 21 students in 2015-16, 12 of whom were new to the program (CHA, Sexual Reproductive Health Program).

CHART 9: Percent of High School Students who have ever had Sexual Intercourse, Somerville and MA (2006-2016)



Sources: Somerville High School (HS) Youth Risk Behavior Survey (YRBS) and MA HS YRBS
MA data not available for 2016.

Respiratory Health

Asthma emergency department utilization (LC-38) is an indicator of poor control of asthma and its triggers and can be a result of disparities in housing quality and regular health care access. The Association for Maternal and Child Health Programs explains that asthma related ED visits are 2 to 3 times higher for Blacks than Whites, nationally. In Somerville and Cambridge, the Healthy Homes Program of the Cambridge Public Health Department offers home visits to teach families about reducing asthma triggers and lead risks in the home, in order to neutralize respiratory health and lead exposure disparities among Somerville youth.

- Since 2004, rates of asthma related emergency department (ED) visits in Somerville have increased across the three youth age groups shown in Chart 9 (MA DPH, Uniform Hospital Discharge Data System Massachusetts Division of Health Care Finance and Policy).

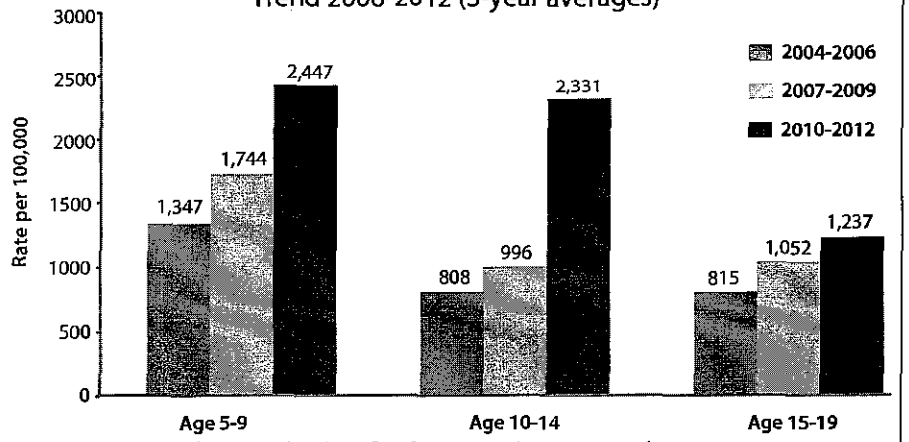
- According to the Somerville Public Schools records, in the 2016-17 school year, 352 students enrolled in the district had an asthma diagnosis, representing 7.1% percent of the district's students.

Disability

Disability status of children under 18 is a U.S. census category. Children with special health care needs have legislated supports and accommodations available in Massachusetts through the 504 Plan to help them participate fully in educational programs.

Students who have documented disabilities impacting their learning may also be served under the Individuals with Disabilities Education Act and have an Individualized Education Plan (IEP). Of Somerville students, 21.7% are considered students with a disability by the Massachusetts Department of Elementary and Secondary Education (DESE). The state identifies the graduation rate of students with IEPs as an indicator for success in serving students with disabilities, as does the Healthy

CHART 10: Asthma Related ED Visits in Somerville by Age, Trend 2006-2012 (3-year averages)



Source: Uniform Hospital Discharge Data System Massachusetts Division of Health Care Finance and Policy, MDPH

People 2020 goals (AH-5.2). Adolescents in Somerville with various disabilities are served in the Somerville Public Schools, in mainstream classrooms and at Full Circle and Next Wave schools, the districts' alternative junior high and high schools for students who have difficulties learning in a traditional setting.

- Among the various disabilities on record, in the 2016-2017 school year, Somerville Public School's rate for documented emotional disability is 9.4%, developmental delay rate is 10.8%, and specific learning disability rate is 31.6% (Somerville Public Schools).

- In the 2016-2017 school year, 1% of students in SPS had physical disabilities such as cerebral palsy and 4.6% had health disabilities such as diabetes or seizure disorder (Somerville Public Schools).

- The state's target for IEP graduation is 84%, while the HP 2020 national target is 65%. Somerville falls between the two targets. In 2015-16, 66.2% of Somerville students with IEPs from the 2015-2016 cohort graduated (MA DESE).

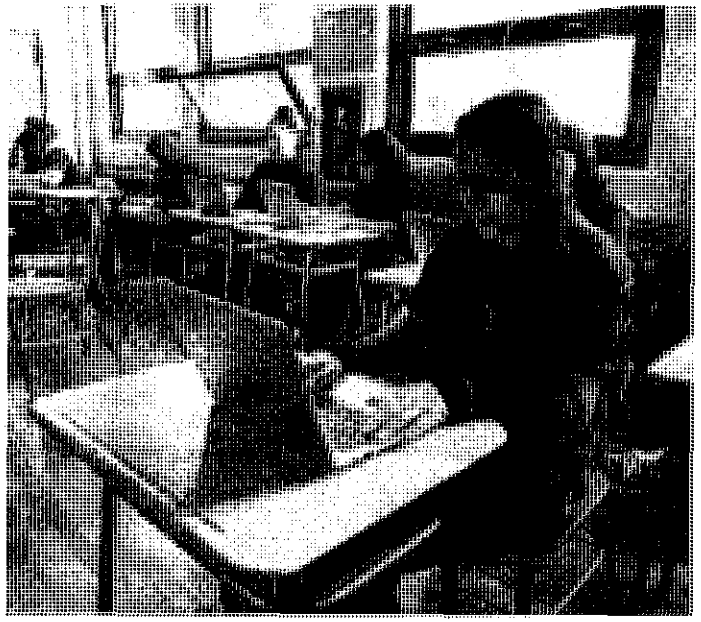
Education

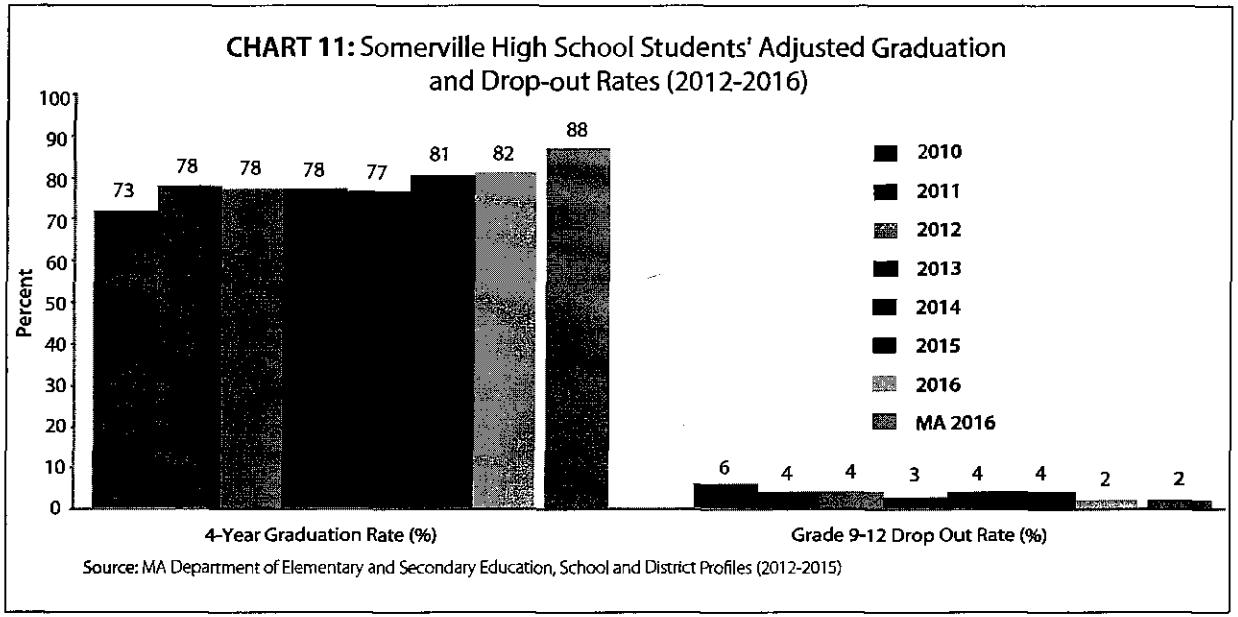
Education is recognized as a social determinant of health. The Healthy People 2020 goals and the Life Course indicators both identify educational attainment as a lifelong indicator of health and wellbeing. According to the Association of Maternal and Child Health Programs (AMCHP), educational attainment is linked to future acute and chronic health conditions and is a predictor of life expectancy. The education related Life Course Indicator proposed by the AMCHP is the percent of 4th grade students meeting proficiency standards in math and reading (LC-57). If students can meet this standard in 4th grade, it is more likely they will graduate from high school on time and achieve good health throughout their lives. Massachusetts Comprehensive Assessment System (MCAS) is the standardized tool used by Somerville Public Schools to evaluate students on English language arts (ELA) and mathematics. Somerville Public Schools' 2016 data for 4th grade students shows that 48% of the students tested advanced or proficient in ELA while 50% tested advanced or proficient in math. The Office of Disease Prevention and Health Promotion Healthy People 2020 objectives anticipate that the proportion of students who graduate with a high school diploma within four years after starting 9th grade will increase to 87% by 2020. Nationally, 82% of students achieved 4-year graduation in the 2013-14 school year.

- As shown in Chart 11, the Somerville district 4-year graduation rate in 2016 was 82%, while the state graduation rate was 87.5%. The adjusted 4-year graduation rate, which excludes transfers into the district, at 87.9% was higher than the state rate of 84.6% (MA DESE).

- The 2015-16 Somerville dropout rate across all grades was 1.9%, which is equal to the MA rate in the same year and half the Somerville dropout rate in the prior year (3.7%) (Somerville YRBS, 2016).

In Somerville, 60.2% of students were considered high-needs in the 2016-17 school year. These students are considered at risk of falling behind in class work or failing school as a result of living in poverty,





having a disability, being an English language learner, or entering high school with limited formal education. In comparison, only 45.2% percent of students in all of Massachusetts were classified as high needs the same year (MA DESE).

Given the strong correlation between wellbeing and the ability to succeed in school, many social factors and family dynamics can impact academic outcomes. As described in the prenatal and early childhood chapter, exposure to Adverse Childhood Experiences (ACEs) can potentially affect lifelong mental and physical health, with corresponding positive or negative outcomes to one's overall life success. The list of ACEs includes physical, sexual, or emotional abuse, neglect, being a victim of or witness to violence at home or in neighborhood, parental separation, divorce or incarceration, mental illness or substance misuse in a child's household, among others. ACEs are associated with a wide array of health outcomes, including symptoms of trauma history.

Among Somerville's many students who may experience ACEs are students who have come to the United States from other countries, particularly in instances due to safety reasons. According to United Nations Children on the Run Report from 2014, the top reasons that youth cite for fleeing to the United States are: personal experience of violence (48%), report of abuse at home (22%), and desire to meet up with relatives who have already immigrated. As a result of their immigration experience, many students feel anxious and depressed and report being bullied by their peers. Many of these students have less formal education than their peers, as well as less medical or dental care history. Unaccompanied minors and other immigrants at Somerville High School are not the only population in Somerville that have experienced ACEs. However, these students are among those who most benefit from culturally sensitive and trauma-informed approaches. Trauma-informed school environments are those that create a sense of safety and stability through routines, clear expectations and modeling emotional regulation. Additionally, such schools promote social connections and supports to increase positive mediating factors in a child's life.

By All Means

Somerville is one of six cities to participate in Harvard's By All Means project, a multi-year initiative aimed at developing comprehensive child wellbeing and education systems that help eliminate the link between children's socioeconomic status and achievement. Somerville's engagement is focused on developing a comprehensive plan for access to high-quality preschool, expanded out-of-school time and integrated health services that support the intellectual and social-emotional growth of all Somerville children. In remarks at one of the convening sessions, Mayor Joseph Curtatone spoke of the need to understand education as a complex ecosystem, in which a variety of players help move a community towards shared goals. The School District, Health and Human Services Department and leading community partners including Cambridge Health Alliance are working towards a strategic continuum of services to strengthen out-of-school time programming and wraparound services for Somerville youth. The Somerville Community Cabinet has established key process indicators, participation metrics and ultimate student outcomes to measure the success of this collective work.

Police Steps Program

Starting with the first day of school, as part of the City's Students & Teachers Engage Public Safety (STEPS) initiative, five Somerville police officers will embark on a journey with the 6th grade classes in each of the district's public schools. This is a commitment for a full seven years, as five new officers serve as mentors for each year's incoming sixth graders and advance with them to graduation. Over the next seven years, Somerville Police plan to have up to 35 officers, approximately one-third of the department's patrol staff, involved in the program. By establishing long-term, real connections between youth and law enforcement, STEPS aims to foster trust and positive relationships between young people and police officers and to help young people grow into responsible and successful adults. The program, believed to be the first of its kind, is a partnership between the City of Somerville, the Somerville Police Department and the Somerville Public Schools.

The Somerville Public Schools has stepped up in recent years to the challenge of addressing the diverse range of issues that face many high-need students. These needs can be a barrier to achieving the 4-year graduation rate national target, yet the public schools are working hard to insure all school age youth have access to the benefits of education in this life stage to increase the potential for success later in life. Some students find achieving a regular diploma can be a challenge. It can be more developmentally appropriate for some older students to transition to the adult education program at SCALE to complete the High School Equivalency Test and achieve an Adult Diploma.

- 46% of Somerville students planned to attend a 4-year college upon graduating when asked in 2016, while 27% planned to attend a 2-year college and 20% planned to enter the workforce (Somerville YRBS, 2016).

- In 2010, 1% of Somerville students reported wanting to join the military upon graduation, while 13% reported plans to join the military in 2016.

To better support all students, Somerville Public Schools offer wrap around services, alternative school experiences at Next Wave and Full Circle with supportive staffing and a Welcome Center at the high school for students and their families newly arrived to the United States. Somerville Public Schools also offers a robust Career and Technical Education program, vocational education that provides skills training as well as serving to introduce students to broader career and future academic options.

It should be noted that Somerville students also have alternative options to attending the local public school. Prospect Hill Academy lower grades and middle school are located in Somerville, with the high school in nearby Cambridge. Parochial schools such as St. Catherine's also provide elementary education options. In addition, some portion of families choose to home school their children, with a vibrant local network to support these children's learning.

Social Emotional Learning

In Somerville Public Schools, all pre-k to 8th grade classes utilize the Second Step program, a developmental curriculum, which teaches social-emotional skills through the progressive grades. Winter Hill Innovation School also utilizes the Responsive Classroom program, integrating social and academic skills building. Such programs have been shown to facilitate classrooms where all children can thrive and where attention to social-emotional learning supports academic success.

Closely related and complementary to the Second Step lessons, Somerville Public Schools is integrating mindfulness practices into the school day. Kennedy School has implemented a pilot project called Mindful Mondays, with classrooms and cafeterias, as well as field trips serving as settings for mindful walking and mindful eating, and mindful breathing for Kindergarten classes. In preparation for the 2017-2018 school year, additional Kennedy teachers participated in related professional development sessions to learn mindful practices and how to implement them with students, as well as how to track and record outcomes. The 5-year goal is to spread similar training across the district.

Economic Stability

International research suggests that family affluence is related to youth health. A 2002 article in the Journal of Youth Psychology states that children who grow up in poverty are at a greater risk for developing physical and mental health conditions (Barrera, et al.). In order to measure income related health disparity, the World Health Organization developed a Family Affluence Scale, a measure of family wealth for children and adolescents, to measure the association between economic status and health in families with children. Currently, Somerville youth data typically does not have related economic status to allow for cross-referencing.

- 23% of Somerville children under 18 were living in poverty as of 2015 data, an 8.2% increase since 2010 and higher than the Massachusetts level of 15%

- 43% of Somerville single female-headed households are in poverty, a 2.6% increase since 2010, consistently higher than the state rate.

- 39.4% of Somerville Public School students were considered economically disadvantaged in 2016-17, a measure based on the number of students participating in state-administered aid programs including the Supplemental Nutrition Assistance Program (SNAP), foster care, the Temporary Assistance for Needy Families (TANF) or MassHealth (Medicaid). Among students in all MA public schools, 30.2% were economically disadvantaged in 2016-17. (MA DESE)

Housing/Housing Security

The McKinney-Vento Act refers to a federal statute, updated by the Every Student Succeeds Act in 2016, requiring each state to insure that homeless children have the same access to school, including preschool, as all other children. School districts each have a Homeless Liaison, who implements the services at the local school district level. Transportation to school, from temporary housing in the Greater Boston region, is one of the key services provided. Youth Harbors works with unaccompanied students in Somerville High School who are experiencing homelessness. According to the SPS Homeless Liaison:

- 94 students who attended SPS reported experiencing homelessness during the 2016-2017 school year (Somerville Public Schools).

- Additionally, 17 students from other communities who were experiencing homelessness were housed temporarily in shelters in Somerville during the 2016-17 school year but continued attending school where they originally became homeless.

Employment and Living Wage Jobs

The Great Recession (2007-2009) shifted the employment market for teens, dramatically increasing competition for even low-paying jobs that were traditionally filled by teens and reducing available summer employment opportunities. Summer jobs programs for youth, such as the one run by the City of Somerville, are often at the mercy of the current economy and can therefore vary greatly year by year, but provide valuable experience and exposure.

Training for future employment options is also important for youth. The Career and Technical Education program at Somerville High School offers 13 different academic and skills building courses of study. Graduates go on to 4 year colleges, 2 year college, advance trainings or apprenticeships or directly to the job market. Community trainings such as the Counselor in Training (CIT) programs offered by the YMCA and others can be a ladder to employment as a counselor/camp leader, while also building leadership and program management skills.

Food Security

Household food insecurity is an issue for Somerville youth. The income diversity of school age youth becomes visible in this increasingly rising area of need. Multiple studies document the links with students' ability to participate and learn in the face of food insecurity at home. The Healthy People 2020 goals address food security by setting a target that only 6% of households are food insecure by 2020 (NWS-13). The national indicator has shown minimal improvement although the percent of food insecure households has dropped slightly, from 14.6% in 2008 to 14% in 2014 (ODPHP, 2014). The Somerville Food Security Coalition, which meets monthly, includes a wide range of city, school and community stakeholders both local and regional, convening regularly to advocate for and provide improved access to available healthy food resources.

- In 2016, for the first time, the Youth Risk Behavior Survey in Somerville addressed food insecurity by asking students if they have ever gone hungry due to lack of money at home. 9.4% of students responded that they had gone hungry, including 18.2% of Haitian Creole speakers and 10.3% of Spanish speakers (Somerville HS YRBS, 2016).

- In 2015, 19.4% of Somerville households with children under 18 were utilizing Supplemental Nutrition Assistance Program (SNAP) benefits, and the median household income of this group was $17,396 (American Community Survey).

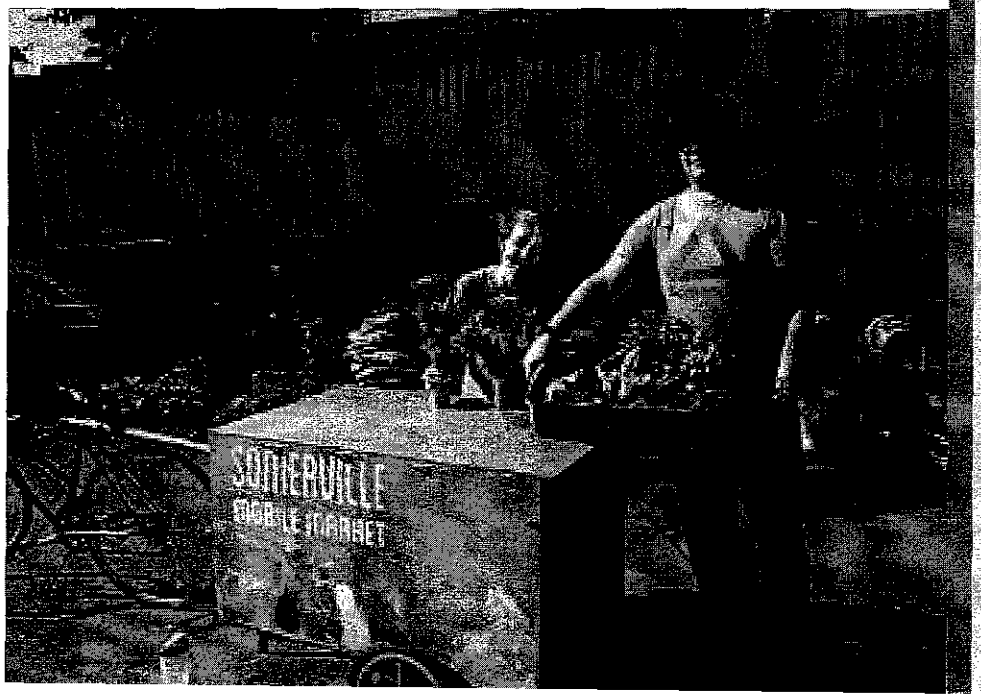
- Between 2010 and 2015, the percentage change for female-headed families with children using SNAP was a 44.6% increase, representing 658 households.

- The statewide calculator for SNAP gap estimates that as of 2016 data, 61% of those who are income eligible for SNAP in Somerville are not accessing these available financial benefits (Food Bank of Western Mass).

Currently, children born in the U.S. or who have a green card may be eligible for SNAP. It should be noted that SNAP is not considered a

public charge, defined as an individual who is likely to become primarily dependent on the government for assistance. Over 60 locations in Somerville, including grocery stores, corner markets, Farmers Markets and the Somerville Mobile Farmers Market accept SNAP benefits. The state-wide Healthy Incentive Program launched in summer of 2017 to provide additional financial supports for SNAP beneficiaries to purchase fresh produce from Massachusetts farmers.

The Somerville Public Schools have developed multiple programs to address food insecurity among youth. All Somerville public schools provide free in-school breakfast (AH-6). In 2014, the non-profit Somerville Backpack program started to provide food for students, identified by the schools, for over the weekend. This public-private partnership program started small at just a few schools, but has expanded to 9 Somerville Public Schools and served 291 school aged children as well as homeless youth in the 2016-2017 school year. Food for Free has also developed a Family Meals program, providing 230 free frozen balanced meals that are available at several Somerville locations to address food emergencies. Prospect Hill Academy also offers a backpack program for children in their two Somerville based schools.



Shape Up Somerville

SHAPE UP SOMERVILLE

The City of Somerville is home to Shape Up Somerville (SUS), a nationally recognized model for community health improvement. This initiative began as a research study at Tufts, under the direction of Dr. Christina Economos, focused on obesity prevention in school age students through policy, systems and environmental change. Now, fifteen years later, this city-wide strategy is part of the Health and Human Services Department in the City of Somerville. City and community partnerships are key in achieving the mission to build and sustain a healthier, more equitable community for everyone who lives in, works in and visits Somerville. SUS works towards this goal by focusing on healthier food access and active living. SUS projects include:

- Somerville Mobile Farmer's Market – increasing access to affordable fruits and vegetables
- Shape Up Approved Restaurant Program – providing healthy meeting and dining options
- Tap Water Campaign – promoting drinking tap water over sugary drinks, starting with installing water bottle filling stations at parks and the High School, in collaboration with CHA and other partners
- Safe Routes to School - having safe walking, biking and rolling options to get to and from school
- Mayor's Wellness Challenge – promoting the park and bike infrastructure
- Food system assessment - strengthening the local food system, in partnership with the Food Security Coalition

Natural and Built Environment

Home Environment

A safe environment is essential for youth and adolescent health. Natural resources and the built environment can either pose risks to health or promote good health. Studies of the links between housing and children's health indicate that quality of housing has more impact than other housing factors such as affordability, stability or ownership. Poor quality housing was identified as a predictor of emotional and behavioral issues in children, largely due to the impact on parent stress (Coley, et al., 2013).

Secondhand environmental smoke exposure is magnified when a child or adolescent is within a confined space, such as a home, with a smoker. This exposure in the home (LC-28) can lead both to many of the same conditions that smokers are at risk for and to new cases of asthma in youth, which is why it has been identified as a leading Life Course Indicator for health. Household asthma triggers include smoke exposure, pets, dust mites and mold.

- In Somerville in 2014 and 2015 respectively, 29% of high school students and 24% of middle school students reported that they lived in a household in which there was a smoker other than themselves. White students reported secondhand smoke exposure at the highest rate (32.3%) (Somerville HS and MS YRBS, 2014 & 2015).

Transportation

Children who become accustomed to walking or biking to school will easily meet recommended levels of daily physical activity and build lifelong habits of active transportation. It is the role of a city to provide safe transportation infrastructure for drivers, pedestrians and cyclists. Somerville is committed to providing safe ways for students to walk and bike to school. In June 2017, the Winter Hill Community Innovation (WHCI) School was awarded a bronze "Safe Routes to School" award from the Massachusetts Department of Transportation (Jessen, K., 2017). WHCI was one of 80 schools and organizations in the state to receive the award.

In 2nd grade, Somerville Public Schools offer pedestrian safety courses, and the schools teach bike lessons to all 5th grade students, which focus on bicycle riding, safety and the rules of the road. The lessons began in 2010 with the Cycle Kids curriculum which was donated to Somerville thanks to a New York Foundation grant. The program has helped improve bicycle safety among Somerville youth, as more middle school students in all grades reported wearing a helmet most of the time or always, when riding a bike, in 2015 than in 2007. Still, 36% fewer 8th graders wore their helmet than 6th graders in 2015 (Somerville MS YRBS), and it may be necessary to continue to address helmet use as students become further removed from the Cycle Kids curriculum. Massachusetts law requires anyone age 16 or younger on a bicycle to wear a helmet.

Access to Nature and Open Space

The availability of open, natural spaces is important for child and adolescent health and development. Air quality is improved by urban forestry. Open spaces set apart from heavy traffic can offer a respite from the pollution caused by car emissions and makes physical activity fun and convenient for youth. In Somerville, the urban trees, parks, community gardens and the Mystic River Watershed are valuable natural resources. Under Mayor Curtatone, the City has renovated 17 parks and added four new parks, increasing the city's open space inventory by 2.05 acres since December 2012. There is a total of 32 playgrounds in the city. Additionally, in 2016, Upper Mystic Lake (site of a popular state managed swimming beach) was awarded an A+ rating by the Mystic River Watershed Association and the Mystic River was awarded ratings of A- for water quality related to swimming and boating safety measures (Bender, E., 2017). These improvements in the city's surrounding environments allows for increased use of open space for land and water recreation. The Gentle Giant rowing program and the canoe and kayak rentals at Blessing of the Bay Boathouse increase the recreational and physical activity options for youth and families with children to explore the local natural areas by boat.

Environmental Health

Environmental impacts on health can lead to a variety of negative health outcomes. An issue impacting Somerville is the introduction of ultrafine particles to neighborhoods in close proximity to Interstate 93. Such exposures have been linked to elevated levels of asthma, respiratory infections and heart disease. These outcomes disproportionately affect those living in the I-93 area. Young children are vulnerable to cumulative impacts of local air pollution, especially if they are also experiencing secondhand smoke or other allergens in the home environment.

Social and Community Context

Historically, Somerville has been a welcoming city for immigrants, serving as a gateway community for new arrivals from around the world who settled and made this their home. National changes in immigration policy since 2017 have highlighted the sanctuary status that communities such as Somerville strive to offer to all residents, regardless of immigration status. The Somerville School Committee passed a resolution confirming the commitment to providing a safe learning environment for all students. From a public health perspective, addressing the perceived safety or related threats and providing knowledge and resources in a supportive environment is preventative particularly for mental health and wellbeing for all residents, especially youth.

Older students are beginning to change their social relationships, building more connections outside of the family in community and non-school settings. In Somerville, there are over 50 identified agencies providing youth development services and a Somerville Youth Workers Network.

For those interested in identifying supports and better understanding social and community resources in service of a healthy childhood and adolescence, the online Somerville Hub offers a broad range of links for families and children. SomerPromise, the City's cradle to career initiative, has gathered this information into one location. The Hub is also a repository for resources such as those developed through the PEP project, so families can have access to materials related to community wide initiatives. More directly, SomerPromise has also offered wrap-around services, especially at the High School, with an emphasis on youth who have recently arrived to Somerville and may have limited formal education.

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Race

It is important for school aged youth to feel safe during their daily routines in order to be productive in school and avoid undo stress and anxiety. However, in some communities, students face social exclusion based on race, disability and gender or sexual orientation. The Life Course Indicators seek to understand the impact of discrimination in childhood, specifically on the basis of race (LC-14), on future health and wellness.

- In Somerville, 15.2% of Black middle school students worried during 2014-15 about being treated different based on their race or ethnicity (Somerville MS YRBS, 2015).

- 10.7% of high school students felt much less safe or somewhat less safe as a result of having police officers in their school in the 2015-16 school year (Somerville HS YRBS, 2016).

The City of Somerville strives to be as inclusive as possible and to reduce incidences of discrimination. In order to aid youth and families, the public schools have made available fact sheets in 14 languages on immigrant rights and support for minorities on the SPS website. Somerville is also one of the 89.8% of schools nationwide, and among 96% in MA, which explicitly prohibits harassment on the basis of a student's sexual orientation or gender (AH-9).

Social Inclusion

In a political climate which challenges not only rights around immigration status, but also sexual and gender orientation, the presence of groups such as the Gay/Straight Alliance supporting LGBTQ youth are critical social supports. The shift at Somerville high school's prom to a "royalty couple" versus king and queen titles to be more inclusive, led to the first same-sex couple being awarded that honor in 2017.

Social Safety Network/Social Support

It is important that students have a social safety network to guard against the negative impact of bullying and discrimination. The Healthy People 2020 goals prioritize the intent to increase the proportion of adolescents who have an adult in their lives with whom they can talk about serious problems (AH-3.1). This is also one of the five target areas of America's Promise Alliance for youth, a national organization with which Somerville is affiliated. In 2014, 79.3% of adolescents nationally were thought to have an adult to talk to, while the 2020 goal is that more than 83.2% of adolescents will be able to talk about serious problems with an adult.

- 80% of Somerville high school students had an adult to talk to outside of school in 2016, while 64.4% reported having a teacher or adult in school with whom to talk (Somerville HS YRBS, 2016).

- 16.1% of female and 8.4% of male students met with a school counselor in 2016, while 19.1% of females and 10.8% of males met with a therapist.

Social Media

The year 2012 was a milestone in social media's impacts on the culture, as it was the year that a Pew report identified as when nearly 50% of Americans owned a smartphone. Based on the most recent Pew report, in 2017, over 77% of Americans have a smartphone and 95% have some kind of cell phone. Research indicates that distinctions between generations has changed and that access to social media and its related technologies has created greater differences across shorter periods (Mobile Fact Sheet, 2017). Today's high school seniors and/or their families, have likely had access to a smartphone or other interactive communication and information technology for most of their teen years. "Screen time" used to refer to hours spent watching television. Then the term came to include cable and MTV or video games, followed by computers being added to the list, and most recently smartphones and tablets.

The social landscape shifted with the advent of Facebook, Twitter, Snapchat and other social media platforms. Instant, and sometimes temporary, interactions via social media have superseded many live, face-to-face interactions. Families and communities, and often youth themselves, are struggling with how to manage the impacts of social media, especially on young people who are developing their social foundations. Safe communications and online etiquette and standards of behavior are not universally in place to protect young people from the rise of new phenomena such as cyber-bullying, which is showing up in the youth survey data. This engagement with social media may have some positive impacts, as reportedly nationwide sexual activity in teens has decreased.

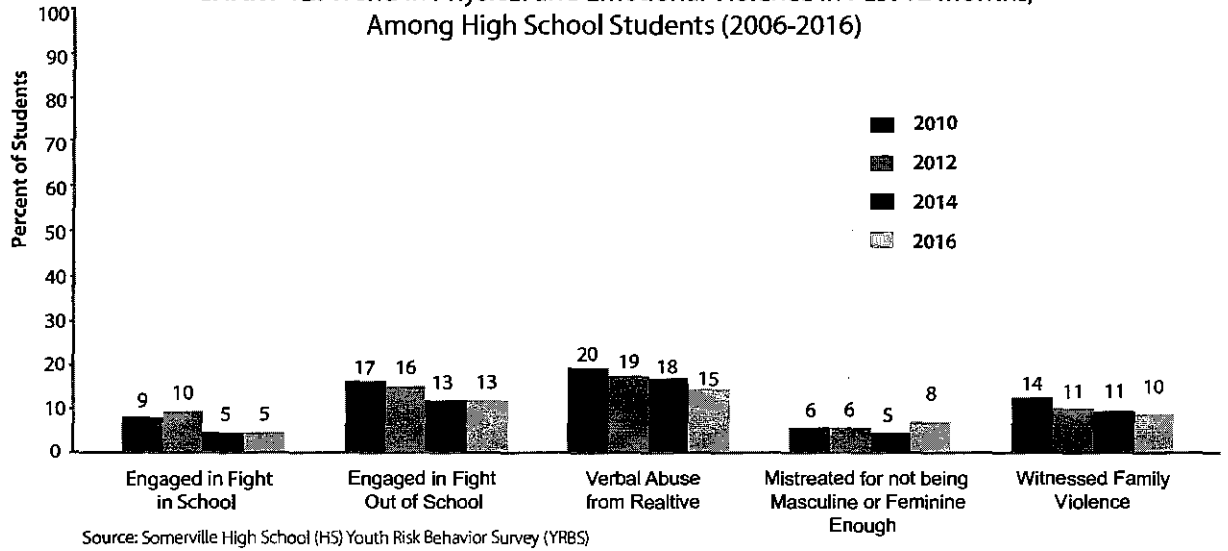
Violence (Neglect, Domestic Violence, Sexual Abuse, Bullying)

The local Department of Children and Families (DCF) Office covers Burlington, Cambridge, Somerville, Winchester, Wilmington, and Woburn. According to this office, of these towns, Somerville has the highest number of open cases accounting for 26-30% of the total number, comprising approximately 126 cases as of December 2016. A case can include multiple children of varying ages and at times multiple families depending on the complexity of the case. This number includes cases that are involved through Care and Protection (C&P), Child Requiring Assistance (CRA) and Voluntary cases. Increasingly, more of the DCF cases are related to substance use by parents.

Somerville Police data indicates the domestic assault rate was lowest in 2013, yet that was also the year the highest numbers of juveniles were involved. Witnessing domestic violence is one of the adverse childhood experiences (ACEs), which if accumulated, can have negative impacts on health and wellbeing in later life.

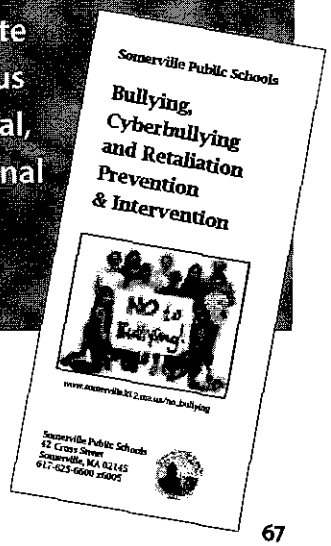
- According to Chart 12, most experiences of violence among Somerville youth became less common between 2010 and 2016. However, more students reported being mistreated for not being masculine or feminine enough in 2016 (8%) than 2010 (6%) (Somerville HS YRBS, 2016).

CHART 12: Trend in Physical and Emotional Violence in Past 12 Months, Among High School Students (2006-2016)



Source: Somerville High School (HS) Youth Risk Behavior Survey (YRBS)

Somerville Public Schools maintain a bullying prevention and intervention website: www.somerville.k12.ma.us/no_bullying. This site offers an anonymous reporting web portal, and links to additional information and resources.



- Comparison data shows that male Somerville students were more likely (17.7%) than female students (7.8%) to engage in a physical fight outside of school in 2016.

- More comparisons show that students identifying as Asian or Pacific Islander were most likely to report verbal or emotional abuse from a family member (21.1%) in 2016.

- When asked about physical or sexual violence by a date, girls reported dating violence (3.8%) at over twice the rate that boys did (1.4%) in 2016.

- Non-domestic violent incidents involving youth, such as robbery and assault, are tracked by the Somerville Police Department. Between 2010 and 2016, the number of such incidents ranged from a low of 27 in 2013, to a high of 56 in 2011 (Somerville Police Department data).

Bullying is a common form of violence among teenagers, which is especially prevalent within schools and may lead to decreased academic achievement and mental health problems among teens who are bullied.

- Among the 282 high school students who reported that they witnessed bullying in school in 2016, 125 (44%) students did nothing and 8 (3%) joined in (Somerville HS YRBS, 2016.)

- In 2015, 11.3% of White middle school students reported being bullied in school or on the way to school and 9.5% reported being bullied electronically, the highest rates among all races.

Community and Civic Engagement

The Association of Maternal and Child Health Programs stresses the importance of social capital in lifelong health. Social capital is built of civic engagement, norms of reciprocity and trust in others. Youth and adolescents can build social capital and lifelong networks through engagement in extracurricular organizations. According to a study published in the Journal of Youth and Adolescence (Chan, Wing Yi et al.), civic engagement among adolescents is related to higher life satisfaction and educational achievement as they emerge into adulthood. In the study, non-Whites and high-risk youth who were civically engaged during adolescence engaged in less criminal activity in adulthood. Civic engagement in youth is so important to the Office of Disease Prevention and Health Promotion that it is stated as a Healthy People 2020 goal to increase the proportion of adolescents who participate in extracurricular and/or out-of-school activities (AH-2) to 90.6%.

- At Somerville High School, participation in sports teams, academic clubs and music or theatre showed a gradual increase between 2010 and 2016 (Somerville HS YRBS, 2010-2016).

- Slightly fewer students participated in student council, community service and community groups (faith based, political, etc.) in 2016 than did in 2010.

- The most popular extracurricular activity among Somerville high school students in 2016 was sports teams, in which 53.5% of high school students were engaged.

- In 2016, Hispanic/Latino high school students in Somerville were the least represented group in every type of extracurricular activity on the Somerville YRBS Survey, with the exception of sports teams where it was only slightly less.

- For the majority of organized social groups in 2016, students who identified as Asian or Other were the most represented, with the exception of sports teams where Black students were the most likely to participate.

Recommendations for School Age/Adolescent

Ages 5–18

Increase access to health promoting resources for school age youth

- Develop shared measures to assess resilience and wellbeing
- Expand in-school health and dental services and consider telehealth policies
- Provide health education to teens and parents/caregivers that is developmentally, culturally and linguistically appropriate

Address systemic social determinants impacting youth health and wellbeing

- Further assess gaps/changes between adequate youth and housing/built environment (traffic, etc.)
- Explore policies that address poor quality housing
- Adopt the Youth Risk Behavior Survey to monitor being affluence to address income related health equity

Facilitate a community with strong social networks and support systems for youth

- Develop and support innovative and evidence-based peer leadership opportunities for youth during out of school time, including virtual
- Expand opportunities for positive mentor-youth pairing and civic engagement, especially to serve youth of color
- Create opportunities for children and youth to participate in public decision-making for their health

Create lifelong habits to promote positive mental health and prevent impact of Adverse Childhood Experiences (ACEs)

- Integrate evidence-based mindfulness programming in to school curriculums at the start of school programs to support and help youth on regulating behaviors and emotion
- Develop and promote a school standard for equity
- Provide policy and development for out of school time providers about trauma informed best practices
- Address stress in minority populations as a result of stereotyping, perceived discrimination in school
- Foster time management and life balance skills
- Support and expand the Life Skills curriculum as part of the student health education program
- Create a task force to explore the HHS self-reported mental health survey data with regards to wellbeing and depression

Support increased physical activity and healthy eating opportunities

- Reduce barriers for student participation in physical activity, especially for females
- Explore expanded school day/school year opportunities for physical activity, especially when school is out of session
- Promote screen time reduction and reduce sugar sweetened beverages
- Reduce barriers to and participation in school breakfast programs

Meet sleep recommendations

- Explore delaying school start time in high school

Promote social supports that reduce screen time

- Expand and integrate trainings on social media use to decrease online bullying and screen time during the school day
- Identify, create and promote out of school time activities as alternatives to screen time and social media
- Provide tools to develop family media plans that support parent/caregiver skills to limit the bedroom of screen time and social media

Prevent sexually transmitted diseases and teen pregnancies

- Ensure all students receive sexuality education that is medically accurate, culturally relevant and consistent with best practices
- Expand age and culturally appropriate education on teen pregnancy prevention in middle schools, especially schools in need

Early Adult

Introduction

The early adult period, for the purposes of this report, is defined as 18-24 years of age and is often described as a time of transition and change. Development is still very much in progress, not only physical maturation, but also emotional, cognitive and social. Literature refers to this stage of life as the "formative years," encompassing the shift from adolescence and the making of choices that transition one to adulthood.

The circumstances for this life stage have shifted dramatically since prior generations, due to new demands on this population's time and attention that compete with the establishment of their independence, careers and social networks. From a public health perspective, the early adult period can be a time of higher risk, with less attention to health supporting behaviors such as good nutrition, exercise and timely medical or dental checkups. There is also a greater threat of health disrupting behaviors such as increased substance use, poor eating patterns, greater stress and lack of sleep. Changes in daily routines and schedules, social media and social networks, and larger economic and societal and political systems can all have an impact on early adults when they tend to be both resilient and vulnerable. The outcomes of negative behaviors can manifest in many ways including obesity, which is increasingly present in early adult years. Mental health issues are also likely to emerge in these years, making this time of transition harder than it already is for many. Cumulative experiences and exposures during childhood may begin to manifest as health issues, especially related to mental health and substance use. Foundational health behaviors established during early adult stage of life can impact health later in life, and for those who are future parents, the health of their children.

It is noteworthy that the stage of life often recognized as a time of transition to full adulthood and its markers such as careers, marriage and starting a family or purchasing a home has shifted for many from the early adult life stage to the young adult life stage (age 25-39). Individual and population health investments in this age group, as individuals move through this prolonged transition stage, can foster both immediate and lifelong improved health and wellbeing outcomes. Creating a healthy early adult population can have positive influences on the workforce, a critical component of filling the void created by retiring baby boomers.

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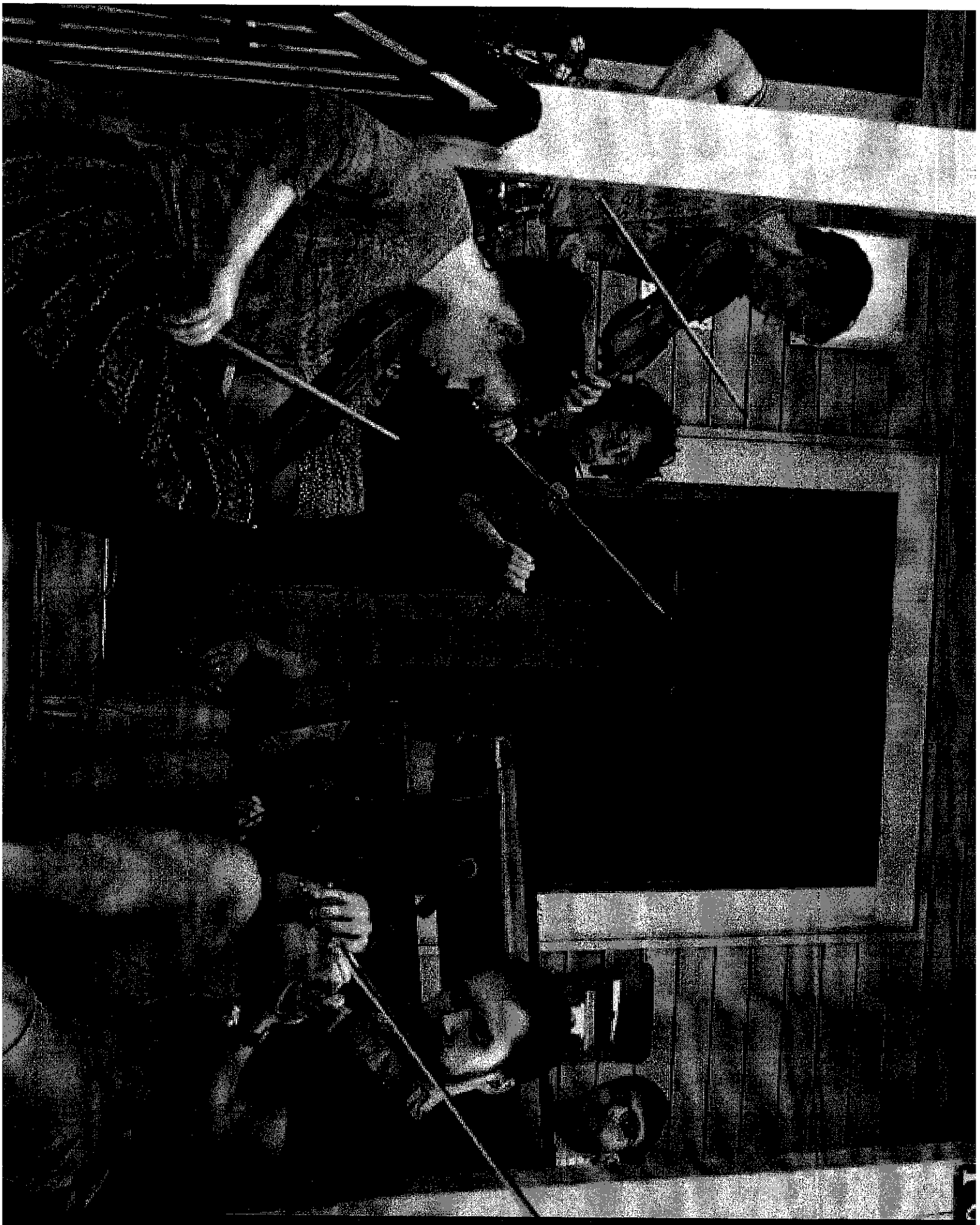
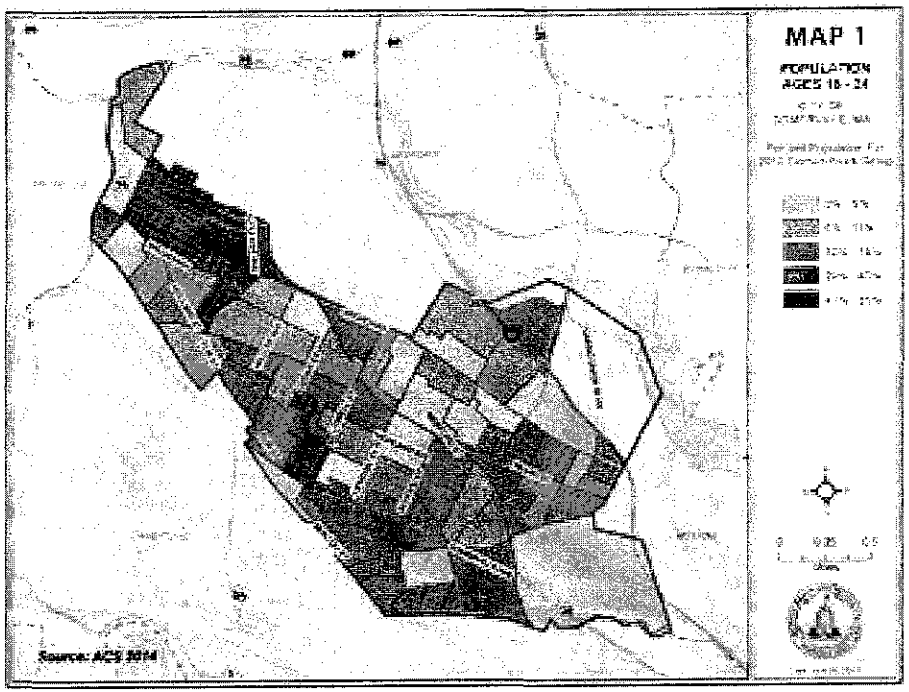
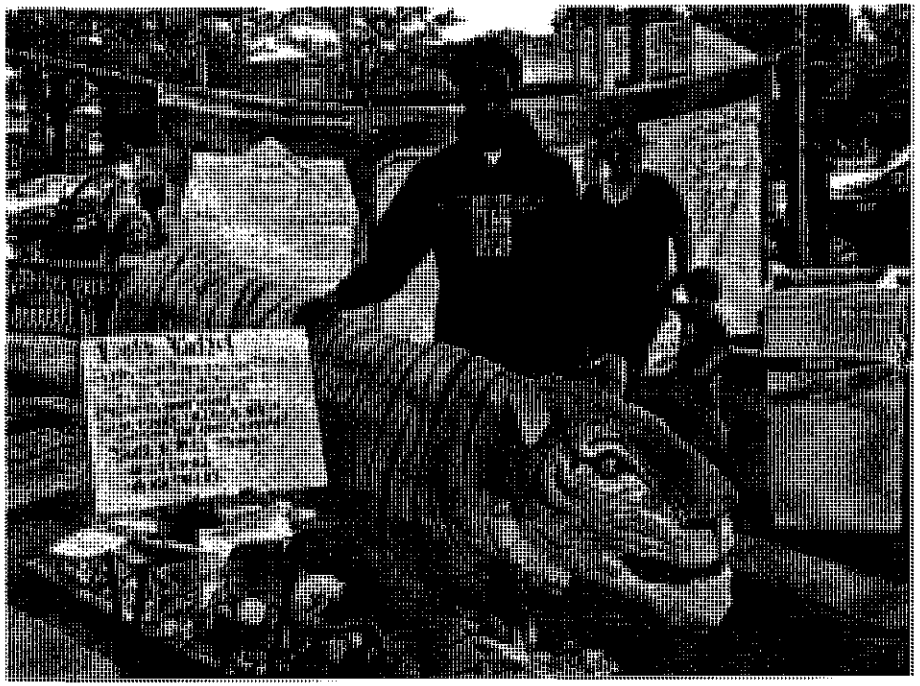


Early Adults / Ages 18–24





Demographics, age specific

The Somerville population in this age range (18-24) decreased from 17.4% of the population in 2010 to 14.1% in 2015, but still remains higher than the MA rate of 10.4%. The 20-24 year olds alone comprised 11.3% of the Somerville population based on the 2011-2015 estimates (American Community Survey). As seen in Map 1 above, this age group is fairly well distributed across the city. With the close proximity of universities such as Tufts, Harvard and MIT, Somerville has a long history of supporting a large college population. Increasingly, early adults from long-time Somerville families find it hard to afford to stay in the city and have their own place to live due to rising housing costs; this may account for some of the decrease in this population.

