

**WINCHESTER HOSPITAL/SHIELDS MRI, LLC
DON APPLICATION # 18042417-RE
ATTACHMENTS**

**APPLICATION FOR DETERMINATION OF NEED FOR
MRI IMAGING SERVICES**

APRIL 30, 2018

BY

**WINCHESTER HOSPITAL/SHIELDS MRI, LLC
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A

Attachment/Exhibit

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2. Project Description

Winchester Hospital/Shields MRI, LLC ("Applicant") is a joint venture between Winchester Hospital ("WH" or "the Hospital") and Shields Imaging of Winchester, LLC ("Shields") that was formed in 2013 to establish a licensed clinic to provide magnetic resonance imaging ("MRI") services to WH patients. Currently, the Applicant provides MRI services at its licensed clinic located at 200 Unicorn Park Drive, Woburn, MA 01801 ("Unicorn Park"). This clinic is not on WH's main campus. For access, quality and cost efficiency purposes, the Applicant is filing a Notice of Determination of Need ("Application") with the Massachusetts Department of Public Health ("Department") for expansion of its existing MRI clinic through the acquisition of a new 1.5T MRI unit. The new unit will be located at a satellite of the Applicant's existing clinic that will be established at WH's main campus at 41 Highland Avenue, Winchester, MA 01890 ("Proposed Project").

The need for the addition of an on-campus MRI service for WH's patients to supplement the MRI services offered by the Applicant's clinic at Unicorn Park is based on the current lack of MRI services offered at WH. Presently, WH is one of only a few community hospitals in the state that does not offer any MR imaging services at its main campus. Rather, the Hospital provides its patients with access to MRI services via arrangement with the Applicant. Under the current arrangement, WH's patients must travel off WH's main campus to the Applicant's Unicorn Park clinic, or to Lahey Health & Medical Center located at 41 Burlington Mall Road, Burlington, MA 01805 during the clinic's off-hours, to access MR imaging services.

This lack of existing on-campus MRI services at WH is not ideal from a timeliness and care experience perspective, particularly for inpatients and emergency department ("ED") patients who require urgent access to MRI services to diagnose and treat acute or emergent conditions. Moreover, WH inpatients and ED patients in need of an MRI during the hospital visit must be transported via ambulance to the clinic and back to the Hospital, resulting in additional costs. This current arrangement disproportionately impacts older adults – who make up substantial percentages of both WH's and the Applicant's patient panels – as they are typically higher-acuity and have complex care needs, are at higher risk for adverse outcomes during transport, and often have fixed incomes. The Proposed Project will address these concerns and meet the need for timely access to conveniently located, cost-effective, and fully integrated inpatient, emergency, and imaging care by co-locating MRI services at WH via a satellite location of the Applicant's clinic.

The need for the Proposed Project is also supported by historical volume trends for the Applicant's MRI service at Unicorn Park. Data for the last three fiscal years ("FY") demonstrate that volume on the Applicant's existing two MRI scanners at Unicorn Park have increased by 11.2% and that these increases have in turn resulted in wait time increases and the need to extend operating hours late in the evening to meet demand. By adding a MR imaging satellite clinic to WH's main campus, the Applicant will not only be able to meet the needs of inpatients and ED patients, but will also be able to increase availability for MRI services at Unicorn Park for outpatient imaging. Specifically, the shift of inpatients and ED patients to WH's main campus for MRI services will help relieve capacity constraints at Unicorn Park and, consequently, will allow outpatients to avoid delays and cancellations caused by MRI scans needed for priority inpatients and ED patients, schedule appointments during convenient hours, and enjoy timely access to high quality MRI services.

Finally, the Proposed Project will address future needs of the patient panel. Projections through 2035 forecast that, in total, ED and inpatient utilization rates will increase into the future; counties

across Massachusetts, including those from which WH's patients originate, will experience increases in the percentages of adults ages 65+; and, therefore, that older adult patients will constitute a higher percentage of those patients served in WH's inpatient and ED departments in coming years. Statistics indicate that the prevalence of orthopedic issues, neurological conditions, cancer, and cardiovascular disease increase with age, and that MRI is a well-established imaging tool used to detect and treat such age-related conditions. Together, these findings suggest that the demand for MRI services to treat inpatients and ED patients, and particularly older adult patients, will expand into the future. The Proposed Project will address this projected demand by providing MRI capacity at WH's main campus, which will allow WH inpatients and ED patients to receive a full complement of comprehensive inpatient, ED and MRI services in one setting.

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.

WH is a non-profit organization that provides comprehensive healthcare services in northwest suburban Boston. In addition to full-service hospital care, WH also provides patients with access to an extensive range of outpatient services, integrated home care, and primary and specialty care through agreements with various physician groups, including Winchester Physician Associates ("WPA"). WPA doctors, like doctors from other groups that refer to WH, are members of the medical staff at WH, and the full range of WH's medical services, including but not limited to inpatient-related services, emergency services, and imaging services, are available to WPA doctors and their patients. Being that both WH and WPA patients utilize the current MR imaging services at Unicorn Park, the Applicant relies on WH's and WPA's patient panel to determine the need for the Proposed Project. Demographic and historical utilization data for the current MR imaging services at Unicorn Park is also provided to establish the need for the Proposed Project.

A. WH Patient Panel

WH serves a diverse patient panel as demonstrated by the demographics data collected for the 36-month period covering FY15-FY17.¹ Appendix 2 provides this demographic profile for WH's patient panel in table form. In FY15, 161,355 unique patients received services through WH. In FY16, this number decreased slightly by 1.2% to 160,353 unique patients, and in FY17, 159,464 unique patients received care through WH. WH's patient mix consists of approximately 40.7% males and 59.2% females.

With regard to patient origin, zip code data demonstrates that WH's patient population resides mainly in Eastern Massachusetts, and more specifically in Middlesex County (greater than 69% in FY17).² Within Middlesex County, the largest number of patients reside in Woburn (10.8%),

¹ Fiscal year October 1 – September 30.

² Patients with a missing or invalid zip code or a zip code from which less than 1% of WH's patients originate in all years are included in "Other". Therefore, it is important to note that the percentage of WH's patient panel originating from Middlesex County may be understated, as there may be cities/towns in Middlesex County from which less than 1% of WH's patients originate which are included in the "Other" category.

followed by Wilmington (7.4%), Reading (6.6%), Winchester (5.8%), and Tewksbury (5.5%). A substantial portion of patients also reside in neighboring Essex County (in FY17, at least 8%).³

The demographic profile for FY15-FY17 shows that the majority of patients within WH's patient population are between the ages of 18-64. Specifically, from FY15 to FY17, patients in the 18-64 age cohort consistently represented 61%-63% of WH's total patient population. However, there is also a significant portion of patients that are 65+. From FY15 to FY17, the percentage of patients in the 65+ age cohort increased from 18.6% to 19.4% of WH's total patient population. Moreover, population projections provided by the UMass Donahue Institute ("UMDI") predict that the principal cities and towns where the majority of WH's reside will experience increases in their aging populations in coming years. For instance, by 2035, 25% of the population in the Northeast region (encompassing most of Essex County and the northern portion of Middlesex County) and 18.4% of the population in the Greater Boston region (encompassing the southern remainder of Essex County and the southeastern portion of Middlesex County) will be individuals 65+ (compared to 14% and 12.7% in 2010, respectively).⁴ These statistics suggest that WH will serve higher percentages of adult and older adult patients into the future.

The Applicant also reviewed race data based on patient self-reporting. Data collected in FY17 indicates that WH's patient panel is largely reflective of a Caucasian/White population (84.5%). The next largest cohorts of patients identify as Asian (3.5%), African American/Black (1.9%), or Hispanic/Latino (1.5%). Subsequently, 0.1% of patients identify as American Indian/Alaska Native and 0.008% identify as Native Hawaiian/Pacific Islander. A substantial portion of patients (8.5%) either did not report their race or identified as a race that was not among the surveyed categories. Thus, it is important to note that the racial composition of WH's patient panel may be understated.

B. WPA Patient Panel

As noted above, WPA is an affiliate of WH. WPA doctors are members of the medical staff of WH and have access to WH's full-range of medical services for their patients. These services available to WPA patients through WH include emergency and imaging services, as well as a variety of specialty services (e.g., cardiac, cancer, and surgical care) that may require an inpatient stay. Because WPA patients utilize the clinic's MR imaging services at Unicorn Park, the Applicant also reviewed WPA's patient panel to determine the need for the Proposed Project. Appendix 2 provides this demographic profile for WPA's patient panel in table form.

The number of patients utilizing WPA's services has increased 7.8% over the past three years. In FY15, 84,439 unique patients received care through WPA. In FY16, this number rose to 91,116 unique patients, and in FY17, 91,062 unique patients utilized WPA's services. The patient mix associated with WPA consists of approximately 41.7% males and 58.3% females.

Zip code data for the last three fiscal years demonstrates that WPA's patient population has a similar geographic composition to WH's patient panel. In regard to age, WPA's demographic

³ Patients with a missing or invalid zip code or a zip code from which less than 1% of WH's patients originate in all years are included in "Other". Therefore, it is important to note that the percentage of WH's patient panel originating from Essex County may be understated, as there may be cities/towns in Essex County from which less than 1% of WH's patients originate which are included in the "Other" category.

⁴ 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.

profile for FY15-FY17 shows that most patients are between the ages of 18-64 years and that a significant portion of patients are 65+, similar to WH. Finally, data based on patient self-reporting demonstrate that WPA's patient panel is largely consistent with WH's patient panel in terms of race.

C. Applicant's Patient Panel

In addition to the WH and WPA patient panel, the Applicant also reviewed the panel data for the existing MRI clinic at Unicorn Park. Appendix 2 provides this demographic profile for patients of the clinic at Unicorn Park in table form.

From Calendar Year ("CY") 15-17, a total of 32,951 unique WH patients visited Unicorn Park for purposes of receiving MRI scan services. A breakdown by year indicates that the number of WH patients utilizing Unicorn Park's MRI services has increased 10.5% the past three years. In CY15, 12,253 WH patients received MRI scans at Unicorn Park. In CY16, this number rose to 12,870, and in CY17, 13,542 WH patients utilized Unicorn Park's MRI services. The gender mix by total volume indicates that approximately 43% of all MRI scans at Unicorn Park are performed for males and 57% are performed for females.

Unicorn Park's patient panel closely mirrors that of WH in terms of patient origin. Specifically, zip code data demonstrates that the majority of MRI scans at Unicorn Park are performed for patients who reside in Eastern Massachusetts, and more precisely in Middlesex County. Review of the top twenty patient origin zip codes indicates that in FY17 at least 71.0% of scans were performed for patients who reside in Middlesex County.⁵ Within Middlesex County, the largest number of scans are for patients who reside in Woburn (10.1%), followed by Wilmington (7.2%), Reading (6.0%), Winchester (5.5%), Stoneham (5.5%), Medford (5.4%), and Tewksbury (5.2%). In addition to Middlesex County, Unicorn Park's Eastern Massachusetts patient population originates from Essex County (in FY17, at least 6.1%) and Suffolk County (in FY17, at least 1.2%).⁶

With regard to age, 7.6% of scans were performed for patients between the ages of 0-18 in FY17, 67.8% were for patients ages 19-64 (19-30: 8.8%, 31-40: 9.7%, 41-50: 17.9%, 51-64: 31.3%), and 24.6% were for patients over the age of 65. From FY15-FY17, the number of MRI scans for adults ages 19-64 at Unicorn Park increased the most (by 1,263), followed by older adults ages 65+ (increased by 344). The number of scans for individuals ages 18 and under seen at Unicorn Park increased by only 11 during this period. These data reflect similar patterns in patient trends to the WH and WPA patient panel and suggest that, like WH and WPA, Unicorn Park will serve higher percentages of adults and older adults in coming years as the cities and towns where the bulk of its patients originate from experience increases in their aging populations.

The Applicant's payer mix shows the breakdown by the following categories: Medicare, Medicare Advantage, Medicaid, Commercial, and "Other." In FY17, 62% of scans at Unicorn Park were covered by a Commercial insurer (e.g., Blue Cross Blue Shield, Harvard Pilgrim Health Care, Tufts Health Plan). Medicare is the next largest payer, covering 18% of the Applicant's patient scans. The remainder of patient scans are covered by Medicaid (6%), Medicare Advantage (1%),

⁵ Data is provided for the top twenty patient origin zip codes. Therefore, it is important to note that the percentage of the Applicant's patient panel originating from Middlesex County may be understated, as there may be cities/towns in Middlesex County from which the Applicant's patients originate which are included in the "Other" category.

⁶ Data is provided for the top twenty patient origin zip codes. Therefore, it is important to note that the percentage of the Applicant's patient panel originating from Essex and Suffolk County may be understated, as there may be cities/towns in Essex and Suffolk County from which the Applicant's patients originate which are included in the "Other" category.

and "Other" (13%). "Other" includes Champus, external collectors, the Hospital, private pay, and liability.

In addition to demographic data, the Applicant also reviewed data related to the number and types of MRI scans performed at Unicorn Park. First, the Applicant examined the number of MRI scans performed since FY15. The statistics for the patient panel include: 14,405 MRI scans in FY15, 15,473 scans in FY16 and 16,023 scans in FY17. These numbers represent a 11.2% increase in the number of MRI scans performed at Unicorn Park from FY15 to FY17 and contributed to an increase in utilization rates during this period. Additionally, the Applicant reviewed the categories of MRI procedures performed. From FY15-FY17, the main categories of MRI procedures performed at Unicorn Park were orthopedic (45.3%), neurologic (40.8%), body (8.0%), chest (4.8%), and angiographic (0.8%). Finally, the Applicant reviewed the volume mix of outpatient, inpatient, and ED patient scans. Between FY15 and FY17, outpatients represented 94.6%-95.5% of all MRI scans performed at Unicorn Park, inpatients represented 4.2%-4.9%, and ED patients represented 0.3%-0.5%.⁷ In terms of numbers, in FY17, 15,300 outpatient scans, 668 inpatient scans, and 55 ED scans were performed for WH patients at Unicorn Park.⁸

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 both existing and future patient panel needs by providing increased access to MR imaging services for all WH and WPA patients. The existing need for the Proposed Project is supported by the current lack of MRI services offered at WH's main campus, as well as historical volume trends for the Applicant's two MRI units at its off-campus Unicorn Park clinic which indicate high utilization rates and operation at near-maximum capacity. Future need for the Proposed Project is demonstrated by projections that forecast total inpatient and ED utilization rates and percentages of adults age 65+ will increase into the future, and by statistics that indicate the prevalence of orthopedic issues, neurological conditions, cancer, and cardiovascular disease increase with age. Given that MRI is a well-established imaging tool used to detect and treat such age-related conditions which patients often present with in the ED and are hospitalized for, these findings suggest that the need for MRI services will expand into the future as the inpatient, ED patient, and 65+ patient populations increase.

A. Need for New On-Campus MRI Unit to Address Patient Needs

As detailed below, the absence of on-campus MRI services at WH precipitates care fragmentation for inpatients and ED patients, as these patients must travel via ambulance between WH and Unicorn Park to access the resources necessary to diagnose and manage their acute conditions.

⁷ Status as an ED patient is entered in at the time of scheduling, but may shift dependent upon a patient's admission to the Hospital.

⁸ Status as an ED patient is entered in at the time of scheduling, but may shift dependent upon a patient's admission to the Hospital.

By establishing a satellite MRI clinic at WH's main campus to address the needs of the Hospital's inpatient and ED patient populations, the Applicant will be able to improve care integration and eliminate barriers to timely, efficient, and quality care caused by interfacility transport. Moreover, by shifting the provision of inpatient and ED MRI services to the Hospital's main campus, the Applicant will be able to provide outpatients with greater access to on-time, regularly scheduled, and convenient MRI services at Unicorn Park.

Need for MRI Unit to be On-Campus to Meet the Needs of Inpatients and ED Patients

The lack of on-campus MRI services at WH impacts patient experience and the provision of timely care. This is especially true for chronically ill, intensive care, and emergent patients who require immediate access to MR imaging to diagnose and treat urgent medical conditions. Specifically, WH inpatients and ED patients receive fragmented care because MRI services are located off-campus while inpatient and ED services are on-campus. As more fully discussed in Factor F1.b.i, these patients face increased risks associated with being transported between facilities given their poor health status.

The need to develop MRI services at WH to address these issues is precipitated by historical trends of increased demand for inpatient and ED services at WH that will continue to increase in the future. The Massachusetts Center for Health Information and Analysis ("CHIA") reports that WH experienced increases in both ED visits and inpatient discharges from FY14-FY16.⁹ National statistics project that, in total, inpatient and ED demand will continue to increase in coming years.¹⁰ As total inpatient and ED demand increase, so too will the need for MR imaging services to help diagnose and treat chronically ill, intensive care, and emergent patients.

Based on the historical volume and projected demand for MRI services for WH inpatients and ED patients and recognizing that the needs of inpatients and ED patients are more appropriately addressed on-campus, the Applicant sought to develop an alternative for these growing patient populations to provide them with more convenient access to high-quality MRI services. Through this process, the Applicant determined that siting the proposed new unit at WH's main campus would allow inpatients and ED patients to receive high-quality MRI services in a cost-effective manner that is more convenient for these patient populations who require acute and timely care. Specifically, siting the Applicant's proposed new MRI unit on WH's main campus rather than expanding capacity at the Unicorn Park clinic location will eliminate the delays and risks associated with transporting high-acuity patients via ambulance between facilities, will ensure that the growing inpatient and ED patient populations have access to fully-integrated and comprehensive care on-site at WH's main campus, and will address concerns related to increased

⁹ MASSACHUSETTS CENTER FOR HEALTH INFORMATION ANALYSIS, MASSACHUSETTS HOSPITAL PROFILES – DATA THROUGH FISCAL YEAR 2015 (Mar. 2017), available at <http://www.chiamass.gov/assets/docs/r/hospital-profiles/2015/Hospital-Profiles-Compendium.pdf>; MASSACHUSETTS CENTER FOR HEALTH INFORMATION ANALYSIS, MASSACHUSETTS HOSPITAL PROFILES – DATA THROUGH FISCAL YEAR 2016 (Jan. 2018), available at <http://www.chiamass.gov/assets/docs/r/hospital-profiles/2016/Massachusetts-Hospitals-Profiles-Compendium-2016.pdf>.

¹⁰ James J. Augustine, *Long-Term Trends in Emergency Department Visits, Patient Care Highlighted in National Reports*, ACEP Now (Jan. 11, 2017), <https://www.acepnow.com/article/long-term-trends-emergency-department-visits-patient-care-highlighted-national-reports/?singlepage=1&theme=print-friendly>; KIMBERLY W. McDERMOTT ET AL., HEALTHCARE COST AND UTILIZATION PROJECT STATISTICAL BRIEF #225: TRENDS IN HOSPITAL INPATIENT STAYS IN THE UNITED STATES, 2005–2014 (Agency for Healthcare Research & Quality 2017), available at <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb225-Inpatient-US-Stays-Trends.pdf>; BRIAN J. MOORE ET AL., HEALTHCARE COST AND UTILIZATION PROJECT STATISTICAL BRIEF #227: TRENDS IN EMERGENCY DEPARTMENT VISITS, 2006–2014 (Agency for Healthcare Research & Quality 2017), available at <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb227-Emergency-Department-Visit-Trends.pdf>. Although the rate of inpatient stays has decreased in recent years, the rate of ED visits has increased by more and there is a continuing growth in the percentage of overall hospital admissions through the ED. Augustine, *supra*; McDERMOTT ET AL., *supra*; MOORE ET AL., *supra*.

demand for inpatient and ED MRI services into the future. For these reasons, the Applicant proposes to implement the proposed new MRI unit on WH's main campus.

Need for New MRI Unit to Address Utilization and Wait Time Increases and to Meet the Needs of Outpatients

MRI utilization and the number of MR images being collected for those exams has increased significantly in the United States over the last 20 years.¹¹ The growth in MRI procedures has been driven in large part by technological advancements, such as improvements in imaging techniques, resolution, and acquisition time, which have increased physician confidence in relying on MRI modalities on a regular basis, especially in high-pressure situations.¹² Moreover, growth in the older adult population has also contributed to increase in MRI use.¹³ Specifically, the increase in older adults has precipitated an increase in the prevalence of age-related conditions (e.g., orthopedic, neurological, cancer, and cardiovascular conditions) and accordingly an expansion of the clinical applications of MR imaging to diagnose and treat such conditions.¹⁴ One study found that overall imaging rates were approximately twice as high among individuals 65+.¹⁵

The Applicant has experienced similar trends. From FY15-FY17, volume on the Applicant's two scanners at Unicorn Park increased by 11.2%, from 14,405 scans in FY15 to 16,023 scans in FY17. Adults and older adults accounted for the majority of this volume. From FY15-FY17, adults 51+ comprised 54.4%-55.9% of the MRI volume at Unicorn Park, and adults 65+ accounted for 24.6%-24.9% of the volume. Moreover, in terms of number of scans, the MRI volume attributed to adults 51-64 and older adults 65+ rose by more than the volume attributed to all other age categories during this period (scans for adults 51+ increased by 911, while scans for those 50 and younger increased by 707).

This increase in MRI utilization has resulted in an increase in machine exertion and therefore increases in workflow, scheduling, and capacity constraints. Wait times increased during this period as well. In FY15, 68% of MRI scans at Unicorn Park were on-time or within 10 minutes of the scheduled appointment. By FY17, this percentage dropped to 59%. Moreover, data extracted from patient satisfaction surveys administered by the Applicant indicates that wait times are the biggest area in need of improvement (cited by 33% of patients). To address the high demand for MRI services, the Applicant has instituted an extended operating schedule. Specifically, the Applicant offers MRI services at Unicorn Park Monday-Friday from 6:30am-10:00pm, as well as

¹¹ 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>.

¹² *Rising Use Of Diagnostic Medical Imaging In A Large Integrated Health System*, supra note 11; *Use of Diagnostic Imaging Studies and Associated Radiation Exposure For Patients Enrolled in Large Integrated Healthcare Systems, 1996–2010*, supra note 11; McDonald et al., supra note 11; Walter et al., supra note 11.

¹³ *Rising Use Of Diagnostic Medical Imaging In A Large Integrated Health System*, supra note 11; *U.S. Diagnostic Imaging Equipment Servicing Market to Remain Largely Flat Through 2017*, IMAGING TECHNOLOGY NEWS (Jan. 14, 2013), <https://www.itnonline.com/article/us-diagnostic-imaging-equipment-servicing-market-remain-largely-flat-through-2017>.

¹⁴ *Rising Use Of Diagnostic Medical Imaging In A Large Integrated Health System*, supra note 11; *U.S. Diagnostic Imaging Equipment Servicing Market to Remain Largely Flat Through 2017*, supra note 13.

¹⁵ *Rising Use Of Diagnostic Medical Imaging In A Large Integrated Health System*, supra note 11.

Saturday and Sunday from 7:30am-5:30pm. However, even with additional hours of operation, the Applicant's existing two MRI units are at capacity.

To address the capacity issue and ensure that all patients have improved access to quality radiology services, the Applicant seeks to expand the number of MRI units by implementing a third MRI unit at the WH main campus for inpatients and ED patients. As noted above, while outpatients receive the bulk of MRI services, WH inpatients and ED patients accounted for 4.5%-5.4% of MRI utilization at Unicorn Park from FY15-FY17. By transferring inpatient and ED patient utilization to the proposed new on-campus MRI unit, the Applicant will be able to relieve some of the capacity constraints currently experienced at Unicorn Park. Specifically, by shifting inpatient and ED patient scans to the new on-campus unit, the Applicant will be able to reduce the 11.2% increase in the number of MRI scans performed at Unicorn Park from FY15 to FY17, and the associated utilization and wait time effects. Thus, the proposed new on-campus MRI will not only benefit the WH inpatients and ED patients who will be scanned on the new machine, but will also benefit outpatients receiving scans at Unicorn Park who will avoid delays and cancellations caused by priority inpatient and ED patient scans, enjoy more options for booking appointments during normal hours (while still retaining the option to be scanned early in the morning and late at night), and experience overall increased availability of, and access to, timely MRI services.

B. Aging Population Needs Access to On-Campus MRI Services for Inpatient and ED Care

The Proposed Project will also allow the Applicant to address the needs of an aging patient panel, particularly in the inpatient and ED settings, and the need for improved access to MRI services to diagnose and treat age-related conditions that older adults are commonly hospitalized and/or seen in the ED for.

Growth in Aging Population, Particularly in Inpatient and ED Settings

As discussed above, statewide population projections provided by UMDI suggest that total population growth in Massachusetts is expected to increase through 2035.¹⁶ While initial projections suggested a consistent statewide population growth rate of 3.2%, updated projections anticipate that the Massachusetts population will grow by 11.8% from 2010 to 2035.¹⁷ Analysis of these projections suggest that certain age cohorts will account for a greater share of the population than others. Specifically, within the next 15-20 years, the largest part of the Commonwealth's population growth will be attributable to residents within the 50+ age cohort, and the 65+ cohort will increase at a rate higher than all other age cohorts.¹⁸ By 2035, residents that are 65+ will represent roughly a quarter of the state's population.¹⁹

The growth trend is similar in the regions where WH, WPA, and Unicorn Park are located, and where the bulk of WH patients (including those that receive care through WPA and those that utilize the current MRI services at Unicorn Park) reside. By 2035, there will be a notable increase in the share of individuals 65+ in the Northeast and Greater Boston regions, which encompass Middlesex and Essex counties (from 14% to 25% in the Northeast region, and 12.7% to 18.4% in

¹⁶ UNIVERSITY OF MASSACHUSETTS DONAHUE INSTITUTE, *supra* note 4.

¹⁷ *Id.* Updated projections account for rapid growth experienced through 2014. *Id.* at 11.

¹⁸ *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; UNIVERSITY OF MASSACHUSETTS DONAHUE INSTITUTE, *supra* note 4. Figure 2.5 in the UMDI Long-Term Populations Projection report demonstrates that while all other cohorts are predicted to decrease, the 65+ cohort increases from 2015 to 2035.

UNIVERSITY OF MASSACHUSETTS DONAHUE INSTITUTE, *supra* note 4, at 14.

¹⁹ *Id.*

the Greater Boston region).²⁰ Consistent with these regional trends, older adults comprise a large share of WH's (and WPA's) patient panels. From FY15-FY17, patients in the 65+ age cohort represented between 18.6%-19.4% of WH's total patient population (and 21.1%-22% of WPA's total patient population). Assuming that the demographic trends within WH's (and WPA's) patient population continues to mirror that of the surrounding region, it is expected that WH will continue to see growth in the 65+ age cohort that it serves into the future.

This anticipated growth of patients 65+ is particularly significant with regard to the ED and inpatient settings. Literature on the patterns of hospital use among older adults across the nation indicate that ED and inpatient resource use intensity increases with age and that older individuals make up a larger share of the patient population in the ED and inpatient settings relative to their population size than nearly all other age cohorts.²¹ In the ED, patients 75+ have the highest visit rates after infants less than one year of age.²² Moreover, compared with younger patients, older adults presenting to the ED are more likely to be hospitalized subsequent to their ED visit (between one third and one half of all ED visits by older patients result in a hospital admission, and these rates are 2.5 to 4.6 times higher than the hospitalization rates for younger patients).²³ With regard to inpatient care, distribution of the US population and hospital discharges by age indicate that adults 65+ make up a larger share of hospital discharges relative to their population size and that this pattern is more pronounced with increasing age (adults 85+ account for quadruple the proportion of all hospital discharges relative to their population size, adults 75-84 account for triple, and adults 65-74 account for double).²⁴ Assuming that hospital service trends at WH will mirror those of the nation, it is expected that as WH's 65+ patient population grows, WH will experience higher demand for ED and inpatient services for these older adult patients.

Ageing Inpatient and ED Patient Populations Need Access to MRI Services for Age-Related Conditions

In addition to WH (and WPA), data indicates that older adults comprise a significant portion of the Applicant's patient panel. From FY15-FY17, adults ages 51-64 consistently accounted for the largest volume of MRI services received at Unicorn Park (30.9% in FY15, 29.7% in FY16, and 31.3% in FY17), followed closely by adults ages 65+ (24.9% in FY15, 24.7% in FY16, and 24.6% in FY17). As the number of WH's patients – and specifically inpatients and ED patients – that fall into the 65+ age cohort continues to grow, the demand for imaging services, such as MRI, is expected to increase as well, as these services are important for detecting, managing, and treating age-related conditions for which older adults seek ED and inpatient care.

Common conditions for which risks increase with older age include orthopedic and musculoskeletal conditions, neurological disorders, cancer, and cardiovascular disease.²⁵ Musculoskeletal and orthopedic conditions are two of the most common problems affecting older

²⁰ *Id.*

²¹ Lesley P. Latham & Stacy Ackroyd-Stolarz, *Emergency Department Utilization by Older Adults: a Descriptive Study*, 17 CAN. GERIATRICS J. 118 (2014), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4244125/>; LAUREN WIER ET AL., HEALTHCARE COST AND UTILIZATION PROJECT STATISTICAL BRIEF #103: HOSPITAL UTILIZATION AMONG OLDEST ADULTS, 2008 (Agency for Healthcare Research & Quality 2010), available at <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb103.pdf>.

²² Latham & Ackroyd-Stolarz, *supra* note 21.

²³ 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>.

²⁴ WIER ET AL., *supra* note 21.

²⁵ WORLD HEALTH ORGANIZATION, WORLD REPORT ON AGEING AND HEALTH (2015), available at http://apps.who.int/iris/bitstream/10665/186463/1/9789240694811_eng.pdf.

adults.²⁶ For instance, the CDC estimates that arthritis affects 49.6% of all adults over 65.²⁷ In the field of neurology, statistics indicate the incidence of neurodegenerative conditions, such as Alzheimer's Disease, increase rapidly over the age of 65 (the likelihood of developing Alzheimer's doubles every 5 years after age 65), and that the incidence of stroke is greater among people 65+ (66% of people hospitalized for stroke in 2009 were 65+).²⁸ Research findings also demonstrate that the prevalence of cancer increases with age, with persons over 65 accounting for 60% of newly diagnosed malignancies and 70% of all cancer deaths.²⁹ Finally, studies indicate that age is a leading risk factor for cardiovascular disease. For example, the risk for both coronary heart disease and atherosclerosis increases starting at age 45 for men and at age 55 for women.³⁰

These categories of conditions are frequently seen in the ED and inpatient settings. Review of the literature on the patterns of emergency services among older adults indicates that the most common medical diagnoses among older ED patients include orthopedic issues (e.g., injuries resulting from falls), neurological issues (e.g., stroke), and cardiovascular issues (e.g., ischemic heart disease).³¹ In the inpatient setting, some of the most common principal and secondary diagnoses among older hospitalized patients fall within the categories of orthopedics (e.g., osteoarthritis, hip fracture, intervertebral disc disorders), neurology (e.g., stroke and dementia), oncology, and cardiovascular care (e.g., congestive heart failure and coronary atherosclerosis).³²

Moreover, these categories of conditions often require imaging. From FY15-FY17, the main MRI procedures that were performed at Unicorn Park were orthopedic, neurologic, body, chest, and angiographic (in FY17, orthopedic procedures accounted for 45.6% of all MRI procedures performed at Unicorn Park, neurologic procedures for 39.7%, body procedures for 8.1%, chest procedures for 5.6%, and angiographic procedures for 0.6%). These categories of MRI procedures are performed to diagnose, evaluate, and monitor treatment for a variety of conditions, including those age-related conditions noted above. For instance, MR imaging of the musculoskeletal system, knee, shoulder, and spine is used evaluate degenerative joint and bone disorders (e.g., arthritis and intervertebral disk disease);³³ head and brain MRIs help assess

²⁶ 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/>.

²⁷ *Arthritis-Related Statistics*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/arthritis/data_statistics/arthritis-related-stats.htm (last updated Jan. 11, 2018).

²⁸ *Causes and Risk Factors*, ALZHEIMER'S ASSOCIATION, <https://m.alz.org/causes-and-risk-factors.asp?sp=true> (last visited Apr. 24, 2018); *Stroke Facts*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/stroke/facts.htm> (last updated May 9, 2017).

²⁹ Nathan A. Berger et al., *Cancer in the Elderly*, 117 TRANSACTIONS OF THE AMERICAN CLINICAL AND CLIMATOLOGICAL ASSOCIATION 147 (2006).

³⁰ *Coronary Heart Disease: Risk Factors*, NATIONAL HEART, LUNG & BLOOD INSTITUTE, <https://www.nhlbi.nih.gov/health/health-topics/topics/cad/atrisk> (last visited Apr. 24, 2018); *Atherosclerosis: Risk Factors*, NATIONAL HEART, LUNG & BLOOD INSTITUTE, <https://www.nhlbi.nih.gov/health-topics/atherosclerosis> (last visited Apr. 24, 2018).

³¹ Aminzadeh & Dalziel, *supra* note 23.

³² WIER ET AL., *supra* note 21; REBECCA ANHANG PRICE ET AL., HEALTHCARE COST AND UTILIZATION PROJECT STATISTICAL BRIEF #125: CANCER HOSPITALIZATIONS FOR ADULTS, 2009 (Agency for Healthcare Research & Quality 2012), available at <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb125.pdf>.

³³ *Magnetic Resonance Imaging (MRI) – Musculoskeletal*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=muscmr> (last updated Apr. 1, 2017); *Magnetic Resonance Imaging (MRI) – Knee*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=kneemr> (last updated Mar. 17, 2016); *Magnetic Resonance Imaging (MRI) – Shoulder*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=shouldermr> (last updated Jan. 26, 2017); *Magnetic Resonance Imaging (MRI) – Spine*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=spinemr> (last updated Mar. 1, 2017).

neurological conditions (e.g. Alzheimer's and stroke) and monitor brain tumors;³⁴ MR body imaging can be used to diagnose or monitor treatment for truncal tumors and heart problems;³⁵ MR chest imaging is performed to screen for cancer and heart disease;³⁶ and MR Angiography is used to identify cardiovascular conditions, including coronary artery and atherosclerotic disease.³⁷

The projected increase in the older adult population, the demand by older adults for ED and inpatient services, in tandem with the volume of older adults requiring MRI to diagnose and treat age-related conditions supports the need for additional MRI capacity for the Applicant to be able to adequately serve the patient panel. Accordingly, to ensure that WH's aging patient panel presenting to the ED and being hospitalized has timely access to high quality MRI services with proven effectiveness in the orthopedic, neurologic, oncologic, and cardiovascular fields, the Applicant seeks to acquire a new MRI unit to be located at WH's main campus.

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 have no material impact on provider price, total medical expenses ("TME"), or provider costs, as the Applicant is seeking to implement a third MRI unit of the clinic at a new satellite location on WH's main campus to meet the current demand for MRI services. Data from FY15-FY17 demonstrate that the volume of scans on the Applicant's existing two MRI units at the Unicorn Park clinic have increased by 11.2% over the last three fiscal years. Despite the Applicant's efforts to address the increased demand for MRI services by instituting extended hours of operation (Monday-Friday 6:30am-10:00pm, and Saturday-Sunday 7:30am-5:30pm), the existing machines at the Unicorn Park clinic are at capacity. Through the Proposed Project, MRI services will be added to a new satellite location of the clinic at WH's main campus, allowing inpatient and ED MR imaging to be provided on-campus, relieving capacity constraints on the existing units at Unicorn Park (which will continue to be utilized by outpatients), and ensuring ready access for all WH patients to necessary MRI services.

The Applicant will utilize the same contracted rates for the MRI services offered at the WH satellite clinic as at Unicorn Park. Given that services are provided by an independent diagnostic testing facility ("IDTF"), these rates are substantially lower in comparison to hospital-based clinic rates. Additionally, TME for these imaging services will not be impacted given that no change is occurring to the price of MRI services. Furthermore, the Applicant's new satellite clinic represents \$597,000 of net revenue annually, which represents a statistically insignificant amount of the imaging services provided in the state, as well as an immaterial amount when compared to overall healthcare spending. Accordingly, this Proposed Project will have little to no effect on competition in the marketplace.

³⁴ *Magnetic Resonance Imaging (MRI) – Head*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=headmr> (last updated Feb. 8, 2017); *Magnetic Resonance, Functional (fMRI) – Brain*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=fmribrain> (last updated Feb. 25, 2018).

³⁵ *Magnetic Resonance Imaging (MRI) – Body*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=bodymr> (last updated May 24, 2016).

