CareGroup, Inc.
DoN Application Number: CG-18051612-HE

Substantial Capital Expenditure
Beth Israel Deaconess Medical Center, Inc.

Application Narrative

July 27, 2018

By

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APPLICATION NARRATIVE

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NOTE: In addition, the following Attachments to the Application have been filed in a separate document:

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QUESTION 2.1: PROJECT DESCRIPTION

Application Narrative: Question 2
Section 2.1 – Project Description

Question 2.1 Project Description: *Provide a brief description of the scope of the project.*

A. Introduction: Description of Applicant and Background Information on Project

CareGroup, Inc. ("CareGroup" or "Applicant") is filing a Notice of Determination of Need (the "Application") with the Massachusetts Department of Public Health ("DPH") for a substantial capital expenditure by Beth Israel Deaconess Medical Center, Inc. ("BIDMC"). CareGroup is a Massachusetts, non-profit, tax exempt corporation that oversees a regional, non-profit health care delivery system comprised of teaching and community hospitals, physician groups, and other caregivers. CareGroup's member hospitals include BIDMC and its three subsidiary hospitals, Beth Israel Deaconess Hospital-Milton, Beth Israel Deaconess Hospital-Needham and Beth Israel Deaconess Hospital-Plymouth, as well as Mount Auburn Hospital and New England Baptist Hospital.[1] CareGroup's member entities serve the health needs of patients and communities of greater Boston and other surrounding communities in Eastern Massachusetts. CareGroup's purpose is to support the missions of its member entities: patient care, research, and education.

BIDMC is a premier, non-profit academic medical center and major teaching affiliate of Harvard Medical School located in the Longwood Medical and Academic Area ("LMA") in Boston. BIDMC offers a full range of adult clinical services to patients in Eastern Massachusetts including cardiovascular care, cancer care, care for digestive diseases, OB/GYN, neonatology, neurosciences, orthopedics, psychiatry/behavioral health, transplantation and emergency services, including a Level 1 Trauma Center accessible by a rooftop helipad. BIDMC has long been renowned for excellence in patient care, biomedical research, teaching, and community service.

Over the past several years, BIDMC has formed important clinical affiliations with a number of lower cost, high quality community hospitals and physician practices throughout eastern Massachusetts. Collectively, these hospitals and physician practices formed Beth Israel Deaconess Care Organization ("BIDCO")[2], in order to align the incentives and efforts needed to dramatically improve the health of broad populations and to focus intently on caring for patients at the right time, in the right location, and in the community whenever possible. BIDMC serves as an important, high value tertiary

[1] Following its formation in 1996 the CareGroup system evolved into a confederation model in which its member hospitals jointly borrow and purchase common services such as insurance coverage and investment services, but otherwise operate on a largely autonomous basis. CareGroup member hospitals do not jointly contract with payers or share centralized operations.
[2] BIDCO is a value-based physician and hospital network and Accountable Care Organization ("ACO") that partners with providers to improve quality of care while effectively managing medical costs, with the goal of providing the highest quality health care in the most efficient way.

and quaternary hub for the benefit of all the patients in this network. BIDMC's clinically integrated network of community-based providers (collectively, the "BID-Network") includes:

- Bowdoin Street Health Center and five other affiliated community health centers: The Dimock Center, Fenway Health, Outer Cape Health Services, Charles River Community Health, and South Cove Community Health Center;
- Three BIDMC-owned non-profit community hospitals (Beth Israel Deaconess Hospital-Plymouth, Beth Israel Deaconess Hospital-Milton, and Beth Israel Deaconess Hospital-Needham);
- Four other hospitals affiliated through BIDCO, including Anna Jaques Hospital, Cambridge Health Alliance, Lawrence General Hospital, and New England Baptist Hospital;
- Health care providers such as Atrius Health, Joslin Diabetes Center and Hebrew SeniorLife; and
- Numerous physician groups, including BIDMC's exclusive affiliate, Harvard Medical Faculty Physicians at BIDMC ("HMFP") whose physicians provide patient care, research and medical education services at BIDMC.

BIDMC was formed in 1996 by the merger of Beth Israel Hospital and New England Deaconess Hospital. Since the merger, BIDMC has worked continuously to optimally integrate the services and operations of its two hospital campuses—the "East Campus" and the "West Campus"—located within a block of each other across the intersection of Brookline Avenue and Longwood Avenue. BIDMC has gradually relocated services and renovated existing facilities to consolidate and reduce duplication of services on the two campuses, create desirable adjacencies among related clinical programs, and upgrade its aging facilities. These ongoing facilities improvements have eased access, enhanced the patient and staff experience, and contributed to cost-saving operational efficiencies in support of BIDMC's commitment to provide the highest quality patient care, medical education, and research at lower costs than other providers in the area.

B. Project Description

After over 20 years of right-sizing and maximizing efficient use of existing facilities on its campuses, BIDMC intends to construct a new inpatient clinical building (the "New Inpatient Building," the "New Inpatient Building Project," or the "Project") on its West Campus. The Project site is located at 111 Francis Street and is bounded by Brookline Avenue, Francis Street, Pilgrim Road, and BIDMC's Rosenberg Building. The New Inpatient Building is planned to be 10 stories, contain approximately 375,000 gross

square feet (approximately 325,000 zoning square feet)[3], and will be located on the site of BIDMC's current Emergency Department parking lot, main West Campus loading facility, and West Campus oxygen farm.

The New Inpatient Building is designed to serve BID-Network's most acute patient care needs and the inpatient needs of those individuals for whom BIDMC serves as the local community hospital. It will be almost entirely comprised of clinical space and will better enable BIDMC to fulfill its mission, including excellence in clinical care; dedication to innovative research; training the next generation of medical and allied health professionals; and a continued commitment to its neighboring communities. The facility will house inpatient medical/surgical and intensive care beds, a perioperative floor with operating and procedure rooms and associated patient care and support areas, ancillary clinical services including radiology, a central sterile processing and operating room storage area and a range of other clinical support functions and areas such as clinical engineering, soiled/clean linen and other storage rooms, loading and materials management facilities. The Project will also include a medical helipad, relocated from the adjacent Rosenberg Building, as well as conference and other education space. The New Inpatient Building will connect to the Rosenberg Building in multiple locations and to an existing connector to the Farr Building to facilitate convenient access and circulation for patients, families, caregivers and staff. The New Inpatient Building's location and connectivity will facilitate the sharing of clinical support functions among existing patient care facilities on the West Campus.[4]

The New Inpatient Building will include up to 158 single-bedded inpatient rooms (up to 30 additional Intensive Care Unit[5] ("ICU") beds and up to 128 medical/surgical beds),[6] enabling BIDMC to decant many of the double-bedded medical/surgical rooms that currently exist on campus. Only 39 of the medical/surgical and 30 of the ICU beds will be additive to the overall BIDMC bed count that will exist at the time the New Inpatient Building opens (i.e., "net new"), as BIDMC anticipates closing up to 89 West Campus medical/surgical beds at that time. Additionally, BIDMC anticipates reopening 20 beds

[3] The Project's gross square feet was reduced slightly as the design evolved in recent weeks. As initially described in the public notice published on July 6, 2018, it was contemplated that the Project would contain up to 395,000 gross square feet (345,000 zoning square feet).

[4] The Project scope includes renovations to small areas of the Rosenberg Building to connect the two buildings, including at Level 3 (Radiology) and Level 5 (the perioperative floor). Renovations in the Rosenberg Building will also be made to relocate or create additional clinical support spaces to create better patient and operational flow. A portion of the basement within the existing Rosenberg Building will be renovated to provide a new kitchen to support the Project's new inpatient floors. The kitchen will be located within a materials management support space that is being relocated to the New Inpatient Building. A portion of Level 2 of the Rosenberg Building will be renovated to expand the existing clinical pathology laboratory. Clinical pathology will expand into an adjacent conference room, and the conference function is being relocated from the Rosenberg Building to the New Inpatient Building.

[5] Beds licensed as ICU beds and coronary critical care beds are collectively described as ICU beds in this Application.

[6] Hereafter, all references to Project bed numbers in this Application shall be construed as referring to an anticipated upper limit, and may in fact be less based on the final design of the Project.

within existing West Campus facilities approximately 24 months after the New Inpatient Building opens. Thus, overall, BIDMC anticipates that up to 89 net new medical/surgical and ICU inpatient beds will be brought on-line on the West Campus in connection with the construction of the New Inpatient Building within two years after its opening. Some of the single-bedded rooms will provide enhanced capabilities for patients of size and patients with advanced communicable diseases. For each inpatient floor in the New Inpatient Building, two rooms will be equipped to accommodate patients of size and three rooms will be negative pressure isolation rooms.

In addition to providing family-friendly single-bedded medical/surgical and intensive care patient rooms able to accommodate the sophisticated technology needed to best treat critically ill patients, the New Inpatient Building Project will provide:

- A perioperative floor, interconnected and integrated with the Rosenberg Building perioperative floor, that will provide:
    - Eight state-of-the-art operating rooms large enough to support the most advanced surgical procedures, robotic surgical technology, and imaging technology;[7]
    - Four procedure rooms with advanced equipment that are designed to handle procedures for BIDMC's most acute patients, including high complexity cardiology procedures;
    - An additional, flexibly designed pre-operative/procedure area to accommodate the additional operating and procedure room capacity, that will include patient and family reception and consultation space;[8]
    - Improvements to the existing pre- and post-operative care area in the Rosenberg Building, which after opening of the Project will be used primarily for post-operative care;
- New central sterile processing and operating room storage area;
- Enhanced and expanded Radiology services area;
- A medical helicopter landing pad (relocated from the adjacent Rosenberg Building);
- An accessible, rooftop green space and healing garden for the benefit of patients, families, and caregivers;
- Conference and other education space to support medical education activities; and

[7] One existing operating room in the Rosenberg Building must be eliminated once the New Inpatient Building is complete to create a connection between the Rosenberg Building and the New Inpatient Building, resulting in the creation of seven net new operating rooms at BIDMC by the Project.

[8] The new pre-operative/procedure unit in the New Inpatient Building, like the existing pre-operative/post-operative unit in the Rosenberg Building, is designed to meet the criteria for a Combined Pre- and Post-Procedure Area. This flexible design means each of these two separate units will be suitable for future use for both pre- and post-operative/procedure care functions as needed. Thus, during times of peak utilization, bays in the pre-operative/procedure unit in the New Inpatient Building will be used as swing space for post-operative/procedure care and/or post-operative/procedure care bays in the Rosenberg Building will be used as swing space for pre-operative care.

- Energy-efficient and environmentally sustainable building design, consistent with BIDMC's commitment to a healthy community and the health benefits of environmental stewardship.

The New Inpatient Building's design addresses many of the current challenges BIDMC faces given its aging facilities, capacity constraints, and patient needs, while preserving and further enhancing the delivery of, and access to, high quality, lower cost health care.

The New Inpatient Building will also be a means to improve patient care and enable BIDMC to continue to provide a premier education to current and future physicians and allied health professionals. BIDMC is accredited by the Accreditation Council for Graduate Medical Education ("ACGME"), and currently has approximately 1,250 physicians on the active medical staff, most of whom hold faculty appointments at Harvard Medical School. The New Inpatient Building will include space designed to facilitate medical education and also support BIDMC's continued fulfillment of ACGME requirements that require faculty to "regularly participate in organized clinical discussions, rounds, journal clubs, and conferences"[9]. Incorporating educational space into the New Inpatient Building will enable physicians to stay closer to patients when they leave patient care areas to fulfill their educational responsibilities.

In summary, with its aging facilities, the New Inpatient Building is a necessary capital project for BIDMC to undertake at this time. By creating new, modern capacity which is designed to improve the efficiency of the current facilities BIDMC will be able to:

- Improve the patient experience and promote restful recovery and healing by increasing the number of single-bedded medical/surgical patient rooms, the number and capabilities of ICU rooms, and by providing specific family and visitor zones within patient rooms;
- Further the delivery of outstanding clinical care with the addition of state-of-the-art operating rooms, procedure rooms, and Radiology areas that are sized and configured to meet industry standards, house the most advanced equipment, and promote collaboration among staff;
- Modernize and update the elements of the campus most in need of improvement to be commensurate with the increasingly complex needs of its patient population and sophisticated care provided by its clinicians;
- Organize clinical space efficiently to improve patient flow; and
- Provide facilities and clinical opportunities that continue to meet the standards of a nationally recognized teaching hospital.

[9] ACGME Common Program Requirement, *Accreditation Council for Graduate Medical Education (2017). Available at* http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_2017-07-01.pdf

The New Inpatient Building will enable BIDMC to continue to offer a top-tier, competitive alternative to other higher-cost academic medical centers, taking advantage of BIDMC's role as the hub of an existing well-developed, lower cost network of providers. The New Inpatient Building is designed to improve health care outcomes, increase operational efficiencies, and enhance quality of care, and due to careful siting and planning the Project can be constructed with minimal disruption to ongoing clinical operations on the current campus.

C. Pending Formation of New Integrated Health System - Beth Israel Lahey Health

On April 13, 2018 the Department of Public Health approved a Determination of Need application to allow for the formation of a new fully integrated non-profit health system (DoN Application NEWCO-17082413-TO). The formation of this new integrated health care delivery system through the incorporation of a new parent organization, to be known as Beth Israel Lahey Health[10], is contingent on additional regulatory action which is pending. If established, upon formation of Beth Israel Lahey Health as a Massachusetts non-profit, tax exempt corporation, CareGroup, along with Lahey Health System ("Lahey") and Seacoast Regional Health System ("Seacoast") will combine to become a new, clinically and financially integrated health care delivery system in Eastern Massachusetts. Beth Israel Lahey Health would become the sole corporate member of each hospital within CareGroup, including BIDMC and its community hospital subsidiaries.[11] Beth Israel Lahey Health will also become the sole corporate member of the other hospitals that are part of Lahey and Seacoast[12].

Information about Beth Israel Lahey Health is included in this Application as additional information to facilitate the review and approval of the Project. Significantly, BIDMC intends to pursue the New Inpatient Building Project as it is described in this Application whether or not Beth Israel Lahey Health is ultimately formed and BIDMC becomes one of its affiliated hospitals.

As noted above, Beth Israel Lahey Health intends to create a new comprehensive and geographically distributed high value health care delivery system in the Eastern Massachusetts marketplace. The new, high value system will be distinguished by the highest quality of care and lower costs distributed across complementary geographies.

[10] NewCo was used to identify the new organization in the DoN application filed regarding the formation of Beth Israel Lahey Health.
[11] Pursuant to the merger transaction, CareGroup will be effectively replaced by Beth Israel Lahey Health.
[12] In order to form Beth Israel Lahey Health, CareGroup will merge with and into BIDMC and BIDMC will be the surviving corporation and successor in interest to CareGroup. The Department of Public Health has confirmed to Applicant that BIDMC as successor to CareGroup would have the standing to substitute, if necessary, as either the Applicant or the Holder in connection with this Project, as applicable, depending on whether or not Beth Israel Lahey Health is formed prior to the completion of DPH's processing of this Application.

BIDMC's affiliation with the new system will not alter the New Inpatient Building Project's design or services, or the costs of the Project. BIDMC's planning for the New Inpatient Building Project predated its decision to participate in the formation of the new system, while fully aligning with the goals and objectives of the new system. The Project has been designed to meet the needs of BIDMC's patient panel.

All parties to Beth Israel Lahey Health were made aware of BIDMC's planned New Inpatient Building Project and its capital requirements during the due diligence process for the Beth Israel Lahey Health transaction. The parties understand that BIDMC will proceed with the Project now and also after the establishment of Beth Israel Lahey Health, and that Beth Israel Lahey Health would become obligated to all the requirements of a New Inpatient Building DoN approval. Affidavits providing attestations concerning the Project from Lahey and Seacoast are attached hereto as Exhibit 1.

The participating hospitals and other providers in Beth Israel Lahey Health are located in distinct and complementary regions and each organization is expected to continue to provide health care services to their unique patient communities and patient service areas. As such, the needs of the existing BIDMC patient panel for the New Inpatient Building facilities and services will continue upon Beth Israel Lahey Health's formation.

BIDMC serves as the academic medical center hub for the extended BID-Network of clinical affiliates described above. Following the formation of Beth Israel Lahey Health, the New Inpatient Building will continue to serve the needs of the existing BIDMC patient panel for tertiary and quaternary care, and BIDMC will also continue to serve as the primary acute care and community hospital for neighborhoods in close proximity to BIDMC that include vulnerable patient populations.[13]

As the design and uses of the New Inpatient Building will not be altered as a result of the creation of Beth Israel Lahey Health, Beth Israel Lahey Health's becoming BIDMC's sole corporate member would not impact the cost of the New Inpatient Building. There are likewise no associated cost implications for the BIDMC patient panel as the cost of the Project, and the patient panel need for the services provided by the Project will not be affected by the formation of the new system. Given this, all the information that follows in this Determination of Need application will be equally applicable to the Project whether or not Beth Israel Lahey Health becomes BIDMC's sole corporate member.

[13] In addition, the merger of CareGroup into BIDMC as a step to the formation of Beth Israel Lahey, as described in footnote 12 above, will not change the BIDMC patient panel or the contents of this Application as CareGroup provides administrative services only, and the other CareGroup hospitals will continue to exist as separate entities with Beth Israel Lahey Health as sole member.

QUESTION 13: FACTORS

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

A. Introduction

1. CareGroup Patient Panel

The Applicant, CareGroup, is a Massachusetts, non-profit, tax exempt corporation that oversees a regional, non-profit health care delivery system comprised of teaching and community hospitals, physician groups, and other caregivers. CareGroup's member entities serve the health needs of patients and communities of greater Boston and other surrounding communities in Eastern Massachusetts. CareGroup's purpose is to support the patient care, research, and educational missions of its member entities. CareGroup's member hospitals include Beth Israel Deaconess Medical Center ("BIDMC") and its three subsidiary hospitals, Beth Israel Deaconess Hospital-Milton, Beth Israel Deaconess Hospital-Needham and Beth Israel Deaconess Hospital-Plymouth, as well as Mount Auburn Hospital and New England Baptist Hospital.

CareGroup hospitals serve a patient panel of nearly two million patients who presented at BIDMC, Beth Israel Deaconess Hospital-Milton, Beth Israel Deaconess Hospital-Needham, Beth Israel Deaconess Hospital-Plymouth, Mount Auburn Hospital, and New England Baptist Hospital for inpatient or outpatient services from fiscal year ("FY") 2015 through FY 2017. This includes patients who were admitted through the Emergency Department.[14] The number of unique patients increased by approximately 2%, from 640,872 patients in FY 2015 to 651,978 patients in FY 2017. In FY 2017, the CareGroup hospitals' patient mix consisted of approximately 59.1% females, 40.8% males.[15]

The number of patients over the age of 65 treated at CareGroup hospitals increased by 9%, from 160,775 patients in FY 2015 to 175,536 in FY 2017. This age cohort represented almost 27% of CareGroup hospitals' patients in FY 2017, up from approximately 25% in FY 2015.

CareGroup hospitals serve an increasingly diverse patient panel. In FY 2015, 68.7% of the patient panel identified as White, 7.5% identified as Black or African American, 7.4%

[14] Unique patients are identified at the hospital level. CareGroup patient numbers referenced throughout are approximate in that patients visiting multiple Care Group hospitals in a given year are not uniquely identified, and numbers are not adjusted for patients visiting hospitals in multiple years.
[15] Numbers do not total to 100% due to patients for whom a gender is not specified or patients whose gender varied across visits during the time period.

identified as Asian, 2.1% identified as Hispanic/Latino, 0.2% identified as American Indian or Alaska Native, 0.1% identified as Native Hawaiian or Other Pacific Islander, and 14.0% identified as Other.[16] In FY 2017, the percent of patients identifying as White decreased to 66.6%, while the percent of patients identifying as Asian increased to 7.8%, and the percent of patients identifying as other increased to 15.8%.

The percent of the CareGroup patient panel with a chronic condition remained consistent over the three-year period at approximately 31% of inpatients.[17] It is estimated that 3.3% of patients in the CareGroup patient panel admitted to the inpatient setting have a behavioral health condition as a primary diagnosis code.[18] This analysis does not consider additional (non-primary) diagnoses codes that may be associated with an inpatient stay, and excludes patients who had a behavioral health condition as a comorbidity.

Given the number of member hospitals in CareGroup, patients originate from an expansive geographic area, with the highest concentration coming from the greater Boston Area. For additional detail, refer to Exhibit 2.

2. BIDMC Patient Panel

As a leading academic medical center, BIDMC provides tertiary and quaternary care to meet complex patient needs and concurrently fulfills its mission as an essential community hospital for residents living in Boston and other nearby communities, including many from vulnerable populations that often demonstrate an increased need for access to health care. Specifically, BIDMC's patient panel for the Project consists of the 104,619 unique inpatients, observation patients, and Emergency Department patients who were admitted during the 36-month period from October 1, 2014 through September 30, 2017[19] at the existing East and West campuses. These patients generated a total of 162,237 inpatient and observation encounters over the 36-month period, as summarized in Table 1.

[16] Race information is self-reported. Only data provided by BIDMC includes a separate Hispanic/Latino category, and patients who are Hispanic/Latino may be of any race.
[17] A CareGroup patient is included in the "Chronic Condition" category in a given year if the primary ICD diagnosis code for any inpatient visit during the year is associated with a chronic condition identified by CMS for Medicare ACOs. Only inpatients are included in the chronic condition counts.
[18] A CareGroup patient is included in the "Behavioral Health" category in a given year if the primary ICD diagnosis code for any inpatient visit during the year is classified under the Clinical Classifications Software "Mental Illness" Level I Description. This analysis does not consider additional (non-primary) diagnoses codes on a claim. Only inpatients are included in the behavioral health counts.
[19] This represents FY 2015, 2016, and 2017. BIDMC operates on a FY basis from October 1 through September 30.

Application Narrative: Question 13
Section F1.a.i – Patient Panel

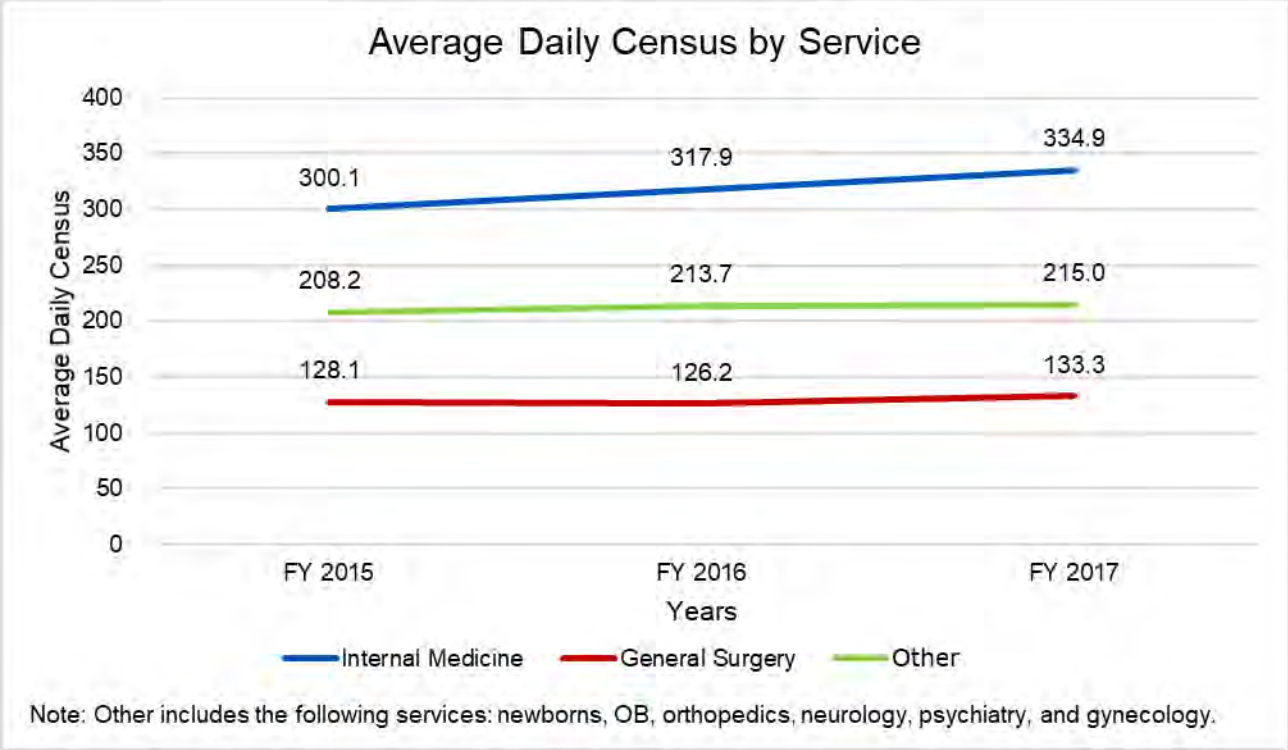
Table 1

BIDMC Inpatient and Observation Encounters FY 2015 - FY 2017[1]				
	FY 2015	FY 2016	FY 2017	Grand Total
Inpatient	38,937	40,111	40,616	119,664
Observation	14,638	14,932	13,003	42,573
Total	53,575	55,043	53,619	162,237

[1]Includes patients who presented through the Emergency Department and were admitted to the Medical Center as inpatient or observation patients.

Inpatient admissions increased by 4.3% from FY 2015 to FY 2017, as shown in Table 1. The number of inpatient Internal Medicine cases, which make up over one-quarter of BIDMC's total cases, increased by 17% from FY 2015 to FY 2017. During this same period, total inpatient and observation bed days at BIDMC increased by 9%. BIDMC's overall average daily census also increased by 7.5% from FY 2015 to FY 2017. This included an 11.6% increase in the average daily census for Internal Medicine, a 4.1% increase for inpatient General Surgery and a 3.3% for other services. (For additional detail refer to Table 2).