Access to Health Care

Health Insurance Coverage

Of the 18-24-year-old cohort within the Somerville population, 4.7% had no health insurance, based on American Community Survey data from 2010 to 2015. Of the 95.4% with health insurance coverage, 82.4% had private insurance and 13% public health coverage. The Affordable Care Act of 2010 allowed parents to continue coverage for children up to age 26, which has had a significant impact on access for this age group.

Primary Care Provider

This age group is the focus of a national initiative to improve the transition out of Pediatric Primary Care to adult Primary Care Providers. Young people who have chronic conditions or diseases can find this transition extremely challenging. To engage with this age group, most

health providers now provide online access and communications through web-based systems, intended to increase access and transparency across the generations. This is also an age when primary care integration with behavioral health is important, particularly for those with a mental health diagnosis, substance use disorder, special health care needs and/or cognitive disabilities, as individuals shift from the support system of the local schools out into broader society. In 2015, CHA provided primary care to 1,190 Somerville residents age 19-24 years.

Immunization

Vaccination guidelines from the CDC include Tdap, HPV, Meningococal conjugate vaccine and annual flu vaccine for this age cohort. Data on immunizations for this age group is not readily available. Enrollment policies at surrounding universities and higher education institutions require immunizations and might be the best source of local trend date to improve efforts of measuring the compliant immunized population. Some infectious diseases such as mumps and measles, which were thought to be almost eradicated through immunization efforts, have been reappearing, especially in colleges, where there are high numbers of early adults living in close proximity.

Oral Health

There is some indication that as medical and dental check-up responsibility falls to the individual, compliance decreases. This is especially evident for preventative visits, including the dentist (LC-05). Often this is the age when wisdom teeth develop and should be monitored by dental professionals. The advent of wisdom teeth can trigger the need for dental surgery, which can be expensive and out of reach financially for many. For some, removal of wisdom teeth and other dental surgery may be the first exposure to prescription pain medications, which over recent decades have included opioids.

Behavioral and Mental Health

Behavioral and mental health, a nuanced and culturally complex subset of health, has gained legitimacy as a medical condition due to advocacy efforts to reduce stigma. As a result, there is now greater focus on the area of mental health and its connections with health overall. The National Alliance on Mental Illness (NAMI) serves as "a vital resource for individuals and families facing the challenges of mental illness, providing free mental health family-based education, family and peer support and grassroots advocacy."

According to a 2014 report from the Substance Abuse and Mental Health Services Administration (SAMHSA), adults ages 20-24 are two times more likely to have a substance use disorder and also have higher rates of co-occurring mental illnesses than adults over age 26. Identification and treatment are currently pressing issues with many younger adults experiencing unidentified mental illness. In 2014, 11.4% of all U.S. younger adults received mental health services. Mental illness can be a challenge for early adults with regard to employment, residential stability and education (Serious Mental Health Challenges, SAMHSA, 2014). For this age group, programs such as CHA's initiatives to address the needs of those with serious mental illness, such as early-onset psychosis, can provide age appropriate supports and services.

Due to the frequency of co-existing mental health diagnosis and substance use disorder, many prevention recommendations focus on increasing social/emotional awareness and coping early in life as a means of preventing substance abuse later in life. National and local efforts have increased to create peer support groups, create policies to regulate alcohol and drug consumption, increase positive social interactions, increase screening and involve communities in supporting recovery. This shifting framework is intended to improve overall health outcomes in the population by increasing individual agency and decreasing stigma (SAMSHA). Cultural norms around mental health and culturally influ-

enced coping styles are important to consider in terms of mental health promotion and treatment. Cultural differences and even taboos related to mental health can create cumulative stress, adding to the burden of coping with mental illness.

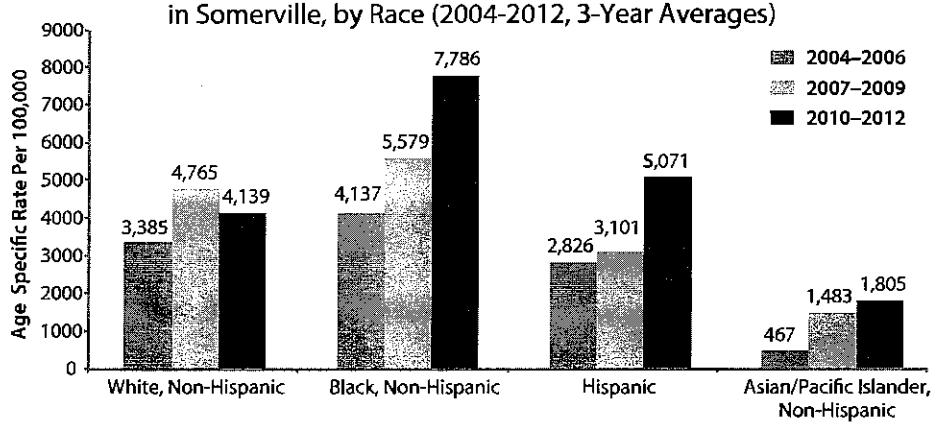
Immigration policies that increase the risk of deportation and/or limit rights and access to basic services are potential risk factors for immigrants' mental health in general. Changes in U.S. immigration policy over time have created an unstable base for early adults who grew up in the era of Deferred Action for Childhood Arrivals (DACA) and more recent changes in enforcement of immigration regulations are creating an inconsistent experience of being welcomed, and then not. Preliminary research indicates that the change in immigration status conferred by DACA was positive for the mental health of the nearly 790,000 19-36 year olds who were eligible and registered in the available window, particularly decreasing reports of psychological stress (McKee and Stuckler, 2017). Uncertainty around policy changes related to immigration status, such as DACA and Temporary Protective Status, can increase stress potentially impacting mental health.

Mental Health

There can be many factors that make the mental health of early adults particularly tenuous, such as facing the expected challenges of establishing a career, securing housing and developing lifelong relationships. Larger external forces also have an impact, such as the 2007-2009 Great Recession's changes in the economic situations affecting the transition from early adulthood, or changes in immigration policy that affect the options for youth who arrived in the U.S. as children. Early adults may be especially vulnerable to racial, social and economic inequities, making this period even more stressful. Prior expectations and aspirations regarding independence are challenged by the high cost of living and stagnant wage growth in the region, making it more likely that adults of this age are sharing housing or still living at home and/or dependent on their families financially, potentially adding to overall stress.

Research indicates that when communities adopt "through any door" models of providing resources, individuals are more comfortable in asking for help and more likely to access services. Such a model is one in which individual service providers are part of a network of care designed to prioritize client needs and in recognition of the interconnectedness of factors that support wellbeing. An example of this is when a mental health provider makes referrals for needs such as housing, jobs or physical health screenings in order to support the overall wellbeing of clients.

CHART 1: Mental Disorder Related ED Visits for Adults Age 20 to 24 in Somerville, by Race (2004-2012, 3-Year Averages)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

- According to Chart 1, the 3-year averages of the rate of emergency department (ED) visits due to mental health related disorders for Somerville adults age 20-24 were higher, for all races, in 2010-2012 than in 2004-2006. Between 2004-2012, the rates of emergency department visits were comparable for females and males, and highest for Blacks, non-Hispanic. (MA DPH Uniform Hospital Discharge Dataset System (UHDDS))

- Additional data shows a general decline in the rate of hospitalizations due to mental health disorders for Somerville adults 20-24, over the period from 2004-2012, while the rate for MA overall was higher than Somerville and demonstrated a gradual increase.

- In contrast to emergency department visits, mental health disorder hospitalizations rate, in adults age 20-24 between 2001 and 2012, were generally higher for Black, non-Hispanic and Hispanic/Latino. This was particularly noted in the 2010-2012 3-year averages which showed White, non-Hispanic rates decreased while rates for Black, non-Hispanic and Hispanic/Latino showed dramatic increases - almost double the rate for Whites. Data for Asian/Pacific Islander, non-Hispanic was at non-reportable levels for the time period.

Mindfulness and Compassion

CHA Cambridge Health Alliance

Center for Mindfulness and Compassion

The Center of Mindfulness and Compassion (CMC) is an interdisciplinary center with Cambridge Health Alliance which aims to enhance the health and wellbeing of CHA and the local community by integrating mindfulness and compassion into healthcare. Based on current scientific understanding of mindfulness and compassion, CMC encourages empirically supported theory and practice. Grounded in the value that mindfulness and compassion are inherent human capacities that support health and wellbeing, CMC aims to foster an inclusive, caring and multi-cultural community that allows individuals to thrive. Programs offered by CMC patients include 8-week sessions of Mindfulness Based Stress Reduction. Current research activities focus such as the neural and physiological effects of self-compassion on chronic pain and [illegible] reflexes on self-regulation and related mental and physical health implications.

Substance Use Disorder/Addiction

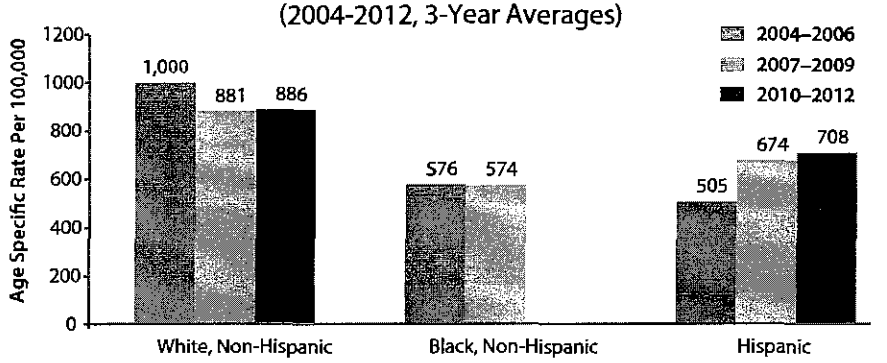
Alcohol

Research shows that the heaviest periods of drinking in many people's lives are in their late teens and early twenties. This a time when binge drinking (consumption of excessive alcohol in a short time span, typically considered 5 or more drinks) or heavy drinking (consuming 5 or more drinks in a row, 5 or more times in a month) are more common. Young people are in different social settings, meeting new people and making their own decisions; as drinking is a common social lubricant, such behaviors provide some context for the increased use. Mixing drinking and driving has potential deadly consequences; 30% of 21-24 year olds who died in traffic accidents tested positive for alcohol in 2014 (National Highway Traffic Safety Administration). A recent study found links between binge drinking and depression, with romantic relationships as a facilitating or mitigating factor (Holaway, Umberson, and Thomeer, 2016), dependent on gender variables.

- As seen in Chart 2, during the eight years between 2004 and 2012, alcohol/substance related emergency department visits decreased for White, non-Hispanic residents but increased for Hispanic/Latino residents in this age group. No data exists for Black, non-Hispanic residents from 2010-2012, but from 2004-2009, the rate of alcohol/substance related emergency department visits decreased very slightly for Black, non-Hispanic residents. (UHDDS)
- Hospital admissions, related to alcohol or substance abuse treatment rates for Somerville adults ages 20-24, were significantly lower than the state levels from 2002-2013. (MA DPH Bureau of Substance Abuse Services)
- According to Chart 3, from 2009-2012, the opioid injury related hospitalization rate for adults age 20 to 24 was lower in Somerville than the statewide rate. (UHDDS)

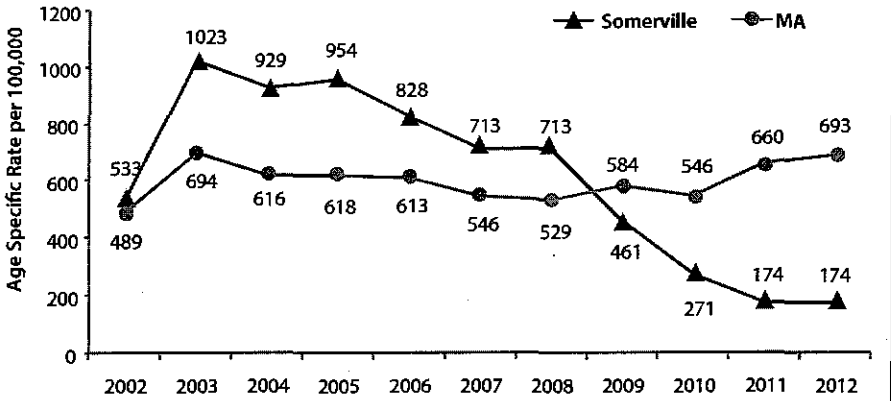
Risks associated with narcotics overdoses include death and injury. Over the last few years, Somerville has similar narcotics overdose trends to those found state-wide.

CHART 2: Alcohol/Substance Related ED Visits for Adults Age 20 to 24 in Somerville by Race/Ethnicity (2004-2012, 3-Year Averages)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)
Black, non-Hispanic rates were not available for 2010–2012

CHART 3: Opioid Injury Related Hospitalizations for Adults Age 20 to 24 (2002-2012)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

- From 2014-16, 13% of fatal narcotics overdoses and 22% of non-fatal overdoses in Somerville were among people aged 16-25. (Somerville Fire and Police, COHR Narcotics Misuse Master Database)

- Overall, in Somerville, the number of both non-fatal and fatal overdoses from narcotics rose sharply from 2010 to 2016. Based on estimates from Police and Fire records (some months may be missing), the number of non-fatal overdoses for narcotics increased from 96 in 2010 to 191 in 2016. Fatal overdoses for narcotics rose from 3 in 2010 to 21 in 2016, with the sharpest increase starting in 2014. The introduction of fentanyl into heroin supplies is associated with increases in statewide deaths. (Somerville Fire and Police)

- Preliminary Somerville data from 2017 shows slight decreases in the number of non-fatal and fatal overdoses.

Tobacco

Regional data for all adults over 18 years, from the Massachusetts Department of Public Health's Community Health Information Profile on Diabetes risk factors, for the greater Cambridge/Somerville Community Health Network Area, (2005-2013), indicate the local rate of smoking was 10.2% for males and 9.3% for females. In 2016 school health surveys of Somerville teens showed that only 5.3% of high school students had smoked during the past 30 days, and 6.8% used e-cigarettes, much lower than the regional level for adult smokers. E-cigarettes are one of the nicotine delivery products especially marketed to young people that has changed the tobacco landscape in recent years.

In the early adult age range of 18-24, national statistics from the CDC report that 42% of adults of this age with mental illness are smokers. Overall, Massachusetts smoking rates for all adults with mental illness is 30-34%. In 2013, a SAMHSA report highlighted the linkage between smoking and mental illness or substance use disorder. Based on 2009-2011 National Surveys on Drug Use and Health, it was determined that adults with any mental illness or substance use disorder, who represented 24.8% of the total adults, were responsible for 40% of all cigarettes smoked in the U.S. (Smoking and Mental Illness, SAMHSA, 2013). The cumulative risk factors of being low income, living in stressful conditions, and smoking –on top of mental illness—makes quitting more difficult and challenging for successful cessation programs.

Reducing smoking is considered a public health success, yet the reduction is not evenly distributed across income or education levels. According to the CDC, cigarette use is higher than the national average among those with lower formal education levels and those living below the poverty level; specifically, the smoking rate remains about 40% among those with a high school equivalency certificate (Cigarette Smoking, CDC, 2017).

Physical Health

Obesity

Massachusetts' rate for obesity among 18-25 year olds was low at 10.6%, based on 2015 data as reported by The State of Obesity, a project of the Trust for America's Health and the Robert Wood Johnson Foundation. Regional data for all adults over 18 years, from the Massachusetts Department of Public Health (MA DPH Community Health Information Profile Diabetes Risk Factors), indicates that within the greater Cambridge/Somerville community health network area from 2005-2013 for all ages the obesity rate was 22.3% for males and 15% for females, with overweight rates for males at 59.3% and for females at 40.3%.

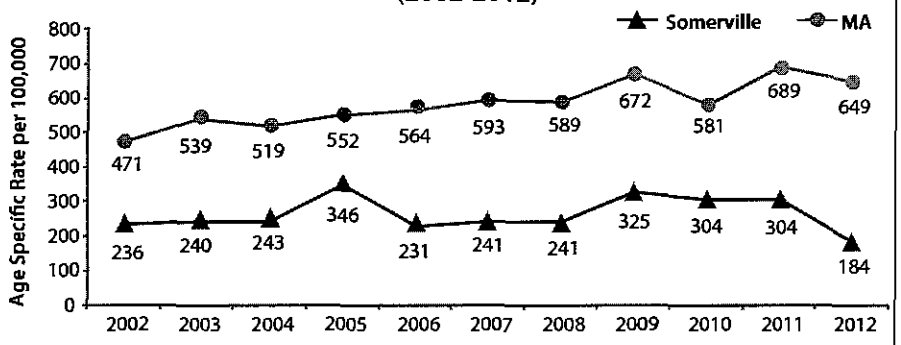
Behavioral risk factors can help predict future health outcomes. Limited data is available locally, but the four risk factors listed in Table 1 are related to risks for obesity and cardiovascular disease. Early adults may be part of a trend towards increasingly sedentary lifestyles, possibly due to the fact that social media has been part of their lives since childhood. More than 20% of Somerville adults, based on 2014 data from

TABLE 1: Select Behavioral Risk Factors, Somerville and MA residents age 18+	Somerville	MA
No leisure-time physical activity	20.2	19.7
Obesity	24.8	23
High blood pressure	27.9	27.5
High cholesterol	31.4	32.6

the Selected Behavioral Risk Factors, have no leisure time physical activity. In addition, a 2005-2013 study of diabetes risk factors among regional adults over 18 revealed that only 28.5% of males and 37.5% of females reported eating 5 or more servings of fruits and vegetable in a day (MA DPH CHIP Diabetes Risk Factors). It has been proposed that increasing the consumption of fruits and vegetables, perhaps by government incentive subsidies, could most effectively help reduce health disparities and improve health outcomes.

For young people ages 18-25, entrance to the military can be a potential path to advancement for economically disadvantaged youth, but requires passing a physical exam. In 2016, the U.S. military reported that close to 8% of active duty personnel were overweight or obese, an increase of 1.6% since 2001. The highest rates were among women, Blacks, Hispanics, older members and those working in health-related jobs. These rates are still much lower than for the U.S. population in general. Failure to meet fitness standards, due to lack of physical activity or obesity is increasingly creating a barrier to young people joining the military service, with 62,000 applicants failing due to weight between 2006 and 2011 (Tilghman, 2016).

CHART 4: Asthma Related Hospitalizations for Ages 20 to 24 Years (2002-2012)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

Respiratory Health

Data on asthma related hospitalizations for ages 20-24 by race is not consistently available. For those years when it is, however, Somerville shows similar trends to MA in higher rates for Blacks and Hispanics, though data is not sufficient to indicate the magnitude of the difference by race. (UHDDS)

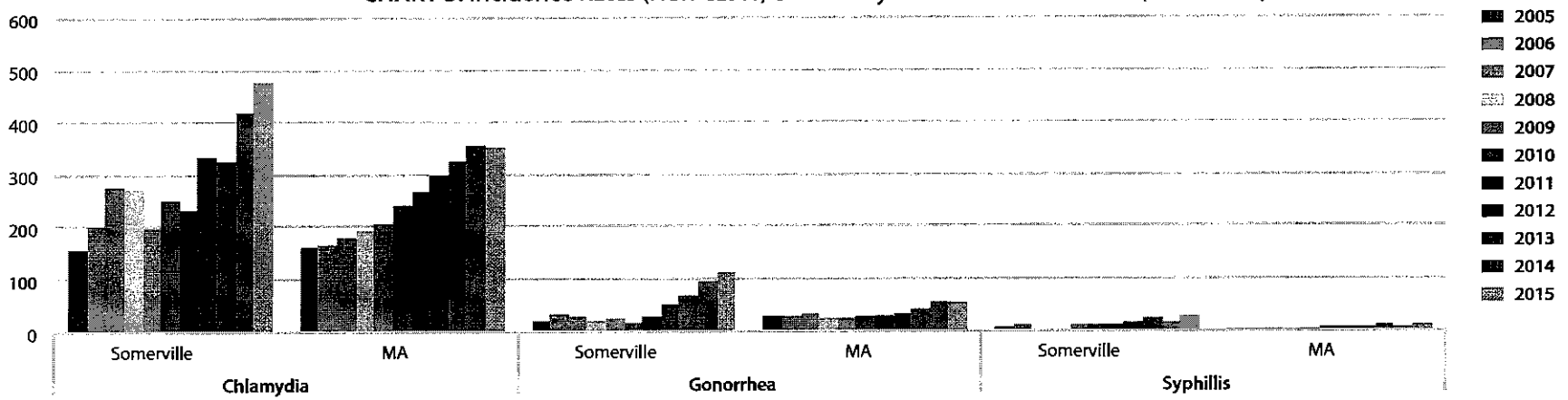
- Since 2002, the rate of asthma related hospitalizations rates for early adults has been consistently lower in Somerville than Massachusetts, according to Chart 4. (UHDDS)

Sexual and Reproductive Health

In 2016, 59 women in this age group residing in Somerville gave birth, a decrease from 2012, when there were 79 births in this cohort. For those not wanting to start families yet, reproductive health care and family planning services is important and may be some younger people's only connection to the health care system.

Sexual education for young people in Somerville is an important tool for keeping residents throughout the life stages safe from Sexually Transmitted Infections (STIs) and unwanted pregnancy; however, it is important that education and access to resources is ongoing throughout adulthood. There has been a national increase in STIs, and in 2015 total cases nationally were at an all-time high. To slow the transmission of STIs, it is important that sexually active early adults are screened annually, especially for chlamydia, syphilis and gonorrhea. National guidelines are for all sexually active women under 25 to be screened yearly for gonorrhea (CDC, Sexually Transmitted Disease Surveillance, 2016). Recent developments have shown increasingly drug resistant strains of gonorrhea showing up in the U.S., making treatment more challenging and prevention even more important. Also critical is that healthcare providers are LBGTQ friendly, with services to meet the needs of all gender and sexual orientations to insure safe access to health care for young people regardless of their orientation.

CHART 5: Incidence Rates (New cases) of Sexually Transmitted Infections (2002-2015)



Source: Division of STI Prevention, Bureau of Infectious Disease and Laboratory Sciences, MA DPH

- As seen in Chart 5, there has been an overall increase in the rate of new cases per year of chlamydia, gonorrhea and syphilis among Somerville residents of all ages since 2005. The incidence rate of each of these three STIs more than tripled between 2005 and 2015 and most currently available data indicates they are occurring at higher levels in Somerville than statewide. (CDC, Sexually Transmitted Disease Surveillance, 2016)

- National data, not pictured above, shows that young people ages 15-24 accounted for almost two-thirds of chlamydia diagnoses and half of gonorrhea diagnoses in 2015.

- From 2014 to 2015, nationally reported congenital syphilis (which occurs when the infection is transmitted from a pregnant mother to her baby) increased by 6%.

CHA Sexual & Reproductive Health Services

The Cambridge Health Alliance offers sexual and reproductive health services at various locations including Somerville. Counseling services do not require clients to be CHA patients. Some visits and services are free, depending on eligibility. Services offered by CHA include birth control and emergency contraception, family planning, HIV and STI testing and pregnancy testing. Visits are confidential.

The Sexual and Reproductive Health program also conducts community education sessions. Information provided includes referrals on birth control, STIs, relationships, gender and sexual orientation, racism in healthcare and other topics. Educational sessions offered at Somerville College and Tufts University, as well as workshops through the Somerville Homeless Coalition, Somerville YWCA, CHAI Job Readiness Program and various other community groups as requested.

Ages 10-24

Early Adult Top 5 Causes of Hospitalizations and Deaths

TABLE 2: Top Causes of Hospitalizations (2010-2012)	Top 5 Causes Somerville*	Age-specific rates per 100,000	Top 5 Causes Massachusetts*	Age-specific rates per 100,000
Early Adult (20-24 years) All Causes in Somerville: n= 732	1. Mental Disorders: All	607.3	1. Mental Disorders: All	1098.5
	2. Digestive System Disease: All	285.6	2. Respiratory: COPD, All (Related)	661.3
	3. Respiratory: COPD, All (Related)	278.4	3. Respiratory: Asthma Related	639.8
	4. Respiratory: Asthma Related	263.9	4. Injuries: Opioid	633.0
	5. Injuries: Opioid	206.1	5. Digestive System Disease: All	490.5

TABLE 3: Top Causes of Death (2010-2012)	Top 5 Causes Somerville**	Age-specific rates per 100,000	Top 5 Causes Massachusetts	Age-specific rates per 100,000
Early Adult (20-24 years) All Causes in Somerville: n= 6 **For each of the Top 5 Causes, there was one death from 2010-2012	Bladder Cancer	3.6	1. All Poisoning Injuries	12.7
	Suicide	3.6	2. Motor Vehicle Related Injuries	11.7
	All Poisoning Injuries	3.6	3. Opioid Injuries	10.6
	Suffocation	3.6	4. Homicide	10.1
	Asthma	3.6	5. Suicide	10.0

Data Source: Uniform Hospital Discharge Data System Massachusetts Division of Health Care Finance and Policy, MDPH (MassCHIP).
The source file is maintained as a zip code based file; 3 year average estimates 2010-2012

Notes: Please note that within some groupings/classifications may overlap and be counted more than once within the rankings
Related includes secondary and primary diagnoses
*Excluded childbirth, pregnancy, pueperium in Causes of Hospitalization ranking

Mental disorders are not detailed individually via MassCHIP

Chronic Obstructive Pulmonary Diseases (COPD) include: Bronchitis (chronic and acute); Emphysema; Asthma; Bronchiectasis; Axtrinsic allergic alveolitis and Pneumonitis

Digestive System Diseases: Diseases of oral cavity, salivary glands, jaw, esophagus, stomach, appendix, intestines, liver, gallbladder, pancreas

All poisoning injuries include: Unintentional and intentional poisoning by self or other from chemicals or noxious substances, including prescription or recreational drugs, alcohol, solvents, vapours, gases, pesticides, and biological substances.

Suffocation includes: Unintentional and intentional strangulation or obstructed airway by self or other from food or other object; accidental mechanical suffocation.

Injuries: Opioid includes: Non-fatal Opioid-related associated with Opioid abuse, dependence and/or poisoning (overdose)

Hospitalizations and Deaths

- As seen in Table 2, the top five causes of hospitalization in Somerville were the same as in the state as a whole, although in a different order.
- The rates of hospitalization for the top 5 causes in Somerville are lower than for the top five causes in Massachusetts including the rate of hospitalization for opioid injuries, which is three times higher in Massachusetts than in Somerville.
- A limited number of early adults died in Somerville during the 2010-2012 period studied, leading to insufficient data to make generalizations about the top causes of death.
- As seen in Table 3, the top 5 causes of death in Somerville occurred at significantly lower age-specific rates per 100,000 than in Massachusetts.

Disability

Young people with disabilities may stay engaged with the public school system through the age of 21, under federal law. This extra time may provide additional opportunities for them to gain transitional life skills and work experience. Research indicates that paid employment prior to leaving school is one of the best predictors of later employment. Other factors impact the success of students with disabilities as they shift into adult non-school settings, including parental expectations. According to a CDC study on wellbeing measures in the U.S., piloted in three states, adults with disabilities were the most likely population to experience challenges with mental wellbeing. (Kobau et al., 2013)

Housing for those in the early adult years who have a disability may be challenging. The majority of individuals in this category live with parents or other family members, as options are limited. Continued dependence on parents for housing can impede potentially desired progress toward development into independent adulthood.

Education

Access to college immediately or soon after high school graduation sets up early adults to complete higher education before they start a family, and it opens doors to higher earning positions for all people in the family, regardless of stage of life. Among 2015 graduates of the Somerville school district, 70.7% attended college, according to the Massachusetts Department of Elementary and Secondary Education (MA DESE). This includes 75.7% of female graduates and 65.5% of males. MA DESE also published the plans of high school graduates from the same year, 2015, noting that 78% of students planned to attend a 2 or 4 year college or university. This statistic indicates that there is a gap in access to higher education for some who hope to attend college, especially males.

It is important that communities provide resources to help graduating students understand college options, especially those available in the state university system, including clear information regarding admissions processes and financial assistance and how to address barriers related to immigration status. The largest gap in earnings comes between those with a high school diploma and those with a college degree; according to the Association of Maternal & Child Health Program (AMCHP), college graduates earn 63% more, on average, compared to high school graduates.

Advanced job training may also be beneficial for the portion of graduates who plan to enter the workforce after high school graduation (13% in 2015 according to MA DESE). The availability of such programs may provide incentives for students to complete their high school degree, which, on average, would allow them to earn 38% more than they would without a high school diploma.

The rate of millennials living with their parents has been steadily increasing since the Great Recession of 2007-2009, due to high housing costs.

Economic Stability

According to the Pew Research Center's article, "Living With Parents Since the Recession," (Fry, 2013) the rate of millennials living with their parents has been steadily increasing since the Great Recession of 2007-2009, due to high housing costs. This is disproportionately the case for low-income, male, unemployed individuals between the ages of 18-25. It is thought that this trend stems from fewer employment opportunities, higher college enrollment and lower marriage rates. Upon graduation from college, the financial burden of starting regular loan payments can be a daunting economic reality. The Somerville median household income increased by 16% from 2006 to 2015 (see Demographics chapter for details), but not for all residents as, in general, wealth disparity has increased and wages have been stagnant when inflation is considered.

Poverty

American Community Survey data from 2011-2015 for Somerville indicates an average poverty rate of 14.7%, across all ages. In contrast to the federal poverty level determination of basic expenses, the MIT Living Wage Calculator for Greater Boston calculates the baseline financial earnings needed to live in this geographic area—given the actual prices of housing, food, etc. For 2017, the calculator determined that a single adult needed an average of $27,081, requiring an hourly wage of $13.02 for full time work to afford to live in the area. This does not include expenses such as college loans, which may be an issue for early adults as they complete college. Basic expenses for one adult with one child requires an hourly wage of $27.31 for a $56,430 annual income; two adults would need $38,771 combined annual income. For context, in 2017 the U.S. poverty threshold was $13,860 for an individual and $18,670 for a family of two.

Homelessness

Somerville has only a small homeless population (LC-07A) that is considered unsheltered. Annually, Massachusetts cities complete a survey of youth and young adults who are not permanently housed, who may be couch surfing or finding other ways to gain shelter. In 2015, the annual "Point in Time count" observed six individuals on the street; in 2017 the point in time count was zero individuals living on the streets in Somerville. The Point in Time count from January 2017 reported 34 people sheltered in Somerville, 11 who were ages 18-24, 30 of whom were female, 13 with a serious mental illness, 8 with substance use disorder, 2 with HIV/AIDS and 20 victims of domestic violence (Point in Time Count). The Massachusetts Bay Veterans Center opened in 2014, adding 22 transitional beds specified for veterans, which has raised the available shelter options in the area for local homeless veterans.

Affordable Housing/Housing Security

The increase in rental costs has resulted in households being displaced from Somerville. The advent of house-sharing websites that allow for short term rentals, such as Airbnb, has also shifted the available rental stock, while also offering possible economic gains for those who are "house rich but cash poor." Early adults who are native Somerville residents, who grew up here and expected to stay in the city, may not be able to afford to, unless they are able to live with family or have a good paying job. Another way that young people afford living in the city is by doubling or tripling up, sharing some of the larger apartments with other young adults.

Employment and Living Wage Jobs

Inequities in work conditions and benefits, such as the frequent lack of adequate sick day policies in part-time and service sector jobs, can negatively affect early adults who occupy enter level positions at higher rates than those at later life stages and who, as the demographics chapter indicates, represent higher percentages of minority populations than older generations do. While states like Massachusetts implemented a policy in 2015 that requires employers to allow workers a minimum number of paid sick days, many states do not allot sick time for low-paid and new

employees. This is not only detrimental to the health of the individuals, but can also affect company-wide health and performance.

In 2014, the National UnDACAmented Research Project (NURP), a national longitudinal survey of 2,684 young people eligible for consideration through Deferred Action for Childhood Arrivals (DACA), found that DACA eligibility positively impacted employment opportunities for early adults, which helps both the individual young people and their local economies. Participants in the study also noted that the decrease in stress levels post-DACA had a positive effect on their ability to work or study (Gonzales and Bautista-Chavez, 2014).

First generation youth, who immigrated as children, often have worked hard to overcome the multiple challenges of being an English Language Learner, experiencing an unfamiliar culture or living in poverty. They have managed to succeed in high school, only to discover that their immigration status prevents equal access to higher education or employment options. DACA once provided a way to gain authorization for employment and protection from deportation for those meeting all of the following criteria: arrival in the U.S. before age 16, here in the U.S. before June 2012, under age 31 on June 15, 2012, no criminal record, and were in high school or obtained a GED or were a veteran.

Early adult veterans are usually returning from a one or two (4-year) term of service and are reintegrated back into the civilian sector yet may face challenges of employment, as well as education, housing and healthcare (VA or civilian).

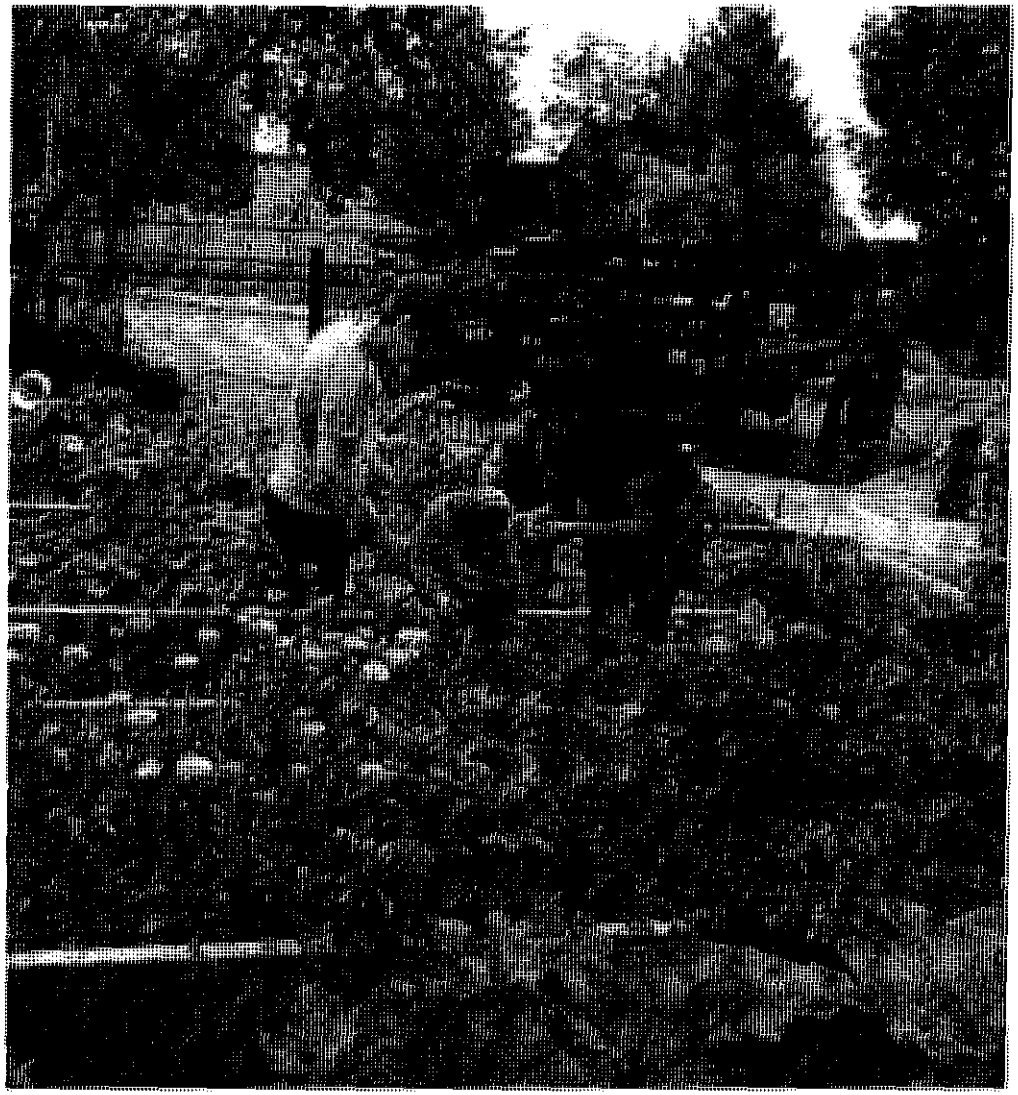
Food Security

The Supplemental Nutrition Assistance Program (SNAP, or "Food Stamps") is available to support a portion of food budgets for those who meet income and other qualifications. Though data is not available specifically for early adults, in 2015, 9.3% of the 32,000 Somerville households received some SNAP benefits. This is an increase of 4.9% from 2010. The highest percentage of distribution of SNAP beneficiaries, between 2010-2015, was in the Black/African-American population

Somerville's Continuum of Care

The Somerville Arlington Continuum of Care (CoC) is the local entity that coordinates housing and services funding for homeless individuals and families. Meetings of the CoC are held on the third Tuesday of each month from 2:00 p.m. to 3:30 p.m. CoC meetings are open to the public. To receive email updates about CoC meetings, including meeting agendas, contact the City of Somerville Housing Program or Somerville Homeless Coalition. Visit the website at http://www.somervillema.gov/coc for additional information or resources, including the Resource Guide for People Homeless in Somerville and Arlington. HUD requires that each CoC across the country conduct a count of all sheltered and unsheltered people experiencing homelessness in the CoC area. This census is called the Point-in-Time Count and is done through the night and into the morning on the last Wednesday of January every year, weather permitting. In 2017, the PIT Count was held on January 25-26th. "Sheltered" includes those in emergency, transitional and safe haven housing. Although Somerville-Arlington does not have safe haven housing at this time).

(28.8%) and Hispanic population (19.5%); Black/African Americans and Asians participation doubled during this period (American Community Survey). There is a 61% gap in the number of people in Somerville that are estimated to be eligible for SNAP benefits and the number who are enrolled in the program (Food Bank of Western Massachusetts).



Natural and Built Environment

According to Harvard researcher David Williams, known for his work in health equity, where we live, work and play has a greater impact on how well and how long we live than medical care. The City of Somerville is noted for its efforts to create a built environment that promotes healthier choices. The local natural environment has seen much change over centuries of development, with concentrated effort required to reclaim or restore natural resources such as the Mystic River and urban trees, which add to the character and livability of the city, and provide access to greenspaces within the urban setting. One of the goals of SomerVision calls for creating 125 acres of new open space by 2030, a challenging goal in this densely packed city that at the same time needs more housing.

Housing (safe, affordable and accessible)

Like the national trend, detailed by Richard Fry in multiple Pew Research Center reports, some Somerville early adults live at home or with family members to make it affordable. There is a long history in Somerville of renting larger apartments to groups of young people. This started near the universities, but has spread through much of the city. Young people now compete directly for available housing with families that have more than two children in an increasingly tight market. Sometimes, young people or even families have been victims of landlords looking to maximize profits while compromising safety by creating basement units or units without basic amenities, particularly impacting new arrivals or those who do not speak English well.

According to Harvard researcher David Williams, known for his work in health equity, where we live, work and play has a greater impact on how well and how long we live than medical care.

Safe and Secure Neighborhoods

Arrests of 16-20 year olds in Somerville have decreased dramatically from 151 in 2010 to 69 in 2016. Non-Domestic Violent Incidents, including robbery and assault, involving youth have decreased from 52 in 2010 to 31 in 2016 (Somerville Police Department).

Transportation

Somerville's Walk Score of 86/100 (a measure of walkability between two points) is the second highest in the state, just barely edged out by Cambridge. In 2013, it made the nation's Top 10 list. The Transit Score is 62/100, rating the public's access to public transportation (Walk Score). In 2014, Somerville was the first Massachusetts city to pass an ordinance for Complete Streets to support a safe, convenient and healthier community. The ordinance calls for city streets to be equitably available for all forms of transportation including cars, bikes and pedestrians, and has required changes in the way the city plan, designs, implements and maintains it streets. Somerville has developed a visibly bike-friendly infrastructure and related polices that encourages many early adults to bike. The addition of Hubway bike sharing stations throughout the city has made biking even more accessible for some residents. Car sharing options, as well as ride-hailing systems, have further revolutionized transportation for the younger generation, who have little need to own a car in Somerville.

Environmental Health

Environmental factors can lead to a variety of negative health outcomes. A concerning issue impacting Somerville is the introduction of ultrafine particles in areas in close proximity to Interstate 93, which research ties to elevated levels of asthma, respiratory infections and heart disease. These outcomes disproportionately affect those living in the I-93 area as well as bicyclists and walkers. A study by Jarjour et al. (2013) found that while there are negative effects on bicyclists, these individuals still have better health outcomes than those who get no exercise.

In 2014, Somerville was the first Massachusetts city to pass an ordinance for Complete Streets in the city to support a safe, convenient and healthier community. The ordinance calls for city streets to be equitably available for all forms of transportation including cars, bikes and pedestrians.

Climate Change

With significant turnover of students and young adults in Somerville, younger residents who are new to Somerville may be less informed about local climate risks and may not be aware of emergency alerts and services available, leaving them vulnerable to climate variations. Early adults who live in rented apartments may have less capacity to make improvements to their homes and therefore could be more vulnerable to heat waves and flooding.

Access to Nature and Open Space

Many young adults between the age of 20-35 enjoy being active in Somerville because of various local social recreational opportunities. Social sports leagues such as Social Boston Sports, Boston Ski & Sports Club, WAKA Kickball and Hub Sports all target early adults living in Somerville. The Somerville Parks & Recreation Department has a permitting process for the city's playing fields to handle requests efficiently and provides consistent policies and procedures. Typically, early adult users have access to the fields after the youth groups finish their activities at 8pm.

Social and Community Context

As mentioned earlier in this report, many in this age group are experiencing a prolonged transition to independence and a delayed adoption of traditional roles and milestones of adulthood that impacts their social and community context. The vast influence of social media also intrudes into daily life, affecting social interactions—and reportedly having impacts on mental health for young people.

Race

This age group is growing up in a more diverse U.S. population cohort than their parents. Fifty years after the U.S. Supreme Court removed legal barriers barring interracial marriages, the percentage of interracial and interethnic marriages had risen to 17% of all marriages in 2015. White and Hispanic/Latino couples have the highest rate of interracial marriage, at 42% of all interracial marriages, while marriages between U.S. born Blacks and Whites are 11% of the total of intermarried couples (Livingston and Brown, 2017).

A prominent issue extending across the life course is the discrepancy in opinion on race relations between the White and Black population in the US. One telling figure shows that 70% of Black Americans believe that racial discrimination is the reason why it is harder to get ahead, while only 36% of White Americans believe that racial discrimination makes it harder for Black Americans to get ahead (On Views of Race, Pew, 2016). Additionally, Whites are less likely to fault institutional racism as compared to Blacks, with 70% of the White population finding that prejudice against individuals is the most pressing issue at hand. The impact of these perceptions on young people of color who are striving to reach adult milestones is still very present, even decades after major civil rights policies legally changed the official landscape in the U.S.

Social Inclusion

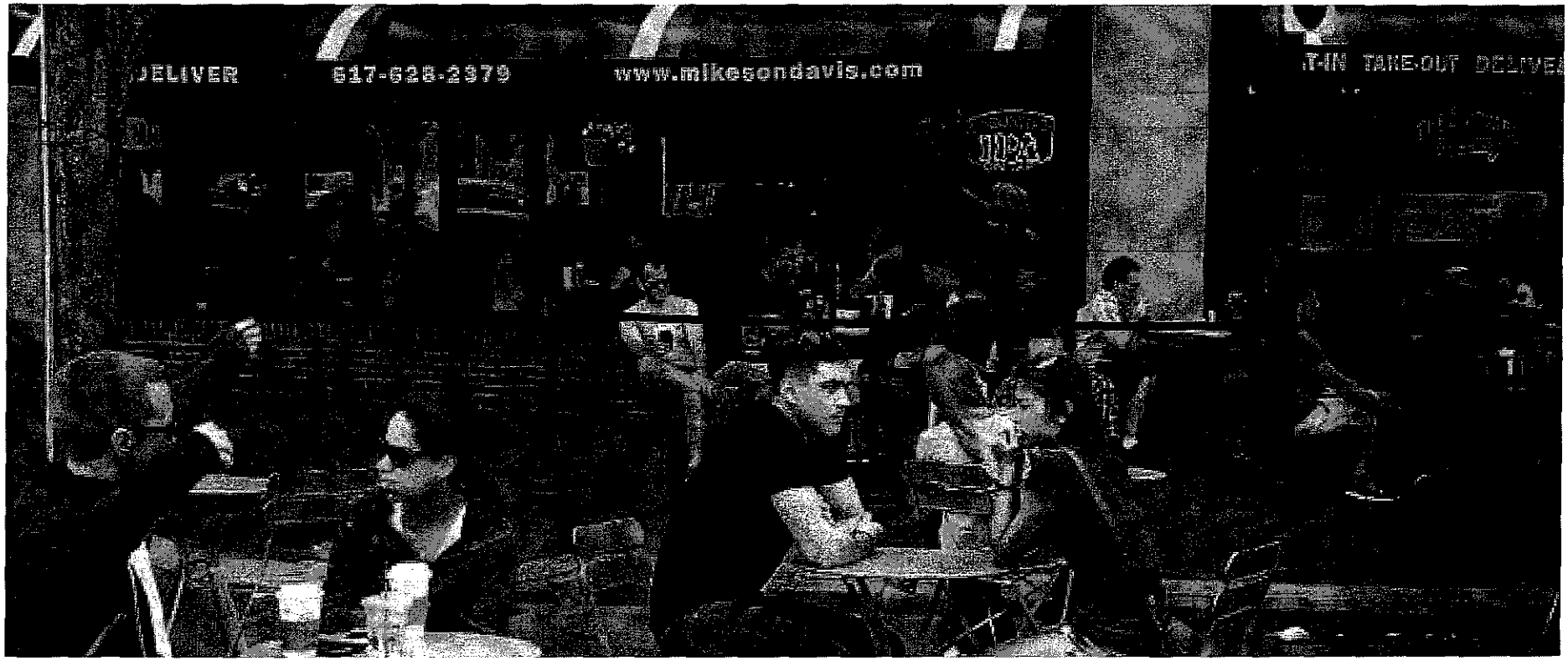
In addition to race and immigration status, gender identity has been the focus of political shifts nationally in recent years. Massachusetts has been a forerunner in extending civil rights to include gender identity and sexual orientation with laws allowing same-sex marriage and anti-discrimination regulations specifically for transgender individuals.

Social Safety Network/Social Support

Strong social supports are protective during all stages of life. During this developmental stage, there is opportunity to focus on creating communities that help young adults to feel that they are a part of something larger than themselves. Once an individual has left behind their childhood home, school and/or university supports, it may be more challenging to maintain healthy habits in a period of rising independence and increased responsibility.

Social Media

Today's early adults grew up with cell phones, which morphed quickly into smartphones, bringing the internet and instant communication into daily life. The proliferation of smartphones and tablets revolutionized social media and made it ubiquitous in just a few years, differentiating the life experiences of this age group from those even just 6-7 years older (Twenge, 2017). A 2017 Pew Research report on mobile devices indicated that of 18-29 year olds, 100% had a cellphone, with only 8% of those not being smartphones. Of note is that young people 18-29, especially among those with incomes less than $30,000 per year and who are non-White, are increasingly dependent on smartphones as their source for online information because they do not have broadband access at home (Mobile Fact Sheet, 2017).

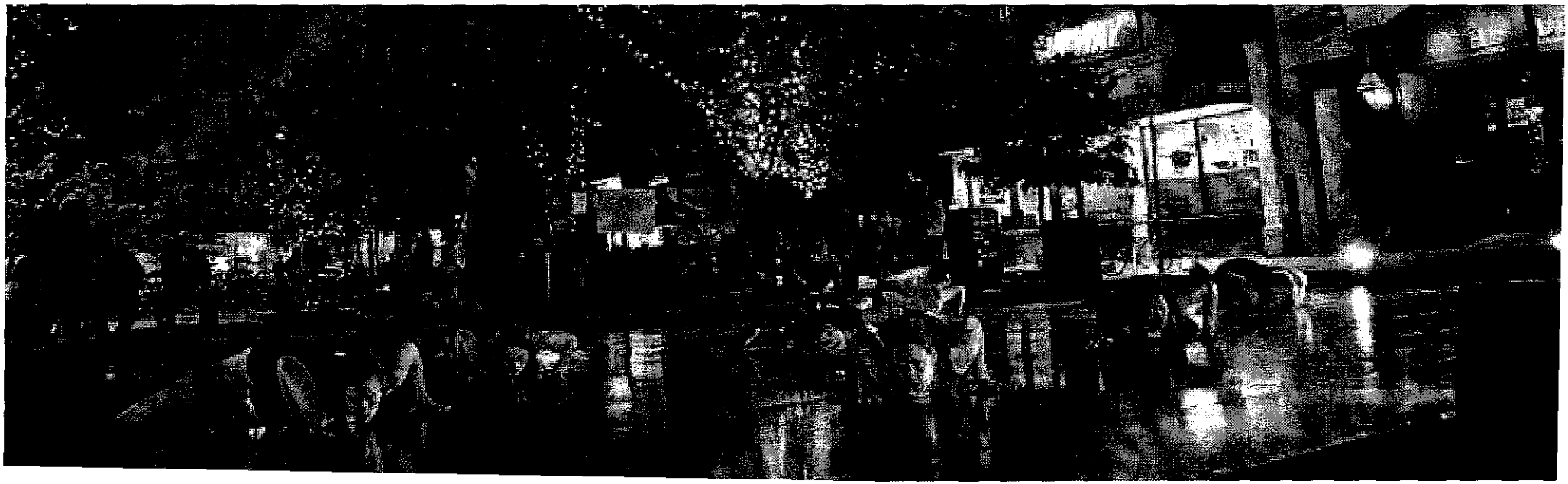


Violence (Domestic Violence, Sexual Abuse)

In 2016, there were 198 Domestic Assaults recorded in Somerville for all ages (Somerville Police Department). Domestic assault can occur at any age, but early adults can be especially vulnerable to exploitation. Human trafficking is an issue that can often impact vulnerable young adults, attracting international, national and state attention. There is a national Blue Campaign, to help increase awareness and educate the public on human trafficking, with a focus on first responders and law enforcement. Human Trafficking is described by the US Homeland Security as "a modern-day form of slavery involving the illegal trade of people for exploitation or commercial gain." This may involve sexual exploitation, or labor related exploitation, with 4,460 cases reported in the U.S. in 2017 by the National Human Trafficking Hotline. In 2017, they reported 40 cases connected to Massachusetts, but since this is an issue about which many victims have been silenced, the exact magnitude of this issue in Somerville is still unclear.