³⁶ *Magnetic Resonance Imaging (MRI) – Chest*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=chestmr> (last updated Mar. 9, 2018).

³⁷ *MR Angiography (MRA)*, RADIOLOGYINFO.ORG, <https://www.radiologyinfo.org/en/info.cfm?pg=angiomr> (last updated Apr. 1, 2017).

Additionally, the Applicant compared the overall expenses associated with the Proposed Project with the expenses associated with the implementation of an additional MRI unit at Unicorn Park. Currently, inpatients and ED patients requiring MRI services are transported from WH to Unicorn Park and back via ambulance. The flat rate for this round-trip ambulance transport is \$400 (known as Medicare contracted rate whether the patient has Medicare or not). From FY15-FY17, 2,205 MRI scans were performed at Unicorn Park for WH inpatients and ED patients. Accordingly, \$882,000 in ambulance costs related to inpatient and ED patient MRI scans at Unicorn Park were incurred over this period. While some of these costs are covered by insurance, many times the Hospital and/or the patients are left to pay for the service. Were the Applicant to implement an additional MRI unit at Unicorn Park, these expenses would continue to be incurred. However, by implementing the Proposed Project and siting an on-campus MRI service at WH for inpatients and ED patients, the Applicant will be able to eliminate these ambulance transport expenses and achieve cost savings for patients as well as the Applicant, which in turn reduces total health care expenditures ("THCE") in the market.

Cost savings will also be achieved through the Proposed Project because a nurse will no longer be necessary at Unicorn Park. Under the current model, a full-time nurse is supported for quality reasons at Unicorn Park to care for inpatients and ED patients coming from WH. This need for a full-time nurse at Unicorn Park would remain if the Applicant implemented an additional MRI unit at Unicorn Park, as inpatients and ED patients would still be traveling to the off-campus clinic location for MRI services. However, under the Proposed Project, a nurse will no longer be needed at Unicorn Park since all high-acuity inpatient and ED patient MRI care will be shifted to the on-campus MRI unit and the lower-acuity outpatients that will continue to receive MRI services at Unicorn Park's existing two MRI units do not require nursing care. This analysis provides that the costs associated with implementing an additional MRI unit at Unicorn Park are more than the Proposed Project. Accordingly, the Proposed Project is more cost-effective.

**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.**

A. MRI as an Imaging Modality

MRI is a well-established, non-invasive imaging system that uses a magnetic field combined with pulses of radio waves to produce detailed images of organs, tissues, and structures within the human body.³⁸ MR images are valuable in that they are obtained without using any ionizing radiation, so patients are not exposed to the harmful effects that are associated with x-ray, computed tomography ("CT"), and positron emission tomography ("PET") imaging.³⁹ To obtain bodily images and information via MRI, patients are placed at the center of an extremely strong magnetic field and measurements related to how atoms respond to pulses of radiofrequency energy are collected and analyzed.⁴⁰ The function of MRI is to provide clinicians access to anatomical and functional information that is important in diagnosing, planning treatment for, and

³⁸ *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 Apr. 24, 2018).

³⁹ *(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).

⁴⁰ *Magnetic Resonance Imaging (MRI)*, *supra* note 38.

monitoring a variety of conditions.⁴¹

B. Value of On-Campus MRI Services

Given its applicability to diagnose, plan treatment for, and monitor a variety of conditions, access to MRI is critical for a wide spectrum of patients across the inpatient, ED, and outpatient cohorts. While WH patients currently have access to MR imaging through a partnership with the Applicant, this access is not on WH's main campus but rather requires patients to travel to the Unicorn Park clinic to receive MR imaging care. For inpatients and ED patients, who are high-acuity, interfacility travel is by ambulance. As described in the literature review below, this unique interfacility transport situation is not ideal. To address these issues and better accommodate patients, the Applicant proposes to operate a satellite location of the MRI clinic at WH's main campus for WH's inpatient and ED patient populations.

Interfacility Transfer Risks and Improving Patient Safety

As an overview, interfacility transfer is defined as movement of a patient, after initial assessment and stabilization, from one facility to another to provide appropriate care for the patient.⁴² Patients can be transferred between a number of facilities (e.g. hospital to hospital, hospital to clinic, hospital to rehabilitation or long-term care, etc.) for a number of reasons, including specialized care is not available at the referring facility, particular investigations cannot be carried out at the referring site, a lack of intensive care beds, or simply to improve prognosis.⁴³ Often, as is the case with the Applicant, interfacility transfer is needed when diagnostic and therapeutic interventions required for a patient are not available at the same facility.⁴⁴ While interfacility transfer ensures that a patient receives treatment at a facility with the capability and appropriate resources to treat the patient's condition, the transfer process entails inherent safety risks and presents the potential for adverse events.⁴⁵ Specific risks associated with interfacility transport include clinical deterioration, adverse events, errors in care, inadequate numbers of healthcare workers to provide complex emergency care, transport delays, miscommunication, and crashes of surface medical transport.⁴⁶ This is particularly significant with regard to chronically ill, critically ill, and emergent patients who have more complex care needs, are prone to changes in their condition even without being transported, and are at increased risk of death or harm from transport.⁴⁷

⁴¹ *Id.*; (MRI) *Magnetic Resonance Imaging: Benefits and Risks*, *supra* note 39.

⁴² NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., GUIDE FOR INTERFACILITY PATIENT TRANSFER (Apr. 2006), available at https://www.ems.gov/pdf/advancing-ems-systems/Provider-Resources/Interfacility_Transfers.pdf; DIANE GURNEY ET AL., POSITION STATEMENT: INTERFACILITY TRANSFER OF EMERGENCY CARE PATIENTS (Emergency Nurses Ass'n 2015), available at https://www.ena.org/docs/default-source/resource-library/practice-resources/position-statements/facilitatingtheinterfacilitytransfer.pdf?sfvrsn=d3d9c8f4_14; Divya Sethi & Shalini Subramanian, *When place and time matter: How to conduct safe inter-hospital transfer of patients*, 8 SAUDI J. ANESTHESIA 104 (2014), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3950432/>.

⁴³ ISLA M. HAINS, SPOTLIGHT CASE: TRANSFER TROUBLES (Agency for Healthcare Research & Quality 2012), available at <https://psnet.ahrq.gov/webmm/case/269/transfer-troubles>; NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 42.

⁴⁴ Sethi & Subramanian, *supra* note 42.

⁴⁵ GURNEY ET AL., *supra* note 42; Sethi & Subramanian, *supra* note 42; HAINS, *supra* note 43; M.J.G. Dunn et al., *Critical care in the emergency department: patient transfer*, 24 EMERGENCY MED. J. 40 (2007), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2658153/>.

⁴⁶ GURNEY ET AL., *supra* note 42; Joep M Droogh et al., *Transferring the critically ill patient: are we there yet?*, 19 CRITICAL CARE 1 (2015), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4335540/>; Jeffrey M. Singh et al., *Critical Events During Land-Based Interfacility Transport*, 64 ANNALS EMERGENCY MED. 9 (2014); HAINS, *supra* note 43; Jeffrey M. Singh & Russell D. MacDonald, *Pro/con debate: Do the benefits of regionalized critical care delivery outweigh the risks of interfacility patient transport?*, 13 CRITICAL CARE 219 (2009), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2750128/>.

⁴⁷ GURNEY ET AL., *supra* note 42; Sethi & Subramanian, *supra* note 42; HAINS, *supra* note 43; Dunn et al., *supra* note 45; Droogh et al., *supra* note 46.

Given the potential hazards inherent in interfacility transfer, the decision to transport a patient to another facility must be made only after an assessment of the potential risks and benefits to the patient is completed.⁴⁸ To avoid delays in care associated with making this assessment, avoid the possibility that the risks may outweigh the benefits and therefore preclude patient transport for certain high-acuity inpatients and ED patients, and generally avoid the safety risks involved in transporting patients via ambulance to Unicorn Park for necessary imaging services, the Applicant seeks to site its proposed new MRI unit at WH's main campus. By providing these MRI services on campus for inpatients and ED patients, the Applicant will be able to eliminate the need for ambulance transports to Unicorn Park and therefore will be able to eliminate the safety risks inherent in the transport process.

Improving Access to Integrated Care

Another advantage of the provision of MRI services on-campus for inpatients and ED patients is that it will allow these patients to receive a full complement of comprehensive, integrated care at WH's main campus. When healthcare delivery is spread out across a number of separately located and operated providers, often the result is fragmented care.⁴⁹ Care fragmentation is considered an important source of inefficiency in the US healthcare system and a large concern for patients.⁵⁰ Under the current arrangement, WH's inpatient and ED patients receive fragmented care as they are required to travel off-campus to the Applicant's Unicorn Park clinic location to receive MRI services. Co-location is one way to address fragmented care. The benefits associated with co-location include: improved access for patients; more patient/family satisfaction because services are provided in a setting familiar to patients; increased collaboration among providers and better coordination of care; increased efficiency; and overall improved health outcomes.⁵¹ Thus, by co-locating MRI services at WH's main campus with the Hospital's inpatient and ED departments, the Applicant will be able to facilitate greater access to integrated care and improved health outcomes for inpatients and ED patients.

Improving Patient Satisfaction

Finally, on-campus siting of MRI services for inpatients and ED patients will improve patient satisfaction for inpatients, ED patients, and outpatients alike. Patient satisfaction is an important indicator used for measuring quality in health care.⁵² It affects clinical outcomes, patient retention, medical malpractice claims, as well as the timely, efficient, and patient-centered delivery of quality health care, and is a very effective indicator to measure the success of doctors and hospitals.⁵³ Thus, its importance cannot be overstated.

Patient satisfaction will be improved here through limiting delays and providing convenience. For inpatients and ED patients, delays caused by waiting for an available ambulance and traveling to Unicorn Park, will be eliminated, and the on-campus location of MRI services will be more

⁴⁸ Dunn et al., *supra* note 45.

⁴⁹ Kurt C. Stange, *The Problem of Fragmentation and the Need for Integrative Solutions*, 7 ANNALS FAMILY MED. 100 (2009), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2653966/>.

⁵⁰ *Id.*

⁵¹ SUSANNA GINSBURG, ISSUE BRIEF: COLOCATING HEALTH SERVICES: A Way to Improve Coordination of Children's Health Care? (The Commonwealth Fund 2008), available at http://www.commonwealthfund.org/usr_doc/Ginsburg_Colocation_Issue_Brief.pdf.

⁵² Bhanu Prakash, *Patient Satisfaction*, 3 J. CUTANEOUS & AESTHETIC SURGERY 151 (2010), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3047732/>.

⁵³ *Id.*

convenient being that these patients are already being treated at WH. For outpatients, they will experience reduced waiting times and greater appointment availability during normal hours at Unicorn Park given the shift of inpatient and ED patient MR imaging to the main campus, and will continue to enjoy the accessibility of Unicorn Park's off-campus location which offers an opportunity for these patients, who do not have a need to visit the main campus, to bypass the hassles of navigating a hospital setting. In both scenarios, the limited delays and increased convenience are anticipated to improve patient satisfaction.

C. Clinical Applications of MRI, Particularly for Older Adults

As noted above, the clinical applications of MRI are extensive. As discussed in further detail below, some of these clinical applications include conditions that fall within the categories of orthopedics, neurology, oncology, and the cardiovascular system. Significant with regard to the Proposed Project, the main categories of MRI procedures performed at Unicorn Park from FY15 to FY17 (orthopedic, neurologic, body, chest, and angiographic MRI scans) are routinely performed to diagnose, evaluate, and monitor treatment for various orthopedic/musculoskeletal, brain, cancer, and heart and blood vessel conditions. Moreover, these are areas which the Applicant has identified, based on a review of WH's, WPA's, and its own patient panel data, as well as projections related to growth in the aging population, as some of the top incidences for which a growing number of older patients will need MRI scans into the future. The Applicant seeks to implement on-campus MRI unit in response to this projected increase in demand.

Orthopedics/Musculoskeletal System

While orthopedic MRIs demonstrate clinical utility across all age groups to diagnose a wide spectrum of musculoskeletal conditions, they are particularly important in the diagnosis and treatment of older adults, who are affected by orthopedic/musculoskeletal issues at high rates.⁵⁴ Research indicates that with older age comes bone fragility, loss of cartilage resilience, reduced ligament elasticity, loss of muscular strength, and fat redistribution that decreases the ability of the tissues to carry out their normal functions.⁵⁵ Loss of mobility and physical independence resulting from age-related orthopedic/musculoskeletal issues, such as osteoarthritis, degenerative disc disorders, fractures and fall-related injuries, are particularly devastating in this population and lead to increased ED use and hospitalization.⁵⁶ Special attention is required in this older adult population, as an early diagnosis can avoid delays in treatment, which are associated with increased morbidity and mortality.⁵⁷ MRI holds great potential for diagnosing and helping to treat these conditions, due to its ability to noninvasively display high definition images of the musculoskeletal system, including bones, cartilage, muscles, tendons, ligaments, and joints.⁵⁸

Neurology

⁵⁴ Apostolos H. Karantanas, *What's new in the use of MRI in the orthopaedic trauma patient?*, 45 INT'L J. CARE OF THE INJURED 923 (2014); Gheno et al., *supra* note 26.

⁵⁵ Gheno et al., *supra* note 26; AJ Freemont & JA Hoyland, *Morphology, mechanisms and pathology of musculoskeletal ageing*, 211 J. PATHOLOGY 252 (2007).

⁵⁶ Gheno et al., *supra* note 26; Aminzadeh & Dalziel, *supra* note 23; WIER ET AL., *supra* note 21.

⁵⁷ Gheno et al., *supra* note 26.

⁵⁸ 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.ojmpe.com%2Findex.php%2FOJMPC%2Farticle%2Fdownload%2F31%2F25&usq=AOvVaw3hriKb3xbWliXUT_yczE1K; 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/>.

An additional clinical application of MRI is in the field of neurology. Structural MRI has become the accepted standard for examination of the brain, offering exquisite anatomical detail related to the shape, size, and integrity of gray and white matter structures in the brain, as well as high sensitivity to pathology changes.⁵⁹ Moreover, functional MRI offers information regarding brain activity and how normal function is disrupted in disease.⁶⁰ The combination of structural and functional MRI has shown great utility in determining which parts of the brain are handling critical functions; identifying the anatomic location corresponding with specific motor, somatosensory, language and cognitive processes; assessing the effects of trauma on brain function; caring for and treating epilepsy; and diagnosing and managing stroke and degenerative disease (e.g., Alzheimer's), the risks of which increase with age.⁶¹

Oncology

MRI also plays a role in cancer diagnosis, staging, and treatment planning.⁶² MRI's superior soft tissue resolution allows clinicians to distinguish between normal and diseased tissue to precisely pinpoint and monitor treatment of cancerous tumors and metastases within certain parts of the body.⁶³ Specifically, orthopedic MRIs are increasingly used for tumor screening and staging within the musculoskeletal system, neurologic MRIs are often used to monitor the growth and function of brain tumors, and body and chest MRIs are useful tools in the diagnosis, staging, surgical planning, and treatment response evaluation of cancer patients with thoracic lesions, including involvement of the chest wall, lungs, esophagus, and heart.⁶⁴ This capability is particularly important for older adults as advancing age is the most important risk factor for cancer overall.⁶⁵

Cardiovascular System

Finally, MRI has become widely available as a valuable tool for the diagnosis and management

⁵⁹ 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 Apr. 24, 2018).

⁶⁰ *What is fMRI?*, *supra* note 59.

⁶¹ Symms et al., *supra* note 59; Prashanthi Vemuri & Clifford R. Jack Jr., *Role of structural MRI in Alzheimer's disease*, 2 ALZHEIMER'S RESEARCH & THERAPY 1 (2010), available at <https://alzres.biomedcentral.com/track/pdf/10.1186/alzrt47>; *What is fMRI?*, *supra* note 59; Daniel Orringer et al., *Clinical Applications and Future Directions of Functional MRI*, 32 SEMINARS IN NEUROLOGY 466 (2012), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3787513/>; Bum Joon Kim et al., *Magnetic Resonance Imaging in Acute Ischemic Stroke Treatment*, 16 J. STROKE 131 (2014), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4200598/>; *Stroke Statistics*, THE INTERNET STROKE CENTER, <http://www.strokecenter.org/patients/about-stroke/stroke-statistics/> (last visited Apr. 24, 2018); Rita Guerreiro & Jose Bras, *The age factor in Alzheimer's disease*, 7 GENOME MED. 1 (2015), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4617238/>.

⁶² *Magnetic resonance imaging (MRI): What is an MRI?*, CANCER TREATMENT CTRS. OF AMERICA, <https://www.cancercenter.com/treatments/mri/> (last visited Apr. 24, 2018).

⁶³ J Lu et al., *Cancer diagnosis and treatment guidance: role of MRI and MRI probes in the era of molecular imaging*, 14 CURRENT PHARMACEUTICAL BIOTECHNOLOGY 714 (2013); *Magnetic resonance imaging (MRI): What is an MRI?*, *supra* note 62.

⁶⁴ *Magnetic resonance imaging (MRI): What is an MRI?*, *supra* note 62; Orringer et al., *supra* note 61; Shanti Parmar & Nirali Gondaliya, *A Survey on Detection and Classification of Brain Tumor from MRI Brain Images using Image Processing Techniques*, 5 INT'L RESEARCH J. ENGINEERING & TECHNOLOGY 162 (2018), available at <https://www.irjet.net/archives/V5/i2/IRJET-V5I239.pdf>; Deyle, *supra* note 58; Marcos Duarte Guimaraes et al., *Magnetic resonance imaging of the chest in the evaluation of cancer patients: state of the art*, 48 RADIOL. BRAS. 33 (2015), available at <http://www.scielo.br/pdf/rb/v48n1/0100-3984-rb-48-01-0033.pdf>.

⁶⁵ *Age and Cancer Risk*, NAT'L CANCER INSTITUTE, <https://www.cancer.gov/about-cancer/causes-prevention/risk/age> (last updated Apr. 29, 2015).

of a wide spectrum of cardiovascular conditions.⁶⁶ Chest and angiographic MRIs provide accurate data representative of cardiac structure, function, and perfusion, and are designed to assess cardiovascular morphology, ventricular volumes and function, myocardial perfusion, tissue characterization, and flow quantification.⁶⁷ Age-related indications within the clinical cardiovascular setting include assessment of myocardial viability and perfusion; evaluation of congenital heart disease, pericardial disease, aortic disease, and cardiac masses; detection of atherosclerosis; and diagnosis of coronary artery disease.⁶⁸

**F.1.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. Improving Health Outcomes and Quality of Life

The Applicant anticipates that the Proposed Project will provide WH's patient panel with improved access to imaging services that will directly impact health outcomes and quality of life. Studies indicate that delayed access to healthcare services results in decreased patient satisfaction, as well as negative health outcomes due to delays in diagnosis and treatment.⁶⁹ By adding MRI capacity at WH's main campus for inpatients and ED patients, the Applicant aims to improve timely access to imaging services, and therefore patient satisfaction, health outcomes and quality of life, for WH inpatients, ED patients, and outpatients alike.

With regard to WH inpatients and ED patients, the Applicant expects that the Proposed Project will result in improved access to integrated hospital, ED and imaging services. The MRI that will be available on WH's main campus will be co-located with WH's inpatient and ED services and will allow WH inpatients and ED patients to receive a full complement of inpatient, ED and MRI services in one setting. As noted above, timely access to high quality, integrated care directly impacts quality outcomes. This is especially true for inpatients and ED patients, who require urgent and emergent access to imaging services to diagnose and treat acute conditions. Currently, inpatients and ED patients receive disjointed care because MRI services are located at Unicorn Park while hospital inpatient and ED services are at WH's main campus. As a result, patients must be transported via ambulance between the two locations to receive a full array of inpatient, ED, and imaging services. As more fully discussed in Factors F.1.b.i. and F.2.a., adding MRI capacity to WH allows for access to high-quality, more convenient, lower-cost imaging care, which will improve health outcomes and quality of life for WH inpatients and ED patients.

⁶⁶ 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/>.

⁶⁷ *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/>.

⁶⁸ Marcu et al., *supra* note 66; Tseng et al., *supra* note 67; 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/>.

⁶⁹ 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/>.

The availability of MRI services at WH will address the patient panel need, particularly for WH's older adult inpatient and ED patient populations, which, in total, are anticipated to grow through 2035. As the number of WH's inpatients and ED patients 65+ continues to increase, so too will the demand for MRI services to detect and treat age-related conditions for which older adults require ED and inpatient care, including orthopedic and musculoskeletal conditions (e.g., arthritis, degenerative disk disease, and fractures), neurological disorders (e.g., stroke and Alzheimer's disease), cancer, and cardiovascular disease (e.g., coronary heart disease and atherosclerosis).⁷⁰ On-campus access to MRI services for these high acuity older inpatients and ED patients with orthopedic, neurology, oncology, and cardiovascular patients is crucial in order to allow clinicians to determine appropriate treatment options that will impact overall health outcomes in a time effective manner.

Along with inpatients and ED patients, the addition of MRI services at WH's main campus will also benefit WH outpatients. By shifting inpatient and ED MR imaging to WH's main campus, the Applicant will be able to increase availability for MRI services for outpatients at Unicorn Park. This will allow outpatients to avoid delays or cancellations caused by emergency MRI scans needed for inpatients and ED patients; will allow the Applicant to schedule appointments for outpatients during hours that are convenient for patients (rather than at 6:30am or 10:00pm as the Applicant has been forced to do given the high utilization rates); and overall will ensure that WH outpatients receive timely access to high-quality MRI services at Unicorn Park into the future. Given that delayed access to healthcare services negatively affects health outcomes, by improving wait times and availability of MRI services at Unicorn Park, the Applicant will be able to ensure improved care outcomes, and improved quality of life, for WH outpatients.

Finally, given that the Applicant is a joint venture with WH, all imaging results – including those at WH and those at Unicorn Park – will continue to be part of a fully integrated medical record. Studies show that having access to integrated health information technology systems, including integrated picture archiving and communication systems ("PACS") information, has a direct impact on health outcomes as access to a single medical record for patients leads to enhanced care coordination by care teams.⁷¹ Additionally, an integrated medical record allows primary care physicians and specialists to have access to the same patient information, allowing for real-time care decisions, thereby reducing duplication of services and unnecessary testing. The continued availability of these integrated record services for all WH patients – at WH and Unicorn Park alike – will facilitate quick and easy access to patient images and reports, which will in turn effect timely care, improved outcomes, and better quality of life.

B. Assessing the Impact of the Proposed Project

To assess the impact of the Proposed Project, the Applicant 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:

⁷⁰ Maravi et al., *supra* note 58; Deyle, *supra* note 58; Orringer et al., *supra* note 61; Kim et al., *supra* note 61; Guimaraes et al., *supra* note 64; Parmar & Gondaliya, *supra* note 64; Marcu et al., *supra* note 66; Anderson & Kramer, *supra* note 68.

⁷¹ 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. AMERICAN MED. INFORMATION ASS'N 506 (2012), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3384105/>.

1. **Patient Satisfaction:** Patients that are satisfied with care are more likely to seek additional treatment when necessary. The Applicant will review patient satisfaction levels with the MRI service.

Measure: To ensure a service-excellence approach, patient satisfaction surveys will be distributed to all patients receiving MR imaging services with specific questions around: (a) satisfaction with the wait time for services; (b) satisfaction around the comfort of procedures; (c) satisfaction levels with pre- and post-appointment communication; and (d) satisfaction with staff and facility environment.

Projections: Baseline: 90% Year 1: 90% Year 2: 91% Year 3: 92%

Monitoring: Any category receiving a less than exceptional rating (satisfactory level) will be evaluated and policy changes instituted.

2. **Quality of Care – Critical Value Reporting:** When critical values or abnormal test results are registered within an electronic medical record for a patient, the referring physician is notified via phone call from the WH reading radiologist. Subsequently, the critical values/abnormal results are dictated into the WH PACS system and the report is sent electronically to the referring physician. This report is also sent to the Applicant, so that it is in the electronic medical record of both the Hospital and the Applicant. A benefit of having an integrated electronic medical record and PACS system is the ability to send these messages to a referring physician, so that clinical decisions may be expedited.

Measure: Number of contracted 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 WH film library and follow-up will be conducted to the referring physician. The radiologist will be made available to answer any questions.

3. **Quality of Care – Quality of MRI Scan:** The quality of an MRI scan is imperative to its interpretation. Accordingly, the Applicant will evaluate the number of scans that need to be repeated within a 48-hour period from the date of the original scan to ensure radiology technicians are performing appropriate scans.

Measure: The number of repeat MRI scans performed on patients within a 48-hour period from the date of the original scan.

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

Monitoring: MRI technologists will track the number of scans that are repeated and scheduled for the next scan day. Technologists will document each case and conduct a monthly comparison to total volume to meet or exceed the metric.

4. **Quality of Care – Peer Review Over Read Correlation:** To evaluate the accuracy of scan interpretations, the Applicant will conduct peer review readings to ensure quality outcomes for patients.

Measure: The Applicant will have contracted radiologists conduct peer review readings on a random basis based on the American College of Radiology (“ACR”) Peer to Peer criteria and will follow-up on all discrepancies with the original reading radiologist.

Projections: Baseline: 95% Year 1: 95% Year 2: 96% Year 3: 97%

Monitoring: A random selection of cases based on ACR Peer to Peer criteria will be reviewed. Radiologists will evaluate scans documenting any inconsistencies and discuss outstanding issues with the original reading radiologist.

5. **Access – Backlog Reporting:** The Proposed Project seeks to ensure access to MRI services. Accordingly, the Applicant will track any backlogs associated with the service.

Measure: The number of times scanning day utilization is greater than 90% and adjustments need to be made to the schedule.

Projections: Baseline: <10% Year 1: <10% Year 2: <10% Year 3: <8%

Monitoring: Applicant’s staff will assess daily hours of service and implement adjustments if necessary.

6. **Provider Satisfaction – Value Assessment:** Ensuring provider satisfaction with MRI scans and their overall value when treating patients is necessary to access the impact on care for patients. The Applicant will survey referring physicians to validate scan utility.

Measure: Confirmation with referral physician about the utility of MRI scans.

Projections: Baseline: 95% Year 1: 95% Year 2: 96% Year 3: 97%

Monitoring: MRI referral physician population will be queried to validate scan utility via surveys.

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.

Relative to Massachusetts overall, most of the communities in WH’s service area are affluent and fare well with respect to the leading health indicators. However, pockets of the population struggle to access needed health services and experience disparities in health outcomes. One of the

dominant themes from the Hospital's 2016 Community Health Needs Assessment ("CHNA") is the impact that the underlying social determinants of health have on the service area, particularly on low-income, racially/ethnically diverse and older adult cohorts. Social determinants such as poverty, lack of employment opportunities, limited transportation, limited health literacy, linguistic barriers, lack of social support and domestic violence limit many people's ability to care for their own and their family's health.⁷²

A. Non-Discrimination

To ensure health equity to all populations, including those deemed underserved, the Proposed Project will not affect accessibility of the Applicant's services for poor, medically indigent, and/or Medicaid eligible individuals. The Applicant does not discriminate based on ability to pay or payor source at its Unicorn Park clinic location and will continue this practice at the satellite clinic at WH's main campus following the implementation of the Proposed Project. As further detailed throughout this narrative, the Proposed Project will increase access to MRI services for all of WH's and the Applicant's patients.

B. Culturally-Appropriate Care and Language Access

Additionally, the Applicant will provide effective, understandable, and respectful care with an understanding of patients' cultural health beliefs and practices and preferred languages. The Applicant has also developed arrangements to offer ongoing education and training in culturally and linguistically appropriate areas for staff. These steps will promote health equity and ensure equal access to MRI imaging services.

Language barriers are an issue in segments of Middlesex County, where the bulk of WH's and the Applicant's patient panel originates. As reported in WH's 2016 CHNA, nearly a fifth (19.3%) of Middlesex County reports as being foreign born compared to 15% of residents in the Commonwealth overall.⁷³ Winchester and Woburn have the highest proportions of foreign born individuals in the WH service area (15% of their total populations), as well as the highest percentages of residents speaking languages other than English at home (18.7% in Winchester and 19.6% in Woburn).⁷⁴ Accordingly, the Applicant has a number of systems in place for patients to access interpreter services, including access to certified/qualified interpreters and translators at no cost to patients with limited English proficiency ("LEP") when required via in-person American Sign Language interpreters (CART Service Providers), video remote interpreting (In Demand), and phone interpreting (Language Line Solutions).

During the scheduling process, it is determined what the patient's preferred language is and whether they will need language assistance services at the time of appointment. For interpretation services at the time of appointment, the Applicant uses In Demand for video and voice interpreting. Language Line Solutions phone interpreting may also be used in the event the In Demand system is not functioning. Designated iPads are used for the In Demand interpreting which provide: real-time, full motion video and audio over a dedicated high-speed, wide-bandwidth video connection or wireless connection that delivers high quality video images; a sharply delineated image large enough to display the interpreter's face and the participating

⁷² 2016 WINCHESTER HOSPITAL COMMUNITY HEALTH NEEDS ASSESSMENT (John Snow Inc.), *available at* <https://www.winchesterhospital.org/File%20Library/Winchester%20Hospital/Our%20Promise/Winchester-Hospital-2016-Community-Health-Assessment.pdf>.

⁷³ *Id.*

⁷⁴ *Id.*

individual's face; a clear, audible transmission of voices; a choice of female or male interpreter, based on patient preference if requested; adequate training to users on the operation of the video remote interpreting system; and phone interpreting services when needed.

The systems described above are currently available at the Applicant's Unicorn Park clinic location and will also be in place at the Applicant's proposed WH satellite clinic location. These systems further health equity and ensure that patients have access to robust services that alleviate barriers to care. Thus, through the Proposed Project, patients will continue to have meaningful access to services, programs and activities although they may be limited in their English language proficiency.

C. Older Adults

Furthermore, the Proposed Project will ensure that older adult inpatients and ED patients have access to co-located MRI services, which will lead to improved care experiences and quality outcomes. Older adults (65+ age cohort) comprise WH's largest underserved community. As discussed in detail Factors F1.a.ii and F1.b.i, older adults are much more likely to develop chronic illnesses and related disabilities (e.g., Alzheimer's, cancer, heart disease, congestive heart failure,). It is estimated that, by 2030, 37 million people nationwide (60% of the older adult population 65+) will manage more than one chronic medical condition. Many of these older adults resultantly experience hospitalizations, nursing home admissions and low-quality care. Chronic conditions are the leading cause of death among older adults.⁷⁵

Not surprising then, elder health is one of the highest priorities for the WH service area according to WH's CHNA. While social determinants of health affect all populations, within the CHNA process, community and organizational experts expressed concern that older adults may feel these effects more acutely. Many older adults live on fixed incomes and have limited funds for medical expenses. This leaves them less able to afford the high costs associated with negative health outcomes, as well as the high costs associated with ambulance transports from WH to Unicorn Park and back for necessary MRI services.

The Proposed Project will address barriers to care and health inequities by co-locating necessary MRI services at the Hospital for inpatients and ED patients. By providing these services on the WH campus, all inpatients and ED patients, including older adults, will have immediate access to imaging services, eliminating transportation barriers. No longer will older patients hospitalized or presenting in the ED be transported off-campus to receive imaging services. This is beneficial to these patients both from a cost standpoint and from a care experience standpoint, as transportation via ambulance is not only costly but can also cause confusion, frustration, and adverse events.

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 WH's patient panel through integration of health information technology tools used by the Hospital and the Applicant, including electronic medical records and a PACS system. These tools are currently utilized by the Hospital and by the Applicant at Unicorn Park, and upon implementation

⁷⁵ *Id.*

of the Proposed Project will also be used at the MRI satellite clinic located at WH's main campus. With the growing need for clinical collaboration and access to patient information across modalities and locations, an integrated health information technology system provides necessary information to multiple clinicians in multiple settings at one time. Early studies of PACS integration into health information technology systems provide evidence of improvements in clinician efficiency around work practices with quick image availability leading to an impact on clinical decision making.⁷⁶ Moreover, enhanced communication enables expedited reaction times by clinicians, which is especially crucial when a patient requires urgent or emergency care.⁷⁷ Overall, access to clinical information in real-time leads to process and work-flow changes that improve clinical care and produce improved health outcomes and more efficient work practices. With implementation of the Proposed Project, all WH patients – including inpatients and ED patients receiving MRI services at WH's main campus, and outpatients receiving MRI services at Unicorn Park – will continue to benefit from these advancements.

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 better coordination of care for WH inpatient and ED patients. Currently, patients receive fragmented care because MRI services are located at Unicorn Park while hospital inpatient and ED services are located at WH's main campus. This requires patients to travel via ambulance to receive a full complement of inpatient, ED and MRI services. A growing body of evidence suggests that care fragmentation is an important source of inefficiency in the US healthcare system. The fragmented care that these patient populations receive contributes to this inefficiency and impedes proper care coordination. Co-location is an established way to combat fragmented care. Benefits associated with co-location include: improved access, increased collaboration among providers, better coordination of care, increased efficiency, and overall improved health outcomes. Accordingly, by co-locating MRI services at WH with inpatient and ED services, the Applicant will be able to facilitate greater continuity of care, improved health outcomes, and enhanced quality of life for inpatients and ED patients.

In addition, linkages to patients' primary care services will be achieved through integrated medical records. As discussed in Factor F.1.b.ii, because the Applicant is a joint venture with WH, all MR imaging results are automatically part of the Hospital's electronic medical record and are also in the clinic's fully integrated electronic medical record. This technology enables imaging results to be available to primary care physicians as part of the integrated medical record from a patient's inpatient stay or ED visit. Research indicates that integrated systems such as the Applicant's has a direct impact on health outcomes as access to a single medical record facilitates enhanced care coordination. Thus, the availability of these integrated record services for the Applicant's patients will ensure appropriate linkages, care coordination, improved outcomes, and therefore better 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.

⁷⁶ Hains et al., *supra* note 71.

⁷⁷ *Id.*

The Applicant sought to receive input from a broad range of stakeholders in the planning of this Proposed Project. Consequently, the Applicant carried out a formal consultative process with individuals at various regulatory agencies regarding the Proposed Project. The following individuals are some of those consulted regarding the Proposed Project:

- Nora Mann, Esq., 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.

Currently, the services proposed for expansion are provided by the Applicant at Unicorn Park clinic, which is located off of WH's main campus. The clinic at Unicorn Park provided 14,405 MRI scans in FY15, 15,473 MRI scans in FY16, and 16,023 MRI scans in FY17. Accordingly, the need for the Proposed Project has been established by utilization of the existing image services at Unicorn Park, as well as by the lack of on-campus MRI services at WH's main campus. However, to inform and consult the community about the Proposed Project, the Applicant sought to engage its patient panel, family members, local residents, resident groups, and community partners and local stakeholders that may be impacted by the Proposed Project. Engagement occurred through various initiatives, as are outlined below.

As a first step in the engagement process, the Applicant sought to engage community partners and local stakeholders impacted by the Proposed Project. Accordingly, WH hosted a community forum on March 20, 2018. The goal of the forum was to educate community partners and local stakeholders on the proposed acquisition of a new, and the first, MRI modality to be located at WH's main campus for use in treating WH's patients. The meeting was well-attended by twenty-eight community partners and local stakeholders from various backgrounds representing all service area cities and towns. The sign-in sheet and presentation for the meeting may be found in Appendix 3. The community partners and local stakeholders that attended the meeting expressed support for the Proposed Project, noting the benefits of having a MR imaging modality co-located on WH's main campus with various inpatient and ED services.

In addition, the Proposed Project was presented to WH's Patient and Family Advisory Council ("PFAC") on April 25, 2018. The PFAC is an important forum for creating partnerships among patients, families and staff dedicated to improving WH's policies, programs, and practices, as well as the overall quality and safety of care provided at WH. The Applicant chose to present to the PFAC on this Proposed Project as the goals for the PFAC include engaging patients, family members and staff in ongoing communication with a focus on: (1) quality and safety of patient and family centered care; (2) strengthening patient education programs; (3) enhancing communications and marketing materials for patients (4) collaboration between staff, patients and families; (5) patient and family satisfaction, including reviewing patient satisfaction results; (6) building positive relationships between WH and the community it serves; (7) providing input and offering suggestions for improving policies and programs, communications, patient satisfaction, and patient experience; (8) providing feedback on the hospital's planning, including space planning; (9) recommending improvements to hospital operations; and (10) evaluating any issues

which are referred to the PFAC by other WH committees. During the PFAC meeting, WH leadership informed PFAC members of the need for the Proposed Project and the services that will be offered by the Applicant.