Table 2



B. Incidence and Prevalence of Disease within Patient Panel

BIDMC is the referral center for the sickest patients who require the most complex care within BIDMC's network of health care providers. Many of these patients suffer from chronic conditions. BIDMC estimates that approximately 57% of its patient panel has at least one chronic condition.[20] The most prevalent chronic conditions within the BIDMC patient panel include Hypertension (33%), Hyperlipidemia (26%), Anemia (21%), Chronic Kidney Disease (17%), Diabetes (14%), and Ischemic Heart Disease (14%).

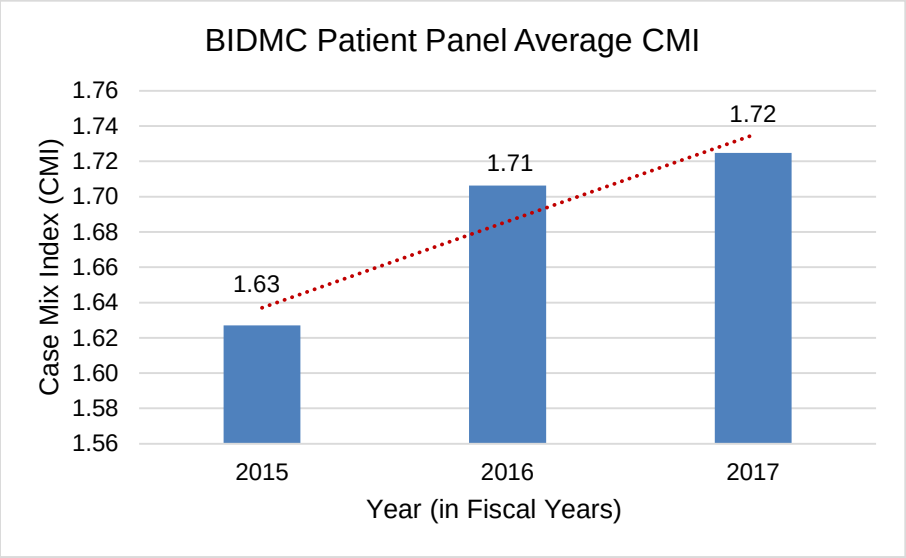
C. Acuity Mix of Patient Panel

BIDMC provides care to an increasingly complex patient population due to its status as an academic medical center and the vulnerable communities it serves as described in this Application. As the anchor to the BID-Network, (for a full definition of the BID-Network, refer to ***Question 2*** subsection A, *Introduction: Description of Applicant and Background Information on Project*) member community hospitals send their highest acuity patients to BIDMC, contributing further to the increase in BIDMC's average patient acuity. BIDMC's overall case mix index ("CMI") increased by 5.5% from FY 2015 to FY 2017, as indicated in Table 3 below. Additionally, for calendar year ("CY") 2015, CY 2016, and CY 2017 (through November), BIDMC's average CMI for general medicine was 1.15 and for general surgery was 2.46, which is the highest average CMI in its peer group of academic medical centers.[21] During this period while acuity was rising, as noted above, BIDMC also cared for a higher volume of inpatients, including a 7.5% increase in average daily census for all services, a 4.3% increase in inpatient admissions, and a 17% increase in the number of Internal Medicine cases. (Refer to ***F1.a.ii*** subsection B.1, *Rise in High Acuity Patients Increases Overall Demand for Inpatient Beds* for additional information on acuity mix, prevalence of disease, and risk factors.)

[20] *CMS Chronic Condition ICD9 and ICD10 Diagnosis Crosswalk*, CENTERS FOR MEDICARE & MEDICAID SERVICES (2018). Conditions that specify claim position or require multiple inpatient claims to qualify were excluded from the analysis.

[21] BIDMC's average CMI for CY 2015, 2016, and 2017 (through November) in general medicine was 1.15 (compared to 1.11, 1.13, 1.13, 1.12, and 1.14 for MGH, BWH, BMC, Tufts, and UMASS, respectively). BIDMC's CMI for general surgery over the same period was 2.46, compared to 2.41, 2.35, 2.21, 2.40, and 2.43 for the same Academic Medical Centers, respectively, VIZIENT, INC, TRUVEN, ACTION OI DATABASE. This comparator group includes 38 major specialty teaching hospitals (academic medical centers) with >500 beds and a CMI of >1.5.

Table 3



Patient length of stay ("LOS") is an additional measure of patient complexity. For most patients, an extended length of stay correlates with complex treatment and care. From FY 2015 to FY 2017, the total number of BIDMC patient panel encounters with a LOS of 14 days or more increased by 12%. In particular, BIDMC's Department of Internal Medicine had 506 discharges in FY 2015 with a LOS of 14 days or greater. This number increased by 43% to 725 such discharges in FY 2017. In FY 2017, 35% of total bed days at BIDMC were attributed to patients whose length of stay exceeded 14 days, reflecting the increasing complexity of BIDMC's patient panel.

The growing population of patients with co-occurring behavioral health needs has contributed significantly to the complexity of the BIDMC patient panel. In particular, the number of patients treated in the Emergency Department with behavioral health needs has continued to rise. From FY 2010 to FY 2016, there was a 22% increase in psychiatric consultations in the Emergency Department. The increasing number of Emergency Department patients who require psychiatric consultation have had a disproportionate impact on lengthening the Emergency Department's length of stay.[22] (Refer below to subsection G.5, *Behavioral Health – Mental Health and Substance Use* for additional discussion of behavioral health needs and risk factors within the patient panel.)

[22] The need for psychiatric consults is determined on a case-by-case basis by Emergency Department staff unless otherwise mandated by the insurance provider.

D. Geographic Breakdown of Patient Panel

Patients originating from the New England[23] area account for 99% of the total patient panel encounters, and patients from Massachusetts account for 96%. An even more concentrated portion of the patient panel resides in the Massachusetts Department of Public Health ("DPH") defined Health Service Area 4[24] in Eastern Massachusetts, accounting for 66% of all encounters. City of Boston[25] residents account for 28% of BIDMC's total encounters. For reference, a service area map of population density is provided in Exhibit 3.

E. Payer Mix Within Patient Panel

BIDMC has a covenant to care for the underserved and to work to address disparities in access to care. While BIDMC provides medical services to patients regardless of their ability to pay, BIDMC also recognizes that the high cost of health care and lack of insurance are barriers to patients' seeking health care. BIDMC's Financial Assistance Office assists patients with eligibility determination for supplemental coverage and the completion of necessary applications to reduce their cost of care and improve access to needed services. From FY 2015 through FY 2017, 45.4% of patient panel encounters were covered by a government payer, whether through Medicare, Medicaid,[26] or the Health Safety Net. In addition, 5.7% of patient panel encounters were covered by the Neighborhood Health Plan, which at the time provided coverage to a mix of Medicaid and commercially insured patients in our panel. In comparison, approximately 43.9% of patient panel encounters were paid by commercial payers. In Internal Medicine, which is BIDMC's largest service line, approximately 57% of patient panel encounters were paid by Medicare and Medicaid in FY 2017. Refer to Table 4 for the distribution of patient panel encounters for all service lines by payer group.

[23] New England area consists of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.
[24] Health Service Area 4 (Greater Boston) consists of the following 68 cities/town: Acton, Arlington, Ashland, Bedford, Belmont, Boston, Boxborough, Braintree, Brighton, Brookline, Burlington, Cambridge, Canton, Carlisle, Chelsea, Cohasset, Concord, Dedham, Dover, Dorchester, Foxborough, Framingham, Hingham, Holbrook, Holliston, Hopkinton, Hudson, Hull, Lexington, Lincoln, Littleton, Marlborough, Maynard, Medfield, Millis, Milton, Natick, Needham, Newton, Norfolk, Northborough, Norwell, Norwood, Quincy, Randolph, Revere, Roslindale, Scituate, Sharon, Sherborn, Somerville, Southborough, Stow, Sudbury, Walpole, Waltham, Watertown, Wayland, Wellesley, Westborough, Weston, Westwood, Weymouth, Wilmington, Winchester, Winthrop, Woburn, and Wrentham.
[25] The City of Boston includes the following 23 neighborhoods: Allston, Back Bay, Bay Village, Beacon Hill, Brighton, Charlestown, Chinatown/Leather District, Dorchester, Mid-Dorchester, Downtown, East Boston, Fenway/Kenmore, Hyde Park, Jamaica Plain, Mattapan, Mission Hill, North End, Roslindale, Roxbury, South Boston, South End, West End, and West Roxbury.
[26] Medicaid includes all Medicaid managed care other than Neighbor Health Plan. BIDMC's payer database does not readily distinguish between the Medicaid and commercial components of Neighborhood Health Plan, and so, the total government payer percentage cannot be precisely calculated.

Table 4

Patient Panel Payer Group by Encounters (FY 2015 through FY 2017)	
Payer Group	**% of Encounters**
Government	
Medicare	29.0%
Medicaid[1]	15.5%
Health Safety Net	0.9%
Total Government[1]	**45.4%**
Neighborhood Health Plan[2]	**5.7%**
Commercial[3]	**44.9%**
Other	
Other Health Care Facility	2.6%
Self-Pay	0.9%
Workers Comp Insurance	0.3%
Auto Liability Insurance	0.2%
Total Other	**4.0%**
Total	**100.0%**

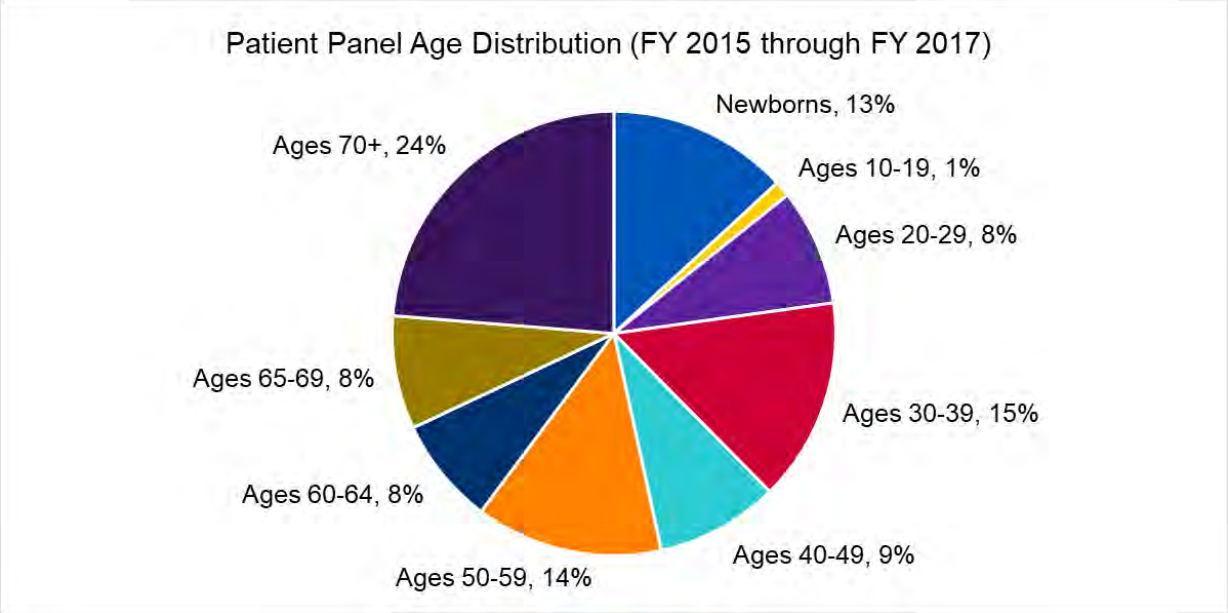
[1] Medicaid includes all Medicaid managed care other than Neighborhood Health Plan.
[2] BIDMC's payer database does not distinguish between the Medicaid and commercial components of Neighborhood Health Plan, and so, the total government payer percentage cannot be precisely calculated. Of note, over the 12-month period ending 7/30/15, 74.9% of inpatient cases at BIDMC covered by Neighborhood Health Plan were Medicaid patients according to data provided to BIDMC by Neighborhood Health Plan.
[3] Includes Commercial Senior Plans.

F. Age of Patient Panel

From FY 2015 through FY 2017 13% of the patient panel were newborns, 1% were between the ages of 10-19[27], 54% were between the ages of 20-64, and 32% were age 65 and older (refer to Table 5 below). Paralleling the Commonwealth's age trends, BIDMC is seeing an increasing number of patients within the older age cohorts. Over this time period, the proportion of patients who were over the age of 65 increased from 33% to 35% of total patients. In particular, the number of patients between the ages of 70 to 79 increased by 11%, and the number of patients between the ages of 90 to 99 increased by 15%.

[27] BIDMC does not admit patients under the age of 10, other than newborns, as these patients are transferred to Boston Children's Hospital; this results in the limited population of child and adolescent patients.

Table 5



G. Vulnerable Populations

To better understand the population BIDMC serves and address health-related needs and health disparities in its Community Benefits Service Area ("CBSA")[28], BIDMC conducted its most recent Community Health Needs Assessment ("CHNA") in 2016, consistent with the Affordable Care Act requirements for not-for-profit hospital organizations and the Massachusetts Office of the Attorney General Community Benefit Guidelines for Non-Profit Acute Care Hospitals. The CHNA was conducted in three phases, which allowed BIDMC to: 1) compile an extensive amount of quantitative and qualitative data, 2) engage and involve key community stakeholders, as well as BIDMC's clinical and administrative staff and 3) develop a report and detailed strategic plan. Information sources included a broad array of publicly available data, stakeholder interviews, and four community forums.[29]

[28] The CBSA is a subset of BIDMC's primary service area focusing on the underserved neighborhoods in Boston and Cape Cod correlating with the neighborhoods and locations of its six licensed and/or affiliated health centers which serve primarily MassHealth and uninsured individuals. BIDMC has six cities/towns within its CBSA: Boston, Quincy, and the Cape Cod towns of Harwich, Provincetown, Truro, and Wellfleet. A map showing the specific neighborhoods, cities, and towns that are part of BIDMC's CBSA is included as Exhibit 3. The Cape Cod towns were originally included in the CBSA because BIDMC has an affiliated health center on the Outer Cape; however, BIDMC's patient panel does not include significant numbers of patients from the Outer Cape towns, given their distance from BIDMC.

[29] *Community Health Needs Assessment (CHNA) – 2016*, Final Report, BETH ISRAEL DEACONESS MEDICAL CENTER, p.3 (2016). *Available at* https://www.bidmc.org/-/media/files/beth-israel-org/community-benefits/bidmc-2016-chna-community-health-needs-assessment.ashx?la=en&hash=250FB0AF225C6F2255CB73C6066A9A82FD054D7F

BIDMC's CBSA includes many vulnerable cohorts of residents who lack sufficient access to health care. These vulnerable cohorts include residents who face barriers to accessing care due to socioeconomic status, insurance status, race, ethnicity, gender identity and sexual orientation, limited English proficiency, and immigration status.[30] These cohorts may also experience heightened health disparities.[31] BIDMC considers addressing the needs of these individuals to be a priority.

1. Socioeconomic Status

Residents of the City of Boston comprised 28% of all BIDMC patient panel encounters from FY 2015 through FY 2017, as indicated above. It is noteworthy that in 2016, 21.1% of Boston's population was living below the federal poverty level.[32] The 2016 CHNA conducted by BIDMC identified several communities within its CBSA that have a high proportion of residents with annual incomes below the federal poverty level. These communities correlate generally with the neighborhoods served by BIDMC's six licensed and/or affiliated health centers, most of which serve patient populations comprised primarily of MassHealth enrollees and the uninsured. BIDMC collaborates with these health centers to offer residents of these vulnerable communities greater access to convenient, high quality services, both in and out of the hospital setting. BIDMC's well developed partnerships with the health centers include financial contributions, clinical services for behavioral health, HIV/AIDS, and cancer screening among others, as well as public health programming including health risk factors and social determinants of health. As noted above, BIDMC's Financial Assistance Office also assists patients determine their eligibility, and file an application for coverage to reduce their costs and improve their access to needed care.

2. Race

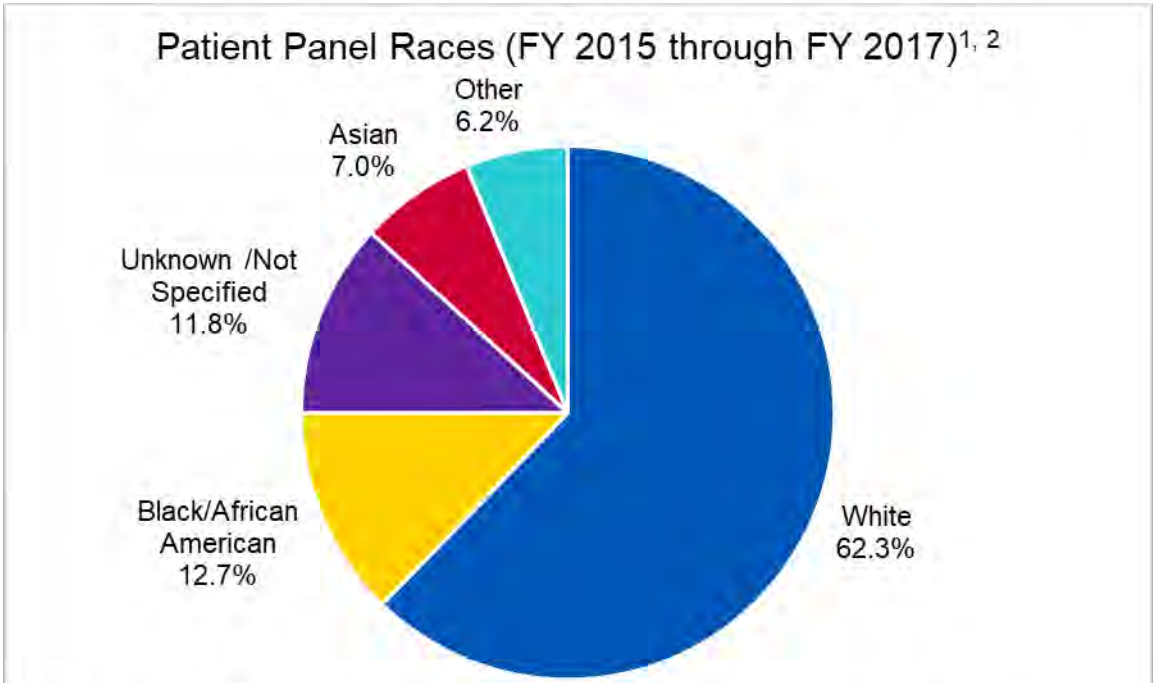
BIDMC's patients come from a diverse set of races and backgrounds, as presented in Table 6 below. From FY 2015 through FY 2017, approximately 62.3% of BIDMC's patient panel identified as White, 12.7% identified as Black/African-American, 7.0% identified as Asian, and 8.0% identified themselves as Hispanic/Latino.[33] These percentages remained consistent from year to year. BIDMC's demographic data is based on patients' self-reporting. Many patients identified themselves as "Other" or "Unknown/Not Specified", either because they prefer not to report their race, or they identify themselves with a race that does not align with the provided options. As a result,

[30] BIDMC CHNA 2016 at p. 3. See note 29.
[31] Ibid.
[32] 2012-2016 American Community Survey 5-Year Estimates, UNITED STATES CENSUS BUREAU. *Available at* https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
[33] As indicated on Table 6, patients who are Hispanic/Latino may be of any race. BIDMC collects data on whether patients consider themselves Hispanic/Latino or non-Hispanic/Latino, but otherwise does not collect data on the ethnicity of patients.

it is possible that the statistics regarding racial demographics do not fully represent the current makeup of BIDMC's patients.

Racially and ethnically diverse residents living in BIDMC's CBSA face major health disparities. Social inequities, such as poverty and a lack of educational and employment opportunities, often have origins in discriminatory policies and practices that have historically denied people of color the right to earn income, own property, and accumulate wealth.[34] The lasting impact of racism and racial segregation create additional barriers to care which negatively affect health outcomes. For example, certain neighborhoods in the CBSA that have relatively high racial and ethnic diversity also have high cancer mortality rates due to limited access to cancer screening. These barriers to accessing care puts the 27.7% of patients in BIDMC's patient panel who identified as a person of color at greater risk for health inequities.

Table 6



[1]Patients who are Hispanic may be of any race.
[2]Other includes the following races: American Indian/Alaska, Caribbean Island, Middle Eastern, multi race ethnicity, Native Hawaiian or other Pacific Island, Portuguese, South American, and Other.

[34] Walsh, M., Johnson, P., Nguyen, Huy. *Health of Boston 2014-2015.* BOSTON PUBLIC HEALTH COMMISSION. (2015). A*vailable at* http://www.bphc.org/healthdata/health-of-boston-report/Documents/HOB-2014-2015/FullReport_HOB_2014-2015.pdf

3. Limited-English Proficiency

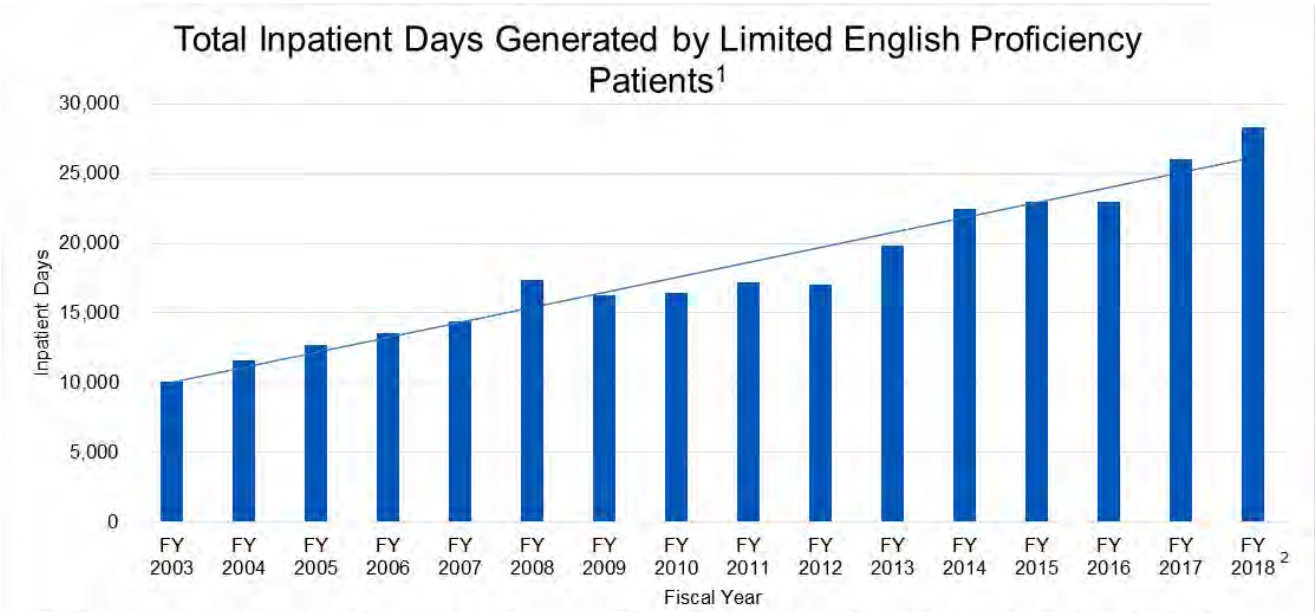
Language barriers create inconveniences and make it more difficult for patients to receive care. In recognition of these challenges, BIDMC focuses on enhancing the experience of limited English proficient ("LEP") patients and families, defined as patients who prefer to receive their health care information in a language other than English (including American Sign Language). As noted in the 2015 Health of Boston Report, in households that have limited English-speaking members, Spanish and Asian languages are the most commonly spoken.[35] From FY 2015 through FY 2017, in approximately 17% of BIDMC's patient panel encounters, or 1 in 6, patients indicated a preference to receive their health care information in a language other than English. The percentage of encounters with patients who indicated such a preference increased by 7% from FY 2015 to FY 2017. BIDMC has experienced substantial growth in the number of inpatient days generated by LEP patients over the past 15 years (refer to

Table **7** below). Total inpatient days generated by LEP patients who received interpreter services from a member of BIDMC's regularly employed staff[36] increased by 13% from FY 2015 to FY 2017, equating to approximately 3,013 additional inpatient days in FY 2017. This trend is projected to continue through FY 2018, with a projected annual increase of 9%, or 2,320 additional inpatient days generated by such LEP patients. Given the increasing numbers of LEP patients, BIDMC continues to enhance its Department of Interpreter Services to better address patient and family needs.

[35] Walsh, M., Johnson, P., Nguyen, Huy. *Health of Boston 2014-2015.* BOSTON PUBLIC HEALTH COMMISSION. (2015). A*vailable at* http://www.bphc.org/healthdata/health-of-boston-report/Documents/HOB-2014-2015/FullReport_HOB_2014-2015.pdf

[36] BIDMC employs staff who provide interpreter services in more than ten different languages most commonly spoken by the patient panel. Interpreter services are also provided on request for over 70 additional languages by per diem staff.

Table 7



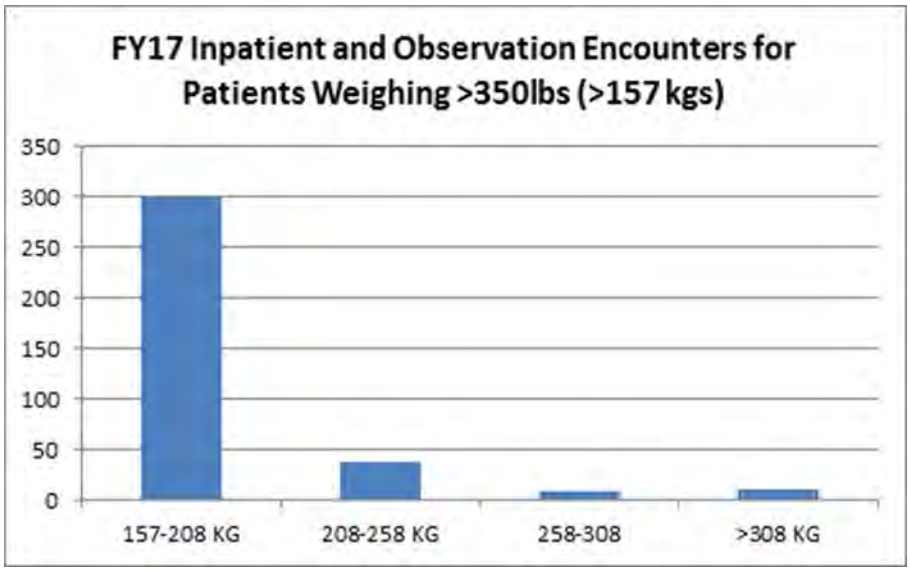
[1] Data shown is only for patients who are provided interpreter services by a member of BIDMC's employed staff. Data is not shown for additional inpatient days generated by LEP patients who were provided interpreter services by per diem staff.
[2] FY 2018 is projected based on data through December 17, 2017.