Community and Civic Engagement

Early adulthood is a time of social change for many. Somerville has a broad range of community programs, social services and neighborhood groups that provide multiple opportunities for active participation in the life of the community. Residents who may be new to Somerville can track down activities of interest and "meet-up" opportunities through multiple online platforms. With "One Call to City Hall," 311 is a great way to connect to City services, including volunteer opportunities. Users can call 311, use the web or download the smartphone app.



Recommendations for Early Adult

Ages 18–24

Increase access to health promoting resources

[illegible]

Create lifelong habits to promote mental health and substance use prevention

[illegible]

Facilitate a community with strong social networks and support systems

[illegible]

Support increased physical activity, healthy built environment and eating opportunities

[illegible]

Young Adult

Introduction

Young adults, for this report, are defined as 25-39 years. This age group dominates the Somerville scene, creating a spike in the distribution of ages across the city population. During this life stage, an individual's physical development is complete and physical health is often at its peak with young adults likely to self-report health as excellent or good. Mental development continues, impacting the many decisions typically encompassed by this life stage. This is also a prime time for childbearing and the time when Somervillians are most likely to become parents, connecting their own health to the health of the next generation. It can also be the time when households starting families consider whether to stay in Somerville. This decision can be impacted by the need for less expensive housing or a lead free unit with more bedrooms suitable for families with children.

As referenced in the Early Adult chapter, in past generations, adolescence was followed very closely by adulthood. Now, turning 21 doesn't necessarily mean accepting the traditional markers of adulthood – starting a career, buying a house and settling down in a chosen community. These milestones are more often being deferred, impacting the activities and life focus during the Young Adult life stage. For some, the lines can be blurred between the values of youth, such as gaining independence, and the values of growing into adulthood, including commitment to greater responsibilities such as a career or parenthood. There have been significant shifts in social conditions because of the Great Recession's impact on job markets, changes in local real estate values, emergence of social movements such as expanded rights to marriage, the environmental /green revolution and the reactions to worldwide terrorism. Additionally, the increase in the cost of education, and the resulting debt, has also been a significant shift in social conditions. This financial burden has led some young adults to delay marriage, child bearing and home buying.

Young adults include a wide range of demographics representing singles, people living together, married people with kids or without kids, divorced individuals and many others. During this life stage, many are settling into the routines of life. They are entering a different world with

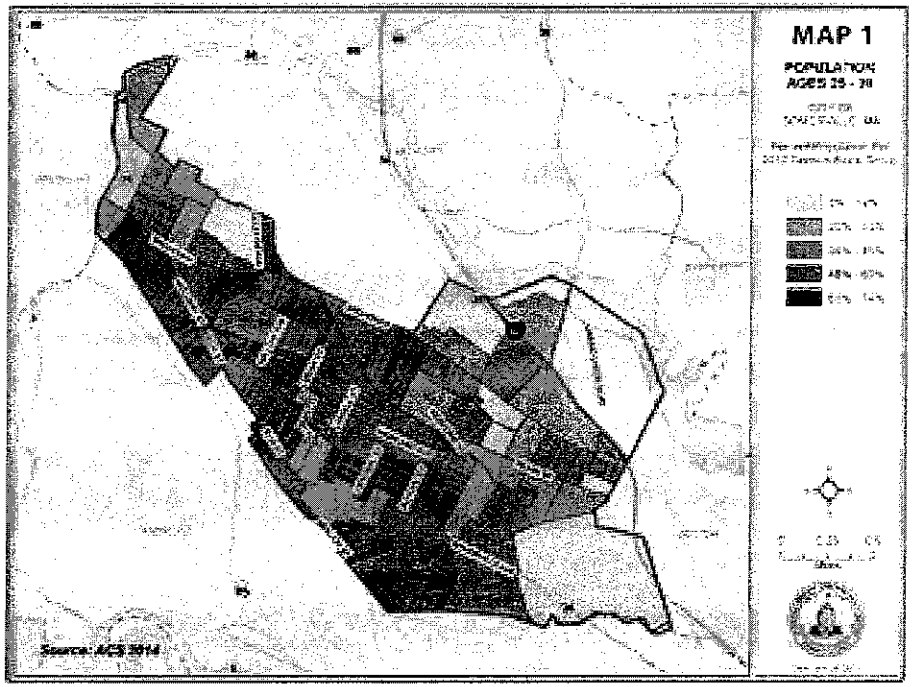
During this life stage, an individual's physical development is complete and physical health is often at its peak. Mental development continues, impacting the many decisions typically encompassed by this life stage. This is also the time when Somervillians are most likely to become parents, connecting their own health to the health of the next generation.

more choices but less security or structure. There is greater fluidity as changes related to jobs, housing, marriage or alternatives to marriage and even the definition of family have become more acceptable. Such changes can have an impact on physical and mental health. While these changes may help build resiliency and protective factors for some, others feel the stress to get a job, make money, be successful quickly and the overall weight of taking on life responsibilities. Today's young adults can often struggle with the multitude of options available, triggering anxiety, depression, a sense of despair and/or a lost sense of belonging.

This age cohort has seen the growth of personal computers and the internet, cable access and MTV as well as increased access to fast foods and ready-made foods. They have lived in a world that included AIDS and the legalization of same-sex marriage, the fall of the Berlin Wall, Middle East wars and increased income disparity. All these factors impact the health and wellbeing of this generation.

They are the first generation to use computers at school and at home, with ever expanding internet access. Their daily lives have always included computers and advanced technology, including ubiquitous cell phones allowing constant contact opportunities. Technology has strongly influenced this age group, from the impacts of social media and platforms such as Facebook, Snapchat and Instagram, to choices for relaxation with on demand movies or serial TV as a main source of relaxation.

For Somerville residents who grew up here, this is also the age group in which many were in high school during the early 2000s when the city experienced a wave of overdoses and suicides among young people, closely tied to opiates, particularly oxycodone. From a life stages perspective, the individual and community trauma of those years of loss could continue to ripple through the health of residents. Systems and supports in the community are becoming available to assist all young adults, regardless of their background, to maintain and improve health during this important period and into later life.



Demographics, age specific

Somerville is noted for its young adult population. According to the most recent 5-year estimates from the American Community Survey (ACS), the 25-39 population account for 40.3% of Somerville's population, much higher than the Massachusetts average of 29.6%. As illustrated on Map 1 above, across the city the distribution of young adults tends to impact every area of the city, with slightly higher concentration of young adults living along the Cambridge border.

Access to Healthcare (LC-40)

Health Insurance Coverage

Based on the American Community Survey data from 2010-2014, 5.1% of Somerville's 25-34 year old cohort had no health insurance. Of

the 94.9% with health insurance coverage, 84.8% had private insurance and 12.1% public health coverage. Individuals can be covered under their parents' health care policies until age 26, a change made possible under the Affordable Care Act, making alternative sources of health insurance and/or work status after age 25 a necessity for continued health care access. A national survey by Kaiser Health indicates that Massachusetts has a history of having the highest monthly health insurance costs, as much as twice the national average, according to MetroBoston Data-Common.

Primary Care Provider

The Healthy People 2020 goal to increase the proportion of adults aged 18 to 64 years who have a specific source of ongoing care (AHS-5.3) is in alignment with preventative and public health goals for this age group. It is important to have periodic check-ups to keep immunizations up to date and to screen for incipient chronic diseases which may show up during these years. Primary care can also help reinforce healthy habits to improve the healthspan, the length of time an individual is healthy. In 2015, of Somerville residents age 25 to 40 years, 8,373 of them received their primary care at Cambridge Health Alliance (CHA), about a third of the total Somerville CHA patient population.

Immunizations

Data is not available specific to this age group related to immunization rates. Recommended immunizations for this age group include annual influenza and 10 year Tdap.

Oral Health

Somerville's drinking water, provided by the MWRA, is treated with fluoride, one of the protective factors for dental health (LC-05). Oral health data is limited, locally, statewide and nationally. Given the importance that oral health has for overall wellbeing, this lack of data is significant. Since this age cohort has the highest pregnancy rates, it is worth noting that statewide, as of 2015, 45.6% of mothers reported having their teeth cleaned during pregnancy. The percentage varied by race and ethnicity, with Whites reporting the highest level at 55.3% and Blacks the lowest at 33.1% (MA Department of Public Health, State Report, Births 2015).

Behavioral and Mental Health

Culturally and socially in the U.S., there can be many barriers to accessing mental and behavioral health (LC-43) including in this age group, where data shows higher rates of reported mental health related disorders in Black and Hispanic/Latino populations.

The concept of adverse childhood experiences (ACEs) and the impact on later health and wellbeing, as illustrated in Image 1, is related to the effects of historical trauma. There is growing recognition of the cumulative nature of both past and current experiences of trauma, especially as it manifests differently within various cultures. People from groups that have historically been oppressed continue to demonstrate high

Image 1: Adverse Childhood Experiences Pyramid

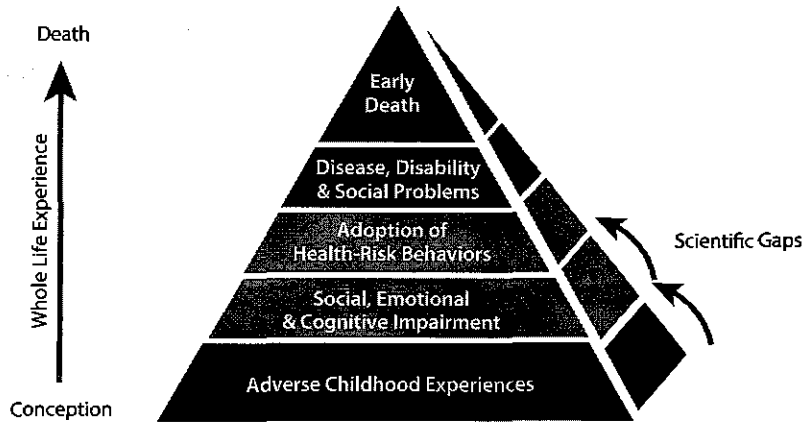
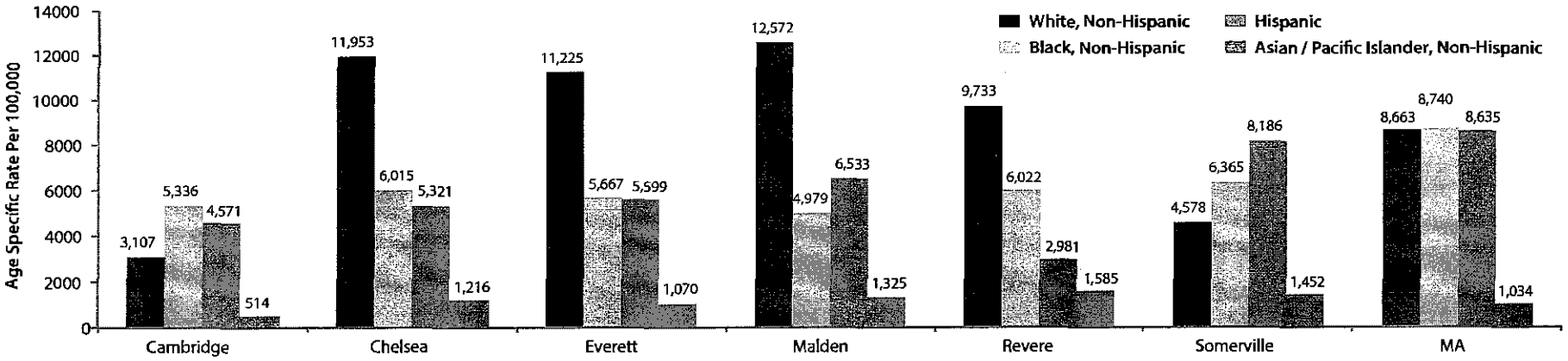


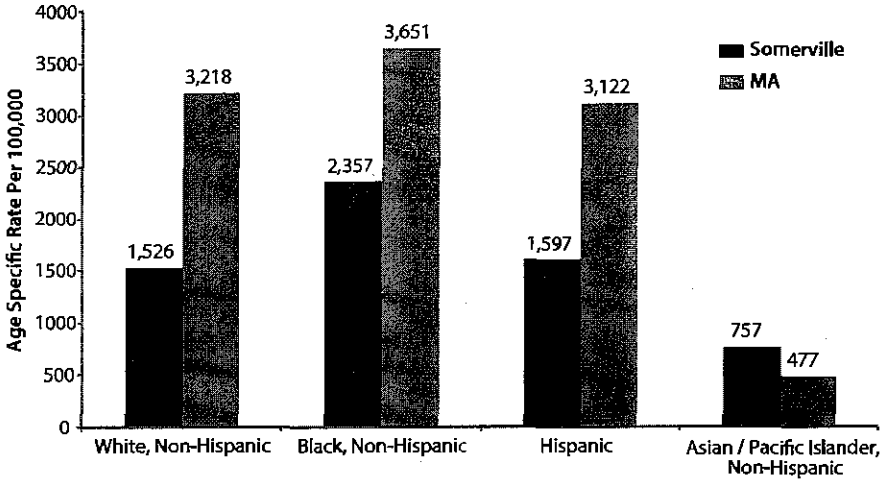
CHART 1: Mental Disorder Related ED Visits for Adults Age 25 to 39 by Race/Ethnicity (2010-2012; 3-Year Average)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

- Chart 1 shows us that the mental disorder related emergency department visit rate from 2010-12 was higher for Hispanics age 25-39 in Somerville than in all surrounding cities, but lower than the state rate. The rate for White, non-Hispanic Somerville residents was lower than in all surrounding cities, except Cambridge, based on 3-year average estimates (UHDDS).
- According to cross tabulated data by gender, mental disorder related emergency department visits for young adults ages 25-39 in Somerville were 71% higher for males than females (6,862.6 per 100,000 for males and 4,004.3 per 100,000 females). The hospitalization rate for mental disorders was much more even, with males being hospitalized at a rate of 1,783.1 per 100,000 men and females being hospitalized at a rate of 1,682.5 per 100,000 women.
- As shown in Chart 2, in Somerville, Blacks had the highest rate of mental disorder related hospitalizations in this age group (UHDDS).
- According to regional data, White residents in Somerville had a lower average rate of mental disorder related hospitalizations between 2010 and 2012 than White residents in all surrounding cities except Cambridge.

CHART 2: Mental Disorder Related Hospitalizations for Adults Age 25 to 39 by Race/Ethnicity (2010-2012, 3-yr averages)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

levels of trauma in their lives, perpetuating health inequities and disparities. Additional research is needed to better understand the underlying factors of racial and ethnic variations in mental health in Somerville data. Across cultures, however, it has been consistently demonstrated that ACEs often perpetuate across generations within families. Communities can provide extra support for young adults who may need to address their own trauma histories as they start to raise a family. Nurturing relationships are part of creating an environment that facilitates the well-being of both young adults and their young children, such as through the practices of healthy parenting.

Data indicates that suicide was one of the top five causes of death in Somerville in this age group from 2010-2012, with 12 suicides (MA DPH Uniform Hospital Discharge Data System (UHDDS)). Social supports and mental health care are key elements in suicide prevention. Trend data is available over the past 12 years on both suicidal ideation and worry for middle and high school students, which might provide some insight into this age cohort for those who grew up in Somerville. An outcome of the wave of suicides and overdoses in the early 2000's, the City maintains a trained Trauma Response Network that activates after suicides, or other community occurrences that might trigger trauma and mental health impacts.

Substance Use Disorder/Addiction

Increasingly, the links between mental health and substance use disorder and addiction are more widely acknowledged and recognized. Also, there has been a significant effort made in Massachusetts, Middlesex County and in Somerville to address the myriad factors related especially to the rise in addiction to opioids and the related overdoses and deaths. Changes in the drug trade, including the introduction of fentanyl and other synthetic drugs into local heroin supplies, have been linked to some of the increase in deaths and overdoses. However, the increased access and utilization of Narcan and its integration into the toolkit of emergency responders has helped to decrease fatal overdoses in the city and the state. The increasing presence of potentially more lethal synthetic opioids, including fentanyl and carfentanyl, has increased the need for responders to carry more Narcan to counteract the high potency of the manufactured drugs added to heroin on the street.

The need to directly address the stigma historically associated with substance use disorder has been reinforced by gains in neuroscience and the understanding of how the brain works and the impacts of substances. The classification of addiction as a chronic disease has begun to shift the way that both the public and the health care community view individuals struggling to recover from substance use disorder. Financial supports such as the Mental Health Parity and Addiction Equity Act of 2008 and the 2010 Affordable Care Act have helped to change the landscape. Data collection and reporting has made apparent the high level of personal, family and community impact from addictions, especially the rise in overdoses related to opioid use over the past few years (U.S. Dept. of Health & Human Services, 2016).

Community practice suggests that peer to peer and family to family prevention and recovery supports can be critical in reversing trends in substance use disorders and addictions, modeling success and providing hope across the spectrum of recovery.

Alcohol

This is the age when many become parents. A key preventative life course health intervention focuses on pregnant women at risk for alcohol use or depression, to mitigate the potential impacts on infants and young children raised by parents dealing with addiction and mental health issues. Literature on children as caregivers cites that substance use and mental health issues are two of the key reasons that children find themselves caring for parents and/or for younger siblings.

Community programs can help to prevent and reduce negative mental health effects associated with unemployment and job-seeking stressors for those in recovery. Beginning in young adulthood, the cumulative effects of excessive alcohol use can begin to present. Even among those who have stopped drinking, those who once drank to excess are now at higher risk for health issues such as liver disease, heart disease, cancer and gastrointestinal problems.

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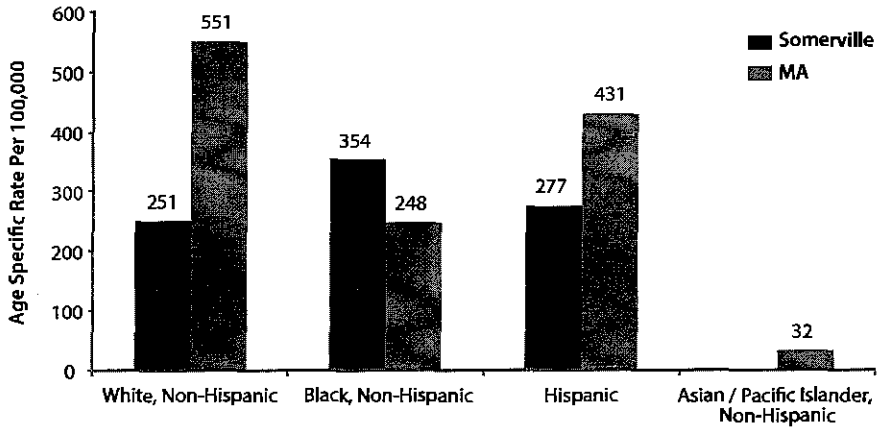
- Black Somerville residents ages 25-39 had the highest rate of alcohol/substance related hospitalizations among all races, according to the 2010-2012 3-year average data portrayed in Chart 3 (UHDDS).

- The rate of substance abuse treatment admission for alcohol rose with age in Somerville in 2013, while adults 25-29 entered treatment at a rate of 128 per 100,000 people 25-29 (18 total admissions), 30-34 year olds were admitted at a rate of 351 per 100,000 (34 admissions), and 35-39 year olds were admitted at a rate of 352 per 100,000 (22 admissions) (MA DPH Bureau of Substance Abuse Services).

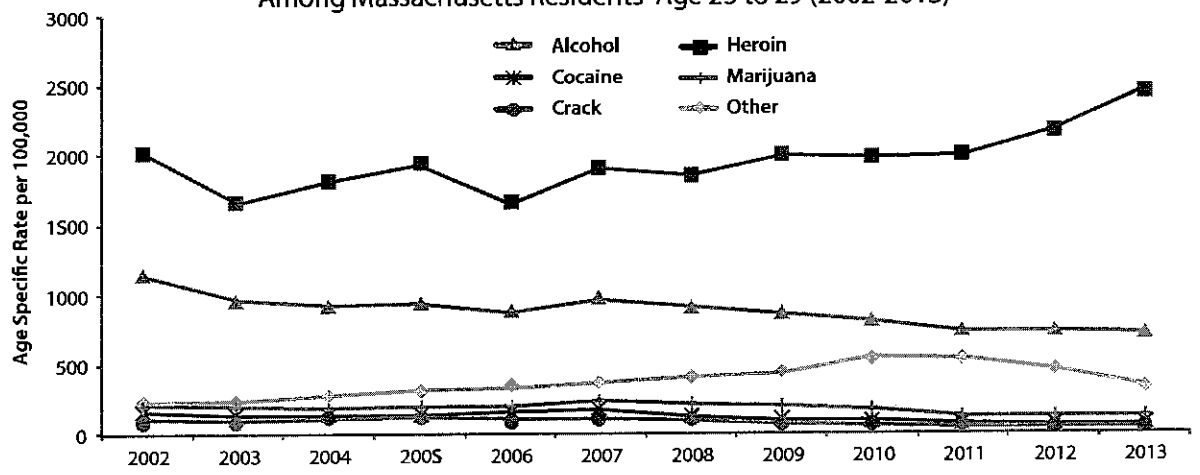
It is important that those who suffer from alcohol or substance dependence are connected to ongoing treatment or supports, as simply visiting the hospital for an acute episode related to alcohol or substances will not treat continuing symptoms of addiction and dependence. Opioid injury can quickly lead to death if not treated quickly and properly.

CHART 3: Alcohol/Substance Related Hospitalizations for Adults Age 25 to 39 by Race/Ethnicity (2010-2012, 3-yr averages)

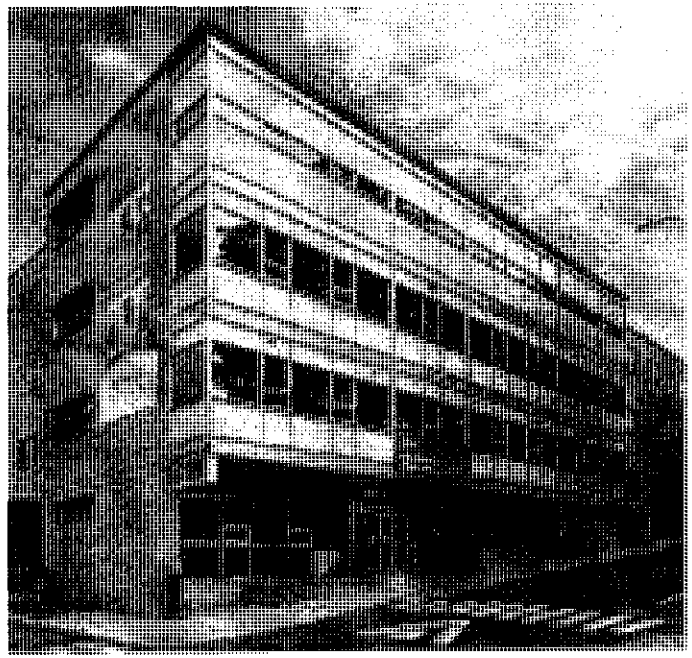


Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)
For Somerville, Asian/Pacific Islander, Non-Hispanic rate was not applicable

CHART 4: Substance Abuse Treatment Admissions, by Primary Substance Used Among Massachusetts Residents Age 25 to 29 (2002-2013)



Source: MA DPH Bureau of Substance Abuse Services
"Other" includes substances that are not alcohol, cocaine, crack, heroin, or marijuana



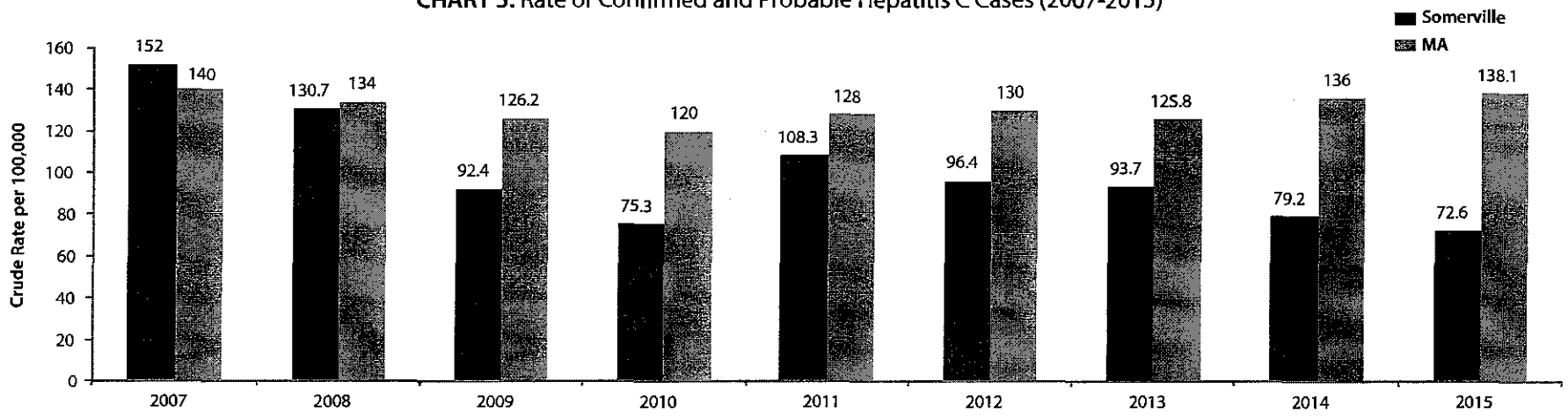
- Overall, in Somerville, the number of both non-fatal and fatal overdoses from narcotics has risen sharply from 2010 to 2016. Based on estimates from Police and Fire records (some months may be missing), the number of non-fatal overdoses for narcotics increased from 96 in 2010 to 191 in 2016. Fatal overdoses for narcotics rose from 3 in 2010 to 21 in 2016, with the sharpest increase starting in 2014 (Somerville Fire and Police).

- According to the Massachusetts Department of Public Health, opioid related admissions to the Bureau of Substance Abuse Services rose from 31% of admissions in 2000 to 55% in 2014, and in 2015 there were an estimated 1,526 opioid deaths in MA, the most deaths in one year for at least the 15 years prior (MA DPH Bureau of Substance Abuse Services).

- According to Chart 5, heroin was the most commonly used substance among 25-29 year olds in Massachusetts admitted to treatment in 2013, while alcohol was the second most used substance. The rate of heroin related admissions rose between 2011 and 2013, while the rate of admissions related to other drugs decreased or leveled off in that time (MA DPH Bureau of Substance Abuse Services).

- Although not shown above, the order of most commonly used substances among adults in treatment in Massachusetts is the same for adults 30-34 and 35-39.

CHART 5: Rate of Confirmed and Probable Hepatitis C Cases (2007-2015)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

Infectious disease

Hepatitis C is an infectious disease that can be transmitted by the use of shared needles, by blood, and sometimes, sexually. Hepatitis C is often linked to injection drug use such as opioid use. For Somerville residents, there is a nearby needle exchange in Cambridge. The Cambridge Needle Exchange offers clean needles, substance abuse support and counseling, shelter and hepatitis C services. CHA Zinberg Clinic located at Cambridge Hospital is a dedicated care center using a multidisciplinary approach providing primary and specialty care for HIV, viral hepatitis and sexually transmitted infections.

- In Somerville, the rate of confirmed and probable hepatitis C cases overall decreased between 2007 and 2015 and has been consistently lower than the MA rate (UHDDS).

- According to data not shown above, in the 25-40 age group, there was an average of 27 confirmed or probable cases of hepatitis C over the three years between 2013 and 2015.

Physical Health

Obesity

Physical activity and nutrition are both closely linked to obesity. Only 19.6% of Massachusetts adults, overall, consumed 5+ fruits/vegetables a day in 2015, according to the 2017 Massachusetts Health Council Report on Preventable Conditions and Social Determinants. The report found that, for consumption of healthy food, disparities were greater along educational attainment lines than racial and ethnic lines. As income and educational attainment are known to be related, the fact that adults who are college educated are 60% more likely than adults without a high school diploma to consume five or more servings of fruits and vegetables per day may be due to financial ability to access and consume nutritious foods. Parents of young children consistently report challenges in finding the time to exercise themselves or participate in other health promoting activities.

Based on 2016 data from CHA patients living in the area, in terms of body mass index (BMI) reporting, African Americans, Haitians, Latinos and Portuguese/Azorean patients 18 and over were most likely to be overweight or obese, with an overall rate of 66.1% overweight or obese, with lowest rates in the Asian populations (CHA)

Massachusetts 2015 data indicates that statewide maternal body mass index records showed that 25% of mothers were overweight and 19.8% were obese prior to pregnancy. By race and Hispanic ethnicity of Massachusetts women prior to pregnancy, 29.2% of Black women, 25.5% of Hispanic/Latino, 18.8% of Whites and 6.5% of Asians were obese (MA DPH, MA Births).

Data from a national report on obesity, indicated that based on 2015 data, 23% of state residents in the 26-44-year range were obese; more than double the rate for early adults ages 18-25 in the same year. Blacks (35.9%) and Latinos (32.4%) were more likely to be obese than Whites (23%) (The State of Obesity).

Respiratory Health

Asthma and other respiratory diseases are among the top five causes of hospitalization for this age group. However, little data is available to provide insight into this health issue for this age group, nor is there much age-specific data on smoking.

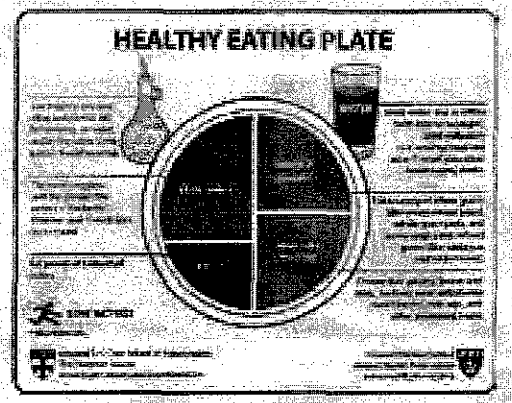
Sexual and Reproductive Health

The rapid rise of drug resistant gonorrhea is being described as an urgent threat by the CDC, significant enough to require targeted education. The incidence of gonorrhea continues to be higher in Somerville, at about double the Massachusetts rate, with a rapid rise from 2012-2016, during which time the state rates rose only slightly (MA DPH, Bureau of Infectious Diseases, Division of STI Prevention).

This is the age when most Somerville mothers give birth, so maternal health and prenatal care are a key focus of sexual and reproductive health in this life stage. Future parents who may have delayed having children may find they need the assistance of fertility programs to become pregnant, which may raise the odds of multiple births, with 13.4% of total births in Massachusetts in 2015 connected to fertility treatments (MA DPH Registry of Vital Records and Statistics).

Evolution of USDA food guidance

The United States Department of Agriculture (USDA) released its first Food Guide Pyramid in 1992, providing the image for nutrition guidance as this group was growing up. This guide was just one in a series of food guidance elements offered by the USDA. The pyramid shape has since been replaced by the Healthy Plate image. Harvard School of Public Health has developed an adaptation of the healthy plate, with additional teaching tools and translations available in multiple languages.



Young Adult Top 5 Causes of Hospitalizations and Deaths

TABLE 1: Top Causes of Hospitalizations (2010-2012)	Top 5 Causes Somerville*	Age-specific rates per 100,000	Top 5 Causes Massachusetts*	Age-specific rates per 100,000
Young Adult (25–39 years)	1. Mental Disorders: All	643.2	1. Mental Disorders: All	1,118.0
All Causes in Somerville: n= 4,700	2. Digestive System Disease: All	421.4	2. Respiratory: COPD, All (Related)	852.1
	3. Respiratory: COPD, All (Related)	350.5	3. Respiratory: Asthma Related	800.9
	4. Respiratory: Asthma Related	329.4	4. Digestive System Disease: All	711.8
	5. Injuries: Opioid	313.9	5. Injuries: Opioid	681.8

TABLE 2: Top Causes of Death (2010-2012)	Top 5 Causes Somerville	Age-specific rates per 100,000	Top 5 Causes Massachusetts	Age-specific rates per 100,000
Young Adult (25-39 years)	1. All Poisoning Injuries	14.4	1. All Poisoning Injuries	23.1
All Causes in Somerville: n= 41	2. Suicide	13.3	2. Opioid Injuries	18.9
	3. Suffocation	7.8	3. Suicide	10.5
	4. Opioid Injuries	6.7	4. Heart Disease	7.5
	5. Heart Disease	5.6	5. Motor Vehicle Related Injuries	6.2

Data Source: Uniform Hospital Discharge Data System Massachusetts Division of Health Care Finance and Policy, MDPH (MassCHIP).
The source file is maintained as a zip code based file; 3 year average estimates 2010-2012

Notes: Please note that within some groupings/classifications may overlap and be counted more than once within the rankings
Related includes secondary and primary diagnoses
*Excluded childbirth, pregnancy, pueperium in Causes of Hospitalization ranking

Mental disorders are not detailed individually via MassCHIP

Chronic Obstructive Pulmonary Diseases (COPD) include: Bronchitis (chronic and acute); Emphysema; Asthma; Bronchiectasis; Axtrinsic allergic alveolitis and Pneumonitis

Digestive System Diseases: Diseases of oral cavity, salivary glands, jaw, esophagus, stomach, appendix, intestines, liver, gallbladder, pancreas

All poisoning injuries include: Unintentional and intentional poisoning by self or other from chemicals or noxious substances, including prescription or recreational drugs, alcohol, solvents, vapours, gases, pesticides, and biological substances.

Suffocation includes: Unintentional and intentional strangulation or obstructed airway by self or other from food or other object; accidental mechanical suffocation.

Injuries: Opioid includes: Non-fatal Opioid-related associated with Opioid abuse, dependence and/or poisoning (overdose)

Heart Disease includes: Coronary heart disease, heart failure, ischemic heart disease, major cardiovascular disease, and acute myocardial infarction (NOT hypertension, atherosclerosis, and cerebrovascular disease)

Hospitalizations and Deaths

- Age-specific rates for both hospitalizations and deaths in this life stage are consistently lower than the state rates, as seen in Tables 1 and 2.
- Between 2010 and 2012, there were 12 suicides among young adults (25-39), the most of any adult life stage. In addition, there were 7 suffocations, some of which may have been suicides.
- Additionally, poisoning injuries and opioid injuries may also overlap due to reporting standards (UHDDS).

Disability

Age specific data on disability in young adults was not readily available. Data from 2012 indicated that compared to 19.8% of nondisabled adults over 18, 64.1% of Somerville disabled adults were not employed in the labor force (Somerville Housing Needs Assessment). Programs such as Massachusetts Disability Commission, located in Somerville, can provide work accommodations or training for a range of disabilities. In general, disability intersects strongly with other social determinants such as poverty, housing and employment. In Somerville, one-quarter of all disabled adults are living in poverty. Public housing units for those with disabilities are included in elderly housing but there are waiting lists of many years for the 95 designated units.

Education

In this mecca of higher education, young adulthood is often a time of continued education for career advancement or personal and professional development. The wealth of colleges and universities brings many students to Somerville and also supports the educational aspirations of long-time residents. Higher levels of education have health impacts through higher income and usually safer working conditions. Increased income helps meet needs for housing, childcare, food and other costs of urban living. As of 2015, the U.S. census data educational attainment rates for 25-34 year olds in Somerville was estimated at 95.9% with high school diploma or higher and 78.4% with Bachelor's degree or higher. This last figure, having a college degree, is much higher than the national average of 40%, a fact that is quickly distinguishing this age group from older generations, especially here in Somerville (American Community Survey).

Despite the fact that Somerville has a highly educated workforce age population, an equally large low income population also exists whose day-to-day struggles often go unrecognized. These may be single-parent households, families without high school or college degrees, those re-entering from the criminal justice system, or immigrants coping with language skills gaps. Many immigrants arrive in the city, as reported by service organizations, with higher education and professional credentials that are not recognized in the U.S., leading to limited earning potential and barriers to accessing resources even if one has English language proficiency. More formal education can be a protective factor, promoting and supporting healthier life choices and better health outcomes, though systemic barriers may prevent some from achieving the higher incomes typically associated with higher education levels. Nationally, there are links between parent's education levels and the health of their children, which start to be increasingly important in this life stage.

Economic Stability

This cohort came of age, or was just starting to get established in adulthood, during the Great Recession (2007-2009), which caused economic upheaval impacting jobs, housing and life plans for many. The recession also spawned the Occupy movement, which strived to bring attention to the growth in wealth disparity nationally and the policies behind the resulting gaps in prosperity. Locally, Somerville residents are increasingly burdened by high housing costs and stagnant wages. Only 16% of the residents in Somerville are able to find work within the city (Somerville Department of Economic Development), which may lead to longer commutes and precious time away from families and other quality of life activities. Another factor for this age group is student debt, which has been on a steady rise nationally for more than a decade and strongly impacts this group who have higher rates of college degrees than older adult stages. For some, this economic factor is behind delayed ages in marriage, having children and home ownership.

Poverty

This information is similar to that found in the Early Adult chapter and more detail can be found in the Demographics chapter. Poverty (LC-10) and income distribution have seen ongoing change in Somerville over the past decade. U.S. data from 2010-2015 for Somerville indicates an overall poverty rate of 14.7%. For context, in 2017 the U.S. poverty threshold was $24,600 for a family of four, the minimum income that the Census Bureau considers necessary to meet basic needs, and is adjusted for family size to determine poverty rate.

- The rate of total individuals living at or below the poverty rate remained stable at 14.7% from 2010-2015, while rates for children, seniors and families with children all saw a slight rise (American Community Survey).

- 17.0% of Somerville families with children under 18 years were living in poverty, a 4.4% increase since 2010.

- 43.2% of Somerville female-headed families with children and with no husband present were living in poverty, a 2.6% increase since 2010, consistently higher than the state rate.

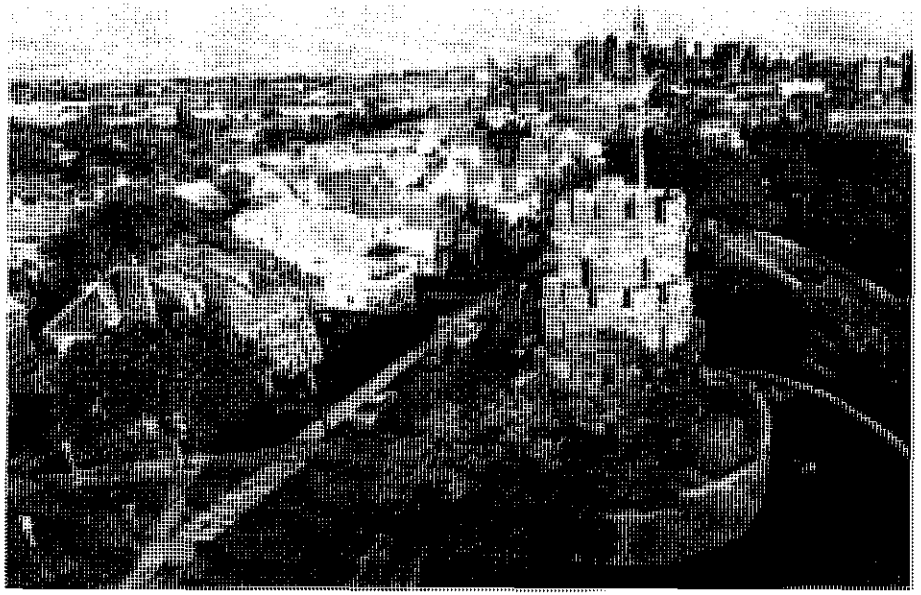
- Of the population in the city over 25, 22.5% of those living in poverty have less than a high school education.

- 11.8% of individuals identifying as "White alone" were living in poverty, compared to 19% of Asians, 26% of Hispanics/Latinos, and 36.6% of African Americans, based on data available through 2015.

The official poverty rate is not adjusted for geographic variation; hence it is not reflective of the income needed to meet basic needs in areas with higher costs of living like New England. For instance, the Living Wage Calculator developed at MIT indicates that a single adult would need a minimum income of $27,040 and two working adults with two children in the Greater Boston area would need to be earning $71,843 to meet basic needs in the area (Living Wage Calculator).

Homelessness

Somerville has a small unsheltered homeless (LC-07A) population, with several shelters serving adult men and women of all ages, families, victims of domestic violence and veterans. There is a wet shelter near Central Square that serves Somerville residents actively dealing with substance use. Some young adults "couch surf," moving from friend to friend to keep a roof over their heads and falling into the unstable housing category if not technically homeless. Per federal and state laws such the McKinney-Vento Act, families with children in the Somerville schools who become homeless are provided with transportation from sheltered housing locations to allow the children to continue schooling in the city until the family gains permanent housing, typically not in Somerville.



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In Somerville, the housing supply available on the open market is very limited for low and middle-income households, for either ownership or renting. The average market rate rent in 2015 was $2,567 for a two-bedroom apartment, which would require a household income of around $90,000 to keep the housing expenses within the recommended 30-40% of total income.

For this age cohort, as for others, preventing homelessness for individuals and families is critical. The annual Save Our Homes walk raises unrestricted funds that can help prevent homelessness by providing funds to cover back rent, security deposits and/or moving costs. This event is organized by the Somerville Affordable Housing Organizing Committee (AHOC), an advocacy coalition comprised of Somerville residents and community organizations including Somerville Community Corporation (SCC), Community Action Agency of Somerville (CAAS), Cambridge and Somerville Legal Services (CSLS), and Somerville Homeless Coalition (SHC). First organized in 2001 by SCC, AHOC continues to pursue the vital mission of preserving affordable housing, increasing affordable housing opportunities and stabilizing Somerville's existing communities.

Affordable Housing/Housing Stability

In Somerville, the housing supply available on the open market is very limited for low and middle income households, for either ownership or renting. There was a steep increase in rents and home sale prices between 2012 and 2015; the limited supply keeps prices high. The sale prices for median single-family homes increased by 30.5% between 2012 and 2015; in the same period, the prices of condominiums rose by 35.7%, according to a Warren Group report from 2015. New luxury apartments were built at Assembly Row and Maxwell's Green with an average monthly rent of $3,533; higher than many residents can afford and requiring a 6-figure income. The average market rate rent in 2015 was $2,567 for a two-bedroom apartment, which would require a household income of around $90,000 to keep the housing expenses within the recommended 30-40% of total income.

Between 1992 and 2014, the Somerville Community Corporation focused on increasing affordable rental units, adding 181 in Somerville. The demand far exceeds the supply, with 2,200 on the waiting list, with over 40% waiting for a 3-bedroom unit to become available (Somerville Housing Needs Assessment).

Some City programs seek to help with these high costs, such as the Prevention and Stabilization Services (PASS) Program and Tenancy Stabilization Program which offer financial support to tenants, with high demand and limited funds for both programs. The PASS program provides financial assistance for rent for up to two years for income eligible households at or below 80% area median income (AMI) with ongoing case management for the households. The household must also demonstrate capacity to become financially self-sufficient. The Tenancy Stabilization Program provides one-time assistance of up to

$3,000, in addition to case management, for households at or below 80% AMI, for costs such as first or last month's rent, security deposits, moving costs, broker's fees (in limited cases) and rental and utility arrearages.

Employment and Living Wage Jobs

One of the biggest changes in employment over the past 40 years is the shift in women into the paid workforce. In 1975, 43% of women in the U.S. 25-34 age bracket took time out of their work careers to stay home and raise a family. More recently, that figure has dropped to 14% (The American Family Today, 2015). Parental leave varies, depending on the type of work parents do. The challenges associated with finding affordable quality childcare and the time juggling to meet new demands are often cited as adding extra layers of pressure on young families.

National research indicates 25% of mothers and 13% of fathers who took parental leave in the past two years reported it having a negative impact on their career. This parental need disproportionately impacts low income individuals, with only 22% of those making under $30,000 reportedly having access to paid leave compared to 58% of individuals making more than $75,000 (Shareable facts, 2017).

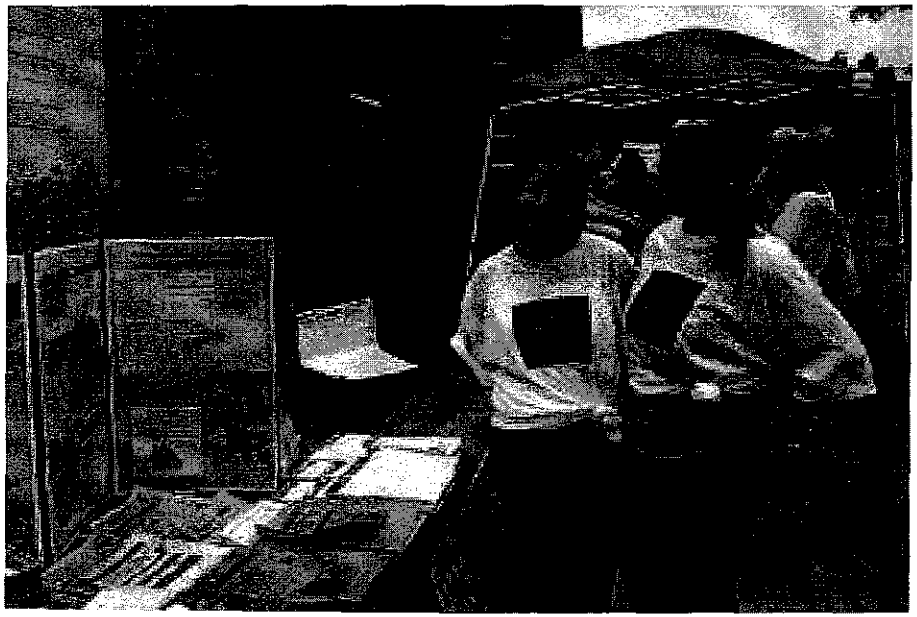
Locally, there has been concern over job displacement, particularly for low income Somerville residents, according to the Somerville Community Corporation. While there has been development in Assembly Square, additional policies are needed to support local community members and efforts to gain living wage jobs. Jobs for Somerville has also pressed for a jobs linkage fee to provide funding for job training, and fought to include local hiring and living wage jobs in a community benefits agreement in Union Square. In 2012, Mayor Curtatone appointed the Somerville Jobs Advisory Committee (SJAC) to conduct an assessment of the workforce development system in Somerville. The SJAC recommended a "robust, sustainable workforce development funding system." The committee also recommended a jobs linkage fee and a line item in the City budget. The linkage fee did get approved, to be implemented in 2017, yet it will still require additional future funding to fully implement the job training and support programs needed to help residents earn enough money to remain in the city.

The range of employment opportunities in the city also includes the reality of day laborers, who show up at Foss Park in Winter Hill hoping for manual labor for the day. These workers, mostly immigrants with limited English Language skills, are vulnerable to wage theft and unsafe working conditions and potential for injury.

Food Security

Massachusetts data on pregnant mothers indicates that statewide, 33.8% received WIC supports during their pregnancy. Of those, 72.5% were Hispanic, 61.9% Black, 24.9% Asian and 18.9% White. (MA DPH, MA Births 2015) In Somerville, 1,834 residents utilized WIC benefits in 2017 (Cambridge Health Alliance).

The USDA survey on food security includes questions on whether parents or adults in the family ever skip meals to make sure children have enough to eat. A 2016 study by the Trussell Trust foodbank system (2017) in England on hunger during school holidays revealed that 1 out of 5 parents between the ages of 25 and 34 were likely to be worried about their children being able to eat during school holidays and would skip meals themselves so their children could eat.



Natural and Built Environment

Housing (safe, affordable and accessible)

Somerville has become a mecca for young adults who thrive on the dynamic community offerings and proximity to higher education and jobs. The safety of the community is another draw for many, as the city offers the diversity of urban living with a low crime rate.

Affordability is the most challenging aspect of housing for many young adults, especially those wanting to start a family. For those who may already have young children and those with low-paying work, choices about staying in Somerville may involve compromises in terms of available space or housing quality. In the current political environment, low income renters who may also have issues with immigration status are particularly vulnerable to threats to their housing safety and even tenancy by unscrupulous landlords who may delay needed repairs or correction of conditions related to rodent or insect infestations.

Safe and Secure Neighborhoods

The overall crime rates in Somerville are 20% lower than the U.S. rates, based on 2015 data, at 22.85 per 1,000 residents. The violent crime rate (murder, rape, assault), is lower than the MA crime rate, while the property crime rate (burglary, theft, auto theft) is higher than the state level (FBI, Uniform Crime Reporting Program and Somerville Police).

Transportation

Somerville ranks high in terms of being a walkable city, as well as bike friendly and with good—and expanding—public transit options. Somerville's Walk Score of 86/100 is the second highest in the state. In 2013, it made the nation's Top 10 list. The Transit Score is 62. These are measures of the walkability of an address or the access to public transit (Walk Score).

Somerville was on par with Everett and Medford in terms of people working outside their place of residence in 2012, higher than the Boston or MA rates at 80%, though the mean travel time to work is almost equal to both the MA and U.S. rates. Somerville commuters are almost three times as likely to use public transportation to commute and more than twice as likely to walk or bike as the state rate and notably less likely to drive alone than the Massachusetts or U.S. average (City of Somerville Data Farm, Work).

Environmental Health

The City began to develop a Climate Change Plan in 2015, which in 2017 manifested as the Somerville Climate Forward initiative with a vision of the city as a "thriving, equitable, carbon neutral, and resilient city that is preparing for climate change while doings its share to prevent it." Part of the work emphasizes the need to be alert to health impacts and the impacts on vulnerable populations (age, income, education and language isolation.) This effort also brings an equity lens to emergency preparedness in the city.

Air quality is an environmental issue that can have serious health implications. Associated with elevated risk of asthma, heart conditions and obesity, the cumulative effects of poor air quality can negatively alter one's quality of life. Health data from this life stage shows that this topic deserves attention in the Somerville community. Those living near the highways in Somerville are at the highest risk of exposure to poor air quality. Recent studies have shown that ultrafine particles emitted from traffic are associated with respiratory infections, lung cancer, heart attacks, stroke and chronic obstructive pulmonary disease (Brugge et al., 2007). These particles can be elevated locally and are rapidly changing and isolated near high traffic areas.

Studies have found that these ultrafine particles are highest when there is high traffic, when there is no wind and when it is cold outside. There have been local efforts to support the health of individuals living in areas near the highways by attempting to install air filtration systems in homes next to interstate 93. While lower levels of ultrafine particles were found, the units are very expensive and are likely not a permanent solution. Other efforts include a zoning ordinance that mandates construction companies working in high risk zones demonstrate that

ultrafine particles are 80% lower on the inside of the building than the outside. Political advocacy is underway for sound barriers to be added along the highway where it cuts through the city, providing some additional mitigation.