Furthermore, to ensure appropriate awareness within the community about the Proposed Project, WH and Shields posted the legal notice associated with the Proposed Project prominently on their websites. This was done to bring awareness of the Proposed Project to all patients, family members, local residents and resident groups, informing them of the new availability of co-located services. It also provides an opportunity for patients to comment on the Proposed Project.

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 took the following actions:

- Presentation to community partners and local stakeholders on March 20, 2018;
- Presentation to the WH PFAC scheduled for April 25, 2018; and
- Publication of legal notice to the WH and Shields websites.

For detailed information on these activities, see Appendix 3.

To ensure appropriate engagement of the community on the Proposed Project, the Applicant developed presentations to provide to attendants at the aforementioned March 20, 2018 community/stakeholder forum and the future April 25, 2018 WH PFAC meeting. These presentations outline the imaging needs of WH's patient panel (with specific focus on hospital inpatients and ED patients), the MRI services that will be offered by the Applicant at WH's main campus, the process by which the organizations determined that the joint venture at WH's main campus was the most clinically sound and cost-effective alternative for meeting the imaging needs of the patient panel, and the impact of the transaction, including the public health value. These materials are provided at Appendix 3.

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. Cost Containment:
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 Massachusetts center around providing low-cost care alternatives without sacrificing high quality. The Proposed Project seeks to align with these goals by providing a lower cost option for patients that seek care at WH and are in need of MRI services.

The Applicant through the Proposed Project seeks to expand the existing MR imaging service that serves WH. As previously discussed, the contracted rates for the MRI services offered at the WH satellite clinic will be the same as those offered at Unicorn Park. Therefore, there will be no increase in the price of the MRI services. Moreover, the Proposed Project meets the goal of providing a lower-cost alternative for MR imaging services, as the services will continue to be provided by a freestanding IDTF, rather than a hospital-based clinic. IDTFs are a more cost-effective option as the operating costs for these types of providers are lower. This difference in costs allows the Applicant to provide cost-effective, quality imaging services to WH's patients at both the Unicorn Park clinic and the proposed WH satellite clinic. Finally, the Applicant will achieve cost-savings by siting the proposed new satellite clinic at WH's main campus. Specifically, this on-campus siting will eliminate the need for ambulance transports from WH to Unicorn Park and back for inpatients and ED patients requiring MRI services, which is a significant cost.

Overall, TME will not be impacted given that the implementation of a third unit of the clinic is being pursued to meet demand and no change will occur with respect to the price of MRI services. Moreover, the elimination of ambulance costs for inpatients and ED patients will contribute to reducing THCE within the state by reducing medical expenses paid to providers by payers and patient cost-sharing amounts. Accordingly, as there will not be any change in TME and with the decrease in THCE, the Proposed Project will have a beneficial effect on the overall healthcare cost benchmark for the state.

**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 WH to improve public health outcomes is precipitated by historical trends of increased demand for inpatient, ED, and outpatient services in Massachusetts, which suggest that hospital utilization will grow into the future. According to the Massachusetts Health Policy Commission's ("HPC") 2017 Cost Report, the Commonwealth continues to have higher hospital utilization than the U.S. across inpatient, ED, and outpatient services.⁷⁸ From FY14-FY16, Massachusetts experienced increases in inpatient discharges, ED visits, and hospital outpatient visits.⁷⁹ Moreover, national statistics project that, in total, inpatient and ED demand will continue to increase in coming years.⁸⁰ As hospital utilization continues to grow, the demand for MRI services is expected to increase as well, as these services are important for detecting, managing, and treating a variety of conditions without exposing patients to the harmful effects of radiation.⁸¹

This need for additional MRI services is further magnified by populations projections. UMDI

⁷⁸ MASSACHUSETTS HEALTH POLICY COMMISSION, 2017 ANNUAL HEALTH CARE COST TRENDS REPORT CHARTPACK (2018), available at <https://www.mass.gov/files/documents/2018/03/28/2017%20CTR%20Chartpack.pdf>.

⁷⁹ *Id.*; MASSACHUSETTS HOSPITAL PROFILES – DATA THROUGH FISCAL YEAR 2015, *supra* note 9; MASSACHUSETTS CENTER FOR HEALTH INFORMATION ANALYSIS, MASSACHUSETTS HOSPITAL PROFILES – DATA THROUGH FISCAL YEAR 2016, *supra* note 9.

⁸⁰ Augustine, *supra* note 10; McDERMOTT ET AL., *supra* note 10; MOORE ET AL., *supra* note 10.

⁸¹ Augustine, *supra* note 10; Maravi et al., *supra* note 58; Deyle, *supra* note 58; Orringer et al., *supra* note 61; Kim et al., *supra* note 61; Guimaraes et al., *supra* note 64; Parmar & Gondaliya, *supra* note 64; Marcu et al., *supra* note 66; Anderson & Kramer, *supra* note 68; (*MRI Magnetic Resonance Imaging: Benefits and Risks*, *supra* note 39).

projections anticipate that the Massachusetts statewide population will grow by 11.8% from 2010 to 2035.⁸² Commensurate with the growth in the total population of the state, there will be a notable increase in the share of older and elderly residents. By 2035, residents that are 65+ will represent roughly a quarter of the state's population.⁸³ The principal regions that WH and the Applicant serve will share in this growth. By 2035, 18.4% of the population in the Greater Boston region and 25% of the population in the Northeast region will be individuals 65+ (compared to 12.7% and 14.0% in 2010, respectively).⁸⁴ As the number of individuals 65+ increases, so too will the need for greater access to diagnostic testing, such as MRI, which is a powerful clinical tool in identifying and understanding of the pathogenesis of various age-related conditions, including orthopedic and musculoskeletal conditions, neurological disorders, cancer, and cardiovascular disease.⁸⁵

To address the projected demand in MRI services in Greater Boston and Northeast Massachusetts caused by increases in hospital utilization rates, particularly by older adults, greater capacity is needed. For inpatient and ED patients (and particularly elderly patients), integrated services enable them to seek care as traveling to two locations is often not appropriate nor feasible. Specifically, interfacility transport carries risks including clinical deterioration, adverse events, care errors, inadequate numbers of healthcare workers to provide complex care, delays, miscommunication, and medical vehicle accidents.⁸⁶ Through the Proposed Project, WH's patients will have increased access to integrated imaging services at WH's main campus. These co-located services will afford patients the opportunity to receive a continuum of inpatient, ED and imaging services in one location; eliminate the delays and risks associated with transporting high-acuity patients via ambulance between facilities; improve timely access to imaging services for all categories of patients; and address concerns related to increased demand for MRI services into the future. Consequently, improved access to integrated services will have a direct impact on care coordination, efficiency, patient satisfaction, improved health outcomes, and quality of life. By improving health outcomes for patients in the Greater Boston and Northeast regions, the Commonwealth will see improved health outcomes for Massachusetts patients overall.

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.

The social determinants of health ("SDoH") are the conditions and environments in which people are born, grow, live, eat, work, play and age, that affect access to the healthcare system and a wide range of health risks and outcomes.⁸⁷ Socioeconomic status, education, employment, housing, food security, transportation, social protective factors, social support, and language/literacy are all examples of SDoH that have an impact on the physical and mental well-

⁸² UNIVERSITY OF MASSACHUSETTS DONAHUE INSTITUTE, *supra* note 4.

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ Maravi et al., *supra* note 58; Deyle, *supra* note 58; Orringer et al., *supra* note 61; Kim et al., *supra* note 61; Guimaraes et al., *supra* note 64; Parmar & Gondaliya, *supra* note 64; Marcu et al., *supra* note 66; Anderson & Kramer, *supra* note 68; (MRI) *Magnetic Resonance Imaging: Benefits and Risks*, *supra* note 39.

⁸⁶ GURNEY ET AL., *supra* note 42; Sethi & Subramanian, *supra* note 42; Dunn et al., *supra* note 45; Droogh et al., *supra* note 46; Singh et al., *supra* note 46; HAINS, *supra* note 43; Singh & MacDonald, *supra* note 46.

⁸⁷ *Social Determinants of Health: Know What Affects Health*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/socialdeterminants/> (last updated Jan. 29, 2018).

being of the population. WH and the Applicant have numerous programs in place to address issues associated with the SDoH, ensure all patients have equal access to care, and ensure linkages to social service organizations.

As discussed in Factor F1.b.iii, language barriers are an issue in pockets of Middlesex County, where the bulk of WH's and the Applicant's patient panel originates. To address this SDoH, the Applicant has a variety of interpreter services in place, including access to certified/qualified interpreters and translators for patients with LEP when required via in-person American Sign Language interpreters, video remote interpreting, and phone interpreting. These systems, which are currently available at Unicorn Park and will also be available at WH's main campus through the Proposed Project, promote health equity and ensure that patients have access to robust language services that help to alleviate barriers to care.

In addition, WH patients that receive MRI services at WH's main campus will have access to WH's case management services as a part of their inpatient stay/ED visit. Case management is a collaborative process of assessment, planning, facilitation, care coordination, evaluation, and advocacy for options and services to meet an individual's comprehensive health and human services needs that is characterized by communication and resource management and promotes quality and cost-effective interventions and outcomes.⁸⁸ Case managers are assigned to each patient care unit at WH. These case managers work collaboratively with the patient and the patient's health care team to coordinate care and determine the best plan to meet the patient's individualized needs. Additionally, case managers at WH help patients plan for insurance approvals, continuation of therapies, alternative living arrangements, medication assistance, and home care or other community resources. The Proposed Project will ensure that WH's inpatient and ED patients seeking MRI services at WH's main campus will have access to these case management services which are vital for addressing issues associated with SDoH, and ensuring a superior care experience, improved health outcomes, and better quality of life.

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 to provide MRI services at WH's main campus to WH's inpatient and ED patient population.

Quality: The Proposed Project is a superior alternative for quality MRI services and improved health outcomes as patients will have access to co-located imaging, emergency, inpatient, and other hospital services at WH's main campus. Providing services that are co-located improves overall quality of hospital services. For

⁸⁸ *Definition and Philosophy of Case Management*, COMMISSION FOR CASE MANAGER CERTIFICATION, <https://ccmcertification.org/about-ccmc/about-case-management/definition-and-philosophy-case-management> (last visited Apr. 24, 2018).

inpatients and ED patients, including the large number of elderly patients within WH's patient panel, co-located services afford access to a continuum of care on-campus at the time of treatment.

Efficiency: The co-location of services leads to more efficient care as patients may receive all of their necessary inpatient, ED and imaging services at one location, rather than traveling off-campus for imaging needs as a part of a patient's "work-up." Additionally, administrative efficiencies will continue to be achieved through the integration of electronic medical records and the PACS system that may be accessed by WH and Shields.

Capital Expense: Through the Proposed Project, the Applicant will provide MRI services on WH's main campus to WH inpatients and ED patients. The facilities and equipment related costs for this model are \$3,795,000.

Operating Costs: The operating costs associated with the Proposed Project are less than the costs associated with implementing an additional MRI unit at Unicorn Park. The Proposed Project eliminates the operating costs related to transporting inpatients and ED patients via ambulance between WH and Unicorn Park for MR imaging needs. In addition, the Proposed Project eliminates the costs associated with having a full-time nurse on-site at Unicorn Park to support inpatients and ED patients.

List alternative options for the Proposed Project:

Alternative Proposal: The alternative option for the Proposed Project would be to implement an additional MRI unit at Unicorn Park.

Alternative Quality: This is not a superior alternative for quality purposes as the unit would be located at Unicorn Park, rather than co-located at WH's main campus with WH's emergency, inpatient, and other hospital services. The benefits of having co-located services are outlined in the Proposal section above.

Alternative Efficiency: An additional MRI unit at Unicorn Park would provide local access to MRI services. However, inpatients and ED patients would continue to have to be transported off-campus to Unicorn Park to access these MRI services.

Alternative Capital Expenses: The Applicant is a tenant in the building at Unicorn Park where its existing MRI clinic is located. There is no room to implement another MRI unit in the Applicant's space and additionally there is no room for expansion within the building.

Alternative Operating Costs: The implementation of an MRI unit at WH is a lower-cost, high quality alternative to the addition of another MRI unit at Unicorn Park. If the Applicant were to install and implement an additional MRI unit at Unicorn Park, there would still be a need to shuttle inpatients and ED patients between WH and Unicorn Park by ambulance, which is a significant cost. Specifically, the flat rate for this round-trip ambulance transport is \$400. While some of these costs are covered by insurance, many times the Hospital and/or the inpatients and ED patients being transported are responsible for some or all of the costs of transport. By implementing the Proposed Project, the Applicant will be able

to eliminate these ambulance transport expenses and achieve cost savings. Additionally, if the Applicant installed and implemented an additional MRI unit at Unicorn Park, there would still be a need for a full-time nurse to support inpatients and ED patients arriving at Unicorn Park for MRI scans. By siting the MRI unit at WH's main campus and shifting inpatient and ED patient MR imaging volume to the on-campus unit, the Applicant will be able to eliminate the need for this full-time nurse at Unicorn Park and therefore will reduce operating costs.

Attachment/Exhibit

2

Winchester Hospital Patient Panel Data

1. Winchester Hospital's Patient Panel Volume

	Unique Visits
FY 15	514,674
FY 16	496,865
FY 17	481,374
FY 15-17 Total	1,492,913

2. Geographic Breakdown

Patient Origin	FY 15		FY 16		FY 17	
	Count	Percent	Count	Percent	Count	Percent
01801	17,286	10.7%	17,288	10.8%	17,260	10.8%
01887	11,704	7.3%	11,840	7.4%	11,794	7.4%
01867	10,811	6.7%	10,727	6.7%	10,518	6.6%
01890	9,279	5.8%	9,171	5.7%	9,171	5.8%
01876	8,700	5.4%	8,710	5.4%	8,845	5.5%
02180	8,944	5.5%	8,641	5.4%	8,421	5.3%
02155	8,279	5.1%	8,250	5.1%	7,740	4.9%
01864	6,839	4.2%	6,893	4.3%	6,990	4.4%
01821	6,526	4.0%	6,479	4.0%	6,447	4.0%
01803	6,518	4.0%	6,426	4.0%	6,428	4.0%
01880	6,336	3.9%	6,264	3.9%	6,219	3.9%
01810	5,346	3.3%	5,353	3.3%	5,500	3.4%
02176	4,272	2.6%	4,219	2.6%	4,105	2.6%
02148	3,612	2.2%	3,545	2.2%	3,283	2.1%
01845	2,999	1.9%	3,142	2.0%	3,039	1.9%
02474	2,834	1.8%	2,913	1.8%	2,775	1.7%
01844	2,382	1.5%	2,301	1.4%	2,255	1.4%
01906	2,055	1.3%	2,029	1.3%	2,009	1.3%
Other	36,613	22.7%	36,162	22.6%	36,665	23.0%
Total	161,335	100%	160,353	100%	159,464	100%

3. Age at Visit (Patient Level)

Age	FY 15		FY 16		FY 17	
	Count	Percent	Count	Percent	Count	Percent
0-17 years old	31,675	19.6%	31,174	19.4%	30,096	18.9%
18-64 years old	99,617	61.7%	99,521	62.1%	98,445	61.7%
65+ years old	30,043	18.6%	29,658	18.5%	30,923	19.4%
Total	161,335	100%	160,353	100%	159,464	100%

4. Gender (Patient Level)

Gender	FY 15		FY 16		FY 17	
	Count	Percent	Count	Percent	Count	Percent
Male	65,192	40.4%	64,954	40.5%	64,968	40.7%
Female	96,113	59.6%	95,377	59.5%	94,470	59.2%
Other	30	0.0%	22	0.0%	26	0.0%
Total	161,335	100%	160,353	100%	159,464	100%

5. Race (Patient Level)

Race	FY 15		FY 16		FY 17	
	Count	Percent	Count	Percent	Count	Percent
White or Caucasian	138,311	85.7%	137,076	85.5%	134,728	84.5%
Black or African American	2,879	1.8%	3,013	1.9%	3,001	1.9%
American Indian or Alaska Native	128	0.1%	156	0.1%	140	0.1%
Asian	5,147	3.2%	5,444	3.4%	5,613	3.5%

Native Hawaiian or Other Pacific Islander	10	0.0%	11	0.0%	13	0.0%
Hispanic or Latino	2,256	1.4%	2,413	1.5%	2,384	1.5%
Other	12,604	7.8%	12,240	7.6%	13,585	8.5%
Total	161,335	100%	160,353	100%	159,464	100%

6. Most Prevalent Conditions - ICD 9 or 10 codes (Top Ten)

	FY 15		FY16		FY17
V700 Routine medical exam	30,146	NO ICD-10-CM DIAGNOSIS	87721	I10 Essential (primary) hypertension	38233
4019 Hypertension NOS	28,283	I10 Essential (primary) hypertension	28555	Z0000 Encntr for general adult medical exam w/o abnormal findings	31879
2724 Hyperlipidemia NEC/NOS	26,079	Z0000 Encntr for general adult medical exam w/o abnormal findings	23148	Z7901 Long term (current) use of anticoagulants	26708
42731 Atrial fibrillation	25,506	Z7901 Long term (current) use of anticoagulants	20765	E785 Hyperlipidemia, unspecified	23206
V5861 Long-term use anticoagul	25,185	E785 Hyperlipidemia, unspecified	18515	Z1231 Encntr screen mammogram for malignant neoplasm of breast	20498
V7612 Screen mammogram NEC	18,490	Z1231 Encntr screen mammogram for malignant neoplasm of breast	17535	I4891 Unspecified atrial fibrillation	16627
25000 DMII w/o comp nt st uncntr	17,816	I4891 Unspecified atrial fibrillation	13397	E119 Type 2 diabetes mellitus without complications	14892
0 NO ICD-9-CM DIAGNOSIS	15,201	E119 Type 2 diabetes mellitus without complications	11720	E039 Hypothyroidism, unspecified	12593
V7231 Routine gyn examination	11,876	Z01419 Encntr for gyn exam (general) (routine) w/o abn findings	10086	E7800 Pure hypercholesterolemia, unspecified	10504
2449 Hypothyroidism NOS	11,703	E039 Hypothyroidism, unspecified	9259	R05 Cough	10478

Notes

- *Counts represent the number of unique patients that visited a facility on the hospital's license for inpatient or outpatient services.
- *Patients were assigned the ZIP Code from their last visit in the given fiscal year. Patients with a missing or invalid ZIP Code or a ZIP Code from which less than 1% of the hospital's patients originate in all years are included in "Other."
- *Patients who fall into multiple age categories in a given year are included in the younger category.
- *Patients for whom a gender is not specified or whose gender varies across visits over each fiscal year are included in "Other."
- *Patients for whom a race is not specified or whose race varies across visits over each fiscal year are included in "Other."
- *A fiscal year spans October 1 of the previous year to September 30 of the given year. For example, fiscal year 2015 spans October 1, 2014 to September 30, 2015.

WPA Patient Panel Data

1. WPA's Patient Panel Volume

	Unique Visits	Unique Patients
FY 15	247,892	84,439
FY 16	251,303	91,116
FY 17	238,818	91,062

2. Geographic Breakdown

Patient Origin	FY 15		FY 16		FY 17	
	Count	Percent	Count	Percent	Count	Percent
01801	9,639	11.4%	10,505	11.5%	10,915	12.0%
01887	6,895	8.2%	7,529	8.3%	7,987	8.8%
01890	5,352	6.3%	5,702	6.3%	5,668	6.2%
01867	4,976	5.9%	5,053	5.5%	4,901	5.4%
02155	4,632	5.5%	4,832	5.3%	4,224	4.6%
01876	4,370	5.2%	5,952	6.5%	6,679	7.3%
01864	4,068	4.8%	4,043	4.4%	4,166	4.6%
01810	3,806	4.5%	3,853	4.2%	4,142	4.5%
02180	3,686	4.4%	4,309	4.7%	4,647	5.1%
01803	2,592	3.1%	2,794	3.1%	2,797	3.1%
01821	2,588	3.1%	2,882	3.2%	3,076	3.4%
01880	2,491	3.0%	2,753	3.0%	2,862	3.1%
01845	2,251	2.7%	2,332	2.6%	2,351	2.6%
02474	1,892	2.2%	1,994	2.2%	1,731	1.9%
02176	1,674	2.0%	1,971	2.2%	1,936	2.1%
01844	1,655	2.0%	1,699	1.9%	1,684	1.8%
02148	1,421	1.7%	1,576	1.7%	1,472	1.6%
01906	739	0.9%	883	1.0%	966	1.0%
Other	19,713	23.3%	20,454	22.4%	18,959	20.8%
Total	84,439	100%	91,116	100%	91,062	100%

3. Age at Visit (Patient Level)

	0-17 years old	18-64 years old	65+ years old
FY 15	9,320	56,539	18,580
FY 16	9,936	61,964	19,216
FY 17	8,224	63,545	19,293
FY 15-17 Total	27,480	182,048	57,089

4. Gender (Patient Level)

	Male	Female	Unknown
FY 15	34,755	49,684	-
FY 16	37,517	53,599	-
FY 17	37,974	53,088	-
FY 15-17 Total	110,246	156,371	-

5. Race (Patient Level)

	American Indian or Alaska Native	Asian	Black or African American	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	White or Caucasian	Other	Unavallable	Declined
FY 15	9	828	440	-	5	45,353	2,210	12,785	22,809
FY 16	9	1,024	503	-	2	49,877	2,648	12,774	24,279
FY 17	8	979	491	-	3	50,126	2,432	9,940	27,083
FY 15-17 Total	26	2,831	1,434	-	10	145,356	7,290	35,499	74,171

6. Most Prevalent Conditions - ICD 9 or 10 codes

FY 15 - ICD 9	V700	V202	4019	V7231	7962	V222
FY 16 - ICD 10	Z0000	I10	Z00129	Z23	M9903	M9901
FY 17 - ICD 10	Z0000	I10	805	Z23	Z00129	M9901

Notes

*Patients were assigned the ZIP Code from their last visit in the given fiscal year. Patients with a missing or invalid ZIP Code or a ZIP Code from which less than 1% of WPA's patients originate in all years are included in "Other."

*A fiscal year spans October 1 of the previous year to September 30 of the given year. For example, fiscal year 2015 spans October 1, 2014 to September 30, 2015.

Winchester Hospital/Shields MRI at Unicorn Park

1. Number of Patients

Year	# Patients
CY 15	12,253
CY 16	12,870
CY 17	13,542
Total Unique Patients	32,951

2. Outpatient v. Inpatient v. ED Monthly Volume Trends

Month	FY15			FY16			FY17		
	Outpatient	Inpatient	ED	Outpatient	Inpatient	ED	Outpatient	Inpatient	ED
Oct	1,251	40	7	1,302	53	5	1,323	53	8
Nov	1,052	43	7	1,177	45	5	1,175	50	5
Dec	1,049	66	8	1,261	44	6	1,221	57	1
Jan	1,069	70	7	1,210	45	5	1,301	53	2
Feb	876	35	7	1,182	59	3	1,138	47	4
Mar	1,212	58	3	1,306	58	3	1,334	51	3
Apr	1,164	52	7	1,221	50	3	1,313	60	7
May	1,180	59	6	1,255	46	6	1,342	49	6
Jun	1,237	74	7	1,267	65	4	1,314	61	4
Jul	1,174	81	2	1,145	51	6	1,254	59	4
Aug	1,218	68	7	1,262	62	7	1,349	58	6
Sep	1,148	53	11	1,178	72	4	1,236	65	5
Total	13,630	699	76	14,766	650	57	15,900	668	55

3. Top 20 Patient Origin Cities

City	FY15	FY16	FY17
Woburn, MA	1,569	1,615	1,613
Wilmington, MA	934	1,010	1,148
Reading, MA	943	954	964
Winchester, MA	837	841	883
Stoneham, MA	809	872	877
Medford, MA	705	786	854
Tewksbury, MA	794	742	839
Wakefield, MA	557	611	658
Burlington, MA	682	713	630
North Reading, MA	511	529	591
Billerica, MA	557	580	565
Melrose, MA	398	438	482
Andover, MA	400	450	450
Malden, MA	306	370	399
Arlington, MA	333	320	373
Lexington, MA	318	314	317
Saugus, MA	255	276	298
North Andover, MA	203	223	223
Revere, MA	130	149	187
Everett, MA	133	142	170

4. Volume by Age Group

Age Range	FY15	FY16	FY17
0-18	1,208	1,253	1,219
19-30	1,252	1,475	1,415
31-40	1,360	1,539	1,559
41-50	2,541	2,836	2,875
51-64	4,450	4,594	5,017
65+	3,594	3,826	3,938
Total	14,405	15,473	16,023

5. Gender Mix (Total Volume)

Gender	FY15	FY16	FY17
Female	8,126	8,897	9,072
Male	6,279	6,576	6,951
Female %	56%	58%	57%
Male %	44%	42%	43%
Total	14,405	15,473	16,023

6. Insurance Mix

Insurance	FY15	FY16	FY17
Medicare	21%	20%	18%
Medicare Advantage	1%	1%	1%
Medicaid	5%	6%	6%
Commercial	66%	64%	62%
Other	7%	9%	13%
Total	100%	100%	100%

7. Volume by Procedure

Category	FY15	FY16	FY17
Ortho	6,478	7,014	7,305
Neuro	6,059	6,300	6,356
Body	1,101	1,275	1,297
Chest	598	711	902
Angio	117	126	104
(Other)	52	47	59
Total	14,405	15,473	16,023

8. Operational Trends: Utilization

Month	FY15	FY16	FY17
October	84%	88%	91%
November	83%	90%	92%
December	80%	86%	92%
January	84%	89%	90%
February	75%	91%	87%
March	84%	90%	88%
April	84%	89%	89%
May	85%	92%	88%
June	88%	89%	91%
July	84%	86%	90%

August	87%	88%	90%
September	86%	88%	85%
Avg Utilization	84%	85%	89%

9. Wait Times

Month	FY15	FY16	FY17
	On-Time 0-10 Min	On-Time 0-10 Min	On-Time 0-10 Min
October	72%	63%	63%
November	71%	68%	58%
December	64%	70%	51%
January	75%	58%	58%
February	63%	69%	58%
March	66%	63%	65%
April	65%	67%	56%
May	67%	61%	67%
June	66%	65%	56%
July	67%	62%	57%
August	74%	61%	61%
September	68%	53%	66%
Avg Wait Time	68%	64%	59%

10. Areas of Improvement

Area of Improvement	% of Responses
Wait Times	33%
Comfort of Procedure	19%
Pre-Appointment	
Communication / Preparation	12%
Ease of Scheduling	10%
Explanation of Next Steps / Follow-Up	8%
Courtesy of Front Office Staff	7%
Courtesy of Technologist(s)	4%
Cleanliness of Facility	4%
Comfortable / Welcoming Environment	3%

Notes

*The Applicant does not collect data on race.


* With regard to insurance, Champus, External Collector, Hospital, Liability, and Private Pay make up the "Other" category.

Attachment/Exhibit

3

Attachment/Exhibit

A



Winchester Hospital Community Partners

March 20, 2018

 Lahey Health

Agenda

- Welcome and hospital updates
- Affiliation update
- Overview of MRI project
- Determination of Need (DoN) funding
- Questions



Winchester Hospital

A member of Lahey Health

Recent Highlights

- New leadership appointments
- Successful Epic rollout
- \$2 million gift to support lactation program
- Recognition:
 - Leapfrog Top General Hospital
 - 20 Boston Magazine Top Docs
 - America Hospital Association “Most Wired” Hospitals



Winchester Hospital

A member of Lahey Health

Community Commitment

Over 30 free
community programs
reaching more
than 50,000
community members

- Substance Use Disorder Outreach
- Home Blood Draw
- Aging on Your Own Terms
- Chronic Disease Management
- Asthma Management
- Support Groups
- Integrative Therapies



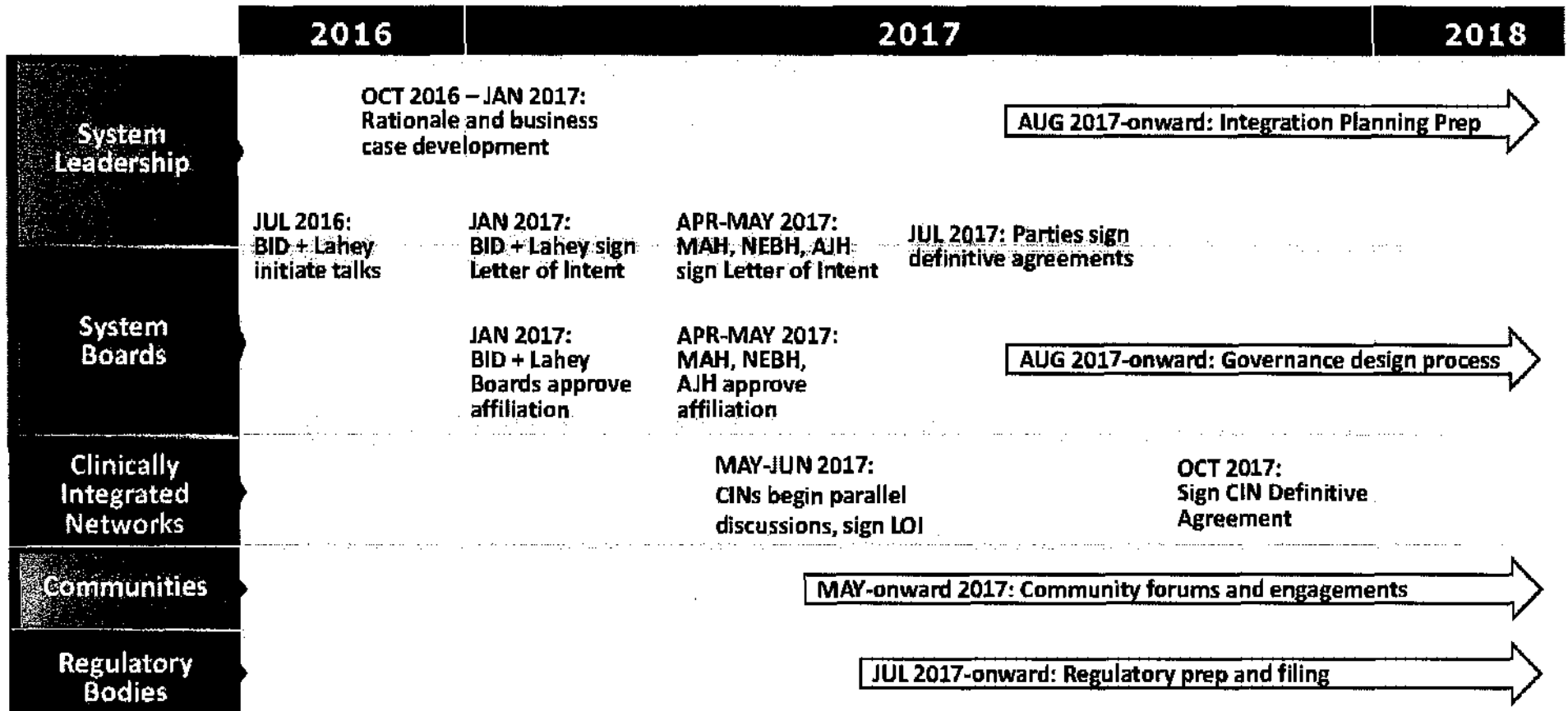
Winchester Hospital

A member of Lahey Health

Affiliation Update



Progress to Date

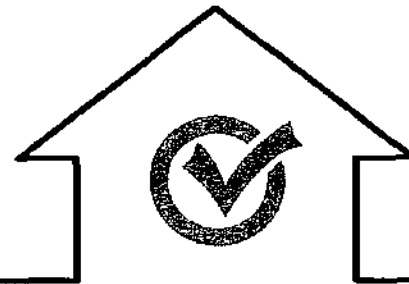


Current Context: Summary



An unsustainable environment for healthcare systems

Significant challenge for all health systems to achieve the levels of financial performance required to fund their future

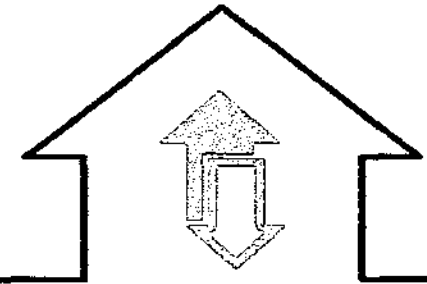


Need for provider-based solutions to:

✓
Propel the market further toward value

✓
Reduce the growth of healthcare spending

✓
Create meaningful competition



Scale has never been more essential

- ⇒ Economies of scale and scope
- ⇒ Strategic positioning
- ⇒ Access to capital
- ⇒ Population health management

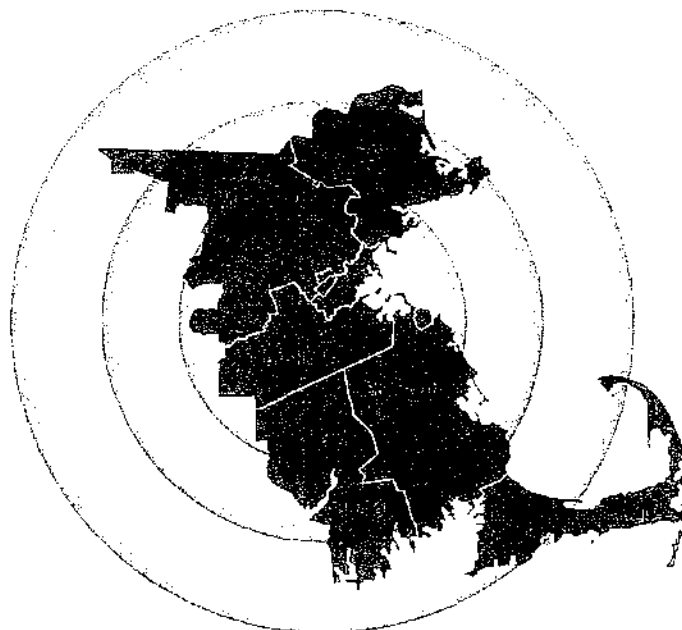
Strategic Rationale

A HIGH VALUE
system of care

A comprehensive
DISTRIBUTED
NETWORK

OPPORTUNITY
TO RECAPTURE
outmigration of specialty
and hospital services in
overlapping markets

Potential to bring innovative
PRODUCTS TO MARKET



Anticipated economies of
SCALE AND SCOPE

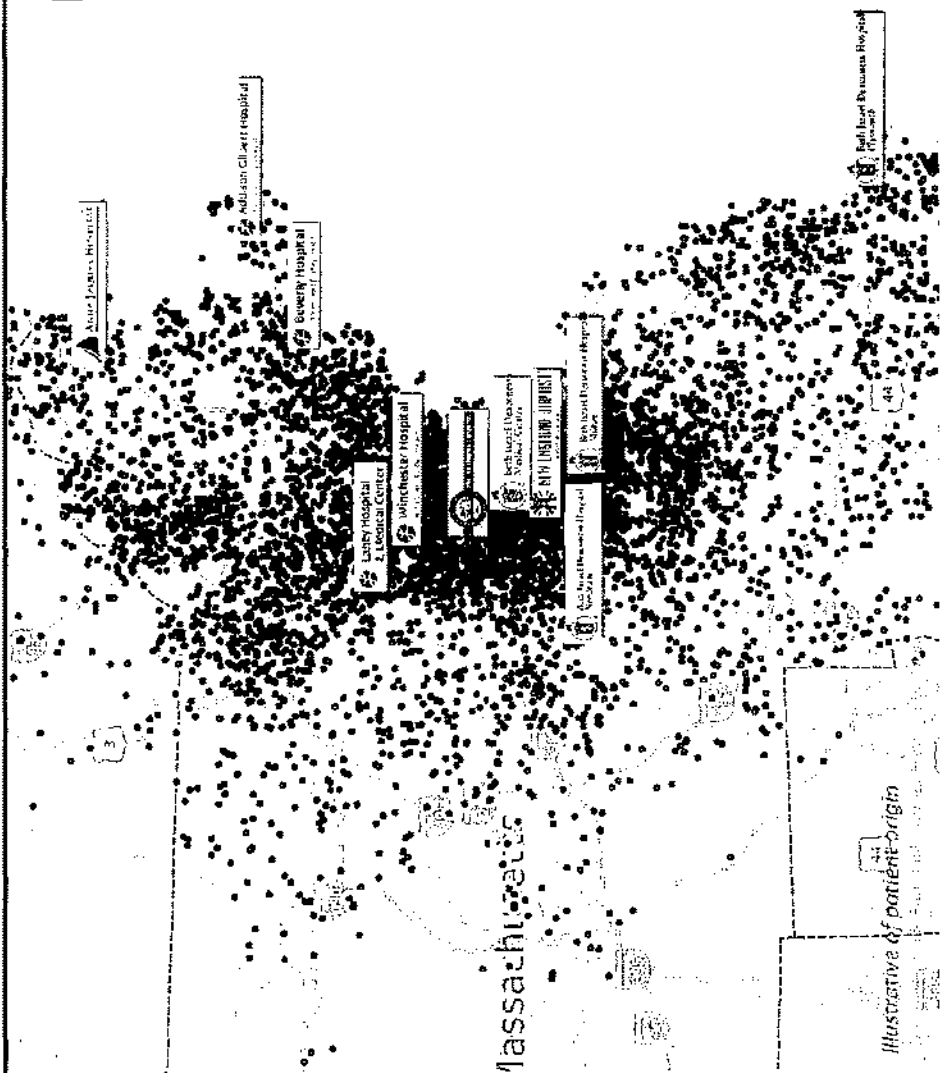
SHARED INVESTMENT
in population health
management infrastructure