4. Patients of Size

According to the 2015 Behavioral Risk Factor Surveillance System, approximately 36% of U.S. adults are overweight, and 30% are obese.[37] The 2015 Health of Boston Report identified that approximately 22% of adult residents in Boston were obese, and noted that Dorchester, Roxbury, Mattapan, and South Boston were communities with significantly higher rates of obesity among their adult population compared to the rest of the City.[38] Approximately 12% of BIDMC's patient panel encounters are with patients from these neighborhoods in Boston. As indicated in Table 8 below, in FY 2017, 350 patient panel encounters were with patients who weighed more than 157 kilograms, or approximately 350 pounds, of which 64 encounters were with patients who exceeded 204 kilograms, or 450 pounds.

[37] *BRFSS Prevalence & Trends Data,* CENTERS FOR DISEASE CONTROL AND PREVENTION, NATIONAL CENTER FOR CHRONIC DISEASE PREVENTION AND HEALTH PROMOTION, DIVISION OF POPULATION HEALTH, *available at* https://www.cdc.gov/brfss/brfssprevalence/
[38] *2015 Health of Boston Report*, BOSTON PUBLIC HEALTH COMMISSION, RESEARCH AND EVALUATION OFFICE 204 (2015). *Available at* http://www.bphc.org/healthdata/health-of-boston-report/Documents/HOB-2014-2015/FullReport_HOB_2014-2015.pdf

Table 8



5. Behavioral Health – Mental Health and Substance Use Disorders

BIDMC characterizes behavioral health patients as those who have a substance use disorder or mental health disorder as a comorbidity. The increasing number of patients with substance use or mental health comorbidities complicate medical/surgical bed assignments and impact BIDMC's occupancy, due to the additional effort required to meet a patient's psychosocial needs. Within BIDMC's patient panel, from FY 2015 through FY 2017, an estimated 41% of patient panel encounters were with patients who had a behavioral health diagnosis.[39] Most common diagnoses included mood disorders (15%), anxiety disorders (12%), and alcohol or substance-related disorders (12%). (Refer to ***F1.a.ii***, subsection B.6, *Needs of Behavioral Health Patients*, for information on incidence of Emergency Department patients requiring psychiatric consultations.)

In 2015, an estimated 20.8 million residents ages 12 or older in the United States were classified with substance use disorders ("SUDS").[40] Of adults ages 18 years and over in the U.S. who experienced a substance use disorder, 41% were also diagnosed with a

[39] A BIDMC patient is included in the "Behavioral Health" category in a given year if any ICD diagnosis code on a claim (including primary or non-primary) for any inpatient visit during the year is classified under the Clinical Classifications Software "Mental Illness" Level I Description. Only inpatients are included in the behavioral health counts. The Clinical Classification Software is a diagnosis and procedure categorization tool that utilizes ICD-9 and ICD-10 to group diagnosis codes into condition groups. It was developed as part of the Healthcare Cost Utilization Project, a Federal-State-Industry partnership sponsored by the Agency for Healthcare Research and Quality.

[40] Jonaki Bose, et al., *Key Substance Use and Mental Health Indicators in the United States: Results from the 2015 National Survey on Drug Use and Health*. SUBSTANCE ABUSE AND MENTAL HEALTH SERVICES, *available at* https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2015/NSDUH-FFR1-2015/NSDUH-FFR1-2015.pdf ADMINISTRATION (2016). *Available at* https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2015/NSDUH-FFR1-2015/NSDUH-FFR1-2015.htm

mental illness within the previous year.[41] Based on BIDMC's CHNA, there are many communities within the CBSA in which high rates of SUDS exist, such as alcohol, prescription drugs/opioids, and marijuana. Dorchester, Roxbury, and Quincy experience higher rates for substance use disorder-related hospital encounters compared to the state average.[42] Of residents throughout Boston, 20% of residents in the Fenway neighborhood, 30% of residents in both Roxbury and Dorchester, and 25% overall, reported binge drinking. The percentage of residents reporting binge drinking in Boston are above the reported statewide binge drinking percentage of 18%.[43],[44] According to BIDMC's CHNA, the number of opioid use overdose deaths within the low-income, underserved communities in BIDMC's CBSA increased by more than 100% between 2001 and 2013.[45] Since 2013, opioid-related deaths of residents in Boston have continued to rise. DPH estimates that the annual number of opioid-related overdose deaths among Boston residents increased 115 percent from CY 2013 to CY 2017.[46]

6. Sexual Orientation and Gender Identity

The Lesbian, Gay, Bisexual and Transgender ("LGBT") community is quite diverse, representing a wide range of people of different races, ethnicities, ages, socioeconomic statuses and identities with unique behaviors, identities, and desires.[47] Stigma and discrimination are at the core of the challenges faced by the LGBT community, impacting their health care. Due to a general lack of awareness of their specific health needs by health professionals, LGBT patients face challenges in accessing culturally competent health services.[48]

[41] Jonaki Bose, et al., *Key Substance Use and Mental Health Indicators in the United States: Results from the 2015 National Survey on Drug Use and Health*, SUBSTANCE ABUSE AND MENTAL HEALTH SERVICES, *available at* https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2015/NSDUH-FFR1-2015/NSDUH-FFR1-2015.pdf ADMINISTRATION (2016). *Available at* https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2015/NSDUH-FFR1-2015/NSDUH-FFR1-2015.htm

[42] *MassCHIP Community Health Information Profile*, MASSCHIP. *Available at* http://www.mass.gov/eohhs/researcher/community-health/masschip/

[43] According to the Centers for Disease Control and Prevention, "binge" drinking is defined as 5 or more drinks on an occasion for men or 4 or more drinks on an occasion for women. *Fact Sheets - Binge Drinking*, CENTERS FOR DISEASE CONTROL AND PREVENTION. *Available at* https://www.cdc.gov/alcohol/fact-sheets/binge-drinking.htm

[44] *See* BIDMC CHNA 2016 p. 44. See note 29

[45] Ibid.

[46] For 2016 and 2017, additional cases are still being confirmed by the Office of the Chief Medical Examiner, and therefore, the increase in opioid-related deaths may be higher than currently indicated. *Data Brief: Number of Opioid-Related Overdose Deaths, All Intents by City/Town 2013-2017*. MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH. (May 2018). *Available at https://www.mass.gov/files/documents/2018/05/22/Opioid-related%20Overdose%20Deaths%20among%20MA%20Residents%20-%20May%202018.pdf*

[47] Kevin L. Ard, M.D., MPH et al., *Improving the Health Care of Lesbian, Gay, Bisexual and Transgender (LGBT) People*, FENWAY INSTITUTE. *Available at* https://www.lgbthealtheducation.org/publication/improving-the-health-care-of-lesbian-gay-bisexual-and-transgender-lgbt-people-understanding-and-eliminating-health-disparities)

[48] *Introduction to LGBT Health*, NATIONAL LGBT HEALTH EDUCATION CENTER. *Available at* http://www.lgbthealtheducation.org/topic/lgbt-health/

Application Narrative: Question 13
Section F1.a.i – Patient Panel

BIDMC has supported and partnered with Fenway Health community health center since 1974. Fenway Health specializes in providing care and resources to LGBT patients and draws patients from throughout the Commonwealth. BIDMC and Fenway Health share a joint primary care/LGBT residency program and collaborate in caring for gender diverse patients. Beginning in April 2015, BIDMC was the first academic medical center in the country to include gender identity and sexual orientation questions in its Medical Practice Survey conducted by Press Ganey.[49] Approximately 0.4% of the patients who responded to the gender identity questions[50] self-identify as transgender or genderqueer, a particular subset of the LGBT community more often associated with poorer health compared to gay and lesbian adults.[51] Of the patients who responded to the sexual orientation questions, approximately 6.1% self-identify as lesbian, gay, or bisexual. LGBT patients face and are at-risk for disparities in access to care and outcomes related to overall health, status, cancer screening, chronic health conditions, mental health, substance use, sexual health and violence victimization.

[49] Press Ganey is the vendor that BIDMC uses to collect patient feedback from survey questions. From October 1, 2015 through December 31, 2017, Press Ganey received over 18,000 responses to the sexual orientation and gender identity questions from BIDMC patients.

[50] Includes all 18,000 respondents from October 1, 2015 through December 1, 2017. Due to the anonymity of surveys, it is possible that respondents are not limited to BIDMC's Project patient panel, which does not include outpatients.

[51] Deval L. Patrick, et al., The Health of Lesbian, Gay, Bisexual and Transgender (LGBT) Persons in Massachusetts: A survey of health issues comparing LGBT persons with their heterosexual and non- transgender counterparts, MASSEQUITY (2009). *Available at* http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjUuJGMrKPaAhULXK0KHe1qDpoQFggsMAA&url=http%3A%2F%2Fwww.mass.gov%2Feohhs%2Fdocs%2Fdph%2Fcommissioner%2Flgbt-health-report.rtf&usg=AOvVaw1NkHSioAtpsg-HXvQ9rVh3

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.*

A. Overview of Need for Project

The New Inpatient Building will provide Beth Israel Deaconess Medical Center ("BIDMC") with added capacity and resources to continue to offer the highest quality tertiary and quaternary care to its growing patient population, thus furthering BIDMC's overarching goal of enhancing effective and sensitive health care access for the diverse and vulnerable communities represented within its patient panel. BIDMC serves an aging and high acuity patient population, many of whom have multiple chronic conditions and/or co-morbid behavioral health diagnoses (refer to ***F1.a.i*** subsection B, *Incidence and Prevalence of Disease within Patient Panel)*. BIDMC's patient panel also includes individuals from other vulnerable cohorts who, together with BIDMC's high acuity patients, have a greater need for the modernized facilities that will be created by the Project, including single-bedded rooms, operating and procedure rooms with advanced technological capabilities, enhanced and expanded pre- and post-operative/procedure care areas, and enlarged areas for ancillary clinical services such as Radiology and other ancillary clinical support spaces commensurate with the increased inpatient and surgical capacities.

More specifically, the New Inpatient Building through the provision of expanded, state-of-the-art facilities, will assist BIDMC in meeting several key objectives intended to improve health outcomes and quality of life to address BIDMC's patient panel need and the needs of its vulnerable patient populations, including:

- Enhancing access to equitable and high quality care for vulnerable patient populations, including behavioral health, Lesbian, Gay, Bisexual and Transgender ("LGBT"), economically and racially disadvantaged, limited English proficient ("LEP"), patients of size, and other vulnerable populations;
- Improving health outcomes through the expanded and improved capabilities, and thereby reducing health care expenditures in the Commonwealth through:
    - Optimizing the patient care environment for improved infection control and patient privacy with single-bedded rooms;

  - Contributing to reducing the time Emergency Department and post-operative patients wait before being admitted to a bed through enhanced inpatient capacity for vulnerable patients;
  - Providing the necessary updated physical and technology platforms in operating and procedure rooms, and elsewhere in the Project, to support the full deployment of the most advanced procedures and best practices with the goal of supporting BIDMC's efforts to reduce patient length-of-stay ("LOS") and readmission rates, thereby enabling BIDMC's patients to return home to their community successfully; and
  - Use of evidence-based design principles and elements incorporated into the design of all spaces to support BIDMC's efforts to achieve these outcomes.
- Promoting BIDMC's non-profit medical education mission; and
- Reducing energy costs through environmentally sustainable facility design

These goals are also consistent with key goals in BIDMC's Community Health Implementation Plan, including:

- Increasing access to quality medical care for vulnerable patient populations;
- Promoting equitable care and support for those with limited English proficiency;
- Improving care transitions for those with chronic health conditions;
- Supporting older adults to age in place; and
- Promoting greater health equity and reducing disparities in access for LGBT populations.

The New Inpatient Building will both meet these patient panel needs and address space constraints in BIDMC's existing facilities. At BIDMC there is simply insufficient existing space to create the needed additional inpatient beds, enlarged areas for perioperative services, ancillary clinical services and the other clinical support spaces under current Massachusetts Department of Public Health ("DPH") facilities requirements. Current DPH requirements typically require more square footage for clinical areas than was required when BIDMC's existing facilities were originally built. (Refer to ***F5.a.i*** for discussion on alternative options.) Moreover, renovating clinical space in existing facilities typically requires a cascade of disruptive moves to relocate existing programs in order to create an area large enough to house a new or expanded service. At BIDMC, there is no longer sufficient space remaining to stage a cost-effective renovation of the existing facilities to effect even a more limited expansion.

The most significant outcome of the New Inpatient Building will be the increased number and proportion of single-bedded rooms that will be available to patients at

BIDMC following completion of the Project. Five floors of the new 10-story Project will be devoted to medical/surgical and intensive care units, creating 158 single-bedded patient rooms. Research demonstrates that single-bedded rooms decrease the spread of hospital acquired infections; reduce ambient noise which promotes patient sleep and reduce stress; improve communication between patients, families and their health care providers by providing increased privacy; and can increase patient satisfaction. (Refer to ***F1.b.i*** for detail.) Evidence-based design principles and elements are incorporated into the design of the single-bedded rooms, to further these goals. (Refer to ***F1.b.i*** subsection A, *Evidence-Based Design* for detail.) Underscoring the need for the New Inpatient Building and the single-bedded rooms it will provide is the fact that since 2010 DPH has set the standard of care by requiring all newly licensed hospital beds to be housed in single-bedded rooms. (Refer below to subsection B.2, *Low Number of Single-Bedded Rooms Exacerbates Inpatient Capacity Constraints* for additional discussion.)

The Project will also create a new perioperative floor, to be integrated physically and operationally with the perioperative floor in the Rosenberg Building, with new state-of-the-art operating rooms that will address constraints and limitations in BIDMC's inpatient surgery facilities (refer to ***F1.b.i*** subsection D, *Improved Design* for detail). These constraints result from several factors: BIDMC's existing operating rooms are not adequately sized to accommodate the equipment needed for all types of procedures; many of BIDMC's existing operating rooms cannot accommodate developing and future technologies, such as those evolving to support advanced minimally invasive surgery techniques; and, the combined pre- and post-operative area in the Rosenberg Building is too small to adequately accommodate patients and clinical staff. Newly designed and optimally configured operating rooms in the New Inpatient Building will enable BIDMC to provide current state-of-the-art procedures under optimal conditions and be platform ready for cutting-edge surgical procedures in the future that would be precluded by the design of the existing facilities. Procedure rooms with advanced technological capabilities suitable for the most complex patients will also be created, as will expanded Radiology and Pathology space and ancillary clinical support functions and areas[52] to address existing capacity constraints and appropriately support the expanded clinical facilities included in the Project.

Major renovations to existing BIDMC facilities to attempt to create the new clinical facilities that will be provided in the New Inpatient Building Project, to the extent they would be possible, would involve significant infrastructure costs (HVAC, electrical, etc.), disruptive relocation of clinical services and support functions, and the challenge of accommodating ongoing patient care needs in adjacent areas in one or more buildings

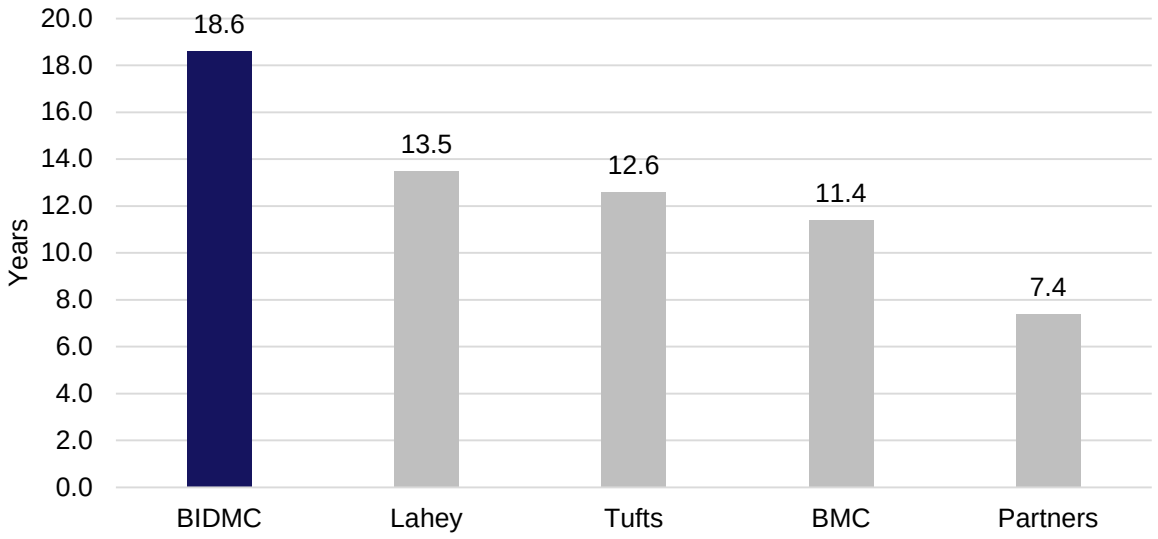
[52] As noted in the Project Description, some of the improved and expanded ancillary clinical services and support areas to be created by the New Inpatient Building Project will be located in the Rosenberg Building, such as an expanded Clinical Pathology laboratory and a kitchen to support the Project's new inpatient floors.

that would be under major construction for lengthy periods. BIDMC has maximized use of its existing space for as long as possible. Over the last twenty years, BIDMC has mitigated capacity issues by renovating its existing facilities to meet increasing patient needs, gradually returning its dedicated house observation beds to full medical/surgical use, and reducing administrative space on its campus. Currently, BIDMC together with its subsidiaries has the oldest average age of plant in the region compared to other systems, at 18.6 years as of FY 2016. [53] Table 9 demonstrates that the consolidated average age of plant of BIDMC and its subsidiaries is well above that of other academic medical centers and health systems in the Boston area.[54] The average age of plant of BIDMC alone is even higher than the consolidated average, at 22.4 years as of FY 2016.[55] The last time a new building was erected on BIDMC's campus was in 1996, more than 20 years ago. Since then, BIDMC has invested significant funds to maintain and optimize current facilities through ongoing and systematic upgrades and renovations to meet patient demands. To support BIDMC's mission "to provide extraordinary care, where the patient comes first, supported by world-class education and research," it is now appropriate and necessary for BIDMC to construct a new inpatient building.

[53] Average age of plant is calculated as Accumulated Depreciation divided by Depreciation Expense.
[54] 2017 data is not yet available for other Boston area academic medical centers and health systems.
[55] Excludes all subsidiaries. Average age of plant calculated based on audited FY 2016 financial statements as Accumulated Depreciation/Depreciation Expense.

Table 9

System-Wide Average Age of Plant Compared to Academic Medical Centers and Health Systems



Source: Based on publically available audited FY 2016 financial statements. Average age of plant calculated by BIDMC Finance Department as: Accumulated Depreciation/Depreciation Expense.

B. Patient Panel Need for Single-Bedded Rooms and Other Modernized Clinical Facilities

1. Rise in High Acuity Patients Increases Overall Demand for Inpatient Beds

The acutely ill patients whom BIDMC serves have a greater need to receive care at BIDMC in a private healing environment to reduce the risk of infection, reduce stress, and improve sleep. BIDMC has experienced significant growth among its primary inpatient service lines, most notably Internal Medicine (refer to ***F1.a.i*** subsection A.2, *BIDMC Patient Panel* for detail). BIDMC has the highest case mix index ("CMI") in general medicine (1.15) and general surgery (2.46) as compared to other Massachusetts academic medical centers and health systems in the Boston area.[56] BIDMC's CMI, inpatient discharges, and total bed days have all increased over the past

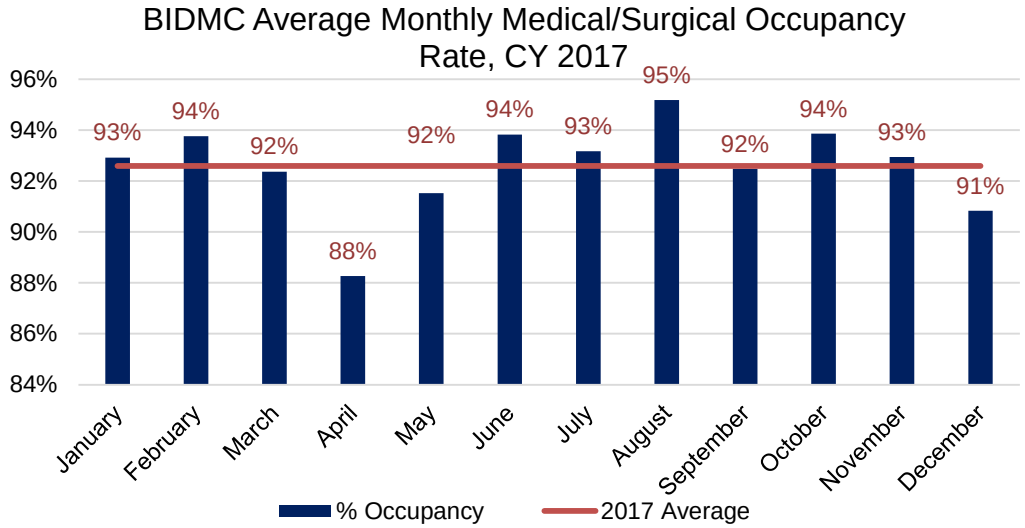
[56] BIDMC's average CMI for CY 2015, 2016, and 2017 (through November) in general medicine was 1.15 (compared to 1.11, 1.13, 1.13, 1.12, and 1.14 for MGH, BWH, BMC, Tufts, and UMASS, respectively). BIDMC's CMI for general surgery over the same period was 2.46, compared to 2.41, 2.35, 2.21, 2.40, and 2.43 for the same Academic Medical Centers, respectively. VIZIENT INC, TRUVEN, ACTION OI DATABASE. This compactor group includes 38 major specialty teaching hospitals (academic medical centers) with >500 beds and a CMI of >1.5.

two years (refer to ***F1.a.i*** subsection C, *Acuity Mix of Patient Panel)*. As patients' acuity has increased, as reflected in BIDMC's rising CMI, so has their length of stay, even with BIDMC's focused efforts to optimize care to reduce length of stay. Concurrent increases in both encounters and patient acuity levels have created capacity challenges in the existing BIDMC facilities and highlight a need for BIDMC to upgrade and expand its inpatient facilities in order to improve its capacity to care for these high acuity patients and meet growing patient demand.

BIDMC currently experiences more significant inpatient capacity challenges as compared to other hospital providers nationally. Among a comparison group of 48 academic medical centers with over 500 hospital beds and a CMI greater than 1.5, BIDMC was within the 92nd percentile for medical/surgical occupancy in calendar year ("CY") 2017.[57]

Table 10 below shows that in calendar year 2017 BIDMC's medical/surgical units operated at an average monthly occupancy rate of 93%, and the occupancy rate never dropped below 88%.

Table 10



Research supports that medical/surgical occupancy over 92% directly impacts interval time (i.e., the time from an admission order to the patient arriving at the bed) and

[57] VIZIENT INC, TRUVEN, ACTION OI DATABASE. This comparator group includes 38 major specialty teaching hospitals (academic medical centers) with >500 beds and a CMI of >1.5.

identifies that single-bedded rooms are generally easier to fill.[58] Furthermore, research also identifies that hospitals with increased numbers of single-bedded rooms often can support higher occupancy rates.[59]

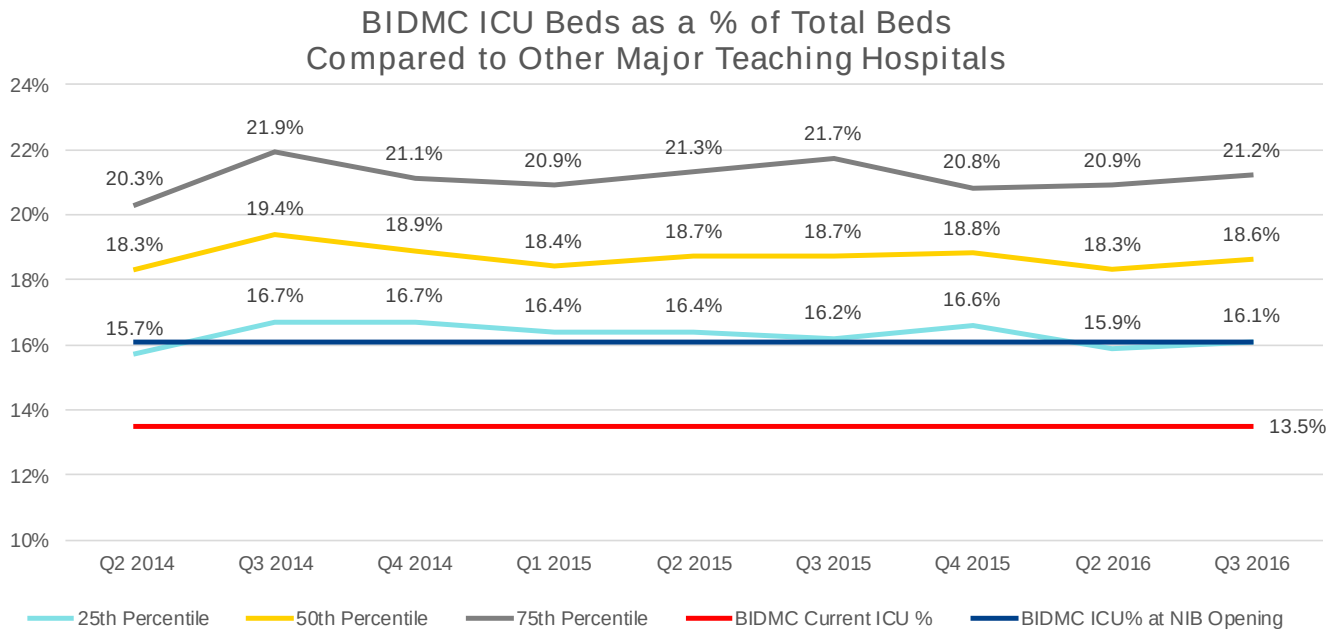
Adjusting for BIDMC's existing higher proportion of double-bedded medical/surgical rooms, the optimal occupancy rate for medical/surgical beds at BIDMC is currently 85%, and the optimal occupancy rate for ICU beds is 80%. After completion of the New Inpatient Building, BIDMC's optimal occupancy rate will rise to 90% for the medical/surgical beds in the New Inpatient Building which will all be in single-bedded rooms. The optimal ICU occupancy rate will remain at 80% following the completion of the New Inpatient Building, as all ICU beds are currently and will continue to be in single-bedded rooms. While there are no specific national standards for optimal occupancy rates, these occupancy targets are within generally accepted industry norms and are consistent with targets set by surrounding area academic medical centers.[60]

To meet the complex needs of BIDMC's patient panel, the New Inpatient Building will house 128 single-bedded medical/surgical rooms and 30 ICU beds. To determine the optimal number of net new beds to add in the New Inpatient Building, BIDMC considered the following factors: current utilization challenges, bed type distribution, current LOS, optimal future occupancy rates, organic growth forecast for tertiary hospital market demand,[61] and market data for the industry standard percent of ICU beds as a percentage of total beds.[62]

Currently, BIDMC has a low percentage of ICU patient rooms as compared to industry norms. The inclusion of 30 ICU rooms in the New Inpatient Building will increase BIDMC's ratio of ICU beds to total hospital beds to 16.1%, approximating the 25th percentile among other major teaching hospitals in the United States, as shown in Table 11.