Access to Nature and Open Space

Approximately 158 acres of the city (6% of all land) is considered open space and given Somerville's population density (43 persons per acre), these spaces are well used by residents of all ages. Young adults are discovering the playing fields for sports and activity leagues and the plazas for community events that celebrate the arts, culture or local food. Boating is available in Somerville at Blessing of the Bay boathouse—with both rowing programs and canoe and kayak rentals. As of 2017, planning is in process to increase the amenities along this area of the Mystic River, which is linked to Assembly Row by a pedestrian underpass at McGrath Highway/Route 28.

Somerville residents love their dogs, who like to get outside and play as well. There were 1,732 licensed dogs in Somerville, as of 2017, with four dedicated dog parks. Close proximity to the Middlesex Fells, with over 2,500 acres of recreational space is a boon for dog owners with cars, but also for bikers, walkers and nature lovers.

Social and Community Context

This cohort includes millennials who came of age in the post 9/11 era, the proliferation of social media and the online shopping explosion, the Great Recession, global warming and shifting work schedules that challenged the 9-5 employee mode of earlier generations. They also grew up in a more racially and ethnically diverse culture, though policies and politics have been slow to reflect this shift.

Young adult veterans may have been part of wars in Iraq or Afghanistan, with 11.4% of Somerville veterans under the age of 35. They are usually mid-career or late career service members reintegrated back into the civilian sector, but may face challenges with employment, housing and healthcare. Community or workplace interventions can support veterans and their families dealing with stressors at work and home, as well as prevent and reduce negative mental health effects associated with reintegration, unemployment and job-seeking stressors and housing challenges.

Historically, Somerville has been a welcoming city for immigrants, serving as a gateway community for new arrivals from around the world who settled and made this their home. Recent national policy changes in immigration policy have highlighted the sanctuary status that communities such as Somerville strive to offer to all residents, regardless of immigration status. In the wake of changing policies in early 2017, the City and community leaders responded on multiple fronts.

A rally at City Hall in February 2017 drew over 4,000 people in demonstration of messages of solidarity for "One Somerville" that welcomes all. The Somerville School Committee passed a resolution confirming their commitment to providing a safe learning environment for all students. Numerous groups arose at the community level, including a multi-sector city, school and community steering committee that helped to coordinate Know Your Rights workshops and other supports.

From a public health perspective, addressing perceived safety and related threats and providing knowledge and resources in a supportive environment can reduce negative risk factors for mental health. Local efforts have strived to support caregivers and front-line service providers, facing an increase of families and individuals in need.

With recent demographic shifts, there could be a rise in experiences of segregation across class and economic lines, as well as cultural lines. Some issues, such as substance use, are more prevalent in the young adult White working-class population. This includes the cohort who were at Somerville High School during high incidence of overdoses and suicides in the early 2000's. One hears references to "old" and "new" Somervillians, creating both opportunities and challenges for bridging connections between long-time residents and recent arrivals.

Race

The Economic Policy Institute reports that by 2043, People of Color will constitute the majority of the working-class population in the United States (Wilson, 2016). This demographic shift suggests that by 2043, 61% of the population under the age of 18 will be People of Color, while 65% of those over 65 will be non-Hispanic White. This population trend, and the social changes it brings, could be tied to racial discord seen in the U.S. in recent years.

Nationally, 55% of Blacks with a four-year college degree report that their race has made it harder for them to succeed in life. (On Views of Race and Inequality, Pew, 2016). National data also shows that 47% of Blacks report someone acting suspicious of them in the past twelve months due to their race or ethnicity and that 45% say that people have treated them like they were less intelligent in the same timeframe (On Views of Race and Inequality, Pew, 2016). This unfair treatment comes in many forms, can be seen both overtly and subtly, and is indicative of a range of manifestations of racism, from interpersonal to structural.

Over the past generation, there has been a significant change in the age at which people get married. According to trends in the U.S. census reporting, 80% of people were married by the age of 30 in 1975. Currently, the national statistic has shifted to 80% being married by the age of 45 (Vespa, 2017). This delay in marriage impacts the social networks and available social supports that can serve as positive forces for health—both physical and mental—throughout the lifespan.

National level data from the 2015 American Community Survey indicates disparities in educational achievement by race. Whites have the highest level of reporting a Bachelor's degree or higher (59%), compared to Blacks (37%) and Hispanics/Latinos (31%). American Community Survey data from 2015 also shows links between educational level and poverty rates. Of people reporting less than a high school degree, 23% were living in poverty, compared to 7% of those with a Bachelor's degree of higher (American Community Survey).

Social Inclusion

Overturning a long time exclusion, Massachusetts was one of the earliest states to legalize same-sex marriages in 2004, and Somerville was an early adopter with a very supportive City Clerk's office helping to facilitate multiple same-sex weddings. This culture of inclusion may help account for Somerville having the 6th highest percentage of households with same-sex partners in the country, at 2% (City of Somerville Data Farm, Raise a Family).

Social Safety Network/Social Support

Over the past generation, there has been a significant change in the age at which people get married. According to trends in the U.S. census reporting, 80% of people were married by the age of 30 in 1975. Currently, the national statistic has shifted to 80% being married by the age of 45 (Vespa, 2017). This delay in marriage impacts the social networks and available social supports that can serve as positive forces for health—both physical and mental—throughout the lifespan. Defining social structures during this life stage can be crucial and used to build relationships, family, employment opportunities and social and civic engagement. Young adults are solidifying lifestyles that will carry them through the lifespan, often creating a "chosen family" to provide critical social supports in the absence of relatives or traditional family structures.

Social Media

This age group has always been part of the digital world, including video games, MTV, email and the advent of Facebook and other social media platforms. Communication is a far cry from the days of waiting for a letter or phone call, with texting updating earlier instant messaging options. News comes from online social media, versus print media. Even television has been overhauled, with automatic DVD taping and on demand movies. Online communications can conjure up everything from finding a nearby farmers market, matching up with a date, taking a car share ride to a "meet-up" event, to tracking one's fitness regime.

Violence (Domestic Violence, Sexual Abuse)

There is limited available data specific to this age group. In 2016, there were 198 Domestic Assaults recorded in Somerville for all ages. Also in 2016, 87.4% of arrests were people in the 21 to 60 range (Somerville Police). In terms of the state's incarceration rates, the average male in Massachusetts Department of Corrections custody was 41 years old; the female average age was 37 (MA Department of Corrections).

Community and Civic Engagement

Young Adults account for 40% of the registered voters in Somerville (censusviewer.com). There are many factors that affect voting decisions including party affiliation, values, education level, religion and economic status. In the 2016 presidential election, Somerville had 54,360 registered voters with 40,874 votes cast. Of the ballots cast, 82.55% were for the Democratic candidate, 10.1 % for the Republican candidate, and 7.35% were for other party candidates, write-in candidates or left blank. Somerville, like much of the country, saw an increase in voter participation during the 2016 elections, with every ward in the City having an increased number of voters. When comparing the voter participation in 2016 to 2012, the last Presidential election, Ward 1, East Somerville, had the largest increase (27.2%), followed by Wards 5 (19.37%) and 4 (17.28%).

Engaging in community issues is closely linked with social media for this age group, who learn about opportunities primarily online. Cities like Somerville are seeing this age group showing up at planning forums and festivals, and as volunteers for causes they support.

Efforts by the City to provide opportunities for social interaction across a range of sectors of the population include a robust arts and culture calendar with events and celebrations throughout the year offered by the Somerville Arts Council. Between these offerings and a broad variety of activities offered by organizations such as Arts at the Armory, there is plenty to entice residents to come out to meet their neighbors through shared experiences. Special attention is given to providing access to learning opportunities for the parents of Somerville's children, who include a large number of families striving to raise their families here despite language barriers, economic disparities and uncertainty about immigration status and safety.

Recommendations for Young Adult

Ages 25–39

Increase access to health promoting resources

- Offer English language learner classes with a focus on health literacy and advocacy, including self-care
- Improve access to homeless prevention and housing supports
- Expand community flu and health education clinics (including sexual health) targeting this population
- Explore worksite health partnerships to support health education, family inclusive policies and access to worksite wellness

Facilitate a community with strong social networks and support systems

- Increase in-person social networking and supportive relationship building opportunities
- Improve capacity of existing neighborhood associations to support an engaged community and connect to the active political scene
- Leverage parents' engagement in the school system to increase connectivity and investment with the broader community
- Increase opportunities for returning veterans to re-engage in social networks
- Connect social network opportunities to other health determinants such as access to healthy foods and physical activity
- For families with young children, expand programs to support parent networking opportunities
- Expand continuing education and learning opportunities to reduce employment gaps
- Engage single mothers and their children in exploring social connections/networks to promote family health and wellbeing

Create lifelong habits to promote mental health

- Share research with broader community on how supportive relationships serve as a protective factor, encouraging the value of making and retaining a circle of friends
- Identify service providers with capacity to serve various community needs including language, culture and orientation.

Support increased physical activity and healthy eating opportunities

- Engage this age group in planning and advocacy for improved equity and infrastructure that supports active transportation, physical activity and healthy eating for all
- Support training for small grocers and corner stores on stocking fresh fruits and vegetables
- Create workplace environments conducive to breastfeeding

Middle Adult

Introduction

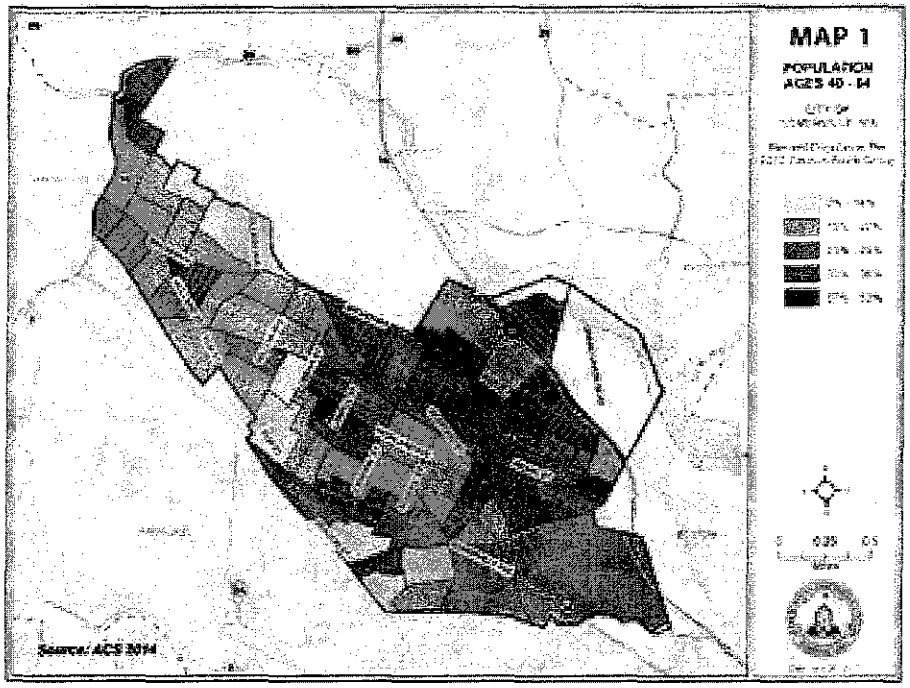
The middle adult period, for the purposes of this report, is defined as 40-64 years of age. Middle adulthood can be a time when a person re-examines their life, evaluating their accomplishments and the legacy they have established. This is also often a time of outward focus such as caring for others, including children, grandchildren, aging parents and friends who may need extra support. Sometimes referred to as the "sandwich generation," this age group's responsibilities can cause stress, as middle adults strive to balance work, family and self-care. Middle adulthood is a time of adjusting relationships due to shifts in familial, work and community roles. Perspectives and outlook on one's own life often shifts as well through an increased understanding of one's capabilities and life purpose. Resilient social support networks are important for health, perhaps even more so as this population ages and transitions to later adulthood.

While many physical changes are gradual, some become obvious in this stage and may lead to chronic health issues that can add to stress. Physically, the body experiences natural aging changes which may impact vision, hearing, skin, weight, strength and sexual health. For women, the end of child-bearing years and menopause most frequently occurs during this time period, though some women are just becoming mothers in their forties. As people move through this life stage, they may become more sensitive to diet, substance use, environmental exposures, stress and needs for rest. Maintaining healthy habits as well as identifying and addressing unhealthy habits, can set the stage for healthier and more productive older years and serve as a positive model for children and grandchildren.

Health problems can turn into a life altering issue or sometimes trigger positive life choices such as increased exercise or healthier diets. There can be increased threats from disability and chronic disease, with the data indicating there are health disparities among this population. People also become more conscious about their own mortality in this stage, in response to the deaths of parents or friends. Because of society's emphasis on youthfulness and physical appearances, middle-aged men and women may suffer from diminished self-esteem or may start to experience age bias in the workplace. For those in manual labor or desk jobs, injuries can become more frequent as the cumulative impact of repetitive motion wears on the musculoskeletal system.

Middle adulthood is a time of adjusting relationships due to shifts in familial, work and community roles. This is also often a time of outward focus such as caring for others, including children, grandchildren, aging parents and friends who may need extra support.


Middle Adults / Ages 40–64



Mental health is also a major factor in this age group. Stresses related to the Great Recession of 2007-2009 as well as recent shifts in immigration policy and increases in overt displays of intolerance and hate crimes may manifest in this group. This life stage is often synonymous with a period of high responsibility and high productivity, and can include planning ahead for when one is not able to continue work or elects to retire—a target which for many has been extended well beyond the historically traditional age of 62 out of financial necessity.

During this stage, middle adults are often fulfilling civic and social responsibilities. For some, time for leisure activities or one's own exercise opportunities shrink as the demands of parenthood, elder care, job security and civic roles may increase. During this stage, most individuals are established in a career and at their highest earning potential, providing at least a basic standard of living.

Demographics, age specific

Following the peak in population in the 25-34 years old range at 40.3% of the total population, the Somerville middle adult cohort decreases to less than the state average for 45-54 year olds (9.9% of the Somerville population) and 55-64 year olds (7.6% of the Somerville population), based on 2011-2015 national data estimates. Map 1, to the left, shows that the 45-64 age population is quite evenly distributed around the city.

Access to Healthcare

Health Insurance Coverage

Medical insurance coverage (LC-40) is important to support preventative care in the middle adult years when chronic conditions start to manifest more often. Health Insurance Coverage for this age group was 93.9%, lower than the state level at 96.1%, with 6.1% of Somerville residents in this age without coverage. Of those with health insurance coverage, 72% had private insurance and 26.3% public coverage (American Community Survey (ACS)).

Primary Care Provider

It is a national goal to increase the proportion of adults aged 18 to 64 years who have a specific source of ongoing care (SHS-5.3). At age 50, the recommendation for frequency of well-visits changes from every 1-3 years for younger adults, to annually. Fifty is also the age that triggers a number of preventative screenings such as colonoscopies, which have been proven to save lives. In 2015, CHA provided primary care to 6,490 Somerville residents age 41-65 years.

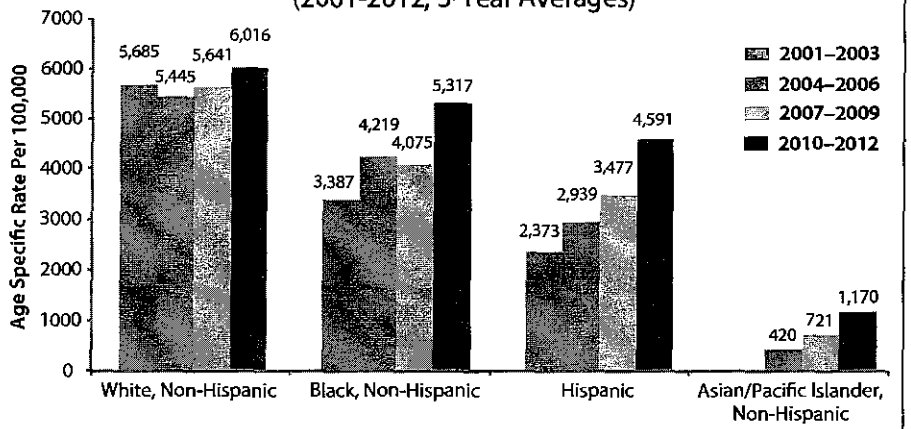
Immunizations

Recommended immunizations in this age include annual influenza, tetanus/diphtheria/pertussis (Tdap) every 10 years, shingles vaccine, and depending on age and health condition, the pneumococcal vaccine.

Oral Health

Somerville's drinking water, provided by the Metropolitan Water Resource Authority, is treated with fluoride, one of the protective factors for dental health (LC-05). Even for those with regular dental check-ups, dental care may be needed during this period as old fillings wear out, triggering more expensive procedures such as crowns or root canals. MassHealth coverage for dental care has varied significantly, from basic care to only providing emergency coverage for extractions, impacting oral health for low income residents.

CHART 1: Mental Disorder Related Hospitalizations for Adults Age 40 to 64 in Somerville by Race/Ethnicity (2001-2012, 3-Year Averages)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

Behavioral Health & Mental Health

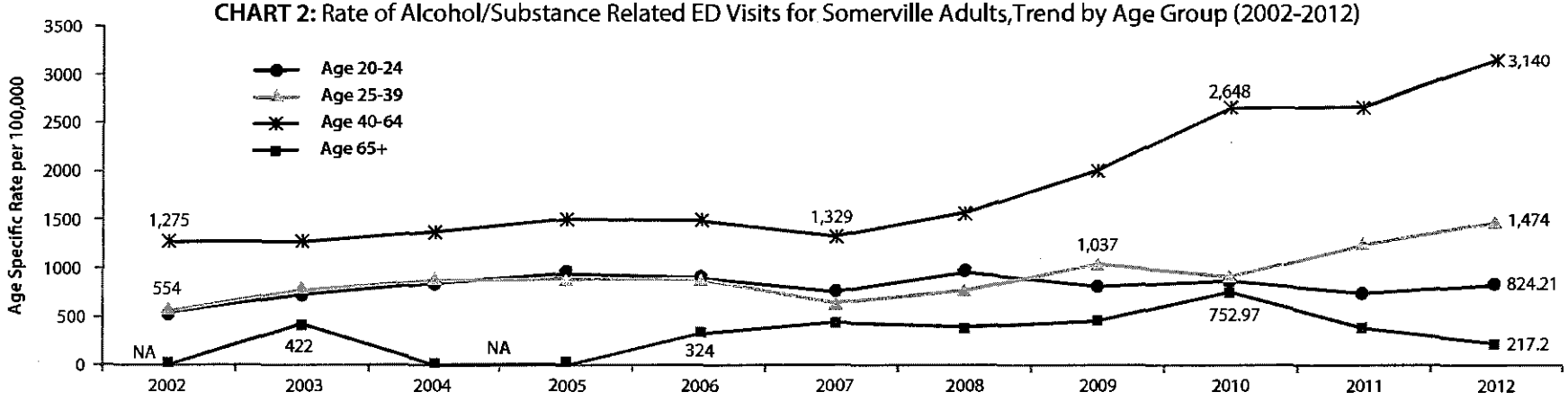
Mental health among adults (LC-43) is a global public health issue. Locally, mental health disorders are the third highest cause of hospitalizations among middle adult Somerville residents (MA Uniform Hospital Discharge Data Set (UHDDS)). Adults can also be dealing with the residual impacts of trauma in their earlier lives, which can increase their risk for negative health outcomes manifesting as they age.

Individuals in this life stage face a variety of stressors that can influence their mental wellbeing. This can include financial responsibilities, lack of social supports, changes in physical health and wellbeing and limited resources available to support mental health. There can also be many barriers to accessing appropriate mental health services for this age group including availability of providers (especially with language or cultural capacity), financial costs and challenges navigating the existing service systems.

- According to data shown in Chart 1, the rate of mental health disorder related hospitalizations increased for all races among Somerville adults ages 40-64 between 2001 and 2012 (UHDDS).
- Among 40-64 year olds in Somerville, mental disorder related hospitalizations were 15% higher among males than females (UHDDS).

In August 2017, the journal Psychiatric Services in Advance published an article with results from a CHA "behavioral health home" pilot program that enhanced services to address health disparities among adults with serious mental illness (SMI). People who experience SMI generally have a shorter life expectancy than others without SMI, which research attributes to a higher prevalence of medical diseases driven by complex social, behavioral, psychological, and treatment quality factors. The CHA program tested the hypothesis that, for people with SMI who often have complex health needs with greater risks and total costs, providing a patient-centered "medical home" in a specialty mental health

CHART 2: Rate of Alcohol/Substance Related ED Visits for Somerville Adults,Trend by Age Group (2002-2012)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)
NA = Data is inapplicable (i.e. not reported because the patient count is too low)

setting could begin to advance the national agenda of achieving better quality of care, better health outcomes and lower healthcare costs.

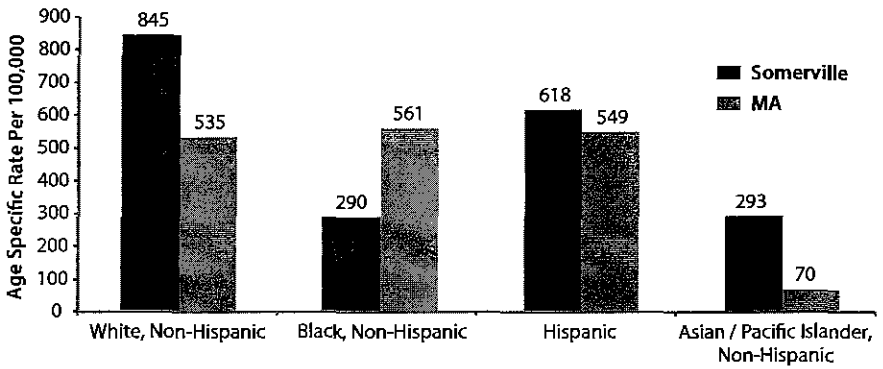
Comparing outcomes before and after the "behavioral health home" intervention for 424 participants with schizophrenia-spectrum or bipolar disorders, members of the intervention group had significantly fewer psychiatric hospitalizations and emergency department visits and more diabetes screenings than the matched control group of 1,521 other CHA patients. The program introduced on-site medical care, health promotion services (e.g. smoking cessation, nutritional education, food preparation), and peer-to-peer engagement opportunities within the mental health clinic. It also involved creating new IT tools to monitor and manage patients' needs, adding support for care coordination within and beyond CHA and changing clinical paradigms to focus more on whole health, preventive care, and population management. Addressing social determinants as well as ways to foster peer support and relationship development were identified as approaches that helped achieve the outcomes, with potential impact for future innovations for serving this population (Tepper et al., 2017).

Substance Use Disorder/Addiction

Nationwide, substance use is a key public health topic, with New England experiencing high levels of overdoses and deaths due to opioids in recent years. In Somerville, deaths due to poisoning injuries and opioid injuries were the 2nd and 5th causes of death respectively for residents age 40-64 between 2010 and 2012 (UHDDS). The primary substances used among Massachusetts residents that lead to substance abuse treatment admissions in descending order include: heroin, alcohol, other, marijuana, cocaine and crack.

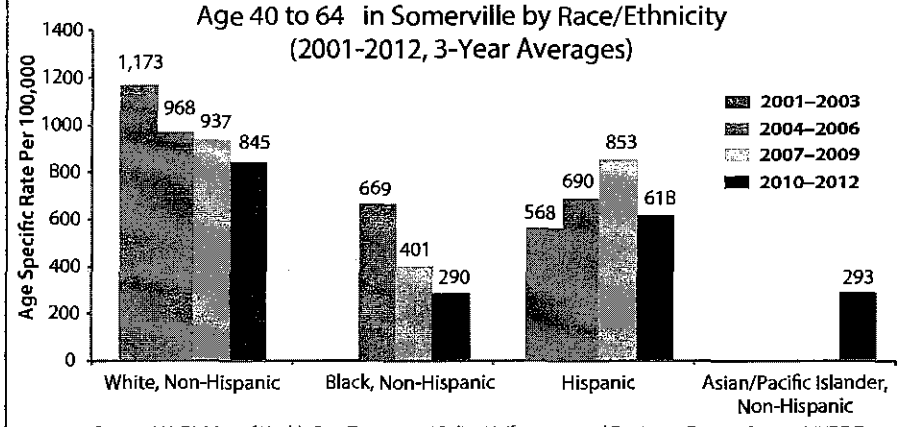
- According to the data portrayed in Chart 2, in 2012, adults 40 to 64 had the highest rate of alcohol/substance related emergency department visits, while adults age 25 to 39 had the second highest rate (UHDDS).

CHART 3: Alcohol/Substance Related Hospitalizations for Adults Age 40 to 64 by Race/Ethnicity (2010-2012, 3-Year Average)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

CHART 4: Alcohol/Substance Related Hospitalizations for Adults Age 40 to 64 in Somerville by Race/Ethnicity (2001-2012, 3-Year Averages)



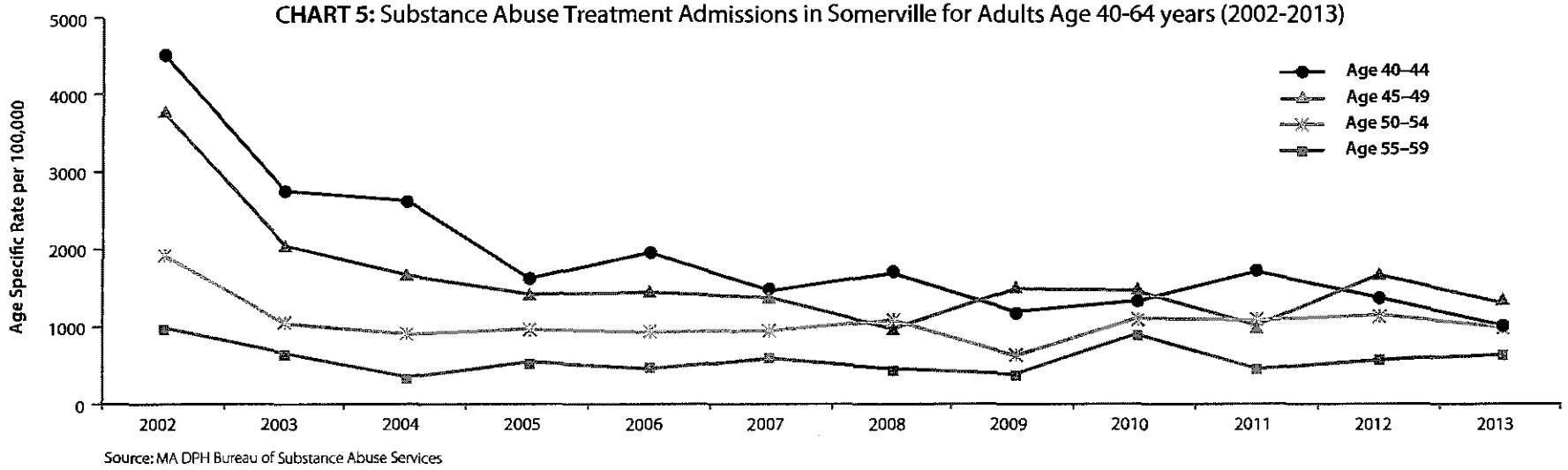
Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)
For 2001-2003, Black, non-Hispanic rate was NA
For 2004-2006, 2007-2009, Asian/Pacific Islander, non-Hispanic rates were not applicable

- According to Chart 3, Black, non-Hispanic Somerville residents age 40-64 had the lowest rate of alcohol/substance related hospitalization than any race in that age group, lower than the state 3-year average for 2010-2012.
- Whites, non-Hispanic had the highest rate of alcohol/substance related hospitalizations, which included opioids (UHDDS).
- Among Somerville's 40-64 year olds, alcohol/substance related hospitalization rates were higher among White, non-Hispanic, Hispanic/Latino and Asians compared to similar groups in Massachusetts
- According to the trend data in Chart 4, alcohol/substance related hospitalizations for adults ages 40-64 dropped between 2001 and 2012 for White and Black residents, but increased for Hispanic/Latino residents. Data for Asian/Pacific Islander, non-Hispanic was at non-reportable levels for the time period. (UHDDS).

Nationwide, substance use is a key public health topic, with New England experiencing high levels of overdoses and deaths due to opioids in recent years. The primary substances used among Massachusetts residents that lead to substance abuse treatment admissions in descending order include: heroin, alcohol, other, marijuana, cocaine and crack.

- Additionally, state data shows alcohol/substance related hospitalization rates for adults age 40-64 increased overall in MA between 2001 and 2012; however, in Somerville, related hospitalizations decreased by 26% in the same time.

CHART 5: Substance Abuse Treatment Admissions in Somerville for Adults Age 40-64 years (2002-2013)



Source: MA DPH Bureau of Substance Abuse Services

- As seen in Chart 5, historically the subset of Somerville residents age 55-59 had the lowest rate of substance abuse treatment admissions among residents 40-59 in 2013. However, the rate for that group was the only one that did not decrease between 2012 and 2013. The youngest subsets of middle adults (40-44 year olds and 45-49 year olds) saw a dramatic drop in substance abuse treatment admissions rates between 2002 and 2005 and stayed relatively stable by comparison through 2013 (MA DPH Bureau of Substance Abuse Services).

- Since 2004, the rates of treatment admissions for substance abuse were highest in Whites, almost double the rates of Blacks or Hispanics.

- Additional data for treatment admissions by specific substances shows that substance abuse treatment admissions specifically for alcohol did not vary much by age in 2013, ranging from 571 admissions per 100,000 among 50-54 year olds to 472 admissions per 100,000 treatment admissions among 55-59 year olds.

- The same data for specific substance abuse treatment admissions shows that rates of substance abuse treatment admissions for alcohol were lower in Somerville than the state average for 40-54 year olds in 2013, but were on par with the Massachusetts average for 55-59 year olds.

- Conversely, substance abuse treatment admissions rates specifically for heroin in Somerville among residents age 50-54 were twice as high in 2012 than Massachusetts rates (408 per 100,000 in Somerville and 203 per 100,000 in Massachusetts.

Many of those who would benefit from substance use disorder treatment do not have insurance coverage or the financial means to be admitted to treatment facilities. Without some form of treatment, people dealing with substance use continue to be at risk for substance overdose or of wearing out family support systems. Increasingly, community based therapies have arisen to provide additional options, including group therapy and medication assisted therapies, as well as a growth in recovery coaches and support groups.

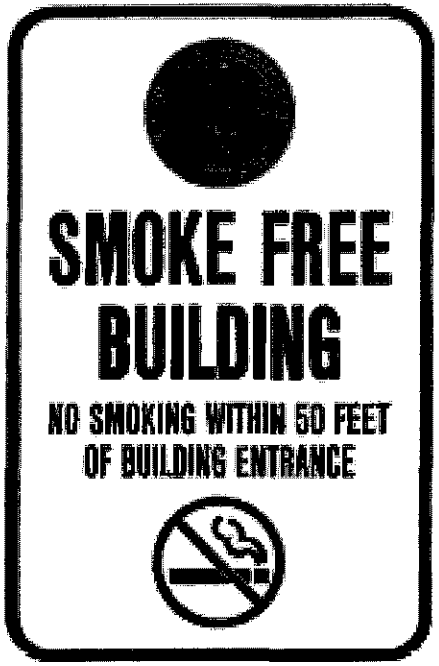
- As stated in previous life stages, in Somerville overall, the number of both non-fatal and fatal overdoses from narcotics rose sharply from 2010 to 2016, based on estimates from Police and Fire records, though some months may be missing (Somerville Fire and Police).

- Non-fatal overdoses for narcotics increased from 96 in 2010 to 191 in 2016. Fatal overdoses for narcotics rose from 3 in 2010 to 21 in 2016, with the sharpest increase starting in 2014. More recent 2017 data indicated these trends have shown decreases in Somerville and Middlesex County.

- For the first quarter of 2017, fatal opioid overdoses in Massachusetts decreased 9% compared to the same quarter in 2016. Additionally, rates for non-fatal overdoses in Somerville remained steady for the first six months of 2017. However, fatal overdoses (involving all substances) in Somerville declined 54%; of these, opioid involved fatalities declined 44%.

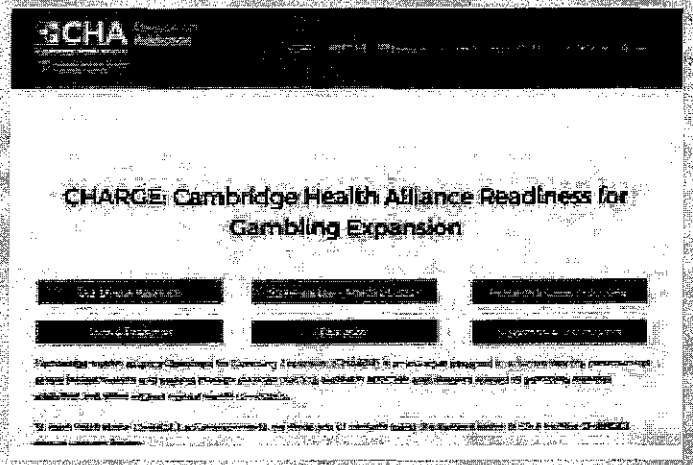
Tobacco

Smoking is a risk factor for diseases that tend to start showing up in this age group, such as cancer or strokes. Nicotine addiction is challenging to address, but if someone quits smoking in middle age, it can still have a positive impact on later health, decreasing risk levels. Smoking cessation programs such as Quitworks are being utilized increasingly to offer support and coaching for those trying to quit.



Gambling Addiction

A baseline study of adults in Massachusetts estimated that 7.5% are at-risk gamblers and 1.7% are problem gamblers. Life changes, such as job loss or retirement, are strong predictors of an increased level of activity for those with addictive gambling behavior. Gambling addiction is often unidentified, but has been associated with both mental health and substance use issues, as well as financial and social implications. With the 2019 opening of a local casino and more gambling venues in the state, there may be both need and opportunity for increased attention to this concern through organizations such as the Massachusetts Council on Compulsive Gambling helpline, trainings and services. Locally, CHA has an initiative, Readiness for Gambling Expansion (CHARGE), focused on treatment for gambling disorders and related conditions.



Physical Health

Obesity

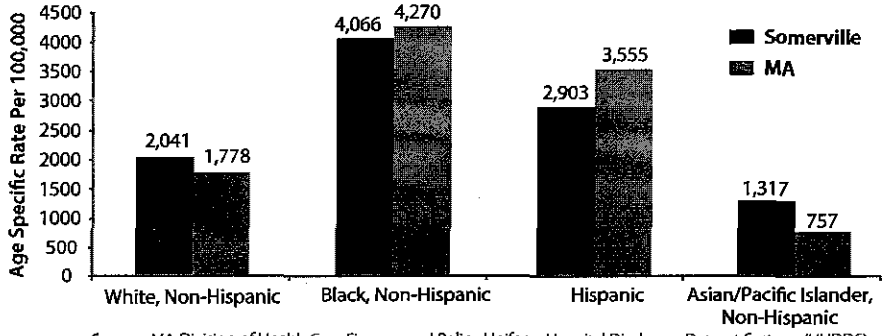
Globally, the obesity rates have doubled in many countries, including the countries of origin for many Somerville immigrants. In Massachusetts, data from 2015 indicates that 29.9% of 45-64 year olds were obese, with higher rates among Blacks and Latinos as indicated in the Young Adult section (The State of Obesity). Data from CHA patients as of October 2016, indicated that rates of being overweight or obese in adults 18+ were lowest for Asian populations (especially East Asians at 31.7%) and highest for Central Americans at 80.7%, followed closely by Portuguese/Azorean, Latino-Caribbean, Haitians and African Americans.

Diabetes Mellitus

This is the top cause of hospitalizations for this life stage in Somerville. CHA patient data from 2015 for Somerville adults ages 40-59 indicated that more South Asian patients had better control outcomes of their diabetes (70%) and that North American-Europeans had the poorest level of control (55%). This indicator is measured by testing for Hemoglobin A1C levels of <8%, which indicate blood sugar levels over time and control often includes a medication plan in addition to nutrition and exercise. It should be noted that these rates changed for patients over 60, with South Asians having the poorest levels of control, while higher percentages of Portuguese and Haitians (83.3% and 74.6% respectively) had better controls. Statewide, based on 2015 data, 8.9% of Massachusetts adults had diabetes, with the trend rising from 5% in the early 90s (The State of Obesity).

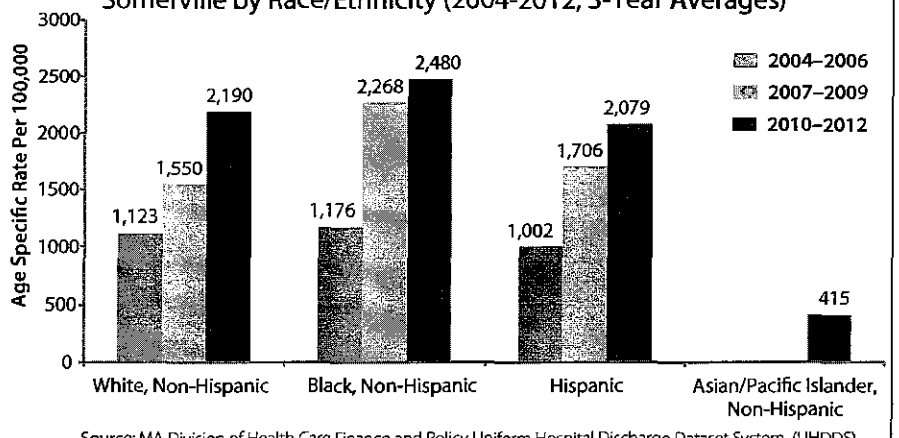
- Shown in chart 6 below, 3-year averages of hospitalization rates related to diabetes in Somerville were generally higher across White, non-Hispanics and Asians, as compared to the state rates for this age group (UHDDS).
- In Somerville and Massachusetts, Black, non-Hispanic rates are higher when compared with other race/ethnicity categories (UHDDS).
- In contrast, the rates of diabetes related emergency department visits for adults ages 40-64 were higher among Blacks and Hispanics in Somerville than the state rates.

CHART 6: Diabetes Mellitus Related Hospitalizations for Adults Age 40 to 64 by Race/Ethnicity (2010-2012, 3-Year Average)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

CHART 7: COPD Related ED Visits for Adults Age 40 to 64 Years in Somerville by Race/Ethnicity (2004-2012, 3-Year Averages)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)
For 2004-2006 and 2007-2009 Asian/Pacific Islander, non-Hispanic rates were not applicable

Respiratory Health

Chronic obstructive pulmonary disease (COPD) has been the second highest cause of hospitalizations in this age group.

- COPD related emergency department visit rates steadily rose for all races in Somerville between 2004 and 2012, as seen in Chart 7 (UHDDS).

Across multiple age groups, there is a trend of higher rates of emergency department visits for minorities for certain medical conditions, with proportionately lower rates of hospitalization compared to Whites. This data may serve as an indicator in inequities among certain groups in accessing preventative healthcare that can lessen the rate and severity of emergencies.

- Similar to many surrounding communities, the 3-year averages for hospitalization rates for COPD were highest for Whites followed by Blacks between 2010-2012. Rates of hospitalization for COPD among Somerville Whites and Asians were higher than the state average. However, rates for Hispanic/Latinos were dramatically lower, and rates for Blacks were lower compared to the state rates. (UHDDS).

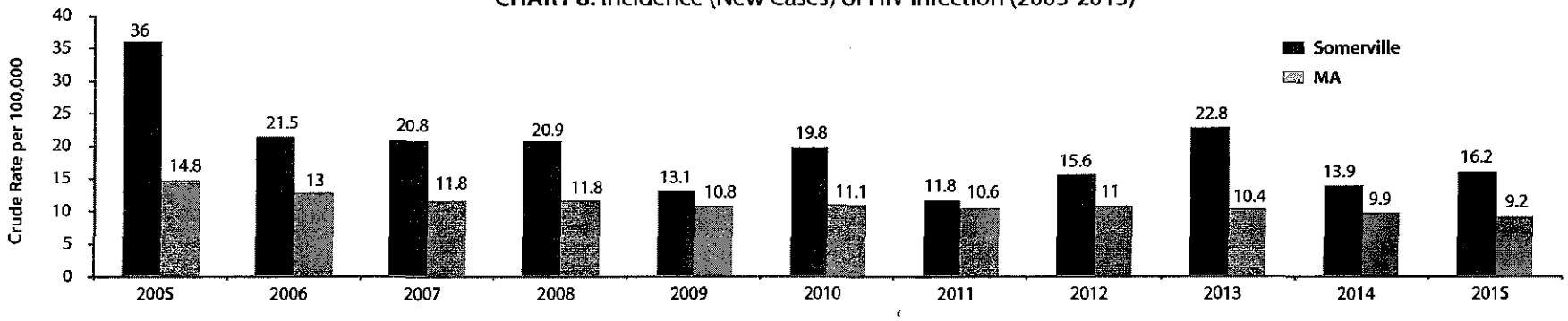
Sexual and Reproductive Health

Some Somerville women, who delayed childbirth, are now having babies in their forties, which automatically places them in a higher pregnancy risk category. For most women, middle age will include menopause, with its changes in hormones. For both men and women, other health issues or medications can have an impact on one's sexual health and activity. Protection from sexually transmitted infections remains important in this life stage, especially with the rise of drug resistant gonorrhea.

Somerville residents in the middle adult group with HIV face additional health challenges, including more mental health and neurocognitive impairments than others in their age group. One U.S. study shows that 94% of people over 50 with HIV have at least one other chronic disease, with an average of three other conditions (Rourke, 2017).

The Cambridge Health Alliance addresses HIV infection among adults at the CHA Zinberg Clinic in Cambridge by providing primary care, counseling and testing services. Specific Haitian and Portuguese speakers' programs target equity in HIV care among CHA patients. The Zinberg clinic also offers testing and counseling for Hepatitis C, including offering resources and counseling sessions in multiple languages.

CHART 8: Incidence (New Cases) of HIV Infection (2005-2015)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

- According to chart 8, overall, there has been a decrease in the incidence rate of HIV infection in Somerville since 2005, from 36.06 per 100,000 people to 16.2 per 100,000, but it remains higher than the state rate. (UHDDS).

- According to data not shown in the chart, for the middle adult age group, 40-64, the incidence of HIV infection in 2015 was 109.43 per 100,000 (reflective of 15 new cases), a rate that is more than twice as high as Massachusetts overall (46.82 per 100,000) (MA DPH, Bureau of Infectious Disease and Laboratory Science, HIV Surveillance Program).

- The prevalence (total existing cases) of HIV infection among the middle adult age group in Somerville is 1,845.6 per 100,000, or 253 total cases.

- Residents 40-64 years of age account for over 66% of all Somerville HIV patients (UHDDS).

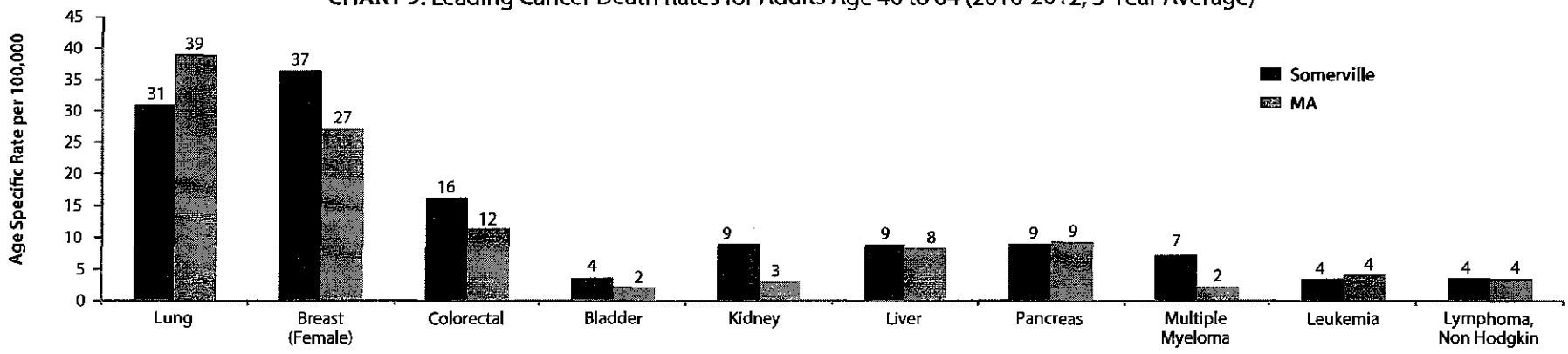
- The prevalence of HIV (among all Somerville age groups) is highest among White, non-Hispanic residents at 48% of all cases in 2015 (MA DPH, Bureau of Infectious Disease and Laboratory Science, HIV Surveillance Program).

Infectious disease

While HIV is often transmitted sexually, the infection can be spread through any bodily fluids, and exposure to the blood of an HIV infected person can also put a person at risk for HIV. One common behavior that increases the likelihood of transmission through blood is sharing needles, most common among those who inject drugs. In addition to risking the spread of HIV, those who share needles are at risk of contracting Hepatitis C, another dangerous virus, which, when spread, is commonly linked to the opioid epidemic.

Among Somerville residents age 40-64, there were 20 cases of Hepatitis C between 2013-2015, 3-year averages. This comprised a third of the average number of Hepatitis C cases for all age groups (MA DPH, Bureau of Infectious Disease and Laboratory Science, Office of Integrated Surveillance and Information Systems).

CHART 9: Leading Cancer Death Rates for Adults Age 40 to 64 (2010-2012, 3-Year Average)



Source: MA DPH Registry of Vital Records

Cancer

The life course approach is particularly relevant to cancer development with its multiple risk factors accumulating over time. The aging process itself increases the risk of cancer, with the majority of diagnosis in people over 60 (National Cancer Institute). Middle adulthood may hold opportunities to reduce risk factors, such as smoking, poor diet and overexposure to sun.

- As seen above in Chart 9, the leading cause of cancer death for Somerville adults ages 40-64 in the years 2010-2012 was female breast cancer (MA DPH Registry of Vital Records).

- On further exploring breast cancer diagnosis rates for2010-2012 (3-year average), White, Black and Hispanic women did not differ significantly (222.5, 221.6 and 213.7 per 100,000 cancer diagnoses, respectively.) Compared to the state breast cancer rates, incidence rates for Somerville were significantly higher (UHDDS).

- The second leading cause of cancer death in this age range, lung cancer, becomes the top leading cause of cancer death for the next older age group, 65+, according to Chart 10 in the older adult chapter (MA DPH Registry of Vital Records).

- As depicted in the Chart 9 above, deaths in the middle adult group due to the following cancers occurred at a higher rate in Somerville than at the state level: breast, colorectal, bladder, kidney and multiple myeloma (UHDDS).

The life course approach is particularly relevant to cancer development with its multiple risk factors accumulating over time. The aging process itself increases the risk of cancer (National Cancer Institute).

Middle Adult Top 5 Causes of Hospitalizations and Deaths

Top Causes of Hospitalizations (2010-2012)	Top 5 Causes Somerville*	Age-specific rates per 100,000	Top 5 Causes Massachusetts*	Age-specific rates per 100,000
Middle Adult (40–64 years)	1. Endocrine: Diabetes Mellitus Related	2333.4	1. Endocrine: Diabetes Mellitus Related	2059
All Causes in Somerville: n= 5,864	2. Respiratory: COPD, All (Related)	2020.3	2. Respiratory: COPD, All (Related)	1999.5
	3. Mental Disorders: All	1821.9	3. Circulatory System Diseases: All	1329.4
	4. Digestive System Diseases: All	1250.4	4. Digestive System Disease: All	1293.1
	5. Circulatory System Diseases: All	1241.3	5. Mental Disorders: All	1055

Top Causes of Death (2010-2012)	Top 5 Causes Somerville	Age-specific rates per 100,000	Top 5 Causes Massachusetts	Age-specific rates per 100,000
Middle Adult (40–64 years)	1. Heart Disease	69.2	1. Heart Disease	74.5
All Causes in Somerville: n= 255	2. All Poisoning Injuries	36.4	2. Lung Cancer	38.9
	3. Lung Cancer	30.9	3. All Poisoning Injuries	22.2
	4. Chronic Liver Disease	20	4. Chronic Liver Disease	15.0
	5. Opioid Injuries	20	5. Opioid Injuries	14.1

Data Source: Uniform Hospital Discharge Data System Massachusetts Division of Health Care Finance and Policy, MDPH (MassCHIP).
The source file is maintained as a zip code based file; 3 year average estimates 2010-2012

Notes: Please note that within some groupings/classifications may overlap and be counted more than once within the rankings
Related includes secondary and primary diagnoses
*Excluded childbirth, pregnancy, pueperium in Cause of Hospitalization ranking

Mental disorders are not detailed individually via MassCHIP

Chronic Obstructive Pulmonary Diseases (COPD) include: Bronchitis (chronic and acute); Emphysema; Asthma; Bronchiectasis; Axtrinsic allergic alveolitis and Pneumonitis

Circulatory System Diseases include: Rheumatic Fever; Rheumatic diseases of the heart and blood vessels (chronic and acute); Hypertensive diseases; Heart diseases; Cereobrvascular diseases; Diseases of blood vessels

Digestive System Diseases: Diseases of oral cavity, salivary glands, jaw, esophagus, stomach, appendix, intestines, liver, gallbladder, pancreas

All poisoning injuries include: Unintentional and intentional poisoning by self or other from chemicals or noxious substances, including prescription or recreational drugs, alcohol, solvents, vapours, gases, pesticides, and biological substances.

Injuries: Opioid includes: Non-fatal Opioid-related associated with Opioid abuse, dependence and/or poisoning (overdose)

Heart Disease includes: Coronary heart disease, heart failure, ischemic heart disease, major cardiovascular disease, and acute myocardial infarction (NOT hypertension, atherosclerosis, and cerebrovascular disease)

Hospitalizations and Deaths

- As seen in Table 1, the rates of hospitalization for many of the top 5 causes in Somerville were similar to the Massachusetts rates from 2010-2012, including Endocrine/Diabetes Mellitus Related, Respiratory and Digestive System Diseases, but higher for mental health (UHDDS).

- As shown in Table 2, Heart Disease was the top cause of death for middle adults in Somerville and Massachusetts overall between 2010 and 2012, and Poisoning Injuries, Lung Cancer, Chronic liver Disease and Opioid Injuries rounded out the top 5, though in different orders, for the City and the State. (Poisoning injuries can include suicide attempts or drug overdoses, other than opioids.)