Meaningful
COST EFFICIENCIES

Ability to leverage the
REPUTATION OF THE
COMBINED SYSTEM



A Comprehensive, Distributed Network



Primary care physicians within 5 miles of

75%

of Eastern MA residents (4.8 million)

A managed patient population of

~1.3 million

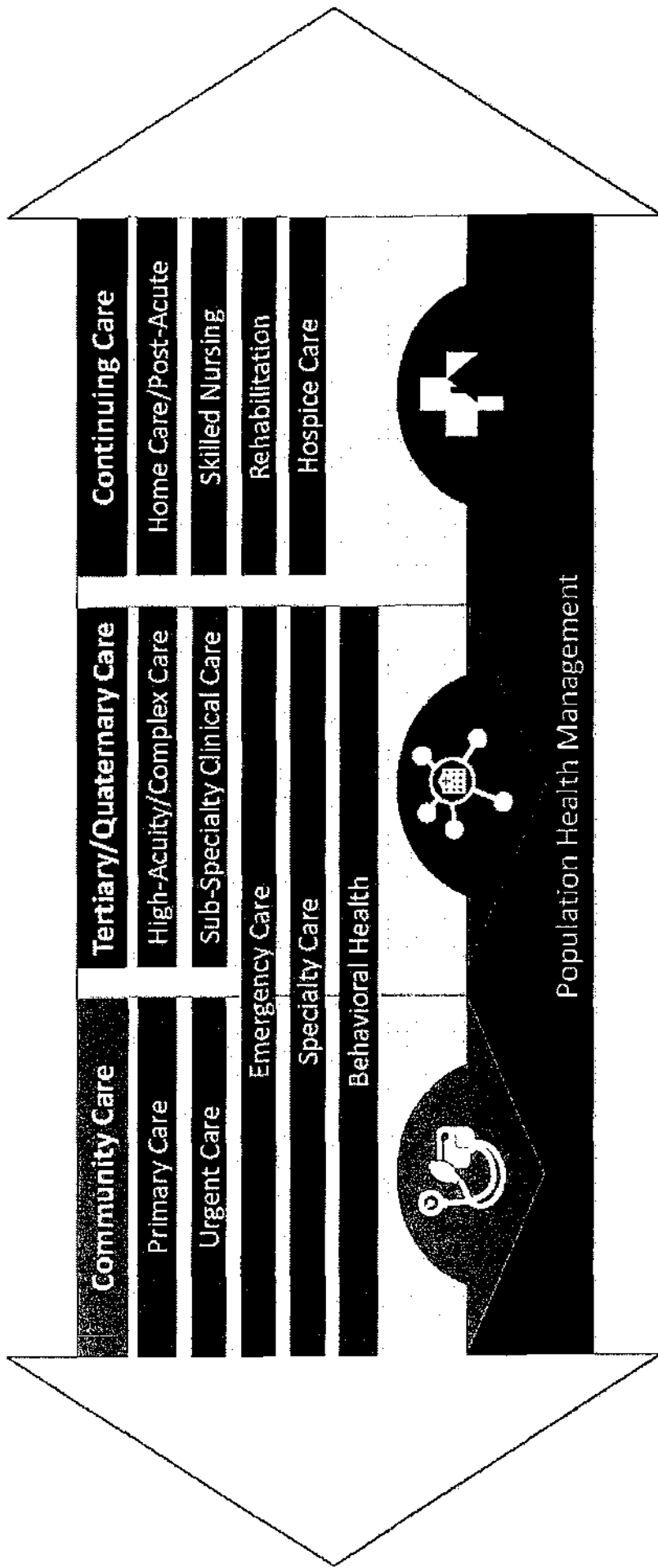
including

400,000

patients under risk contracts



Spanning the Care Continuum



Principles to Guide Us

VALUING

each partner's contributions

RESPECTING & HONORING

each of our legacy cultures

COMMITTING

to bold, market changing
integration goals

BELIEVING

in the potential good unleashed by
our unified system

EMPOWERING

every provider and employee to
drive our institutional goals

REMAINING

nimble, innovative, and adaptive



Questions

Hospital-Based MRI

Winchester Hospital MRIs

- Joint venture with Shields Healthcare
- 2 MRIs at Unicorn Park in Woburn
- Exams include neuro, musculoskeletal, breast, prostate
- Total volume: 16,000; inpatients 660

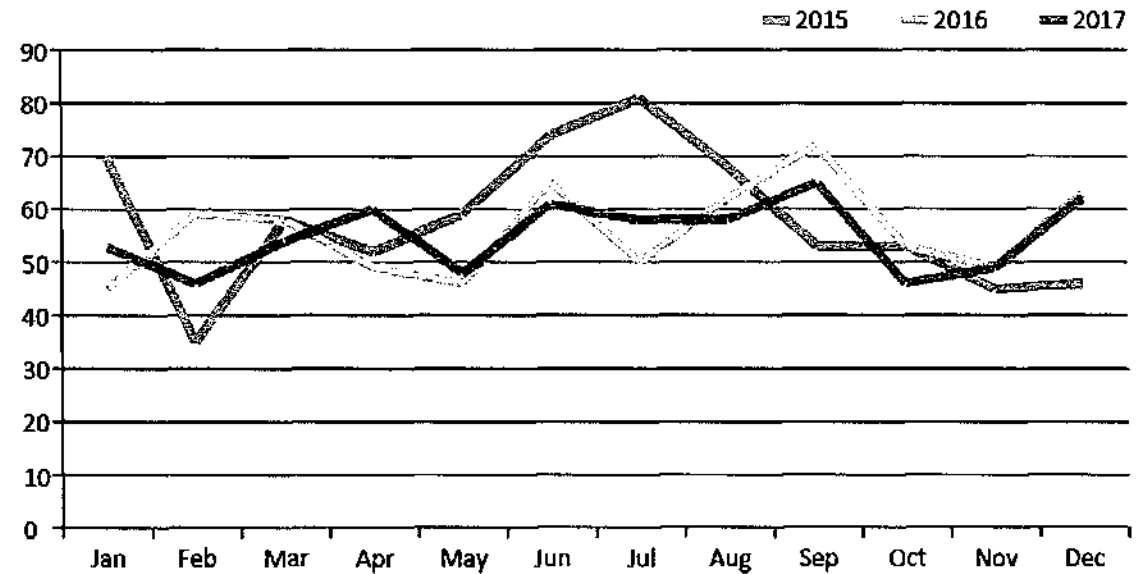


Winchester Hospital

A member of Lahey Health

Inpatient Volume

Month of Year	2017	2016	2015
Jan	53	45	70
Feb	46	59	35
Mar	54	58	58
Apr	60	49	52
May	48	46	59
Jun	61	65	74
Jul	58	50	81
Aug	58	62	68
Sep	65	72	53
Oct	46	53	53
Nov	49	49	45
Dec	67	63	46
Total	660	671	694
Inpatient Mix	4.1%	4.3%	4.7%



Winchester: Monthly Utilization (89%)

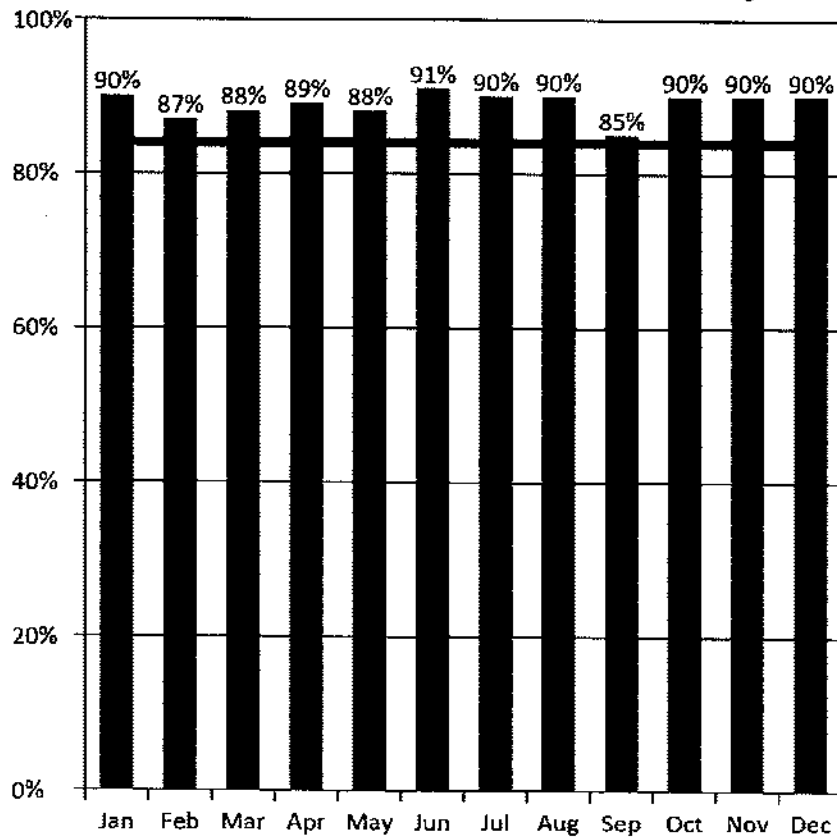
3T Operating at 89% Utilization

GE Operating at 89% Utilization

Winchester MRI: Utilization

(by Month)

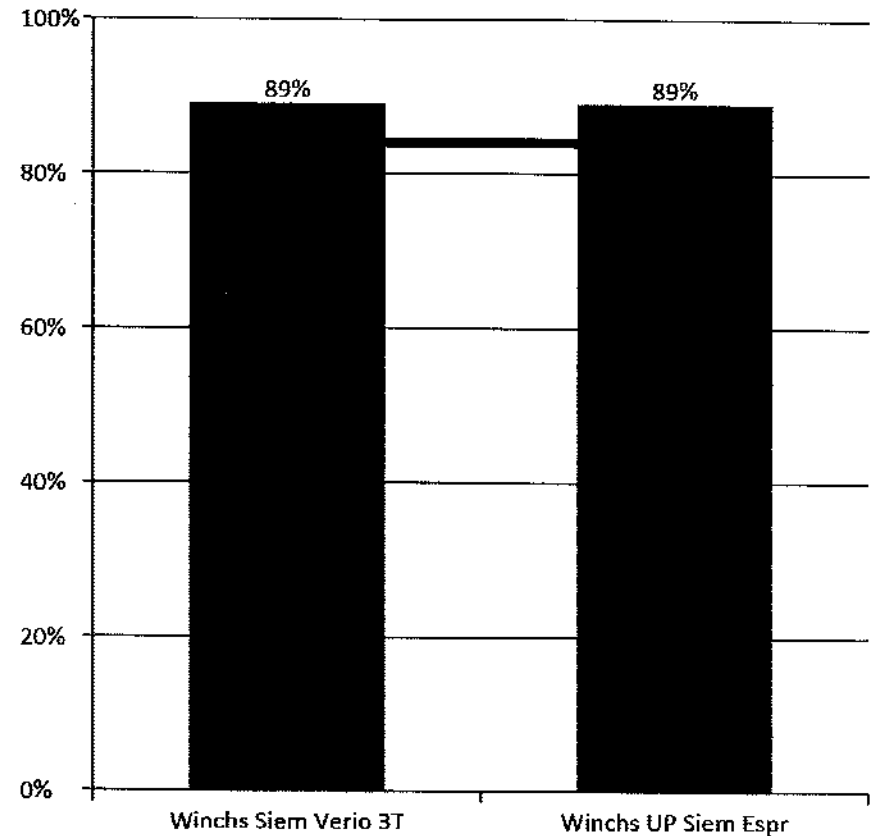
■ Utilization
— SHCG Network Avg



Winchester MRI: Utilization

(by Machine)

■ Utilization
— SHCG Network Avg



Proposed New MRI

- Service inpatients, ED and outpatients
- Operate 7 days per week
- Enhanced patient experience
- Projected volume: 1,500/first year

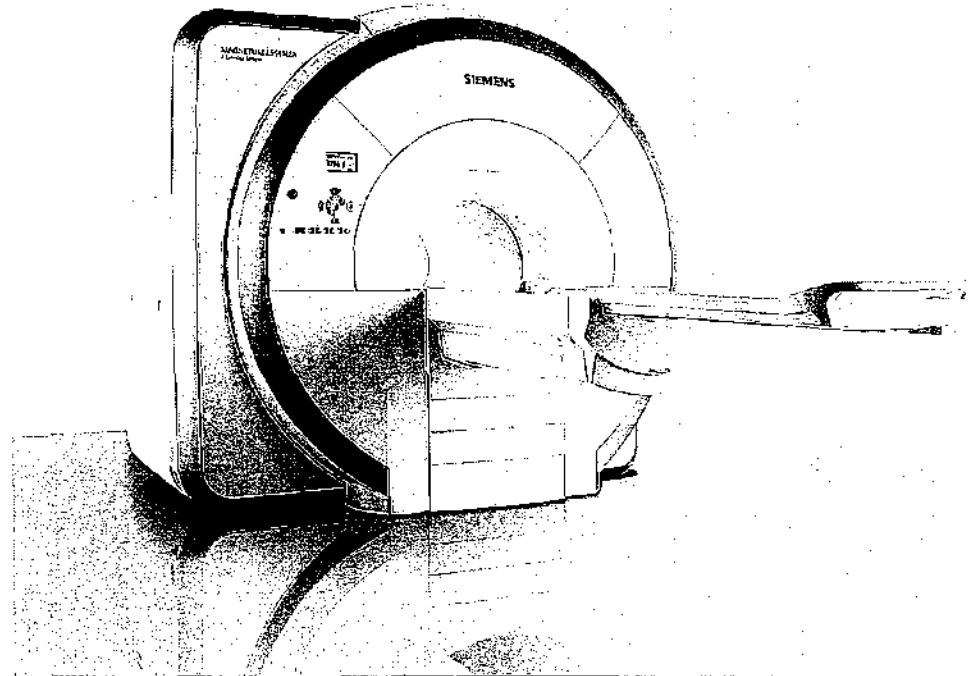


Winchester Hospital

A member of Lahey Health

Proposed New MRI

- Planning to begin regulatory process
- Project timeline: Summer 2019
- Project cost: \$2.5 million



Winchester Hospital

A member of Lahey Health

DoN Funding

- Community Health Initiative resources:
\$125K
- Community Benefits Advisory Committee
subcommittee
- Community participation encourage



Winchester Hospital

A member of Lahey Health

Questions

Attachment/Exhibit

B

Name & Title/Position	Organization	Email	Phone
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Michael McCoy	Wilmington Selection		
Jim McIsaac	Stoneman Police		
Megan Somborski	Stoneman substance Abuse Coalition		
Kayla Voker	"		
Stephen Buckley	Satter Healthcare		
Mary Heater	Nurse manage Woburn Public		
Daniel O'Connell	Winchester Police		
Shelby Newhouse	Wilmington Board of Health		
Mike Murphy	NOEIT Reading		
Don Stapp	North Reading		
Bob Fenlo	Woburn Police		
Michael Day	STATE REP		
Matthew Griffin	Stoneman Fire		
Mary Ann O'Connor	Medford Board of Health		

Name & Title/Position	Organization	Email	Phone
Jean Delios Assistant Town Manager	Town of Reading		
Don Eisenmunt CEO	Salter Healthcare		
Len Murphy Health Director	Health Dept		
Meg White Town Mgr. Office	Town of Winchester		
Daniel O'Connell Asst. Mgr. Office	Winchester Police		
Michael McCoy	Wilminster Selectm.		
Jean Delios	(see above)		
Stephen Buckley	Salter Healthcare		
Anthony Guendia	Boys + Girls Clubs of the Nation		
Jackie Bird	Mystic Valley Elder Service		
Jason Lewis	State Senator		

V. 2 of 3

Name & Title/Position	Organization	Email	Phone
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Megan Day, Exec. Director	Somerset Chamber of Com.	Det Butler	Worcester Coalition
Jackie Bird	Mystic Valley Elder Service		

Attachment/Exhibit

C



Winchester Hospital

A member of Lahey Health

Patient Family Advisory Council

AGENDA

6:00 PM, April 25, 2018
Cancer Center Conference Room
620 Washington Street
Winchester, MA
Winchester Hospital

Welcome & Announcements

Kathy Schuler

**Winchester Hospital's
EPIC Conversion**

Deborah Ash
Director of Ambulatory Applications

Zachary Johnson
EHR Application Analyst II,
Epic Ambulatory

Joel Okeefe
Director of Inpatient Clinical, HIM,
Access/Scheduling and Revenue
Applications

B-L Pellicore
Lahey Health Epic Communications
PM

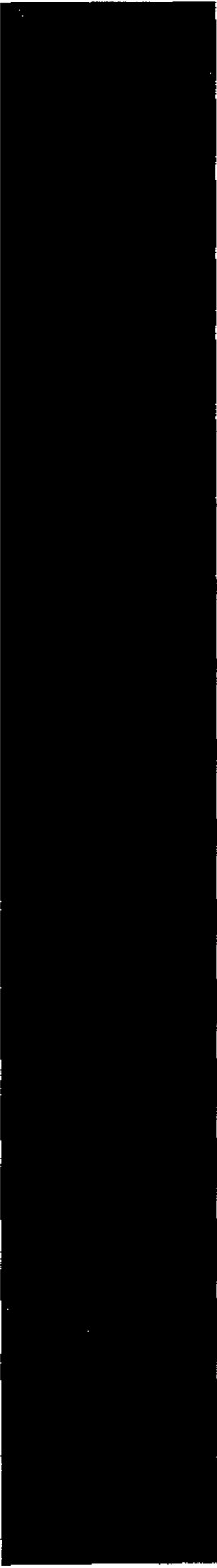
MRI Project

Joanne Grega

The next meeting will be held on Wednesday, May 23, 2018.

Attachment/Exhibit

D



Hospital-Based MRI

Winchester Hospital MRIs

- Joint venture with Shields Healthcare
- 2 MRIs at Unicorn Park in Woburn
- Exams include neuro, musculoskeletal, breast, prostate
- Total volume: 16,000; inpatients 660

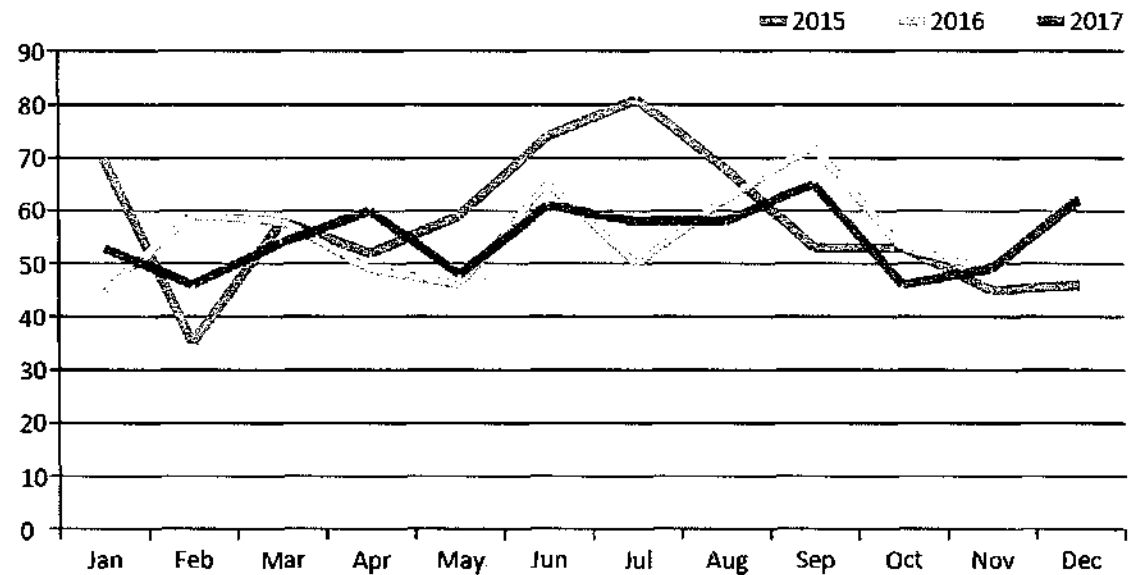


Winchester Hospital

A member of Lahey Health

Inpatient Volume

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Total	660	671	694
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Winchester Hospital

A member of Lahey Health

Winchester: Monthly Utilization (89%)

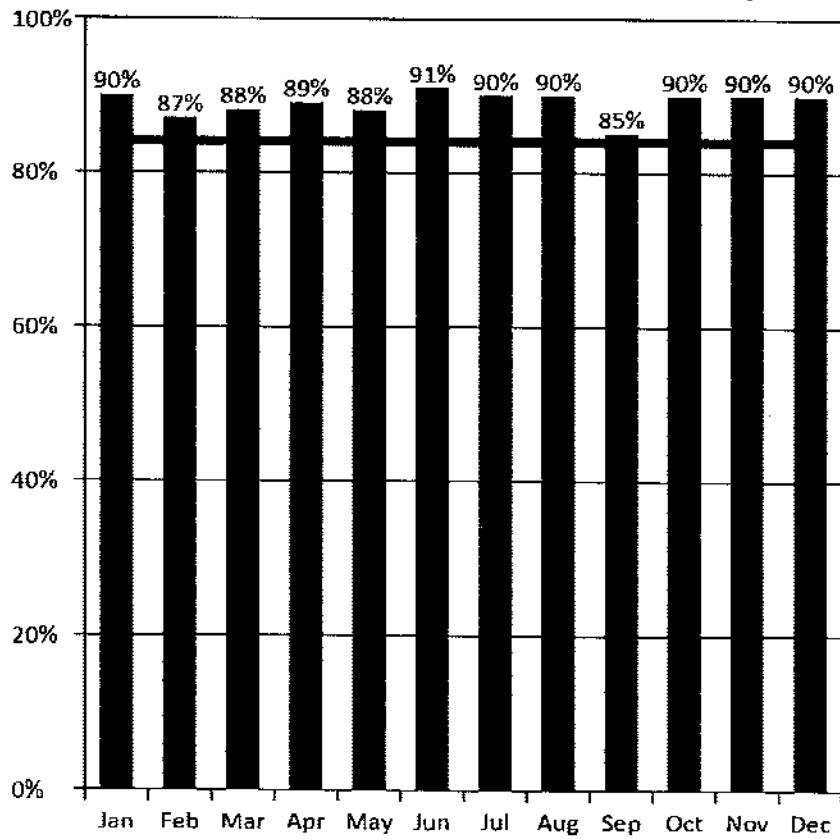
3T Operating at 89% Utilization

GE Operating at 89% Utilization

Winchester MRI: Utilization

(by Month)

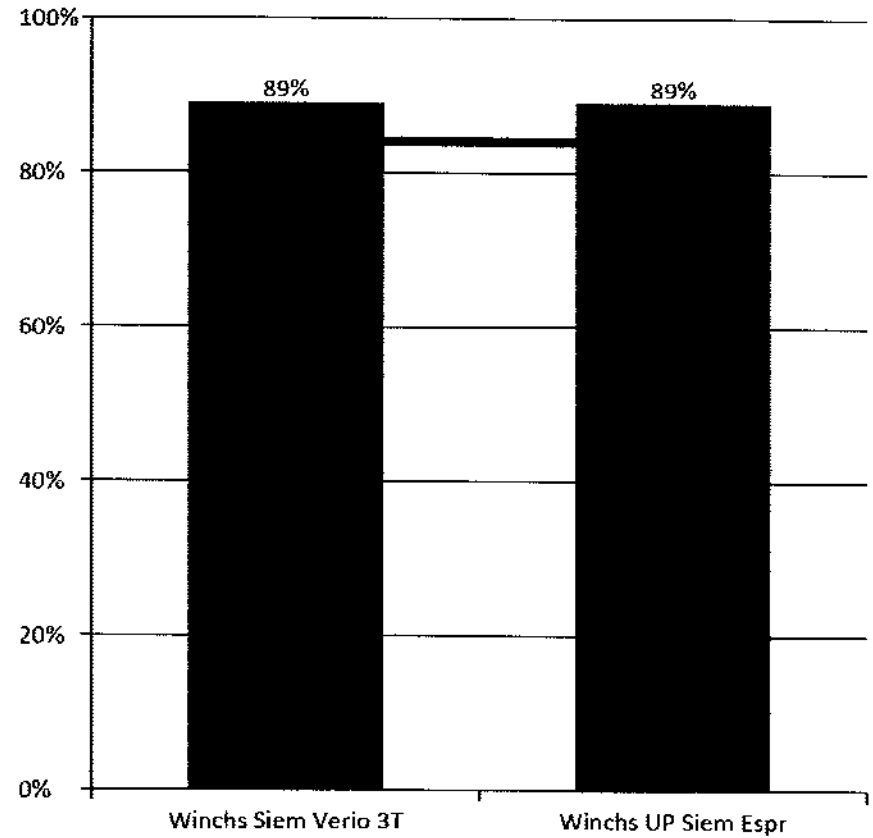
■ Utilization
— SHCG Network Avg



Winchester MRI: Utilization

(by Machine)

■ Utilization
— SHCG Network Avg



Proposed New MRI

- Service inpatients, ED and outpatients
- Operate 7 days per week
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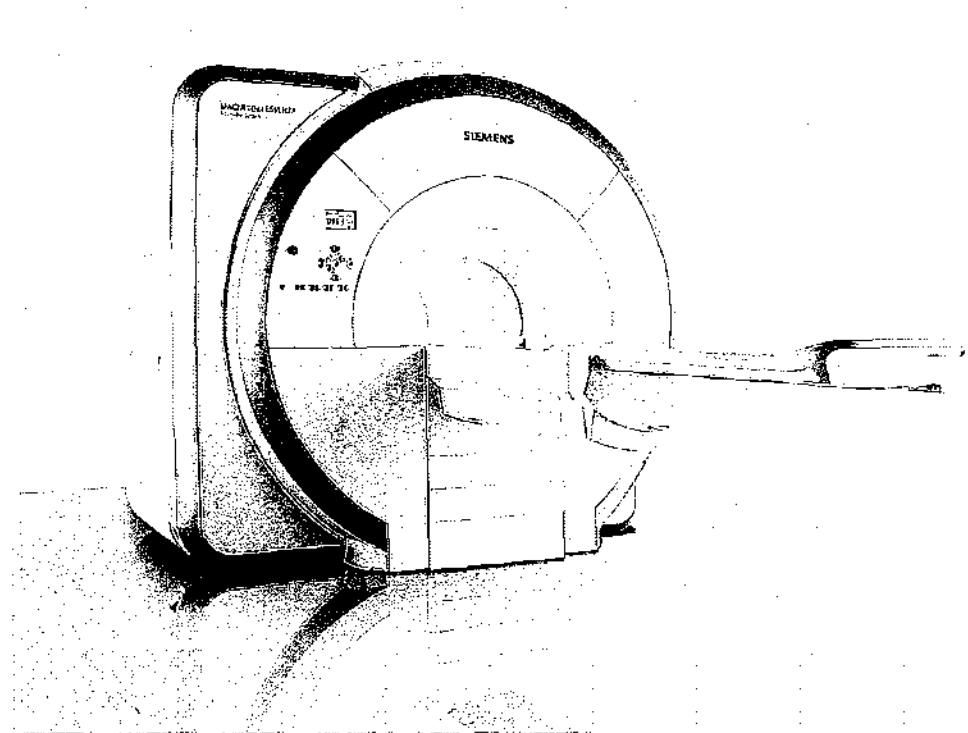


Winchester Hospital

A member of Lahey Health

Proposed New MRI

- Planning to begin regulatory process
- Project timeline: Summer 2019
- Project cost: \$3.8 million



Winchester Hospital

A member of Lahey Health

DoN Funding

- Community Health Initiative resources: \$190K
- Community Benefits Advisory Committee subcommittee
- Community participation encourage



Winchester Hospital

A member of Lahey Health

Questions

Attachment/Exhibit

E

Winchester Hospital

Patient Family Advisory Committee Meeting

Wednesday, April 25, 2018

Attendance

Name	Address	Email
<u>Karen Heaney</u>		
<u>Nancy Fletcher</u>		
<u>PAT FORTIER</u>		
<u>Nicole Galini</u>		
<u>Linda Call</u>		
<u>Anne Savas</u>		
<u>Regina Capone</u>		

Winchester Hospital

Patient Family Advisory Committee Meeting

Wednesday, April 25, 2018

Attendance

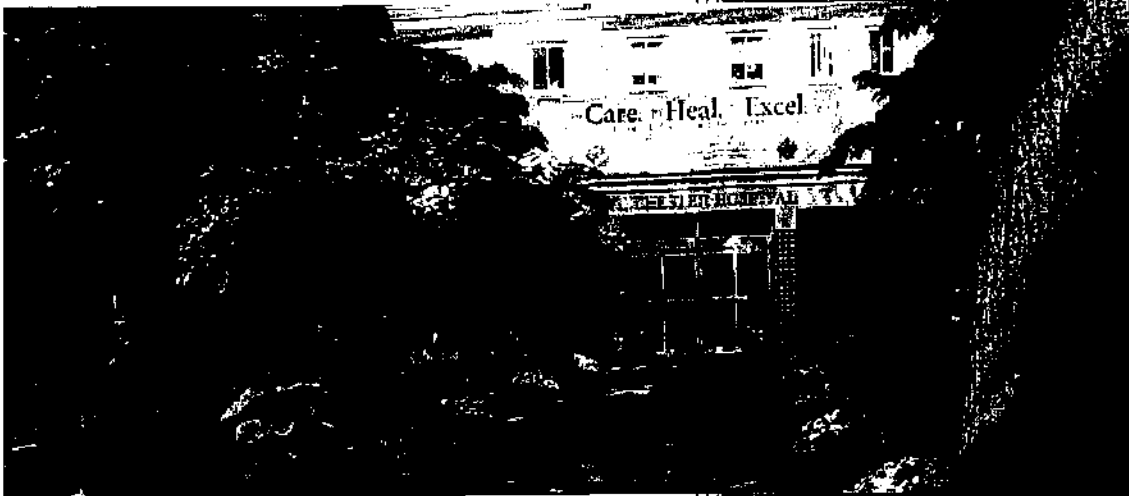
Name	Address	Email
<u>Lauren Reardon</u>		
<u>Kathy Schuck</u>		
<u>Carmen Kenrich</u>		
<u>Alice Kuhace</u>		

Attachment/Exhibit

4

2016

Winchester Hospital Community Health
Needs Assessment



Produced by John Snow Inc.



Executive Summary

Purpose and Background

Winchester Hospital (WH), founded in 1912, is a 229-bed community hospital located in Winchester, Massachusetts, that serves nearly half a million people and is one of the leading providers of comprehensive health care services in northwest suburban Boston. In addition to acute-care hospital inpatient services, Winchester Hospital provides an extensive range of outpatient services as well as integrated home care. It provides care in major clinical areas including medicine, surgery, pediatrics, cancer, obstetrics/gynecology and newborn. WH is a leading provider in the region in a broad range of important medical specialties, including cardiology, pulmonary medicine, oncology, gastroenterology, orthopedics, rehabilitation, radiation oncology and pain management. The staff is guided by the hospital's mission, "To Care. To Heal. To Excel," in service to its community.

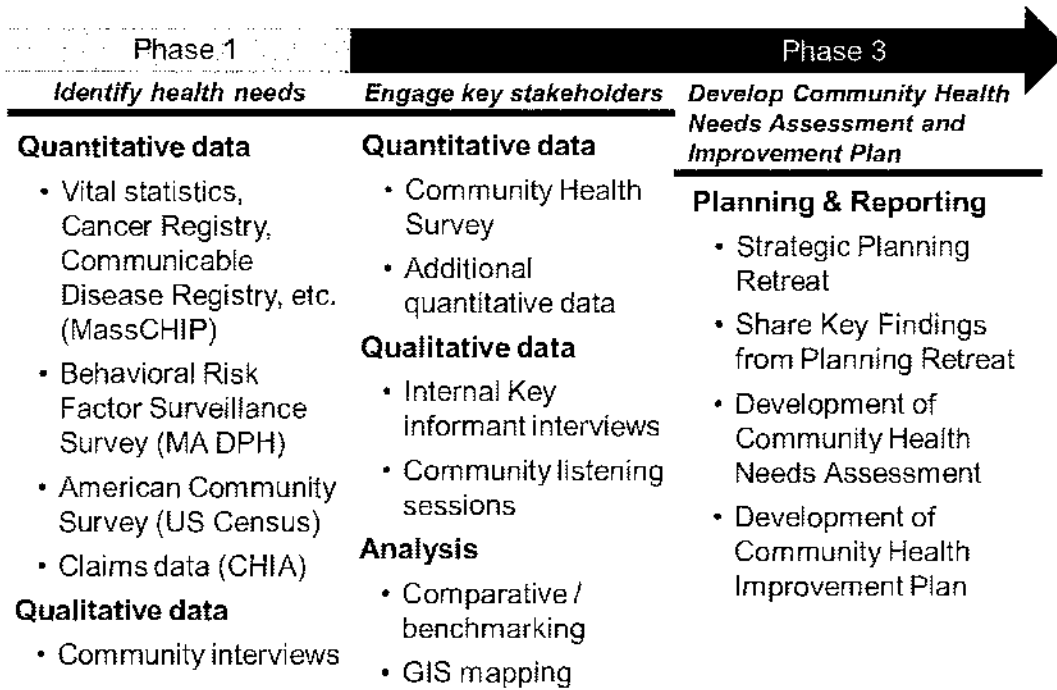
This Community Health Needs Assessment (CHNA) report, along with the associated Community Health Improvement Plan (CHIP), is the culmination of nearly a year of work. WH conducted the assessment to better understand and address the health-related needs of those living in its service area, with an emphasis on those who are most vulnerable. This project fulfills Massachusetts Attorney General's Office and federal Internal Revenue Service (IRS) requirements mandating that WH assess community health need, engage the community and identify priority health issues every three years. The Commonwealth and federal requirements further direct WH to create a community health improvement plan that will guide how WH, in collaboration with the community, its network of health and social services providers, and the local health departments, will address the identified needs and priorities.

With respect to community benefits, WH works with partners and collaborators to increase access to hospital emergency and inpatient services, specialty care services, primary care, behavioral health services, and other needed community services. In addition, WH supports or implements community health programs that promote health education, reduction of health care risk factors (e.g., poor nutrition, limitations on physical activity, tobacco use, alcohol abuse), as well as ensure that those in its service area are provided chronic disease management services. Winchester Hospital also works with partners to reduce the burden of mental illness and substance use. This work is done in partnership with an extensive array of health, social services, public health and other community-based organizations throughout WH's service area.

WH implements activities that meet the needs of all demographic and socio-economic segments of the population, but focuses particular efforts on those who face disparities due to socio-economic status, race/ethnicity, age and other factors.

Approach and Methods

The CHNA was conducted in three phases, which allowed WH to (1) compile an extensive amount of quantitative and qualitative data, (2) engage and involve key stakeholders, WH clinical and administrative staff, and the community at large, (3) develop a report and detailed strategic plan, and (4) comply with all Commonwealth Attorney General and federal IRS community benefits requirements. Data sources included a broad array of publicly available secondary data, key informant interviews, community forums, and a random household community health survey that captured information from hundreds of households in WH's primary service area.