[58] Bobrow, M. and Thomas, J., *Hospitals' prosperity should be by design*, 47 MODERN HEALTHCARE 54 (1994). *Available at* https://www.ncbi.nlm.nih.gov/pubmed/10138246
[59] Chaudhury, Habib et al., *The Use of Single Patient Rooms versus Multiple Occupancy Rooms in Acute Care Environments*, COALITION FOR HEALTH ENVIRONMENTS RESEARCH (2004). *Available at* https://www.healthdesign.org/sites/default/files/use_of_single_patient_rooms_v_multiple_occ._rooms-acute_care.pdf
[60] Industry norms were derived from consultation with various health care design planners and architects.
[61] VIZIENT, INC. TRUVEN, ACTION OI DATABASE. This comparator group includes 38 major specialty teaching hospitals (academic medical centers) with >500 beds and a CMI of >1.5.
[62] Ibid.

Table 11



Source: Vizient Inc. Truven, Action OI Database. This comparator group includes 38 major specialty teaching hospitals (academic medical centers) with >500 beds and CMI of >1.5.

By addressing the occupancy challenges at BIDMC discussed above, BIDMC anticipates the New Inpatient Building's net new medical/surgical single-bedded rooms will enable BIDMC to achieve the optimal occupancy rate in the New Inpatient Building of 90% occupancy for single-bedded rooms. The additional bed capacity is also expected to indirectly help lower the occupancy rate across the rest of the campus towards the optimal occupancy rate for mixed-bed units of 85%.

In addition to the benefits of additional beds, clinical space in the New Inpatient Building will be designed and organized to alleviate constraints on inpatient bed availability, as well as operating and procedure room capacity and limitations, pre- and post-operative care, Radiology and other ancillary clinical services and clinical support functions. This will improve patient flow within the Medical Center, while simultaneously enhancing collaborative care and communication among providers, patients, and families. Construction of the New Inpatient Building will increase BIDMC's inpatient capacity and will enable it to regain flexibility to make cost-effective adjustments and renovations to clinical space throughout its existing facilities over the coming decades, thus enhancing BIDMC's ability to continue to offer the highest quality tertiary and quaternary care to its patient population.

2. Low Number of Single-Bedded Rooms Exacerbates Inpatient Capacity Constraints

While BIDMC has enhanced the services available at its subsidiary community hospitals to help maximize the care provided at those facilities, BIDMC continues to attract and treat some of the most clinically complex patients in the region. As a leading academic medical center, BIDMC is a vital resource for the immediate health needs of local community residents and must also meet the tertiary and quaternary needs of all other patients within BIDMC's network of providers. Currently only 37% of BIDMC's medical/surgical beds are in single-bedded rooms, a low percentage due to the fact that BIDMC's existing inpatient facilities were constructed when double-bedded rooms were standard. Since 2010, DPH requirements as set forth in the Facilities Guidelines Institute ("FGI") Guidelines for Design and Construction of Hospitals and Outpatient Facilities have required that all new inpatient beds be in single-bedded rooms. Since the New Inpatient Building will be the first new building that BIDMC has built since that standard was adopted, BIDMC has a low percentage of single-bedded rooms compared to other academic medical centers that have constructed new inpatient facilities in the past decade. The low proportion of single-bedded rooms, coupled with the fact that BIDMC typically operates at a much higher occupancy than the optimal occupancy rate for a mix of single and double-bedded medical/surgical beds, exacerbates BIDMC's inpatient capacity constraints.

3. Blocked Beds in Double-bedded Rooms Reduce Bed Capacity

One factor that further decreases BIDMC's available bed capacity is the average daily count of blocked beds in double-bedded rooms (i.e., a licensed bed that cannot be used for patient care for some period of time). In the current BIDMC facilities, there are multiple occasions each day where it is necessary to block at least one bed in a double-bedded room to provide vulnerable patients with a single-bedded room environment. Blocked beds reduce the availability of inpatient beds and lengthen the interval time before an inpatient bed is provided to a patient once an admission order is given. Beds may be blocked or restricted from patient use for a variety of clinical reasons. Hospitals block beds in order to adhere to infection control standards and protect patients from being exposed to antibiotic resistant infections, such as Clostridium difficile. Beds are also blocked to meet behavioral health and other patient-care related needs. As vulnerable patient populations increase, the number of beds blocked in double-bedded rooms is expected to increase proportionately, unless BIDMC facilities can provide alternative means of addressing patients' needs for individual healing environments. The single-bedded rooms in the New Inpatient Building will increase the number and ratio of single-bedded rooms at BIDMC and this is expected to provide vulnerable

patients with greater access to single-bedded rooms and reduce the number of blocked beds at BIDMC.

In FY 2017, the number of beds blocked per day at BIDMC ranged from a low of four beds to a high of 23 beds; on average, 9.7 beds were blocked per day because a double-bedded room needed to be used for a single patient.

4. Patient and Staff Feedback Supports the Need for Single-Bedded Rooms

BIDMC regularly obtains patient feedback through the Patient Family Advisory Council ("PFAC"), a council made of advisors who were previously inpatients and family of inpatients at BIDMC. PFAC advisors meet with patients on inpatient floors to better understand the patients' experiences in real-time. The PFAC has been, and continues to be engaged, in the design and planning for the New Inpatient Building through participation in ongoing committee meetings and user group panels. Feedback from surveys conducted between 2016 and 2018 by the PFAC provided BIDMC with valuable insight into the effectiveness of providing patients with single-bedded rooms and supported the need for the Project.

The comments received from patients in single-bedded rooms contrasted sharply from those with a double-bedded patient experience and indicated how important having a single-bedded room is to BIDMC's medical/surgical patients. Patients staying in a single-bedded room provided highly positive feedback on both privacy and quietude, two important criteria for patient care criticized by patients staying in double-bedded rooms. Providers and administrative staff at BIDMC in separate surveys also echoed many of the same sentiments expressed by patients to the PFAC. As shown in Table 12 below, feedback from PFAC patient surveys and staff surveys collected by consultants supported that patients, families and staff regard single-bedded rooms as a vital component of the inpatient care experience. BIDMC regards these positive reactions to single-bedded rooms as highly indicative of the future success of the New Inpatient Building and the benefits of its single-bedded inpatient rooms for patients and staff.

Table 12

Patient and Staff Feedback on Single and Double- Bedded Rooms
Patient Feedback: Double-Bedded Rooms
Patient expressed to PFAC advisor dissatisfaction with Roommate's Visitors because of disruption to Patient's quiet time for rest and healing and inability to fully control room temperature.
Patient felt helpless that Roommate showed signs of being extremely sick and was uncomfortable with feeling responsible for Roommate's care.
Single-bedded rooms allow family members and caregivers to participate in the care and healing process. Existing double-bedded rooms are not large enough to comfortably host visitors.
Patient was unable to properly rest as Roommate had memory problems and would inappropriately leave the bed, activating the alarm system.
Patient overheard conversations between Roommate and Hospital staff and felt uncomfortable when the situation escalated to where Patient believed Hospital Security needed to become involved.
Patients feel their privacy is compromised when a physician comes into the room to discuss medical needs while there is another patient/patient's family in the room. When roommates have family visiting conversations are often overheard.
Sharing a bathroom is challenging, especially for patients with gastrointestinal issues and those who need assistance utilizing the facilities.
Patient Feedback: Single-Bedded Rooms
Patient expressed how nice room facilities were and had no complaints with temperature control.
Patient expressed how nice room facilities were and had no complaints with temperature control or noise level.
Patient expressed how nice room facilities were and had no complaints with temperature control or noise level. Patient also expressed appreciation for sofa bed as Visitors came from far away.
Patient compared current Hospital stay with past Hospital stay in 2012, which required sharing a double-bedded room, and praised the Hospital on the current experience. Patient further noted the benefits of privacy and complimented the room decor.

Patient and Staff Feedback on Single and Double- Bedded Rooms
Patient Feedback: Single-Bedded Rooms
Patient commented on the great view the room offered and the comfortableness of the bed and chair. Patient was also impressed with the cleanliness of the room and the friendliness of the environmental staff.
Staff Feedback: Double-Bedded Rooms[1]
Existing rooms are too small to effectively engage the family and care team.
Double-bedded rooms can be noisy, especially when visitors and patient care teams are present.
Additional family rest areas are needed.
Existing low ratio of single-bedded rooms causes inefficiencies when patients need to be moved to single-bedded rooms that are not adjacent to relevant staff areas or other patients with similar conditions.
Privacy challenges arise during conversations between providers, patients, and families in double-bedded rooms.

[1] Staff Feedback was collected by consultants for purposes of the New Inpatient Building Project planning.

As another source of patient feedback, the Hospital Consumer Assessment of Healthcare Providers and Systems ("HCAHPS") survey, provides patient responses collected after they have been discharged[63], to gain perspective on the entirety of the patient's experience during their inpatient stay. BIDMC has identified from HCAHPS surveys that patient satisfaction was significantly different in certain categories between patients who had roommates during their inpatient stay compared to those who did not. Survey responses obtained for FY 2015 through FY 2017 identified that the widest variance in scores between patients with a roommate and patients without a roommate in BIDMC's HCAHPS survey questions pertain to the physical character of patient rooms, including quietness.[64] There were also variances in HCAHPS survey responses between patients with a roommate and those without in patients' rating of BIDMC and

[63] Surveys are sent to patients after they are discharged to their homes.
[64] HCAHPS Surveys include a category that combines cleanliness and quietness.

their likelihood to recommend BIDMC to others. Table 13 below shows the HCAHPS patient satisfaction scores in these three categories for FY 2015 through FY 2017.

Table 13

BIDMC Patient Satisfaction Scores - With Roommate vs. No Roommate[1]									
	FY 15			FY 16			FY 17		
	With Roommate	No Roommate	Difference	With Roommate	No Roommate	Difference	With Roommate	No Roommate	Difference
Hospital Environment Quiet & Cleanliness (Top Box Rating of "Always")	48.6%	66.2%	17.6%	50.3%	67.1%	16.8%	50.2%	67.6%	17.5%
Rate Hospital 0-10 (Top Box Score represents 9 & 10)	70.0%	78.1%	8.1%	70.7%	77.3%	6.6%	71.4%	79.2%	7.8%
Recommend (Top Box Rating of "Definitely Yes")	75.8%	84.5%	8.7%	76.1%	83.2%	7.1%	77.5%	84.2%	6.7%

[1] Press Ganey Top Box results for FY 2015 - FY 2017.

The New Inpatient Building's single-bedded rooms are designed to provide patients, providers, and staff with the best environment of care to effectively carry out BIDMC's patient care mission. These rooms will address patient concerns, contribute to a more restful, healing atmosphere and enhance and advance care delivery and the patient experience at BIDMC.

5. Insufficient Inpatient Bed Availability Contributes to Overcrowding in the Emergency Department

Overcrowding in emergency departments is recognized as one of the leading problems that hospitals face nationally. It impacts the care hospitals can provide to high-risk patients, causes longer wait times which particularly challenge vulnerable patients, and strains available resources and staff.[65] A steadily increasing time interval between Emergency Department admission and inpatient admission indicates that Emergency Department boarding is becoming a more significant issue at BIDMC due to capacity constraints within the inpatient units. Table 14 below shows that BIDMC's increasing occupancy rate of inpatient medical/surgical beds corresponds with the increasing wait time in the Emergency Department. As discussed previously, high occupancy rates and the number of blocked beds lead to reduced inpatient bed availability. [66, 67] When inpatient units are too full to admit additional patients, patients remain in the Emergency

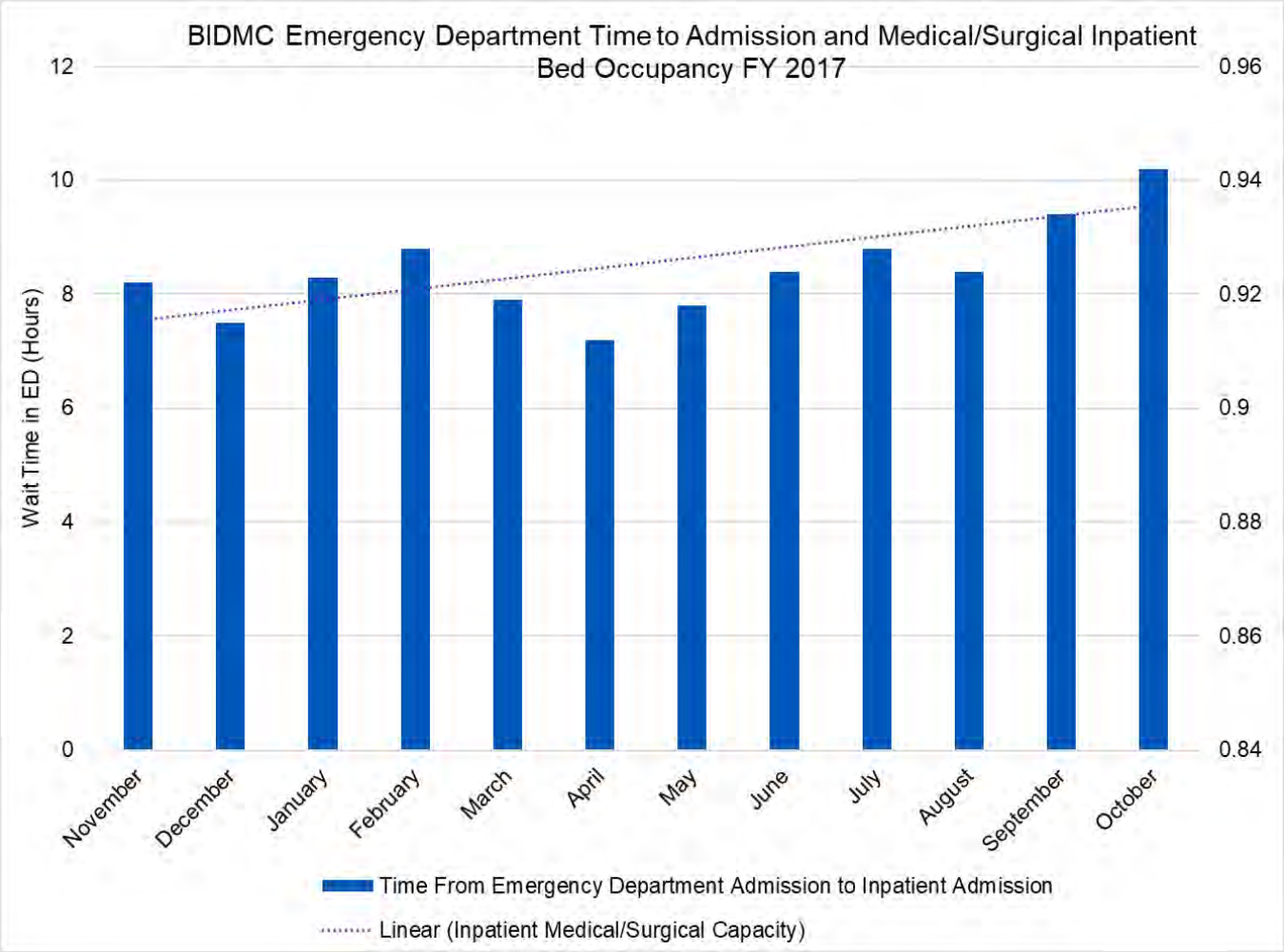
[65] Krall, Scott, et al., *Higher Inpatient Medical Surgical Bed Occupancy Extends Admitted Patients' Stay*, 10 WESTERN J. EMERGENCY MED. 93 (2009). *Available at https*://www.researchgate.net/profile/Robert_OConnor4/publication/26325922_Higher_Inpatient_Medical_Surgical_Bed_Occupancy_Extends_Admitted_Patients%27_Stay/links/00b4952814e7838895000000/Higher-Inpatient-Medical-Surgical-Bed-Occupancy-Extends-Admitted-Patients-Stay.pdf?origin=publication_detail

[66] Paul Richard Edwin Jarvis, *Improving emergency department patient flow,* 3 CLINICAL & EXPERIMENTAL EMERGENCY MED. 63, 63-68 (2016). *Available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5051606/pdf/ceem-16-127.pdf

[67] John R. Richards, et al., *Providing Care in Emergency Department Hallways: Demands, Dangers, and Deaths*, ADVANCES IN EMERGENCY MED. (2014). *Available at* http://downloads.hindawi.com/archive/2014/495219.pdf

Department for longer than is optimal waiting for an inpatient bed to become available. This boarding of patients in the Emergency Department in turn reduces the treatment bay availability in the Emergency Department; increases wait times to be seen in the Emergency Department; and, at times, requires patients be served outside of designated Emergency Department bays.

Table 14



When the Emergency Department is approaching capacity limits, there are three codes used for warning:

- Code Help Alert occurs when there are:
  - 10 or more Emergency Department boarders; *OR,*
  - 25 or more patients in the Emergency Department waiting for treatment for 2 consecutive hours; *OR,*

  - 58 or more patients being treated in the Emergency Department for over 2 consecutive hours.
- Code Help Activation occurs when there are:
  - 10 or more Emergency Department boarders; *AND,*
  - 58 or more patients in the Emergency Department for over 2 consecutive hours.
- Code Triage Activation occurs when:
  - After 2 hours of Code Help Activation status there remains an admitted patient burden of 10 or more Emergency Department boarders; *AND,*
  - There are 58 or more patients in the Emergency Department for 2 consecutive hours.

Emergency Department boarding at BIDMC is increasing as is evident from a review of the number of times Emergency Department capacity alerts have occurred at BIDMC from FY 2015 through FY 2017. From FY 2015 through FY 2017, there were 15 months in which BIDMC had five or more Code Help Alerts and Activations. In October 2017 alone, BIDMC's Emergency Department had a total of 25 Code Help Alerts and Activations, and this trend is continuing. The additional beds that will be provided in the New Inpatient Building are expected to help address Emergency Department overcrowding by allowing patients who need to be admitted from the Emergency Department to be moved to an inpatient bed more quickly.

6. Needs of Behavioral Health Patients

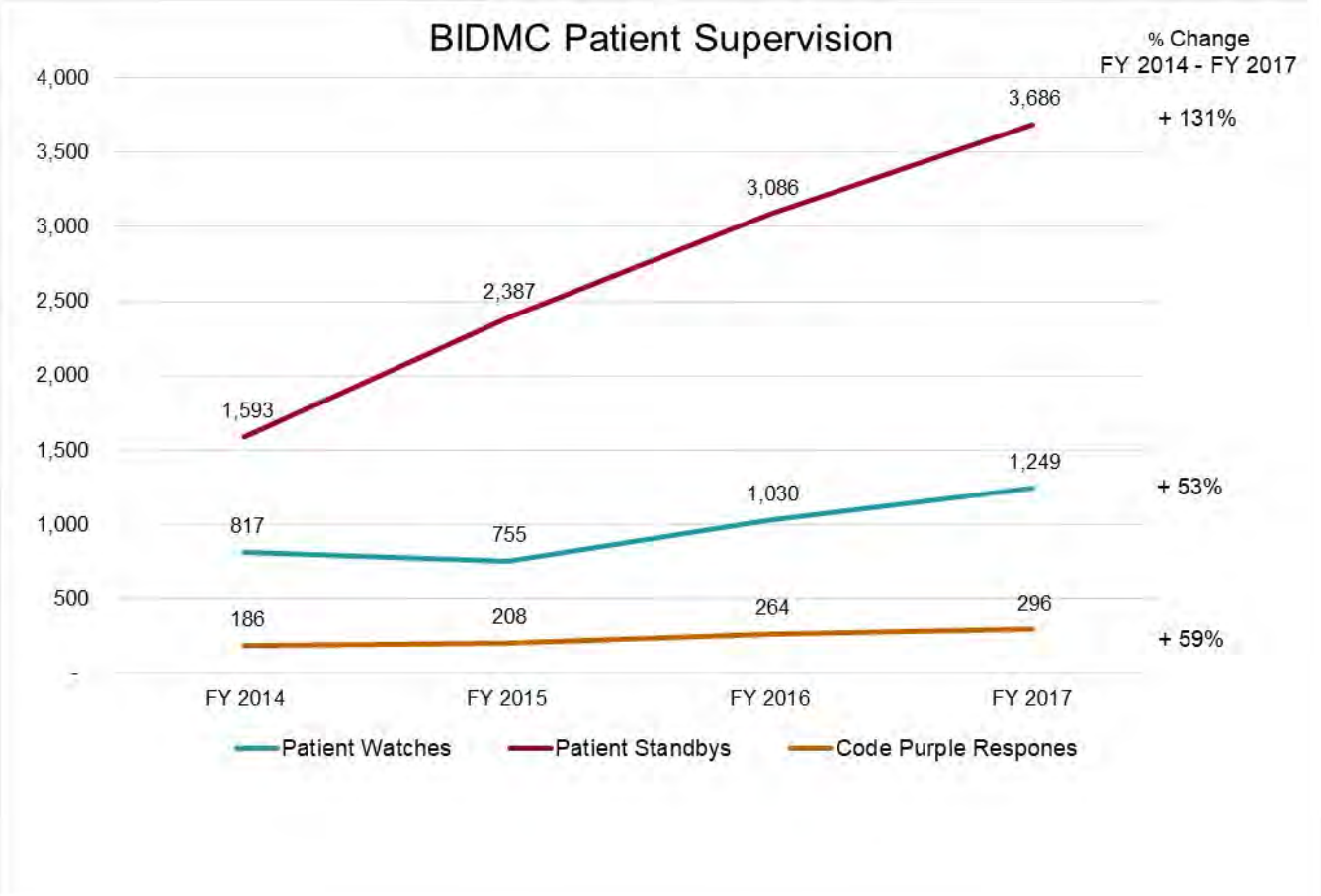
BIDMC serves many patients with co-morbid medical and behavioral health diagnoses, many of whom initially present in the Emergency Department. The behavioral health patient population at BIDMC includes patients with Alzheimer's or Dementia, mental health diagnoses, and substance use disorders. Behavioral health patients who present in the Emergency Department with medical ailments are part of a vulnerable and sensitive population, and their behavioral health needs must be considered throughout the course of medical treatment. The number of patients who presented in BIDMC's Emergency Department and required a psychiatric consultation increased by 14% from FY 2015 to FY 2017.[68]

An Emergency Department visit can be especially stressful for patients with behavioral health diagnoses, as noisy and hectic environments can exacerbate their stress levels or current behavioral instability. In certain cases, staff must constantly observe and monitor patients with behavioral health needs during their stay in the Emergency

[68] Psychiatric consults are determined on a case-by-case basis by Emergency Department staff unless otherwise mandated by the insurance provider.

Department to provide them with appropriate care and support.[69] As shown in Table 15, the number of patients requiring such support during their inpatient stay has increased by approximately 100% since FY 2014. These trends are expected to continue, leading to increased pressure in the Emergency Department and inpatient medical/surgical units.

Table 15



The addition of single-bedded inpatient rooms in the New Inpatient Building will help shorten the time it takes to transition patients from the Emergency Department to an inpatient room. Reducing the time a behavioral health patient spends in the Emergency Department's noisy and hectic environment should also reduce the amount of time a behavioral health patient may require monitoring and support.[70] The availability of more single-bedded rooms will also increase BIDMC's capacity to care for patients with

[69] At times, this supervision must continue from the Emergency Department to the inpatient unit.
[70] Ula Hwang & R. Sean Morrison, *The Geriatric Emergency Department*, 55 J. OF AM. GERIATRICS SOC'TY 1873 (2007). *Available at* https://stallseniormedical.com/wp-content/uploads/Geriatric-emergency-department-JAGS-2007.pdf

behavioral health needs in single-bedded rooms that are quieter and provide private healing environments better suited for these vulnerable patients.