Disability

Disability can compound health disparities and access to preventative health. For instance, women with disabilities are less likely to have had a recent mammogram than women without disabilities. People with cognitive or communication disabilities may not be fully included in health care decision making. In the age of rising concerns related to obesity, it is known that people with both motor and cognitive disabilities are at higher risk for obesity. Morbid obesity, meaning someone is 100 or more pounds over his or her ideal weight or has a BMI over 40, can severely impact everyday activities and ability to work. This along with related health issues such as diabetes or heart disease, can meet the official qualifications for disability status.

Education

Of the 35–44 years group in Somerville, based on U.S. census data available through 2015, 92.6% had a high school degree or some higher education, with 62.7% with a Bachelor's degree or higher. In the 45–64 years group in Somerville, 84.8% had a high school degree or some higher education, but only 33.6% had a Bachelor's degree or higher, notably half the rate of college degrees of the younger middle age cohort (ACS). Given the protective factors that higher education offers, this might impact or inform targeted public health initiatives. This age group is also well represented in the adult education programs, especially those offering English language classes.

Economic Stability

According to The New York Times, areas of the United States with higher income inequality tended to have lower health outcomes than areas of just low income or high income residents (Sanger-Katz, 2015). There is emerging sociological theory that this stems from wealthier residents buying their way out of community social services and investing less in the community resulting in fewer local resources, causing more stress for the less wealthy. Author Sanger-Katz asserts, "This stress may translate into mental health problems or cardiac disease for lower-income residents of unequal places." This is of particular interest in the Greater Boston area communities, including Somerville, where the income and asset inequality gap is rising. With a widening gap between the wealthiest and the poorest, there are now peaks on the ends of the socioeconomic spectrum with a dip in the middle between those with enough resources to be independent and those who are income eligible for subsidies to allow them to stay in the community and access services.

A key example of the relationship between health and economic stability is research on suicide in older men that demonstrated a distinct decrease in suicide at age 62, the threshold for social security early retirement age, indicating some link to the access to a steady income at this age for those who may be struggling financially (Desimone, 2017). However, there are effective financial penalties to collecting benefits before Full Retirement Age, which is shifting gradually up to 67, depending on date of birth. For instance, for someone born in 1957, full retirement age will be 66 and 6 months. Given that the life expectancy of someone born in 1957 is estimated at another 25+ years, financial considerations that impact whether one receives 75% or 100% of benefits

can be a substantial decision. Yet, low income residents without other income options who must take early retirement will systematically have less income over the rest of their lives than those with the means to delay the start of Social Security benefits.

Poverty

The available information for middle adults is similar to earlier adult stages, with poverty (LC-10) and income distribution changes in Somerville over the past decade. American Community Survey data from 2010-2015 for Somerville indicates an overall poverty rate of 14.7%. In 2017, the poverty threshold was $24,600 for a family of four, the minimum income that the U.S. Census Bureau considers necessary to meet basic needs, and is adjusted for family size to determine poverty rate. The official poverty definition refers to money income and does not include noncash benefits such as subsidized housing, health care or SNAP. See the Demographics section and other life stages for additional details.

Homelessness

Families with children facing homelessness (LC-07A) may have access to state funded temporary housing, though it may not be near Somerville. If families have children in the public schools and become homeless, resources are available to maintain students in their schools. Nationally, over recent decades, more women in this age group have become homeless due to factors such as domestic violence or abusive relationships, change in marital status or illness. Healthcare services, including case management and advocacy from programs such as CHA's Healthcare for the Homeless, can provide sorely needed medical supports for homeless populations, especially in this life stage where chronic disease and disability become more prominent. Changes in approaches to social supports for this population have directed more resources to case management and to supportive and permanent housing solutions to help both men and women transition from homelessness living on the streets or in shelters to safe, supportive settings, through agencies such as the Somerville Homeless Coalition.

Affordable Housing/Housing Security

The percentage of units of housing in Somerville designated as affordable continues to grow, though it is not able to keep pace with the demands from current residents for housing costs that can allow all who desire to live in the city to remain here. Even for those who own their own home, for those facing retirement and seeking to secure future income, the incentive to sell property that may have been in the family for generations comes with the caveat that it is hard to find another place to afford in the city.

Public housing, which provides subsidies for those who are income eligible, offers a resource that has preserved some options for families, seniors and the disabled. There are 674 family units and 782 elderly units owned and managed by the Somerville Housing Authority (SHA). Waiting lists are long. One fifth of the waiting list is seeking a unit with more than two bedrooms, to house families with children and/or multiple generations. There are also over 1,000 federally subsidized Section 8 vouchers for housing, though there is an average wait of two years. However, high prices have made it difficult to find housing in Somerville, so voucher holders have had to look for housing in other communities. As of 2015, there were also 474 privately owned subsidized family units and 381 elderly units in the city (Somerville Housing Needs Assessment).

Employment and Living Wage Jobs

According to the City's Economic Development Office, the top three industries or employment in Somerville are: 1) Health Care and Social Assistance with 5,569 employees, 2) Accommodation and Food Services with 3,852 employees and 3) Retail Trade with 3,661 employees.

This is generally the period of highest income for many as individuals are established in their careers and generally have completed higher education degrees. It is also the time of life when emotional work stressors, physical demands, hazardous conditions and cumulative impacts of repetitive motions can take their toll, producing complaints such as headaches and eye strain or low back pain and carpal tunnel.

Workplace interventions can provide support and facilitate wellness for employees. Worksite programs such as yoga, Weight Watchers, walking clubs, or mindfulness can help support skills building and behavior shifts. Peer supports, especially for those dealing with family mental illness and/or substance abuse, can help promote positive mental health in times of stress. For some populations such as middle adult veterans, retirement from the military can happen early in this stage, triggering challenges in finding new work or juggling financial needs, perhaps along with continuous healthcare issues from earlier service.

A recent study of American workers, based on a 2015 survey, indicated that 20% of workers report that they deal with hostile environments at work, especially those who have front line jobs dealing with customers. On a more positive note, over half of workers surveyed reported they had good friends at work (Maestas et al., 2015).

Food Security

Food security is defined as "having reliable access to a sufficient quantity of affordable, nutritious food." In the past five years, the demographics for who is food insecure has shifted. Especially as housing costs in Somerville has risen, the squeeze on income has created hard choices between housing, utilities and food. If an individual or family does not have help with housing costs, they may be stretching to cover other expenses such as food. In Somerville, 9.3% of households were reported to receive SNAP benefits as of 2015, with the largest percentage in zip code 02145 (the eastern side of the City). Yet, based on available information, it is suggested that as many as 61% of those who are income eligible for SNAP benefits in Somerville are not accessing them (Food Bank of Western MA). This may have some links with a years old phenomenon where rumors spread that accepting WIC or SNAP would impact an immigrant's path to citizenship. While at the time of this publication, that has not been true, just the threat of this potentially changing has created yet another barrier to current food security for individuals and families, many with young children.

The Great Recession

The Great Recession was a period of general economic decline observed in world markets, officially lasting from 2007-2009. This was predominantly due to the real-estate market's housing bubble, including the subprime mortgage crisis here in the United States, though there were other global factors. The Great Recession resulted in the collapse of numerous financial banks in the world economy. The resulting loss of wealth led to sharp cutbacks in consumer spending. This loss of consumption, combined with the financial market chaos, also led to a collapse in business investment.

As consumer spending and business investment dried up, massive job loss followed. In 2008 and 2009, the U.S. labor market lost 8.4 million jobs, or 6.2% of all payroll employment. This was the most dramatic employment drop of any recession since the Great Depression between 1929-1933. The job loss during the Great Recession meant that family incomes dropped, poverty rose and people lost job related health insurance. The bursting of the housing bubble and the drop in the stock market persecuted a dramatic drop in family wealth. The recovery of financial stability has been strongest and faster for those individuals and businesses that had financial cushions to ride them out but has not been as evident and has had longer lasting implications for those with less financial wealth before the recession.

Natural and Built Environment

Housing (safe, affordable and accessible)

Quality housing, inclusive of safe housing, is important at all ages, though the impact may be different. The age of Somerville housing stock means that many properties may be in need of repair or renovation. Research indicates that parental stressors due to poor quality housing have negative impacts on children. Parents and non-parents alike can be stressed by problems that arise from dated appliances, rotten porches, the presence of lead paint or rodent or bug infestations that may be beyond renters' control. Even though tenants have numerous rights in Massachusetts, if English is not one's first language or one's immigration status is insecure, claiming those rights might require an external advocate. In 2014-2016, housing security became a growing issue for renters as landlords were raising rents to levels that were not affordable on basic incomes or selling properties and triggering significant shifts towards higher income populations. Moving regularly is a known risk factor for children's health—and does little to improve the health of parents. Community organizations continue to struggle to keep up with the demand for eviction protection and homelessness prevention for those most economically vulnerable.

Safe and Secure Neighborhoods

Somerville crime showed a general decrease, based on data available for between 2012 and 2014. The crude rates per 100,000 were lower than the state and national rates, with the exception of motor vehicle theft. The rates for violent crime, murder, rape, property crimes and burglary were notably lower (Somerville Police).

Transportation

Somerville's Walk Score of 86/100 is the second highest in the state, just barely edged out by Cambridge. In 2013, it made the nation's Top 10 list. The Transit Score is 62. These are measures of the walkability of an address and the access to public transit (Walk Score).

The Green Line Extension will increase additional commuting options for Somerville residents, expanding public transit to almost all areas of the city. The companion Community Path is gradually extending the multi-modal path which will eventually allow for largely off-road people-powered transit into Boston and out past Concord. These projects were intended to serve as environmental mitigation for the increased vehicular traffic on I-93 related to the "Big Dig" construction projects which were completed in 2007.

Environmental Health

The reality of a major highway bifurcating the city has potential health impacts. Somerville, and nearby Chelsea, disproportionally have higher lung cancer and heart attack deaths. Increasingly more residents in these areas are active commuters, who may be unaware of the potential health impacts associated with exposure to ultrafine particles when being active near the highway. Cyclists along high traffic routes experience higher exposure to air pollution than commuters in buses and cars (Zuurbier et al., 2010).

While there are clear benefits to active transportation, policy and system changes in the location of housing and construction of infrastructure can help to better protect population health. Somerville state representatives, as well as Tufts professor Doug Brugge, have recognized the risk posed to vulnerable Somerville communities, especially those living near Interstate-93 and McGrath Highway and those who commute by bicycle. They are working with advocates from the Somerville Transportation Equity Partnership and the City to fund solutions for the pollution exposure problem, including physical barriers between high traffic roads in the City and nearby parks and sidewalks (Bowler, 2017).

With the combined impact on global health of intercontinental travel and the increase in extreme weather events linked to climate change, there is growing attention related to planning for pandemics. Municipalities like Somerville have efforts under way to plan for local emergency preparedness including discussions on how to address the needs of the most vulnerable populations, including animal companions, in facing future threats to health and safety whether from natural disasters or epidemics.

Access to Nature and Open Space

Access to greenspaces and nature is increasingly recognized for offering respite, solace and rejuvenation for both mental and physical wellbeing, even in small urban venues. The city has many parks, with newly built or renovated parks combining passive recreation with active uses such as community gardening or sports. Nearby amenities include the Middlesex Fells, a favorite of bikers, dog walkers and hikers, as well as the Mystic River system with improved boating options and waterside walking trails.

Social and Community Context

Many of today's middle age adults would be considered part of the Gen X and later baby-boomer generation. The social transitions that marked their childhood included higher rates of divorce and women moving from the home into the workforce in large numbers. Opportunities for out of school or after school activities were limited, so as young people, many in this group had more freedom and less adult supervision than other life stage groups, sometimes referred to as the "latchkey" or free-range generation.

As grown-ups, these middle adults tend to be the "sandwich generation," with simultaneous responsibility for children and aging parents, which can stretch life balance, with multiple impacts on health and wellbeing. Self-care and attention to one's own health may suffer when one is focused on caring for others. Stress has cumulative effects on mental and physical health. At the same time, the later end of this life stage is when health issues may start to increase. Social conversations in one's sixties can become dominated by life's ailments and the advent of chronic diseases that require changes in one's daily activities. Community networks and social supports are especially important during such times of life.

Race

A Pew study conducted in 2016, "On Views of Race and Inequality, Blacks and Whites Are Worlds Apart," revealed some significant differences of opinion between Blacks and Whites, non-Hispanic. For example, 88% of Blacks believe the U.S. has more work to do for Blacks to have equal rights with Whites; by comparison, only 53% of Whites think there is still work needed to be done. In terms of strategies to address inequality, there are also discrepancies; 41% of Blacks and 34 % of Whites believe that bringing people of different racial backgrounds together to talk about race is important in achieving racial equality, 38% of Blacks and 24% of Whites believe that getting more elected Black officials is important, and 19% of Blacks and only 7% of Whites believe that organizing protests and rallies are very effective tactics. The national discourse between 2013 and 2017 provided increasingly public demonstrations challenging persistent structural racial inequities, ranging from increasingly outspoken voices across the social spectrum, such as the Black Lives Matter movement which rose to attention in 2014 or the White supremacist and counter rallies of August 2017.

Social Safety Network/Social Support

Some find support and solace from faith-based organizations. In the City of Somerville, there are a number of new and long standing churches, one synagogue, an active havurat and a mosque in close proximity that serves the growing Muslim populations. It should be noted that within several decades, there has been a significant drop in religious affiliation, particularly for the White population and this age range. Not long ago, there were seven active Roman Catholic parishes each with an associated parochial school. Today only five parishes and one school remain. Protestant congregations have typically seen even more decline,

with many renting space to newer immigrant congregations coming into the city in order to survive.

Somerville is a city with a history of collaborations among social services to better serve residents. Yet, there are often information or data gaps between service providers, at times requiring someone in need of assistance to visit several different offices to repeat their information and story yet one more time. At the state level, there are efforts underway to have a universal portal for accessing state services such as MassHealth or SNAP. In Somerville, service providers are exploring methods to improve both interagency referrals and integrated data tracking to improve outcomes and reduce redundancies for residents and increase effective use of resources.

Violence (Domestic Violence, Sexual Abuse)

Domestic assault data from the Somerville Police indicates that there has been a slight increase from 2010 to 2016. Domestic assault in middle age, and later in life, occurs in two main contexts. The first is late-onset domestic violence, which begins for the first time during this age, either in a new or existing relationship. The second is domestic violence "grown old", with experience of violence throughout a relationship continuing into middle and older age. Some victims, and survivors, may come from generations where they were less likely to have financial independence. For others, generational norms and values particularly for those over 50, may include violence as a normal part of a relationship that should be kept private and within the family. These incidents also affect others in the family, as well as the workplace, with potential impacts on physical and mental health as well as productivity.

Incarceration Rate

The incarceration rates (LC-58B) in Massachusetts have decreased since 2007. In 2015, the population under the authority of the Massachusetts Department of Corrections was 10,544. There was a high level of mental illness among the incarcerated population; in 2015, 13% of women and 8% of men had a diagnosed serious mental illness, and 56% of females and 21% of males were prescribed psychotropic medications. The average male in Massachusetts Department of Corrections (DOC) custody was 41 years old and the average female was 37. Of the males, 46% had less than a 9th grade reading level; 32% for females. The highest proportion of inmates in Massachusetts are White, though the population of Blacks is disproportionate to the overall state population. As of January 2016, 39.7% were between the ages of 40 and 59 (MA Department of Corrections).

Community and Civic Engagement

For anyone who wants to get engaged in community—both locally and beyond—Somerville has multiple options. A quick scan of opportunities posted online shows a wide range, from requests for therapy dogs for classrooms, Girl Scout Troop Leaders, math tutors, hospice volunteers, literacy tutors, food pantry support and medical advocates. The City has developed a robust community engagement approach to planning that often offers several meetings per week one could attend, if desired. City Commissions and non-profit boards rely on the civic spirit of residents to fill these important positions that keep public programs and agencies operational. Many devote hours to their faith-based community, or friends and family in ways that foster the type of social networks that build individual and community resilience.

Another form of community engagement is the electoral system, where there can be activity on very local to national levels. Door knocking, canvassing, stand-outs and "get out the vote" efforts can absorb a lot of time and talents. Over the past decade, efforts to build local leadership capacity, including but not exclusive to running for elected office, have taken place in such venues as the City's earlier adaptive leadership training program, Somerville Community Corporation's long running Leadership Development Institute, and most recently, Emerge Massachusetts, which trains women to participate in the democratic process.

Recommendations for Middle Adult Ages 40–64

Increase access to health promoting resources

- Increase access to health advocacy tools for English language learners and low income adults, including self-care
- Promote a culture that supports improved self-care for caregivers, emphasizing periodic health screenings for prevention such as breast or prostate cancer and diabetes
- Engage local primary care provider in health education and screening efforts that support positive aging
- Improve data collection and tracking efforts for health and wellbeing for middle adults
- Explore ways to reduce obesity in Hispanic and Black communities to reduce adverse health impacts
- Expand outreach to first time older mothers to improve birth outcomes

Facilitate a community with strong social networks and support systems

- Increase in-person social networking opportunities, promoting the benefits of positive relationships for all ages
- Improve capacity of existing neighborhood investments to support an engaged community and connect to the active transit system
- Promote volunteer opportunities for engagement
- Create supports for the sandwich generation who are caring for young kids and older parents, and struggles with isolation
- Expand continuing and returning education opportunities for adult learners

Create lifelong habits to promote mental health and substance use prevention

- Increase and foster peer and professional mental health education opportunities
- Implement consistent mental health literacy and work place policies across sectors, including addressing stress and other key health issues impacting middle age adults
- Integrate stress reduction and self-compassion techniques [illegible] into daily life settings
- Identify new ways to acknowledge the role of caregiving for the aging in the [illegible] encourage new norms and resources for caregiving

Support increased physical activity and healthy eating opportunities

- Engage the age group in planning and advocacy for improved equity and infrastructure supporting active transportation, physical activity and healthy eating for all
- Explore opportunities to expand on [illegible] existing [illegible] to reduce exposure

Older Adult

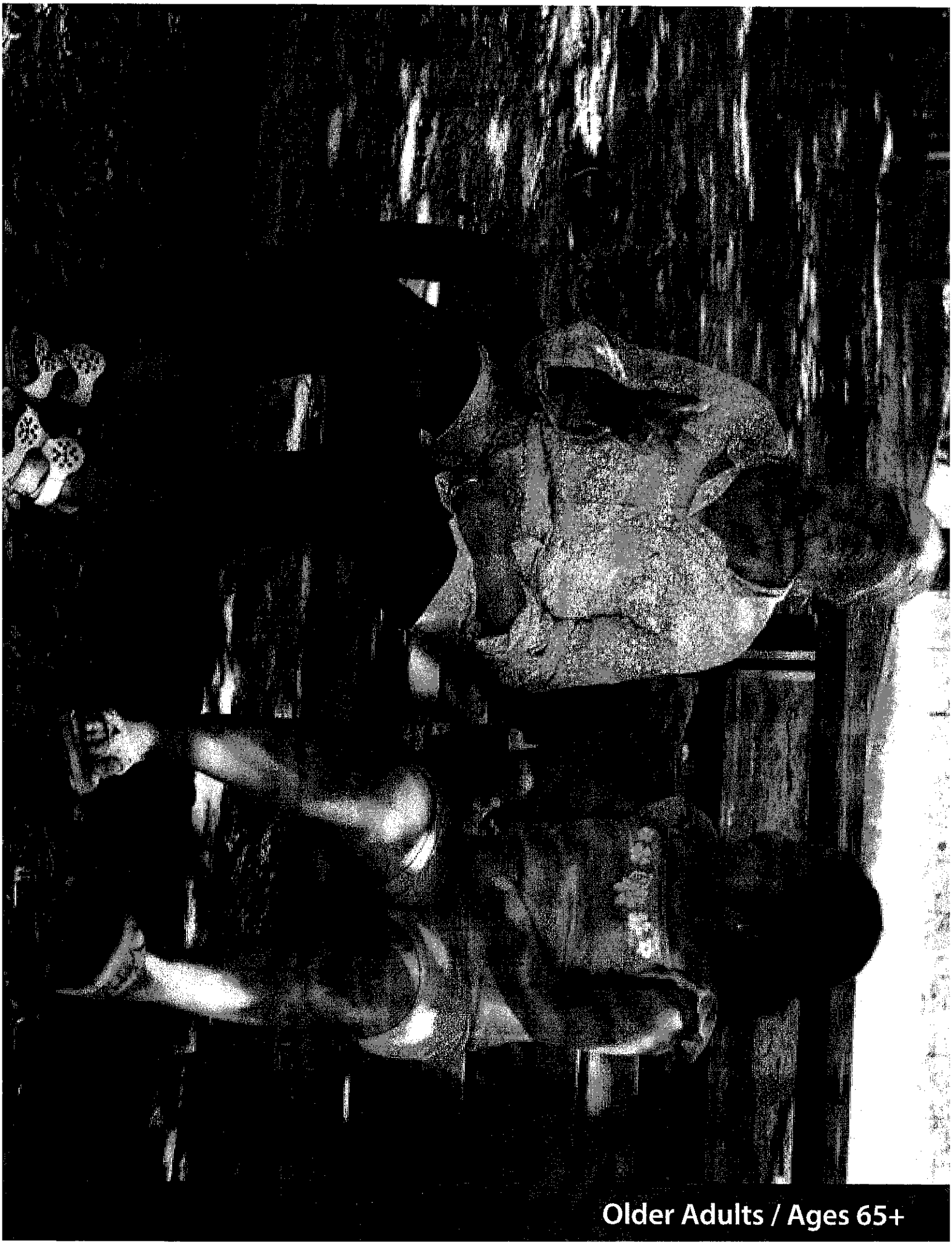
Introduction

Somerville is a great place to live, work, raise a family—and increasingly, to grow older. Somerville is listed as an emerging age-friendly community by the Massachusetts Healthy Aging Collaborative. The city is striving to provide the infrastructures and supports to encourage "aging in place." The Center for Disease Control defines "aging in place" as the concept of a person being able to remain living in their own home safely and independently despite age, income or ability level. The diversity, walkability and wide range of community services available in Somerville makes the city very attractive for aging baby boomers, the youngest of whom will reach the age of 65 by the year 2030.

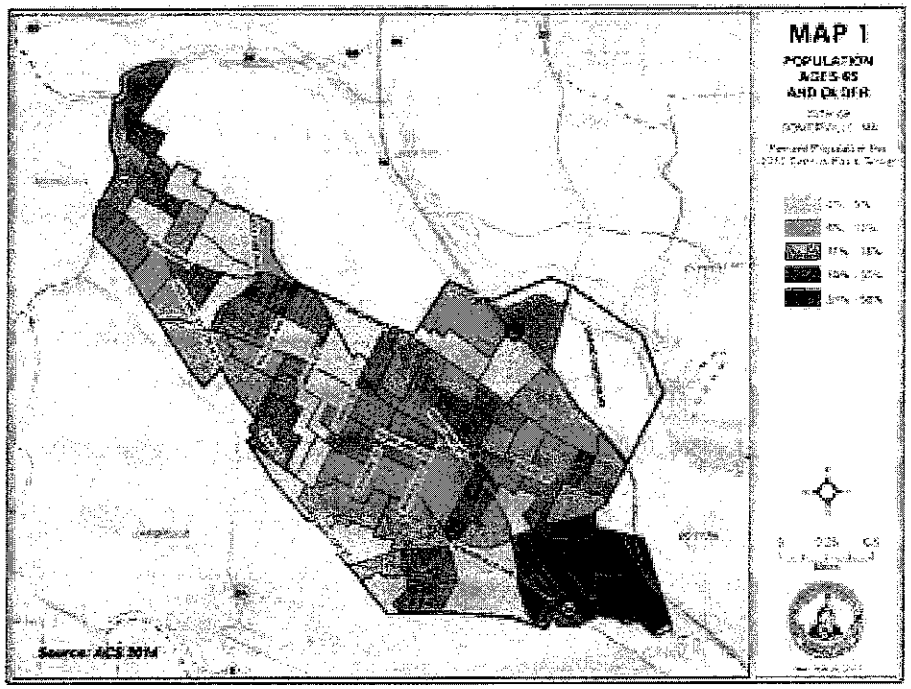
The age range for older adult is 65 years and above, the broadest age range within the report. Older adults have a wide variability in terms of health, ranging from very healthy older adults who are actively engaged in the community to those with multiple chronic diseases or disabilities who may be socially isolated. Global research indicates that overall U.S. health outcomes as people age are worse than other countries and data within the U.S. indicates persistent health disparities in older age, influenced by disadvantages such as race and poverty at earlier life stages. Among the large number of immigrants within the city's older adult population, many have limited capacity to communicate in English and close to a third are not U.S. citizens, limiting access to benefits available to native born residents that help support this life stage. Variability is also notable within education and economic status. One seventh of the older adults in Somerville are living in poverty, relying on social supports for housing, health and other basic needs while more of their peers are very financially secure, emphasizing the growing wealth gap in the city.

Older adults have experienced a great deal of change within their lifetime. They have experienced the "race to space" and cultural revolutions as well as taken part in wars with resulting social and economic impacts. Almost half of the veterans in the city were involved in World War II, the Korean War or Vietnam. Adults in this age have seen the transformation of the public housing system that was implemented to help returning veterans; today, this system primarily serves elderly, immigrant and low income populations. The advent of nuclear power, a force utilized to end World War II, has been redirected to providing

Older adults have a wide variability in terms of health, ranging from very healthy older adults who are actively engaged in the community to those with multiple chronic diseases or disabilities who may be socially isolated.



Older Adults / Ages 65+



energy across the world, while also escalating the nuclear arms race for decades. In their lifetimes, the Berlin Wall fell and the Soviet Union was dissolved, heralding the supposed end of the Cold War. Perhaps just as impactful, technology moved from computers that took up entire rooms to small, personal computing devices that can connect one instantly to the information of the internet. Shifts in technology changed the American workplace, with far fewer remaining manufacturing jobs. This is also the group that may have been most impacted by the Great Recession, which dramatically shrunk retirement savings for many or extended the years that people needed to work.

Demographics, age specific

People age 65 or older constitute 9.4% of Somerville's population or approximately 7,387 older adults, according to the U.S. Census Bureau American Community Survey 2011-2015 five-year estimates. Map 1 at left, demonstrates that older adults over 65 are most likely to be concentrated where this is senior housing, such as assisted living and public housing. Overall nationally, the older U.S. population is growing, more than doubling between 1975 and 2015, as the baby-boomers age. Data estimates from 2011-2015 indicated that 4.2% of the total U.S. population was over 75 years of age (Health, United States, 2016).

The race/ethnicity distribution of older adults in Somerville, according to 2015 government estimates was: 88.8% White, 5.6% Black or African-American, 4.7% Asian, and 3.6% of Hispanic or Latino origin (of any race). The race/ethnicity distribution in Massachusetts, according to 2015 US Census estimates was: 79.6% White, 7.1% Black or African-American, 6.0% Asian, and 10.6% of Hispanic or Latino origin (of any race). In 2015, just over 75% of the U.S. older adult population was non-Hispanic White, 8.8% was non-Hispanic Black, and 7.9% was Hispanic/Latino (U.S. Department of Health and Human Services). Based on the most recent available data, from 2015, 29.5% of Somerville residents 65 or older were not U.S. citizens, 23.4% spoke English less than "very well," 38.2% had a disability, and 14.2% lived below 100% of the poverty level (American Community Survey (ACS)). These are all risk factors for the development of health issues in older adults.

Access to Healthcare

Health Insurance Coverage

Medical Health Insurance coverage (LC-40) is one of the predictors of health and wellbeing. Most Americans over the age of 65 are eligible for Medicare, to assist with medical coverage. Additionally, low income seniors and people with disabilities have access to Medicaid support. At the time of this publication, the future of health care access for immigrants is not certain, as proposed legislation would severely impact the eligibility of immigrants and/or create waiting periods for accessing federal healthcare supports. Somerville adults age 65 or older have the highest rates of health insurance coverage of all age groups, with only 0.4% without coverage. The number of Somerville residents served by Medicare in 2015 included 27.0% who were Medicare Managed Care enrollees (where individuals pay extra premiums to help cover costs beyond Medicare coverage) and 23.5% who were dually eligible for Medicare and Medicaid (due to income eligibility).

Of the older adult population in Somerville, 65 and over, 61% reported more than 4 chronic conditions, as of 2011 (Dugan, Porrell, and Silverstein, 2015). Compared to the Massachusetts population, Somerville residents reported higher percentages of diagnosis with depression (31.5%), diabetes (34.9%), ischemic heart disease (46.8%), congestive heart failure (28.8%), anemia (51.4%) and chronic kidney disease (23.8%) (Dugan, Porrell, and Silverstein, 2015).

Yamada et al. (2015) discuss in the article "Access Disparity and Health Inequality of the Elderly: Unmet Needs and Delayed Healthcare" how increased income amongst the elderly was associated with more positive health outcomes, particularly when examining unmet needs related to medication. For lower income elders, many problems were associated with out-of-pocket expenditures for medications, an issue that correlates with poorer health outcomes.

Primary Care Provider

Increasing the proportion of adults aged 65 years and older who have a specific source of ongoing medical care (AHS-5.4) is key to promoting health in older adults. According to the Massachusetts Healthy Aging Community Profile (Dugan, Porrell, and Silverstein, 2015), 97.8% of Somerville residents over 65 received their care from a Primary Care Provider, 89.1% had a physical exam/check-up within the last year and 3.7% did not see a doctor when needed, citing cost as the reason. It is a national goal to increase the proportion of the health care workforce with geriatric certification (OA-7) to better meet the specific needs of the aging population. In 2016, Cambridge Health Alliance (CHA) provided care for 1,975 Somerville adults over the age of 65. In 2016, Medicare started covering the cost of advanced-care planning conversations, including between the primary care provider, patient and the patient's family to discuss treatment goals and patient preference as they near the end of life.

The special needs of local frail, older adults triggered the establishment, in 1987, of the CHA House Calls Program to provide primary care in the Somerville-Cambridge area for those who have difficulty leaving the home for routine medical care. House Calls staff includes 2 physicians, 5 nurse practitioners and 1 social worker. Currently expanded to an additional five cities, the program serves more than 260 homebound older adults in the region, allowing them to remain at home and age in place.

Four CHA geriatrics physicians and four nurse practitioners in the CHA Nursing Home Program collaborate to provide primary care to over 450 older adults living in eight area nursing facilities, including in Somerville. Additionally, they provide post-hospital discharge care to older adults who are receiving skilled nursing facility-level rehabilitation in the same nursing facilities. There is also collaboration with home care services for seniors, such as the Visiting Nurses Association of Eastern Massachusetts, who are able to reside in their homes. The CHA Elder Service Plan (ESP) is one of 122 PACE (Program of All-Inclusive Care of the Elderly) programs in the country. A multidisciplinary team and support staff collaborate to provide community-based, coordinated care to adults 55 years of age and older who are considered eligible for nursing home level of care. The CHA ESP program enrolled its 400th patient in mid-2017.

Immunizations

The estimated national rate, as of 2013, for persons 65 and older who had received a pneumococcal vaccination at least once during their lifetime was highest for Whites at 64.7%; Blacks, Hispanics/Latinos and Asians were in the 45-50% range (Williams et al., 2016). The lowest rates nationally were in the Hispanic/Latino population and those living below 100% of the poverty level. In Somerville, 62.3% of the population age 65 or older had a pneumonia vaccine according to the MA Healthy Aging report from 2015. Shingles vaccines for those over 65 were reported at 26% in the same report.

Although vaccines are most notably administered to children or young adults, older adults, are at a higher risk when it comes to the flu due to age-related weakening of the immune system. For the 86% of adults 65+ who are managing a chronic condition such as diabetes or heart disease, the flu can be even more dangerous due to the likelihood of developing complications or becoming hospitalized. CDC vaccine guidelines for older adults include: Influenza (Flu), Shingles (Herpes Zoster), Diphtheria, Tetanus, Pertussis (Whooping Cough) and Pneumococcal disease (Pneumonia).

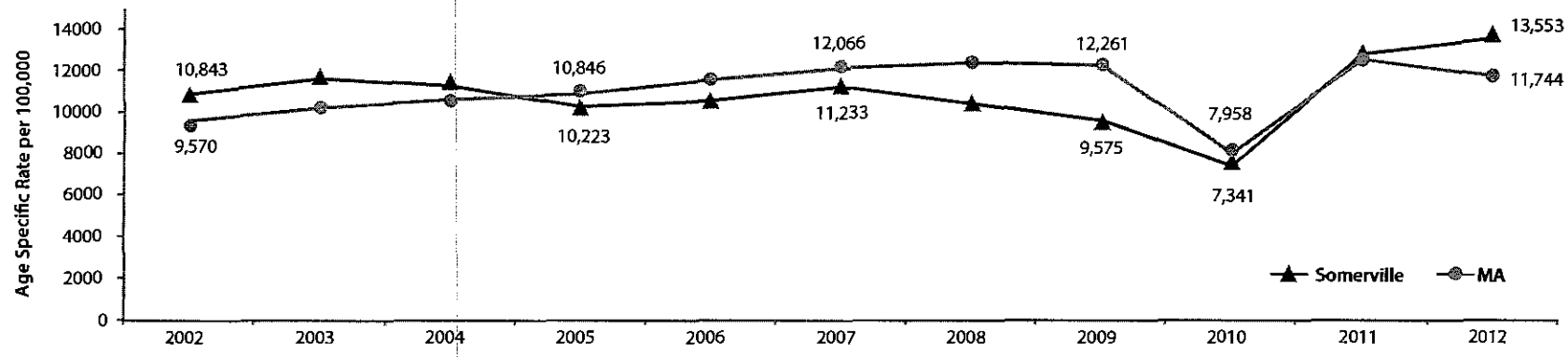
Oral Health

Fluoridation (LC-05), recognized as preventative for dental health, may not have been as readily available when today's older adults were young children, though it is now inherent in the public water supply. According to the Massachusetts Healthy Aging Community Profile for 2015, 73.4% of older adults in Somerville had an annual dental exam, compared to the state at 76.1%. Complete tooth loss, requiring dentures, was reported by 35.8% of Somerville seniors, the same as the state rate (Dugan, Porrell, and Silverstein, 2015).

Behavioral & Mental Health

According to the Massachusetts Healthy Aging Community Profile (Dugan, Porrell, and Silverstein, 2015), on self-reported mental health (LC-34) issues, the rate of older adults who reported "15 or more days of poor mental health in the last month" was 2.6% for Somerville residents; the State reported rate was 6.7%. Satisfaction with life was high both among Somerville older adults and across the state, both at 95.8%. Two risk factors for mental health that were examined were: 1) receiving adequate emotional support (Somerville 77.4%, MA 80.7%) and 2) ever having been diagnosed with depression (Somerville 31.5%, MA 28.6%).

CHART 1: Mental Disorder Related Hospitalizations for Adults Age 65+ in Somerville and MA (2002-2012)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

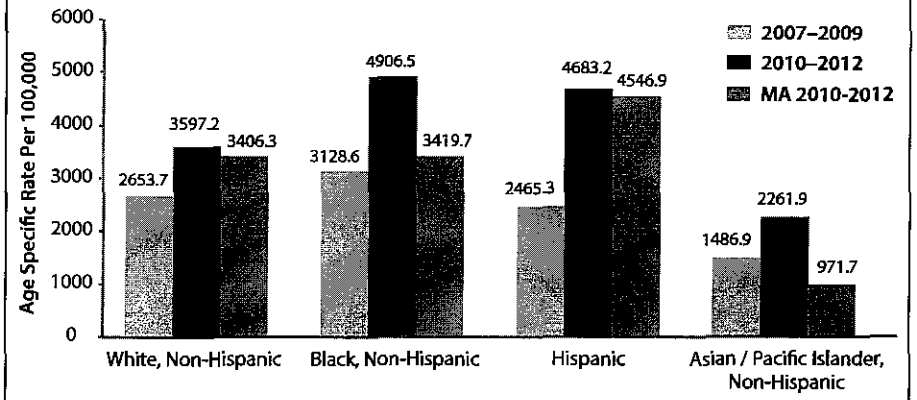
- Chart 1 illustrates that rates for hospitalizations for treatment of mental disorder among all Somerville residents 65+ increased between 2010 and 2012 and surpassed the Massachusetts average rate in 2011 and 2012 for the first time since 2004 (MA Division of Health Care Finance and Policy, Uniform Hospital Discharge Dataset System (UHDDS)).

- Additional information demonstrates that mental disorder related hospitalizations in adults age 65+ in Somerville has been at consistently higher rates among females than males, with an increased rate in both genders between 2010 and 2012.

- In general, data on mental disorder related emergency department visits in Somerville demonstrated similar trends to Massachusetts, with an overall increase between 2002 and 2012.

- In contrast to hospitalizations, data from the state reports that from 2006 to 2011, Somerville males 65+ visited the emergency department for mental disorders at a higher rate than females. However, the rate for females visiting emergency departments for mental disorder has been rising consistently and in 2012 female visits to the ED exceeded male visits.

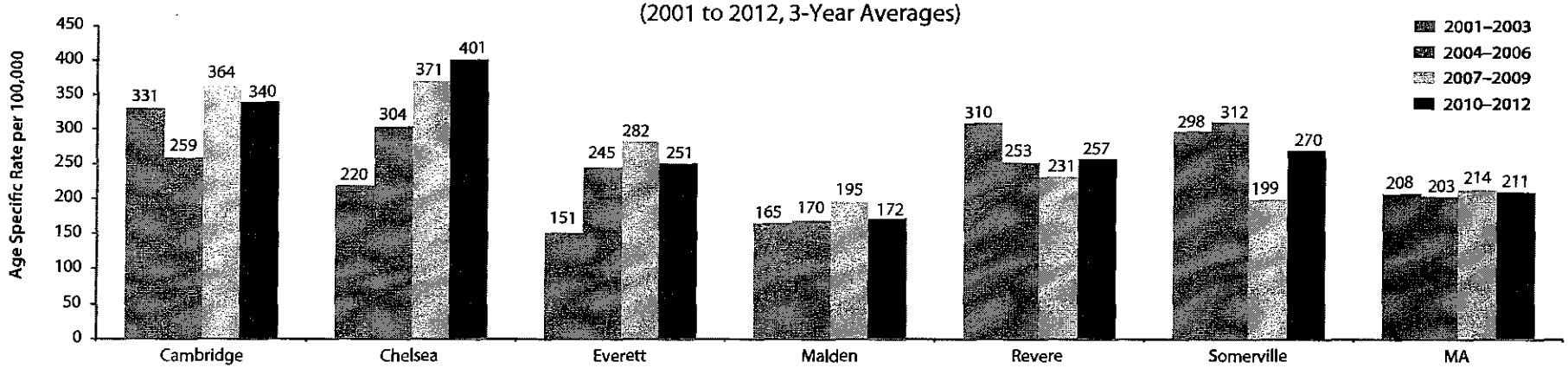
CHART 2: Mental Disorder Related ED Visits for Adults Aged 65+ in Somerville and MA by Race (2007-2012, 3-Year Averages)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

- According to Chart 2 (the 3-year average from 2010-2012), Black and Hispanic/Latino adults 65+ had the highest rate of mental disorder related emergency department visits (4,906.5 per and 4,683.2 per 100,000 visits, respectively). Asians had the lowest rate (2,261.9 visits per 100,000 visits overall) (UHDDS).

CHART 3: Alcohol/Substance Related Hospitalizations for Adults Age 65+ in Somerville and Surrounding Cities
(2001 to 2012, 3-Year Averages)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

Substance Use Disorder/Addiction

Substance use is a growing issue among older adults, involving the abuse of alcohol, drugs and prescription medications. It is important for both families and medical professionals not to exclude the possibility of substance abuse when an older adult is presenting with symptoms typical of addiction or withdrawal.

Alcohol

Aging can lower the body's tolerance for alcohol. Older adults generally experience the effects of alcohol more quickly than when they were younger. This puts older adults at higher risks for falls, car crashes and other unintentional injuries that may result from drinking. Alcohol abuse in older adults can be complicated by the use of prescription and over the counter (OTC) medications. Combining medications and alcohol increases the occurrence of side effects and can intensify adverse reactions.

According to the National Institute on Aging, older adult drinkers usually fit within two general types: the "hardy survivors," those who have been abusing alcohol for many years and have reached 65, and the "late onset" group, those who begin abusing alcohol later in life. The latter group's alcohol abuse is often triggered by changes in life such as: retirement, death or separation from a family member, a friend or a pet, health concerns, reduced income, impairment of sleep and/or familial conflict. About half of all Americans ages 50 to 70 will be at high risk for alcohol and marijuana abuse by 2020, compared with less than 9 percent in 1999, according to the Substance Abuse and Mental Health Services Administration.

- In contrast to the Hospitalization data in Chart 3 above, additional related data indicates that in the 2010-2012 period (3-year averages), the rate of Alcohol/Substance related emergency department visits for adults 65+ in Somerville was lower only than Chelsea's, when compared to rates in surrounding cities (UHDDS).

- Relatedly, in 2010-2012, the age-specific rate of emergency department visits for adults age 65+ in Somerville was higher for both Whites and Blacks than the state. Black, non-Hispanic rates (2,024.9 per 100,000) were dramatically higher than Whites (347.4 per 100,000).

Tobacco

Nicotine dependence is also a significant problem in the elderly. Use early in life sets the stage for morbidity and mortality from this addiction. Elderly smokers not only continue to impair their respiratory systems, but are also more apt to die from respiratory diseases.

Physical Health

According to the Massachusetts Healthy Aging Community Profile 2015 (Dugan, Porrell, and Silverstein, 2015), 14.5% of Somerville's older adults self-report fair or poor health status, slightly lower than the state rate at 20.7%. National studies, such as the Health and Retirement Study Aging in the 21st Century, suggest chronic diseases are manifesting at younger ages which impacts the healthspan of the older population. Although the early onset is not changing morbidity, people are living longer with chronic disease that may impact quality of life. Women have longer life expectancy than men, but are more apt to be assessed as being frail, thus increasing risk for falls and injury while decreasing resilience (University of Michigan, 2017).

Obesity

Nationally, 11.7% of people 65 and over reported participating in leisure time aerobic and muscle-strengthening activities that meet the 2008 Federal physical activity guidelines from 1998-2014. Participation varied based on age ranging from 14.5% for 65-74 year olds down to 5.1% for those over 85 (Older Americans: Key Indicators of Well-being, 2016). In Massachusetts, data reported in 2015 indicated that 25.2% of state residents over the age of 65 were obese (Dugan, Porell, and Silverstein, 2015). In Somerville, the Council on Aging and Parks & Recreation Departments offer a range of physical activities for older adults, such as the evidence based Fit-4-Life program developed with Tufts University. Limited data is available on healthy eating and physical activity levels in Somerville older adults.

Increased rates of obesity may be associated with more physical ailments in older adults, based on trends over the last 15-20 years. Early baby boomers (born between 1948-1953) reflect this with national increases of obesity rates by 7-10% compared to older cohorts. There are associated links between obesity and increased rates of diabetes and arthritis, both of which can impair daily living activities (University of Michigan, 2017). There is increasing attention to the connections between disability and obesity. Physical inactivity is a high predictor of obesity. Mobility or cognitive limitations can seriously impact the opportunities and options for physical activity, especially for those with limited financial resources. There is a lack of available data on obesity and related conditions for Somerville older adults.

In Somerville, the Council on Aging and Parks & Recreation Departments offer a range of physical activities for older adults, such as the evidence based Fit-4-Life program developed with Tufts University.

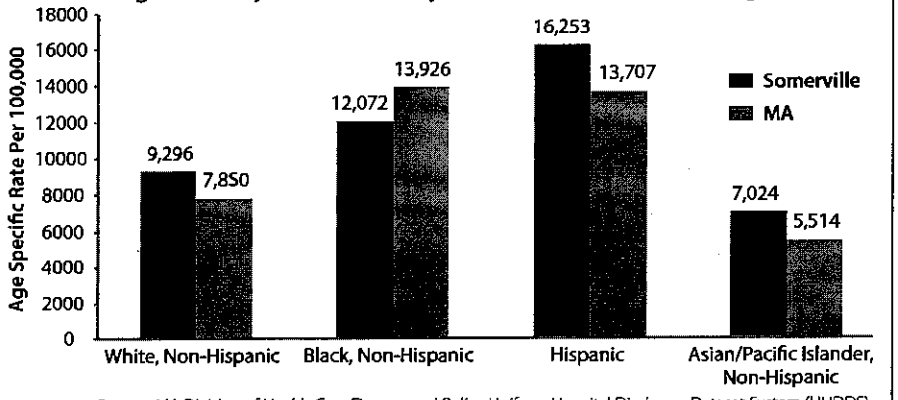
Diabetes

Diabetes Mellitus is a chronic disease that affects multiple body systems, requiring attention to diet and exercise levels, as well as often requiring medication for treatment to limit the negative impacts. Older adults have higher rates of diabetes than other age groups, across the U.S., with more than a quarter of Americans 65 and older with this diagnosis. Diabetes can be linked to higher risk factors for cardiovascular disease, as well as higher levels of nursing home placement. Other risk factors include a higher rate of dementia and cognitive deficits, neuropathies, falls, depression and vision impairment (Kirkman et al., 2017).

- Based on Chart 4, rates of hospitalizations between 2010-2012 (3-year average) for Diabetes Mellitus were higher in Somerville than the state rate for Hispanics/Latinos, Whites and Asians. Hispanics/Latinos and Blacks have the highest rates of hospitalizations, compared to Whites, with Asians having the lowest rate (UHDDS).

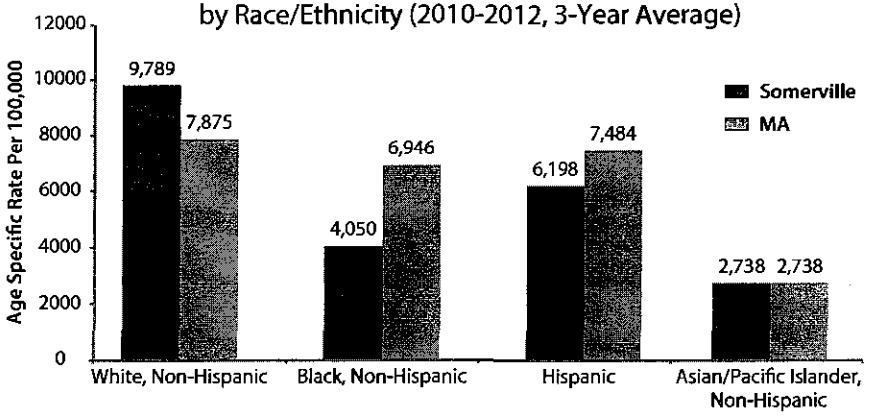
- Additional state data indicates that Diabetes Mellitus has been the leading cause of hospitalizations for residents 65 and older in both Somerville and the state as a whole.

CHART 4: Diabetes Mellitus Related Hospitalizations for Adults Aged 65+ by Race/Ethnicity (2010-2012, 3-Year Average)



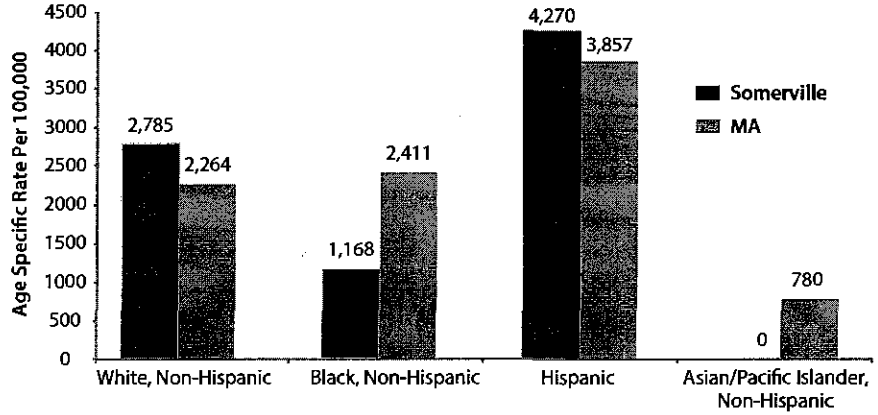
Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

CHART 5: COPD Related Hospitalizations for Adults Age 65+ by Race/Ethnicity (2010-2012, 3-Year Average)



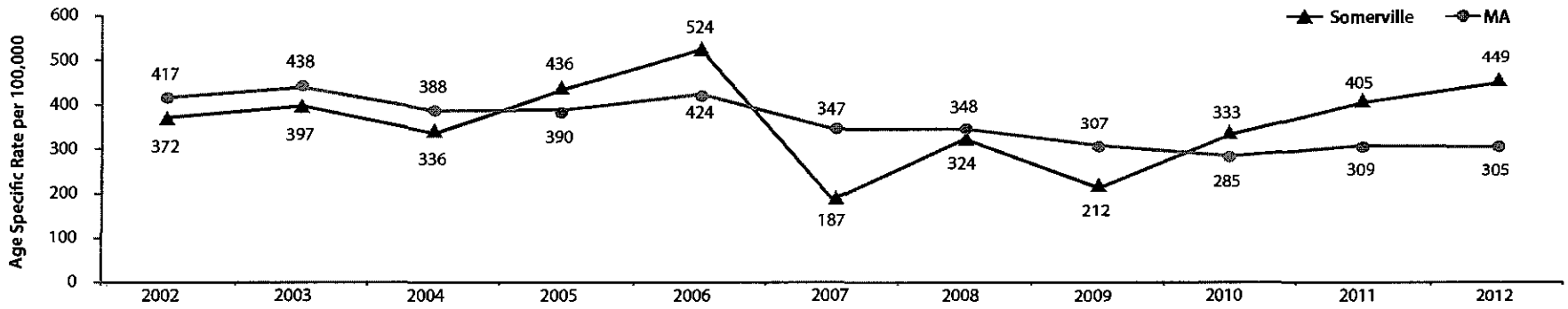
Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

CHART 6: COPD Related ED Visits for Adults Age 65+ by Race (2010-2012, 3-Year Average)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

CHART 7: Bacterial Pneumonia Related ED Visits for Adults Aged 65+ (2002-2012)



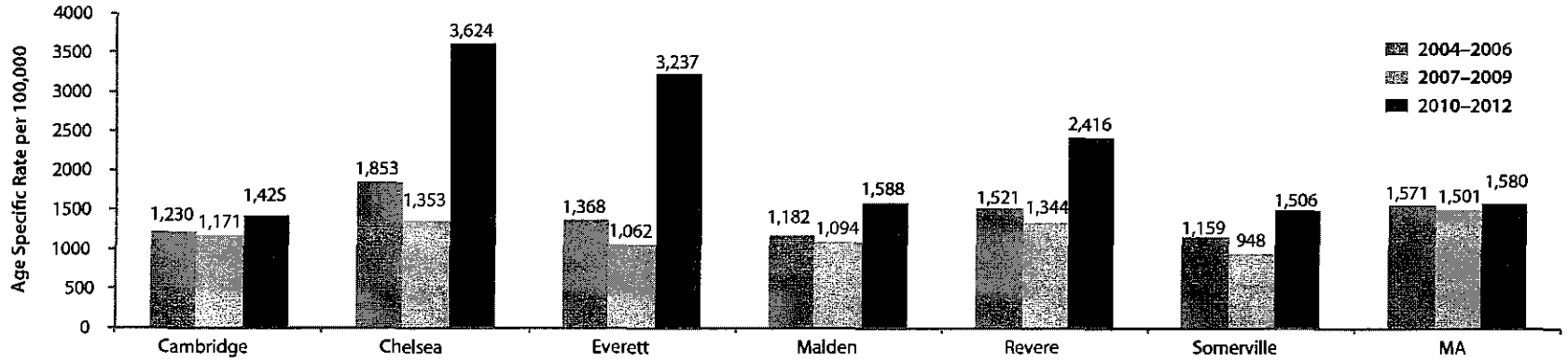
Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

Respiratory Disease

Respiratory issues account for some of the top causes of both hospitalizations and emergency department visits for adults 65 or older. There are strong links between asthma in childhood and COPD later in life, especially for those with a history of severe asthma.