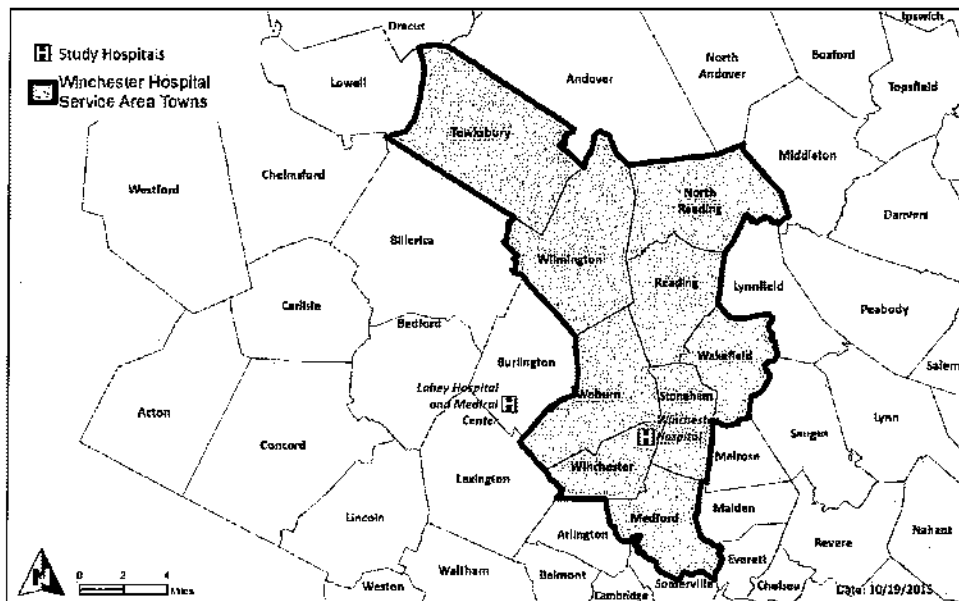


Winchester Hospital Community Benefits Service Area

WH's community benefits investments are focused on expanding access, addressing barriers to care and improving the health status of residents living in eight municipalities located in Middlesex County: North Reading, Reading, Stoneham, Tewksbury, Wakefield, Wilmington, Winchester and Woburn. WH also

serves patients and provides some community health programming in Medford due to long-standing program affiliations with various community health stakeholders. As a result, health status information from this community is included in the

Winchester Hospital Community Benefits Service Area



assessment. However, because Medford is part of other hospitals' community benefits service areas, information from this community has not been included in WH's Community Health Improvement Plan.

Demographically and socio-economically, WH focuses activities to meet the needs of all segments of the population with respect to age, race/ethnicity, income and the broad range of other ways that populations characterize themselves, to ensure that all residents have the opportunity to live healthy, happy and fulfilling lives. However, in accordance with federal status and Commonwealth guidelines, WH's community benefits activities are focused particularly on those population segments identified by the needs assessment as being most at risk: low-income individuals and families, racial/ethnic minorities, youth and adolescents, older adults, and those who are geographically or otherwise isolated. The body of evidence and academic literature have shown that these populations are more likely to face disparities with respect to the social determinants of health, access to care and health outcomes. A map showing the hospital locations and the specific cities and towns that are part of WH's community benefits service area is included above.

Key Health-Related Findings

Following are the key health-related findings drawn from the assessment's interviews and community forums as well as a review of the existing quantitative data.

- **Social Determinants of Health Have a Major Impact on Many Segments of the Service Area's Population.** Relative to the Commonwealth overall, most of the communities in WH's service area are affluent and fare well with respect to the leading health indicators. However, segments of the population struggle to access needed health services and experience disparities in health outcomes. One of the dominant themes from the assessment's key informant interviews and community forums was the impact that the underlying social determinants of health have on the service area, particularly on low-income, racially/ethnically diverse and older adult cohorts. Social determinants such as poverty, lack of employment opportunities, limited transportation, limited health literacy, linguistic barriers, lack of social support and domestic violence limit many people's ability to care for their own and their family's health.
 - **Low Income.** The towns in the WH service area with the highest proportion of low-income individuals are Medford and Woburn. Nearly a tenth (9.8%) of Medford's population was living in poverty, and 21.8% were living in low-income households earning less than 200% of the federal poverty level. In Woburn, 6.2% were living in poverty, and 19.6% were living in low-income households. In the Commonwealth, 8.1% of the population is living in poverty, and 24.8% is living in low-income households.¹
 - **Economic Challenges.** More than 40% of those living in rental units in the cities/towns of North Reading, Stoneham and Winchester applied 33% or more of their income toward rent.²
 - **Older Adults.** Stoneham and Winchester had statistically higher³ proportions of older adults (65 years old or older) – 18.4% and 16.4%, respectively – compared to 14.1% for the Commonwealth.⁴

¹ 2009-2013 US Census Bureau American Community Survey (ACS)

² 2009-2013 US Census Bureau American Community Survey (ACS)

- **Foreign Born.** Nearly a fifth (19.3%) of Middlesex County reported as being foreign born compared to 15% of residents in the Commonwealth overall. Winchester and Woburn had the highest proportions of foreign born in the WH service area, accounting for approximately 15% of their total populations.⁵ These towns also had the highest percentages of residents speaking languages other than English at home, with Woburn reporting 19.6% and Winchester reporting 18.7%.⁶
- **Limited Access to Primary Care, Oral Health and Behavioral Health Services for Low-Income, Medicaid-Insured, Uninsured and Other Vulnerable Population Segments.** Massachusetts has one of the highest rates of health insurance coverage and one of the strongest, most robust health service systems in the nation, yet there are still pockets of low-income, Medicaid-insured, uninsured and underinsured residents who have limited access to needed services and/or are not properly engaged in essential medical, oral and behavioral health services. Behavioral health and oral health services are a particular concern. Per the WH Community Health Survey, these populations are, in turn, more likely to use the emergency room and more likely to have health risk factors such as obesity, poor fitness, and risky alcohol use and be more prone to developing diabetes, hypertension and asthma.
 - **Low-Income Segments Most at Risk.** Key informants and community forum participants stressed the fact that despite the relative affluence of the area, there were pockets of service area residents who struggled with poor health outcomes and faced significant barriers to access.⁷ These populations were more likely to be low income, older adult and foreign born.
 - **High Rate of Uninsured Residents in Low-Income Populations.** Low-income residents are much more likely to be uninsured than residents in middle- and upper-income brackets. According to the 2015 WH Community Health Survey, 3.2% of all respondents from WH's service area were currently uninsured, compared to 8% of low-income respondents.⁸
 - **Lack of Access to Primary Care.** According to the 2015 WH Community Health Survey, 74.9% of all respondents from WH's service area had seen a primary care provider in the past 12 months, compared to only 65.7% of low-income respondents.⁹
 - **Higher Emergency Department Utilization.** According to the 2015 WH Community Health Survey, 22.5% of all respondents from WH's service area had at least one hospital emergency department visit in the past 12 months compared to 29.1% of low-income respondents.¹⁰

³ Throughout the assessment, statistical significance is defined as two values with non-overlapping 95% confidence intervals.

⁴ 2009-2013 US Census Bureau American Community Survey (ACS)

⁵ 2009-2013 US Census Bureau American Community Survey (ACS)

⁶ 2009-2013 US Census Bureau American Community Survey (ACS)

⁷ 2015 WH Key Informant Interviews and Community and Provider Forums

⁸ 2015 Winchester Hospital (WH) Community Health Survey. In order to ensure an appropriate, statistically sound sample size, all low-income respondents from each of the surveys conducted by Lahey Health System's three hospital partners were aggregated.

⁹ 2015 WH Community Health Survey

¹⁰ 2015 WH Community Health Survey

- **Lack of Access Due to Cost of Care.** Three in 10 (30.1%) of those living at 138% of the federal poverty level or below reported not getting needed dental care due to cost, and 1 in 5 (19.3%) were not able to fill a needed drug prescription due to cost.¹¹
- **High Rates of the Leading Health Risk Factors.** Another significant finding drawn from the assessment's quantitative data was the fact that many cities and towns in WH's service area have rates of chronic physical and behavioral health conditions that are higher than Commonwealth averages. In some people, these conditions have underlying genetic and biological causes that are difficult to counter. However, for most, these conditions are considered preventable or at least manageable. Addressing the leading health risk factors (e.g., obesity, lack of fitness, poor nutrition, tobacco use and alcohol abuse) is critical to chronic disease prevention and management efforts. It should be noted that most cities and towns in WH's service area fare well as a whole compared with Commonwealth averages on these risk factors. However, there are cities/towns whose rates are not as favorable and segments of populations in all municipalities that do not fare as well and have major risk factors. As stated above, those at risk are more likely to be low income, older adults or foreign born.
 - **Overweight/Obese.** Based on responses from the WH Community Health Survey, the percentage of adult respondents (18+) who reported as either obese or overweight (58%) was similar to the percentage for the Commonwealth. Adults in households earning below 200% of the federal poverty level were much more likely to be overweight or obese, with 72% of low-income individuals reporting as either overweight or obese.¹²
 - **Cigarette Smoking.** According to the 2015 WH Community Health Survey, 6.2% of adult respondents (18+) reported as current cigarette smokers, compared to 22.3% of low-income respondents. Commonwealth-wide, 16.6% of adults reported as current cigarette smokers.¹³
 - **Alcohol Use.** According to the 2015 WH Community Health Survey, 10.5% of adult respondents reported as heavy drinkers, defined as more than 60 drinks a month for men and 30 drinks a month for women, compared to only 8% of adults in the Commonwealth overall. Similarly, 27.2% of respondents reported "binge drinking" – more than five alcoholic drinks at any one sitting for men and more than four drinks for women – compared to only 19.4% for Commonwealth residents overall.¹⁴
- **High Rates of Substance Use and Mental Health Issues.** One of the leading findings from the assessment was the profound impact that substance use and mental health are having on individuals, families and communities throughout WH's service area. Depression/anxiety, suicide, alcohol abuse, opioid and prescription drug abuse, and marijuana use among youth are major health issues. Numerous residents and area service providers spoke passionately during interviews and community forums about the tremendous impact that these issues have on many individuals and families in the service area. Opioid abuse was a particular concern for residents

¹¹ Center for Health Information and Analysis. Findings from the 2014 Massachusetts Health Insurance Survey. May 2015. Accessed at: <http://www.chiamass.gov/assets/docs/r/pubs/15/MHIS-Report.pdf>

¹² 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

¹³ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

¹⁴ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

and service providers in WH's service area, and there were calls for greater outreach, education, screening and treatment services for all segments of the population by age and income.¹⁵

- **Substance Abuse Deaths.** Middlesex County experienced more than a 200% increase in opioid overdose deaths between 2001 and 2014. Specifically, in 2001, 76 deaths were reported due to opioid abuse in Middlesex County. By 2013 this number had risen to 147, and between 2013 and 2014 the figure rose to 257 deaths.¹⁶
- **Opioid-Related ED Visits.** Startlingly, every city/town other than Winchester had higher rates of opioid-related emergency department visits per 100,000 population than the Commonwealth or Middlesex County, with Wakefield posting the highest rate at 518 visits per 100,000, followed by Stoneham (398), Wilmington (384), Tewksbury (372), North Reading (369), Medford (355), Reading (333) and Woburn (332). The Commonwealth rate for opioid-related emergency department visits was 260 per 100,000 population, and the Middlesex County rate was 227.¹⁷
- **Opioid-Related Hospitalizations.** Medford (340) and Stoneham (367) each had rates of opioid-related hospitalizations per 100,000 population that were significantly higher than the rates for Middlesex County (208) and the Commonwealth overall (316).¹⁸
- **Alcohol Use.** According to the WH Community Health Survey, approximately 10.5% of adults reported as heavy drinkers, compared to approximately 8% for the Commonwealth overall.¹⁹
- **Binge Drinking.** According to the WH Community Health Survey, 27.2% of respondents reported “binge drinking” – more than five alcoholic drinks at any one sitting for men and more than four drinks for women – compared to only 15.8% for low-income respondents and only 19.4% for Commonwealth residents overall.²⁰
- **Mental Health.** According to the 2015 WH Community Health Survey, approximately 7% of adult respondents (18+) reported as being in poor mental or emotional health more than 15 days per month, compared to approximately 10% of low-income individuals. Commonwealth-wide, 11.2% of adults reported as being consistently in poor mental or emotional health.²¹
- **Mental Health-Related Hospitalization Rates.** Only Medford had higher hospitalization rates for all mental health-related disorders per 100,000 population than the Commonwealth. Medford's rate was 4,030 compared to 3,266 for Middlesex County and 3,840 for the Commonwealth overall.²²

¹⁵ 2015 WH Key Informant Interviews and Community and Provider Forums

¹⁶ Massachusetts Department of Public Health. Data Brief: Fatal Opioid-Related Overdoses among Massachusetts Residents. 2015.

¹⁷ 2008-2012 Massachusetts Hospital Emergency Visit Discharges

¹⁸ 2008-2012 Massachusetts Hospital Inpatient Discharges (UHDDS)

¹⁹ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

²⁰ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

²¹ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

²² 2008-2012 Massachusetts Hospital Inpatient Discharges (UHDDS)

- **Mental Health-Related ED Visits.** With respect to mental health-related emergency department visits, only Medford and Wakefield had rates of utilization per 100,000 population that were higher than the rates for Middlesex County and the Commonwealth overall. Medford's rate was 5,480 per 100,000 population, and Wakefield's rate was 5,273, compared to the Commonwealth rate of 4,990 and the Middlesex County rate of 4,074.²³
- **High Rates of Chronic and Acute Physical Health Conditions, Particularly for Low-Income Populations (e.g., heart disease, hypertension, cancer and asthma).** The assessment's quantitative data shows that WH's service area fares better than the Commonwealth overall with respect to chronic disease rates, but a number of towns fare less favorably, and the rates for low-income and older adult populations are very high. It should be noted that even for those communities that do not have rates that are statistically higher than the Commonwealth's, these conditions are still the leading causes of premature death.
 - **Diabetes.** Among WH Community Health Survey respondents, 4.6% of all respondents reported that they had ever been told they had diabetes, compared to 8.5% of adults 18+ in the Commonwealth overall. However, among low-income respondents, 12.1% reported that they had been told they had diabetes.²⁴
 - **Hypertension.** Twenty-five percent of respondents from the WH Community Health Survey reported ever being told they had hypertension, compared to 29% for the Commonwealth overall. Among low-income respondents, 32% reported that they had been told they had hypertension.²⁵
 - **Asthma.** Sixteen percent of WH Community Health Survey respondents reported being told they had asthma, compared to 17% for the Commonwealth overall. The percentage for low-income respondents in this case was actually lower at 13%; however, low-income respondents were considerably more likely to be seen in the hospital emergency department for urgent care. For the entire survey sample, 11% of asthmatics had had an emergency department visit, compared to 19% of low-income respondents.²⁶
- **High Rates of Cancer, Particularly for Low-Income, Racially/Ethnically Diverse and Otherwise At-risk Population Segments.** Many of the communities that are part of WH's service area have high cancer incidence, hospitalization or mortality rates. This is particularly true for certain cancers in specific communities. Myriad factors are associated with cancer, and many of them are very difficult to assess completely or to address. However, at the root of addressing cancer and high mortality are screening, early detection, peer support and access to timely and supportive quality treatment.
 - **Cancer.** Four of the eight towns that are part of WH's primary service area (Reading, Tewksbury, Wilmington and Woburn) reported higher cancer incidence rates (all cancer types) than did the Commonwealth. The highest all-cancer incidence rate per 100,000

²³ 2008-2012 Massachusetts Hospital Emergency Visit Discharges

²⁴ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

²⁵ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

²⁶ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

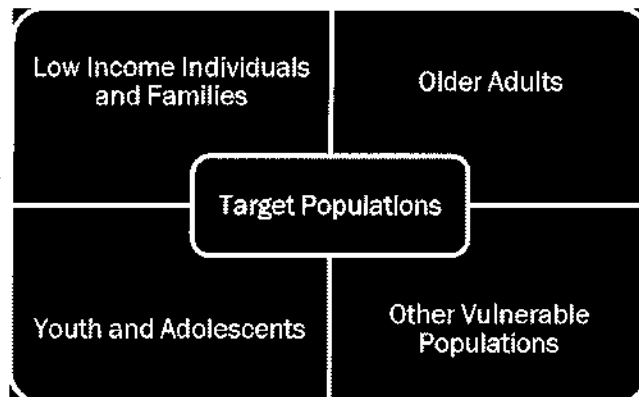
population was in Wilmington (588), followed by Tewksbury (578), Woburn (562) and Reading (561). These rates compare to 509 for the Commonwealth and 510 for Middlesex County.²⁷

Cancer. Of all respondents to WH's Community Health Survey, 11.8% reported that they had ever been told they had cancer, compared to 11.1% for residents in the Commonwealth; 17% of low-income respondents to the survey had ever been told they had cancer.²⁸

- o **Most Common Cancer.** Prostate cancer was the most common cancer among men and breast cancer among women, followed by lung cancer in men and women.²⁹
- o **Mammography Screening.** According to the WH Community Health Survey, the percentage of women 40+ who have had a mammography screening in the preceding two years was slightly lower in WH's service area (84%) than in the Commonwealth overall (85%).³⁰

Priority Target Populations

WH focuses its activities to meet the needs of all segments of the population with respect to age, race, ethnicity, income, gender identity and sexual orientation to ensure that all residents have the opportunity to live healthy lives. However, its community benefits activities are focused particularly on low-income, youth/adolescent and older adult segments of the population that are more likely than other cohorts to face disparities in access and health outcomes.



WH Community Benefits Target Population

Community Health Priorities

The WH CHNA's approach and process provided ample opportunity to vet the quantitative and qualitative data compiled during the assessment. WH has framed the community health needs in three priority areas, which together encompass the broad range of health issues and social determinants of health facing WH's service area. These three areas are (1) Wellness, Prevention, and Chronic Disease Management; (2) Elder Health; and (3) Behavioral Health. WH already has a robust Community Health Improvement Plan that has been addressing many of the issues identified. However, this CHNA has provided new guidance and invaluable insight on quantitative trends and community perceptions that can be used to inform and refine WH's efforts. The following are the core elements of WH's updated Community Health Improvement Plan.

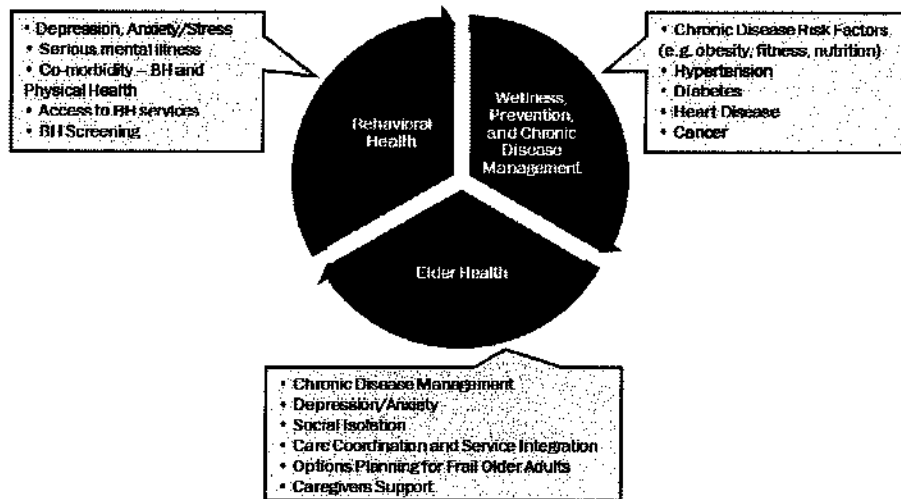
²⁷ 2007-2011 Massachusetts Cancer Registry

²⁸ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

²⁹ 2007-2011 Massachusetts Cancer Registry

³⁰ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

WH Community Health Priorities



Summary Community Health Improvement Plan (CHIP)

Priority Area 1: Wellness, Prevention and Chronic Disease Management

Goal 1: Promote Wellness, Behavior Change and Engagement in Appropriate Care (physical, mental, emotional and behavioral health)

Goal 2: Increase Physical Activity and Healthy Eating

Goal 3: Identify Those with Chronic Conditions or at Risk; Screen and Refer for Counseling/Treatment

Priority Area 2: Elder Health

Goal 1: Promote General Health and Wellness

Goal 2: Decrease Depression and Social Isolation

Goal 3: Increase Physical Activity and Healthy Eating

Goal 4: Improve Access to Care

Goal 5: Improve Chronic Care Management

Goal 6: Reduce Falls

Goal 7: Enhance Caregiver Support and Reduce Family/Caregiver Stress

Goal 8: Reduce Economic and Food Insecurity

Priority Area 3: Behavioral Health (Mental Health and Substance Use)

Goal 1: Promote Outreach, Education, Screening and Treatment for Those with Mental Health and Substance Use Issues in Clinical and Community-Based Settings

Goal 2: Increase Access to Mental Health and Substance Use (MH/SA) Services

Priority Area 4: Partner Collaboration

Goal 1: Promote Collaboration with State and Local Public Health Offices and Community Partners

Acknowledgments

This Community Health Needs Assessment was developed through a collaborative assessment process with the three hospital systems that are part of Lahey Health – Winchester Hospital, Northeast Health Corporation (Beverly Hospital and Addison Gilbert Hospital), and Lahey Hospital Medical Center.

Winchester Hospital (WH) would like to acknowledge the great work, support and commitment of the Lahey Health CHNA Advisory Committee, with representation from each of Lahey Health’s hospitals, including WH. The Advisory Committee met periodically throughout the assessment in order to keep abreast of the assessment’s progress and to provide important feedback on the process.

Since the beginning of the assessment in April 2015, dozens of individuals have participated in this process through interviews and community forums, including representatives from health and social services organizations, public health departments, community advocacy groups, community businesses, and the community at large. The information gathered as part of these efforts allowed WH to engage residents in discussions on community health status, capacity and overall community need, and to gain a better understanding of barriers to care, service gaps and the underlying determinants of health. In addition, hundreds of community members from WH’s primary service area completed lengthy community health surveys. The information gathered through this survey has been critical to assessing need, and will be important as WH moves forward to target its community benefits strategies.

Winchester Hospital would like to thank everyone who was involved in this assessment, but particularly the region’s service providers, health departments, advocacy groups and community members who invested their time, effort and expertise through interviews, surveys and community forums to ensure the development of a comprehensive, thoughtful and quality assessment. While it was not possible for this assessment to involve all of the community’s stakeholders, care was taken to ensure that a representative sample of key stakeholders was engaged. Those involved showed a strong commitment to strengthening the region’s system of care, particularly for those segments of the population who are most at risk. This assessment would not have been possible, or nearly as successful, without the support of all who were involved. Please accept our heartfelt appreciation and thanks for your participation in this assessment.

John Snow Inc. (JSI)

John Snow Inc. and our nonprofit JSI Research & Training Institute Inc. form a public health management consulting and research organization dedicated to improving the health of individuals and communities throughout the world. JSI's mission is to improve the health of underserved people and communities and to provide a place where people of passion and commitment can pursue this cause.

For over 35 years, Boston-based JSI and our affiliates have provided high-quality technical and managerial assistance to public health programs worldwide. JSI has implemented projects in 106 countries, and currently operates from eight U.S. and 81 international offices, with more than 500 U.S.-based professionals and 1,600 host country staff.

JSI is deeply committed to improving the health of individuals and communities worldwide. We work in partnership with governments, organizations and host-country experts to improve the quality, access and equity of health systems worldwide. We collaborate with government agencies, the private sector, and local nonprofit and civil society organizations to achieve change in communities and health systems.

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Introduction

Tax-exempt hospitals like Winchester Hospital (WH) play essential roles in the delivery of health care services and, as a result, are afforded a range of benefits, including state and federal tax-exempt status. With this status comes certain fiduciary and public service obligations. The primary obligation of tax-exempt hospitals is that they provide charity care to all qualifying individuals. Tax-exempt hospitals are also expected to assess health needs within their community and to support the implementation of community-based programs geared to improving health status and strengthening the health care systems in which they operate. Specifically, the IRS requires tax-exempt hospitals to conduct a Community Health Needs Assessment (CHNA) and to develop an associated Community Health Improvement Plan (CHIP) every three years. It is expected that these activities be done in close collaboration with the area’s health and social services providers, local public health departments, key stakeholders, and the public at large.

Figure 1. Commonwealth and Federal Community Benefits Requirements

<p>Massachusetts Voluntary Guidelines Hospitals are required to provide charity care as a condition of Massachusetts licensure – maintaining or increasing the percentage of patient revenues allocated to free care</p> <p>The Attorney General’s Office has developed a set of Voluntary Guidelines for non-profit hospitals and health plans. Specifically, non-profit hospitals are expected to:</p> <ul style="list-style-type: none"> • Affirm and publicize a community benefits mission statement • Demonstrate institutional support / involvement • Demonstrate involvement of the community • Involve local public health departments • Conduct a Community Health Needs Assessment • Identify target populations, specific programs that meet identified need, and measurable goals • Submit a community benefits report to the AG’s office 	<p>Federal IRS Requirements The Patient Protection and Affordable Care Act (PPACA) established requirements for non-profit hospitals under § 501(r) of the Internal Revenue Code. The federal code requires that tax-exempt hospitals:</p> <ul style="list-style-type: none"> • Conduct a Community health needs assessment • Engage community stakeholders including local health departments • Prioritize leading health issues • Conduct evidence-based planning activities addressing key health issues • Implement a community health improvement strategy <p>Community Benefits expenditure categories include:</p> <ul style="list-style-type: none"> • Uncompensated Care • Medical, Education & Training • Medical Research • Community Health Programming
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WH recognizes the merit and importance of these activities and, as such, its efforts over the past year extend far beyond meeting Commonwealth expectations or federal regulatory requirements. A robust, comprehensive and objective assessment of community health needs and service capacity, conducted collaboratively with key stakeholders and the community at large, allows WH not only to fulfill its public requirements, but also to explore ways to more effectively leverage its community benefits activities and resources and align these with the organization’s broader business and strategic objectives. The CHNA process facilitates community partnerships and fosters broad community engagement. These efforts can promote the development of more targeted, integrated and sustainable community benefits activities.

This report along with the associated CHIP is the culmination of more than a year of work. It summarizes the findings from WH’s CHNA and provides the core elements of WH’s CHIP, including the major goals that will guide the plan. WH’s Community Relations Department, with the full support

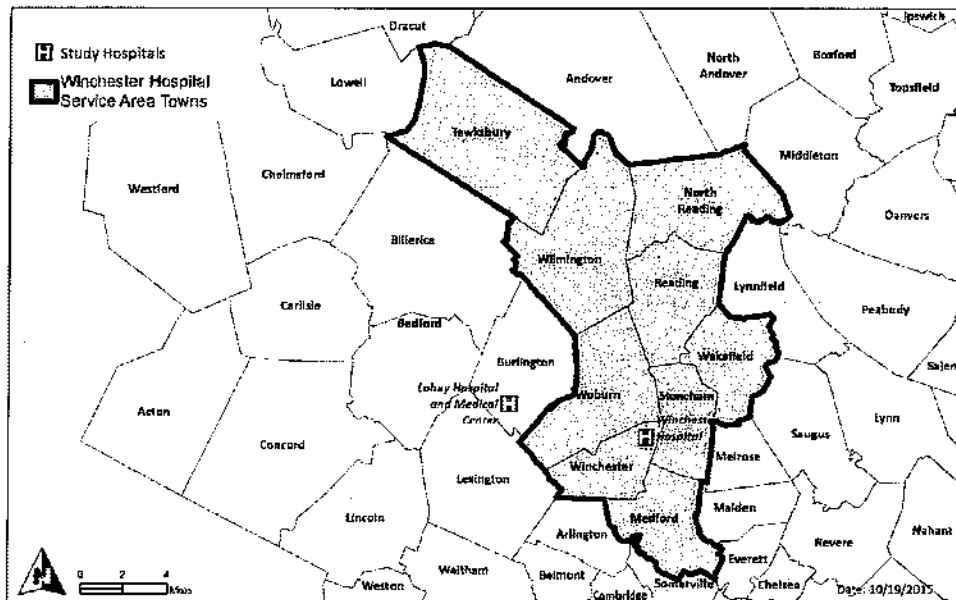
of WH's Board of Directors, clinicians and administrators, looks forward to working with community partners, local health departments and community residents to address the issues that arose from the CHNA and to implement the CHIP.

Included below are further details regarding WH's service area and target population as well as detailed descriptions of how the CHNA was completed and the CHIP developed.

Overview of Community Benefits Service Area and Target Population

Winchester Hospital, founded in 1912, is a 229-bed community hospital located in Winchester, Massachusetts. It serves nearly half a million people and is one of the leading providers of comprehensive health care services in northwest suburban Boston. In addition to acute-care hospital inpatient services, Winchester Hospital provides an extensive range of outpatient services and integrated home care. It provides care in major clinical areas including medicine, surgery, pediatrics, cancer, obstetrics/gynecology and newborn. WH is a leading provider in the region in a broad range of important medical specialties, including cardiology, pulmonary medicine, oncology, gastroenterology, orthopedics, rehabilitation, radiation oncology and pain management. The hospital's staff goes above and beyond every day and is guided by its mission, "To Care. To Heal. To Excel," in service to its community. WH serves individuals and families primarily from northwest

Figure 2: Winchester Hospital Community Benefits Service Area



suburban Boston but has a loyal following who come from far and wide to access its exceptional services. With respect to community benefits, WH focuses its efforts more narrowly on the communities in its primary, local service area. More specifically, WH's community benefits investments are

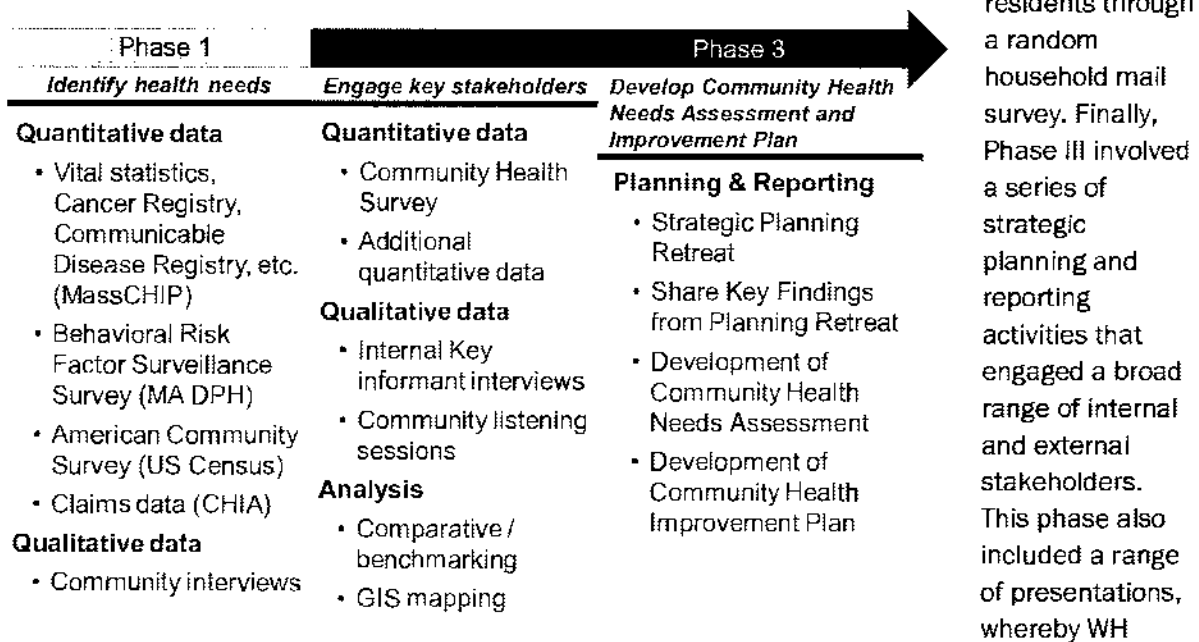
focused on expanding access, addressing barriers to care and improving the health status of residents living in eight municipalities in Middlesex County: North Reading, Reading, Stoneham, Tewksbury, Wakefield, Wilmington, Winchester and Woburn. WH also serves patients and provides some community health programming in Medford due to long-standing program affiliations with various community health stakeholders. As a result, the assessment collected health status information from this community. However, because Medford is included in other hospitals' community benefits service areas, it is not included in WH's CHIP.

Demographically and socio-economically, WH focuses activities on meeting the needs of all segments of the population with respect to age, race/ethnicity, income and the broad range of other ways that populations characterize themselves, to ensure that all residents have the opportunity to live healthy, happy and fulfilling lives. However, its community benefits activities are focused particularly on low-income individuals and families, racial/ethnic minorities, youths and adolescents, older adults, and those who are geographically or otherwise isolated. The body of evidence and academic literature have shown that these populations are more likely to face disparities with respect to social determinants of health, access to care and health outcomes. A map showing the hospital locations and the specific cities and towns that are part of WH's community benefits service area is included above in Figure 2.

Approach and Methods

The CHNA was conducted in three phases. Phase I involved a rigorous and comprehensive review of existing quantitative data along with qualitative interviews with key stakeholders to characterize community need. Phase II involved a more targeted assessment of need and broader community engagement activities that included additional interviews and community listening sessions with health care, social services and public health service providers, as well as forums that included community residents at large. Another major component of Phase II was a comprehensive community health survey (WH Community Health Survey), which collected information directly from

Figure 3: CHNA Approach and Methods



communicated the results of the CHNA and outlined the core elements of its current and revised CHIP. Figure 3 provides a visual of the approach's key components. Following is a more detailed discussion of these components.

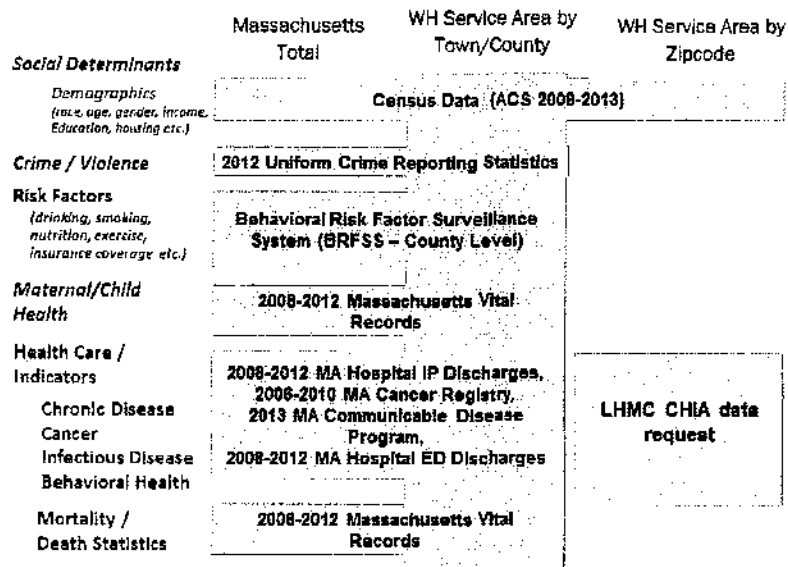
Characterize Population and Community Need

In Phases I and II, the JSI Project Team strived to understand the region's population with respect to its demographic, socio-economic, geographic, health status, care seeking and access to care characteristics. This involved quantitative and qualitative data analysis, including, to the extent possible, an analysis of changes over time using trend data and information from previous assessments.

Community-specific health data analysis. JSI characterized health status and need at the town, zip code or census tract level. JSI collected

data from a number of sources to ensure a comprehensive understanding of the issues. The primary source of secondary, epidemiologic data was the Massachusetts Community Health Information Profile (MassCHIP) data system.³¹ Tests of significance were performed, and statistically

Figure 4: Data Sources by Level of Geography



significant differences between values are noted when applicable. More specifically, data from the MassCHIP resource is typically provided along with the 95% confidence interval for any given statistic. A confidence interval measures the probability that a population parameter will fall between two set values. Throughout our assessment, statistical significance is defined as two values with non-overlapping 95% confidence intervals. JSI produced GIS maps that facilitated analysis and helped the Project Team visually present the data. The list of secondary data sources included:

- U.S. Census Bureau, American Community Survey 5-Year Estimates (2009-2013)
- Behavioral Risk Factor Surveillance System (BRFSS) (2012-2013 aggregate)
- CHIA Inpatient Discharges
- Massachusetts Health Data Consortium (MHDC) ED Visits
- MA Hospital IP Discharges (2008-2012)
- MA Cancer Registry (2007-2011)
- MA Communicable Disease Program (2011-2013)

³¹ Massachusetts Community Health Information Profile (MassCHIP) system. <http://www.mass.gov/eohhs/researcher/community-health/masschip/>

- MA Hospital ED Discharges (2008-2012)
- Massachusetts Vital Records (2008-2012)
- Massachusetts Bureau of Substance Abuse Services (BSAS) (2013)

Random household survey. To obtain targeted, direct quantitative data from residents of WH's service area, JSI conducted a random household mailing survey that asked over 100 questions on residents' health, well-being and perception of wellness in the community. A randomly generated sample of approximately 1,500 households was drawn from the service area. Selected households received prenotification letters seven to ten days in advance of receiving surveys. Respondents could request a Spanish version of the survey to be mailed by calling an 800 number. Reminder letters and additional survey packets were sent out in two-week intervals, and an online version of the survey was provided to nonrespondents after eight weeks. In all, 1,137 community residents responded to the survey across Lahey Health System's entire service area; 1,022 of these respondents were drawn from the eight cities/towns in WH's primary community benefits service area. A more detailed description of our survey approach and methods is included in the report's appendices.