7. Needs of the Aging Patient Population

Older adults are one of BIDMC's priority populations, as they are inherently more at-risk for medical illness than younger age cohorts, more likely to struggle with depression, anxiety, isolation, and chronic health conditions, and less likely to have available supports[71]. Approximately 32% of BIDMC's patient panel is aged 65 or older.[72] From FY 2015 to FY 2017, patients aged 70 to 79 increased by 11%; and, although not a high-volume cohort, patients aged 90 to 99 increased by 15%. Historically, BIDMC has served a high acuity, aging patient population, many of whom have multiple chronic conditions and/or co-morbid behavioral health diagnoses. BIDMC's older patients are also affected by detrimental social determinants of health that exist in urban settings.

The New Inpatient Building will enable BIDMC to better accommodate older patients. Aging patients over 65 are predisposed to having infections as a result of reduced immune defense systems, underlying chronic diseases, long-term hospitalizations and malnutrition.[73] Therefore, it is important to maintain a lower length of stay for aging patients as an increased duration increases their likelihood of acquiring another infection while in the hospital.[74, 75, 76, 77, 78] The design of the single-bedded rooms in the New Inpatient Building is responsive to care issues related to aging patients, such as mobility complications and transfers to the bathroom, reducing the likelihood of

[71] *Community Health Needs Assessment (CHNA) – 2016*, Final Report, BETH ISRAEL DEACONESS MEDICAL CENTER (2016). p. 22 *Available at* https://www.bidmc.org/-/media/files/beth-israel-org/community-benefits/bidmc-2016-chna-community-health-needs-assessment.ashx?la=en&hash=250FB0AF225C6F2255CB73C6066A9A82FD054D7F

[72] Globally, 70% of inpatients are over the age of 65 years, with approximately 30% of all inpatients being diagnosed with Dementia. Jim George, Susannah Long, & Charles Vincent, *How can we keep patients with dementia safe in our acute hospitals? A review of challenges and solutions*, 106 J. OF ROYAL SOCIETY OF MED. 355 (2013). *Available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3758672/

[73] Kevser Özdemir & Murat Dizbay, *Nosocomial infection and risk factors in elderly patients in intensive care units*, 1 J. OF MICROBIOLOGY & INFECTIONS DISEASES 38, 38 (2015). *Available at* http://www.jmidonline.org/upload/sayi/20/JMID-00829.pdf

[74] Elderly patients who develop bloodstream infections in the hospital have a longer length of stay. K.S. Kaye et al., *Effect of nosocomial bloodstream infections on mortality, length of stay, and hospital costs in older adults*, 62 J. AMER. GERIATRICS SOCIETY 306 (2014). *Available at* https://www.ncbi.nlm.nih.gov/pubmed/24438554

[75] J.W. Warren et al., *A prospective microbiologic study of bacteriuria in patients with chronic indwelling urethral catheters*, 146 J. INFECTIOUS DISEASES 719 (1982). *Available at* https://www.ncbi.nlm.nih.gov/pubmed/6815281

[76] D.J. Beaujean et al., *Surveillance of nosocomial infections in geriatric patients*, 36 J. HOSPITAL INFECTIONS 275 (1997) (GERIATRIC PATIENTS WITH INFECTIONS HAVE A LONGER LENGTH OF STAY THAN THOSE WITHOUT). *Avaliable* at https://www.sciencedirect.com/science/article/pii/S0195670197900542

[77] Susan M. Saviteer, M.D., M.P.H., Greg P. Samsa Ph.D., and William A. Rutala Ph.D., M.P.H., *Nosocomial infections in the elderly. Increased risk per hospital day*, 84 AMER. J. MED. 661 (1988) (SHOWING RISK OF URINARY TRACT RESPIRATORY TRACT, AND BLOODSTREAM INFECTIONS INCREASED FOR INCREASING LOS >7 DAYS). *Available a*t https://www.amjmed.com/article/0002-9343(88)90101-5/pdf

[78] Ibid.

complications that are unrelated to the patient's underlying diagnosis. The planned design will facilitate best practices in infection prevention. (Refer to section ***F1.b.ii*** subsection F, *Reducing the Risk of Hospital-Acquired Infections* for further detail.) Furthermore, research demonstrates that single-bedded rooms reduce ambient noise which promotes patient sleep and reduces stress and confusion, improves communication between patients, families and their health care providers by providing increased privacy, and is expected to increase patient satisfaction.[79] (Refer to section ***F1.b.ii***) These benefits from single-bedded rooms are all responsive to the needs of the aging patient population.

8. Needs of Other Vulnerable Patient Populations

The New Inpatient Building will be a state-of-the-art academic medical center facility, designed to serve the needs of BIDMC's patient panel, including vulnerable patient populations that are priority populations for BIDMC's Community Health Implementation Plan ("CHIP")[80], such as patients who are racially and ethnically diverse, have limited English proficiency, are economically disadvantaged, and members of the LGBT community. Some of these patient populations often require increased staff and equipment resources to meet their needs. Single-bedded rooms are best equipped to handle such increased patient care needs. For patient groups with sensitive medical, cultural, or spiritual privacy needs, single-bedded rooms in the New Inpatient Building will create private space that allows for open discussions between patients and their health professionals on a myriad of sensitive topics. Conversations of this nature are necessary for effective patient education and self-advocacy and promote better health outcomes, but may be uncomfortable to conduct in a double-bedded room, in the presence of a roommate or a roommate's visitors.

Single-bedded rooms create increased flexibility and capacity to treat multiple co-morbid conditions. Furthermore, research indicates that single-bedded rooms enhance the recovery process for patients.[81, 82, 83, 84, 85] The New Inpatient Building will increase

[79] Anjali Joseph, Ph.D. & Roger Ulrich, Ph.D., *Sound control for improved outcomes in healthcare* settings, THE CENTER FOR HEALTH DESIGN (2007). *Available at* https://www.healthdesign.org/sites/default/files/Sound%20Control.pdf

[80] *Community Health Implementation Plan.* BETH ISRAEL DEACONESS MEDICAL CENTER. p. 4. (September 2016). *Available at* https://www.bidmc.org/-/media/files/beth-israel-org/community-benefits/community-health-implementation-plan.ashx?la=en&hash=34ABD4FEC2D8FBB7D060A94A74351C9EFE4F0699

[81] Irene van de Glind, et al., *Do patients in hospitals benefit from single rooms? A literature review*, 84 HEALTH POLICY 153 (2007). *Available at* https://www.ncbi.nlm.nih.gov/pubmed/17631979

[82] Landro L., *New standards for hospitals call for patients to get private room*, WALL STREET JOURNAL (MAR. 22, 2006). *Available at* https://www.wsj.com/articles/SB114298897540904723

[83] Romano, M., *Personal space. Guidelines call for only private rooms,* 35 MODERN HEALTHCARE 20 (2005)

[84] Romano M. *Going solo. Private-rooms-only provision for new hospital construction stirs controversy*, 34 MODERN HEALTHCARE 36 (2004)

BIDMC's percentage of single-bedded rooms to approximately 55%. Dedicated family zones will be included in the New Inpatient Building's medical/surgical and ICU rooms to enable patients and families to comfortably spend time together (refer to ***F1.b.i*** subsection B, *Benefits of the New Inpatient Building's Single-Bedded Rooms*). As discussed above, the issues addressed by the New Inpatient Building's single-bedded rooms respond to needs expressed by patients, providers, and staff, alike, including privacy concerns. The environment created by a single-bedded room can be especially helpful for providing care to LGBT patients, patients of size and Limited English Proficiency patients, who may prefer greater privacy or whose care may require more area to accommodate additional equipment, clinical staff, or interpreters typically involved in their care. The volumes of patients in all four of these populations within BIDMC's patient panel have increased over the last three years. (Refer to ***F1.a.i*** subsection G, *Vulnerable Populations* for detail.) Ultimately, the New Inpatient Building's design will enhance care at BIDMC and contribute to a more restful, private healing atmosphere.

a. Patients within the LGBT Community

Over the last decade, a national movement has launched to recognize the significant barriers to health care faced by the LGBT Community.[86, 87] More specifically, transgender patients who typically experience the need for significant medical and therapeutic care are a large subset of the LGBT group. Since 1974, Fenway Health, a community health center with a primary clinical affiliation with BIDMC, has partnered closely with BIDMC to identify needs and resources within the LGBT community, to provide access to the highest quality health care, education, research and advocacy to this particular population.[88] As part of its commitment to the LGBT community, BIDMC seeks to provide health care in a manner that respects the privacy needs of the LGBT population.

Gender-based room assignments alone are not sufficient to establish a safe and appropriate way to provide care for LGBT inpatients. Despite current policies that assign patients to rooms based on their self-identified gender, transgender patients continue to face challenges in achieving optimal comfort with roommates when hospitalized in

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[85] Sandrick K., *A higher goal. Evidence-based design raises the bar for new construction*, 16 HEALTH FACILITY MANAGEMENT 16 (2003). *Available at* https://www.ncbi.nlm.nih.gov/pubmed/14531201

[86] *Transgender Patients: Transgender-Affirming Hospital Policies*, LAMDA LEGAL (May 2016). *Available at* https://www.lambdalegal.org/sites/default/files/publications/downloads/hospital-policies-2016_5-26-16.pdf

[87] LGBT Health Education, *available at* http://www.lgbthealtheducation.org/topic/lgbt-health/

[88] Recently, Health Resources & Services Administration (HRSA) awarded Fenway Health the honor of being a 2017 National Quality Leader. *2016 Fenway Community Health Center, Inc. Health Center Profile*, HEALTH RESOURCES & SERVICES ADMINISTRATION. *Available at* https://bphc.hrsa.gov/uds/datacenter.aspx?q=d&bid=010600&state=MA&year=2015#nationalia

double-bedded rooms.[89] At the forefront of transgender health care, BIDMC recognizes the increasing demand for single-bedded rooms to maximize patient privacy. In order to respect all patients' opinions and perspectives, the optimal solution for first-class care begins with eliminating the need to assign roommates to patients in the first place. Single-bedded rooms enable BIDMC to provide exceptional patient experiences by meeting the privacy, safety and comfort expectations and needs of all patients.

b. Patients of Size

The New Inpatient Building will increase access to care for patients of size over 157 kilograms ("kgs.") (approximately 350 pounds "lbs."). According to research, "patient rooms are often not large enough to house bariatric equipment, beds, and required caregivers." To accommodate such inpatients, hospital rooms need to be larger than typical.[90, 91] The majority of BIDMC's existing inpatient rooms do not meet current patient of size specifications. All the inpatient rooms in the New Inpatient Building will be large enough to accommodate patients of size and meet the regulatory guidelines for physical room size for this patient population. Additionally, each medical/surgical and ICU floor will have two designated patient of size rooms designed to meet the care needs of patients weighing over 227 kgs., or 500 lbs. One of these rooms will be a negative pressure isolation room designed to accommodate advanced clinical needs of patients of size. These designated patient of size rooms will comply with the appropriate specifications to facilitate staff's provision of care and assistance to this subset of patients. These rooms will have lift equipment designed for patients weighing over 227 kgs., reinforced infrastructure, beds and furniture designed to support patients of size, and reinforced grab bars and fixtures in the bathrooms.[92]

In FY 2017, BIDMC cared for 350 patients who required patient of size accommodations, including a fully equipped patient of size room, a patient lift or other support resources. (Refer to ***F1.a.i*** subsection G.4, *Patients of Size* for additional detail). Although less than one percent of total inpatient and observation discharges meet the threshold for patient of size support resources, BIDMC strives to be responsive to the needs of special populations and eliminate barriers to their access to the highest quality care. The low number of existing patient of size rooms in BIDMC facilities also limits BIDMC's ability to accept transfers of patients of size. Most importantly, the comfort conferred by appropriate accommodations will improve the

[89] *Transgender Patients: Transgender-Affirming Hospital Policies*, LAMDA LEGAL (May 2016). *Available at* https://www.lambdalegal.org/sites/default/files/publications/downloads/hospital-policies-2016_5-26-16.pdf
[90] *See also* K. L. Hammond*, Practical Issues in the Surgical Care of the Obese Patient*, 13 THE OCHSNER JOURNAL 224 (2013). *Available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3684332/
[91] INPRO, *Bariatric Design 101 – An Introduction to Design Considerations*, White Paper. *Available at* https://www.inprocorp.com/~/media/Inpro/TDM%20Files/Literatures/B/a/r/i/a/bariatricdesign101pdf.ashx
[92] DiNardo, Anne, *Room for All: Trends In Bariatric Healthcare Design*, HEALTHCARE DESIGN MAGAZINE (Jul. 1, 2013). *Available at* https://www.healthcaredesignmagazine.com/architecture/room-all-trends-bariatric-healthcare-design/

quality of care for this segment of the patient panel and enhance patients' experiences at BIDMC.

c. Patients with Limited English Proficiency

The New Inpatient Building will also better serve patient populations and communities who have particular language, cultural, and/or clinical needs. During FY 2015 through FY 2017, in approximately 17% of BIDMC's patient panel encounters, or one in six, patients indicated a preference to receive their health care information in a language other than English. In FY 2017 alone, in 18.4% of BIDMC patient panel encounters were with patients who indicated such a preference. This creates a significant need for professional medical interpreter services. In FY 2017, BIDMC responded to a total of 237,256 interpreter service requests. The same year, 30,856 inpatient days were generated by Limited English Proficiency patients requiring interpreter services.[93] This represents a 14.6% increase from the 26,670 inpatient days generated in FY 2016. This upward trend is expected to continue with patients who speak Spanish, Haitian Creole, and Portuguese accounting for a significant portion of the increase being experienced in FY 2018. (Refer to ***F1.a.i*** subsection G, *Vulnerable Populations* for additional detail on the increases in Limited English Proficiency patients over the last 15 years.)

The New Inpatient Building will enhance BIDMC's ability to meet the needs of these patients by providing adequate space in each room to allow an interpreter to be comfortably present with family and medical staff. The New Inpatient Building's infrastructure will also have the capability to support advanced interpretation technologies, including video-enabled services, for the future benefit of Limited English Proficiency and Deaf and hard-of-hearing patients. (Refer to ***F1.b.iii*** subsection B, *Culturally and Linguistically Appropriate Care* for detail.)

9. <u>Need for New Perioperative Facilities for Current and Future Patient Care.</u>

The New Inpatient Building facility will house eight new, state-of-the-art operating rooms,[94] and four new procedure rooms designed to handle high acuity patient needs, including high complexity cardiology procedure rooms. BIDMC anticipates that in the New Inpatient Building there will be one or two operating rooms equipped for performing minimally invasive surgical procedures, a hybrid operating room outfitted with imaging equipment and the remainder will be general operating rooms. The new, modern

[93] This data includes total inpatient days generated by patients who received interpreter services from a member of BIDMC's employed staff or from per diem staff who BIDMC retains to provide interpreter services for less commonly requested languages.
[94] There will be seven net new operating rooms, as one existing operating room in the Rosenberg Building will be eliminated to create the interconnection of the New Inpatient Building's perioperative floor with the perioperative floor in the Rosenberg Building.

operating and procedure rooms in the New Inpatient Building will enable BIDMC to provide advanced care and create additional operating room capacity to better serve its high acuity and aging patient population.

a. Improved Perioperative Floor and Operating Suite Design

The current surgical suite located in the Rosenberg building is constrained by the physical design and dimensions of the facilities[95] The proposed design of the New Inpatient Building incorporates design features such as improved storage spaces, separate corridors for clean and soiled transport and appropriately sized operating and procedure rooms.

Operating rooms are required by DPH to be arranged in such a way as to appropriately limit unrelated traffic through the surgical suite. Given the layout and dimensions of existing operating rooms in the Rosenberg Building, equipment cannot always be appropriately positioned to allow for optimal work zones for all members of the surgical team. Operating rooms in the New Inpatient Building will be large enough to accommodate new technology, permit optimal equipment layout and configuration, and improve the flow of patients and personnel through and around the areas of the surgical suite.

BIDMC has the highest acuity patients (as measured by CMI) in general medicine and general surgery as compared to other Massachusetts academic medical centers and health systems. (Refer to section ***F1.a.i*** subsection C, *Acuity Mix of Patient Panel* for additional detail.) The number of inpatient surgical procedures has increased by 27% since FY 2016. From FY 2015 to FY 2017, certain complex surgeries have seen marked increase in patient volume, such as Transcatheter Aortic Valve Replacement surgeries which increased by 91%, and endovascular surgery, which increased by 17%. BIDMC anticipates patient volumes of these surgeries to continue to grow over the next few years. With the increasing volume of these and other similarly complex procedures, operating room and procedure room occupancy concerns are expected to continue.

The New Inpatient Building's improved facility design will provide operating rooms that are sized to handle a wide variety of procedures to meet the surgical needs and demands of BIDMC's patient panel. The New Inpatient Building layout will also promote better and more efficient storage areas for supplies, back-up equipment, and shared equipment. Equipment will be kept out of hallways ensuring that all storage will be contained in restricted access areas. Improved operating room and support facilities are

[95] These design and dimensional constraints cannot be overcome by remodeling or reconfiguring the operating and procedure room areas given the full utilization of BIDMC's existing buildings, as well as their age and dimensional limitations such as limited floor to floor heights. (Refer to ***F1.b.i*** for additional discussion.)

expected to contribute to a reduction in average operating room case length, and increased staff and patient satisfaction.

b. Better Technology, Equipment and Minimally Invasive Surgery

Technological advances in surgical medicine have paved the way for improvements in surgical procedures resulting in both medical advances and better patient outcomes.[96] Since the advent of laparoscopic techniques, the introduction of surgical robots with cameras has expanded the visualization and control that a surgeon has during such procedures.[97] Conducting surgical procedures with surgical robots allows for a 3-dimensional view of the surgical site to be maintained throughout the operation allowing surgeons to perform complicated surgical procedures through the use of less-invasive techniques.[98] The ability to provide surgical procedures with minimally invasive techniques shortens length of stay and promotes and enhances healing and recovery of patients due to the reduced invasiveness of the procedure.

BIDMC is currently unable to provide certain patients with maximum advantages through the use of advanced robotics technology. As BIDMC's patient panel's needs grow in complexity, there is growing demand for advanced surgical procedures that require the use of robots. BIDMC currently has a robot on both the East and West Campuses, however, size limitations in the existing Rosenberg operating rooms prevents BIDMC from upgrading to the newest robotic technology as the increased size requires a larger operating room. The New Inpatient Building operating rooms are designed to permit installation of advanced robots through larger room size which accommodate the surgical team, sterile field, and surgical flow. With the Project's new operating rooms, BIDMC will be able to provide patients with cutting-edge advances in surgical technique using the latest technologies, now and in the future. Procedure rooms in the New Inpatient Building will likewise be sized and have the technological capabilities needed to support complex and advanced cardiac and other procedures.

c. Aging Population Needs Increased Access to Minimally Invasive Surgery

Minimally invasive techniques are best suited for the aging population[99] as well as for individuals who are more susceptible to the negative impacts of sedation, such as behavioral health patients. Recent studies show that there is ample opportunity to

[96] Michael J. Mack, MD, *Minimally Invasive and Robotic Surgery*, 285 JAMA 568 (2001). *Available at* https://jamanetwork.com/journals/jama/fullarticle/193511
[97] Bobby L. Gibbons, MD, *How Robotic Surgery Advances Care for Patients*, ORLANDO HEALTH (Jan. 9, 2018). *Available at* https://www.orlandohealth.com/blog/how-robotic-surgery-advances-care-for-patients
[98] Ibid.
[99] Caleb J. Fan, et al., *Minimally Invasive Surgeries Underused in Older Patients, New Study Finds*, JOHNS HOPKINS MEDICINE (Mar. 5, 2018). *Available at* https://www.hopkinsmedicine.org/news/media/releases/minimally_invasive_surgeries_underused_in_older_patients_new_study_finds

provide higher-value surgical care through minimally invasive operations for Medicare patients, who are generally individuals over the age of 65.[100] Improved outcomes for patients over 65 reduce readmission rates, postoperative complications, length of stay, and cost of care.[101] These improvements are especially remarkable for older patients who often experience a continuation of costly medical incidences as a result of even one single post-surgical complication, such as delirium, pneumonia, decline in functional ability, exacerbation of co-morbid conditions, pressure ulcers, decreased oral intake, gastrointestinal disturbance, and falls.[102] With a growing number of aging patients, BIDMC recognizes a great need in ensuring that this vulnerable population receives appropriate surgical care with the best possible post-operative outcomes, to preserve their quality of life and promote continued aging in place, consistent with the goals stated in BIDMC's (CHIP).

d. Additional Spaces in Operating and Procedure Rooms for Medical Education

The New Inpatient Building will allow for physicians and staff to collaborate on researching, developing, and implementing advanced care techniques, to best serve BIDMC's patients, including the aging and other vulnerable populations, and ensure they have access to the high quality care they need. In addition to allowing sufficient space for advanced technologies and the larger surgical teams needed for complex surgeries and procedures, the New Inpatient Building's new larger operating rooms and procedure spaces will enhance BIDMC's medical education mission by providing sufficient space to accommodate the presence of researchers, medical students and allied health profession trainees. Operating rooms will be equipped with the necessary space to provide medical students, residents, and fellows with the advantage of observing and participating in the most-complex operations and the latest innovative techniques. Updated equipment will also allow researchers and learners alike to experience the power of advanced technology and enable them to innovate beyond current standards and practices. In addition, the New Inpatient Building will incorporate conference and other education space for medical education uses.

e. Expanded Pre-Operative and Post-Operative Areas to Accommodate Patients and Clinical Staff

As BIDMC's CMI has increased, so has the length of stay in the post-operative/procedure care unit. From FY 2015 to FY 2017, the average length of stay for

[100] Ibid.
[101] Ibid.
[102] Seymour DG, Pringle R, *Post-operative complications in the elderly surgical patient,* GERONTOLOGY (1983) 29:262-270 a*vailable at https://www.karger.com/Article/Pdf/213125*

a patient in the post-operative/procedure care unit increased 9%, further stressing the occupancy of this area. The existing space in the Rosenberg Building for pre- and post-operative care is shared, and beds are allocated for pre- or post-operative care on a case-by-case basis. As noted previously, the high inpatient census at BIDMC acts as a bottleneck and at times requires patients to stay in this unit following surgeries and procedures longer than is needed for their post-operative care while waiting for an inpatient bed. Slow turnover of bays in use for post-operative care longer than planned has the potential to delay the start of the subsequent cases. The New Inpatient Building will address these issues two-fold by creating a new flexibly designed pre-operative/procedure area to accommodate the additional operating room and procedure room capacity and improving the current pre- and post-operative care area in the Rosenberg Building that will become dedicated primarily to post-operative care once the New Inpatient Building opens. The new pre-operative unit in the New Inpatient Building, like the existing pre-operative/post-operative unit in the Rosenberg Building, is designed to meet the criteria for a Combined Pre- and Post-Procedure Area. This flexible design means each of these two separate units will be suitable for future use for both pre- and post-operative/procedure functions as needed. Thus, during times of peak utilization, bays in the pre-operative/procedure unit in the New Inpatient Building will be used as swing space for post-operative/procedure care, and bays that will primarily be used for post-operative/procedure care in the Rosenberg Building will be used a swing space for pre-operative care. The expanded footprint of the pre-operative and post-operative areas will also allow for adequate seating and space for family and visitors and private consultation rooms so patients and families can have privacy while consulting with their providers.

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.*

BIDMC is a lower cost provider of high quality tertiary and quaternary services. Patients rely on BIDMC to provide these services as a cost-effective alternative to more expensive providers in the region. The New Inpatient Building is needed to address issues of inpatient capacity and space constraints to allow BIDMC to continue to provide the patient panel with the highest quality care; to improve health outcomes and quality of life for BIDMC's patient panel; and to meet the Commonwealth's cost containment goals by maintaining and enhancing access to lower cost providers. The site selection and design of the New Inpatient Building also takes advantage of shared, flexible and efficient use of ancillary clinical services and support functions to reduce construction and operating costs. This approach will ultimately allow BIDMC to continue providing high quality, complex treatment and care at an economical value, which in turn supports the shared goal of lowering total medical expenses in the Commonwealth.