- White Somerville adults ages 65+ had the highest rate of COPD related hospitalizations between 2010-2012 (3-year average) as seen in Chart 5 (UHDDS).
- Data in Chart 6, on the rate of COPD related emergency department visits, shows the highest rates for Hispanics/Latinos, suggesting possible barriers to primary and preventative care for this population, or possibly delays in seeking health care until faced with an emergency (UHDDS).
- Bacterial pneumonia related emergency department visits in Somerville, seen in Chart 7, rose from 2009 to 2012 to hit the City's second highest rate since 2002 (448.9 visits per 100,000 ED visits overall), well over the state 2012 rate (304.5 per 100,000 visits) (UHDDS).

CHART 8: Cardiovascular Related ED Visits for Adults Aged 65+ Years (2004 to 2012, 3-Year Averages)



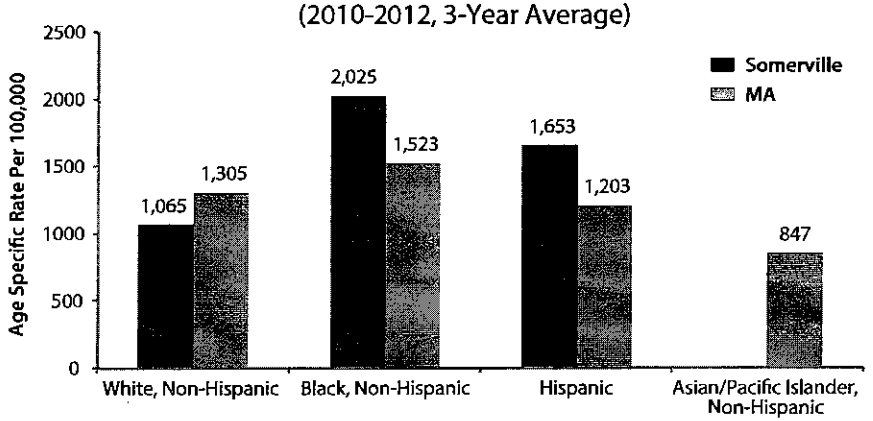
Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

Cardiovascular Disease

According to the American Heart Association, cardiovascular disease is the number one cause of death for both men and women over 65. In Somerville, it has been the top cause of death for those 65+, and the third most likely cause of hospitalizations.

- According to Chart 8, data from 2004-2012 (3-year averages) indicates that rates of cardiovascular related emergency department visits for adults 65+ saw an overall increase (29.9%) in Somerville and an even more dramatic increase in surrounding towns, especially between 2007-2009 and 2010-2012, while the state level held fairly steady throughout.
- In Somerville, Hispanics/Latinos had the highest rate of cardiac related hospitalizations (UHDDS).
- When comparing cardiovascular related hospitalizations data with data on emergency department visits between races in Somerville among adults 65+, Asians were hospitalized for cardiovascular issues at a rate that was slightly less than one third the rate for Whites (2,976 per 100,000 hospitalizations versus 7,587 per 100,000 hospitalizations between 2010 and 2012), yet Asians visited the emergency department for cardiovascular related issues at almost twice the rate (2,262 per 100,000 ED visits) that White adults 65+ did (1,227 per 100,000).
- Somerville Hispanics/Latinos had the poorest cardiovascular health overall between 2010 and 2012, with the highest rates of cardiovascular related hospitalizations and emergency department visits in that period.

CHART 9: Stroke Related Hospitalizations for Adults Aged 65+ by Race (2010-2012, 3-Year Average)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)
For Somerville, Asian/Pacific Islander rates was not applicable

- As indicated in Chart 9, the rates of stroke related hospitalizations for Blacks and Hispanics/Latinos 65+ in Somerville, were higher by 33.0% and 37.4% respectively than Somerville Whites or the respective Massachusetts rates in 2010-2012 (3-year average), with data on Asians 65+ in Somerville at levels not reportable (UHDDS).

- Based on a comprehensive review of data for this age group, it is notable that similar to cardiovascular related hospitalizations, stroke and diabetes related hospitalizations tend to have occurred at higher rates in Black and Hispanic/Latino adults 65+ in Somerville. A notable increase was noted in the Hispanic/Latino population for cardiovascular disease related hospitalizations in the 2007-2009 period compared to 2004-2005, though the rate decreased overall.

- Between 2004 and 2012, stroke related emergency department visits for ages 65+ saw a 37% increase, the highest by double of regional cities and much higher than the increase of 4.3% in the state levels.

Health Reserve Index Pilot

Lack of physical reserves can increase risk of falls, hospitalizations and disability for aging seniors. Frailty has been defined as a clinical syndrome that increases risk of poorer health outcomes for older adults. Criteria often include slower walking, lower grip strength, low energy, low levels of physical activity or unintentional weight loss. In 2014, a 13 item survey with an additional grip strength measurement was piloted by CHA and community partners to try to identify seniors who were at risk for losing health reserves. Of Somerville adults 60 and older, 49.8% of females (n=253) and 68% of males (n=97) met the criteria for non-frail. Respectively, 37.9% of females and 27% of males were pre-frail and 12.3% of females and 5% of males were determined to be frail (CHA).

Older Adult Top 5 Causes of Hospitalizations and Deaths

TABLE 1: Top Causes of Hospitalizations (2010-2012)	Top 5 Causes Somerville	Age-specific rates per 100,000	Top 5 Causes Massachusetts	Age-specific rates per 100,000
Older Adult (65+years)	1. Endocrine: Diabetes Mellitus Related	9870.6	1. Endocrine: Diabetes Mellitus Related	8394.1
All Causes in Somerville: n= 7,201	2. Respiratory: COPD, All (Related)	9190.1	2. Circulatory System Diseases: All	7825.6
	3. Circulatory System Diseases: All	8287.5	3. Respiratory: COPD, All (Related)	7795.8
	4. Respiratory: Pneumonia and Influenza	4508.2	4. Respiratory: Pneumonia and Influenza	3756.5
	5. Digestive System Diseases: All	3518.7	5. Digestive System Diseases: All	3249.1

TABLE 2: Top Causes of Death (2010-2012)	Top 5 Causes Somerville	Age-specific rates per 100,000	Top 5 Causes Massachusetts	Age-specific rates per 100,000
Older Adult (65+ years)	1. Heart Disease	1047.4	1. Heart Disease	1074.1
All Causes in Somerville: n= 1,017	2. Lung Cancer	337.9	2. Lung Cancer	276.3
	3. Chronic Lower Respiratory Diseases	284.8	3. Cerebrovascular Disease	237.9
	4. Cerebrovascular Disease	220.0	4. Chronic Lower Respiratory Diseases	221.5
	5. Bladder Cancer	53.1	5. Alzheimer's Disease	187.7

Data Source: Uniform Hospital Discharge Data System Massachusetts Division of Health Care Finance and Policy, MDPH (MassCHIP).
The source file is maintained as a zip code based file; 3 year average estimates 2010-2012

Notes: Please note that within some groupings/classifications may overlap and be counted more than once within the rankings
Related includes secondary and primary diagnoses

Mental disorders are not detailed individually via MassCHIP

Chronic Obstructive Pulmonary Diseases (COPD) include: Bronchitis (chronic and acute); Emphysema; Asthma; Bronchiectasis; Axtrinsic allergic alveolitis and Pneumonitis

Circulatory System Diseases include: Rheumatic Fever; Rheumatic diseases of the heart and blood vessels (chronic and acute); Hypertensive diseases; Heart diseases; Cereobrvascular diseases; Diseases of blood vessels

Chronic Lower Respiratory Disease Includes: Chronic obstructive pulmonary disease with acute lower respiratory infection; persistent abnormal dilatation of the bronchi.

Digestive System Diseases: Diseases of oral cavity, salivary glands, jaw, esophagus, stomach, appendix, intestines, liver, gallbladder, pancreas

Heart Disease includes: Coronary heart disease, heart failure, ischemic heart disease, major cardiovascular disease, and acute myocardial infarction (NOT hypertension, atheroscelerosis, and cerebrovascular disease)

Hospitalizations and Deaths

- The top five causes of hospitalization, as indicated in Table 1, were similar in Somerville and at the state level, though the rates were higher across all five causes for Somerville residents 65+ than statewide during these years (UHDDS).

- The top four causes of death for Somerville residents 65+ (Table 2) were consistent with statewide results, with higher rates of death due to lung cancer and chronic lower respiratory diseases in Somerville than at the state level during these years (UHDDS).

Cancer

Age is a risk factor for developing cancer, with a 10 times greater incidence of cancer in those 65 or older than younger age groups. It is estimated that as the population ages, cancer will outstrip cardiovascular disease as the leading cause of death nationally. In Somerville, cancer is the second and fifth top cause of death in those 65+ (UHDDS).

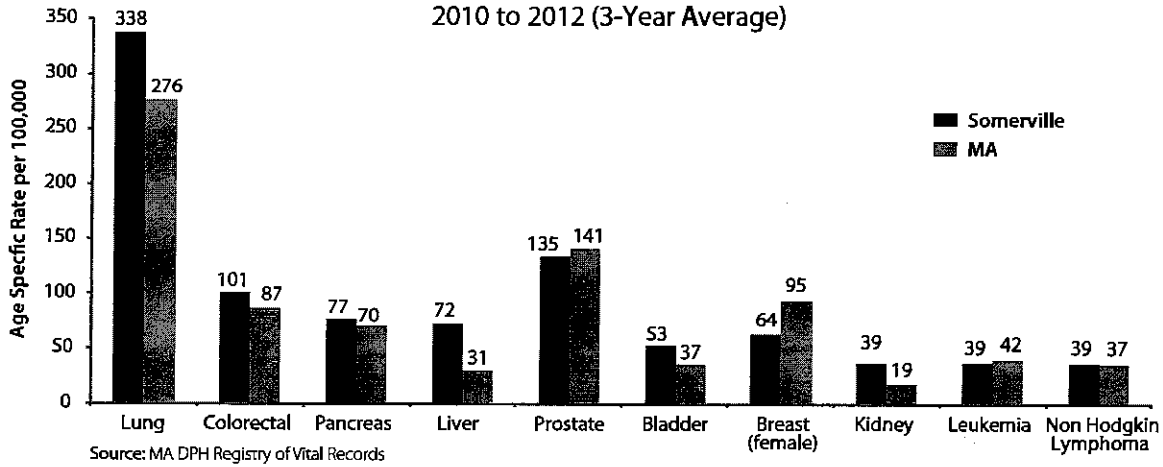
- Per Chart 10, from 2010-2012 (3-year average), lung cancer was the leading cause of cancer death in Somerville, significantly higher than the MA rate. Rates of colorectal, pancreatic, liver, bladder and kidney cancers were all higher than the state rates between 2010-2012.

- Additional data indicates that the incidence (new cases) of most cancers in Somerville has fallen since 2001. However, the rate of lung cancer diagnoses per 100,000 overall cancer diagnoses rose from a rate of 372.08 on average between 2001-2003 to 432.2 per 100,000 diagnoses on average from 2007-2009 (MA DPH, Registry of Vital Records).

Falls

National statistics on falls and older adults indicate more than a third of people over 65 will fall each year and the risks increase with age. Falls are often associated with fractures and potential reduced mobility and/or independence and are the leading cause of injury deaths in older adults. Fear of falling also may reduce older adults' active participation in social and physical activities, creating greater risks for mental and physical

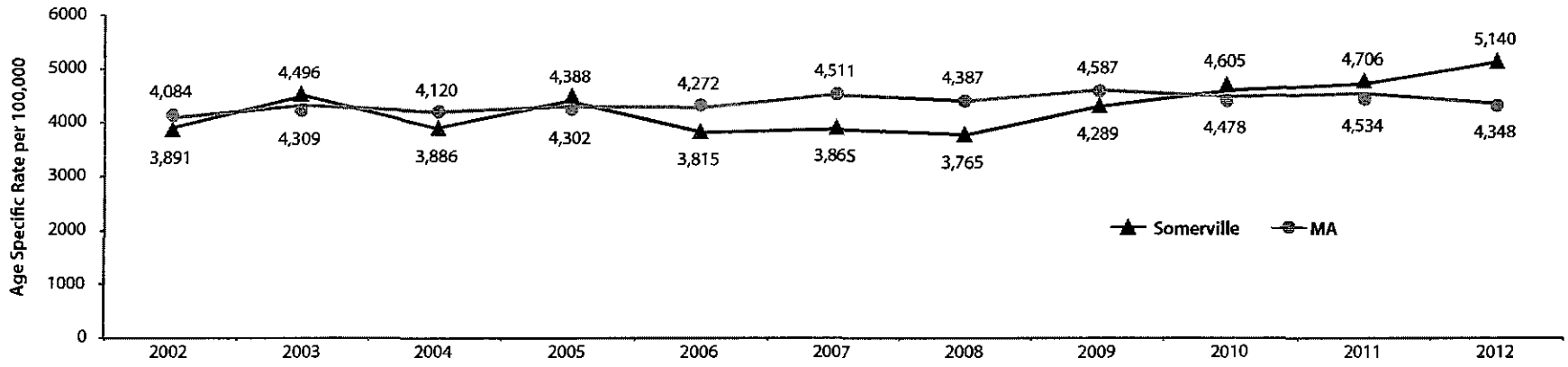
CHART 10: Leading Cancer Death Rates for Adults Age 65+ in Somerville and MA, 2010 to 2012 (3-Year Average)



Source: MA DPH Registry of Vital Records

Age is a risk factor for developing cancer, with a 10 times greater incidence of cancer in those 65 or older than younger age groups.

CHART 11: ED Visits from Injuries Related to Falls for Adults Age 65+ (2002-2012)



Source: MA Division of Health Care Finance and Policy Uniform Hospital Discharge Dataset System (UHDDS)

health. Nationally, in 2014, 28.7% of older adults reported at least one fall in the past 12 months.

- As indicated in Chart 11, the rate of emergency department visits from injuries related to falls for adults 65+ has risen in Somerville since 2008. Surpassing the state 3-year average rates between 2010-2012, it was the second highest in the region after Chelsea. The actual count in 2012 was 355 ED visits for this Somerville age group due to falls (UHDDS).

- Other data shows that in both Somerville and MA, the rates of hospitalizations for falls for adults age 65+ showed a slight decline between 2004 and 2012. There was insufficient data on race/ethnicity for Somerville, though the MA rates are highest for Whites, followed by Hispanics.

Disability

National level data available from 2015 indicates that of the Somerville civilian noninstitutionalized population of this age group, 38.2% had any disability, with 61.8% having no disability (American Community Survey). The national measure of disability, at least one basic action difficulty or one complex activity limitation, has risen for persons 65 and older over the past decade to 26.5% of the population based on 2015 data, with more U.S. females effected than males. African-Americans and those who identify as two or more races had higher levels of disability than Whites, Hispanics/Latinos, or Asians (U.S. Department of Health and Human Services). It is estimated that there is a greater than 60% probability that an adult over the age of 65 will become cognitively impaired or develop self-care difficulty of two or more basic daily functions in their lifetime.

Some studies using the Baltimore Longitudinal Study on Aging have indicated linkages between hearing impairment and dementia, though the results are not fully understood. Social isolation, due to hearing loss, may be a factor. This also potentially indicates possible intervention strategies to reduce cumulative impacts of multiple factors on an individual's health and wellbeing across life stages.

- The rates of ambulatory, self-care, hearing, vision and cognitive impairments for Somerville residents 65-74 and over 75 were both higher than the state percentages based on data available in 2014 (Dugan, Porell, and Silverstein, 2015).

Education

According to the Massachusetts Healthy Aging Community Profile (Dugan, Porrell, and Silverstein, 2015), 33.2% of adults 65+ had less than a high school education, higher than the state's 20.4%. The percentage of Somerville older adults with a college degree was 13.9%, lower than the state average of 25.1%. In an area like Boston that is saturated with higher education, the lower rates of both high school education and college degrees in the Somerville senior population could have influenced lifelong earning potential and wealth accumulation for many. The Somerville Council on Aging provides support for continued learning and informal education options. The public libraries, adult education classes at SCALE, and non-profits such as the The Welcome Project report seniors are consistently well represented in their English language classes.

LIVING WITH A DISABILITY	SOMERVILLE	MA
% disabled for a year or more	30.6%	31%
Ambulatory impairment		
% 65-74 with ambulatory difficulty	18.8%	12.9%
% 75+ with ambulatory difficulty	33.8%	29.4%
Self-care impairment		
% 65-74 with self-care impairment	7.3%	3.7%
% 75+ with self-care impairment	12.9%	12.2%
Hearing Impairment		
% 65-74 with hearing impairment	9.6%	7.4%
% 75+ with hearing impairment	24.7%	21.2%
Vision Impairment		
% 65-74 with vision impairment	3.7%	3.2%
% 75+ with vision impairment	9.8%	9.3%
Cognition		
% 65-74 with cognition difficulty	5.6%	4.7%
% 75+ with cognition difficulty	14.5%	12.1%
Source: Massachusetts Healthy Aging Community Profile 2014		

Economic Stability

Lower education levels for over a third of Somerville seniors may have impacted economic opportunities over the life time of the 65+ population. According to 2015 American Communities Survey data, the percentage of Somerville households of individuals 65+ with an annual income of less than $20,000 was 34.6% compared to 28.4% statewide. Of those 65 and older in Somerville, there were four main sources of income in 2015: 35.7% income (mean earnings $59,873), 35.8% retirement income (mean of $20,532), 85.5% income from Social Security (mean $16,248) and 8.8% Supplementary Security Income (mean income $8,626) (American Community Survey).

The full retirement age for Social Security benefits has been at age 65, but will be increasing gradually up to age 67, with an option for early retirement benefits at age 62, though this reduces the benefit amount by 25%. People whose work is physically demanding are more likely to retire earlier. According to the Economic Policy Institute, retirement savings for people approaching retirement in the U.S. peaked in 2007, with a drop in 2009/2010, with some increase since then to an estimated median of $17,000, including 401(K)s, IRAs and Keogh plans. With the general rule of thumb being to save 20 times one's annual salary by age 67 to cover retirement costs, many residents will be increasingly reliant on government and social supports.

Poverty

American Community Survey data from 2011-2015 for Somerville indicates that the overall poverty rate was 14.7%. For residents 65 and older, the rate of poverty increased between 2010 and 2015 from 11.4% to 14.2%, which was higher than the Massachusetts rate for this age group at 9.2%. Poverty later in life creates particular vulnerabilities as individuals over 65 years of age often have very limited control over earning options and may also have limited or no control over housing options. Fixed incomes mean that a health crisis or other unanticipated expense can further burden a limited income. For some, this may include decisions about purchasing food, medication, or other basic needs.

Housing/Housing Stability

In the region, according to a 2017 Metropolitan Area Planning Council report on the state of equity, individuals aged 65+ are the most cost burdened renters and owners, with more than 30% of income going to housing. According to 2015 national American Community Survey data, adults 65 and older in Somerville are much more likely to be owner occupants (56%) than renters (44%) than the total population at 34% owners and 66% renters. Of renters, a higher percentage (47.3%) of 65+ adults in Somerville have more than 30% of their income going to housing than the total population (38.1%).

For those who have owned a house for decades, the prospect of selling to downsize might be attractive, but such owners are then faced with a low probability of finding affordable alternative housing in the city. It remains to be seen how the cost of housing will affect aging baby boomers who may desire to age in place. Reportedly, rental levels have seen some decrease since 2015 data was available, yet, it is unclear if this is enough change to make a difference for those looking to retire and have secure, stable housing in Somerville.

Elderly and disabled housing is available through the Somerville Housing Authority. Within Somerville there are five federal housing locations and four state funded locations with a total of 700 units of affordable housing that can serve those 65+, with 95 units for people with disabilities. Additionally, there are four privately operated buildings serving the elderly/disabled in Somerville. The SomerVision goal of creating 1,200 permanently affordable housing units will be critical to help meet both the needs of aging boomers and young families wanting to stay in the city. In addition, there are 149 nursing home beds available in Somerville (compared to 47,990 nursing home beds in Massachusetts) at two locations, the Somerville Home (59) and Little Sisters of the Poor (90 beds total, 26 with skilled nurses and 64 residential). There are also two assisted living centers in Somerville, built and managed by the Visiting Nurses Association of Eastern Massachusetts, providing 198 units for elderly and disabled residents with affordable housing options, along with supportive services.

Employment

Of those 65 years or older in Somerville, 81.1% were not in the labor force as of 2015, with 18.8% employed (ACS). Multiple national reports indicate that since the early 1990s adults over 65 are remaining in the work market longer than in past decades. Self-reported poor health status is one of the strongest predictors of retirement, by some reports accounting for over 20% of retirement decisions. Access to financial benefits such as pensions, social security and Medicare also significantly impacts decisions about continuing to be active, or not, in the labor force. Today's older adults may have been negatively affected by the Great Recession, finding it necessary to work more years to counter loses in wealth accumulation.

Early baby boomers (those born between 1948 and 1953) generally expect to work at least one year longer than older cohorts. However, there are factors other than health and financial status that effect decisions to retire. Many boomers contend that they want to remain active and engaged, and for some, work meets that desire. For others, changes in life roles such as becoming a grandparent are a strong predictor of retirement; for women, this increases the likelihood of retirement by 8%.

Race, gender and education level factors seem to indicate that Blacks with poor health and women with less education are less likely to work past the age of accessing benefits. There is also a segment of the older adult population that would like to work, but face age discrimination following the loss of a job later in life. The majority of people follow a traditional course of fully retiring directly from full time work. However, increasingly, alternative pathways include moving to part time work or partial retirement and transitioning between these various states.

The Health and Retirement Study reported 43% of women and 50% of men who retire return to work again. The desire to be a part of the larger community and to be socially engaged, as well as the financial incentive, can all be part of why older adults may return to work post traditional retirement (University of Michigan, 2017).

Food Security

Age, as with income, is a key risk factor for food insecurity. Residents 65 years and older may increasingly be in the position of having to decide between housing costs and purchasing food or medicine. This is especially alarming for this age group when there are more chronic diseases that have links to nutrition such as Diabetes Mellitus or cardiovascular disease. Data from the Massachusetts Department of Transitional Assistance SNAP enrollment for December 2016, showed that nearly 1,500 residents over the age of 60+ utilized SNAP and were 27% of the total SNAP clients during this timeframe. Somerville Cambridge Elder Services (SCES) is an agency that works to address food security among seniors, providing Meals on Wheels, distributing senior farmers' market coupons, providing nutritional classes and counseling and partnering with the Council on Aging to host LGBT cafes. In collaboration with the Greater Boston Food Bank, both the Somerville Council on Aging and Somerville Cambridge Elder Services coordinate regular food distribution programs for seniors and people with disabilities.

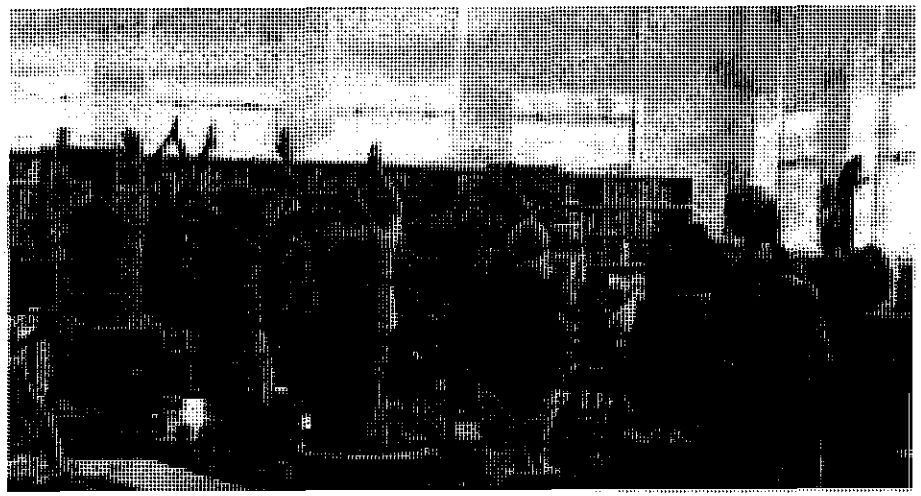
Natural and Built Environment

Housing (safe, affordable and accessible)

Many seniors may have lived in their units for many years, and these units may be in need of upgrading for safety. Home modifications, such as shower bars, can help those 65 and older to age in place more safely and prevent falls and injury which can trigger significant changes in wellbeing and independence. Hoarding, or compulsive clutter, is a growing issue among older adults that can impact home safety.

Safe and Secure Neighborhoods

Police data indicates that crime in Somerville has been generally decreasing. Of all the arrests in the city in 2016, only .014% were people over the age of 61 (Somerville Police Department). More often, this age cohort may be victims of crime, especially scams targeting the elderly. Older adults in need of assistance with financial management who lack a trustworthy relative or friend may be particularly vulnerable to fraud, yet may not report it due to feelings of shame, a desire for independence or lack of awareness either that such fraud occurred or how to report it. Somerville Cambridge Elder Services provides trained volunteers to offer money management support for seniors as a preventative intervention.



Transportation

The high scores that Somerville earns on national measures of walkability, public transit and bikeablilty are attractive to older active adults. Attention to universal access, with curb cuts and well-marked crosswalks also contribute to safety for all ages, including seniors. As the onset of disabilities increases with age, transportation can become more challenging and less accessible; older adults report transportation as one of their top areas of need, according to surveys by the Somerville Cambridge Elder Services. Transportation supports for this life stage include a range of community resources such as subsidized shuttles, companions to attend medical appointments and special rates for public transportation passes. The City of Somerville waives parking permit fees for older adults. A number of residents over 65 are driving their own cars for transport: Between June 2016 and July 2017, the City's Traffic and Parking Department issued 4,337 senior resident permits. There were also 127 handicapped reserved parking signs in place at residential addresses in the same time period; although they may not all be for seniors.

Environmental Health and Climate Change

Elderly residents often have greater physical limitations during a climate event. These limitations include higher overall health vulnerability, such as greater susceptibility to extreme heat and impacts from poor air quality and insect-borne diseases, among other illnesses. As a result of some of these vulnerabilities, older individuals – across all income brackets – have a greater reliance on support services, including senior centers and cooling centers during high heat events. Elderly residents that live alone may be more socially isolated and lack reliable access to transportation, which can make it more difficult for them to access support services or evacuate during emergency events. The City of Somerville currently provides transportation to seniors and disabled residents during storm events and high heat days; climate change is likely to increase demand for these types of services as such events become more frequent.

A concerning and rapidly evolving environmental issue is climate change. A report by the National Resources Defense Council claims that there will be thousands of deaths due to heatwaves by the 2100s related to climate change, specifically in urban areas. Exposure to intense heat can lead to many health complications including heat exhaustion and dehydration and can trigger heart attacks and stroke (Constible, 2017). The most recent data available from MA Environmental Public Health Tracking indicates that in 2012, 102 Massachusetts residents were hospitalized for heat stress, with over half of those adults 65 and older.

The heat index is a standard measure that includes both temperature and humidity. When the heat index rises to 104, health impacts occur due to the inability of the human body to function when internal temperatures reach that level. Globally, more deaths due to heat have been reported in those over 75. Income inequality magnifies the negative impacts for low income elders, many who live alone, making them higher risk.

Exposure to poor air quality, which is impacted by heat, traffic pollution and rising pollen levels, can be linked to cardiac and lung problems, as well as cognitive and memory issues in seniors, altering quality of life, as well as longevity. Older adults, especially frail or immune compromised adults, may also be more at risk for the increasing presence of insect borne diseases such as West Nile virus.

Social and Community Context

Race

The race/ethnicity distribution of this age group in Somerville, according to 2015 government estimates was: 88.8% White, 5.6% Black or African-American, 4.7% Asian, and 3.6% of Hispanic or Latino origin (of any race). According to a PEW report, Black adults over fifty have the worst perception on race relations in the US, with 65% believing that relations are "generally bad," compared to 58% for those who are 18-50 (Wormald, 2016).

Social Inclusion

Metro Boston is becoming more economically segregated and potentially less inclusive. The region's poorest households are becoming more concentrated into low income neighborhoods (State of Equity, 2017). For older adults, immigration status can impact socialization, with 29.5% of Somerville residents over 65 estimated to not have U.S. citizenship. The vast majority, 92.5%, of immigrants over 65 entered the US before 2000, with 2.2% arriving later than 2010. The language spoken at home is English for 68.3% of Somerville residents 65 or older, with 23.4% speaking English less than "very well." There is also an aging LGBT population in the city. Several of these factors can increase social isolation or feelings of exclusion.

Social Safety Network/Social Support

Social isolation is a recognized risk factor for all ages, but is particularly recognized as a factor in the health of older adults. Isolation may be due to changes in social status such as loss of a life partner due to death, visual or hearing impairment, limited English proficiency or other trigger events that impact one's physical or psychological ability to connect with other people causing a loss of social network or group belonging. There is a strong correlation between health and isolation.

In 2015, an estimated 42.5% of Somerville residents 65 or older were married, 27.7% widowed, 11.8% divorced and 16.4% never married. Additionally, 54.4% of older adults in the city lived alone, with 11.7% of

females living with family with no husband present. 6.8% of older adults are living with grandchildren, while 1.9% are responsible for parenting grandchildren. A significant number of this age cohort are veterans, at 14.1% (ACS).

Up to three quarters of the older population are predicted at some point to need long term care that ends up being provided by family or friends. Women are more likely to need such care, partly due to longer life expectancy. The stress of serving as caretaker for a partner with a disability can significantly increase the risk of stroke for the caregiver. The impacts of such stress are stronger for men than women. Creating systems of supports for both isolated older adults and those caring for loved ones may help decrease the negative impacts of related stressors. Family caregiver supports are available through organizations such as Somerville Cambridge Elder Services.

Violence (Domestic Violence, Sexual Abuse)

The CDC defines Elder Abuse as "an intentional act, or failure to act, by a caregiver or another person in a relationship involving an expectation of trust that causes or creates a risk of harm to an older adult." This can be physical, sexual or emotional and can include neglect by a caretaker or financial exploitation. In the U.S. it is estimated that 10% of older adults are victims of abuse, though it is generally very under reported. The Elder Protective Services Program of Somerville Cambridge Elder Services can assist adults 60 or older with a range of supports including legal assistance, planning for harm reduction, in-house assistance and preventing loss of one's home.

Community and Civic Engagement

Historically, Somerville older adults tend to be civically engaged in terms of consistent voter turnout. In the 2016 November election, 75% of all eligible voters participated in Somerville. This is in contrast to a low of 14% voter turnout for the Municipal Elections in 2015. Though millennials have a larger voting group by population, it remains to be seen if they can rival the engagement of seniors.

The City has a long history of residents actively participating in civic life, identifying or addressing public issues of concern. Increasingly, new retirees are turning up as volunteers in programs ranging from the Council on Aging, the public schools, English language classes and in affordable housing and other social justice initiatives. Regionally, there are organizations such as the MA Senior Action Council, run by seniors to advocate and empower members to address key policy issues that affect health and wellbeing. Studies indicate that active participation in civic life by seniors increases longevity.

End of Life

A 2017 report stated that only 30% of U.S. adult residents have created an advance directive that outlines their health care wishes. Typically, this would be two documents. The first is a document that communicates an individual's wishes about end of life care; examples include Medical Orders for Life-Sustaining Treatment (MOLST), Living Will or Five Wishes. The second is a document stating the designated person to make decisions if the individual is unable to do so; in the state of Massachusetts this is known as a Health Care Proxy. Numerous documents are available in 10 languages on the state's website under "End of Life Care."

Palliative care addresses the physical, emotional and spiritual needs of someone who is experiencing serious illness, helping to support someone who may be undergoing active treatment. It is about helping to coordinate care, symptom relief, support and assistance with appropriate planning and decision making.

Hospice care is a choice for those who are facing the end of life, providing support and comfort for an individual and their family. Nearly 50% of Medicare recipients that died in 2014 had received end of life care from hospice, an increase greater than 20% since 2000 (Price et al., 2017). This care is not about extending one's life, but about making one's remaining time comfortable and meaningful and assisting with care at the end of life.

Recommendations for Older Adult

Ages 65+

■ Increase access to health promoting resources for older adults

- Establish physical or online networking tools for services to access health resources, referrals and self-advocacy training.
- Increase access to services and health advocacy tools, especially for English language learners and low income older adults.
- Offer senior health and medical/health screening fairs for elders in a congregate setting by venues.
- Expand stroke prevention planning and knowledge of warning signs of stroke.
- Promote a culture that encourages life balance and improved attitude for caregivers.
- Support home modifications/repairs to improve safety and security, explore ideas from community based providers.
- Promote advance planning for end-of-life and support increased utilization of advanced care planning supports available through Medicare.
- Expand senior center opportunities for elderly, including age friendly activities and programs that promote health.
- Increase public education and awareness of health and well being for older adults.

■ Facilitate a community with strong social networks and support systems for older adults

- Mobilize seniors as advocates for needs identified by community leaders and other stakeholders.
- Promote opportunity programs and/or activities to build relationships in the village.
- Explore options for older adults, who may qualify for services but have English language impairment in the planning and implementation process, especially as applied to the VCS.
- Create programs aimed at reducing isolation among older adults, including utilization of homebound residents to improve social connections, mental health and safety.
- Explore social networks for those living alone and/or isolated and the feasibility of creating support circles/villages/networks in the community and within housing units.

■ Support increased physical activity and healthy eating opportunities for older adults

- Develop an Older Adult Events Calendar to coordinate activities and avoid conflicts with other events.
- Explore options for transportation to activities.
- Promote healthy eating and physical activity for older adults, especially those who live alone and have limited social interaction.
- Coordinate with local efforts to address food insecurity issues.

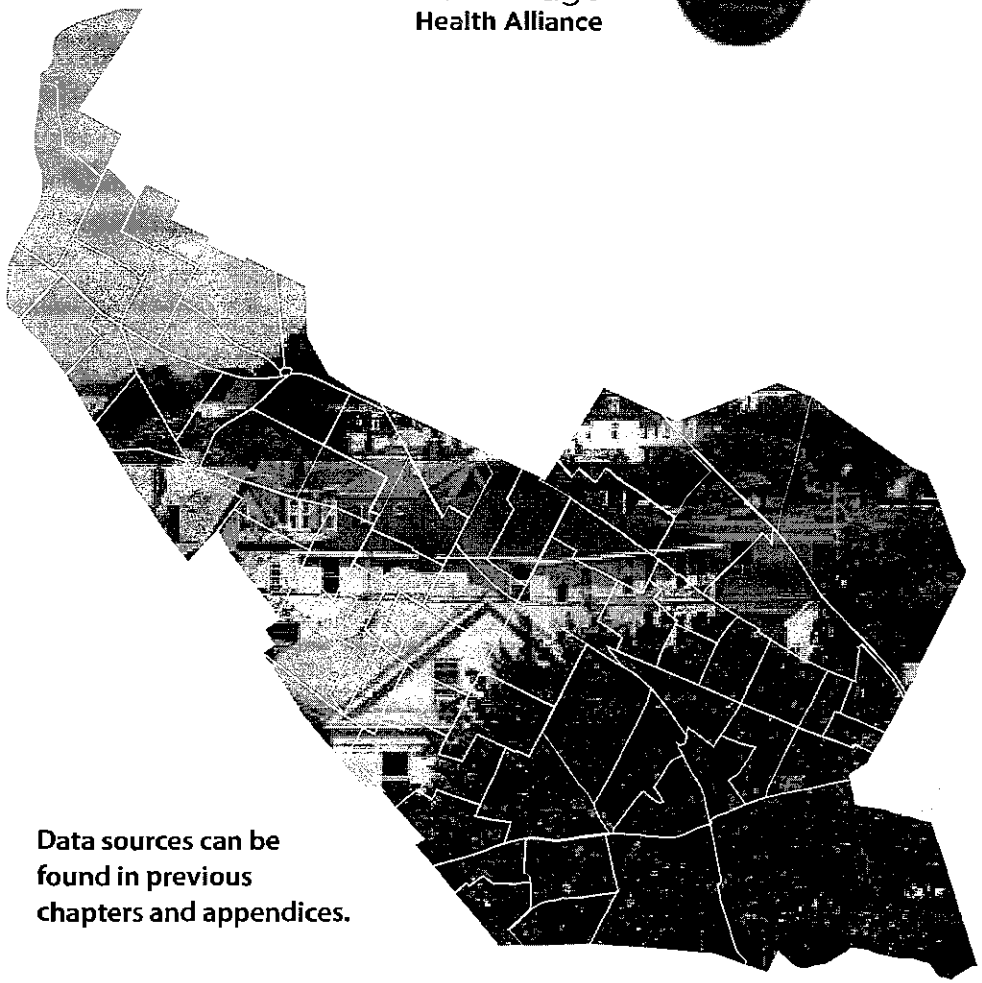
■ Create lifelong habits to promote mental health and substance use prevention

- Offer programs that promote social support, coping skills, and healthy lifestyles for older adults and their caregivers.
- Explore ways to increase awareness, recognition and treatment of depression in older adults.

The Wellbeing *of* Somerville Report

2017

CHA Cambridge Health Alliance



Data sources can be found in previous chapters and appendices.

Data Summary

Somerville is a densely populated city adjacent to Boston, Massachusetts, with an estimated 81,322 people in 4.1 square miles.

Who lives here?

- The population is young, with a median age of 31.3 years. Over 32% of the population is 25-34 years of age, one of the largest such populations per capita of young adults in the country.
- Somerville continues to be a community of immigrants. Only 75.3% of residents are native born, compared to the state average of 93%. The top five countries of birth for foreign born residents are Brazil, Portugal, China, India and El Salvador.
- The school population of 4,931 students has a higher diversity than the overall population, with 36.5% White and 43% Hispanic/Latino. Language diversity is also prevalent with 26.7% of students speaking Spanish at home, 9.3% Portuguese and 12% other languages.
- People with a disability comprise 8% of residents, with the highest percentage (38%) among residents 65+.
- An estimated 2,147 Veterans live in the City; 11.4% are under the age of 35 and 14.1% are 65+.
- Somerville residents are responsible for 1,732 licensed dogs in Somerville, as of 2017.

▶Education

- The percentage of residents who are high school graduates or higher is 89.3%;10.7% of Somerville residents over the age of 25 do not have a high school diploma or equivalency.
- The percent of the Somerville population over the age of 25 who had obtained a graduate or professional degree rose by 12% between 2010 and 2015.
- The Somerville district 4-year high school graduation rate in 2016 was 81.5%, while the state graduation rate was 87.5%. The adjusted 4-year graduation rate, which excludes transfers into the district, is higher than the state at 87.9% compared to state rate of 84.6%.
- The 2015-16 Somerville dropout rate across all grades was 1.9%, half the rate in the prior year (3.7%).

▶Economic Stability/Income

- The median income for Somerville is $73,106, an increase of 16% from 2006 to 2015. Based on the actual cost of living in the Greater Boston area, a single adult needs a minimum income of $27,040 and two working adults with two children need to earn $71,843 to meet basic needs.
- Of the total population, 14.7% percent of residents live in poverty; 22.7% of children under 18, 14.2% of people 65 and over and 43.2% of families with a single female head of household had incomes below the poverty level. The city poverty rate is higher than the Massachusetts average.
- Of community members living in poverty, 11.8% identified as White, compared to 19% as Asians, 26% as Hispanic/Latino, and 36.6% as Black/ African Americans, based on data available through 2015.

▶Health care coverage

- In Somerville, as of 2015, residents ages 35-64 were the least likely to have health Insurance, with 6.1% having no health coverage, higher than the state level for this age range.

- Of Somerville residents who had MassHealth insurance coverage, 54.7% lived in zip code 02145, 27.2% in 02143 and 18% in 02144.

▶Housing

- Somerville has 33,720 housing units, 65.2% were built prior to 1940.

- Rental units comprise 66% of the housing units with 34% of units occupied by the property owners.

- The Somerville Housing Authority owns and manages subsidized housing including 674 family units and 782 elderly units, as well as Section 8 housing.

- Since 2000, single-family home sales have increased in price by 112% (30.5% since 2012) while median rent increased by 43%. The average market rate rent in 2015 was $2,567 for a two-bedroom apartment, an amount requiring a household income of around $90,000 to keep housing expenses within the recommended 30-40% of total income.

- As of 2015, 39.1% of renter households in Somerville were rent-burdened, defined as households paying more than 30% of gross income towards housing. Just over thirty eight percent of owner households were cost-burdened.

- The City's SomerVision Comprehensive Plan for 6,000 new housing units by 2030 includes an additional 1,200 permanently affordable units.

▶Food Security

- In 2015, 9.3% of Somerville's 32,000 total households received some SNAP benefits, an increase of 4.9% from 2010.

- It is estimated that of those who are income eligible for SNAP, 61% are not enrolled in the program, referred to as the SNAP gap.

- In 2016, for the first time, the Youth Risk Behavior Survey in Somerville addressed food insecurity, with 9.4% of high school students responding that they had gone hungry; 18.2% of those identified as Haitian Creole speakers and 10.3% of Spanish speakers were food insecure.

▶Safety and Security

- Somerville has been a Sanctuary City for 30 years, a municipality that does not prosecute undocumented immigrants for violating federal immigration laws.

- Somerville data indicates that overall crime is decreasing, with 739 arrests in 2016 compared to 967 in 2010. The overall crime rates in Somerville are 20% lower than the U.S. rates, based on 2015 data.

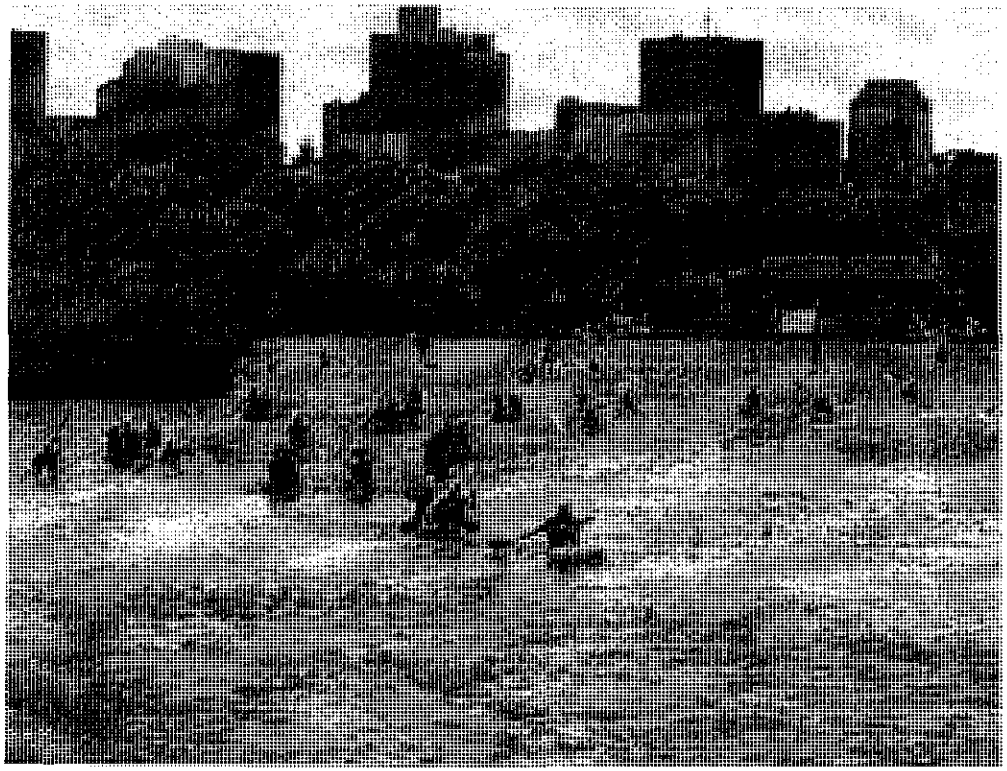
- In 2016, there were 198 domestic assaults recorded in Somerville for all ages, with 18% involving juveniles.

▶Employment

- Unemployment is low at 3.7%. 80% of working Somerville residents are employed in jobs outside the city.
- Compared to 19.8% of nondisabled adults over 18, 64.1% of disabled adults in Somerville were unemployed.

▶Transportation

- Somerville commuters are almost three times as likely to use public transportation to commute and more than twice as likely to walk or bike as the state rate and notably less likely to drive alone than the Massachusetts or U.S. average.
- Somerville's Walk Score of 86/100 is the second highest in the state. The Transit Score is 62/100.
- Public transportation will be enhanced by the extension of the Green Line and the Community Path, yet public transit will remain limited for north-south travel.



▶Environmental Health

- The Mystic River was awarded water quality ratings of A- for swimming and boating safety measures.
- Close proximity of Somerville neighborhoods to two major state highways is linked to increased exposure to air pollution.
- In Somerville, 57 units of Somerville housing have been de-leaded since 2012 in partnership with Federal grants.

▶Open Space and Access to Nature

- There are roughly 158 acres of publicly-accessible open spaces within Somerville, only 37% city-owned.
- This represents 6% of the City's land area and translates to roughly 2 acres of open space for every 1,000 Somerville residents.

▶Community Engagement

- In the 2016 presidential election, Somerville had 54,360 registered voters with 40,874 votes cast, a 75% turnout.
- In February 2017, over 4,000 people attended the ONE Somerville rally.

Prenatal/Early Childhood

- In 2016, of the total births, 61.9% of Somerville births were to mothers who identified as White (non-Hispanic), 16.2% Hispanic/Latino, 13.3% Asian and 5.7% Black (Non-Hispanic). In 2015, over one fifth of mothers were unmarried.
- In 2015, the percentage of children who were born premature was 10.3% in Somerville (90 of 876 births) and 10.7% of all births to Somerville mothers were reported to be low birth weight (91 out of 876).
- The teen birth rate in Somerville has declined since a peak in 2007-2009, to 7.6 per 1,000 live births or 12 babies born to teens ages 15-19 in 2015, with highest rates among Hispanic/Latino teens.
- For Somerville new mothers, the intention to breastfeed, based on response at time of birth, varied by age of mother with lower rates for teen mothers (79.6%) and higher rates for mothers over 30 years (94.3%) between 2011-2013.
- Between 2013-2015, of the 1,101 CHA patients aged 2-5 years who lived in Somerville who had an office visit where height and weight were measured, 32.2% of the children were overweight or obese.
- Between 2010 and 2016, the percentage of births to Somerville mothers with some post high school level education increased from 32.3% to 44.8%, while the percentage with less than a high school or high school only education background decreased from 33.4% to 12.8%.
- Of students entering Kindergarten in the Somerville Public Schools for the 2017-2018 school year, 93% had early education and/or care experience.
- Costs of early care and/or education vary greatly, ranging from an average of $25,000 per year for infants to $16,000 for preschool age children.

▶School Age/Adolescent (6-18 years)

- Between 2010-2017 school years, the Hispanic/Latino student population increased from 35.9% to 43.0% to become Somerville Public Schools largest ethnic group.

- The English Language Learners population in Somerville grew from 16.0% in 2010 to 19.2% in 2017, compared to 9.5% of MA students in 2017. The percentage of Somerville students whose first language was not English, at 49.3%, was more than double the percentage at the state level.

- In the 2016-2017 school year, 60.2% of Somerville students were classified as high needs, higher than the 45.2% state average.

- Among 2015 graduates of the Somerville school district, 70.7% attended college.

- In 2016, 31.2% of Somerville high school students felt depressed, defined as feeling sad or hopeless almost every day for two weeks or more in a row, at some point during the prior 12 months.

- In 2015, 12.2% of all Somerville middle school students self reported seriously considering suicide; the rate was 16% among Hispanic/Latino students.

- Among Somerville high school students, 7.9% of students engaged in binge drinking in the 30 days prior to being surveyed, continuing a downward trend since the 2002 rate of 26.3%.

Between 2010-2017, the Hispanic/Latino student population increased from 35.9% to 43.0% to become Somerville Public Schools largest ethnic group.

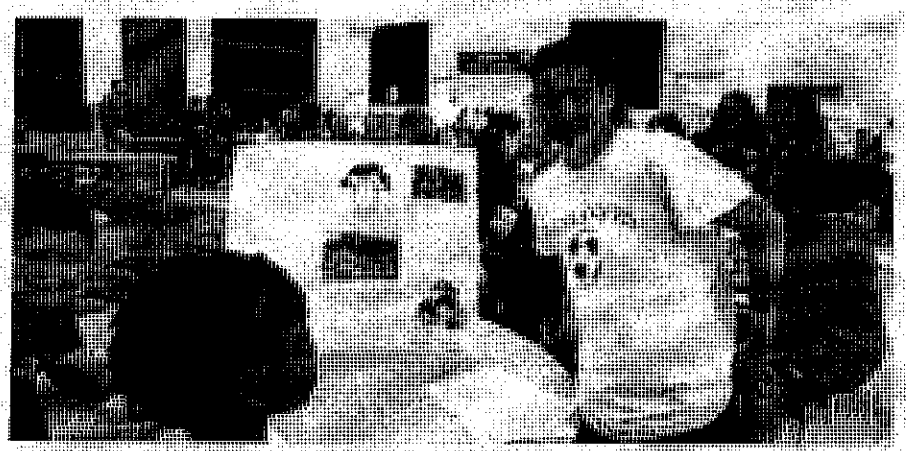
- A decrease in trend data since 2010, 12.9% of Somerville 9th graders reported substance use, including marijuana or alcohol, in the past 30 days for 2016.