Key informant interviews with stakeholders. JSI conducted 28 external stakeholder interviews in the hospital's service area. Interviewees included staff at each participating hospital, primary care providers, behavioral health and mental health providers, community-based service organizations, community leaders, and local health officials. Interviews were conducted using a standard interview guide, and information was gathered related to major health issues, mortality/morbidity, barriers to care, underlying determinants of health and service gaps that could not be identified through quantitative data. The goals of these interviews were (1) to understand what health issues were perceived by service providers and policymakers to be most critical and (2) to develop an inventory of resources in the region. One JSI staff person was the lead on all hospital interviews to ensure continuity of understanding of the hospital's needs and resources. Interview notes were reviewed and extracted into a Google spreadsheet. A list of the interviewees is included in the report's appendices.

Capture Community Input

JSI conducted a series of community and provider forums in the hospital's service area to gather community input. During the community forums, JSI discussed findings from the assessment and posed a range of questions that solicited input on community need, perceptions and attitudes, including: (1) Does the data reflect what you see as the major needs and health issues in your community? Are the identified gaps the right ones? What segments of the population are most at risk? What are the underlying social determinants of health status? (2) What strategies would be most effective for improving health status and outcomes in these areas?

The provider forums captured similar information, but more time was dedicated to discussing service gaps and strategies for improving health status and outcomes. The community and provider forums and their locations are listed in Figure 5.

Figure 5: Community and Provider Forums

Date	Event	Audience
February 16, 2016	WH Medical Executive Committee	WH Physician Leaders, Department Chairs
February 2, 2016	Community Forum	Community Members (Service Providers and Residents)

Use Data to Prioritize Needs and Set Goals

The goal of the final phase of the assessment was to review the results, identify priorities, review existing community benefits activities and determine a range of proven, feasible, evidence-based interventions that hospitals and other key providers believed would address the identified community health priorities. One of the major goals of this phase was to develop a community benefits strategic framework to clarify community health priorities and identify the range of health issues and subcomponents within each priority area. Drawing on the information gathered in Phases I and II, JSI presented CHNA findings, reviewed the breadth of WH's current community benefits programming, and explored how WH could refine or augment what it is currently doing to better address community need. These strategic planning activities involved WH's and Lahey Health's clinical and administrative leadership, the WH Board of Directors, community service providers, local public health officials, and other community leaders.

Data Limitations

Assessment activities of this nature face limitations with respect to both quantitative and qualitative data collection. With respect to the quantitative data compiled for this project, the most significant limitation was the availability of timely data. Relative to most states and commonwealths throughout the United States, Massachusetts does an exemplary job of making comprehensive data available at the Commonwealth, county and municipal level. This data is made available through the Massachusetts Community Health Information Profile (MassCHIP) data system,³² which is an internet-based resource provided by the Massachusetts Department of Public Health (MDPH).³³ MassCHIP makes a broad range of health-related data available to health and social services

³² Massachusetts Community Health Information Profile (MassCHIP) system.

<http://www.mass.gov/eohhs/researcher/community-health/masschip/>

³³ The MassCHIP portal was down due to technical difficulties at the Massachusetts Department of Public Health, but JSI staff made a formal, comprehensive request in writing, which was met by staff at MDPH. This process limited our ability to do multiple, iterative data draws, but the JSI staff still was able to capture ample data through the MassCHIP system.

providers and the public at large. The data compiled for this assessment represented nearly all of the health-related data that was made available through MassCHIP.

The breadth of available demographic, socio-economic and epidemiologic data was more than adequate to facilitate an assessment of community health need and support the CHIP development process, particularly as it was augmented by health status data captured by the household survey. Nonetheless, the value of the data from MassCHIP is limited due to the fact that much of the information was four to five years old. The list of data sources included in this report indicate the dates for each of the major data sets provided by the Commonwealth. The data was still valuable and allowed the Project Team to identify health needs relative to the Commonwealth and specific communities. However, older data sets may not reflect recent trends in health statistics. The age of the data also hindered trend analysis, as trend analysis required the inclusion of data that may have been up to 10 years old, which challenged any current analysis.

With respect to the household survey, great efforts were made to ensure a representative sample and maintain the analytic power of our analysis. Our sampling strategy was driven by household address data collected at the municipality and census tract levels. A certain number of households were selected in each census tract based on the size of the municipality to ensure an appropriate distribution of households across the service area. In addition, we invested substantial resources to maximize our response rate, which ranged from 35% to more than 50% across the service area, with a total response rate for the WH service area of ~45%.

With respect to qualitative data, information gathered through interviews and community forums engaging service providers, health department officials, other community stakeholders and/or community residents provided invaluable insights on major health-related issues, barriers to care, service gaps and at-risk target populations. Overall, nearly 100 people were involved through our interviews, community forums and strategic planning sessions. This is a considerable achievement but is still a relatively small sample compared to the size of the resident and service provider populations overall. While every effort was made to advertise the community forums and to select a broadly representative group of stakeholders to interview, the selection or inclusion process was not random. In addition, the community forums did not exclude participants if they did not live in the particular regions where the meetings were held, so feedback by meeting does not necessarily reflect the needs or interests of the areas in which the meetings were held.

Leading CHNA Findings

Population Characteristics, Determinants of Health and Health Equity

An understanding of community need and health status in WH's community benefits service area must begin with an understanding of the population's characteristics as well as the underlying social, economic and environmental factors that impact health status and health equity. This information is critical to (1) recognizing disease burden, health disparities and health inequities; (2) identifying target populations and health-related priorities; and (3) targeting strategic responses. The assessment captured a wide range of quantitative and qualitative data related to age, gender, race/ethnicity, income, poverty, family composition, education, violence, crime, unemployment, access to food and recreational facilities, and other determinants of health. This data provided valuable information that characterized the population as well as provided insights into the leading determinants of health and health inequities.

The following is a summary of key findings related to community characteristics and the social, economic and environmental determinants of health for WH's community benefits service area. Conclusions were drawn from quantitative data and qualitative information collected through interviews and community/provider forums. Summary data tables are included below, and more expansive data tables are set forth in the WH CHNA data appendices included with this report.

- **Age and Gender:** Age and gender are fundamental factors in determining community need. With respect to age, more densely populated geographies typically have younger populations than do suburban or rural geographies. WH's service area is a relatively suburban area, and these trends certainly apply in this case.
 - Two of the eight cities/towns that are part of WH's community benefits service area (Stoneham and Winchester) had a statistically higher percentage of older adults (65+) compared to the Commonwealth overall.³⁴
 - Towns in WH's service area with the highest percentages of residents 65 or older were Stoneham, Winchester, Reading and Tewksbury.³⁵
 - At the same time, many of the service area towns also had higher than average percentages of youth/adolescents, including Reading, Wilmington and Winchester.³⁶

A common theme throughout the stakeholder interviews and community/provider forums was that older adults (~65+) and youth (~12-18) represented two of the most vulnerable populations in the service area. This is not to say that young and middle-aged adults, 19-65 years of age, do not face critical problems — only that when community participants were asked to identify demographic segments of the population that were most at risk, they were more likely to cite youth/adolescent and older adult populations than other age cohorts.³⁷ The specific needs of these populations are discussed in greater detail later in the report.

With respect to gender, the service area's distribution overall mirrors that in the Commonwealth, with distributions by gender ranging 50% to 54% female and 46% to 50% male.³⁸ See Figure 6 for specific age distributions at the local, county and Commonwealth levels.

- **Race/Ethnicity, Foreign-Born Status and Language:** There is an extensive body of research and evidence that illustrates the health disparities that exist for racial/ethnic minorities, foreign-born populations and individuals with limited English language proficiency.³⁹ Overall, the service area has a relatively homogeneous, white, non-Hispanic population, although pockets of diversity do exist in selected communities, particularly in Medford, Winchester and Woburn.

³⁴ 2009-2013 US Census Bureau American Community Survey (ACS)

³⁵ 2009-2013 US Census Bureau American Community Survey (ACS)

³⁶ 2009-2013 US Census Bureau American Community Survey (ACS)

³⁷ 2015 WH Key Informant Interviews and Community and Provider Forums

³⁸ 2009-2013 US Census Bureau American Community Survey (ACS)

³⁹ Institute of Medicine. Coverage Matters: Insurance and Health Care.

<http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2003/Coverage-Matters-Insurance-and-Health-Care/Uninsurance8pagerFinal.pdf> Accessed 6/2/16

- The percentage of white, non-Hispanic people at the municipality level ranged from as high as 93.1% in Wakefield to a low of 77.3% in Medford, with the median being approximately 91%.⁴⁰
- In Middlesex County, 19.3% of the population is reported as being foreign born compared to 15% for the Commonwealth. The median among the eight municipalities in WH's community benefits service area was approximately 7%. Winchester and Woburn had the highest percentages of foreign born at 15%.⁴¹
- Towns with the largest percentages of foreign-born people in the service area were Winchester and Woburn (approximately 15% for both). These towns also had the highest percentages of residents speaking languages other than English at home, with Woburn reporting 19.6% and Winchester reporting 18.7%.⁴²

According to information gathered from our interviews and community forums, foreign-born and racial/ethnic minority populations (e.g., Hispanics, Black/African Americans, Asian-Indians) represent some of the most at-risk populations in the service area. A number of these interviewees or meeting participants cited the fact that often those most at risk are the older parents of those living in the region, who come to the area to live with or to visit their adult children.⁴³

Notably, just because someone is foreign born does not mean they face disparities in health outcomes or barriers to care. In fact, some foreign-born cohorts are known to have generally better outcomes than the population overall. However, it does mean they are more likely to face cultural, linguistic or health literacy barriers that require a more tailored response.

- **Income, Education and Employment:** Socio-economic status has long been recognized as a critical determinant of health. Higher socio-economic status, as measured by income, employment status, occupation, education and the extent to which one lives in areas of economic disadvantage, is closely linked to health status, overall well-being and premature death. Research shows that communities with lower socio-economic status bear a higher disease burden and have a lower life expectancy. Residents of these communities are less likely to be insured, less likely to have a usual source of primary care, more likely to use the emergency department for emergent and non-emergent care, and less likely to access health services of all kinds, particularly routine and preventive services. Moreover, research shows that children born to low-income families are, as they move into adulthood, less likely to be formally educated, less likely to have job security, more likely to have poor health status and less likely to rise to higher socio-economic levels.⁴⁴ A recent article published in the *Journal of the American Medical Association (JAMA)* studied life expectancy across the United States and identified demographic and socio-economic factors that were correlated more or less strongly with low life expectancy. Two of the strongest determinants of low life expectancy are whether individuals were immigrants or foreign born or whether they lived in low-income

⁴⁰ 2009-2013 US Census Bureau American Community Survey (ACS)

⁴¹ 2009-2013 US Census Bureau American Community Survey (ACS)

⁴² 2009-2013 US Census Bureau American Community Survey (ACS)

⁴³ 2015 WH Key Informant Interviews and Community and Provider Forums

⁴⁴ Alexander, K., Entwistle, D., and Olson, L. Family Background, Disadvantaged Urban Youth, and the Transition to Adulthood, Russell Sage Foundation. June 2014

communities. Those living in communities with a larger proportion of low-income residents were much more likely to have a lower life expectancy and to face disparities with respect to other leading health indicators.⁴⁵

Overall, the WH service area is relatively affluent compared to the Commonwealth and had a significantly higher median income, a lower percentage of low-income individuals (those earning less than 200% of the federal poverty level) and higher rates of education. However, pockets of people live in poverty or are in low-income brackets in all the cities and towns that are part of the WH service area. There are also individuals who have historically been in middle- or high-income brackets who are temporarily unemployed as well as disabled, or older adults who are on fixed incomes, who struggle due to high housing and other living expenses. Often these individuals and their families struggle to pay for essential household items or are forced to make hard choices about what they live with and without.

- In WH's service area, Medford and Woburn had the highest proportion of their populations living in poverty – 9.8% and 6.2%, respectively, compared to 11.4% for the Commonwealth and 8.1% for Middlesex County.⁴⁶
- In 2014, more than 40% of those living in rental units in the cities/towns of North Reading, Stoneham and Winchester were considered “house poor”⁴⁷ and paid 33% or more of their income on housing.⁴⁸

With respect to education and employment, all the cities and towns in WH's service area had a higher percentage of residents with a high school diploma or GED equivalency as well as lower unemployment rates than the Commonwealth overall.

- In 2014 in the Commonwealth overall, 89.4% of adults 25 or older had a high school diploma or GED equivalency; six of the eight cities/towns in WH's primary service area had percentages at or above 95%.⁴⁹
- Unemployment rates were lower in Middlesex County (3.3%) compared to the Commonwealth overall (4.2%) as of April 2016.⁵⁰
- **Crime, Violence and Community Cohesion.** Crime and violence are major issues in some communities, and these issues can have intense and far-reaching impacts on health status. In their extreme, these impacts can include death, injury and economic loss, but they also include emotional trauma, anxiety, isolation, lack of trust and an absence of community cohesion. Overall, according to quantitative data from the Massachusetts Department of Public Health and anecdotal information from key informants and community forum participants, crime and violence were not leading health concerns in WH's service area.⁵¹

⁴⁵ McGinnis J. Income, Life Expectancy, and Community Health: Underscoring the Opportunity. *JAMA*. 2016;315(16):1709-1710. doi:10.1001/jama.2016.4729.

⁴⁶ 2009-2013 US Census Bureau American Community Survey (ACS)

⁴⁷ “House poor” describes a situation in which a person spends a large proportion of his or her total income on home ownership, including rent payments, mortgage payments, property taxes, maintenance and utilities.

⁴⁸ 2009-2013 US Census Bureau American Community Survey (ACS)

⁴⁹ 2009-2013 US Census Bureau American Community Survey (ACS)

⁵⁰ Bureau of Labor Statistics. http://www.bls.gov/cps/cps_hrgm.htm

⁵¹ 2015 WH Key Informant Interviews and Community and Provider Forums. 2012 Uniform Crime Reporting Statistics

- o Crime rates were relatively low compared to the Commonwealth overall, and no one in our interviews or community forums mentioned that crime was a major health concern.⁵²
- o Data on domestic violence was limited, but there was information on child abuse. In this case, only two towns, Medford and Woburn, had rates of child abuse or maltreatment/neglect that were higher than county levels.⁵³ A number of informants noted elder abuse/neglect as a key concern,⁵⁴ but there was no quantitative data to support this.
- **Unstable Housing and Homelessness.** An increasing body of research suggests that poor housing is associated with a wide range of health conditions, including asthma and other respiratory diseases, exposure to environmental toxins, injury, and the spread of communicable diseases. These health issues have proved to be more common in low-income cohorts who often must decide between paying for safe housing, healthy food, needed health care services and other needs.

At its extreme are those without housing, either living on the street or in some transient, unstable housing situation, who have been shown to have significantly higher rates of illness and shorter life expectancy. Other groups lack affordable housing. Although they technically do not fall into low-income brackets, the high cost of their housing causes them to struggle to pay for food, other essential household items and needed health care services.

Nearly all residents in Middlesex County live in safe housing, and homelessness is not a major concern in WH's service area. However, homelessness does exist, and there are pockets of residents who struggle with their housing costs.

- o Qualitative interviews suggested the high home values and cost of living in many of these areas made it difficult for many residents to make ends meet. Older adults living on fixed incomes were identified as particularly at risk.⁵⁵ In 2014, more than 40% of those living in rental units in the cities/towns of Medford, Stoneham and Winchester paid 33% or more of their income on housing.⁵⁶
- o **Food Access.** "Food is one of our most basic needs. Along with oxygen, water and regulated body temperature, it is a basic necessity for human survival. But food is much more than just nutrients. Food is at the core of humans' cultural and social beliefs about what it means to nurture and be nurtured."⁵⁷ Issues related to food insecurity, food scarcity, hunger, and the prevalence and impact of obesity are at the heart of the public health discourse in urban and rural communities across the United States.

While we were unable to capture quantitative data on this topic, many interviewees and participants in the community forums identified lack of access to healthy foods as a major health issue for segments of the population in this region. Specifically, low-income

⁵² 2015 WH Key Informant Interviews and Community and Provider Forums

⁵³ 2011 Massachusetts Department of Children and Families

⁵⁴ 2015 WH Key Informant Interviews and Community and Provider Forums

⁵⁵ 2015 WH Key Informant Interviews and Community and Provider Forums

⁵⁶ 2009-2013 US Census Bureau American Community Survey (ACS)

⁵⁷ Feeding America. Child Development. <http://feedingamerica.org/SiteFiles/child-economy-study.pdf>.

individuals and families, as well as low-income, frail and/or isolated older adults, were identified as at risk with respect to food access. Interviewees and community forum participants reported that significant numbers of people struggled to buy fresh produce and other nutritional foods, and referred to food insecurity and food scarcity as major contributors to obesity and chronic disease.

Figure 6: Demographic and Socio-economic Characteristics of Winchester Hospital Primary Service Area

Statistically Higher than State and County⁵⁸
 Statistically higher than State
 Statistically higher than the County

Total Population	6,605,058	1,522,533	56,607	15,076	24,957	21,498	29,429	25,400	22,656	21,621	38,528
Male	48.4%	48.7%	47.7%	49.7%	48.1%	47.6%	48.1%	49.1%	49.2%	46.8%	49.0%
Female	51.6%	51.3%	52.3%	50.3%	51.9%	52.4%	51.9%	50.9%	50.8%	53.2%	51.0%
0-9 Years	11.3%	11.6%	8.8%	11.1%	12.7%	9.0%	10.9%	11.8%	14.4%	15.5%	10.8%
10-19 Years	13.0%	12.4%	10.1%	14.3%	14.6%	11.4%	12.4%	10.6%	14.5%	14.8%	10.4%
20-24 Years	7.2%	6.7%	9.6%	4.7%	4.2%	5.1%	5.0%	5.6%	4.2%	3.3%	4.7%
25-64 Years	54.2%	56.1%	57.0%	56.7%	53.2%	56.0%	56.5%	63.3%	53.7%	50.3%	58.2%
65+ Years	14.1%	13.4%	14.7%	13.3%	15.3%	15.3%	15.3%	14.4%	13.3%	15.0%	15.0%
Population 18 years and older	78.7%	78.9%	78.7%	75.7%	74.8%	78.6%	79.1%	73.7%	71.5%	80.0%	80.0%
Non-Hispanic White	75.7%	76.3%	77.3%	75.7%	74.8%	78.6%	79.1%	73.7%	71.5%	80.0%	80.0%
Non-Hispanic Black	6.3%	4.4%	7.4%	0.6%	1.0%	0.8%	1.8%	0.4%	1.0%	0.9%	4.0%
Hispanic	9.9%	6.8%	4.8%	1.9%	2.8%	3.1%	1.8%	1.8%	1.6%	1.9%	4.3%
Non-Hispanic Asian	5.5%	9.7%	3.9%	3.9%	4.1%	3.1%	3.0%	4.0%	4.3%	6.1%	6.1%
Foreign Born	15.0%	19.3%	20.9%	6.8%	7.5%	9.7%	6.9%	7.1%	7.0%	14.5%	15.1%
Linguistically Isolated	21.9%	25.0%	27.1%	9.8%	9.6%	14.2%	9.1%	10.2%	8.5%	18.7%	19.6%
High School Graduates	89.4%	92.1%	91.6%	91.6%	93.5%	93.5%	93.5%	93.5%	93.5%	93.4%	93.4%
Living in Poverty	11.4%	8.1%	9.8%	4.8%	1.7%	4.4%	3.1%	4.1%	2.4%	3.4%	6.2%
Renter Occupied Housing	37.3%	37.3%	37.3%	13.8%	18.9%	30.8%	13.7%	25.4%	12.3%	16.5%	39.6%
House Poor (>35% of income)	40.5%	36.5%	33.0%	53.2%	28.1%	43.3%	39.2%	27.6%	32.6%	46.7%	36.5%

⁵⁸ Data provided by the Massachusetts Department of Health through the MassCHIP resource is typically provided along with the 95% confidence interval for any given statistic. A confidence interval measures the probability that a population parameter will fall between two set values. Throughout our assessment, statistical significance is defined as two values with non-overlapping 95% confidence intervals.

Major Findings by the Leading Areas of Health-Related Need

At the core of the CHNA process is an understanding of access-to-care issues, the leading causes of illness and death, and the extent to which population segments and communities participate in certain risky behaviors. This information is critical to assessing health status, clarifying health-related disparities and identifying community health priorities. The assessment captured a wide range of quantitative data from federal, Commonwealth and local data sources, including from the U.S. Census Bureau and the Massachusetts Department of Public Health. Information was also compiled through the Winchester Hospital Community Health Survey, which augmented the data collected through the Massachusetts Department of Public Health and allowed for the identification of geographic “hotspots” and demographic/socio-economic population segments most at risk. Qualitative information gathered from the assessment’s interviews and community forums greatly informed this section by providing perceptions on the confounding and contributing factors of illness, health priorities, barriers to care, service gaps and possible strategic responses to the issues identified.

The following are key findings related to health insurance coverage and access to primary care, health risk factors, overall mortality, health care utilization, chronic disease, cancer, infectious disease, behavioral health (mental health and substance use), elder health, and maternal and child health.

Summary data tables/graphs are included below, along with a narrative review of the assessment’s qualitative findings. More expansive data tables and summaries of findings from the assessment’s interviews and forums are included in the WH CHNA data appendices.

Insurance Coverage and Usual Source of Primary Care (including medical, oral health and behavioral health services)

The extent to which a person has insurance that helps to pay for needed acute services, as well as access to a full continuum of high-quality, timely and accessible preventive and disease management or follow-up services, has shown to be critical to overall health and well-being. Access to a usual source of primary care is particularly important as it greatly impacts one’s ability to receive regular preventive, routine and urgent care, and chronic disease management services for those in need.⁵⁹

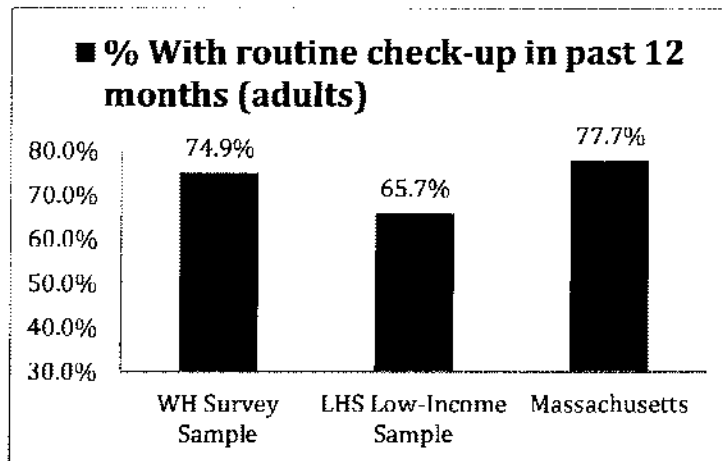
Eastern Massachusetts, including Middlesex County, has a robust health care system that provides comprehensive services spanning the health care continuum, including outreach and screening services, primary medical care, medical specialty care, hospital emergency and trauma services, inpatient care, and outpatient surgical and post-acute/long-term care services. There are no absolute gaps in any components of the system, except possibly in the area of behavioral and oral health.

⁵⁹ Institute of Medicine. Coverage Matters: Insurance and Health Care. September 2001. Accessed at: <http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2003/Coverage-Matters-Insurance-and-Health-Care/Uninsurance8pagerFinal.pdf>

Based on information gathered from interviews and community or provider forums, large proportions of the population in WH's community benefits service area struggle to access behavioral health and oral health services. These barriers are partly due to shortages of service providers willing to accept the uninsured or certain types of health insurance, particularly Medicaid. Many residents also struggle to pay for services, particularly those who have to pay out of pocket for copays or pay for the full cost of care. While medical health insurance rates are high throughout Middlesex County and the Commonwealth, the proportion of the population with comprehensive oral health insurance is quite low. And although behavioral health services are typically covered by most health plans, the benefits are not always robust, and the copays can be high. Interviewees and forum participants noted particular gaps in behavioral health services for children and youths. According to the 2015 WH Community Health Survey:

- 3.2% of all respondents from WH's service area were uninsured, compared to 8% of low-income respondents drawn from across Lahey Health System's entire service area in Northeastern Massachusetts.⁶⁰

Figure 7: Percent with Routine Checkup in Past 12 Months, 2015 (Source: WH Community Health Survey, 2015)



- 74.9% of all respondents from WH's service area had seen a primary care provider in the previous 12 months, compared to only 65.7% of low-income respondents across the Lahey Health System's service area.⁶¹
- 22.5% of all respondents from WH's service area had had at least one hospital emergency department visit in the previous 12 months, compared to 29.1% of low-income respondents in the entire Lahey service area.⁶²
- 5.3% of respondents were uninsured for at least some period in the preceding 12 months, compared to a startling 30.2% among low-income respondents across the Lahey service area.⁶³

⁶⁰ 2015 WH Community Health Survey. In order to ensure an appropriate, statistically sound sample size, all low income respondents from each of the surveys conducted by Lahey Health System's three hospital partners were aggregated together.

⁶¹ 2015 WH Community Health Survey

⁶² 2015 WH Community Health Survey

⁶³ 2015 WH Community Health Survey. In order to ensure an appropriate, statistically sound sample size, all low-income respondents from each of the surveys conducted by Lahey Health System's three hospital partners were aggregated.

In addition:

- o Nearly one third (30.1%) of those living at 138% of the federal poverty level or below reported not getting needed dental care due to cost, and 1 in 5 (19.3%) were not able to fill a needed drug prescription due to cost.⁶⁴
- o The largest single group of uninsured residents is undocumented immigrants, followed by those struggling with administrative and policy barriers related to retaining coverage.

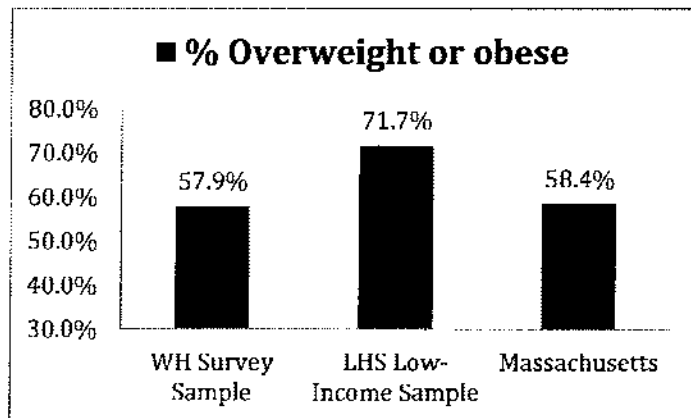
While these findings are generally positive, the data should not be interpreted to suggest that everyone in WH's service area receives the highest-quality services when and where they want them. In fact, despite these strong statistics and the overall success of the Commonwealth's health reform efforts, data captured for this assessment showed that substantial segments of the population — particularly those with low income, racial/ethnic minorities and older adults — faced significant barriers to care and struggled to access medical, oral health and behavioral health services due to lack of insurance, cost, transportation, cultural/linguistic barriers, and shortages of providers willing to serve Medicaid-insured or low-income, uninsured patients. More importantly, these challenges often lead to poor health status and disparities in health outcomes.

Health Risk Factors

There is a growing appreciation for the effects that certain health risk factors — such as obesity, lack of physical exercise, poor nutrition, tobacco use and alcohol abuse — have on health status, the burden of physical chronic conditions and cancer, as well as on mental health and broader substance use problems. A discussion and review of available data and information drawn from quantitative and qualitative sources from this assessment is provided below.

- **Overweight/Obesity.** Over the past two decades, obesity rates in the United States have doubled for adults and tripled for children.^{65,66} Overall, these trends have spanned all segments of the population, regardless of age, sex, race, ethnicity, education, income or geographic region. While some segments have struggled more than others, no segment has been completely unaffected. In aggregate the data shows that

Figure 8: Percent Overweight or Obese, 2015
(Source: WH Community Health Survey, 2015)



⁶⁴ Center for Health Information and Analysis. Findings from the 2014 Massachusetts Health Insurance Survey. 2015. Accessed at: <http://www.chiamass.gov/assets/docs/r/pubs/15/MHIS-Report.pdf>

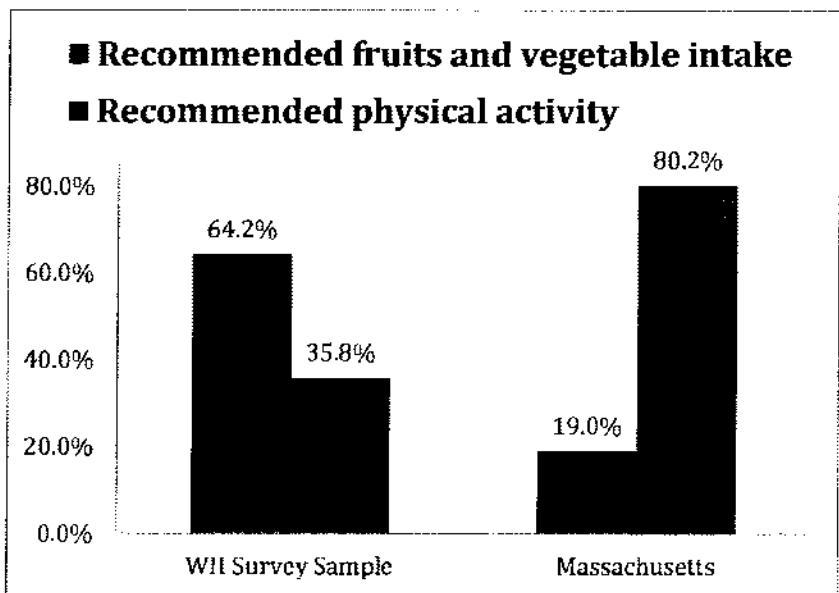
⁶⁵ Fryar DC, Carroll MD, Ogden CL. Prevalence of overweight, obesity, and extreme obesity among adults: United States, 1960-1962 through 2011-2012. National Center for Health Statistics Health E-Stat. 2014. Ogden CL. Childhood Obesity in the United States: The Magnitude of the Problem. PowerPoint.

⁶⁶ The State of Obesity. Obesity Rates and Trends Overview. Accessed July 19, 2016. Accessed from: <http://stateofobesity.org/obesity-rates-trends-overview/>

residents in WH's community benefits service area fare very similarly to residents of the Commonwealth overall with respect to percentage of the population that is either overweight or obese. However, this does not mean that the cities and towns in the service area should not be concerned about this issue, as the rates for those who are in low-income brackets are much higher than Commonwealth benchmarks.

- More than half of Massachusetts adults (18+) (58%) are either overweight or obese, and nearly one-quarter of children and youth (0-18) (23%) are either obese or overweight.⁶⁷
 - Based on responses from the WH Community Health Survey, the percentage of adults (18+) reporting in either obese or overweight categories mirrors the figure for the Commonwealth (58%). Those with household incomes below 200% of the federal poverty guideline are much more likely to be overweight or obese, with 72% of low-income individuals reporting as either overweight or obese.⁶⁸
 - Data for children and youth from the MA Youth Risk Behavior Surveillance System (YRBSS) was not available for Middlesex County, but, anecdotally, the JSI Project Team learned through interviews and the community forums that overweight/obesity was a major health issue.⁶⁹
- **Physical Fitness and Nutrition:** Lack of physical fitness and poor nutrition are among the leading risk factors associated with obesity and chronic health issues, such as heart disease, hypertension, diabetes, cancer and depression. Adequate nutrition helps prevent disease and is essential for the healthy growth and development of children and adolescents. Overall fitness and the extent to which people are physically active reduce the risk for many chronic conditions and are linked to good emotional health.
 - Approximately 1 in 5 adults (18+) (19%) ate the recommended five servings of fruits and vegetables per day,

Figure 9: Recommended Fruits and Vegetables and Physical Activity (Source: WH Community Health Survey, 2015)



⁶⁷ 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS). 2013 Youth Risk Behavior Survey (YRBS) for 9th-12th-graders

⁶⁸ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

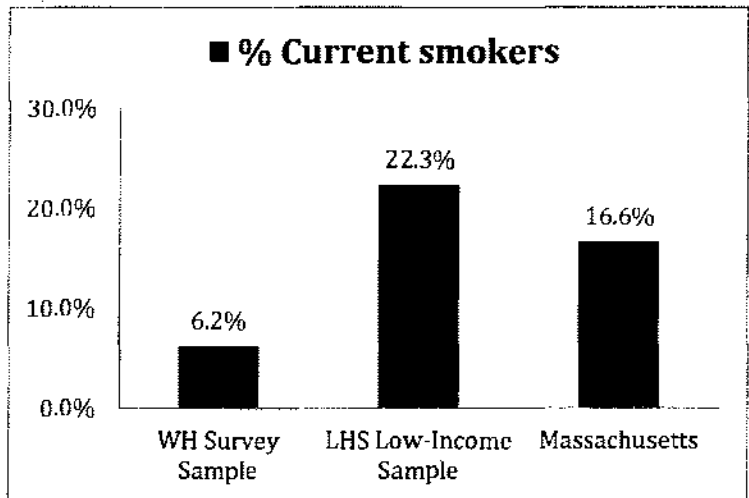
⁶⁹ 2015 WH Key Informant Interviews and Community and Provider Forums

and roughly the same proportion (20%) reported getting no physical activity in the preceding 30 days.⁷⁰ According to data collected through the WH Community Health Survey, adults in WH's service area fare much better than the adults Commonwealth-wide with respect to eating the recommended number of servings of fruits and vegetables, but a considerably larger percentage of respondents reported not getting any physical activity other than that related to their job. Once again, it is important to note that low-income survey respondents fared considerably worse than respondents overall.

- According to the WH Community Health Survey, only 36% of respondents overall did not eat at least five servings of fruits and vegetables per day, compared to 43% of low-income respondents.⁷¹
- More than 50% of survey respondents did not have adequate physical activity, according to Centers for Disease Control and Prevention guidelines, other than activity related to their jobs.⁷²
- **Tobacco Use:** Tobacco use is the single most preventable cause of death and disease in the United States. Each year, approximately 443,000 Americans die from tobacco-related illnesses. For every person who dies from tobacco use, 20 more people suffer with at least one serious tobacco-related illness, such as chronic airway obstruction, heart disease, stroke or cancer.⁷³

Massachusetts and Middlesex County had lower rates of tobacco use than many geographies throughout the United States, but given that tobacco use is still the leading cause of illness and disease in the United States, it is important that work be done to lower these rates further.

Figure 10: Percent Current Smokers, 2015
(Source: WH Community Health Survey, 2015)



- According to the 2015 WH Community Health Survey, 6% of adult respondents (18+) reported as current cigarette smokers, compared to 22.3% of low-income respondents. Commonwealth-wide, 16.6% of adults reported as current cigarette smokers.⁷⁴

⁷⁰ 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

⁷¹ 2015 WH Community Health Survey

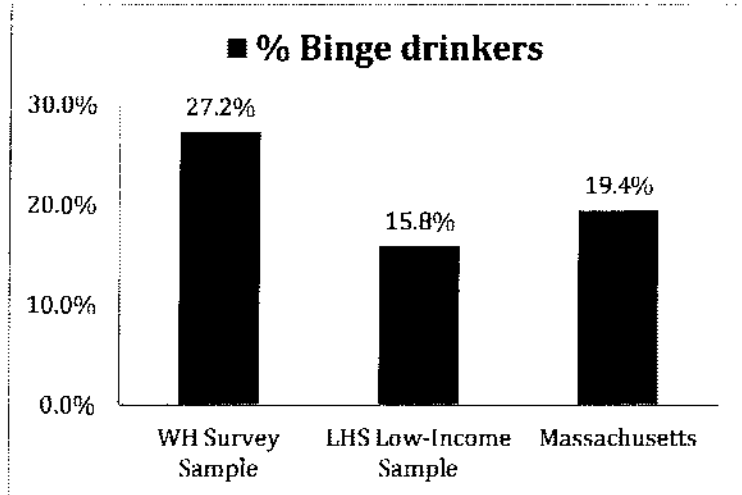
⁷² 2015 WH Community Health Survey

⁷³ Office of Disease Prevention and Health Promotion. Tobacco Use. Accessed at: <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=41#five>. Accessed on: July 20, 2016.