A. Enhanced Facility Design Allows for Better Competitive Position

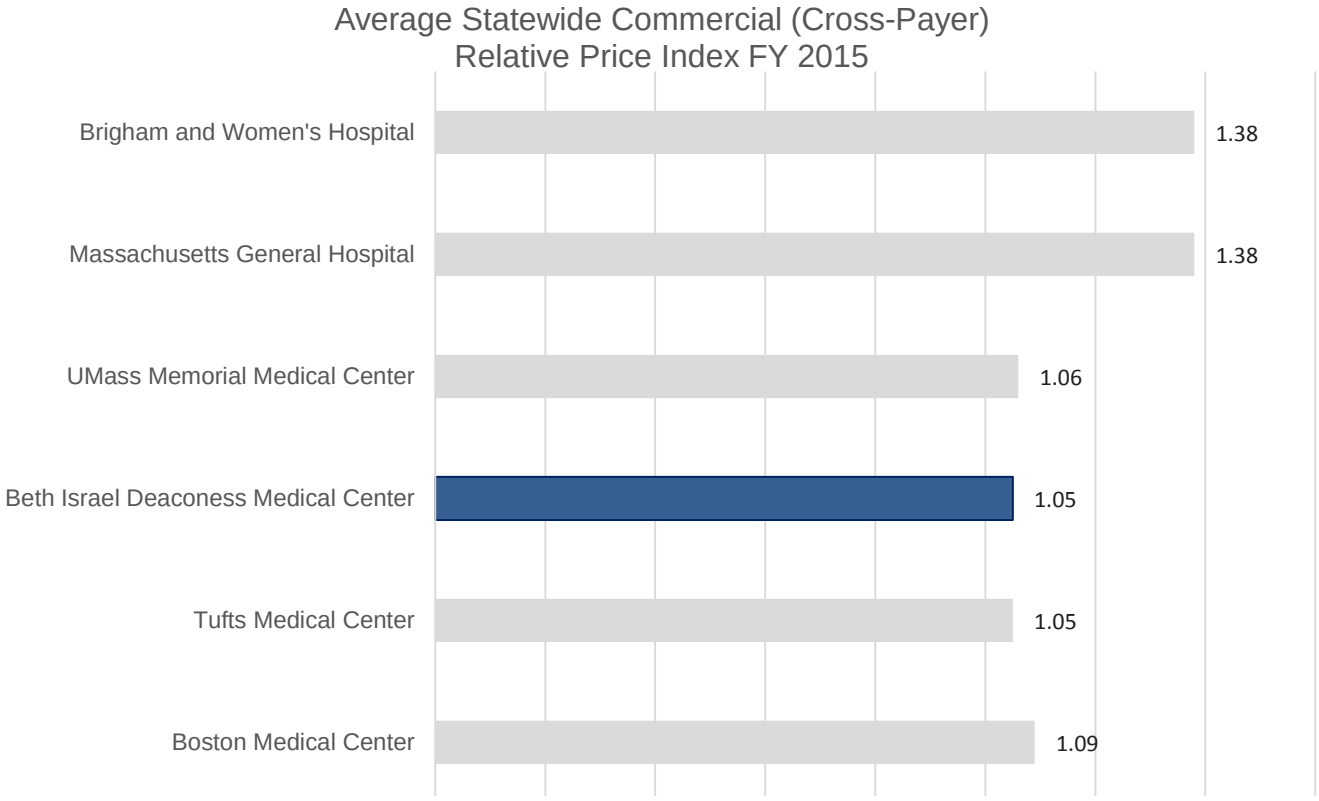
The New Inpatient Building is being planned and will be implemented with the goal of minimizing capital expenditures. Project planning and design focus on ensuring reasonable costs and maintaining financial feasibility. The site selected is the most cost-effective of all options evaluated (refer to ***F5.a.i***). The New Inpatient Building will be constructed on existing BIDMC property, adjacent to other inpatient facilities, leveraging existing buildings, services, and functions on the West Campus. This Project also does not require demolition of existing buildings, major disruption of existing services, or acquisition of land. These factors all significantly reduce the capital expenditures required to complete the Project.

In BIDMC's existing facilities, the low ratio of single-bedded patient rooms to double-bedded patient rooms diminishes its ability to effectively compete with other academic medical centers identified in
Table **16**, including higher cost providers. According to research, a higher ratio of single-bedded rooms in a hospital is more likely to translate to increased cost savings. Research also indicates that single-bedded rooms for intensive care units can offer cost savings because of shorter lengths of stay and a decrease in the number of transfers within the hospital.[103] Furthermore, research suggests that additional costs for maintaining a single-bedded room can be compensated by increased patient throughput, sufficient space to simplify room maintenance and shorten turnover time

[103] Reiling J, Hughes RG, Murphy MR. *The Impact of Facility Design on Patient Safety*. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses.* AGENCY FOR HEALTHCARE RESEARCH AND QUALITY Chapter 28, (2008). *Available at* https://www.ncbi.nlm.nih.gov/books/NBK2633/#

following discharges.[104,105] BIDMC believes based on informal data collection that it currently has the lowest ratio of single-bedded rooms to double-bedded rooms as compared to local academic medical centers. After completion of the New Inpatient Building, BIDMC anticipates it will have an increased ability to provide a lower cost academic medical center inpatient care option to its patient panel based on the increase in availability of single-bedded rooms.

Table 16



Source: Payer-reported data to CHIA; THE CENTER FOR HEALTH INFORMATION AND ANALYSIS, Report, Relative Price: Provider Price Variation in the Massachusetts Commercial Market (2018). A hospital's S-RP is calculated using

[104] Fairhall, K., et al. *Patient Safety: Single-bed versus multi-bed hospital rooms.* WORLD HEALTH DESIGN. *Available at* http://www.worldhealthdesign.com/Patient-Safety-Single-bed-versus-multi-bed-hospital-rooms.aspx
[105] Clancy, C., *Designing for Safety: Evidence-Based Design and Hospitals,* AMERICAN JOURNAL OF MEDICAL QUALITY, (2008). *Available at* http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.906.7443&rep=rep1&type=pdf

B. Enhanced Facility Design Improves Operating Efficiencies

By managing patient flow more efficiently and continuing to maintain BIDMC's lower cost per discharge, the New Inpatient Building will further BIDMC's ability to provide lower cost highest quality services to patients and to support total lower medical expenditure performance. According to the Institute for Healthcare Improvement, "the results of improving flow can include increased access, shorter waiting times, lower costs, and better outcomes"[106] (refer to ***F1.c*** for detail). As described above, BIDMC's operating efficiency is hindered by the low existing single-bedded room ratio. To address a variety of patient care needs, such as infection control precautions and behavioral health care needs, BIDMC must block a number of beds each day in double-bedded rooms, which requires greater staff resources to manage and coordinate patient admissions and patient movement (refer to ***F1.a.ii*** subsection B.3, *Blocked Beds in Double-bedded Rooms Reduce Bed Capacity* for detail). The constraints created by these blocked beds generate operating inefficiencies, potentially forcing patients who require advanced procedures at BIDMC to experience longer wait times as a result. These delays also may result in patients choosing to have their care provided at a more expensive provider in exchange for expedited care.[107] Thus, the New Inpatient Building may improve BIDMC's patient retention rate by increasing the number of single-bedded rooms.

Increasing the number of single-bedded rooms will reduce the need to block beds each day, enhancing patient flow and decreasing interval time. Additionally, these enhancements are expected to improve the flow of Emergency Department patients to inpatient beds. Creating operating efficiencies in the patient admission, transfer and admissions process not only improves patient care but streamlines hospital operations bending the cost curve.

C. Environmentally Sustainable Facility Design Reduces Operating Costs

The New Inpatient Building will meet LEED certification standards at the silver level or higher. The Department of Energy has found LEED-certified buildings, when compared to the national average, to have 25% lower energy use, and to reduce operational costs by 19%.[108] BIDMC believes that environmental responsibility is an integral part of providing high quality health care and is committed to improving environmental sustainability. Under the LEED certification framework, through the building design

[106] IHI Innovation Series white paper. O*ptimizing Patient Flow: Moving Patients Smoothly Through Acute Care Settings.* INSTITUTE FOR HEALTHCARE IMPROVEMENT (2003). *Available at http://www.ihi.org/resources/Pages/IHIWhitePapers/OptimizingPatientFlowMovingPatientsSmoothlyThroughAcuteCareSettings.aspx*

[107] Shaikh, S. B., Jerrard, D. A., Witting, M. D., Winters, M. E., & Brodeur, M. N.. *How Long Are Patients Willing to Wait in the Emergency Department Before Leaving Without Being Seen?* WESTERN JOURNAL OF EMERGENCY MEDICINE, 13(6), 463–467. (2012). *Available at* http://doi.org/10.5811/westjem.2012.3.6895

[108] U.S. Green Building Council's "LEED Facts" (August 7, 2013). *Available at* https://www.usgbc.org/articles/leed-facts

process BIDMC is striving to create a healthy, highly efficient and cost-saving green building.

In order to best determine what types of environmental sustainability initiatives would be ideal for the New Inpatient Building, BIDMC is using an integrative design process throughout the various project design phases. Preliminary design charrettes have already taken place with the engineering team and their recommendations for energy reduction strategies are being implemented as the design progresses.

The BIDMC New Inpatient Building addresses water and energy efficiency in numerous ways. A rainwater management system that includes both green roofs and a rainwater harvesting tank is being developed. Numerous strategies will be investigated for water use reduction at the BIDMC New Inpatient Building. The development of landscape design options, including the proposed roof garden will explore planting strategies which do not require extensive irrigation. Captured rainwater will be used to provide make-up water for the cooling tower and to satisfy as much of the irrigation demand as possible. Low flow water fixtures and fittings will be specified where permitted by health and safety regulations to limit use of potable water within the building as much as possible. A range of energy reduction options are also currently being evaluated for energy saving measures such as heat recovery, Dedicated Outdoor Air System, and chilled beams. Additionally, the project scope will include enhanced commissioning services to ensure the building systems are operating as designed.

The New Inpatient Building will provide the infrastructure to support advanced technological capabilities in the building to improve value of care. Communication systems are expected to be directly connected to hospital information systems to facilitate improved communication among providers, clinical staff and support staff, allowing a more rapid response when housekeeping, maintenance and other support services are needed. Patient flow is expected to improve with advanced communication systems. Patients will have access to a state-of-the-art building and the Project will help BIDMC continue to be a meaningful alternative to higher cost providers.

D. Price and Total Medical Expenses

Provider price variation is a critical driver of cost growth in the Commonwealth of Massachusetts.[109] A foundational component of BIDMC's competitive advantage is its lower cost, high quality position in the market as measured by price and by total medical expenditures, a function of price and utilization. In constructing the New Inpatient Building, BIDMC will be able to care for increasingly complex patients in an efficient and effective manner while helping BIDMC and its affiliates maintain their below-average

[109] Price can vary dramatically among hospitals and is not significantly correlated to individual hospital quality. Gabriella Lockhart, Ildiko Kemp, John Freedman, *Re-examining the Health Care Cost Drivers and Trends in the Commonwealth*, FREEDMAN HEALTHCARE (2016). *Available at* http://mahp.com/wp-content/uploads/2017/05/MAHP-freedman-report.pdf

price position. This, in turn, supports the Commonwealth's goals of managing cost growth and total health care expenditures.

In Massachusetts, a hospital's relative price index ("RPI") measures provider price variation within the Commonwealth's health care market. Relative price standardizes the calculation of provider prices to account for differences in patient acuity, the types of services providers deliver to patients, and the different product types that payers offer to their members.[110] In standardizing this measurement, an RPI above 1.0 indicates above average pricing, while an RPI below 1.0 indicates below average pricing, relative to other providers within the geographic region. Among the academic medical center cohort, aggregated data generated a statewide RPI above 1.0 across commercial payers, signifying above average pricing for the entire cohort. Moreover, with a statewide RPI of 1.17, academic medical centers are paid an average of 17% more than other acute care hospitals across commercial payers. BIDMC had an average statewide commercial relative price index of 1.05 in 2016, which is below the statewide academic medical center average in Massachusetts.

BIDMC will continue to support growth at its affiliated community hospitals and retain and enhance care in these lower cost settings, as appropriate. BIDMC's subsidiary community hospitals, Beth Israel Deaconess Hospital – Milton, Beth Israel Deaconess Hospital – Plymouth, and Beth Israel Deaconess Hospital – Needham, all generate RPI's below the statewide average (0.76, 0.87, and 0.98 respectively).[111] In striving to keep appropriate cases in its community hospitals, BIDMC is committed to continuing work with community hospitals to keep care in the local, lower cost, most clinically appropriate, and high quality setting. Significant investments have been made to increase the availability of high level services at its community hospital affiliates, especially in the areas of cancer care, obstetrics, maternal fetal medicine, gynecology services, bariatrics, and spine care. These investments have successfully resulted in growth in admissions and observations at BIDMC's community hospitals, consistent with the Commonwealth's cost containment goals.

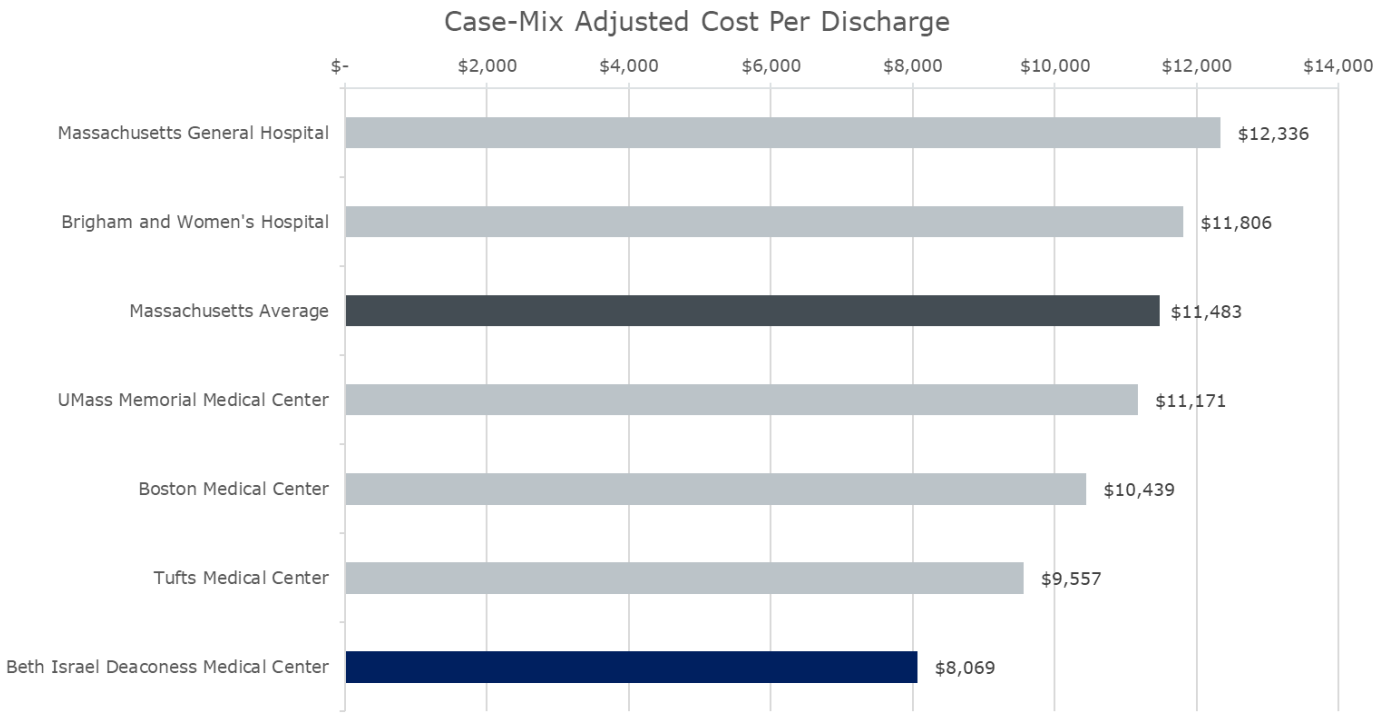
E. Provider Costs

BIDMC supports the Commonwealth's goals of managing cost growth and total health care expenditures with its lower than average case-mix index ("CMI") adjusted cost per discharge. As demonstrated in Table 17 below, in FY 2016, the average CMI-adjusted cost per discharge for hospitals in Massachusetts was $11,483, based on the CMS cost report issued in October 2017.**[112]** Not only was BIDMC lower than the average CMI-

[110] THE CENTER FOR HEALTH INFORMATION AND ANALYSIS, Report, *Relative Price: Provider Price Variation in the Massachusetts Commercial Market* 1 (2018). *Available at* http://www.chiamass.gov/assets/docs/r/pubs/18/Relative-Price-Report-2018.pdf
[111] Ibid.
[112] October 2017 Medicare Cost Report.

adjusted cost per discharge for local academic medical centers, but it had the lowest adjusted cost per discharge of $8,069.

Table 17



Financial data for hospital cost report period ending 09/30/2016. Data is from October 2017 Medicare Cost Report release.

BIDMC is committed to maintaining a low level of cost per discharge compared to its academic medical center peers. In order to accommodate for the growing patient volume and increasing CMI, the New Inpatient Building is designed to have the capabilities, equipment, and technology that will enable BIDMC clinicians and staff to provide the advanced, highly-complex patient care needed by its patient panel. The New Inpatient Building is being designed to be implemented and operated in a cost-efficient manner and will be flexible and adaptive to meet the future needs of BIDMC's patients, further promoting cost-efficiency and allowing BIDMC to continue to compete effectively on the basis of price and provider costs.

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 the Applicant has identified?*

The New Inpatient Building will allow BIDMC to implement the latest Massachusetts Department of Public Health ("DPH") requirements, which incorporate Facilities Guidelines Institute ("FGI") guidelines[113], and hospital design best practices to ensure the building is designed to best serve the needs of its patient population.

The building thoughtfully incorporates numerous design elements that have been shown to improve health care outcomes, increase operational efficiencies, and enhance the quality of care delivered to patients. Such elements include:

- Single-bedded rooms, both medical/surgical and intensive care unit ("ICU");
- Family zones in patient rooms;
- Access to daylight and views of nature;
- Improved patient floor layout;
- Rightsizing the proportion of centralized and decentralized support and supply areas;
- New central sterile processing and operating room storage area; and
- Expanded space to accommodate state-of-the-art operating and procedure rooms.

A. Evidence-Based Design

The design of patient and clinical spaces in a hospital can have a significant positive impact on patient outcomes. As medical advances drive the delivery of health care, hospital facilities must be designed, sized and configured to effectively keep up with new developments in order for hospitals to provide cutting-edge treatment.[114] BIDMC's New Inpatient Building will incorporate design features that align with medical advances to enhance patient care. Various design elements have been shown to benefit patients by decreasing length of stay, reducing hospital acquired infection rates, improving

[113] Under DPH oversight, new hospital construction must comply with applicable FGI guidelines and specified design and construction requirements. The Department of Public Health requirements currently reference the 2014 Edition of the FGI Guidelines for Design and Construction of Hospital and Outpatient Facilities. The New Inpatient Building will be designed to meet the 2018 FGI Guidelines, anticipating the Department's adoption of the latest version in advance of this Project's plan approval.

[114] *Best practices for healthcare renovations, new construction*, HEALTHCARE FACILITIES TODAY (2013). *Available at* https://www.healthcarefacilitiestoday.com/posts/Best-practices-for-healthcare-renovations-new-construction--118

patient experience, and enhancing efficiencies.[115,116] Table 18 summarizes the correlation between advanced design features and enhanced health care outcomes.

Table 18

Design Factors and Healthcare Outcomes[1,2]						
Health Care Outcomes	**Single Bed Rooms**	**Access to Daylight**	**Views of Nature**	**Family Zone in Patient Rooms**	**Nursing Floor Layout**	**Decentralized Supplies**
Reduced hospital-acquired infections	**					
Reduced medical errors	*				*	
Reduced patient falls	*			*		
Reduced pain		*	**			
Improved patient sleep	**	*				
Reduced patient stress	*	*	**	*		
Reduced depression		**	*	*		
Reduced length of stay		*	*			
Improved patient privacy and confidentiality	**			*		
Improved communication with patients & family members	**			*		
Improved social support	*			*		
Increased patient satisfaction	**	*	*	*		
Decreased staff injuries						
Decreased staff stress	*	*	*			
Increased staff effectiveness	*				*	*
Increased staff satisfaction	*	*	*			

[1] Outcomes and design elements adapted from Healthcare Leadership White Paper Series, "A Review of the Research Literature on Evidence-Based Healthcare Design," September 2008.

[2] Items with ** indicates that there is especially strong evidence (findings from multiple studies) indicating that a design intervention improves a healthcare outcome. Items with * indicates that a relationship between the specific design factor and healthcare outcome was indicated by the empirical studies reviewed in the report.

Patient rooms in the New Inpatient Building will incorporate the design factors identified in Table 18, as well as numerous design elements from The Center for Health Design's Medical-Surgical Patient Room Design Checklist.[117] This Checklist incorporates 23 evidence-based design goals into four overarching categories, including patient safety, worker safety and effectiveness, quality of care and patient experience. Specific design elements that are included in the New Inpatient Building and their benefits are discussed below.

[115] E.R.C.M. Huisman, et al., *Healing environment: A review of the impact of physical environmental factors on users*, 58 BUILDING AND ENVIRONMENT 70 (2012). *Available at* https://www.sciencedirect.com/science/article/pii/S0360132312001758

[116] John Reilling, et al., *The Impact of Facility Design on Patient Safety*, PATIENT SAFETY AND QUALITY: AN EVIDENCE-BASED HANDBOOK FOR NURSES (2008). *Available at* https://www.ncbi.nlm.nih.gov/books/NBK2633/

[117] *Patient Room Design Checklist and Evaluation Tool - Medical-Surgical Patient Room Design Checklist*, THE CENTER FOR HEALTH DESIGN (2015). *Available at* https://www.healthdesign.org/insights-solutions/patient-room-design-checklist-and-evaluation-tool

B. Benefits of the New Inpatient Building's Single-Bedded Rooms

Since 2010, the FGI guidelines have required all inpatient rooms to be single-bedded. DPH adopted these guidelines and requires all new inpatient construction and renovation projects to provide single-bedded patient rooms. Extensive research supports the efficacy of single-bedded patient rooms. Single-bedded rooms help reduce the incidence of hospital-acquired infections, improve patient sleep, and reduce stress for patients and their families, which ultimately improves health care outcomes.[118] Moreover single-bedded rooms have been proven to positively impact patient care, safety, privacy, comfort, and improve patient recovery rate.[119] The New Inpatient Building will include 30 additional ICU beds and 128 single-bedded medical/surgical rooms, enabling BIDMC to decant many of the older double-bedded medical/surgical rooms that are currently utilized in its other older buildings. The Project will increase BIDMC's percentage of medical/surgical beds in single-bedded rooms across both the East and West Campuses from 37% to 55%, to effectively meet patient demand and capacity needs.

1. Improved Room Design to Reduce Falling Hazards and Noise Levels

Facility design is also a key factor in avoiding adverse events.[120,121,122,123] Single-bedded rooms provide additional space which helps reduce tripping or falling hazards created by medical equipment and personnel in tight quarters. Research identified two cohorts with high fall-rates as patients age 65 years and older and behavioral health patients.[124] As noted in ***F1.a.i***, 32% of the patient panel is aged 65 and older, and 41% of patient panel encounters were with patients who had a primary or co-morbid behavioral health diagnosis.

Improved room and floor layouts in the New Inpatient Building will reduce the noise heard from patient alarms, and move much of nearby staff activity away from patient

[118] Ulrich, Rogers S., et al. "*A Review of the Research Literature on Evidence-Based Healthcare Design,"* HEALTH ENVIRONMENTS RESEARCH AND DESIGN JOURNAL 3(1) (2008). *Available at* https://www.ncbi.nlm.nih.gov/pubmed/21161908

[119] Reiling J, Hughes RG, Murphy MR. *The Impact of Facility Design on Patient Safety.* In: Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville (MD): AGENCY FOR HEALTHCARE RESEARCH AND QUALITY (US); Chapter 28 (2008). *Available at:* https://www.ncbi.nlm.nih.gov/books/NBK2633/

[120] Ibid.

[121] Ulrich, Rogers S., et al. *"A Review of the Research Literature on Evidence-Based Healthcare Design,"* Health Environments Research and Design Journal 3(1) (2008). *Available at* http://journals.sagepub.com/doi/abs/10.1177/193758670800100306?journalCode=hera

[122] Chaudhury, Habib et al. "*The Use of Single Patient Rooms versus Multiple Occupancy Rooms in Acute Care Environments,"* COALITION FOR HEALTH ENVIRONMENTS RESEARCH (2004). *Available at* https://www.healthdesign.org/sites/default/files/use_of_single_patient_rooms_v_multiple_occ._rooms-acute_care.pdf

[123] Malkin, J. *"A Visual Reference for Evidence-Based Design,"* THE CENTER FOR HEALTH DESIGN AND ROBERT WOOD JOHNSON FOUNDATION (2018). *Available at* https://www.healthdesign.org/store/visual-reference-evidence-based-design

[124] Morgan, V.R., et al. *Hospital Falls: A Persistent Problem.* AMERICAN JOURNAL OF PUBLIC HEALTH 75, NO. 7. PP 775-777 (2011). *Available at:* http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.75.7.775

rooms. Single-bedded rooms eliminate ambient noise caused by roommates and reduce noise from other hospital activity. Noise reduction on hospital patient floors can contribute to shorter lengths of stay, improved sleep and reduced blood pressure,[125] and enhance the impact of other design elements that also improve recovery.[126]

2. Dedicated Family Zones

All single-bedded rooms in the New Inpatient Building, both medical/surgical and ICU rooms, will include dedicated family zones to support comfortable visitation and communication between patients, visitors, and providers. Evidence shows that welcoming families into patient rooms can improve patient safety, lowering overall costs, and improving communication and understanding between the patient and caregivers.[127] Family support during treatment is linked to higher patient satisfaction scores, and creating family zones in rooms encourages family and friends to be part of the healing process.[128]

3. Access to Daylight and Views of Nature

In the New Inpatient Building windows will be located at the end of every corridor, and in every single-bedded room, providing patients access to natural light. Many windows will overlook either the healing garden at BIDMC (described below) or the City of Boston's Riverway parkland. Research studies have found that natural lighting and access to views of nature can shorten a patient's length of stay and improve staff satisfaction. According to the Center for Health Design in California, "higher levels of natural light are linked with better performance of complex visual tasks and light requirements increase with age. Light impacts outcomes in health care settings by reducing depression among patients, decreasing length of stay in hospitals, improving sleep and circadian rhythm, lessening agitation among dementia patients, easing pain, and improving adjustment to night-shift work among staff."[129, 130]

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[125] Joseph A, Ulrich R*. Sound control for improved outcomes in healthcare settings. Concord, CA:* CENTER FOR HEALTH DESIGN; 2007. *Available at* https://www.healthdesign.org/sites/default/files/Sound%20Control.pdf.
[126] Nelson C, West T, Goodman C. *The hospital built environment: what role might funders of health services research play? Rockville, MD*: AGENCY FOR HEALTHCARE RESEARCH AND QUALITY. (2005). Contract no: 290-04-0011. AHRQ Publication No. 06–0106-EF. *Available at* https://archive.ahrq.gov/professionals/systems/hospital/hospbuilt/hospenv.pdf
[127] Nemschoff. (2014). Research Summary: The Case for Including Friends and Family in the Healing Process. Nemschoff, Inc.; *See* Sushrut Jangi, *We shouldn't keep families out of hospital rooms. Here's why.* THE BOSTON GLOBE (May 1, 2018). *Available at* https://www.bostonglobe.com/magazine/2018/05/01/family-members-are-doctor-best-asset-hospital-room-they-can-even-help-save-lives/sGFGSNnrX1RvguPEuZcwzH/story.html#
[128] Ibid.
[129] M. M. Shepley, et al., *The impact of daylight and views on ICU patients and staff*, 5 HEALTH ENVIRONMENTS RESEARCH & DESIGN JOURNAL. 46 (2012). *Available at* http://journals.sagepub.com/doi/abs/10.1177/193758671200500205?journalCode=hera
[130] Joseph A., *The impact of light on outcomes in healthcare settings*, CENTER FOR HEALTH DESIGN (2006). *Available at* https://www.healthdesign.org/sites/default/files/CHD_Issue_Paper2.pdf

The New Inpatient Building will include a rooftop healing garden so that patients, their visitors and staff have access to peaceful, quiet, outdoor space. One study cited that 95% of people who visited a healing garden reported a therapeutic benefit.[131] The healing garden will provide patients and staff in the New Inpatient Building with direct access to daylight, and up-close views of nature, two components noted as evidence-based design elements that enhance patient outcomes in Table 18.