- In the 2016-2017 school year, of a total of 1,439 Somerville students measured in grades 1, 4, 7 and 10, 18.5% were considered overweight and 24% obese, showing slight decreases from last year but still higher than the state rates of 16.6% and 15.3% respectively.

- Between 6th and 12th grades there was an 8.0% decrease in the number of Somerville students reporting that they get 8+ hours of sleep on average, with a decrease in high school students from 29.2% getting at least 8 hours of sleep in 2012 to 26.4% in 2016.

- Of the 274 Somerville high school students who reported having ever had sexual intercourse in 2016, 44.4% had been sexually active by age 14.

- In 2016, 60.4% of sexually active high school students reported using a condom the last time they had intercourse, a 15.4% drop from 2014.



- In the 2016-17 school year, 352 students enrolled in the district had an asthma diagnosis, representing 7.1% percent of the district's students.
- In Somerville in 2014 and 2015 respectively, 29% of high school students and 24% of middle school students reported that they lived in a household in which there was a smoker other than themselves.
- During the 2016-2017 school year, 94 students who attended Somerville Public Schools reported experiencing homelessness.
- Of 2016 Somerville High School students, 80% had an adult outside of school they feel they can talk to and 64.4% had an adult in school with whom to talk.
- Among the 282 high school students reporting they witnessed bullying in school in 2016, 44% of students did nothing and 3% joined in.
- In Somerville, 15.2% of Black middle school students worried during 2014-15 about being treated differently based on their race or ethnicity.
- Non-domestic violent incidents, including robbery and assault, involving youth decreased from 52 in 2010 to 31 in 2016.

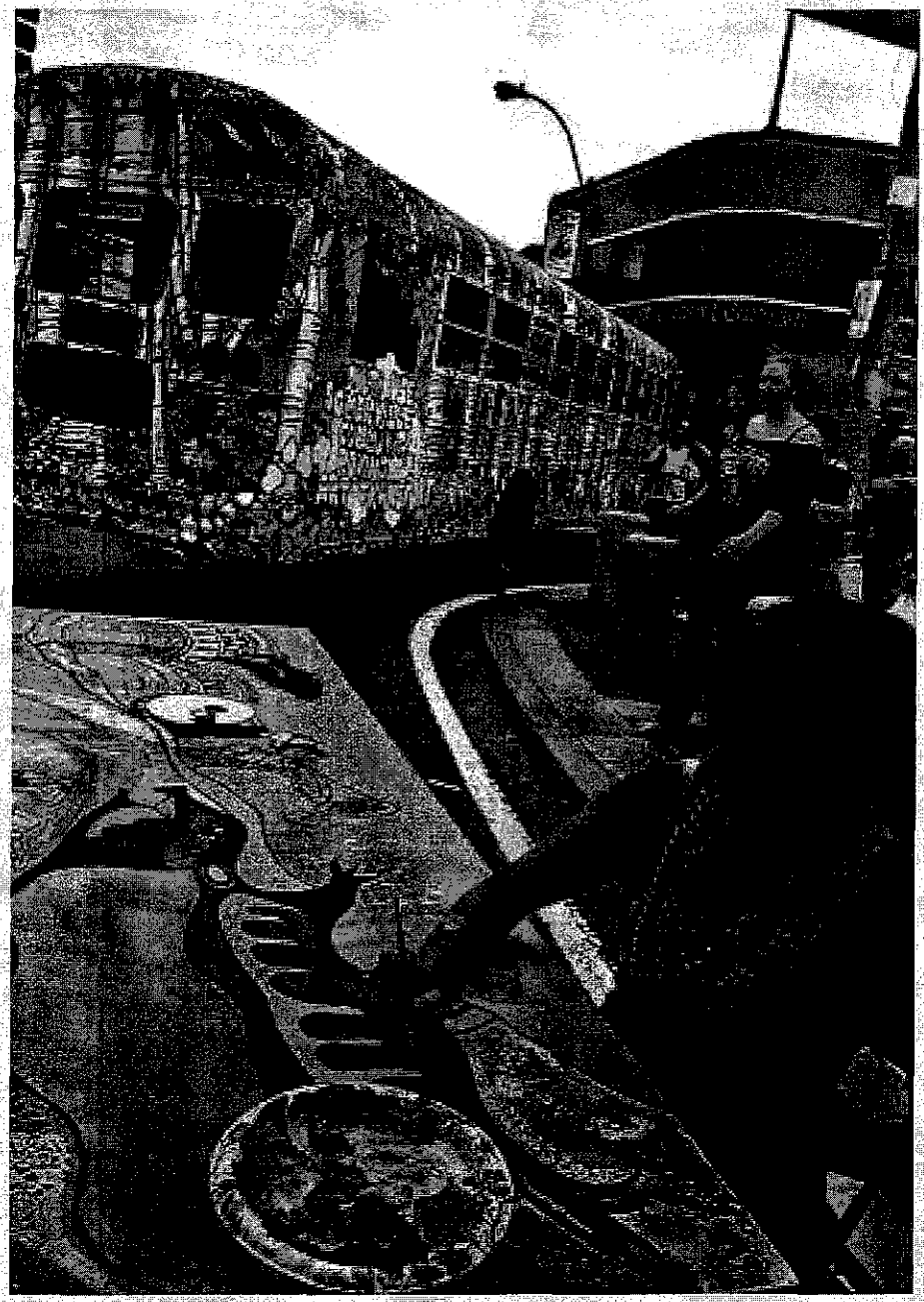
Early Adult (18-24 years)

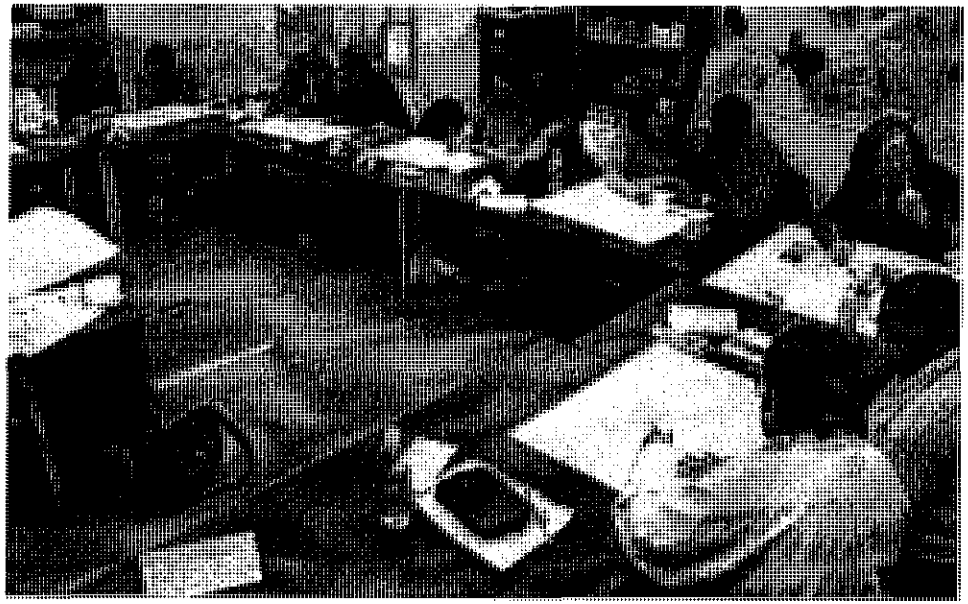
- Trends in rates of emergency department visits for mental health for this age have been higher for Black, non-Hispanics.
- From 2014-2016, 13% of fatal narcotic overdoses and 22% of non-fatal overdoses in Somerville were among people aged 16-25.
- Arrests of 18-20 year olds in Somerville have decreased dramatically from 151 in 2010 to 69 in 2016.
- More than 20% of Somerville adults over 18 had no leisure-time physical activity and only 28.5% of males and 37.3% of females reported eating five or more servings of fruits and vegetables in a day.
- In 2016, 59 women in this age group residing in Somerville gave birth, a 25% decrease from 2012, when there were 79 births in this cohort.
- There has been an overall increase in the rate of new cases per year of chlamydia, gonorrhea and syphilis among all Somerville residents since 2005. The incidence/new cases/rate of each of these three sexually transmitted infections more than tripled between 2005 and 2015 and the most currently available data indicates they are occurring at higher rates in Somerville than statewide.

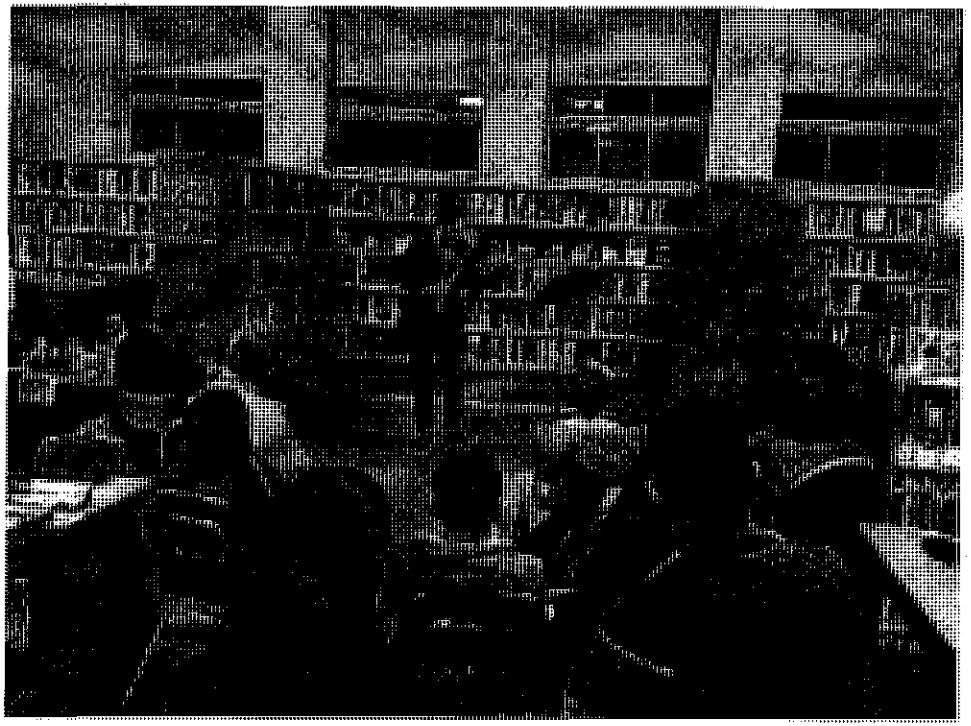
Young Adult (25-39 years)

- Rates for mental health related emergency department visits for young adults ages 25-39 in Somerville were 71% higher for males than females (2010-2012).
- Black young adults had the highest rate of mental health hospitalizations in this age group, between 2010 and 2012.
- Between 2010 and 2012, there were 12 suicides among young adults (25-39), the most of any adult life stage.
- Heroin was the most commonly used substance among 25-29 year olds in Massachusetts admitted to treatment in 2013, while alcohol ranked second.
- In the 25-40 age group, there was an average of 27 confirmed or probable cases of hepatitis C over the three years between 2013 and 2015.
- Asthma and other respiratory diseases were among the top five causes of hospitalization for this age group (2010-2012).
- Non-fatal overdoses for narcotics increased from 96 in 2010 to 191 in 2016. Fatal overdoses for narcotics rose from 3 in 2010 to 21 in 2016, with the sharpest increase starting in 2014. More recent 2017 data indicated these trends have shown decreases in Somerville.

Somerville's population is young, with a median age of 31.3 years. Over 32% of the population is 25-34 years of age, one of the largest such populations per capita of young adults in the country.







▶Middle Adult (40-64)

- Substance abuse treatment admission rates specifically for heroin at Somerville arising residents age 50-54 were twice as high as 2012 than Massachusetts rates; alcohol was the second substance related to medical intervention.

- Rates of diabetes related emergency department visits for Somerville adults ages 40-64 were higher among Blacks and Hispanics in the 2010-2012 period. The rates for Black adults were slightly higher than the state average, as well as surrounding communities, accounting for 227 visits.

- Trends for COPD-related emergency department visit rates steadily rose for all races in Somerville between 2006 and 2012.

- For the middle adult age group, the incidence (new cases) of HIV infection in 2015 was 109.43 per 100,000 with 16 new cases, a rate that is more than twice as high as MA overall; this age group accounts for over 66% of all Somerville residents living with HIV.

- For Somerville adults of this age, the leading cause of cancer death in the years 2010-2012 was lung cancer; though death due to female breast cancer were at a rate higher than the state.

- Heart Disease was the top cause of death for middle adults in Somerville and MA overall between 2010 and 2012.

- In the 45 to 64 age group in Somerville, 84.8% have a high school degree or higher, with only 33.6% with a Bachelor's degree or higher, notably half the rate of college degrees of the 25-44 age cohort.

▶Older Adult (65 and over)

- The race/ethnicity distribution of this age group in Somerville, according to 2015 government estimates was: 88.8% White, 5.6% Black or African-American, 4.7% Asian and 3.6% of Hispanic/Latino origin (of any race).
- Of Somerville residents 65+, an estimated 29.5% do not have U.S. citizenship, 92.5% of whom entered the U.S. before 2000 with 2.2% entering since 2010.
- The language spoken at home is English for 68.3% of Somerville residents age 65 or older, but 23.4% report speaking English less than "very well."
- Of the Somerville noninstitutionalized population in this age group, 38.2% had any disability and 61.8% had no disability, as of 2015.
- Black and Hispanic/Latino adults 65+ had the highest mental health related emergency department visit rates of all races, and Asians had the lowest.
- The age-specific rate of alcohol/substance related emergency department visits for adults age 65+ in Somerville was higher for both Whites and Blacks than the state. Black (Non-Hispanic) rates were dramatically higher than White rates.
- Self-reported satisfaction with life was high both among Somerville older adults and across the state, both at 95.8%.
- Diabetes Mellitus has been the leading cause of hospitalizations for residents 65 and older in both Somerville and the state as a whole. Between 2010-2012, Hispanics/Latinos and Blacks had the highest rates of hospitalizations among this age for Somerville residents.
- Data from 2004-2012 on cardiovascular health indicates health disparities. Hispanics/Latinos had the highest rate of cardiac related hospitalizations.
- Rates of stroke related hospitalizations for Blacks and Hispanics/Latinos 65+ in Somerville, were higher by 33.0% and 37.4%, respectively, than Somerville Whites or the respective MA rates.
- Lung cancer was the leading cause of cancer death in Somerville, significantly higher than the MA rate.
- The percentage of Somerville older adults with a college degree was 13.9%, lower than the state average of 25.1%.
- Poverty rates for this age group increased between 2010 and 2015 from 11.4% to 14.2%, higher than the Massachusetts rate for this age group at 9.2%. The percentage of Somerville 65+ households with an annual income of less than $20,000 was 34.6% compared to 28.4% statewide.
- Adults 65 and older in Somerville are more likely to be owner occupants (56%) than renters (44%) than the total population (34% owners and 66% renters). Of renters, a higher percentage (47.3%) of 65+ adults in Somerville spend more than 30% of their income on housing than does the total population (38.1%).
- 2016 data indicated nearly 1,500 residents over the age of 60+ utilized SNAP and were 27% of the total SNAP clients at that time.
- Close to 60% of residents over 65 drive their own cars for transport; in the year June 2016 through June 2017, the City's Traffic and Parking Department issued 4,337 senior resident permits.
- In 2015, an estimated 42.5% of Somerville residents 65 or older were married, 27.7% widowed, 11.8% divorced and 16.4% never married.
- 54.4% of older adults in the city live alone, with 11.7% of females living with family with no husband present. 6.8% of older adults are living with grandchildren, while 1.9% are responsible for parenting grandchildren.

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Who created The Wellbeing of Somerville Report 2017?

This report is the result of contributions from across the city of Somerville. It has been shaped through the feedback of community members, agencies and service providers, municipal employees, clinical staff and public health workers and academic interns.

The coordination of the effort is led by the Somerville Community Health Agenda of the Community Health Improvement Department at Cambridge Health Alliance in collaboration with the City of Somerville Health and Human Services Department, with data support from the Institute of Community Health. This report is the result of collaboration and contributions from a broad group of partners who participated in discussions and/or focus groups to select data points of interest and importance to the community of Somerville. In developing this report, partners also assisted with collecting and analyzing secondary data related to public health from a variety of lenses.

Community stakeholder groups for focus groups and feedback included such organizations as the By All Means Community Cabinet, Early Childhood Advisory Council, the Immigrant Service Providers, Shape Up Somerville Steering Committee, Somerville Youthworkers Network and an informal gathering of Somerville Senior Providers. These sessions provided valuable insights and feedback, as well as provocative questions to help direct exploration of data and recommendations. Over 80 community members who spent an evening together in late April 2017 also helped to provide diverse perspectives on the most pressing issues impacting the health of Somerville residents across the lifespan and recommendations to improve the health of all residents.

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Disclaimer

The content is solely the responsibility of the authors and does not necessarily represent official views of these agencies. This report is an ongoing effort to reflect some community-defined indicators that relate to health broadly defined. This report also highlights a range of data sources, including data from the Massachusetts Department of Health and Youth Risk Behavior Survey data collected from Middle and High School students.

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Appendix A: Data Resources

Some data sources are available to the public online and are linked in the web version of Appendix A, while others were provided by local agencies for the purpose of this report.

Demographics

American Community Survey, United States Census Bureau	2006-2015
Massachusetts Department of Elementary and Secondary Education, Profiles	2010-2017
United States Department of Labor, Bureau of Labor Statistics	1990-2016
Massachusetts Department of Labor and Workforce Development	2016
Massachusetts Department of Public Health, Registry of Vital Records and Statistics Bureau of Health Statistics, Research and Evaluation	2017
The Greater Boston Housing Report Card	2009-2015

Prenatal/Early Childhood

American Community Survey, United States Census Bureau	2006-2015
Cambridge Health Alliance	2016-2017
Community Action Agency of Somerville, Somerville Head Start	2016
City of Somerville Data Farm, Raise a Family, Somervillema.gov	2014
Data Resource Center for Child & Adolescent Health, National Survey of Children with Special Healthcare Needs	2010
Food Bank of Western Massachusetts, MA SNAP GAP	2017
The Kaiser Family Foundation, Health Insurance Coverage of Children 0-18	2015
Living Wage Calculator, Boston-Cambridge-Newton. Livingwage.mit.edu	2017
Massachusetts Department of Public Health, MA Births State Report	2015
Massachusetts Department of Public Health, Registry of Vital Records and Statistics, Bureau of Health Statistics, Research and Evaluation	2015
Massachusetts Department of Public Health, Uniform Hospital Discharge Data System, Division of Health Care Finance and Policy	2012
Massachusetts Pregnancy Risk Assessment Monitoring System	2011
Project Bread, 2015 Status Report on Hunger in Massachusetts, Projectbread.org	2015
Somerville Police Department	2010-2016
Somerville Public Schools	2017
The State of Obesity, Adult Obesity in the United States Stateofobesity.org	2016
The State of Obesity, Obesity Among WIC Participants Age 2-4, 2000-2014 Stateofobesity.org	2016
US. Census Bureau, Poverty Thresholds	2017
Youth Risk Behavior Survey, Somerville High School Health Survey	2006-2016

Adolescent/School-Aged

American Community Survey, United States Census Bureau	2006-2015
Association of Maternal & Child Health programs, Life Course Indicators Online Tool	2014
Cambridge Health Alliance	2014-2017
Centers for Disease Control, Adolescent Health	2017
Data Resource Center for Child & Adolescent Health, National Survey of Children with Special Healthcare Needs	2010
Department of Children and Families, Cambridge/Somerville	2016
Food Bank of Western Massachusetts, MA SNAP GAP	2017
Massachusetts Department of Elementary and Secondary Education, Profiles	2010-2017
Massachusetts Department of Public Health, Current Statistics (Overdose Deaths Data)	2017
Massachusetts Department of Public Health, MA Births State Report	2015
Massachusetts Department of Public Health, The Status of Child Weight in Massachusetts	2014
Massachusetts Department of Public Health, Uniform Hospital Discharge Data System, Division of Health Care Finance and Policy	2012
Massachusetts High School Youth Risk Behavior Survey (MA YRBS)	2006-2015
Massachusetts Youth Health Survey	2015
Office of Disease Prevention and Health Promotion, Healthy People 2020 Topics and Objectives	2008-2015
Somerville Department of Health and Human Services	2015-2016
Somerville Police Department	2010-2016
Somerville Public Schools	2015-2016
The UN Refugee Agency (UNHCR), Children on the Run	2014
Youth Risk Behavior Survey, Somerville High School Health Survey	2006-2016
Youth Risk Behavior Survey, Somerville Middle School Health Survey	2003-2015

Early Adult

American Community Survey, United States Census Bureau	2006-2015
Center for Disease Control and Prevention, 500 Cities Project: Local Data for Better Health	2017
Food Bank of Western Massachusetts, MA SNAP GAP	2017
Massachusetts Department of Elementary and Secondary Education, Profiles	2010-2017
Massachusetts Department of Public Health	2016
Massachusetts Department of Public Health, Community Health Information Profile Diabetes Risk Factors	2005-2013
Point in Time Count, Somerville Continuum of Care, 1/25/2017	2017
Somerville Fire and Police, COHR Narcotics Misuse Master Database	2014-2016
Somerville Police Department	2010-2016
Uniform Hospital Discharge Data System, Massachusetts Division of Health Care Finance and Policy, Massachusetts Department of Public Health	2012
Walk Score, Living in Somerville	2017

Young Adult

American Community Survey, United States Census Bureau	2006-2015
Cambridge Health Alliance	2015
City of Somerville Data Farm, Work, Somervillema.gov	2012
City of Somerville Data Farm, Raise a Family, Somervillema.gov	2012
Federal Bureau of Investigation, Uniform Crime Reporting Program	2015
Institute for Community Health	2016
Living Wage Calculator, Boston-Cambridge-Newton. Livingwage.mit.edu	2017
Massachusetts Department of Corrections, Prison Population Trends	2015
Massachusetts Department of Public Health, Bureau of Infectious Diseases and Laboratory Sciences, Division of STI Prevention	2005-2015
Massachusetts Department of Public Health, Bureau of Substance Abuse Services	2013
Massachusetts Department of Public Health, State Report (MA Births)	2015
Massachusetts Department of Public Health, Uniform Hospital Discharge Data System, Division of Health Care Finance and Policy	2012
Massachusetts Health Council, Report on Preventable Conditions and Social Determinants	2017
National Highway Traffic Safety Administration	2014
Somerville Department of Health and Human Services	2017
Somerville Fire and Police, COHR Narcotics Misuse Master Database	2014-2016
Somerville Police Department	2015
Somerville Housing Needs Assessment	2015
Registry of Vital Records and Statistics, Bureau of Health Statistics, Research and Evaluation	2015
The State of Obesity, Adult Obesity in the United States Stateofobesity.org	2016
Walk Score, Living in Somerville	2017

Middle Adult

American Community Survey, United States Census Bureau	2006-2015
Cambridge Health Alliance	2015
Food Bank of Western Massachusetts, MA SNAP GAP	2017
Massachusetts Department of Corrections, Prison Population Trends	2015
Massachusetts Department of Public Health, Bureau of Infectious Disease and Laboratory Science, HIV Surveillance Program	2015
Massachusetts Department of Public Health, Bureau of Infectious Disease and Laboratory Science, Office of Integrated Surveillance and Information Systems	2015
Massachusetts Department of Public Health, Bureau of Substance Abuse Services	2013
Massachusetts Department of Public Health, Registry of Vital Records and Statistics, Bureau of Health Statistics, Research and Evaluation	2015
Massachusetts Department of Public Health, Uniform Hospital Discharge Data System, Division of Health Care Finance and Policy	2012
Somerville Fire and Police	2017
Somerville Police Department	2017
Somerville Housing Needs Assessment	2015
The State of Obesity, Adult Obesity in the United States Stateofobesity.org	2016
Walk Score, Living in Somerville	2017

Older Adult

American Community Survey, United States Census Bureau	2006-2015
Massachusetts Department of Public Health, Registry of Vital Records and Statistics, Bureau of Health Statistics, Research and Evaluation	2015
Massachusetts Department of Public Health, Uniform Hospital Discharge Data System, Division of Health Care Finance and Policy	2012
Massachusetts Environmental Public Health Tracking	2012
Massachusetts Healthy Aging Data Report: Community Profiles	2015
Somerville Police Department	2016
Somerville Traffic and Parking Department	2017
U.S. Department of Health and Human Services, National Center for Health Statistics, "Health, United States, 2016"	2017

Appendix B: Citations

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Appendix C: Glossary

Accountable Care Organizations

Accountable Care Organizations (ACOs) are groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high quality care to their Medicare patients. The goal of coordinated care is to ensure that patients, especially the chronically ill, get the right care at the right time, while avoiding unnecessary duplication of services and preventing medical errors. When an ACO succeeds both in delivering high-quality care and spending health care dollars more wisely, it will share in the savings it achieves for the Medicare program (Accountable Care Organizations, 2017).

ACS – American Community Survey

An annual survey conducted by the U.S. Census Bureau in all U.S. counties and in Puerto Rico. It provides critical economic, social, demographic, and housing information to this country's communities every year. The survey provides communities with up-to-date information they need to better understand community issues, respond to needs, and allocate programs and resources. In recent years, the ACS has become more accessible online, and is now available to the public at factfinder.census.gov. Users can search for data exclusive to Somerville residents or compare data with other cities or the entire state.

ACEs – Adverse Childhood Experiences

Childhood experiences, both positive and negative, have a tremendous impact on future violence victimization and perpetration, and lifelong health and opportunity. As such, early experiences are an important public health issue. Much of the foundational research in this area has been referred to as Adverse Childhood Experiences (ACEs). Adverse Childhood Experiences have been linked to: risky health behaviors; chronic health conditions; low life potential, and early death. As the number of ACEs increases, so does the risk for these outcomes. The wide-ranging health and social consequences of ACEs underscore the importance of preventing them before they happen. CDC promotes lifelong health and well-being through Essentials for Childhood – Assuring safe, stable, nurturing relationships and environments for all children (About Adverse Childhood Experiences, 2016).

Affordable Care Act (ACA)

The comprehensive health care reform law enacted in March 2010 (sometimes known as ACA, PPACA, or "Obamacare"). The law has 3 primary goals: 1. Make affordable health insurance available to more people. The law provides consumers with subsidies ("premium tax credits") that lower costs for households with incomes between 100% and 400% of the federal poverty level; 2. Expand the Medicaid program to cover all adults with income below 138% of the federal poverty level. (Not all states have expanded their Medicaid programs); 3. Support innovative medical care delivery methods designed to lower the costs of health care generally (Affordable Care Act, n.d.).

Age Specific Rate per 100,000

A way to compare rates of disease, death, injury and other health outcomes between different age ranges; used to compare rates of health outcomes in different communities; ex. The amount of men over 50 diagnosed with cancer per 100,000 in New York City compared to Boston.

Association of Maternal and Child Health Programs Life Course Indicators (LCIs)

The Association of Maternal and Child Health Programs developed a set of 59 Life Course Indicators which are designed to promote a standard set of indicators to be applied to measure progress and improve maternal and child health. The Life Course Indicators were selected to address the social determinants of health among mothers and children in America. AMCHP Life Course Indicators selected for this report were chosen because existing Somerville data aligns with the indicators or because they are of particular national importance. The indicators chosen do not represent City-wide priorities, and while all AMCHP indicators are worth addressing, many could not be discussed in the report due to space limitations.

Behavioral Health

Behavioral health is inclusive of the emotions, behaviors and biology relating to a person's mental well-being, their ability to function in everyday life and their concept of self. While often used with Mental Health, Behavioral Health also includes the biological component of wellness. For example, Behavioral Health encompasses all contributions to mental wellness including substances and their abuse, behavior, habits and other external forces.

CDC – Center for Disease Control

The Centers for Disease Control and Prevention (CDC) is a federal agency that conducts and supports health promotion, prevention and preparedness activities in the United States, with the goal of improving overall public health. Established in 1946 and based in Atlanta, the CDC is managed by the Department of Health and Human Services (HHS) (Centers for Disease Control and Prevention, 2017).

Demographics

Statistical data relating to the population and particular groups within it; what ethnicities, ages, races, religions, genders make up a population in a particular area.

English-Language Learners, or ELLs

Students who are unable to communicate fluently or learn effectively in English, who often come from non-English-speaking homes and backgrounds, and who typically require specialized or modified instruction in both the English language and in their academic courses.

Equity

Everyone having access to fair and equal treatment under the law, regardless of race, social class or gender. Equity and equality are two strategies to produce fairness, but they are distinct. Equity is giving everyone what they need to be successful. Equality is treating everyone the same.

Equality aims to promote fairness, but it can only work if everyone starts from the same place and needs the same help. Equity is a focus on ensuring that those who have been disadvantaged for any number of reasons, including due to structural inequalities, are given what they need to be successful.

Federal Poverty Level

A measure of income issued every year by the Department of Health and Human Services (HHS). Federal poverty levels are used to calculate eligibility for Medicaid, the Children's Health Insurance Program (CHIP) and other programs and benefits. In 2017, the federal poverty level (FPL) for a family of 4 is $24,600(adapted from https://www.healthcare.gov/glossary/federal-poverty-level-FPL/).

Health

A state of complete physical, mental and social wellbeing and not merely the absence of disease; influenced by many socioeconomic factors.

Physical Health: good body health, being healthy includes regular physical activity, good nutrition and adequate rest.

Mental Health: cognitive and emotional wellbeing: a state of wellbeing in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.

Healthy Communities Initiative

Involves a wide range of local institutions, community groups and private citizens, as well as health professionals, in community development efforts to improve conditions that encourage and support healthy living, engaging citizens in helping realize visions for a healthier community.

Health Disparity

A health difference that is closely linked with social, economic or environmental disadvantage.

Health Equity

Healthy People 2020 defines health equity as attainment of the highest level of health for all people. Health Equity means efforts to ensure that all people have full and equal access to opportunities that enable them to lead healthy lives (https://healthequity.sfsu.edu/content/defining-health-equity).

Health Span

The period of a person's life during which they are generally health and free from serious or chronic illness.

Healthy People 2020

The U.S. CDC (Center for Disease Control) develops science-based "Healthy People" objectives, revised every 10 years. Leading Health Indicators (LHI) are high priority health issues and actions that can be taken to address them. Topics include: access to health services, clinical preventative services, environmental quality, injury and violence, maternal, infant and child health, mental health, nutrition, physical activity and obesity, oral health, reproductive and sexual health, social determinants, substance abuse and tobacco. The Healthy People 2020 leading health indicators were selected to strategically incorporate determinants of health and health disparities, as well as to promote health across life stages to "promote quality life, healthy development, and health behaviors across all life stages." The indicators selected for inclusion in the Healthy People 2020 leading health indicators were also informed by the National Prevention Strategy. Healthy People 2020 leading health indicators selected for The Wellbeing Report 2017 were chosen because there is existing Somerville data which aligns with the indicators or because they are of particular national importance. The indicators chosen do not represent City-wide priorities, and while all HP-2020 indicators are worth addressing, many could not be discussed in the Report due to space limitations.

High Needs

According to the Massachusetts Department of Elementary and Secondary Education a high needs classification includes students with disabilities and English Language Learners in addition to students who are homeless or in the foster system, those who perform far below grade level, and students who otherwise are in need of special assistance and support (MA DESE and U.S. Department of Education).

Life Course Indicators

See 'Association of Maternal and Child Health Programs Life Course Indicators (LCIs)' above.

Life Course Theory

Considering a range of factors that impact health, not just in one stage of life, but across all the life stages. Looks at patterns across time and populations. Family, social, economic and environmental factors impact health equality.

MWRA - Massachusetts Water Resources Authority

The public authority in the Commonwealth of Massachusetts that provides wholesale drinking water and sewage services to Somerville and other municipalities and industrial users. MWRA receives water from the Quabbin and Wachusett Reservoirs and the Ware River in central and western Massachusetts. For sewage, it operates an effluent tunnel in Boston Harbor for treated sewage as well as a treatment center on Deer Island at the mouth of the harbor, among other properties.

MAPP- Mobilizing for Action Through Planning and Partnerships

A community-driven strategic planning process for improving community health. Facilitated by public health leaders, this framework helps communities apply strategic thinking to prioritize public health issues and identify resources to address them. This approach drove the earliest Somerville health data inquiry process.

Median Income

Median income is the amount which divides the income distribution into two equal groups, half having incomes above the median, half having incomes below the median. The medians for households, families and unrelated individuals are based on all households, families and unrelated individuals, respectively. The medians for people are based on people 15 years old and over with income (U.S. Census Bureau, 2004).

Population Health

Health outcomes of a group of individuals, including the distribution of such outcomes within the group. The framework for population health includes three areas:

- Health outcomes (morbidity, mortality, quality of life)
- Health determinants that influence distribution (medical care, socioeconomic status, genetics)
- Policies and interventions that affect these determinants (social, environmental, individual) (http://www.rwjf.org/en/culture-of-health/2013/01/defining_population.html)

Risk and Protective Factors

There are certain determinants of health which are risk factors and others which are considered protective factors for health outcomes. Just like the fact that there can be biological risk factors for disease, such as obesity as a risk factor for diabetes, family and community risk and protective factors can also increase or decrease the odds of poor health outcomes.

Risk factors can be described as "a characteristic at the biological, psychological, family, community or cultural level that precedes and is associated with a higher likelihood of problem outcomes." Conversely, a protective factor is associated with a lower likelihood of problem outcomes.

Individual risk factors can have multiple outcomes. For example, an adverse experience such as the observation of or experience of abuse is associated with anxiety as well as depression and substance abuse.

Risk factors are correlated and those with some risk factors are likely to experience many risk factors. Risk factors and protective factors are cumulative, and somebody with more risk factors is more likely to have multiple or worse negative health outcomes, while those with many protective factors are at a reduced risk for negative outcomes (SAMSHA).

SAMHSA – Substance Abuse and Mental Health Services Administration

The agency within the U.S. Department of Health and Human Services that leads public health efforts to advance the behavioral health of the nation. SAMHSA's mission is to reduce the impact of substance abuse and mental illness on America's communities (SAMHSA).

Social Determinants of Health

A range of personal, social, economic, and environmental factors that contribute to an individual's health and wellbeing, including equity. Education, housing, and the built and natural environment, the economic climate and social structures are all factors contributing to individual and population health. For example, people with a quality education, stable employment, safe homes and neighborhoods and access to preventative services tend to be healthier throughout their lives. The world health organization (WHO) defines social determinants of health as "the conditions in which people are born, grow, live, work and age, and which are shaped by the distribution of money, power and resources at global, national and local levels and mostly responsible for health inequities."The CDC mentions that factors that impact social determinants of health are those that are "not controllable by the individual but affect the individual's environment."

YRBS- Youth Risk Behavior Survey

National survey conducted every two years to monitor priority health risk behaviors that contribute to the leading causes of death, disability and social problems among youth and adults in the United States. Similar surveys are conducted at the state and local leveks on varied schedules, accessing similar risk factors. These health risk behaviors include:

- Behaviors that contribute to unintentional injuries and violence
- Sexual behaviors related to unintended pregnancy and sexually transmitted infections, including HIV infection
- Alcohol and other drug use
- Tobacco use
- Unhealthy dietary behaviors
- Inadequate physical activity

Walk Score/Bike Score/

Walk Score is a number between 0 and 100 that measures the walkability of any address, usually between two points.

Bike Score is a number between 0 and 100 that measures the bikeability of any address, usually between two points

Wellbeing

Wellbeing is comprised of numerous dimensions that influence an individual's quality and duration of life. Wellbeing integrates mental health (mind) and physical health (body) resulting in more holistic approaches to disease prevention and health promotion. Wellbeing is a valid population outcome measure beyond morbidity, mortality and economic status that tells us how people perceive their life is going from their own perspective. Results from cross-sectional, longitudinal and experimental studies find that wellbeing is associated with: self-perceived health; longevity; healthy behaviors; mental and physical illness; social connectedness; productivity; factors in the physical and social environment. Wellbeing can provide a common metric that can help policy makers shape and compare the effects of different policies measuring, tracking and promoting wellbeing can be useful for multiple stakeholders involved in disease prevention and health promotion. Wellbeing is associated with numerous health, job, family and economically related benefits. Individuals with high levels of wellbeing are more productive at work and are more likely to contribute to their communities (adapted from https://www.cdc.gov/hrqol/wellbeing.htm).

Notes:

Prenatal & Childhood (Birth–4yrs)

Pages 22–43

- Disparities in utilization of prenatal care for African mothers.
- Infant mortality very low.
- Teen birth rates have declined.
- High risk populations disproportionately represented in premature and low weight births.
- Lack of screening on adverse childhood experiences despite known impacts.
- Adequate housing and food have long term positive impacts on children's health.
- Early childhood obesity carries lifelong impacts.
- Child care expenses a burden for many families.

School Age & Adolescence (5–19yrs)

Pages 44–69

- English and Math testing proficiency of approximately 40% of students.
- 31% of HS students self-report mental health issues including depression.
- 3rd grade reading proficiency decreasing.
- Black children are in foster care at a greater rate, primarily due to substance use of parents.
- Childhood obesity: 23% of school students measured in BMI system data collected statewide.
- By high school, nearly 20% of students report using vape devices.
- With 23% poverty rate for children under 18, housing and food security disproportionate.

Early Adult (18–24yrs)

Pages 70–89

Young Adult (25–39yrs)

Pages 90–109

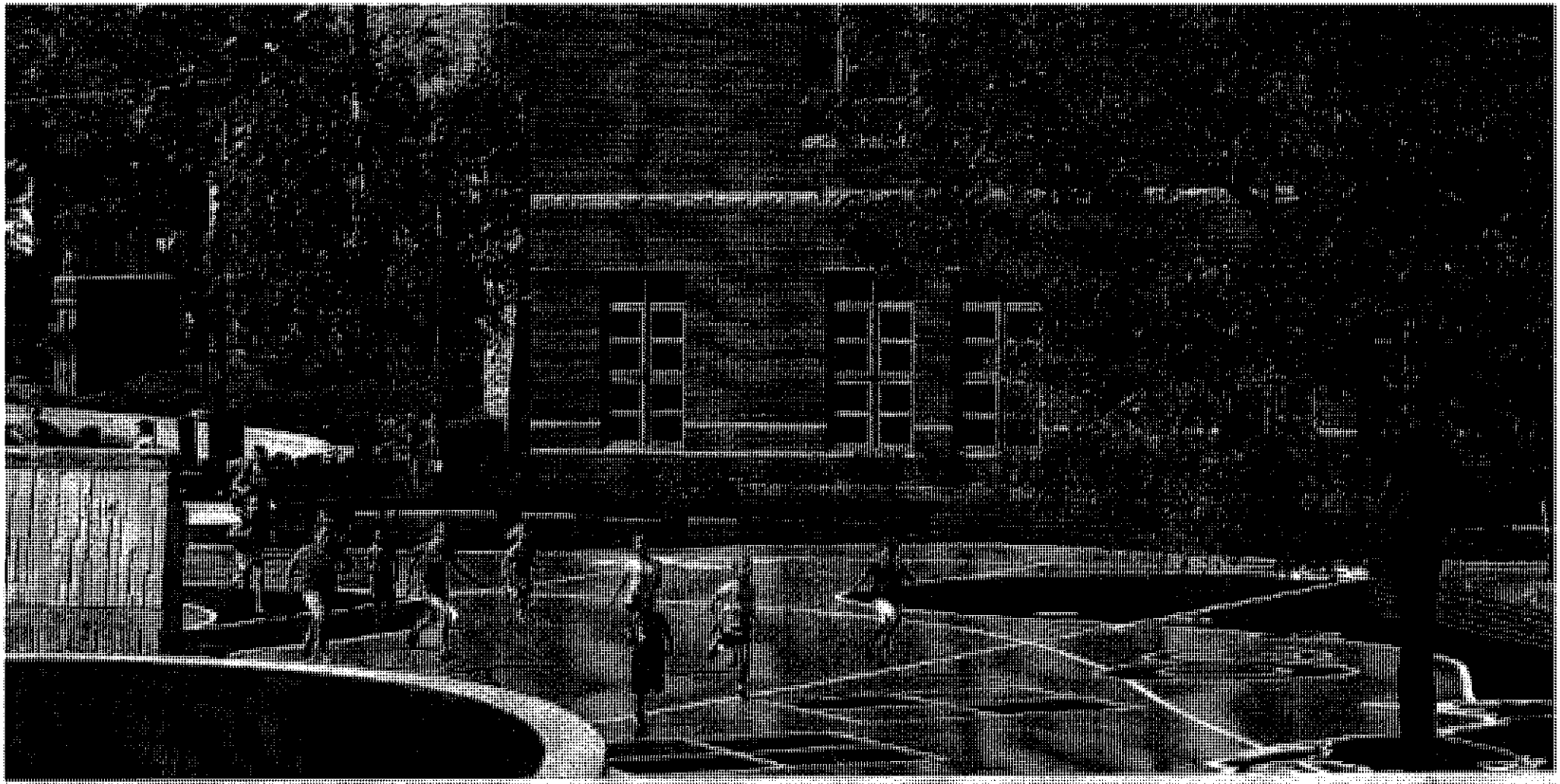
- Represent 40% of total population.
- Mental health issues persist, with indication of racial/ethnic disparities.
- Mental health historically a top cause of hospitalizations.
- Non-fatal and fatal overdoses increased since 2010, showing slight decreases in 2017.
- Trend of asthma and respiratory diseases among top 5 causes of hospitalization.
- High cost of housing impacting options and choices.

Middle Adult (40–64yrs)

Pages 110–129

Older Adult (65+yrs)

Pages 130–151



CHA
Cambridge
Health Alliance

Cambridge Health Alliance
Community Health Improvement
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Attachment/Exhibit

D

Partners HealthCare System, Inc.
Massachusetts General Physicians Organization - Assembly Row
Determination of Need – Community Health Initiative Narrative

A. Community Health Initiative Monies

The breakdown of Community Health Initiative ("CHI") monies for the proposed Project is as follows:

- Maximum Capital Expenditure: $14,983,573.00
- Community Health Initiative: $749,178.65 (5% of Maximum Capital Expenditure)
- CHI Administrative Fee: $22,475.35 (3% of the CHI monies)
- Overall CHI Money – less the Administrative Fee: $726,703.30

- CHI Funding for Statewide CHI Fund: $181,675.82 (25% of CHI monies – less the administrative fee)
- Initial CHI Local Funding: $545,027.48 (75% of CHI monies – less the Administrative Fee)
- Evaluation Monies to be retained by Cambridge Heath Alliance ("CHA") $54,502.75 (10% of the Initial CHI Local Funding)
- Final CHI Local Funding for Distribution: $490,524.73

B. Overview and Discussion of CHNA/DoN Processes

The Community Health Initiative ("CHI") processes and community engagement for the proposed Determination of Need ("DoN") Project[1] will be conducted by Cambridge Health Alliance ("CHA"). Over the last two years, Partners HealthCare System, Inc. ("Applicant") through the Massachusetts General Hospital's Center for Community Health Improvement ("CCHI") has developed a close partnership with CHA on addressing social determinants of health needs, community health needs assessments ("CHNAs") and planning. Currently, CCHI partners with CHA on the North Suffolk CHNA-CHIP Collaborative, as well as the Malden-Everett CHNA-CHIP Collaborative. These opportunities for collaboration have allowed the relationship between CHA and CCHI to flourish. Consequently, given that CHA has the equivalent of a CHNA in place for the City of Somerville, as well as the Hospital's strong commitment to community engagement and investment, the Applicant is requesting that CHA carry out the CHI processes for the Proposed Project.

CHA Overview

CHA is an innovative health system dedicated to providing essential services to all members of the community. With over 140,000 patients in Cambridge, Somerville, and Boston's Metro North region, CHA is a local provider of primary care, specialty care, emergency services, hospital care, maternity care and behavioral health. CHA also provides a vital safety net for underserved populations facing barriers to care.

[1] The proposed project is for the expansion of MGPO's existing licensed imaging clinic through the acquisition of three 3T magnetic resonance imaging ("MRI") units. The MRI units will operate at a new satellite of MGPO's clinic that will be located at 391 Revolution Drive, Store 1126, Somerville, MA 02145.

CHA mission's is "to improve the health of our communities." CHA is recognized for its commitment to improve population health and to address healthcare disparities through innovative clinical and community initiatives designed to address the needs of low income and ethnically diverse patients and community populations. Increasingly, CHA's community-based work is addressing systemic causes of health inequities. As a safety net system, CHA has historically been a major provider of primary care, as well as mental health and substance use disorder services, serving a high proportion of low income and immigrant residents.

CHA was created in 1996 through a merger between Cambridge Hospital and the private non-profit Somerville Hospital. CHA added a community hospital in Everett in 2001, and in 2013, became affiliated with Beth Israel Deaconess Medical Center. CHA is a teaching affiliate of Harvard Medical School's School of Public Health, and School of Dental Medicine, and the Tufts University School of Medicine. CHA operates the Cambridge Public Health Department and collaborates closely with local public health, elected officials, local agencies and organizations to improve the health of its communities.

Today, CHA is comprised of three hospitals: Cambridge, Somerville, and Everett, each with 24-hour emergency services and fifteen primary care practices all NCQA Level III Medical Homes (highest level of certification). Specific to Somerville, CHA operates three primary care practices in the City - CHA Broadway Care Center, CHA Union Square Health Center and CHA Primary Care at Somerville Hospital - a hospital emergency room, behavioral health services at the CHA Central Street Care Center, and the Teen-Based Clinic at Somerville High School. A new primary care clinic, the CHA Assembly Square Care Center in Somerville, opened in June of 2018. Several regional CHA programs are designed to meet the needs of older Somerville adults, including the Elder Service Plan/PACE program, Hospital-to-Home Discharge program and House Calls for homebound elders. Mental health and substance use treatment services are available at the Central Street location, offering outpatient services for adults, including the Health Integration Program to improve access to primary care for patients with mental illness. CHA also offers medication-assisted recovery and case management.

Somerville CHNA/CHIP History

As part of CHA's Community Health Improvement ("CHI") Department, staff lead the Somerville Community Health Agenda ("SCHA"), an innovative partnership between CHA, the Somerville Health Department and the community that works collaboratively to improve the health of residents. Core activities of the SCHA include collecting, assessing, and disseminating community health data, community visioning, coordinating systems change efforts, and facilitating coalition development. Since 2010, SCHA has created a monthly listing of "Somerville Health Happenings" to help communicate the wide range of health impacting efforts and resources available to improve the health of Somerville residents.

In the early years of the SCHA, starting in 2000, community work focused on periodic community health needs assessments with the first Wellbeing of Somerville Report completed in 2002. Working with local agencies and the City of Somerville, the needs assessment process and the final report spurred development and implementation of strategies to address identified needs, largely through coalition and capacity building, creating significant infrastructure capacity and sustained positions within the local public health department. Current Somerville Health and Human Service Department positions addressing substance use, youth mental health, obesity prevention and healthy built communities were created through grant funding supported by SCHA staff in collaboration with the City of Somerville and local partners. SCHA served as the backbone organization for the Shape Up Somerville Steering Committee from 2003-2009, with a heavy

emphasis on built environment strategies (farmers markets, local trails, community paths), as well as policy changes (purchasing of produce from local farmers). SCHA has provided leadership for coalitions, such as mental health and suicide prevention, having facilitated the introduction and evaluation of Mental Health First Aid as a tool to address both community education and stigma.

Starting in 2015 with a review of the plans for action in the 2011 Wellbeing of Somerville Report and more intensively during 2016 and 2017, CHA staff coordinated the development of the Wellbeing of Somerville Report 2017. This process built from earlier Mobilizing for Action through Planning and Partnership (MAPP) framing started in the early 1990s, evolved to bring a targeted focus on the CDC's leading health indicators, and in 2011 added exploration of the role of social determinants of health in Somerville. This latest participatory process, co-led with the Somerville Health & Human Services Department, was organized differently than past assessments, to ensure engagement of stakeholder groups across the life span, from prenatal to older adults. A health equity lens was applied throughout the process to highlight both unique challenges and opportunities across the age spectrum, influenced by work in the national maternal-child health and health equity realms.

Current Somerville CHNA/CHIP

In Somerville, CHA has recently coordinated a multi-phase CHNA including the Wellbeing of Somerville Report 2017 engagement process (2016-2018 CHNA phase) followed by CHA's Strategy for a Healthy Somerville 5-year community health improvement planning process (2018-2019 CHIP phase). Community engagement is a key element of CHA's work, including these efforts which involved approximately 1,679 people in exploring questions of how to improve the health of residents of Somerville.

Community Involvement
1,022 surveys completed
133 residents participated in focus groups
31 Stakeholder interviews
493 people attended community meetings

Although CHA was not under obligation to comply with the CHNA requirements for hospitals created by the Affordable Care Act, the Hospital is committed to working with its core communities to ensure access to health information and engaging processes for identifying key health priorities and developing strategic plans. Accordingly, CHA has worked to develop robust needs assessments processes, using the Hospital's long history of community involvement in periodic reviews of health data, with related prioritization and selected recommendations and actions to improve health at the local level. Given the changes in the healthcare industry and federal and state regulatory landscape, CHA has recently been exploring and piloting collaborative efforts with other regional health care/hospital systems to create CHNAs across all CHA core communities in closer approximation to the ACA/ACO/DPH guidelines for future assessment.

Somerville CHNA/CHIP Priorities and Strategies

Priorities that arose consistently throughout the Wellbeing assessment process (CHNA) included:

- Mental Health issues (including depression, anxiety, suicidality, social isolation);
- Substance Use (Opioids, Alcohol);

- Obesity/Nutrition and Physical Activity and related chronic diseases (diabetes and heart disease); and
- Social Determinants of Health (affordable housing, food access, employment/jobs, access to early education and care, etc.).