⁷⁴ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

- Alcohol Abuse:** Risky behaviors related to alcohol are strongly correlated with chronic medical and mental health issues. Alcohol abuse raises the risk of developing chronic illnesses and increases the severity of illnesses once they emerge.
 - According to the 2015 WH Community Health Survey, 10.5% of adult respondents reported as heavy drinkers, defined as more than 60 drinks a month for men and 30 drinks a month for women, compared to only 8% of adults in the Commonwealth overall.⁷⁵
 - Similarly, 27.2% of respondents reported “binge drinking” – more than five alcoholic drinks at any one sitting for men and more than four drinks for women – compared to only 19.4% for Commonwealth residents overall.⁷⁶

Figure 11: Percent Binge Drinkers, 2015
(Source: WH Community Health Survey, 2015)



This finding was confirmed by key informant interviews and participants in the community forums, as a major theme from the qualitative information was the impact and burden of substance use, particularly alcohol and opioids, on the service area’s population. A majority of the key informants who were part of this assessment cited alcohol abuse as a major health concern for all segments of the population.⁷⁷

Mortality and Premature Mortality

In 2012, the life expectancy for a resident in the Commonwealth of Massachusetts was 81 years. In 1950, it was 70 years, and in 1900 it was 45 years.⁷⁸ This change is dramatic and is due largely to improvements in the ability to prevent maternal/child deaths during pregnancy and manage infectious diseases, such as influenza. In 1900, cancer was the known cause of death in only 4%-5% of deaths; today nearly 25% of all deaths can be attributed to cancer. See Figure 12 below.

Since 1950, there have been major improvements in the ability to prevent premature death due to heart disease, stroke and even cancer. However, there is still a great deal of work to do in this area, as these diseases are still the top three causes of premature death. Even if city- or town-level rates of illness are not higher than the county, Commonwealth or national benchmarks, it is still important

⁷⁵ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

⁷⁶ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

⁷⁷ 2015 WH Key informant interviews and Community and Provider Forums

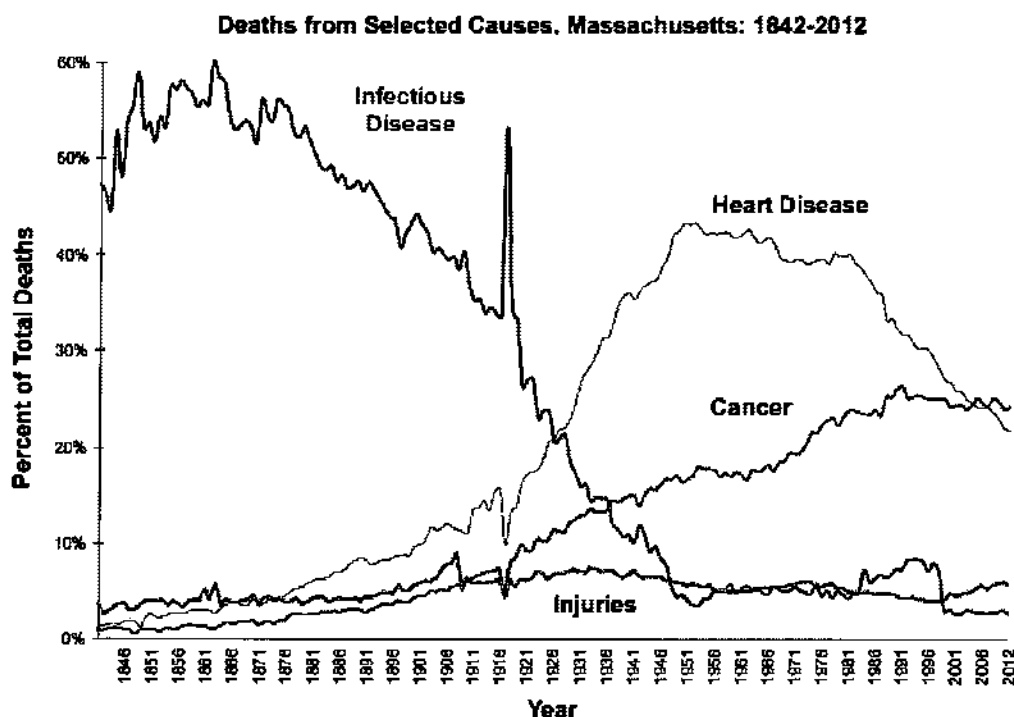
⁷⁸ Massachusetts Department of Public Health. *Massachusetts Deaths 2012: Data Brief*. January 2015. <http://www.mass.gov/eohhs/docs/dph/research-epi/death-data/death-databrief-2012.pdf>, Accessed 5/11/2016

that WH and its community health partners address these issues if they are to improve health status and well-being.

According to data from the Massachusetts Department of Public Health, in 2012 cancer, cardiovascular disease (heart disease), cerebrovascular disease (stroke) and chronic lower respiratory disease (COPD) were the leading causes of death for the service area. Other leading causes include diabetes, influenza/pneumonia, opioid-related issues, homicide, suicide and motor vehicle accidents.

As discussed above, there is a correlation between income and where one lives on the one hand and

Figure 12: Deaths from Selected Causes in Massachusetts, 1842-2012



life expectancy, death and overall health status on the other. According to a study published in April 2016 in the *Journal of the American Medical Association*, Middlesex County residents living in households earning less than \$100,000 per year are expected to die about seven years before their wealthier counterparts. That's roughly equivalent to the difference in life expectancy between an average man in the United States and one in Egypt. The report underscores the role of geography and wealth in attaining longevity. The essential point is that those who live in communities with a large proportion of low-income residents have a lower health status and a shorter life expectancy.⁷⁹

⁷⁹ The Health Inequality Project. How can we reduce disparities in health? Accessed at <https://healthinequality.org>. Accessed 6/22/16

Table 13: Leading Causes of Death in Massachusetts and the United States, 2012

(Source: Massachusetts Deaths 2012: Data Brief. Boston, MA: Office of Data Management and Outcomes Assessment, Massachusetts Department of Public Health. January 2015. <http://www.mass.gov/eohhs/docs/dph/research-epi/death-data/death-databrief-2012.pdf>)

US Leading Cause of Death	Death Rate in MA	Total Deaths in MA	State Rank	US Rate	US Ranking
Cancer	159.6	12,858	31	163.2	2
Heart Disease	141.5	12,023	43	169.8	1
Accidents	32.5	2,393	45	39.4	4
Chronic Lower Respiratory Diseases	31.7	2,572	46	42.1	3
Stroke	27.7	2,354	47	36.2	5
Alzheimer's Disease	19.4	1,699	38	23.5	6
Influenza/Pneumonia	18	1,551	16	15.9	8
Kidney Disease	15.1	1,261	18	13.2	9
Diabetes	14.1	1,142	50	21.2	7
Suicide	8.2	572	48	12.6	10

All of these leading causes of death, individually and collectively, have a major impact on people living in the service area, but cancer, cardiovascular disease (heart disease), cerebrovascular disease (stroke), chronic lower respiratory disease (COPD) and diabetes are the most important for WH to consider as they are the most prevalent conditions and are, to a large extent, preventable. All of these chronic conditions also share the health risk factors discussed above: obesity/overweight, lack of physical exercise, poor nutrition, tobacco use and alcohol abuse.

Throughout the United States, including Massachusetts, there were major health disparities with respect to all of these conditions among low-income, racial/ethnic minority and other subgroups. Rates of illness and death vary by condition, but overall, non-Hispanic, white populations are less likely to have chronic health conditions than are low-income segments and most racial/ethnic minority segments. This puts a disproportionate burden on communities with a high proportion of low-income and racial/ethnic populations. In WH's service area, Medford and Woburn were the communities with the greatest proportion of low-income and racial/ethnic minority or foreign-born populations.

The leading causes of premature death were similar to those for mortality overall in the Commonwealth, but there are important differences. The first and second leading causes of premature death in Massachusetts in 2012 were cancer and heart disease. Unintentional injuries, respiratory disease and diabetes are ranked third, fourth and fifth, respectively, and each had a considerable impact on the premature death rate overall. With respect to the CHNA, the more

relevant variable is premature death⁸⁰ and the prevention of disease. Putting greater emphasis on premature death, rather than overall mortality, supports the intention of the community benefits program to improve health status and to focus attention on the morbidity and mortality that can be prevented. None of the cities and towns in WH's primary service area had a statistically higher rate of premature death than the Commonwealth rate of 276 per 100,000.⁸¹

Health Care Utilization

Increasing health care costs combined with poor health outcomes have encouraged a close review of the utilization of health care services. At the core of recent health care reform efforts in Massachusetts and throughout the nation is the idea of promoting a focus on prevention and the reduction of health care utilization rather than the treatment of disease. Hospital

community benefits programs are geared toward supporting preventive services; strengthening community health, social services and public health programs; and ensuring that the population has access to high-quality primary care services, including primary medical care, behavioral health and oral health services.

With respect to health care utilization, there has been a substantial focus on strategies to reduce costly hospital emergency department and inpatient care utilization, particularly service utilization that is preventable or avoidable with proper education and screening and timely primary care and outpatient services. The federal Agency for Healthcare Research and Quality (AHRQ) has identified a series of measures that apply hospital discharge codes designed to identify when people are seen in the hospital emergency department or inpatient setting for conditions that are preventable or avoidable. These measures are called Preventable Quality Indicators (PQIs), and when the rates of these specific hospital discharge codes are high, it suggests that consumers need to be more engaged in or have better access to preventive, primary care and care management services.

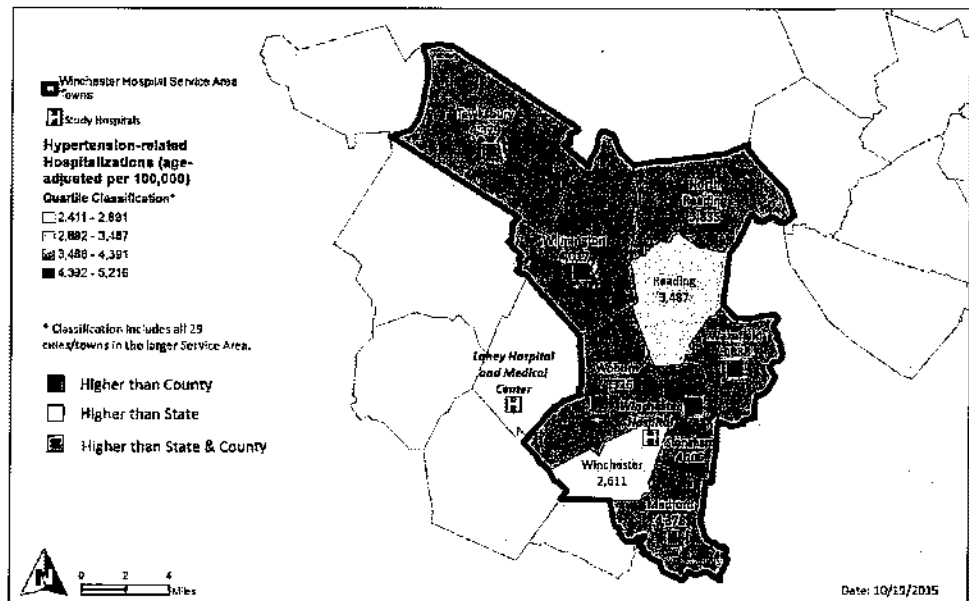


Figure 14: Hypertension Hospitalizations (Per 100,000 Population)
 (Source: Massachusetts Department of Public Health, MassCHIP; 2008-2012
 Massachusetts Hospital Inpatient Discharges (UHDDS))

⁸⁰ Premature deaths are deaths that occur before a person reaches an expected age – for instance, age 75. Many of these deaths are considered preventable.

⁸¹ 2009-2012 Massachusetts Vital Records Mortality

- Of the five PQI measures reported by MDPH for all towns in Massachusetts, several towns reported consistently higher rates, compared to Commonwealth and county levels, of congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD) and asthma admissions in patients older than 20.⁸²
- Towns reporting significantly higher rates on these indicators were Medford (asthma, CHF, hypertension, bacterial pneumonia), Stoneham (CHF and bacterial pneumonia) and Woburn (asthma, CHF, bacterial pneumonia and COPD).⁸³

More generally, MDPH reports data on hospital emergency department discharges. Across the WH service area, the most common disease-specific measures that were statistically higher than average involved mental health, substance use, diabetes, hypertension and heart disease. Service-area towns with consistently higher rates across these measures than Commonwealth rates were Medford, Stoneham and Woburn.

Chronic Disease

Throughout the United States, chronic diseases such as heart disease, stroke, cancer, respiratory diseases and diabetes are responsible for approximately 7 of 10 deaths each year, and treating

people with chronic diseases accounts for 86% of our nation's health care costs. Half of all American adults (18+) have at least one chronic condition, and almost 1 in 3 have multiple chronic conditions.⁸⁴ Perhaps most significantly, despite their high prevalence and dramatic impact, chronic diseases are largely preventable,

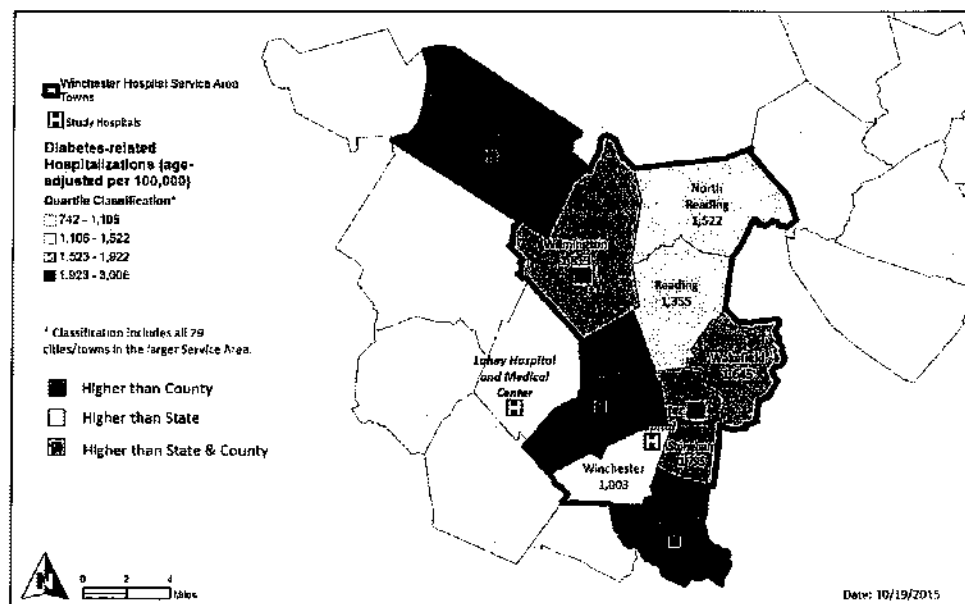


Figure 15: Diabetes-Related Hospitalizations (Per 100,000 Population)
 (Source: Massachusetts Department of Public Health, MassCHIP; 2008-2012 Massachusetts Hospital Inpatient Discharges (UHDDS))

⁸² 2008-2012 Massachusetts Hospital Inpatient Discharges (UHDDS)

⁸³ 2008-2012 Massachusetts Hospital Inpatient Discharges (UHDDS)

⁸⁴ A chronic condition is a human health condition or disease that lasts a year or more and requires ongoing medical attention or that limits activities of daily living. Centers for Disease Control and Prevention. Chronic Disease Prevention and Health Promotion. Accessed at: <http://www.cdc.gov/chronicdisease/>. Accessed on July 19, 2016.

which underscores the need to focus on the health risk factors, primary care engagement and evidence-based chronic disease management.

Many of the cities and towns in WH's service area have chronic disease prevalence, hospitalization and mortality rates that are higher than the rates for the Commonwealth overall. Chronic health conditions such as asthma, cardiovascular disease, cerebrovascular disease (stroke), chronic lower respiratory disease (most notably COPD), diabetes, heart failure and hypertension are the most common chronic conditions.

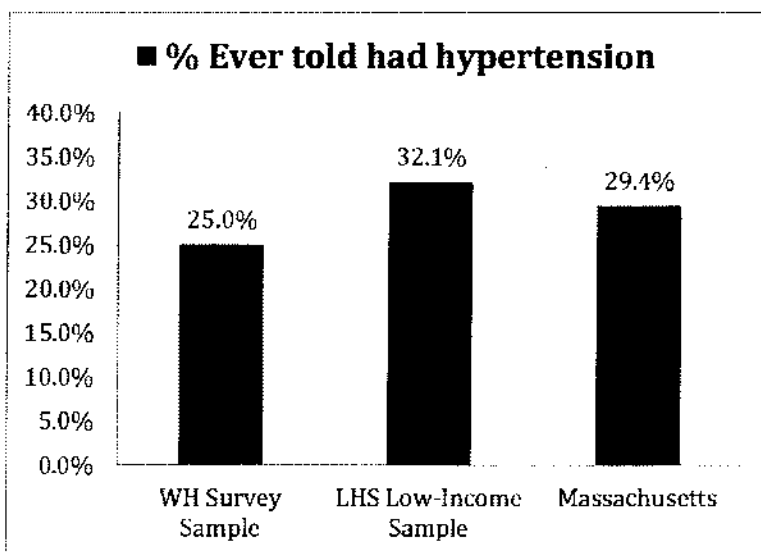
Even in towns where these rates are not higher than Commonwealth averages, qualitative interviews and forums indicated that these diseases were of utmost concern to community members, local health officials and service providers. These interviewees and forum participants also discussed the disparities that exist for at-risk subpopulations such as members of low-income households, racially or ethnically diverse populations, and older adults, all of whom are more likely to have one or more of these conditions.

Data from the WH Community Health Survey confirms that these chronic physical health conditions are a substantial issue. However, it is important to note that the prevalence rates for the overall respondent population are generally not higher for the leading conditions than the rates for the Commonwealth overall, according to comparison data from the Massachusetts Department of Public Health, Behavioral Risk Factor Survey System collected in 2012-2013.

- **Chronic Disease "Hotspots."** Medford, Tewksbury and Woburn all reported higher rates of illness, hospitalization and mortality than the Commonwealth for two or more of these chronic conditions. Stoneham, Wilmington and Winchester had higher rates than the Commonwealth for at least one of the chronic conditions referenced above.⁸⁵

Figure 16: Percent Ever Been Told Had Hypertension, 2015 (Source: WH Community Health Survey, 2015)

- **Diabetes.** Among WH Community Health Survey respondents, 4.6% reported that they had ever been told they had diabetes, compared to 8.5% of adults 18+ in the Commonwealth overall. Among low-income respondents, 12.1% reported that they had been told they had diabetes.⁸⁶



⁸⁵ 2008-2012 Massachusetts Hospital Inpatient Discharges (UHDDS). 2008-2012 Massachusetts Vital Records Mortality

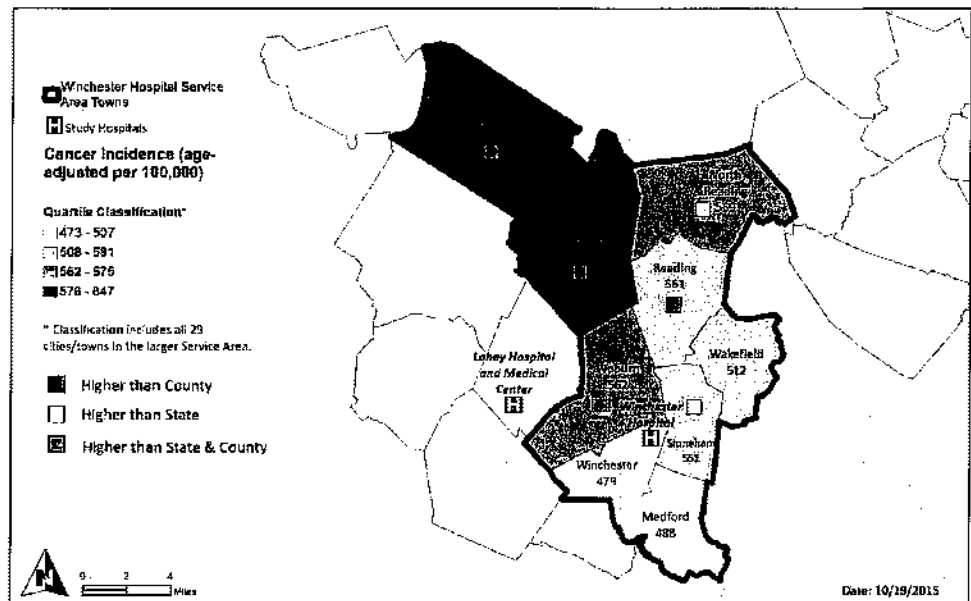
⁸⁶ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

- **Hypertension.** Twenty-five percent of respondents from the WH Community Health Survey reported ever being told they had hypertension compared to 29% for the Commonwealth overall. Among low-income respondents, 32% reported they had been told they had hypertension.⁸⁷
- **Asthma.** Sixteen percent of WH Community Health Survey respondents reported being told they had asthma, compared to 17% for the Commonwealth overall. The percentage for low-income respondents in this case was actually lower at 13%; however, low-income respondents were considerably more likely to be seen in the hospital emergency department for urgent care. For the entire survey sample, 11% of asthmatics had had an emergency department visit compared to 19% of low-income respondents.⁸⁸

Cancer

Cancer is the second leading cause of death in the United States and the leading cause of death in the Commonwealth. While experts have an idea of the risk factors and causal factors associated with cancer, more research is needed as there are still many unknowns. The majority of cancers occur in people who do not have any known risk factors. The major known risk factors for cancer are age, family history of cancer, smoking, overweight/obesity, excessive alcohol consumption, excessive exposure to the sun, unsafe sex, and exposure to fumes, secondhand cigarette smoke, and other airborne environmental and occupational pollutants. As with other health conditions, there are major disparities in outcomes and death rates across all forms of cancer, which are directly associated

Figure 17: Cancer Incidence (All Cancers) (Per 100,000 population)
(Source: Massachusetts Cancer Registry (2006-2010))



⁸⁷ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

⁸⁸ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

with race, ethnicity, income and whether one has comprehensive medical health insurance coverage. In 2015, nationally, 163.2 people per 100,000 died of cancer, and in Massachusetts this figure was 159.6 deaths per 100,000.⁸⁹

- o **All Cancer.** Four of the eight towns in WH's primary service area (Reading, Tewksbury, Wilmington and Woburn) reported higher cancer incidence rates (all cancer types) than those for the Commonwealth (509 per 100,000 population) and Middlesex County (510). The highest rate per 100,000 population was in Wilmington (588), followed by Tewksbury (578), Woburn (562) and Reading (561).⁹⁰
- Cancer.** Of all respondents to WH's Community Health Survey, 11.8% reported that they had ever been told they had cancer, compared to 11.1% for residents of the Commonwealth; 17% of low-income respondents had ever been told they had cancer.⁹¹
- o **Most Common Cancer.** Prostate cancer was the most common cancer among men and breast cancer among women, followed by lung cancer in men and women.⁹²
- o **Mammography Screening.** According to the WH Community Health Survey, the percentage of women 40+ who had a mammography screening in the preceding two years was slightly lower in WH's service area (84%) than in the Commonwealth overall (85%).⁹³

Behavioral Health

Mental illness and substance use have a profound impact on the health of people living throughout the United States. Data from the Centers for Disease Control and Prevention suggests that approximately 1 in 4 (25%) adults in the United States has a mental health disorder,⁹⁴ and an estimated 22 million Americans struggle with drug or alcohol problems.⁹⁵ Depression, anxiety and alcohol abuse are directly associated with chronic disease, and a high proportion of those living with these issues also have a chronic medical condition. The impact of mental health and substance use on the residents of WH's service area and in Middlesex County overall is particularly profound. There is ample quantitative and qualitative information to show this impact.

With respect to substance use, according to 2008-2012 data from the MDPH, several cities/towns had statistically higher rates of hospital inpatient and emergency department utilization per 100,000 population for both mental health- and substance use-related conditions. More specifically:

⁸⁹ Centers for Disease Control and Prevention. Stats for the State of Massachusetts. Accessed at: http://www.cdc.gov/nchs/pressroom/states/MA_2015.pdf

⁹⁰ 2007-2011 Massachusetts Cancer Registry

⁹¹ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

⁹² 2007-2011 Massachusetts Cancer Registry

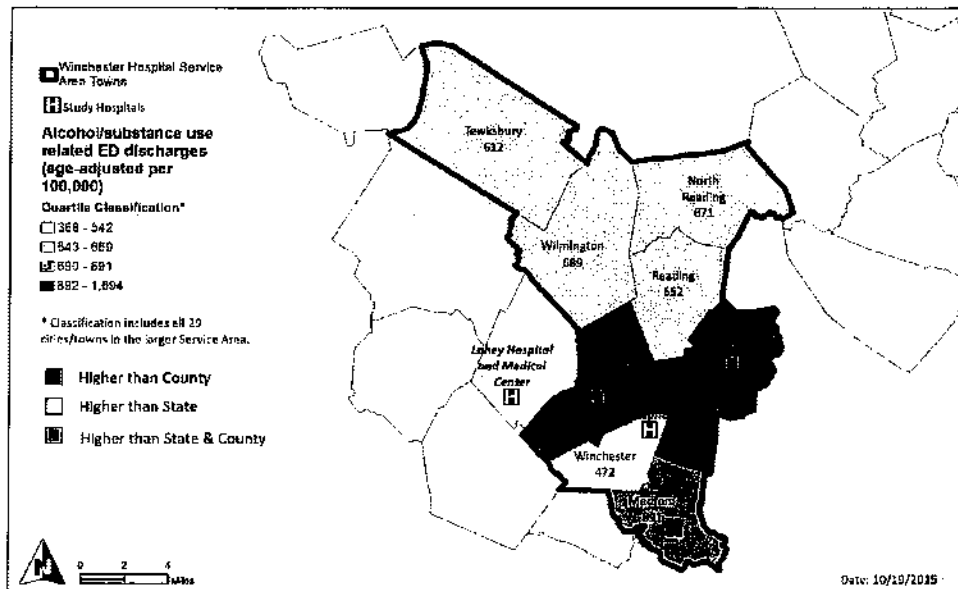
⁹³ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

⁹⁴ National Institute of Mental Health. Statistics. Accessed at

<http://www.nimh.nih.gov/health/publications/the-numbers-count-mental-disorders-in-america/index.shtml>. Accessed 7/19/2016

⁹⁵ Office of Disease Prevention and Health Promotion. HealthyPeople.gov. Substance Abuse. Accessed at <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=40>. Accessed on 7/19/2016

Figure 18: Alcohol/Substance Abuse Emergency Department Discharges (Per 100,000 Population) (Source: Massachusetts Department of Public Health, MassCHIP; 2008-2012 Massachusetts Hospital Inpatient Discharges)



- **Opioid Overdoses.** Middlesex County experienced more than a 200% increase in opioid overdose deaths between 2001 and 2014. Specifically, in 2001, 76 deaths were reported due to opioid abuse in Middlesex County. By 2013 this number had risen to 147, and between 2013 and 2014 the figure rose to 257 deaths.⁹⁶
- **Opioid-Related ED Visits.** Startlingly, every city/town other than Winchester had higher rates of opioid-related emergency department visits per 100,000 population than the Commonwealth (260) or Middlesex County (227), with Wakefield posting the highest rate at 518 visits per 100,000, followed by Stoneham (398), Wilmington (384), Tewksbury (372), North Reading (369), Medford (355), Reading (333) and Woburn (332).⁹⁷
- **Alcohol- or Other Substance Abuse-Related ED Visits:** Wakefield (1,063) and Woburn (922) had rates of alcohol- or other substance abuse-related emergency department visits per 100,000 population that were significantly higher than the rates for Middlesex County (714) and the Commonwealth overall (859).⁹⁸
- **Alcohol Use.** According to the WH Community Health Survey, approximately 10.5% of adults reported as heavy drinkers, compared to approximately 8% for the Commonwealth overall.⁹⁹

⁹⁶ Massachusetts Department of Public Health. Data Brief: Fatal Opioid-related Overdoses among Massachusetts Residents. Accessed at: <http://www.mass.gov/eohhs/docs/dph/quality/drugcontrol/county-level-pmp/data-brief-aug-2015-overdose-county.pdf>

⁹⁷ 2008-2012 Massachusetts Hospital Emergency Visit Discharges

⁹⁸ 2008-2012 Massachusetts Hospital Emergency Visit Discharges

⁹⁹ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

- **Binge Drinking.** According to the WH Community Health Survey, 27.2% of respondents reported “binge drinking” – more than five alcoholic drinks at any one sitting for men and more than four drinks for women – compared to only 15.8% for low-income respondents and 19.4% for Commonwealth residents overall.¹⁰⁰
- **Poor Mental Health.** According to the 2015 WH Community Health Survey, approximately 7% of adult respondents (18+) reported as being in poor mental or emotional health more than 15 days per month, compared to approximately 10% for low-income individuals. Commonwealth-wide, 11.2% of adults reported as being consistently in poor mental or emotional health.¹⁰¹
- **Mental Health-Related Hospitalizations.** Only Medford (4,030) had higher hospitalization rates for all mental health-related disorders per 100,000 population than the Commonwealth overall (3,840) and Middlesex County (3,266).¹⁰²
- **Mental Health-Related ED Visits.** With respect to mental health-related emergency department visits, only Medford (5,480) and Wakefield (5,273) had rates per 100,000 population that were higher than the rates for Middlesex County (4,074) and the Commonwealth overall (4,990).¹⁰³

There was an overwhelming sentiment across all community forums that mental health and substance use issues were two of the major health issues facing the community. The clear sentiment was that these issues impacted all segments of the population from children and youth to young and middle-aged adults to elders.

Interviewees and meeting participants discussed the stresses that youth face related to family, school and their social lives with peers. These stresses often lead to depression, low self-esteem and isolation, as well as substance use, risky sexual behaviors and, in extreme cases, suicide. A number of stakeholders and forum participants also referenced ADHD, autism and developmental delays in children and youth.

With respect to adults and older adults, the issues are similar in many ways. Stakeholders and forum participants cited depression, anxiety and stress, often coupled with isolation, particularly in older adults. In older adults, mental health issues are often exacerbated by lack of family/caregiver support, lack of mobility and physical health conditions.

These issues have a major impact on a small but very-high-need group of individuals and families. Community forum participants and interviewees cited substantial gaps in behavioral health services and family/child support services, particularly for low-income individuals and families. Stakeholders advocated strongly for expansion of mental health services, particularly care/case management services, as well as other supportive services that this population needed to manage their conditions and improve their health status and overall well-being.¹⁰⁴

¹⁰⁰ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

¹⁰¹ 2015 WH Community Health Survey. 2012-2013 Behavioral Risk Factor Surveillance System (BRFSS)

¹⁰² 2008-2012 Massachusetts Hospital Inpatient Discharges (UHDDS)

¹⁰³ 2008-2012 Massachusetts Hospital Emergency Visit Discharges

¹⁰⁴ 2015 WH Key Informant Interviews and Community and Provider Forums

Elder Health

In the United States, in the Commonwealth and in Middlesex County, older adults are among the fastest-growing age groups. The first baby boomers (adults born between 1946 and 1964) turned 65 in 2011, and over the next 20 years these baby boomers will gradually enter the older adult cohort.

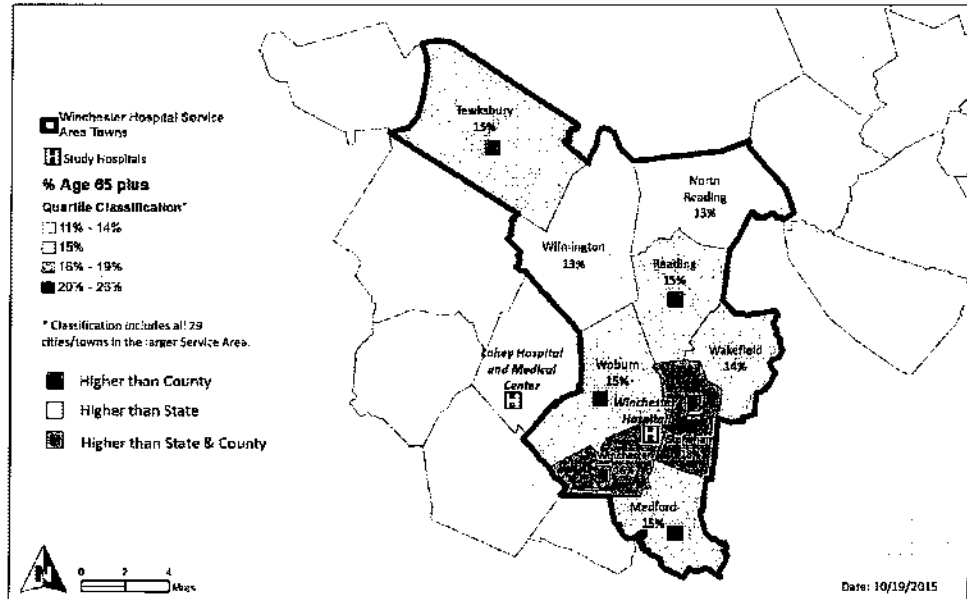
Older adults are much more likely to

develop chronic illnesses and related disabilities such as heart disease, hypertension and diabetes as well as congestive heart failure, depression, anxiety, Alzheimer's, Parkinson's disease and dementia. The CDC and the Healthy People 2020 Initiative estimate that, by 2030, 37 million people nationwide (60% of the older adult population 65+) will manage more than one chronic medical condition. Many experience hospitalizations, nursing home admissions and low-quality care. They may also lose their ability to live independently at home. Chronic conditions are the leading cause of death among older adults.¹⁰⁵

According to qualitative information gathered through interviews and community forums, elder health is one of the highest priorities for the WH service area. Chronic disease, depression, isolation and fragmentation of services were identified as some of the leading issues facing the area's senior population. Demographically, two of the eight cities/towns in WH's primary service area (Wilmington and North Reading) had a higher percentage of older adults (65+) compared to the Commonwealth overall.¹⁰⁶

When considering elder health, it is important to understand that rates of chronic physical disease by age are much higher for elders 65+ compared to rates for the adult population overall. The older people are, the more likely they are to have one or more chronic conditions. Older adults commonly have two to three or more chronic health conditions.

Figure 19: Percent Older Adults (65 Years Old or Older)
(Source: US Census Bureau American Community Survey (ACS), 2009-2013)

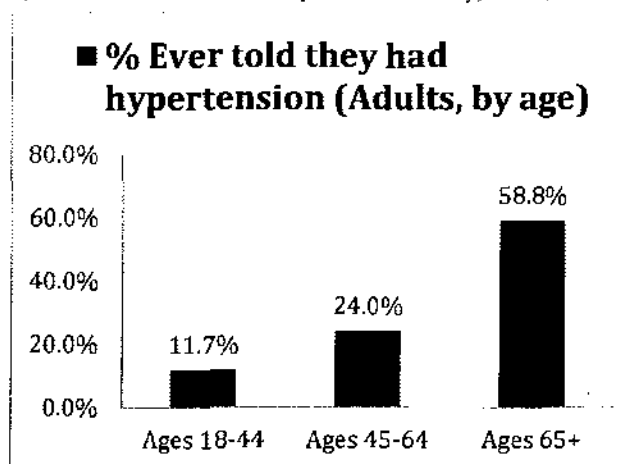


¹⁰⁵ Office of Disease Prevention and Health Promotion. HealthyPeople.gov. Older Adults. Accessed at <https://www.healthypeople.gov/2020/topics-objectives/topic/older-adults#two>. Accessed on 7/19/2016

¹⁰⁶ 2009-2013 US Census Bureau American Community Survey (ACS)

- **Hypertension.** According to the WH Community Health Survey, 58.7% of older adult respondents 65+ had ever been told they have hypertension, compared to only 24.8% of survey respondents overall.¹⁰⁷
- **High Cholesterol.** Similarly, of the respondents 65+ who had ever had their blood cholesterol levels checked, 48.9% had ever been told their blood cholesterol levels were high, compared to 32.1% for survey respondents overall.¹⁰⁸
- **Cancer.** With respect to cancer, 33.4% of older adults 65+ had ever been told they had cancer, compared to 11.8% for survey respondents overall.¹⁰⁹

Figure 20: Percent Ever Been Told Had Hypertension by Age, 2015
(Source: WH Community Health Survey, 2015)



As some of the highest utilizers of health care services and specialty care, seniors are more at risk of being affected by gaps in the health care infrastructure.