4. Enhanced Patient and Staff Satisfaction, Efficiency and Patient Flow with the Addition of Single-bedded Rooms

The impact that single-bedded rooms have on patient and staff satisfaction is documented in research studies[132] and reinforced by the feedback that BIDMC has received from patients, families and staff. (Refer to sections ***F1.a.ii***, ***F1.b.ii***, and ***F2.c*** for detail.) The single-bedded rooms in the New Inpatient Building will help alleviate capacity challenges experienced at BIDMC and reduce operating inefficiencies caused by high occupancy. In calendar year 2017, the BIDMC medical/surgical units operated at over 85% of occupancy, more than 88% of the time. This high level of occupancy is exacerbated by the number of blocked beds at BIDMC. (Refer to ***F1.a.ii*** subsection B.1, *Rise in High Acuity Patients Increases Overall Demand for Inpatient Beds* for detail.) The addition of single-bedded rooms will lower BIDMC's count of blocked beds and in turn increase access for Emergency Department patients waiting for a medical/surgical or ICU bed, which is expected to reduce the interval time between patient admission and inpatient floor arrival. Research indicates that prolonged Emergency Department wait time and length of visit reduces quality of care and increases adverse events.[133] Increased Emergency Department patient throughput at BIDMC will enhance efficiency, patient flow and quality of care. Additionally, behavioral health patients originating from the Emergency Department or directly admitted as inpatients, often require constant monitoring and support by BIDMC staff, and single-bedded rooms are helpful for accommodating this need. Single-bedded rooms provide a better environment for behavioral health patients, by increasing privacy and quietness and reducing the potential for patient exposure to various environmental stressors that may result in adverse symptoms and side-effects of their underlying behavioral health issues. (Refer to ***F1.a.ii*** subsection B.6, *Needs of Behavioral Health Patients* for detail.) Alleviating the bed capacity constraints at BIDMC will reduce the time it takes for patients, including patients with behavioral health co-morbidities, to reach an inpatient room.

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[131] Cooper, C., and Barnes, M. (1995). *Gardens in Healthcare Facilities: Uses, Therapeutic Benefits, and Design Recommendations*. THE CENTER FOR HEALTH DESIGN, INC. *Available at* https://www.healthdesign.org/sites/default/files/Gardens%20in%20HC%20Facility%20Visits.pdf

[132] Ulrich R, Quan X, Zimring C, et al. *Report to The Center for Health Design, for the designing for the 21st century hospital project: The role of the physical environment in the hospital of the 21st century: a once-in-a-lifetime opportunity*. ROBERT WOOD JOHNSON FOUNDATION. (2004). *Available at* https://www.healthdesign.org/system/files/Ulrich_Role%20of%20Physical_2004.pdf

[133] Horwitz LI, Green J, Bradley EH. *United States emergency department performance on wait time and length of visit.* ANNALS OF EMERGENCY MEDICINE 55(2):133-141. (2010). *Available at* https://www.ncbi.nlm.nih.gov/pubmed/19796844

Additionally, each medical/surgical floor in the New Inpatient Building will have two negative pressure isolation rooms ("NPIRs"). In BIDMC's existing facilities, the limited number of existing NPIRs often requires that patients be transported across campus, and at times between the East and West Campuses, for admission to an available NPIR. The increased number of NPIRs in the New Inpatient Building will significantly reduce these patient transports and further enhance patient flow.

C. Improved Facility Layout and Design

The layout of the New Inpatient Building is designed to promote collaboration and efficiencies in the delivery of care, increase staff effectiveness, reduce medical errors, and be more cost effective.

1. Configuration of Staff Work Spaces on Patient Floors

Patient floors will include both decentralized and centralized staff spaces on each inpatient floor. Research shows that the layout of nursing stations affects collaboration and efficiencies in the delivery of care. The ideal configuration for an inpatient unit allows for both centralized and decentralized work stations and support spaces. Decentralized workstations outside patient rooms allow nurses to remain closer to the patients and provide increased patient visibility.[134] Concurrently, as health care is becoming a more inter-disciplinary practice, standards-setting entities, such as The Joint Commission, are emphasizing the need for more collaborative care among nurses, physicians and other health care professionals and support staff. The decentralized work spaces next to patient rooms will enhance provider communication and collaborative care. Centralized workstations and adjacent workrooms also facilitate collaboration, and will provide space for teaching and research.

2. Reduction in Hallway Space Inefficiencies

The layout in the New Inpatient Building will separate staff-only corridors from those that patients and visitors are permitted to use, reducing corridor clutter and noise. Improper use of hallway space may lead to such corridor clutter, which is frequently cited during hospital surveys conducted by The Joint Commission.[135] The design of the New Inpatient Building directly responds to this common patient care issue and ensures wide, clutter-free access to hallways by providing dedicated equipment storage space

[134] A. Joseph. *The role of the physical and social environment in promoting health, safety and effectiveness in the healthcare workplace* (2006). *Available at* https://www.healthdesign.org/sites/default/files/CHD_Issue_Paper3.pdf
[135] HEALTH SAFETY INSIDER. *How to prevent the Joint Commission's top Life Safety Findings*. (2017). *Available at* http://www.hcpro.com/SAF-328684-874/How-to-prevent-The-Joint-Commissions-top-Life-Safety-findings.html

and recessed staff space in between patient care rooms that do not interfere with hallway space.

3. Clinical Support Spaces

Decentralized clinical support spaces, such as clean and soiled rooms, medication rooms, and equipment rooms, provide multiple benefits, including:

- Increasing the amount of time spent with patients by reducing the number of steps staff take to access and/or dispose of items;
- Improving the accuracy of medication dispensing through proper medication room size and design and minimal distraction;
- Maintaining the appropriate level and quantities of supplies and minimizing excess inventory; and,
- Reducing corridor clutter by having appropriately sized equipment rooms.

The New Inpatient Building will also have a new and expanded Department of Central Sterile Processing and Operating Room Storage Area. This will provide the following benefits:

- Reduced travel times between the central sterile processing and operating room storage area and the clinical areas it serves;
- Improved turnaround and utilization of supplies and equipment in the central sterile processing and operating room storage area;
- A clean core[136] that is rightsized to accommodate the movement of carts and clean supplies to support the needs of operating and procedure rooms;
- Dedicated elevators and hallways to segregate transportation between sterile and soiled equipment going to and from the operating and procedure rooms; and
- The ability to stock and store specialty equipment and supplies in the clean core rather than within individual operating and procedure rooms, minimizing the amount of time staff spends accessing or looking for supplies.

[136] A clean core is a staff-only area within an operating room that is used for sterile supply storage. Only staff wearing appropriate surgical attire may enter the clean core to retrieve sterile supplies. As supplies are often stored on multiple exchange carts, the clean core must be sized to accommodate these carts. DEPARTMENT OF VETERANS AFFAIRS, *Surgical Service Design Guide. Available at* https://www.wbdg.org/FFC/VA/VADEGUID/dg_surgical_services.pdf

[136] Joseph A., *The impact of light on outcomes in healthcare settings*, CENTER FOR HEALTH DESIGN (2006). A*vailable at* https://www.healthdesign.org/sites/default/files/CHD_Issue_Paper2.pdf

[136] M. M. Shepley, et al., *The impact of daylight and views on ICU patients and staff*, 5 HEALTH ENVIRONMENTS RESEARCH & DESIGN JOURNAL. 46 (2012). *Available at* http://journals.sagepub.com/doi/abs/10.1177/193758671200500205?journalCode=hera

D. Improved Design of Perioperative Floor

The New Inpatient Building will create a perioperative floor that connects to and integrates with the perioperative floor of the Rosenberg Building. The New Inpatient Building's operating and procedure rooms will be large enough to accommodate surgical, procedural, and imaging equipment required for complex surgeries and procedures for BIDMC's patient panel. BIDMC's existing pre- and post-operative patient areas and family and visitor waiting area are undersized relative to industry norms. These areas do not meet current DPH regulatory requirements for new facilities.

1. State of the Art Operating and Procedure Rooms

As described in the Project Description in the response to ***Question 2.1***, it is no longer cost-effective to further renovate the existing facilities at BIDMC. The floor-to-floor height of the operating rooms makes it extremely difficult to renovate them to house new equipment in a cost-effective and timely manner. Renovation requires closing operating rooms for the duration of the renovation and expanding the operating room size, as is necessary. In BIDMC's existing facilities, increasing the size of the operating rooms would require a reduction in the number of operating rooms available after renovation. Existing operating rooms on the West Campus have an average area of 450 net square feet and a low existing floor-to-floor height of 14 feet 6 inches. Table 19 summarizes the operating room floor-to-floor heights for projects that are either under construction or were built in the last five years across the United States at other academic medical centers. Standard operating rooms in the New Inpatient Building will be approximately 625 net square feet, and specialty operating rooms will be approximately 750 net square feet with a floor-to-floor height of 18 feet. Similarly, existing procedure rooms on the West Campus have an average of 519 net square feet. Procedure rooms in the New Inpatient Building will be 600 net square feet. The larger size of the New Inpatient Building operating and procedure rooms will provide the appropriate space for modern clinical equipment and clearances to maintain a sterile field.

Table 19

Approximate Operating Room Floor-to-Floor Heights for National Academic Medical Center Construction Projects[1]		
Hospital	**Location**	**Height (FT)**
BIDMC - New Inpatient Building	Boston, MA	18
OU Medical Center	Oklahoma City, OK	20
MGH - Lunder Building	Boston, MA	18
Maine Medical Center	Maine	16
University of Connecticut Health Center	Farmington, CT	15

[1]Data collected by Turner Construction Company from local and National Healthcare projects.

The new operating and procedure rooms will provide the ability to leverage new technology and provide sufficient above-ceiling areas to accommodate equipment booms, medical gas services, room lights, and building support infrastructure, such as utilities, and communications conduits. In the past, all surgical and procedural tools were hand held, whereas today, many devices are brought into the room on carts and plugged into electrical outlets. Instead of running electrical cords along the floor to different outlets, all the wires in the new rooms can be collected into booms that move around a large radius during surgeries and procedures, and can be docked when not needed, enabling case flexibility and better utilization.

Building larger operating rooms allows accommodation of the newer surgical technology on the West Campus. For example, newer surgical robots require more space as compared to existing surgical robots on BIDMC's current campus. As discussed in ***F1.a.ii*** (refer to subsection 9.B, *Better Technology, Equipment and Minimally Invasive Surgery*), the size of the existing operating rooms on the West Campus is insufficient for newer robotic surgical technology. One or two minimally invasive surgery operating rooms on the West Campus in the New Inpatient Building will enable BIDMC to utilize robotic surgical technology, making operating room use more efficient and aligned with advanced surgical practices. Research supports that with the aid of surgical robots, patients have a shorter case duration, improved clinical outcomes, and better patient safety.[137]

The complexity of cases, as well as BIDMC's role as an academic medical center, results in the need to accommodate a greater number of residents, fellows, nursing, and other staff members in the operating and procedure rooms. The ability to configure the rooms to accommodate these individuals without compromising the surgical team,

[137] Oh, Hong Choon et al., *Assessing the Performance of Operating Rooms: What to Measure and Why?* 20 PROCEEDINGS OF SINGAPORE HEALTHCARE 105 (2011), *available at* http://journals.sagepub.com/doi/pdf/10.1177/201010581102000206

sterile field, and surgical flow can only be accomplished by larger operating and procedure rooms. These enhancements will address existing clinical and medical education challenges, better meet the needs of the patient panel, and improve health outcomes.

2. Enhanced Pre- and Post-Operative Care Units

The New Inpatient Building Project will create additional flexibly designed pre-operative/procedure capacity and enable BIDMC to improve and primarily use the existing combined pre- and post-operative care unit in the Rosenberg Building for post-operative/procedure care (refer to ***F1.a.ii*** subsection B.9.e, *Expanded Pre-operative and Post-operative areas to Accommodate Patients and Clinical Staff*). In the current configuration of the Rosenberg Building, visitors and family members need to walk through the pre- and post-operative care area to arrive at the Trauma Surgery ICU, which may be uncomfortable for visitors, patients, and staff, and results in unnecessary foot traffic in a primarily staff corridor. The New Inpatient Building Project[138] addresses this design flaw and will provide more efficient access to the Trauma Surgery ICU from the new waiting area and ensures more privacy and a restful milieu for patients within the post-operative/procedure care unit. The patient bays within the pre- and post-operative areas will be designed to enhance staff workflow by increasing staff visibility to each patient.

All of the advanced design features and elements for the New Inpatient Building discussed above will allow BIDMC to meet the latest DPH requirements, better serve the needs of the patient panel, increase operational efficiencies, enhance the quality of care delivered to patients, and have a significant positive impact on patient outcomes.

[138] The New Inpatient Building Project includes renovations to the Rosenberg Building to connect the perioperative floors of the two buildings and to improve the pre- and post-operative care unit, including the addition of four toilet rooms, and one additional isolation post-operative/procedure care unit bay.

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

As presented in ***F1.b.i***, the New Inpatient Building's elements have been proven to result in improved health outcomes and operating efficiencies, higher patient and family satisfaction, and increased communication and collaboration among providers. Beth Israel Deaconess Medical Center ("BIDMC") believes the New Inpatient Building will have the most impact on measures and outcomes within following categories:

- Reduction in average daily blocked beds;
- Improved optimal occupancy rates;
- Reduced emergency department boarding;
- Increased patient satisfaction scores;
- Reduced incidence of patient falls; and,
- Reduced risk of hospital-acquired infections.

Each issue and specific corresponding performance metrics are defined and described in further detail below.

A. Improving Patient Access to Single-Bedded Inpatient Rooms

The New Inpatient Building will allow BIDMC to improve patient access to single-bedded rooms and meet current standards of care for newly constructed hospital facilities. As discussed in ***F1.b.i***, the current number of blocked beds in double-bedded rooms negatively impacts the availability of inpatient beds for daily patient care and use at BIDMC. BIDMC measures the average daily number of blocked beds on a monthly basis. As shown in Table 20, for fiscal years ("FY") 2015, 2016, and 2017, the average daily count of blocked beds was 12.3, 14.3, and 9.7,[139] respectively. BIDMC expects blocked bed numbers to rise over time without the addition of single-bedded rooms in the New Inpatient Building. Upon completion of the New Inpatient Building these additional single-bedded rooms will reduce the need to block a bed in a double-bedded room due to infection control precautions, behavioral health, or other patient-care related needs. This will enable BIDMC to better use its full complement of licensed beds and increase patient throughput.

[139] The decrease in average daily census of blocked beds in FY 2017 is in part attributable to a change in policy for Methicillin-resistant Staphylococcus aureus (MRSA) precautions. It is noted that the number of patients presenting with community acquired infections or other patient care needs that require treatment in a single-bedded room varies over time.

Table 20

Average Daily Census of Blocked Beds (All Services)				
Measure	**FY 2015**	**FY 2016**	**FY 2017**	**BIDMC Target for Year 2 of Project Operations[1]**
Average Daily Census of Blocked Beds (All Services)	12.30	14.30	9.70	*Ongoing Measurement and Improvement*

[1] BIDMC will measure and report on the 12 month period that commences at the beginning of the 13th month after the New Inpatient Building Project is fully operational.

Due to numerous external factors that affect the number of patients who require care in a single-bedded room environment, it is difficult to set a specific target for reduction in blocked beds. With the opening of the New Inpatient Building, BIDMC is committed to continuing to measure, and anticipates a decrease, in the daily count of blocked beds.

B. Improving Optimal Occupancy Rates

The industry standard for optimal occupancy rate for units with all single-bedded medical/surgical rooms is approximately 90%.[140] As shown in Table 21, for medical/surgical units with a mix of single-bedded and double-bedded rooms the optimal occupancy rate is 85%, and the optimal occupancy rate for intensive care unit ("ICU") beds is 80%.[141] Higher than optimal occupancy rates can lead to longer interval times the time it takes from an admission order to a patient arriving at a bed. (Refer to ***F1.a.ii*** subsection B.1, *Rise in High Acuity Patients Increases Overall Demand for Inpatient Beds.*)

[140] Krall, Scott, et al. *Higher Inpatient Medical Surgical Bed Occupancy Extends Admitted Patients' Stay.* WESTERN JOURNAL OF EMERGENCY MEDICINE, 10(2): 93-96. (2009). *Available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2691507/

[141] As discussed in ***F1.a.ii***, these industry norms were derived from consultation with health care planners and architects. There are no National or Massachusetts benchmarks.

Table 21

Occupancy Rates				
Measure	**FY 2015**	**FY 2016**	**FY 2017**	**BIDMC Target for Year 2 of Project Operations[1]**
Occupancy Rates				
Medical/Surgical (*in New Inpatient Building only*)	*N/A*	*N/A*	*N/A*	*Target not to exceed 90%*
Medical/Surgical (*remainder of BIDMC Campus Buildings*)	91%	89%	92%	*Target not to exceed 85%*
ICU *(All BIDMC)*	81%	81%	84%	*Target not to exceed 80%*

[1] BIDMC will measure and report on the 12 month period that commences at the beginning of the 13th month after the New Inpatient Building Project is fully operational.

BIDMC's average medical/surgical bed occupancy for FY 2015 to 2017 was 91%, 89%, and 92%, respectively. BIDMC's average ICU bed occupancy ranged from 81% in FY 2015 to 84% in FY 2017. As discussed in ***F1.a.ii***, BIDMC's medical/surgical bed occupancy is in the 92nd percentile, in a cohort of 48 academic medical centers with an overall CMI greater than 1.5 and at least 500 beds.

The enhanced efficiencies in the design of the New Inpatient Building, in conjunction with the increased capacity created by single-bedded rooms, should allow BIDMC to move towards attaining optimal industry occupancy rates for medical/surgical and ICU units. BIDMC anticipates attaining the 90% optimal occupancy rate for entirely single-bedded medical/surgical units in the New Inpatient Building. The additional bed capacity is also expected to indirectly help lower BIDMC's occupancy rates in existing medical/surgical units that have a mix of single and double-bedded rooms towards the 85% optimal mixed-bed occupancy rate. Similarly, the additional capacity is also expected to help lower BIDMC's ICU occupancy rates towards the 80% optimal ICU occupancy rate.

C. Reducing Emergency Department Boarding

High inpatient occupancy rates contribute to longer boarding times in the Emergency Department.[142] Longer boarding times in the Emergency Department create bottlenecks that hinder the Emergency Department's ability to see waiting patients and may trigger Code Help activation. (Refer to ***F1.a.ii*** subsection B.5, Insufficient Inpatient Bed Availability Contributes to Overcrowding in the Emergency Department for additional

[142] Krall, Scott, et al. *Higher Inpatient Medical Surgical Bed Occupancy Extends Admitted Patients' Stay.* WESTERN JOURNAL OF EMERGENCY MEDICINE, Vol X, No 2. (2009). *Available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2691507/

detail.) Emergency Department boarding has become a significant issue with the wait time from a bed request to assignment steadily increasing.[143,144] As shown below in

Table 22, BIDMC's average time from bed request to assignment for FY 2015 to FY 2017 was 2.2 hours, 2.3 hours, and 3.3 hours, respectively. The New Inpatient Building is expected to assist BIDMC in moving patients more quickly and efficiently to an inpatient bed, thereby reducing boarding times in the Emergency Department.

Table 22

ED Wait Times (Physician Order to Bed Assignment)				
Measure	**FY 2015**	**FY 2016**	**FY 2017**	**BIDMC Target for Year 2 of Project Operations[1]**
ED Wait Times (Physician Order to Bed Assignment)	2.2 hours	2.3 hours	3.3 hours	*Continued Improvement*

[1] BIDMC will measure and report on the 12 month period that commences at the beginning of the 13th month after the New Inpatient Building Project is fully operational.

As a measure to assess Emergency Department boarding, the Emergency Department generates a report identifying wait times at different steps during a patient's transition from the Emergency Department to an inpatient bed. Wait time is expected to decrease after the opening of the New Inpatient Building due to the increase in single-bedded rooms. Recognizing that many factors influence this wait time, BIDMC aims to continually improve this measure.

D. Improving Patient Satisfaction Scores

BIDMC collects patient satisfaction data using the Hospital Consumer Assessment of Healthcare Providers and Systems ("HCAHPS") survey, which measures patient satisfaction with their hospital experience, as required by Centers for Medicare and Medicaid Services. HCAHPS questions and survey inquiries relating to physical room environment and overall patient satisfaction assess the following:

- Maintenance of a quiet and clean room environment;
- Patient rating of Hospital; and
- Whether Patient would recommend Hospital to others.

[143] Brian J. Moore Et Al., *Healthcare Cost And Utilization Project Statistical Brief#227: Trends In Emergency Department Visits*, AGENCY FOR HEALTHCARE RESEARCH & QUALITY 2017, (2006-2014). *Available at* https://www.hcupus.ahrq.gov/reports/statbriefs/sb227-Emergency-Department-Visit-Trends.pdf

[144] *Hospital Compare, Brigham and Women's Hospital,* U.S. CTRS. FOR MEDICARE & MEDICAID SERVS., (2017). *Available at* https:/twww.medicare.gov/hospitalcompare/profile.html#proffab=2&1D=220110&1oc=BOSTON%2C%20MA&lat=42.3584308&/ng=-71.0597732&name=BRIGHAM%20AND%20WOMEN%27S%20HOSP IT AL&Distn=3. 6

As discussed in ***F1.a.ii***, patient satisfaction survey results indicate that patients who are in double-bedded rooms with a roommate, rate BIDMC with lower HCAHPS scores in these categories than patients without a roommate. BIDMC anticipates that single-bedded rooms and enhanced design and technology in the New Inpatient Building will decrease noise levels and reduce interruptions to patient rest. These improvements are expected to lead to increases in BIDMC's patient satisfaction scores in the following categories:

- Hospital Environment Quiet & Cleanliness (Top Box Rating of "Always");
- Rate Hospital 0-10 (Top Box Scores represents 9 & 10); and
- Recommend (Top Box Rating of "Definitely Yes").

After the initial twelve (12) months of inpatient bed floor operations in the New Inpatient Building, BIDMC expects patient satisfaction scores to improve during the second year of operation. During this period (months 13 through 24), BIDMC's goal is a 1% improvement, above the scores in the twelve-month period immediately preceding the occupancy of the New Inpatient Building patient bed floors, in top box patient satisfaction scores for BIDMC as a whole, as measured by HCAHPS survey feedback for each of the above-listed categories.[145] In subsequent years, BIDMC anticipates maintaining this improved satisfaction level.

E. Reducing the Incidence of Patient Falls

The New Inpatient Building will also incorporate design enhancements that provide an environment favorable to a reduced risk of patient falls in the medical/surgical units. As shown in Table 23, from FY 2015 to FY 2017 BIDMC experienced a decrease in the number of patient falls that lead to injuries. The single-bedded rooms in the New Inpatient Building are expected to further reduce the risk of patient falls by providing inpatient rooms with more space, expanded lines-of-sight for staff supervision, and better, unobstructed access to bathrooms for patients.

[145] This improvement target in overall BIDMC patient ratings in the above-listed categories reflects the fact that single-bedded rooms in the New Inpatient Building will make up less than one-quarter of total inpatient beds at BIDMC.

Table 23

Patient Falls with Injury (per 1,000 days)[1]						
Measure	**FY 2015**	**FY 2016**	**FY 2017**	**Massachusetts' Average**	**National Benchmark**	**BIDMC Target for Year 2 of Project Operations[2]**
Adult Medical	1.35	0.62	0.89	0.62	*N/A*	< 0.65
Adult Medical-Surgical	1.26	0.37	0.68	0.52	*N/A*	< 0.50

[1] Source: MHA PatientCareLink Project for the period January 2017 - December 2017. (Lower rate reflects better performance).
[2] BIDMC will measure and report on the 12 month period that commences at the beginning of the 13th month after the New Inpatient Building Project is fully operational.

BIDMC's goal is to bring patient falls in the New Inpatient Building below statistics generated from other local Massachusetts' Hospitals provided by the Massachusetts Health and Hospital Association ("MHA") PatientCareLink Project.[146] The FY 2017 MHA data identifies 0.62 Patient Falls with Injuries (per 1,000 days) among adult medical patients as the average among the BIDMC local hospital peer group and 0.52 Patient Falls with Injuries (per 1,000 days) among adult medical/surgical patients in this same peer group.