The process of assessment that continued with the development of the CHA Strategies for a Healthy Somerville (CHIP) echoed needs identified through the Somerville assessment, including:

- Access to healthcare, including urgent care access, navigation supports and education to address health literacy challenges;
- Increased Access to Mental Health and improved continuum of care for Substance Use Treatment;
- Social Determinants of Health ("SDOH") (housing, education, access to healthcare) and connections to population health goals such as stress, healthy child development, obesity and equity & inclusion for all; and
- Better leverage technology to improve customer service and strengthen the continuum of care.

Strategies to address these priority issues include continuing to work with the City of Somerville to address the influencers of health. To be successful, this work requires a multi-pronged approach that intervenes at all levels from the individual to community, from direct services to policy solutions. CHA backbone support and technical assistance for building capacity and impact of community coalitions engaged in access, mental health, substance use and SDOH issues will be strengthened. Screenings of our patients for SDOH will continue to be expanded, having initially started with all MassHealth patients. Hospital staff are working on quality improvement efforts within the CHA systems, including improving technology tools, and partnering closely with local and regional service providers on closing the loop on successful referrals to ensure that basic needs of patients are met to better promote lifelong health and wellbeing. Patient Navigator, Patient Resource Coordinators and Community Health Workers will be engaged to deepen health access promotion and education initiatives in primary care, mental and behavioral health/substance use treatment, as well as transition from ED to Urgent Care at Somerville Hospital, while addressing cultural barriers for immigrants in accessing the U.S. health care system.

C. Advisory Committee Duties

Given that this is a Tier 2 CHI, the scope of work that the CHA Community Advisory Committee will carry out includes:

- Based upon the 2017-2019 Wellbeing of Somerville Report and aligned with the Department of Public Health's ('Department") Health Priorities and the Executive Office of Health and Human Services' Focus Areas, the CHA Community Advisory Committee is tasked with determining the Health Priorities for CHI funding.

D. Allocation Committee Duties

The Allocation Committee is comprised of individuals from the Advisory Committee who do not have a conflict of interest in regard to funding. The scope of work that the Allocation Committee will carry out includes:

- Determining If there is a conflict of interest for any Allocation Committee member, and if so, asking the member to recuse him/herself (a Conflict of Interest Form is in the process of being developed).
- Selecting the Health Strategies for the CHI Process.

- Submitting the Health Priorities and Strategies Form to the Department for review and approval.
- Carrying out a formal request for proposal ("RFP") process for the disbursement of CHI funds or some similar transparent process for funding distribution.
- Engaging resources that can support and assist applicants with their responses to an RFP.
- Disbursement of CHI funding.
- Providing oversight to a third-party vendor that is selected to carry out the evaluation of CHI-funded projects.

E. Timeline for CHI Activities

Upon a Notice of Determination of Need being issued by the Public Health Council, the CHA Community Advisory Committee will commence meeting and begin the CHI Process. The timeline for CHI activities is as follows:

- Six weeks post-approval: The CHA Community Advisory Committee will begin meeting and reviewing the 2017-2019 Wellbeing of Somerville Report to commence the process of selecting Health Priorities.
- Three – four months post-approval: The CHA Community Advisory Committee has determined Health Priorities and Strategies for funding and submits the Health Priorities and Strategies Form to the Department.
- Five – six months post-approval: The Allocation Committee is developing the RFP process and/or potentially some other transparent process for funding distribution and determining how this process will work in tandem with CHA's current grant efforts.
- Five – six months post-approval: CHA will seek to work with an evaluator that will serve as a technical resource to grantees.
- Nine months post-approval: The RFP for funding is released.
- Ten months post-approval: Bidders conferences are held on the RFP.
- Twelve months post-approval: Responses are due for the RFP.
- Fifteen months post-approval: Funding decisions are made, and the disbursement of funds begins.
- Eighteen months post-approval: Evaluator will begin evaluation work.

The aforementioned process is longer than the process outlined in the DoN Guidelines for Tier 2 projects. However, given CHA's previous experience with RFP processes, staff feel strongly that it will take nine months to develop an RFP process that is transparent, fair and appropriate.

F. Request for Additional Years of Funding

CHA is seeking additional time to carry out the disbursement of funds for CHI. Based on the current Wellbeing of Somerville Report, as well as previous experience with providing grant funding, CHA will offer larger, potentially multi-year grants with CHI funding. Consequently, CHA is seeking to disburse these monies over a 3-5 year period to ensure the greatest impact for the largest number of individuals.

G. Evaluation Overview

CHA is seeking to use 10% of local CHI funding for evaluation efforts. These monies will allow the Hospital to engage a third-party evaluator to carry out technical assistance and ensure appropriate evaluation of the CHI-funded projects.

H. Administrative Monies

Applicants submitting a Tier 2 CHI are eligible for a three percent (3%) administrative fee. Accordingly, CHA is requesting $22,475.35 in administrative funding. These monies are critical in developing a sound CHI process that complies with the Department of Public Health's expectations. These monies will pay for reporting and dissemination of promising practices and lessons learned, facilitation support for the Advisory Committee and Allocation Committee, costs associated with the development of communication materials and placement of procurement information in community newspapers, as well as offset the costs associated with the development and implementation of the RFP process.

Attachment/Exhibit

5

RETURN OF PUBLICATION

I, the undersigned, hereby certify under the pains and penalties of perjury, that I am employed by the publishers of the *Boston Herald* and the following Public/Legal announcement was published in two sections of the newspaper on September 8, 2019 accordingly:

1) "Public Announcement Concerning a Proposed Health Care Project" page 33, Legal Notice Section.

2) "Public Announcement Concerning a Proposed Health Care Project" page 15, Local News Section.

Signature

Brian Robinson
Name

Call Center Manager
Title

617470.1

Public Announcement Concerning a Proposed Health Care Project

Partners HealthCare System, Inc. ("Applicant") located at 800 Boylston Street, Suite 1150, Boston, MA 02199 intends to file a Notice of Determination of Need ("Application") with the Massachusetts Department of Public Health for a change in service by the Massachusetts General Physicians Organization, Inc. ("MGPO"). The project is for the expansion of MGPO's existing licensed imaging clinic through the acquisition of three 3T magnetic resonance imaging ("MRI") units. The MRI units will operate at a new satellite of MGPO's clinic that will be located at 391 Revolution Drive, Store 1126, Somerville, MA 02145 ("Project"). The total value of the Project based on the maximum capital expenditure is $14,983,573. The Applicant does not anticipate any price or service impacts on the Applicant's existing Patient Panel as a result of the Project. Any ten Taxpayers of Massachusetts may register in connection with the intended Application by no later than October 23, 2019 or 30 days from the Filing Date, whichever is later, by contacting the Department of Public Health, Determination of Need Program, 250 Washington Street, 6th Floor, Boston, MA 02108.

Sept 8

PUBLIC ANNOUNCEMENT CONCERNING A PROPOSED HEALTH CARE PROJECT

Partners HealthCare System, Inc. ("Applicant") located at 800 Boylston Street, Suite 1150, Boston, MA 02199 intends to file a Notice of Determination of Need ("Application") with the Massachusetts Department of Public Health for a change in service by the Massachusetts General Physicians Organization, Inc. ("MGPO"). The project is for the expansion of MGPO's existing licensed imaging clinic through the acquisition of three 3T magnetic resonance imaging ("MRI") units. The MRI units will operate at a new satellite of MGPO's clinic that will be located at 391 Revolution Drive, Store 1126, Somerville, MA 02145 ("Project"). The total value of the Project based on the maximum capital expenditure is $14,983,573. The Applicant does not anticipate any price or service impacts on the Applicant's existing Patient Panel as a result of the Project. Any ten Taxpayers of Massachusetts may register in connection with the intended Application by no later than October 23, 2019 or 30 days from the Filing Date, whichever is later, by contacting the Department of Public Health, Determination of Need Program, 250 Washington Street, 6th Floor, Boston, MA 02108.

Attachment/Exhibit

6

The Commonwealth of Massachusetts
HEALTH POLICY COMMISSION
50 MILK STREET, 8TH FLOOR
BOSTON, MASSACHUSETTS 02109
(617) 979-1400

STUART H. ALTMAN
CHAIR

DAVID M. SELTZ
EXECUTIVE DIRECTOR

December 29, 2017

Sree Chaguturu
Partners HealthCare System, Inc.
800 Boylston Street, 11th Floor
Boston, MA 02199

RE: ACO Certification

Dear Dr. Chaguturu:

Congratulations! The Health Policy Commission (HPC) is pleased to inform you that Partners HealthCare System, Inc. meets the requirements for ACO Certification. This certification is effective from the date of this letter through December 31, 2019.

The ACO Certification program, in alignment with other state agencies including MassHealth, is designed to accelerate care delivery transformation in Massachusetts and promote a high quality, efficient health system. ACOs participating in the program have met a set of objective criteria focused on core ACO capabilities including supporting patient-centered care and governance, using data to drive quality improvement, and investing in population health. Partners Healthcare System, Inc. meets those criteria.

The HPC will promote Partners HealthCare System, Inc. as a Certified ACO on our website and in our marketing and public materials. In addition, a logo is enclosed for your use in accordance with the attached Terms of Use. We hope you will use the logo to highlight the ACO Certification to your patients, payers, and others.

The HPC looks forward to your continued engagement in the ACO Certification program over the next two years. In early 2018, HPC staff will contact you to discuss any updates to your submission and to plan a site visit for later in the year.

Thank you for your dedication to providing accountable, coordinated health care to your patients. If you have any questions about this letter or the ACO Certification program, please do not hesitate to contact Catherine Harrison, Deputy Policy Director, at HPC-Certification@state.ma.us or (617) 757-1606.

Best wishes,

David Seltz
Executive Director

Attachment/Exhibit

7

Examiner

Name Approved

The Commonwealth of Massachusetts

OFFICE OF THE MASSACHUSETTS SECRETARY OF STATE
MICHAEL J. CONNOLLY, Secretary
ONE ASHBURTON PLACE, BOSTON, MASSACHUSETTS 02108

ARTICLES OF ORGANIZATION

(Under G.L. Ch. 180)

ARTICLE I

The name of the corporation is:

MGH/BRIGHAM HEALTH CARE SYSTEM, INC.

ARTICLE II

The purpose of the corporation is to engage in the following activities:

(i) To organize, operate and support a comprehensive health care system, including without limitation hospital and other health care services for all persons, and education and research for the prevention, diagnosis, treatment and cure of all forms of human illness; (ii) to improve the health and welfare of all persons; (iii) to operate for the benefit of and to support The Massachusetts General Hospital, The Brigham Medical Center, Inc., their respective affiliated corporations and such other charitable, scientific or educational organizations which are or are affiliated with teaching hospitals in the Greater Boston Area; and (iv) to carry on any other activity that may lawfully be carried on by a corporation formed under Chapter 180 of the Massachusetts General Laws which is exempt under section 501(c)(3) of the Internal Revenue Code.

93-349060

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M ☐
R.A. ☐

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P.C.

Note: If the space provided under any article or item on this form is insufficient, additions shall be set forth on separate 8½ x 11 sheets of paper leaving a left hand margin of at least 1 inch. Additions to more than one article may be continued on a single sheet so long as each article requiring each such addition is clearly indicated.

ARTICLE III

If the corporation has one or more classes of members, the designation of such classes, the manner of election or appointments, the duration of membership and the qualification and rights, including voting rights, of the members of each class, may be set forth in the by-laws of the corporation or may be set forth below:

The designation of classes of members, if any, the manner of election or appointment, the term of office, and the qualifications and rights of members are set forth in the by-laws of the Corporation.

ARTICLE IV

* Other lawful provisions, if any, for the conduct and regulation of the business and affairs of the corporation, for its voluntary dissolution, or for limiting, defining, or regulating the powers of the corporation, or of its directors or members, or of any class of members, are as follows:

See Continuation Sheets IV-A through IV-D attached hereto and incorporated herein by reference.

* If there are no provisions, state "None".

Note: The preceding four (4) articles are considered to be permanent and may ONLY be changed by filing appropriate Articles of Amendment.

MGH/BRIGHAM HEALTH CARE SYSTEM, INC.

IV. Other Lawful Provisions for Conduct and Regulation of the Business and Affairs of the Corporation, for its Voluntary Dissolution, and for Limiting, Defining and Regulating the Powers of the Corporation and of its Trustees and Members.

4.1. The corporation shall have in furtherance of its corporate purposes all of the powers specified in Section 6 of Chapter 180 and in Sections 9 and 9A of Chapter 156B of the Massachusetts General Laws (except those provided in paragraph (m) of said Section 9) as now in force or as hereafter amended, and may carry on any operation or activity referred to in Article 2 to the same extent as might an individual, either alone or in a joint venture or other arrangement with others, or through a wholly or partly owned or controlled corporation; provided, however, that no such power shall be exercised in a manner inconsistent with said Chapter 180 or any other chapter of the Massachusetts General Laws or which would deprive it of exemption from federal income tax as an organization described in Section 501(c)(3) of the Internal Revenue Code.

4.2. The by-laws may authorize the trustees to make, amend or repeal the by-laws in whole or in part, except with respect to any provision thereof which by law, the articles of organization or the by-laws requires action by the members.

4.3. Meetings of the members may be held anywhere in the United States.

4.4. No trustee or officer of the corporation shall be personally liable to the corporation or its members for monetary damages for breach of fiduciary duty as such trustee or officer notwithstanding any provision of law imposing such liability, except to the extent that such exemption from liability is not permitted under Chapter 180 of the Massachusetts General Laws.

4.5.(a) The corporation shall, to the extent legally permissible, indemnify each person who serves as one of its members, trustees or officers, or who serves at its request as a member, trustee or officer of another organization or in a capacity with respeot to any employee benefit plan (each such person being called in this Section 4.5 a "Person") against all liabilities and expenses, including amounts paid in satisfaction of judgments, in compromise or as fines and penalties, and

counsel fees, reasonably incurred by such Person in connection with the defense or disposition of any action, suit or other proceeding, whether civil or criminal, in which such Person may be involved or with which such Person may be threatened, while in office or thereafter, by reason of being or having been such a Person, except with respect to any matter as to which such Person shall have been adjudicated in any proceeding not to have acted in good faith in the reasonable belief that his or her action was in the best interests of the corporation or, to the extent that such matter relates to service at the request of the corporation for another organization or an employee benefit plan, in the best interests of such organization or of the participants or beneficiaries of such employee benefit plan. Such best interests shall be deemed to be the best interests of the corporation for the purposes of this Section 4.5.

(b) Notwithstanding the foregoing, as to any matter disposed of by a compromise payment by any Person, pursuant to a consent decree or otherwise, no indemnification either for said payment or for any other expenses shall be provided unless such compromise shall be approved as in the best interests of the corporation, after notice that it involves such indemnification, (a) by a disinterested majority of the trustees then in office; or (b) by a majority of the disinterested trustees then in office, provided that there has been obtained an opinion in writing of independent legal counsel to the effect that such Person appears to have acted in good faith in the reasonable belief that his or her action was in the best interests of the corporation; or (c) by a majority of the disinterested members entitled to vote, voting as a single class.

(c) Expenses, including counsel fees, reasonably incurred by any Person in connection with the defense or disposition of any such action, suit or other proceeding may be paid from time to time by the corporation in advance of the final disposition thereof upon receipt of an undertaking by such Person to repay the amounts so paid if such Person ultimately shall be adjudicated to be not entitled to indemnification under this Section 4.5. Such an undertaking may be accepted without reference to the financial ability of such Person to make repayment.

(d) The right of indemnification hereby provided shall not be exclusive. Nothing contained in this Section shall affect any other rights to indemnification to which any Person or other corporate personnel may be entitled by contract or otherwise under law.

(e) As used in this Section 4.5, the term "Person" includes such Person's respective heirs, executors and administrators, and

a "disinterested" member, trustee or officer is one against whom in such capacity the proceeding in question, or another proceeding on the same or similar grounds, is not then pending.

4.6.(a) No person shall be disqualified from holding any office by reason of any interest. In the absence of fraud, any trustee, officer or member of this corporation, or any concern in which any such trustee, officer or member has any interest, may be a party to, or may be pecuniarily or otherwise interested in, any contract, act or other transaction (collectively called a "transaction") of this corporation, and

(1) such transaction shall not be in any way invalidated or otherwise affected by that fact; and

(2) no such trustee, officer, member or concern shall be liable to account to this corporation for any profit or benefit realized through any such transaction;

provided, however, that such transaction either was fair at the time it was entered into or is authorized or ratified either (i) by a majority of the trustees who are not so interested and to whom the nature of such interest has been disclosed, or (ii) by vote of a majority of each class of members of the corporation entitled to vote for trustees, at any meeting of members the notice of which, or an accompanying statement, summarizes the nature of such transaction and such interest. No interested trustee or member of this corporation may vote or may be counted in determining the existence of a quorum at any meeting at which such transaction shall be authorized, but may participate in discussion thereof.

(b) For purposes of this Section 4.6, the term "interest" shall include personal interest and also interest as a trustee, officer, stockholder, shareholder, director, member or beneficiary of any concern; and the term "concern" shall mean any corporation, association, trust, partnership, firm, person or other entity other than this corporation.

(c) No transaction shall be avoided by reason of any provisions of this paragraph 4.6 which would be valid but for such provisions.

4.7. No part of the assets or net earnings of the corporation shall inure to the benefit of any member, officer or trustee of the corporation or any individual; no substantial part of the activities of the corporation shall be the carrying on of propaganda, or otherwise attempting, to influence legislation except to the extent permitted by Section 501(h) of the Internal Revenue Code; and the corporation shall not participate in, or

intervene in (including the publishing or distributing of statements), any political campaign on behalf of (or in opposition to) any candidate for public office. It is intended that the corporation shall be entitled to exemption from federal income tax as an organization described in Section 501(c)(3) of the Internal Revenue Code and shall not be a private foundation under Section 509(a) of the Internal Revenue Code.

4.8. If and so long as the corporation is a private foundation (as that term is defined in Section 509 of the Internal Revenue Code), then notwithstanding any other provisions of the articles of organization or the by-laws of the corporation, the following provisions shall apply:

A) the income of the corporation for each taxable year shall be distributed at such time and in such manner as not to subject the corporation to the tax on undistributed income imposed by Section 4942 of the Internal Revenue Code, and

B) the corporation shall not engage in any act of self dealing (as defined in Section 4941(d) of the Internal Revenue Code), nor retain any excess business holdings (as defined in Section 4943(c) of the Internal Revenue Code), nor make any investments in such manner as to subject the corporation to tax under Section 4944 of the Internal Revenue Code, nor make any taxable expenditures (as defined in Section 4945(d) of the Internal Revenue Code).

4.9. Upon the liquidation or dissolution of the corporation, after payment of all of the liabilities of the corporation or due provision therefor, all of the assets of the corporation shall be disposed of pursuant to Massachusetts General Laws, Chapter 180, Section 11A, to The Massachusetts General Hospital and The Brigham Medical Center, Inc. if exempt from taxation as organizations described in Section 501(c)(3) of the Internal Revenue Code or, if both are not, to one or more organizations with similar purposes and similar tax exemption.

4.10. All references herein: (i) to the Internal Revenue Code shall be deemed to refer to the Internal Revenue Code of 1986, as now in force or hereafter amended; (ii) to the General Laws of The Commonwealth of Massachusetts, or any chapter thereof, shall be deemed to refer to said General Laws or chapter as now in force or hereafter amended; and (iii) to particular sections of the Internal Revenue Code or said General Laws shall be deemed to refer to similar or successor provisions hereafter adopted.

MGH/BRIGHAM HEALTH CARE SYSTEM, INC.

Continuation Sheet VII(b)

	Name	Residence or Post Office Address
Officers		
Vice-President	J. Robert Buchanan, M.D.	25 Commonwealth Avenue Boston, MA 02116
President	H. Richard Nesson, M.D.	565 Boylston Street Brookline, MA 02146
Treasurer	Richard A. Spindler	210 Schoolmaster Lane Dedham, MA 02026
Clerk	David M. Donaldson	22 Weston Road Lincoln Center, MA 01773
Trustees	W. Gerald Austen, M.D.	163 Wellesley Street Weston, MA 02193
	Eugene Braunwald, M.D.	75 Scotch Pine Road Weston, MA 02193
	J. Robert Buchanan, M.D.	25 Commonealth Avenue Boston, MA 02116
	Francis H. Burr	44 Prince Street Beverly, MA 01915
	Ferdinand Colloredo-Mansfeld	Winthrop Street Hamilton, MA 01982

MGH/BRIGHAM HEALTH CARE SYSTEM, INC.

Continuation Sheet VII(b)

Name	Residence or Post Office Address
John H. McArthur	Fowler 10 Soldiers Field Boston, MA 02134
H. Richard Nesson, M.D.	565 Boylston Street Brookline, MA 02146
Richard A. Spindler	210 Schoolmaster Lane Dedham, MA 02026

ARTICLE V

By-laws of the corporation have been duly adopted and the initial directors, president, treasurer and clerk or other presiding, financial or recording officers, whose names are set out below, have been duly elected.

ARTICLE VI

The effective date of organization of the corporation shall be the date of filing with the Secretary of the Commonwealth or if a later date is desired, specify date, (not more than 30 days after date of filing).

The information contained in ARTICLE VII is NOT a PERMANENT part of the Articles of Organization and may be changed ONLY by filing the appropriate form provided therefor.

ARTICLE VII

a. The post office address of the initial principal office of the corporation IN MASSACHUSETTS is:

c/o Ropes & Gray, One International Place, Boston, MA 02110

b. The name, residence and post office address of each of the initial directors and following officers of the corporation are as follows:

	NAME	RESIDENCE	POST OFFICE ADDRESS
President:	See Continuation Sheet VII(b) attached hereto and incorporated herein by reference.		
Treasurer:			
Clerk:			

Directors: (or officers having the powers of directors).

NAME	RESIDENCE	POST OFFICE ADDRESS
See Continuation Sheet VII(b) attached hereto and incorporated herein by reference.		

c. The fiscal year of the corporation shall end on the last day of the month of: September

d. The name and BUSINESS address of the RESIDENT AGENT of the corporation, if any, is:

I/We the below-signed INCORPORATORS do hereby certify under the pains and penalties of perjury that I/We have not been convicted of any crimes relating to alcohol or gaming within the past ten years. I/We do hereby further certify that to the best of my/our knowledge the above-named principal officers have not been similarly convicted. If so convicted, explain.

IN WITNESS WHEREOF and under the pains and penalties of perjury, I/WE, whose signature(s) appear below as incorporator(s) and whose names and business or residential address(es) ARE CLEARLY TYPED OR PRINTED beneath each signature do hereby associate with the intention of forming this corporation under the provisions of General Laws Chapter 180 and do hereby sign these Articles of Organization as incorporator(s) this 9th day of December, 19 93

David M. Donaldson

David M. Donaldson

Ropes & Gray
One International Place
Boston, MA 02110

NOTE: If an already-existing corporation is acting as incorporator, type in the exact name of the corporation, the state or other jurisdiction where it was incorporated, the name of the person signing on behalf of said corporation and the title he/she holds or other authority by which such action is taken.

SECRETARY OF STATE
RECEIVED
1993 DEC 15 PM 1:39
CORPORATION DIVISION

449104

THE COMMONWEALTH OF MASSACHUSETTS

ARTICLES OF ORGANIZATION

GENERAL LAWS, CHAPTER 180

I hereby certify that, upon an examination of the within-written articles of organization, duly submitted to me, it appears that the provisions of the General Laws relative to the organization of corporations have been complied with, and I hereby approve said articles; and the filing fee in the amount of $35.00 having been paid, said articles are deemed to have been filed with me this 15TH day of December 1993.

Effective date

Michael Joseph Connolly

MICHAEL J. CONNOLLY
Secretary of State

A PHOTOCOPY OF THESE ARTICLES OF ORGANIZATION SHALL BE RETURNED

TO: David M. Donaldson, Esq.
Ropes & Gray
One International Place, Boston, MA 02110

Telephone: (617) 951-7250

FEE: $15.00

The Commonwealth of Massachusetts

MICHAEL J. CONNOLLY
Secretary of State
ONE ASHBURTON PLACE, BOSTON, MASS. 02108

FEDERAL IDENTIFICATIO
NO. 000449104

ARTICLES OF AMENDMENT

General Laws, Chapter 180, Section 7

This certificate must be submitted to the Secretary of the Commonwealth within sixty days after the date of the vote of members or stockholders adopting the amendment. The fee for filing this certificate is $15.00 as prescribed by General Laws, Chapter 180, Section 11C(b). Make check payable to the Commonwealth of Massachusetts.

We. H. Richard Nesson
David M. Donaldson
, President/Vice President, and
, Clerk/Assistant Clerk of

MGH/BRIGHAM HEALTH CARE SYSTEM, INC.
(Name of Corporation)

located at One International Place, Boston, MA 02110

do hereby certify that the following amendment to the articles of organization of the corporation was duly adopted at a meeting held on March 14, 19 94, by vote of all members/shareholders/directors/trustees/members of the guarantee/members of the corporation entitled to vote thereon:

That the Articles of Organization of this corporation be and they hereby are amended to change the name of the corporation to "Partners HealthCare System, Inc."

Note: If the space provided under any article or item on this form is insufficient, additions shall be set forth on separate 8½ x 11 sheets of paper leaving a left hand margin of at least 1 inch for binding. Additions to more than one article may be continued on a single sheet so long as each article requiring each such addition is clearly indicated.

The foregoing amendment will become effective when these articles of amendment are filed in accordance with Chapter 180, Section 7 of the General Laws unless these articles specify, in accordance with the vote adopting the amendment, a later effective date not more than thirty days after such filing, in which event the amendment will become effective on such later date.

IN WITNESS WHEREOF AND UNDER THE PENALTIES OF PERJURY, we have hereto signed our names this 18th day of March, in the year 1994

H. Richard Nesson ..... President/~~Vice President~~

..... Clerk/~~Assistant Clerk~~

459052

SECRETARY OF STATE
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1994 MAR 18 PM 4:10

CORPORATION DIVISION

THE COMMONWEALTH OF MASSACHUSETTS

ARTICLES OF AMENDMENT

(General Laws, Chapter 180, Section 7)

I hereby approve the within articles of amendment and, the filing fee in the amount of $ 15 having been paid, said articles are deemed to have been filed with me this 18th day of March, 1994

Michael Joseph Connolly

MICHAEL J. CONNOLLY

Secretary of State

TO BE FILLED IN BY CORPORATION

PHOTO COPY OF AMENDMENT TO BE SENT

TO: John E. Beard

Ropes & Gray

One International Place, Boston 02110

Telephone 617-951-7411

Copy Mailed

FEDERAL IDENTIFICATION NO. 04-2103535
Fee: $15.00

Examiner

The Commonwealth of Massachusetts

William Francis Galvin
Secretary of the Commonwealth
One Ashburton Place, Boston, Massachusetts 02108-1512

Name Approved

ARTICLES OF AMENDMENT
(General Laws, Chapter 180, Section 7)

We, Samuel O. Thier, M.D., *President / ~~Vice President~~,

and Ernest M. Haddad, Secretary ~~Assistant Secretary~~,

of Partners HealthCare System, Inc.,
(Exact name of corporation)

located at 800 Boylston Street, Suite 1150, Boston, MA 02199,
(Address of corporation in Massachusetts)

do hereby certify that these Articles of Amendment affecting articles numbered:

II and IV
(Number those articles 1, 2, 3, and/or 4 being amended)

of the Articles of Organization were duly adopted at a meeting held on May 4, 1998, by vote of:

277 members, ~~of the directors~~ ~~shareholders~~

being at least two-thirds of its members/directors legally qualified to vote in meetings of the corporation ~~holders of two-thirds of the capital stock having the right to vote~~

1. Delete Article II and insert in place thereof the following:

Article II

(i) To organize, operate and support a comprehensive health care system, including without limitation hospital and other health care services for all persons, and education and research for the prevention, diagnosis, treatment and cure of all forms of human illness: (ii) to improve the health and welfare of all persons: (iii) to operate for the benefit of and to support The Massachusetts General Hospital, The Brigham Medical Center, Inc., The North Shore Medical Center, Inc., their respective affiliated corporations, such other hospitals, charitable, scientific or educational organizations, and their affiliated corporations that become affiliated with Partners HealthCare System, Inc.

C ☐
P ☐
M ☐
R.A. ☐

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P.C.

*Delete the inapplicable words.
Note: If the space provided under any article or item on this form is insufficient, additions shall be set forth on one side only of separate 8 1/2 x 11 sheets of paper with a left margin of at least 1 inch. Additions to more than one article may be made on a single sheet so long as each article requiring each addition is clearly indicated.

(collectively, the "Partners Affiliated Corporations") and such other charitable, scientific or educational organizations which are or are affiliated with teaching hospitals in the Greater Boston Area; and (iv) to carry on any other activity that may lawfully be carried on by a corporation formed under Chapter 180 of the Massachusetts General Laws which is exempt under Section 501(c)(3) of the Internal Revenue Code; and in furtherance of the foregoing purposes to:

(a) Serve as the controlling and coordinating organization for the Partners Affiliated Corporations in order to assure the consistency and appropriateness of their respective missions, activities, governance and administration;

(b) Solicit and receive devises of real property and grants, donations and bequests of money and other property to be used to further the foregoing purposes and those of the Partners Affiliated Corporations; and

(c) Support the Partners Affiliated Corporations by loan, lease or donation of funds or other assets, by guaranty of obligations or by other action.

2. Delete Section 4.5. of Article IV.

The foregoing amendment(s) will become effective when these Articles of Amendment are filed in accordance with General Laws, Chapter 180, Section 7 unless these articles specify, in accordance with the vote adopting the amendment, a *later* effective date not more than *thirty days* after such filing, in which event the amendment will become effective on such later date.

[redacted] _____

SIGNED UNDER THE PENALTIES OF PERJURY, this 29TH day of May, 1998

_____, *President [redacted]

_____, Secretary
*[redacted]

*Delete the inapplicable words.

THE COMMONWEALTH OF MASSACHUSETTS

ARTICLES OF AMENDMENT

(General Laws, Chapter 180, Section 7)

S29730

SECRETARY OF THE COMMONWEALTH
98 JUN -2 AM 9:52

I hereby approve the within Articles of Amendment and, the filing fee in the amount of $ 150 having been paid, said articles are deemed to have been filed with me this 2ND day of JUNE 19 98.

Effective date: _____

William Francis Galvin

WILLIAM FRANCIS GALVIN
Secretary of the Commonwealth

TO BE FILLED IN BY CORPORATION
Photocopy of document to be sent to:

Ernest M. Haddad, Esq.
Partners HealthCare System, Inc.
800 Boylston Street, Ste. 1150
Boston, MA 02199

Telephone: (617) 278-1065

AACR.6

FEDERAL IDENTIFICATION NO. 04 3230035
Fee: $15.00

Examiner

N/A
Name Approved

The Commonwealth of Massachusetts

William Francis Galvin
Secretary of the Commonwealth
One Ashburton Place, Boston, Massachusetts 02108-1512

ARTICLES OF AMENDMENT
(General Laws, Chapter 180, Section 7)

042

We, Samuel O. Thier, M.D., *President / ~~Vice President~~,

and Ernest M. Haddad, Secretary ~~Clerk / Assistant Clerk~~,

of Partners HealthCare System, Inc.,
(Exact name of corporation)

located at 800 Boylston Street, Suite 1150, Boston, MA 02199,
(Address of corporation in Massachusetts)

do hereby certify that these Articles of Amendment affecting articles numbered:

II
(Number those articles 1, 2, 3, and/or 4 being amended)

of the Articles of Organization were duly adopted at a meeting held on May 3, 19 99, by vote of:

293 members, ~~of the directors, or of the shareholders~~

being at least two-thirds of its members/directors legally qualified to vote in meetings of the corporation ~~(or in the case of a corporation having capital stock, by the holders of at least two-thirds of the capital stock having the right to vote thereon)~~:

Delete Article II and insert in place thereof the following:

Article II

The purpose of the corporation is to engage in the following activities:

(i) To organize, operate, coordinate and support a comprehensive integrated health care delivery system (the "System") that provides, without limitation, hospital, physician and other health care services for all persons and education and research for the prevention, diagnosis, treatment and cure of all forms of human illness; (ii) to improve the health and welfare of all persons; (iii) to serve as the controlling and coordinating organization for the System and its member institutions and entities including Brigham and Women's/Faulkner Hospitals, Inc., The Massachusetts General Hospital, The North Shore Medical Center, Inc., Newton-Wellesley Health Care System, Inc., and such other hospital, physician, charitable, scientific, educational,

C ☐
P ☐
M ☐
B.A. ☐

3

**Delete the inapplicable words.*
Note: If the space provided under any article or item on this form is insufficient, additions shall be set forth on one side only of separate 8 1/2 x 11 sheets of paper with a left margin of at least 1 inch. Additions to more than one article may be made on a single sheet so long as each article requiring each addition is clearly indicated.

research and other institutions and entities that are controlled, directly or indirectly, through sole corporate membership, stock ownership or otherwise, by the Corporation (collectively, the "Affiliated Organizations"); (iv) to assist and support the Affiliated Organizations in fulfilling their respective purposes, missions and objectives in a manner consistent with the purposes, missions and objectives of the Corporation and the System; and (v) to carry on any other activity that may lawfully be carried on by a corporation formed under Chapter 180 of the Massachusetts General Laws which is exempt under Section 501(c)(3) of the Internal Revenue Code; and in furtherance of the foregoing purposes to:

(a) Solicit and receive devises of real property and grants, donations and bequests of money and other property to be used to further the foregoing purposes; and

(b) Support the Affiliated Organizations by loan; lease or donation of funds or other assets; and

(c) Support the Affiliated Organizations by guaranty of the obligations of the Affiliated Organizations or by other action.

The foregoing amendment(s) will become effective when these Articles of Amendment are filed in accordance with General Laws, Chapter 180, Section 7 unless these articles specify, in accordance with the vote adopting the amendment, a *later* effective date not more than *thirty days* after such filing, in which event the amendment will become effective on such later date.

~~Later effective date: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx~~

SIGNED UNDER THE PENALTIES OF PERJURY, this 24th day of May, 19 99.

[signature], *President/~~Vice President~~

[signature] Secretary
*~~Clerk/Assistant Clerk~~

*Delete the inapplicable words.

660922

THE COMMONWEALTH OF MASSACHUSETTS

ARTICLES OF AMENDMENT

(General Laws, Chapter 180, Section 7)

I hereby approve the within Articles of Amendment and, the filing fee in the amount of $ 15.00 having been paid, said articles are deemed to have been filed with me this 26th day of May 19 99.

99 MAY 26 AM 9:24

Effective date: _____

William Francis Galvin

WILLIAM FRANCIS GALVIN

Secretary of the Commonwealth

TO BE FILLED IN BY CORPORATION

Photocopy of document to be sent to:

Mary LaLonde

Partners HealthCare System

Office of the General Counsel
50 Staniford St., 10th floor
Boston, MA 02114

Telephone: 617-726-5315

The Commonwealth of Massachusetts
William Francis Galvin

Minimum Fee: $15.00

Secretary of the Commonwealth, Corporations Division
One Ashburton Place, 17th floor
Boston, MA 02108-1512
Telephone: (617) 727-9640

Articles of Amendment
(General Laws, Chapter 180, Section 7)

Identification Number: 043230035

We, BRENT L. HENRY __ **President** X **Vice President,**

and MARY C. LALONDE __ **Clerk** X **Assistant Clerk ,**

of PARTNERS HEALTHCARE SYSTEM, INC.
located at: 800 BOYLSTON ST., SUITE 1150 BOSTON , MA 02199 USA

do hereby certify that these Articles of Amendment affecting articles numbered:

__ Article 1 X Article 2 __ Article 3 __ Article 4

(Select those articles 1, 2, 3, and/or 4 that are being amended)

of the Articles of Organization were duly adopted at a meeting held on 4/19/2016 , by vote of: 197 members, 0 directors, or 0 shareholders,
being at least two-thirds of its members/directors legally qualified to vote in meetings of the corporation (or, in the case of a corporation having capital stock, by the holders of at least two thirds of the capital stock having the right to vote therein):

ARTICLE I

The exact name of the corporation, ***as amended***, is:
(Do not state Article I if it has not been amended.)

ARTICLE II

The purpose of the corporation, ***as amended***, is to engage in the following business activities:
(Do not state Article II if it has not been amended.)

THE PURPOSE OF THE CORPORATION IS TO ENGAGE IN THE FOLLOWING ACTIVITIES: (I) TO ORGANIZE, OPERATE, COORDINATE AND SUPPORT A COMPREHENSIVE INTEGRATED HEALTH CARE DELIVERY SYSTEM (THE "SYSTEM") THAT PROVIDES, WITHOUT LIMITATION, HOSPITAL, PHYSICIAN AND OTHER HEALTH CARE SERVICES FOR ALL PERSONS AND EDUCATION AND RESEARCH FOR THE PREVENTION, DIAGNOSIS, TREATMENT AND CURE OF ALL FORMS OF HUMAN ILLNESS; (II) TO IMPROVE THE HEALTH AND WELFARE OF ALL PERSONS AND TO CONDUCT AND SUPPORT EDUCATION, RESEARCH AND OTHER ACTIVITIES RELATING THERE TO, (III) TO SERVE AS THE CONTROLLING AND COORDINATING ORGANIZATION FOR THE SYSTEM AND ITS MEMBER INSTITUTIONS AND ENTITIES INCLUDING BRIGHAM AND WOMEN'S HEALTH CARE, INC., THE MASSACHUSETTS GENERAL HOSPITAL, NSMC HEALTHCARE, INC., NEWTON WELLESLEY HEALTH CARE SYSTEM, INC., PARTNERS COMMUNITY PHYSICIANS ORGANIZATION, INC., PARTNERS CONTINUING CARE, INC., NEIGHBORHOOD HEALTH PLAN, INC. AND SUCH OTHER HOSPITAL, PHYSICIAN, CHARITABLE, SCIENTIFIC, E

DUCATIONAL, RESEARCH AND OTHER INSTITUTIONS AND ENTITIES THAT ARE CONTROLLED, DIRECTLY OR INDIRECTLY, THROUGH SOLE CORPORATE MEMBERSHIP, STOCK OWNERSHIP OR OTHERWISE, BY THE CORPORATION (COLLECTIVELY, THE "AFFILIATED ORGANIZATIONS"); (IV) TO ASSIST AND SUPPORT THE AFFILIATED ORGANIZATIONS IN FULFILLING THEIR RESPECTIVE PURPOSES, MISSIONS AND OBJECTIVES IN A MANNER CONSISTENT WITH THE PURPOSES, MISSIONS AND OBJECTIVES OF THE CORPORATION AND THE SYSTEM; AND (V) TO CARRY ON ANY OTHER ACTIVITY THAT MAY LAWFULLY BE CARRIED ON BY A CORPORATION FORMED UNDER CHAPTER 180 OF THE MASSACHUSETTS GENERAL LAWS WHICH IS EXEMPT UNDER SECTION 501(C)(3) OF THE INTERNAL REVENUE CODE; AND IN FURTHERANCE OF THE FOREGOING PURPOSES TO: (A) SOLICIT AND RECEIVE DEVISES OF REAL PROPERTY AND GRANTS, DONATIONS AND BEQUESTS OF MONEY AND OTHER PROPERTY TO BE USED TO FURTHER THE FOREGOING PURPOSES; AND (B) SUPPORT THE AFFILIATED ORGANIZATIONS BY LOAN, LEASE OR DONATION OF FUNDS OR OTHER ASSETS; AND (C) SUPPORT THE AFFILIATED ORGANIZATIONS BY GUARANTY OF THE OBLIGATIONS OF THE AFFILIATED ORGANIZATIONS OR BY OTHER ACTION.

ARTICLE III

A corporation may have one or more classes of members. ***As amended,*** the designation of such classes, the manner of election or appointments, the duration of membership and the qualifications and rights, including voting rights, of the members of each class, may be set forth in the by-laws of the corporation or may be set forth below:

ARTICLE IV

As amended, other lawful provisions, if any, for the conduct and regulation of the business and affairs of the corporation, for its voluntary dissolution, or for limiting, defining, or regulating the powers of the business entity, or of its directors or members, or of any class of members, are as follows:
(If there are no provisions state "NONE")

The foregoing amendment(s) will become effective when these Articles of Amendment are filed in accordance with General Laws, Chapter 180, Section 7 unless these articles specify, in accordance with the vote adopting the amendment, a *later* effective date not more than *thirty days* after such filing, in which event the amendment will become effective on such later date.

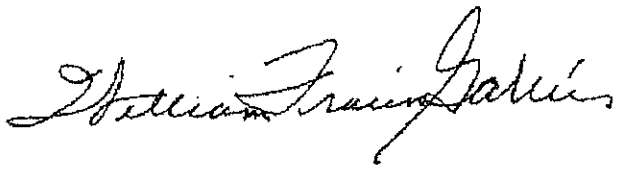
Later Effective Date:

Signed under the penalties of perjury, this 20 Day of April, 2016, BRENT L. HENRY , its , President / Vice President,
MARY C. LALONDE , Clerk / Assistant Clerk.

THE COMMONWEALTH OF MASSACHUSETTS

I hereby certify that, upon examination of this document, duly submitted to me, it appears that the provisions of the General Laws relative to corporations have been complied with, and I hereby approve said articles; and the filing fee having been paid, said articles are deemed to have been filed with me on:

April 20, 2016 04:09 PM



WILLIAM FRANCIS GALVIN

Secretary of the Commonwealth

Attachment/Exhibit

8

Massachusetts Department of Public Health
Determination of Need
Affidavit of Truthfulness and Compliance with Law and Disclosure Form 100.405(B)

Version: 7-6-17

Instructions: Complete Information below. When complete check the box "This document is ready to print:". This will date stamp and lock the form. Print Form. Each person must sign and date the form. When all signatures have been collected, scan the document and e-mail to: **dph.don@state.ma.us** Include all attachments as requested.

Application Number: PHS-19093011-HS

Original Application Date: 09/30/2019

Applicant Name: Partners HealthCare System, Inc.

Application Type: Hospital/Clinic Substantial Change in Service

Applicant's Business Type: (•) Corporation ( ) Limited Partnership ( ) Partnership ( ) Trust ( ) LLC ( ) Other

Is the Applicant the sole member or sole shareholder of the Health Facility(ies) that are the subject of this Application? (•) Yes ( ) No

The undersigned certifies under the pains and penalties of perjury:

1. The Applicant is the sole corporate member or sole shareholder of the Health Facility[ies] that are the subject of this Application;
2. I have ~~read~~* 105 CMR 100.000, the Massachusetts Determination of Need Regulation;
3. I understand and agree to the expected and appropriate conduct of the Applicant pursuant to 105 CMR 100.800;
4. I have ~~read~~* this application for Determination of Need including all exhibits and attachments, and ~~certify that~~** all of the information contained herein is accurate and true;
5. I have submitted the correct Filing Fee and understand it is nonrefundable pursuant to 105 CMR 100.405(B);
6. I have submitted the required copies of this application to the Determination of Need Program, and, as applicable, to all Parties of Record and other parties as required pursuant to 105 CMR 100.405(B);
7. I have caused, as required, notices of intent to be published and duplicate copies to be submitted to all Parties of Record, and all carriers or third-party administrators, public and commercial, for the payment of health care services with which the Applicant contracts, and with Medicare and Medicaid, as required by 105 CMR 100.405(C), et seq.;
8. I ~~have caused~~** proper notification and submissions to the Secretary of Environmental Affairs pursuant to 105 CMR 100.405(E) and 301 CMR 11.00; will be made if applicable
9. If subject to M.G.L. c. 6D, § 13 and 958 CMR 7.00, I have submitted such Notice of Material Change to the HPC - in accordance with 105 CMR 100.405(G);
10. Pursuant to 105 CMR 100.210(A)(3), I certify that both the Applicant and the Proposed Project are in material and substantial compliance and good standing with relevant federal, state, and local laws and regulations, as well as with all ~~previously issued~~ Notices of Determination of Need ~~and the terms and Conditions attached therein~~;***
11. I have ~~read~~* and understand the limitations on solicitation of funding from the general public prior to receiving a Notice of Determination of Need as established in 105 CMR 100.415;
12. I understand that, if Approved, the Applicant, as Holder of the DoN, shall become obligated to all Standard Conditions pursuant to 105 CMR 100.310, as well as any applicable Other Conditions as outlined within 105 CMR 100.000 or that otherwise become a part of the Final Action pursuant to 105 CMR 100.360;
13. Pursuant to 105 CMR 100.705(A), I certify that the Applicant has Sufficient Interest in the Site or facility; and
14. Pursuant to 105 CMR 100.705(A), I certify that the Proposed Project is authorized under applicable zoning by-laws or ordinances, whether or not a special permit is required; or,
    a. If the Proposed Project is not authorized under applicable zoning by-laws or ordinances, a variance has been received to permit such Proposed Project; or,
    b. The Proposed Project is exempt from zoning by-laws or ordinances.

Corporation:

Attach a copy of Articles of Organization/Incorporation, as amended

Anne Klibanski, MD		09/26/2019
CEO for Corporation Name:	Signature:	Date
Scott M. Sperling		
Board Chair for Corporation Name:	Signature:	Date

*been informed of the contents of
**have been informed that
***issued in compliance with 105 CMR 100.00, the Massachusetts Determination of Need Regulation effective January 27, 2017 and amended December 28, 2018

Massachusetts Department of Public Health
Determination of Need
Affidavit of Truthfulness and Compliance with Law and Disclosure Form 100.405(B)

Version: 7-6-17

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Application Type: Hospital/Clinic Substantial Change in Service

Applicant's Business Type: (•) Corporation ( ) Limited Partnership ( ) Partnership ( ) Trust ( ) LLC ( ) Other

Is the Applicant the sole member or sole shareholder of the Health Facility(ies) that are the subject of this Application? (•) Yes ( ) No

The undersigned certifies under the pains and penalties of perjury:

1. The Applicant is the sole corporate member or sole shareholder of the Health Facility[ies] that are the subject of this Application;
2. I have ~~read~~* 105 CMR 100.000, the Massachusetts Determination of Need Regulation;
3. I understand and agree to the expected and appropriate conduct of the Applicant pursuant to 105 CMR 100.800;
4. I have ~~read~~* this application for Determination of Need including all exhibits and attachments, and ~~certify that~~** all of the information contained herein is accurate and true;
5. I have submitted the correct Filing Fee and understand it is nonrefundable pursuant to 105 CMR 100.405(B);
6. I have submitted the required copies of this application to the Determination of Need Program, and, as applicable, to all Parties of Record and other parties as required pursuant to 105 CMR 100.405(B);
7. I have caused, as required, notices of intent to be published and duplicate copies to be submitted to all Parties of Record, and all carriers or third-party administrators, public and commercial, for the payment of health care services with which the Applicant contracts, and with Medicare and Medicaid, as required by 105 CMR 100.405(C), et seq.;
8. I ~~have caused~~** proper notification and submissions to the Secretary of Environmental Affairs pursuant to 105 CMR 100.405(E) and 301 CMR 11.00; will be made if applicable
9. If subject to M.G.L. c. 6D, § 13 and 958 CMR 7.00, I have submitted such Notice of Material Change to the HPC - in accordance with 105 CMR 100.405(G);
10. Pursuant to 105 CMR 100.210(A)(3), I certify that both the Applicant and the Proposed Project are in material and substantial compliance and good standing with relevant federal, state, and local laws and regulations, as well as with all ~~previously issued~~ Notices of Determination of Need ~~and the terms and Conditions attached therein~~***;
11. I have ~~read~~* and understand the limitations on solicitation of funding from the general public prior to receiving a Notice of Determination of Need as established in 105 CMR 100.415;
12. I understand that, if Approved, the Applicant, as Holder of the DoN, shall become obligated to all Standard Conditions pursuant to 105 CMR 100.310, as well as any applicable Other Conditions as outlined within 105 CMR 100.000 or that otherwise become a part of the Final Action pursuant to 105 CMR 100.360;
13. Pursuant to 105 CMR 100.705(A), I certify that the Applicant has Sufficient Interest in the Site or facility; and
14. Pursuant to 105 CMR 100.705(A), I certify that the Proposed Project is authorized under applicable zoning by-laws or ordinances, whether or not a special permit is required; or,
    a. If the Proposed Project is not authorized under applicable zoning by-laws or ordinances, a variance has been received to permit such Proposed Project; or,
    b. The Proposed Project is exempt from zoning by-laws or ordinances.

Corporation:

Attach a copy of Articles of Organization/Incorporation, as amended

Anne Klibanski, MD		
CEO for Corporation Name:	Signature:	Date
Scott M. Sperling		09/26/2019
Board Chair for Corporation Name:	Signature:	Date

*been informed of the contents of
**have been informed that
***issued in compliance with 105 CMR 100.00, the Massachusetts Determination of Need Regulation effective January 27, 2017 and amended December 28, 2018

Attachment/Exhibit

9

DATE					CHECK NO
08/29/2019					0006100428
VOUCHER INVOICE NUMBER	INVOICE DATE	PO NUMBER	GROSS AMOUNT	DISCOUNT	NET AMOUNT
28509338 DON-ASSEMBLYROW19 COURIERED	08/28/2019		29,967.15	0.00	29,967.15

MM Client Services (617) 726-2142	AP 1300 MGB505	TOTAL AMOUNT	DISCOUNT	NET AMOUNT
		29,967.15	0.00	29,967.15

To Remove Document Fold and Tear Along This Perforation

VERIFY THE AUTHENTICITY OF THIS MULTI-TONE SECURITY DOCUMENT. CHECK BACKGROUND AREA CHANGES COLOR GRADUALLY FROM TOP TO BOTTOM.

PARTNERS. HealthCare

Bank of America, N.A.
South Portland, ME

52-153
112 ME

DATE
08/29/2019

0006100428

AMOUNT
$29,967.15

PAY **Twenty-Nine Thousand Nine Hundred Sixty-Seven and 15/100 Dollars**

TO THE ORDER OF **COMMONWEALTH OF MASSACHUSETTS**
DETERMINATION OF NEED PROGRAM
DEPT OF PUBLIC HLTH - 99 CHAUNCY ST-2ND FL
BOSTON MA

AUTHORIZED SIGNATURE
VOID IF NOT CASHED WITHIN 90 DAYS

⑈0006100428⑈ ⑆011201539⑆ 000080056978⑈

See Reverse Side For Easy Opening Instructions

PARTNERS. P.O. Box 9127
Boston, MA 02129-9127

COMMONWEALTH OF MASSACHUSETTS
DETERMINATION OF NEED PROGRAM
DEPT OF PUBLIC HLTH - 99 CHAUNCY ST-2ND FL
BOSTON MA 02111