- **Specialty Care Utilization.** According to the WH Community Health Survey, 70.6% of older adults (65+) reported seeking specialty care within the preceding year, compared to 56.8% of all respondents.¹¹⁰
- **Care Coordination and Fragmentation of Services.** While clinical integration and care coordination efforts have made great strides, fragmentation of care persists as a serious issue affecting seniors in particular. Older adults in the WH service area may find themselves seeing a variety of specialty care doctors, following entirely separate care plans, and attempting to fill and manage multiple prescription drugs without any coordinated direction or support.

While social determinants of health affect all populations, community and organizational experts expressed concern that seniors may feel these effects more acutely. Many older adults live on fixed incomes with limited funds for medical expenses, leaving them less able to afford the high costs associated with negative health outcomes. Transportation was also consistently mentioned as a major barrier to senior well-being, as many elders no longer drive and find themselves with fewer transportation options in WH's suburban setting.

Caregiver support was consistently brought up as a serious issue in community interviews, as many elders rely on family members or aides to manage their care. Stakeholders reported that, between navigating the health system, organizing appointments and medications, and making major medical

¹⁰⁷ 2015 WH Community Health Survey

¹⁰⁸ 2015 WH Community Health Survey

¹⁰⁹ 2015 WH Community Health Survey

¹¹⁰ 2015 WH Community Health Survey

decisions on behalf of their loved one, caregiver stress and burnout was one of the greatest threats to senior well-being.

Maternal and Child Health

Maternal and child issues are of critical importance to the overall health and well-being of a geographic region and are at the core of what it means to have a healthy, vibrant community. Infant mortality, childhood immunization, rates of teen pregnancy, rates of low birth weight, and rates of early, appropriate prenatal care for pregnant women are among the most critical indicators of maternal and child health. Data compiled on maternal and child health from the MDPH showed that communities in the WH service area were not worse off than the Commonwealth with respect to the leading maternal and child health indicators.¹¹¹

Youth and Adolescents

There is an unfortunate lack of data available on youth and adolescents at the county and town levels. Commonwealth-level data is available through the Massachusetts Youth Risk Behavior Survey, which provides critical information about substance use, mental health and stress, sexual activity, and other risky behaviors, but it does not provide a complete picture of youth/adolescent health and is not collected for all cities and towns in WH's service area.¹¹² Nonetheless, a number of areas of concern particular to youth were highlighted by the state-level data, and these same concerns were passionately confirmed by qualitative comments from the interviews and community forums:

- **Mental Health.** In 2013, 1 in 5 high-school youth (22%) in the Commonwealth felt sad or hopeless, and 6% had attempted suicide in the preceding year.¹¹³ Nearly 1 in 5 (17%) reported being bullied at school. Exposure to stressors may explain, in part, why certain groups suffer from poorer mental and physical health outcomes than others. Stress related to school, family issues or social situations with peers can have detrimental effects on mental health.
- **Overweight/Obesity, Physical Activity and Healthy Eating.** In 2013, 25% of high-school youth in the Commonwealth were overweight or obese. Just 15% reported eating at least five servings of fruits and vegetables each day, whereas a quarter (25%) reported watching at least three hours of TV on an average school day.¹¹⁴
- **Alcohol and Substance Use.** In 2013, almost a quarter (23%) of high-school youth in the Commonwealth reported that they had been offered, sold or given drugs in the preceding

¹¹¹ 2008-2012 Massachusetts Vital Records Natality and Infant Deaths

¹¹² Massachusetts Department of Elementary and Secondary Education & Massachusetts Department of Public Health. Health and Risk Behaviors of Massachusetts Youth, 2013. <http://www.doe.mass.edu/cnp/hprograms/yrbs/2013report.pdf>

¹¹³ Massachusetts Department of Elementary and Secondary Education & Massachusetts Department of Public Health. Health and Risk Behaviors of Massachusetts Youth, 2013. <http://www.doe.mass.edu/cnp/hprograms/yrbs/2013report.pdf>

¹¹⁴ Massachusetts Department of Elementary and Secondary Education & Massachusetts Department of Public Health. Health and Risk Behaviors of Massachusetts Youth, 2013. <http://www.doe.mass.edu/cnp/hprograms/yrbs/2013report.pdf>

year. Meanwhile, 1 in 10 (11%) reported current cigarette use, and a third (36%) reported current alcohol use.¹¹⁵

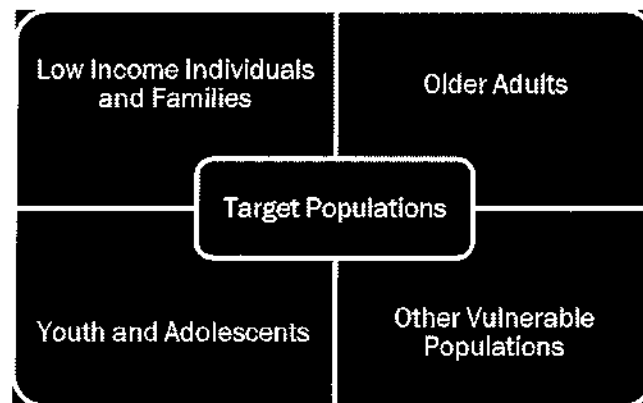
All of these issues were discussed passionately by educators, service providers and community members through the interviews and community forums, and in fact, they were the basis for one of a few dominant discussions at all the forums organized for this assessment.

Community Health Priorities and Target Populations

Once all of the assessment's findings were compiled, hospital and community stakeholders participated in a strategic planning process that integrated data findings from Phases I and II of the project, including information gathered from the interviews, community forums and the WH Community Health Survey. Participants engaged in a discussion of (1) the assessment's findings, (2) current community benefits program activities and (3) emerging strategic ideas that could be applied to refine their community benefits strategic response. From this meeting, community health priorities were identified, as were target populations and core strategies to achieve health improvements.

Following is a brief summary of the target populations and community health priorities that were identified with the support of community stakeholders. Also included below is a review of the goals of WH's Community Health Improvement Plan.

Figure 21: WH Community Benefits Target Population



Target Populations Most at Risk

WH, along with its health, public health, social services and community health partners, is committed to improving the health status and well-being of all residents living throughout its service area. WH's Community Health Improvement Plan (CHIP), which was developed as part of this process, provides a roadmap for how WH will address the issues identified by the needs assessment, including information on goals, objectives, target populations, specific activities, programs and services, measures to monitor impact, and key partners/collaborators.

After considerable discussion, there was broad agreement that WH's CHIP should target low-income populations (e.g., low-income individuals/families, older adults on fixed incomes, homeless), older adult populations (e.g., frail, isolated older adults), youth/adolescents (i.e., 13-18, those in middle school and high school), and other vulnerable populations (e.g., diverse racial/ethnic minority and

¹¹⁵ Massachusetts Department of Elementary and Secondary Education & Massachusetts Department of Public Health. Health and Risk Behaviors of Massachusetts Youth, 2013. <http://www.doe.mass.edu/cnp/hprograms/vrbs/2013report.pdf>

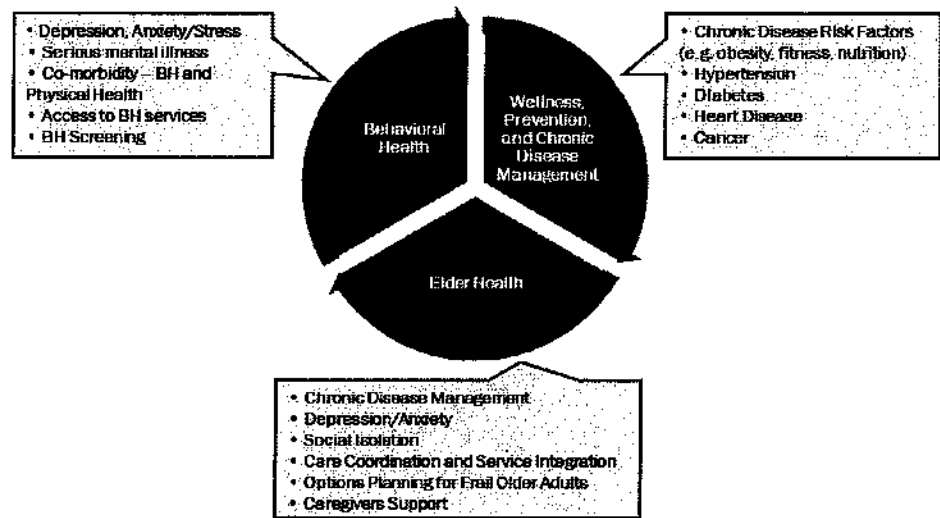
linguistically isolated populations). These demographic and socio-economic target populations have complex needs and face barriers to care and service gaps as well as other adverse social determinants of health that can put them at greater risk, limit their access to needed services and lead to disparities in health outcomes.

Community Health Priorities

WH's CHNA approach and process provided ample opportunity to vet the quantitative and qualitative data compiled during the assessment. WH has framed the community health needs in four priority areas, which together encompass the broad range of health issues and social determinants of health facing residents living in WH's service area. These three areas are (1) Wellness, Prevention and Chronic Disease Management; (2) Elder Health; and (3) Behavioral Health (mental health and substance use).

WH already has a robust CHIP to address all the identified issues. However, the CHNA has provided new guidance and invaluable insight on quantitative trends and community perceptions, which WH is using to inform and refine its efforts. The following are the core elements of WH's updated CHIP.

Figure 22: WH Community Health Priorities



WH's Summary Community Health Improvement Plan

Given the complex health issues in the community, WH has been strategic in identifying its priority areas in order to maximize the impact of its community benefits program and its work to improve the overall health and wellness of residents in its service area. The community health priorities identified above have guided WH's community health improvement planning process. The priorities are designed to promote community-based wellness and disease prevention, and ensure ongoing self-management of chronic diseases and behavioral health disorders. The goals and activities drawn from these priorities will make extensive use of existing partnerships, resources and programs to facilitate the greatest possible health impact.

The following goals address the existing issues affecting the target populations and the community health priorities identified above.

Priority Area 1: Wellness, Prevention and Chronic Disease Management

**Goal 1: Promote Wellness, Behavior Change and Engagement in Appropriate Care
(physical, mental, emotional and behavioral health)**

Goal 2: Increase Physical Activity and Healthy Eating

Goal 3: Identify Those with Chronic Conditions or at Risk; Screen and Refer for Counseling/Treatment

Priority Area 2: Elder Health

Goal 1: Promote General Health and Wellness

Goal 2: Decrease Depression and Social Isolation

Goal 3: Increase Physical Activity and Healthy Eating

Goal 4: Improve Access to Care

Goal 5: Improve Chronic Care Management

Goal 6: Reduce Falls

Goal 7: Enhance Caregiver Support and Reduce Family/Caregiver Stress

Goal 8: Reduce Economic and Food Insecurity

Priority Area 3: Behavioral Health (Mental Health and Substance Use)

**Goal 1: Promote Outreach, Education, Screening and Treatment for Those with Mental Health and
Substance Use Issues in Clinical and Community-Based Settings**

Goal 2: Increase Access to Mental Health and Substance se (MH/SA) Services

Priority Area 4: Partner Collaboration

Goal 1: Promote Collaboration with State and Local Public Health Offices and Community Partners

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 April 10, 2018 accordingly:

- 1) "Public Announcement Concerning a Proposed Health Care Project" page 25, Legal Notice Section.

(check one) Size at least two inches high by three columns wide
 Size at least three inches high by two columns wide

- 2) "Public Announcement Concerning a Proposed Health Care Project" page 8, main news Section.

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 Size at least three inches high by two columns wide

PUBLIC ANNOUNCEMENT CONCERNING A PROPOSED HEALTH CARE PROJECT

Winchester Hospital/Shields MRI, LLC ("Applicant") with a principal place of business at 700 Congress Street, Suite 204, Quincy, Massachusetts 02169 intends to file a Notice of Determination of Need with the Massachusetts Department of Public Health for expansion of its existing clinic through the acquisition of a third MRI unit. The MRI unit will operate at a new satellite of the clinic that will be located at Winchester Hospital, 41 Highland Avenue, Winchester, MA 01890 ("Project"). The total value of the Project based on the maximum capital expenditure is \$3,795,000. 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 no later than 30 days of the filing of the Notice of Determination of Need by contacting the Department of Public Health, Determination of Need Program, 10 Washington Street, 6th Floor, Boston, MA 02108.

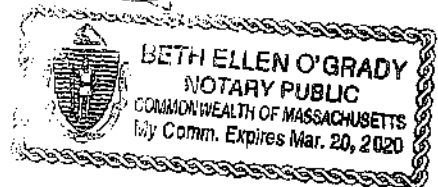
Signature

Name

Title

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4/10/18

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... members said they
"shocked" when the ad
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cause it was tens of mil
of dollars in debt.

"The faculty had no
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properties located at 2430 and 2406 Washington Street, which are portions of the disposal site. The Notice of Activity and Use Limitation will limit the following activities and uses on the properties located at 2430 and 2406 Washington Street:

- The removal or damage of the concrete floor, and/or the Active EPMM;
- Any activities which may damage and/or compromise the concrete floor, or components of the Active EPMM including the ventilation piping located beneath the building, the underground manifold piping, and/or venting system components and fans located on the exterior of the fueling canopy;
- Removal or damage of the fueling canopy that will compromise the integrity of the sub-slab venting system;
- Removal or damage of the electric fans;
- Shutting down, turning off, or removing electrical power to the fan, or any other activity that would make such fan inoperable, except for planned maintenance activities;
- Construction of any addition or occupied structure at the Portion of the Property without the installation of an EPMM and subsequent indoor air sampling to confirm its effectiveness in preventing or mitigating vapor intrusion into the structure;

Any person interested in obtaining additional information about the NOTICE OF ACTIVITY AND USE LIMITATION may contact Joseph Roman, LSP at GEI Consultants, Inc., 400 Unicorn Park Drive, Woburn, Massachusetts, 01801, 781-721-4136.

The NOTICE OF ACTIVITY AND USE LIMITATION and the disposal site file can be reviewed at MassDEP website using Release Tracking Number (RTN) 3-11352 at <http://public.dep.state.ma.us/SearchableSites2/Search.aspx> or at Massachusetts Department of Environmental Protection, Northeast Regional Office, 205B Lowell Street, Wilmington, MA, 978-694-3200.
Apr 10

BOSTON HERALD TUESDAY, APRIL 10, 2018

PUBLIC ANNOUNCEMENT CONCERNING A PROPOSED HEALTH CARE PROJECT

Winchester Hospital/Shields MRI, LLC ("Applicant") with a principal place of business at 700 Congress Street, Suite 204, Quincy, Massachusetts 02169 intends to file a Notice of Determination of Need with the Massachusetts Department of Public Health for expansion of its existing clinic through the acquisition of a third MRI unit. The MRI unit will operate at a new satellite of the clinic that will be located at Winchester Hospital, 41 Highland Avenue, Winchester, MA 01890 ("Project"). The total value of the Project based on the maximum capital expenditure is \$3,795,000. 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 no later than 30 days of the filing of the Notice of Determination of Need by contacting the Department of Public Health, Determination of Need Program, 250 Washington Street, 6th Floor, Boston, MA 02108.

Attachment/Exhibit

6



**Analysis of the Reasonableness of
Assumptions Used For and Feasibility
of Project Financials of:**

Winchester Hospital/Shields MRI, LLC

For the Years Ending December 31, 2018
Through December 31, 2023



Tel: 617-422-0700
Fax: 617-422-0909
www.bdo.com

One International Place
Boston, MA 02110 1745

April 16, 2018

Mr. Jeff Ronner
Chief Financial Officer
Shields Health Care Group, Inc.
Crown Colony Plaza
700 Congress Street
Quincy, MA 02169-0909

**RE: Analysis of the Reasonableness of Assumptions and Projections Used to Support
the Financial Feasibility and Sustainability of the Proposed Project**

Dear Mr. Ronner:

Enclosed is a copy of our report on the reasonableness of assumptions used for and feasibility of the financial projections for Winchester Hospital/Shields MRI, LLC. Please contact me to discuss this report once you have had an opportunity to review.

Sincerely,

BDO USA, LLP

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III. SCOPE OF REPORT	3
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Tel: 617-422-0700
Fax: 617 422 0909
www.bdo.com

One International Place
Boston, MA 02110-1745

April 16, 2018

Mr. Jeff Ronner
Chief Financial Officer
Shields Health Care Group, Inc.
Crown Colony Plaza
700 Congress Street
Quincy, MA 02169-0909

RE: Analysis of the Reasonableness of Assumptions and Projections Used to Support the Financial Feasibility and Sustainability of the Proposed Project

Dear Mr. Ronner:

We have performed an analysis related to the reasonableness and feasibility of the financial projections (the "Projections") of Winchester Hospital / Shields MRI, LLC ("Shields" or "the Applicant") in connection with the expansion of its magnetic resonance imaging ("MRI") clinic through the acquisition of a new 1.5T MRI unit (the "Proposed Project"). This report details our analysis and findings with regards to the reasonableness of assumptions used in the preparation of the Projections and feasibility of the projected financial results prepared by the management of Shields ("Management"). This report is to be used by Shields in connection with 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 our review was limited to an analysis of the six year financial projections for the Applicant for the fiscal years ("FY") 2018 through 2023 prepared by Management 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.

The Projections exhibit a cumulative operating EBITDA surplus of approximately 48.3 percent of cumulative projected revenue for Shields for the six years from 2018 through 2023. Based upon our review of the relevant documents and analysis of the Projections, we determined the anticipated operating EBITDA surplus is a reasonable expectation and based upon feasible financial assumptions. Accordingly, we determined that the Projections are reasonable and feasible, and not likely to result in a liquidation of Shields' assets. A detailed explanation of the basis for our determination of reasonableness and feasibility is contained within this report.

II. RELEVANT BACKGROUND INFORMATION

The Applicant intends to expand its existing MRI clinic through the acquisition of a new 1.5T MRI unit. The Applicant is a joint venture between Winchester Hospital ("WH") and Shields Imaging of Winchester, LLC that was formed in 2013 to provide MRI services to WH patients. The Applicant's existing clinic at Unicorn Park has two MRI scanners and is located outside the WH campus. Patients are transported from the hospital to the existing clinic to access services. The new unit will be located at a satellite clinic at the WH's main campus to provide more timely services, particularly to inpatients and emergency department patients who require urgent access to MRI services to diagnose and treat acute or emergent conditions. Management indicated the need for the Proposed Project is supported by increased volume

at the Applicant's existing location, which has caused increases in wait time and extended operating hours. The Proposed Project would also allow for increased availability for MRI services at Unicorn Park for outpatients.

III. SCOPE OF REPORT

The scope of this report is limited to an analysis of the six year financial projections for Shields, the Applicant, for the fiscal years ending 2018 through 2023 (the "Projections"), prepared by Management, 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. The Projections include the operations of the new MRI scanner beginning in FY 2019. 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 project is not likely to result in a liquidation of the underlying assets or the need for reorganization.

This report is based on prospective financial information provided to us by Management. BDO has not audited or performed any other form of attestation services on the projected financial information related to the operations of Shields.

If BDO had audited the underlying data, matters may have come to our attention that would have resulted in our using amounts that differ from those provided. Accordingly, we do not express an opinion or any other assurances on the underlying data presented or relied upon

in this report. We do not provide assurance on the achievability of the results forecasted by the Applicant 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. We reserve the right to update our analysis in the event that we are provided with additional information.

IV. SOURCES OF INFORMATION UTILIZED

In formulating our opinions and conclusions contained in this report, we reviewed documents produced by Management as well as third party industry data sources. The documents and information upon which we relied are identified below or are otherwise referenced in this report:

1. WH 3rd Magnet Data Request to BDO 032818.xlsx;
2. Winchester 1.5T Aera Quote.pdf;
3. Winchester 2015 & 2016 Audited Financials.pdf;
4. WH 3rd Magnet Pro Forma 021618 Free Standing IP at Valuation - DRAFT DoN....pdf;
5. WH 3rd Magnet Pro Forma 030918 Free Standing IP at Valuation - DRAFT BDO.xlsx;
6. WH 3rd Magnet Data Request to BDO 032818 -historicals included.xlsx;
7. Shields_Winchester MRI DoN - Narrative Draft_v8.docx;
8. Winchester Hospital_Sheilds MRI, LLC - DoN Factor 4.XLSX;
9. IBISWorld Industry Report, Diagnostic Imaging Centers in the US, January 2017;

10. IBISWorld Industry Report, Diagnostic & Medical Laboratories in the US, June 2017;
and,
11. RMA Annual Statement Studies, published by Risk Management Associates.

V. REVIEW OF THE PROJECTIONS

This section of our report summarizes our review of the reasonableness of the assumptions used and feasibility of the Projections.

The following tables presents the Key Metrics, as defined below, which compares the operating results of the Projections to market information from RMA Annual Studies (“RMA”) and IBISWorld as well as Shields’ historical performance, to assess the reasonableness of the projections.

Key Financial Metrics and Ratios	Actual					Projected			
	2015	2016	2017	2018	2019	2020	2021	2022	2023
Winchester Hospital/Shields MRI, LLC									
Profitability									
Operating Margin (%)	41.9%	45.3%	43.9%	47.8%	39.6%	39.9%	41.7%	47.7%	42.4%
Net Income Margin (%)	41.9%	45.3%	43.9%	47.8%	38.5%	39.0%	41.1%	41.9%	42.3%
Debt Service Coverage Ratio (x)	N/A	46.9x	133.3x	N/A	6.5x	6.3x	5.8x	7.0x	7.1x
Liquidity									
Days of Available Cash and Investments on Hand (#)	96.4	96.4	85.9	77.3	61.6	64.7	63.7	60.9	60.7
Operating Cash Flow Margin (%)	52.6%	52.2%	52.4%	53.4%	45.1%	45.1%	46.8%	47.7%	48.2%
Solvency									
Current Ratio (x)	5.8x	7.0x	7.4x	6.6x	2.1x	2.1x	2.4x	2.6x	6.0x
Ratio of Total Debt to Total Capitalization (%)	0.8%	0.3%	0.0%	0.0%	19.5%	15.5%	11.0%	5.9%	0.0%
Ratio of Cash Flow to Total Debt (%)	4251.7%	13964.3%	26739%	N/A	317%	187%	272%	474%	1629%
Total Net Assets (\$ in thousands)	\$ 13,252	\$ 12,757	\$ 11,834	\$ 11,144	\$ 11,784	\$ 11,849	\$ 11,898	\$ 11,974	\$ 12,079

Key Financial Metrics and Ratios Winchester Hospital/Shields MRI, LLC	Industry Data		
	RMA - Diagnostic Imaging Centers	BIS - Diagnostic Imaging Centers	BIS - Diagnostic & Medical Laboratories
Profitability			
Operating Margin (%)	18.4%	14.0%	13.7%
Net Income Margin (%)	18.0%	NA	NA
Debt Service Coverage Ratio (x)	NA	NA	3.89
Liquidity			
Days of Available Cash and Investments on Hand (#)	NA	NA	NA
Operating Cash Flow Margin (%)	NA	NA	11.4%
Solvency			
Current Ratio (x)	1.39	NA	1.4
Ratio of Total Debt to Total Capitalization (%)	39.9%	NA	NA
Ratio of Cash Flow to Total Debt (%)	NA	NA	NA
Total Net Assets (\$ in thousands)	5,462	NA	35,669

The Key Metrics fall into three primary categories: profitability, liquidity, and solvency. Profitability metrics are used to assist in the evaluation of management performance in how efficiently resources are utilized. Liquidity metrics, including common ratios such as “days of available cash and investments on hand”, measure the quality and adequacy of assets to meet current obligations as they come due. Solvency metrics measure the company’s ability to take on and service debt obligations. Additionally, certain metrics can be applicable to multiple categories. The table below shows how each of the Key Metrics are calculated.

Key Financial Metrics and Ratios Ratio Definitions	Calculation
Profitability	
Operating Margin (%)	Income / (Loss) from Operations Divided by Total Revenue
Net Income Margin (%)	Net Income Divided by Total Revenue
Debt Service Coverage Ratio (x)	(Net Income Plus Depreciation and Interest) Divided by Principal and Interest Payments
Liquidity	
Days of Available Cash and Investments on Hand (#)	Cash and Investments Divided by Daily Operating Expenses (Excl. Depreciation)
Operating Cash Flow Margin (%)	Cash Flow from Operations Divided by Total Revenue
Solvency	
Current Ratio (x)	Current Assets Divided by Current Liabilities
Ratio of Total Debt to Total Capitalization (%)	Total Debt Divided by Total Capitalization (Total Debt and Unrestricted Net Assets)
Ratio of Cash Flow to Total Debt (%)	Cash Flow from Operations Divided by Total Debt
Total Net Assets (\$ in thousands)	Total Shareholders' Equity of the Company

2. Revenues

We analyzed the projected revenues within the Projections. Revenues for the Applicant include revenues from the existing two MRI units as well as revenues from the satellite third MRI unit. The Applicant's revenue is a function of number of scans and rate per scan.

Growth in scans for the existing two MRI units was projected to range between -1.6 percent and 2.1 percent in the Projections. Negative growth is anticipated in FY 2019 due to the commencement of operations of the third MRI unit which will discontinue the transfer of inpatients for services to Unicorn Park. Nominal volume growth is expected for the other years in the Projections until the scanners reach capacity. Management indicated that each MRI scanner has a capacity of approximately 8,500 scans per year.

Projected volume for the third MRI unit in its first year of operation, FY 2019, is based on historical volume of inpatient scans that have occurred at Unicorn Park. The projected volume growth is driven by the service being provided at the WH campus, which increases the quality of care and eliminates the need to transport patients to and from the other clinics.

The projected rate per scan in each year of the Projections is within range, or below, the Applicant's historical rates per scan.

Equipment Maintenance Expense

Equipment maintenance expense increases in FY 2020 related to a service contract for the third MRI unit. The third unit will be under warranty for one year. The estimated expense related to the service contract appears to be consistent with the service contracts on the existing two MRI scanners.

Technologists Salaries and Benefits

Expense related to technologists' salaries is projected to increase in FY 2019 related to staffing needs at the third MRI unit, which will be on campus at WH. The estimated total salaries is consistent with the current technologists' salaries on a full-time equivalent basis. After FY 2019, technologists' salary and benefit expenses are expected to grow at 1.4 percent in FY 2020 and FY 2021, 0.7 percent of revenue in FY 2022, and 0.0 percent in FY 2023. It is our understanding that Shields employs full-time and part-time technologists with a mix of salaried and hourly employees. Shields expects to be able to decrease use of hourly employees as technology advances and operational time is shortened.

Selling General & Administrative Expenses ("SG&A")

SG&A expenses are expected to increase in FY 2019 due to one-time start-up costs related to the Proposed Project and Community Health Initiative payments. Thereafter, SG&A expenses are expected to decline as a percentage of revenue marginally below historical levels as Management expects to generate efficiencies due

to scale as a result of the incremental revenue generated by the additional capacity form the third MRI unit.

Based upon the foregoing, it is our opinion that the operating expenses projected by Management reflects a reasonable estimation of future expenses of the Applicant.

4. Proposed Project Capital Expenditures and Financing

We understand that the MRI 1.5T equipment will cost approximately \$1.6 million and leasehold improvements are expected to be approximately \$1.9 million for a total expected expenditure of \$3.5 million. We reviewed the preliminary proposal received by the Applicant related to the equipment cost. We understand the expected cost of the leasehold improvements are based on Management's historical experience and best estimate. Given the Applicant's point in the process, at the time of our report, the lease related to the space at WH was not yet signed.

We also reviewed the proposed financing of the project. The Applicant plans to finance the full amount of the capital expenditures with debt. The Projections include interest and debt payments based on assumed terms of 60 months and an interest rate of 3.5 percent. While this loan has not yet been taken out, we understand that this is Management's best estimate and the Applicant has not had difficulty obtaining financing (at comparable terms) in the past.

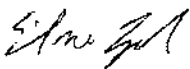
Given our review of this information and the Key Metrics above, it is our opinion that the Proposed Project will be adequately financed and the Applicant will be able to sufficiently service its debt.

VI. FEASIBILITY

We analyzed the Projections and Key Metrics for the Proposed Project. In preparing our analysis we considered multiple sources of information including industry metrics, historical results, and Management expectations. 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.

Within the projected financial information, the Projections exhibit a cumulative operating EBITDA surplus of approximately 48.3 percent of cumulative projected revenue for the six years from 2018 through 2023. Based upon our review of the relevant documents and analysis of the Projections, we determined the anticipated operating surplus is a reasonable expectation and based upon feasible financial assumptions. Accordingly, we determined that the Projections are reasonable and feasible, and not likely to have a negative impact on the patient panel or result in a liquidation of assets of Shields.

Respectively submitted,



Erik Lynch
Partner, BDO USA LLP

Attachment/Exhibit

7



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

Christopher Murphy
Lahey Health System, Inc.
41 Mall Road
Burlington, MA 01803

RE: ACO Certification

Dear Mr. Murphy:

Congratulations! The Health Policy Commission (HPC) is pleased to inform you that Lahey Health 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. Lahey Health System, Inc. meets those criteria.

The HPC will promote Lahey Health 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,

A handwritten signature in black ink, appearing to read "David Seltz".

David Seltz
Executive Director

Attachment/Exhibit

8

EXHIBIT A

CERTIFICATE OF ORGANIZATION

OF

WINCHESTER HOSPITAL / SHIELDS MRI, LLC

(Pursuant to the provisions of Section 12 of the
Massachusetts Limited Liability Company Act)

To the State Secretary
Commonwealth of Massachusetts

F.E.I. Number: Applied for

It is hereby certified that:

FIRST: The name of the limited liability company (the "Company") is

WINCHESTER HOSPITAL / SHIELDS MRI, LLC.

SECOND: The address of the office of the Company in the Commonwealth of Massachusetts, required to be maintained by the provisions of Section 5 of the Massachusetts Limited Liability Company Act, and where the records are to be kept as prescribed by the provisions of Section 9 of said Act, is: 700 Congress Street – Suite 204, Quincy, Massachusetts 02169.

THIRD: The name and the address within the Commonwealth of Massachusetts of the resident agent for service of process for the Company is: Shields Health Care Group, Inc., 700 Congress Street – Suite 204, Quincy, Massachusetts 02169.

FOURTH: The Company is not to have a specific date of dissolution.

FIFTH: The Managers of the Company are:

<u>NAME</u>	<u>ADDRESS</u>
-------------	----------------

None identified at this time.

SIXTH: The names and the addresses of the persons authorized to execute any documents to be filed with the office of the Secretary of State of the Commonwealth of Massachusetts are:

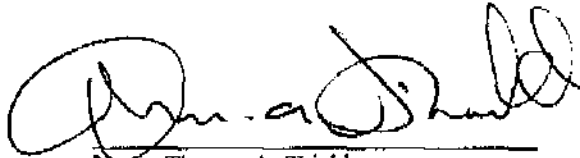
<u>NAME</u>	<u>ADDRESS</u>
Thomas A. Shields	700 Congress Street – Suite 204 Quincy, Massachusetts 02169
Kevin F. Smith	41 Highland Avenue Winchester, MA 01890

SEVENTH: The general character of the Company's business is as follows: To engage in any or all lawful activities for which limited liability companies may be organized under the Massachusetts Limited Liability Company Act, including but not limited to the acquisition, ownership, development, and management of advanced medical imaging facilities.

EIGHTH: The names and the addresses of the persons authorized to execute, acknowledge, deliver and record any recordable instrument purporting to affect an interest in real property recorded with a registry of deeds or district office of the land court are:

<u>NAME</u>	<u>ADDRESS</u>
Thomas A. Shields	700 Congress Street – Suite 204 Quincy, Massachusetts 02169
Kevin F. Smith	41 Highland Avenue Winchester, MA 01890

IN WITNESS WHEREOF AND UNDER THE PENALTIES OF PERJURY, the person whose signature appears below does hereby affirm and execute this certificate of organization as authorized person this 11th day of April, 2013.

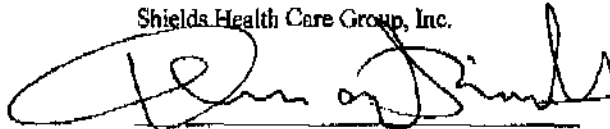


Name: Thomas A. Shields
Title: Authorized Person

CONSENT OF RESIDENT AGENT:

Shields Health Care Group, Inc., resident agent of the above limited liability company, consents to its appointment as resident agent pursuant to G.L., c 156C § 12.

Shields Health Care Group, Inc.



By: Thomas A. Shields
Its: Pres.

CONSENT TO USE NAME

The undersigned, being the President of Shields Health Care Group, Inc., and the Authorized Signatory for its affiliated companies:

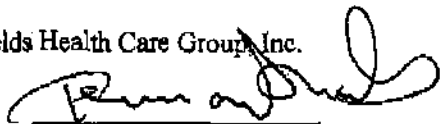
- Shields Health Care Group, LP
- Shields Health Care of Leominster, LLC
- Shields Healthcare of Brighton, LLC
- Shields Healthcare of Brockton, Inc.
- Shields Healthcare of Cambridge, Inc.
- Shields Healthcare of Dartmouth, Inc.
- Shields Healthcare of Springfield, LLC
- Shields Healthcare of Suffolk, inc.
- Shields Healthcare of Weymouth, Inc.
- Shields Healthcare of Winchester, LLC
- Shields Healthcare of Worcester, LLC
- Shields Imaging of Lowell, LLC
- Shields Imaging of Lowell General Hospital, LLC
- Shields Imaging of Eastern Massachusetts, LLC
- Shields Imaging of Marlborough, LLC
- Shields Imaging of Massachusetts, LLC
- Shields Imaging of Massachusetts II, LLC
- Shields Imaging of Massachusetts III, LLC
- Shields Imaging of New England, LLC
- Shields Imaging of South Shore, LLC
- Shields Imaging of Springfield, LLC
- Shields Imaging of the North Shore, LLC
- Shields Imaging of Winchester, LLC
- Shields Imaging of Worcester, LLC
- Shields MRI & Imaging Center of Cape Cod, LLC
- Shields MRI of Framingham, LLC

does hereby consent to the use of the name, "WINCHESTER HOSPITAL / SHIELDS MRI, LLC" by WINCHESTER HOSPITAL / SHIELDS MRI, LLC, a limited liability company seeking to organize and do business in the Commonwealth of Massachusetts.

IN WITNESS WHEREOF, said corporation has caused this Consent to be executed this 11th day of April 2013.

Shields Health Care Group, Inc.

By:



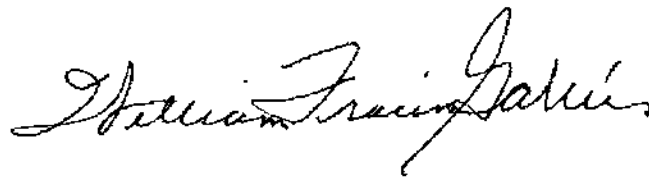
Thomas A. Shields, Pres.
And Authorized Signatory
For All Above-Referenced Entities

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 11, 2013 02:38 PM

A handwritten signature in cursive script that reads "William Francis Galvin". The signature is written in black ink and is centered on the page.

WILLIAM FRANCIS GALVIN

Secretary of the Commonwealth

Attachment/Exhibit

9



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: Original Application Date:

Applicant Name:

Application Type:

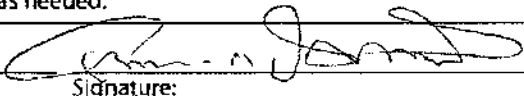
Applicant's Business Type: Corporation Limited Partnership Partnership Trust LLC Other

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.

LLC
 All parties must sign. Add additional names as needed.

Thomas A. Shields 
 Name: THOMAS A. SHIELDS Signature: _____ Date: _____

This document is ready to print: Date/time Stamp 04/05/2018 3:38 pm