F. Reducing the Risk of Hospital-Acquired Infections

Replacing double-bedded rooms with single-bedded rooms will improve the following circumstances related to infection control:

- **Increased bed availability:** Increased bed availability has a significant impact on infection control-related issues. As discussed in ***F1.a.ii***, ***section B.3***, because BIDMC has numerous double-bedded rooms, available patient beds in these rooms must often be blocked for proper infection control. By adding single-bedded rooms in the New Inpatient Building, the number of blocked beds will be reduced, and that bed capacity will be made available to patients.
- **Improved availability of negative pressure isolation rooms:** BIDMC's current number of negative pressure isolation rooms ("NPIR") may limit its ability to provide care for patients with conditions that require NPIR to reduce the risk of transmission of disease (for example, in cases of active tuberculosis). Changes in NPIR availability may result in delays in admission and/or transfer to appropriate NPIR for both new and current patients. The New Inpatient Building will improve BIDMC's ability to care for patients who require care in a NPIR by optimizing bed management through an increased ratio of NPIRs to all inpatient beds. The New Inpatient building will increase the number of current NPIR by 45%, adding an additional 15 new NPIRs. An increased proportion of single-bedded, NPIRs better facilitates patient flow when transmission-based

[146] MHA PatientCareLink Project groups data collected for "peer groups" according to similar and comparable hospital types. *Massachusetts Hospital Data*, MASSACHUSETTS HEALTH & HOSPITAL ASSOCIATION, INC. (2018). *Available at* http://patientcarelink.org/healthcare-provider-data/hospital-data/

precautions need to be implemented for pathogens such as influenza, norovirus, C. difficile, tuberculosis, multidrug-resistant Gram-negative bacteria, etc.

- **Decreased exposure to patients with undetected communicable disease:** For patients with an as-yet undetected and undiagnosed communicable disease, such as influenza, sharing a double-bedded room with a roommate may increase the roommate's risk of exposure to the disease (depending on the pathogen and circumstances). Patients in separate rooms are not at risk for exposure to an as-yet undetected disease from close contact with an undiagnosed roommate, or roommate's visitors, who also may be sick with a communicable disease, as they have their own rooms.
- **Decreased opportunities for transmission from the environment to the patient:** Although appropriate hand hygiene and room cleaning in double-bedded rooms should prevent transmission of infectious microbes from the environment to the patient, shared rooms may increase the opportunity for contamination of room surfaces and transmission to patients. The physical environment of a single-bedded room benefits a patient in the following ways:

    - Fewer curtains and other shared surfaces would reduce the likelihood for such objects to carry infections;
    - More spacious single-bedded rooms may better facilitate daily room cleaning; and
    - Dedicated staff zone in entryway of patient rooms to provide area for donning personal protective equipment.

Increasing the number of single-bedded rooms may facilitate a decrease in the rate of Hospital-Acquired Infections ("HAI") over time, specifically laboratory-identified events for MRSA bacteremia and Clostridium Difficile Infections ("C. difficile") as provided in Table 24.

Table 24

Hospital Acquired Infection Rates[1]						
Measure	**FY 2015**	**FY 2016**	**FY 2017**	**Massachusetts' Average**	**National Benchmark**	**BIDMC Target for Year 2 of Project Operations[2]**
MRSA Blood Infections	0.57	0.77	0.37	0.60	1.00	*Continued Measurement*
Clostridium difficile Intestinal Infections	0.92	0.96	1.41	0.90	1.00	*Continued Measurement*

[1] BIDMC measures and benchmarks are reported on Medicare.gov's Hospital Compare.

[2] BIDMC will measure and report on the 12 month period that commences at the beginning of the 13th month after the New Inpatient Building Project is fully operational.

BIDMC tracks HAIs as it continuously seeks to improve infection rates and find ways to prevent spread of diseases among patients. Current research has not yet isolated the impact of single-bedded rooms on infection control and HAIs, leaving a gap in

understanding the principle behind this public health concern. The New Inpatient Building gives BIDMC an opportunity to measure HAIs and identify the value of having single-bedded rooms in an inpatient setting for infection control purposes.[147]

[147] Phillippe Brouqui, *Should we provide acute care in single or double room occupancy?*, 22 CLIN MICROBIOLOGY AND INFECTION. 402 (2016). *Available at https://www.ncbi.nlm.nih.gov/pubmed/26850827*

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 will take to ensure equal access to the health benefits created by the Proposed Project and how these actions will promote health equity.*

As identified in BIDMC's 2016 Community Health Needs Assessment ("CHNA"), Beth Israel Deaconess Medical Center ("BIDMC") serves residents living in Boston and other nearby communities, including many from vulnerable populations who are impacted by social determinants of health, such as socioeconomic status, insurance status, race, ethnicity, gender identity and sexual orientation, limited English proficiency, and immigration status (refer to ***F1.a.i***). These patient groups also experience heightened health disparities and greater internal and external challenges to accessing care. The limited current capacity at BIDMC creates barriers to care for the vulnerable members of BIDMC's patient panel. The New Inpatient Building will reduce health inequities faced by these patient populations by increasing timely access to care with the capacity that will be made available through the addition of single-bedded rooms.

A. Non-Discrimination

To ensure health equity to all populations, including those deemed underserved, BIDMC is committed to serving the community regardless of an individual's ability to pay. BIDMC does not discriminate based on ability to pay or payer source. As noted in ***F1.a.i***, approximately 45% of BIDMC's patient panel is comprised of patients with coverage provided by a government payer (including Medicare, Medicaid, and Health Safety Net, among others).

B. Culturally and Linguistically Appropriate Care

Patients receiving care in the New Inpatient Building will have access to BIDMC's expansive interpreter services. BIDMC serves multiple populations with distinct language and cultural needs. As noted in ***F1.a.i***, from FY 2015 to FY 2017 total inpatient days generated by patients with limited English proficiency who received interpreter services from a member of BIDMC's regularly employed staff increased by 13%. BIDMC strives to use a culturally appropriate lens to facilitate communication with, and understanding of, the patient experience. BIDMC was one of Boston's first hospitals with an Interpreter Services Department and has a proven track record for expanding capacity and increasing resources to serve BIDMC's increasing non-English speaking patient population. BIDMC interpreters provide translation services in many different languages including Russian, Spanish, Cantonese, Mandarin, Cape Verdean, Portuguese, Haitian Creole, Thai, Vietnamese, and American Sign Language.

BIDMC accommodates patients' need for interpreters 24 hours a day, seven days a week. Interpreters are provided on request for over 70 additional languages either in person, via phone or video. The Interpreter Services staff members also offer in-service training to employees and clinical staff to enhance BIDMC's Cultural Competence Initiative, a BIDMC program to focus efforts to provide care that recognizes and responds to differences in culture. Inpatients in the New Inpatient Building will have access to all of these services, and the design of the new single-bedded patient rooms will enable interpreters to provide services in a more convenient and private manner.

BIDMC also has one of Massachusetts' longest tenured nationally certified American Sign Language interpreters on staff, supported by a cadre of certified per diem American Sign Language interpreters. In the existing facilities, BIDMC has Sorenson videophones installed across the campus to increase communication access for BIDMC's Deaf and Hard-of-Hearing patients and their families. BIDMC also has personalized headsets with adjustable volume controls for use by patients admitted to the hospital. For these efforts, BIDMC received the Outstanding Organization of the Year award from the Massachusetts Commission for the Deaf and Hard of Hearing in a ceremony at the Massachusetts State House on March 24, 2014. These technological supports will be expanded to the New Inpatient Building.

C. Equal Access to Care

In addition to serving as a tertiary/quaternary care provider to community-based practices and as a clinical research center, BIDMC also serves as the community hospital for residents from surrounding neighborhoods, some of whom live in the city because they have physical disabilities and/or rely on public transportation. Many of these patients rely on public transportation to get to and from medical appointments at BIDMC. BIDMC is easily accessible via public transportation; seventeen bus routes, nine shuttle routes, five commuter rail lines, and three subway lines currently service the BIDMC campus and surrounding area. This access to public transportation at BIDMC is critical for its patient panel, as it ensures access to care in an affordable manner. The location of the New Inpatient Building on BIDMC's West Campus ensures that the patient panel will continue to have access to the high quality, cost-effective care BIDMC provides. The availability of additional capacity at the New Inpatient Building will ensure these underserved patients also have additional access to care in a convenient location.

BIDMC is committed to making its facilities and medical services accessible and welcoming for all patients. All existing BIDMC facilities built after the 1990 passage of the Americans with Disabilities Act ("ADA") are compliant with the standards it established. The New Inpatient Building will be designed to the most recent ADA standards established for new facilities. BIDMC has also ensured the New Inpatient Building is compliant with rules and regulations established by the Massachusetts Architectural Access Board ("MAAB"). Often, the new MAAB has more stringent design

standards than the ADA requires. All rooms in the New Inpatient Building will be compliant with the higher of the two regulatory standards, either the ADA or MAAB. In addition, ensuring that the New Inpatient Building will be compliant with the most stringent access standards, during the design process BIDMC has consulted regularly with its Universal Access/ADA Staff and Advisory Council, a group comprised of staff and prior inpatients, as to whether the proposed designs will be truly effective to meet accessibility needs.

D. Community Outreach for Vulnerable Populations

BIDMC collaborates with community hospital affiliates and other community providers to address health inequities in the service area. Patients throughout BIDMC's service area benefit from its centers of excellence, residency training programs, and clinical research trials. The New Inpatient Building will improve access to BIDMC's high quality, cost-effective care for all patients, including the vulnerable patient populations BIDMC serves.

The New Inpatient Building will further BIDMC's efforts to address social determinants of health. Currently, BIDMC's Emergency Department utilizes Screening, Brief Intervention, and Referral to Treatment ("SBIRT") for the treatment and prevention of substance use disorders. This is an evidence-based approach to the delivery of early intervention and treatment services for both individuals with substance use disorders and those who are at risk of developing substance use disorders. Through the SBIRT program, BIDMC's Emergency Department notifies two large primary care practices by secure messaging if a patient of theirs is seen in the Emergency Department for a reason related to substance use. One area of focus for the SBIRT program is the reduction of opioid use. This approach improves communication and collaboration with primary care physicians. With the New Inpatient Building, the increase in single-bedded rooms is anticipated to support a decrease in interval time and enhance patient flow from the Emergency Department to an inpatient unit (refer to ***F1.a.iii*** subsection B, *Enhanced Facility Design Improves Operating Efficiencies)*. The increased efficiency that this provides will help enable providers in the Emergency Department to attend to all patients in a timely manner, including those who require SBIRT.

1. Community Health Centers

As described in ***F1.a.i***, BIDMC's Community Benefits Service Area ("CBSA") includes many vulnerable cohorts of residents who face additional barriers to access of health care. BIDMC considers the needs of these individuals to be a priority, and therefore focuses on providing care for the residents in these underserved neighborhoods in Boston and the surrounding areas. The CBSA includes communities that have a high proportion of residents whose income levels are at or below the federal poverty line. Government payers including Medicare, Medicaid, and Health Safety Net account for over 45% of BIDMC's patients receiving inpatient care. (Refer to ***F1.a.i*** subsection E,

Payer Mix Within Patient Panel) Many of the neighborhoods in BIDMC's CBSA correlate with one of BIDMC's six licensed and/or affiliated health centers.

BIDMC supports numerous initiatives at these health centers to ensure that residents have access to local primary and secondary care, while BIDMC provides necessary tertiary and quaternary care. BIDMC is committed to maintaining strong relationships with primary care clinics, including community health centers, that operate in the service area, many of which are members of the Community Care Alliance. The Community Care Alliance is a health center network that was founded by BIDMC in 1997. The Community Care Alliance includes six Community Health Centers licensed or affiliated with BIDMC, five of which are in Boston. BIDMC collaborates with the Community Care Alliance health centers on clinical and administrative issues and provides technical assistance to help its members continue to provide health care services, including:

- Staff training;
- Recruitment assistance;
- Interpreter services;
- Financial support;
- Credentialing of physicians and mid-level providers;
- Coordination of care tools that also address social determinants of health;
- Admitting privileges; and
- Eligibility for Membership in the MassHealth Accountable Care Organization Program through Beth Israel Deaconess Care Organization.

The care provided at these health centers focuses on addressing the needs of vulnerable populations within BIDMC's patient panel. Various initiatives and efforts targeted at addressing the social determinants of health among these populations are discussed below.

a. Behavioral Health Patients

BIDMC assists in increasing access to care for behavioral health patients by providing on-site psychiatry care and services at Bowdoin Street Health Center. Bowdoin Street Health Center also offers "warm hand-offs" in which a care manager is available on-site to provide behavioral health assessment, intervention and consultation to patients during primary care visits. Additionally, at the Charles River Community Health Center, a BIDMC/Harvard Medical Faculty Physician psychiatrist provides clinical support and training to enable primary care clinicians to provide appropriate and responsive behavioral health care to health center patients.

b. *Gender Identity and Sexual Orientation*

As a community leader in this area, BIDMC offers a variety of inclusive services to serve the Lesbian Gay Bisexual and Transgender ("LGBT") community. BIDMC hosts faculty development courses and collaborates with Fenway Health and Fenway Institute's National Center for LGBT Health Education to ensure that LGBT individuals are able to access high quality, sensitive and inclusive care. BIDMC also holds a transgender support group which has been facilitated by a licensed speech-language pathologist and a clinical social worker to help transgender individuals work on voice modification and emotional issues as they transition. These efforts are aimed at promoting greater health equity and reducing disparities in access to care for LGBT populations, consistent with BIDMC's Community Health Implementation Plan.[148]

c. *Other Vulnerable Patient Groups*

BIDMC offers health care related services for survivors of abuse and/or violence. BIDMC's Center for Violence Prevention and Recovery provides care to survivors of domestic violence, sexual assault, and community violence through a continuum of education, outreach, and treatment interventions.

These patient groups are only a sample of the vulnerable populations that BIDMC cares for. While primary care is provided in the community setting, BIDMC serves as the community hospital for many of these patients, and is also a tertiary and quaternary care provider. The design of the New Inpatient Building and clinical services that will be provided address access to care, and specific barriers these patient groups face. The single-bedded rooms in the New Inpatient Building will provide improved privacy for BIDMC's patients, including vulnerable patient populations.

[148] *Community Health Implementation Plan.* BETH ISRAEL DEACONESS MEDICAL CENTER. (September 2016). *Available at* https://www.bidmc.org/-/media/files/beth-israel-org/community-benefits/community-health-implementation-plan.ashx?la=en&hash=34ABD4FEC2D8FBB7D060A94A74351C9EFE4F0699.

Application Narrative: Question 13
Section F1.b.iv – Additional Information on Health Outcomes

F1.b.iv Additional Information on Health Outcomes: *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.*

As described throughout this Application, the New Inpatient Building will assist BIDMC in improving health outcomes and quality of life for its patient panel, while enhancing health equity for vulnerable populations in need of enhanced access to inpatient care responsive to their unique needs. Features of the New Inpatient Building that support these goals include:

- Increased access to single-bedded patient rooms:
  - Will enhance room environment to improve patient sleep and reduce noise and stress for patients and their families, improving health care outcomes (refer to ***F1.a.ii***, ***F1.b.i*** and ***F1.b.ii***).
  - Will provide a better environment for behavioral health patients, who need greater privacy and access to single-bedded rooms (refer to ***F1.a.i, F1.a.ii,*** and ***F1.b.i***).
  - Will provide a better environment for other vulnerable populations, including LGBT, limited English proficient, patients of size and others (refer to ***F1.a.ii*** and ***F1.b.iii***).
  - Will help address Emergency Department overcrowding through improving interval time and facilitate greater access to needed acute care beds, thereby enhancing access to optimal care environments for BIDMC's most acutely ill and vulnerable patients (refer to ***F1.a.i*** and ***F1.a.ii***).
  - Will reduce the risk of infection (refer to ***F1.a.ii*** and ***F1.b.i***).
- State of the art operating rooms:
  - Will be large enough to accommodate equipment and imaging capabilities needed for the intensive and complex procedures required to meet the needs of BIDMC's patient panel, including tertiary and quaternary patients and to support BIDMC's commitment to training the next generation of physicians and allied health professionals (refer to ***Question 2***, ***F1.a.i***, ***F1.a.ii***, ***F1.b.i***, ***F1.c***, and ***F2.b***).
  - Additional private surgical consult rooms will enhance patient, family and care giver communications, particularly for vulnerable patient populations (refer to ***Question 2***, ***F1.a.i***, ***F1.a.ii***, ***F1.b.i***, and ***F1.b.iii***).
- Increased access to new facilities for care for vulnerable populations of BIDMC's Patient Panel:
  - BIDMC will continue to build upon existing relationships with primary care clinicians and other community-based providers throughout the BID-Network, including those that operate within the Community Benefits Service Area (refer to ***F1.b.iii*** and ***F2.c***).
  - The New Inpatient Building will be designed to meet current American Disability Act and Massachusetts Architectural Access Board standards

established for new facilities, thereby enhancing access to patients who face barriers to optimal inpatient care environments (refer to ***F1.b.iii***).
    - Improved physical room environment will enhance care for aging patients, supporting BIDMC's Community Health Implementation Plan objective of helping older adults to age in place (refer to ***F1.a.ii***.).
    - Expanded physical room size and specialized lifts and other equipment will better accommodate patients of size (refer to ***Question 2*** and ***F1.a.ii***).
- Improved operating efficiencies:
    - The New Inpatient Building will facilitate greater implementation of team-based and equitable care to continue BIDMC's high standards for clinical excellence through:
        - Providing technology platform for interpretive services (refer to ***F1.a.ii***, ***F1.b.iii***, ***F1.e.ii***, and ***F2.c***).
        - Separation of patient care areas from clinical support spaces will limit noise and operational activity in patient areas and reduce the environmental stress experienced by patients and families (refer to ***F1.a.ii*** and ***F1.b.i***).
    - The layout of inpatient floors will generate more staff and family spaces for higher quality of collaborative care for patients (refer to ***F1.b.i***).
    - The new perioperative floor, including enhanced pre- and post-operative/procedure care space, will enable staffing efficiencies and enhance team-care through improved collaboration of staff and distribution of resources, enhancing BIDMC's full mission: patient care, teaching, research and commitment to its neighborhoods and communities (refer to ***Question 2***, ***F1.a.ii***, and ***F1.b.i***).

Additional Information on the New Inpatient Building Project's support for BIDMC's Commitment to Medical, Nursing and Allied Health Education and to Research and Discovery for the Benefit of Diverse Patient Panel

BIDMC is an academic medical center that meets the highest standards of clinical excellence. As an affiliate of Harvard Medical School, BIDMC is committed to delivering outstanding care while training the next generation of physicians, nurses and allied health professionals.

BIDMC's affiliation with Harvard Medical School helps to attract some of the best and brightest physicians, nurses, allied health professionals and scientists in the world. These professionals require access to cutting edge technology and clinical space to support continuous efforts toward improved health outcomes, quality and access to care, and innovations that benefit BIDMC's patient panel. BIDMC's teaching mission and its application at the bedside supports the provision of outstanding clinical care to all of BIDMC's diverse patients. BIDMC operates numerous accredited residency programs for over 50 interns and almost 160 residents in a variety of clinical areas. BIDMC also participates with other area teaching hospitals to provide 62 additional

residency positions in other specialties. These trainees move into practice or teaching positions in the Greater Boston region and throughout the nation. Therefore, BIDMC's ability to attract the most highly qualified physicians and other clinicians is vital.

The New Inpatient Building will have modernized patient rooms, operating and procedure rooms, intensive care unit, pre- and post-operative/procedure areas, and teaching space, as detailed in the other sections of this Application.

The New Inpatient Building will enable BIDMC to provide students and teachers with modernized equipment, in clinical space that matches the level of care delivered to its diverse and complex patient population. It will enable BIDMC health care providers to continue to improve quality and access to care, treat the needs of the entire patient panel, and teach the next generation of clinicians. The New Inpatient Building will ensure that BIDMC is able to recruit and retain world-class physician faculty and other clinicians, attract top students, and will ensure BIDMC's continuing clinical excellence and ability to improve the health outcomes and the quality of life of its patient panel.

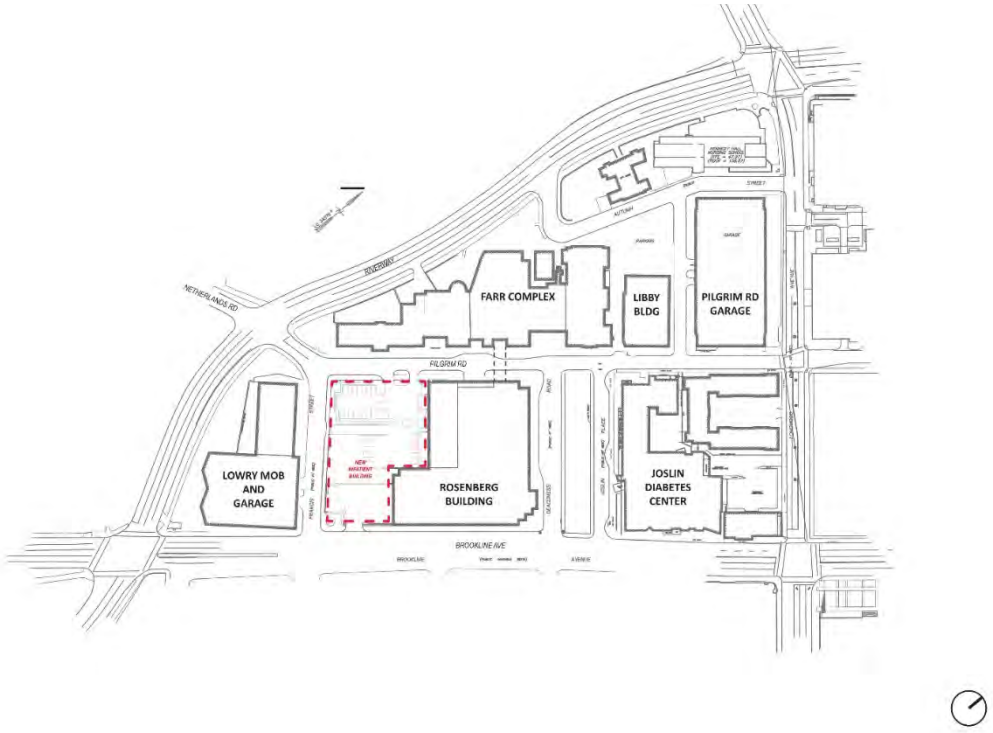
F1.c Efficient and Effective Operations: *Provide evidence that the Proposed Project will operate efficiently and effectively by furthering and improving continuity and coordination of care for the Applicant's Patient Panel, including, how the Proposed Project will create or ensure appropriate linkages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

Beth Israel Deaconess Medical Center ("BIDMC") engaged in a rigorous planning and design process to ensure that the New Inpatient Building will be efficient and economical to build and operate. The facility is designed to meet the evolving needs of the patient population and their families, and provide an environment for caregivers to deliver optimal services.

A. Site Selection

The selected site for the New Inpatient Building is adjacent to the Rosenberg Building. The Rosenberg Building is BIDMC's primary inpatient facility on the West Campus and in addition to inpatient beds, houses multiple operating rooms and, BIDMC's Emergency Department, a Level 1 Trauma Center. The location of the New Inpatient Building will enable services to be connected to, and integrated with, existing inpatient services in the Rosenberg Building. The adjacency of the New Inpatient Building to the existing Emergency Department and the operating rooms in the Rosenberg Building will provide connectivity to support rapid, safe, and efficient movement of patients between both buildings. Likewise, the New Inpatient Building's flexibly designed primarily pre-operative/procedure care unit will have streamlined connections to procedure rooms in the Farr Building through the bridge connector between the Rosenberg Building and the Farr Building. The connectivity between the three buildings will enhance clinical collaboration and efficiency of patient flow. Patients seen for services in any of these buildings will have covered, quick access to the entire complex. Refer to Table 25 for a schematic of the site with the New Inpatient Building.

Table 25



The integration and interconnections on the West Campus between the New Inpatient Building, the Rosenberg Building, and the Farr Building will provide additional operational efficiencies because they will be able to share and utilize existing ancillary clinical services, such as pharmacy, radiology, and pathology. Clinical and operational support services, such as central sterile processing, dietary services, clinical equipment engineering, and the main West Campus loading dock will also function more efficiently due to the proximity of these three buildings. BIDMC's helipad will be relocated to the New Inpatient Building's rooftop to receive patients via air ambulance and retain efficient access to the Level 1 Trauma Center in the Rosenberg Building.

B. Internal Design

The layout of the New Inpatient Building will decrease steps in workflows and enhance efficiency for care delivery teams which will improve the continuity of patient care. BIDMC engaged stakeholders at all levels to ensure the optimization of workflows. During the planning and design process, user groups, including operational support staff, nurses, physicians, and patients, were formed to evaluate every function and to ensure that the building will meet their needs in the most efficient manner possible.

The addition of single-bedded rooms in the New Inpatient Building will lower BIDMC's count of blocked beds in double-bedded rooms, which is expected to help decrease the

time Emergency Department patients spend waiting for a medical/surgical or intensive care unit ("ICU") bed. A reduction in interval time, the time from which an admission order is given to the time that a patient arrives at the inpatient bed, will in turn enhance access to BIDMC's Emergency Department bays for patients waiting to be seen in the Emergency Department.

In general, the New Inpatient Building layout will reduce the travel time required of care teams to keep them near their patients, which will improve the continuity and coordination of care. The new perioperative floor, with additional operating, pre-operative and post-operative/procedure area and location in proximity to the ICU and medical/surgical inpatient floors will also allow care teams to remain closer to their patients.

Capacity challenges have, at times, forced the existing Rosenberg Building pre- and post-operative/procedure areas to serve as short term holding areas until an inpatient bed is available. This creates inefficiency for the medical staff as they must travel to different areas of the existing hospital to round on post-operative patients. The New Inpatient Building will reduce this inefficiency by providing additional capacity. A new, flexibly designed pre-operative/procedure area will be created in the New Inpatient Building and the existing combined pre- and post-operative/procedure area in the Rosenberg Building will be dedicated primarily to post-operative care. (Refer to ***F1.a.ii***, subsection B.9.e, *Expanded Pre-operative and Post-Operative Areas to Accommodate Patients and Clinical Staff*.)

In addition to improved efficiencies in clinical areas, the New Inpatient Building will enhance efficiency of support services. In the existing West Campus, the central sterile processing and operating room storage area is undersized. Space constraints restrict storage of implants and operating room supply room kits, and force materials management personnel to travel greater distances to distribute materials, at times traversing the campus outdoors. The central sterile processing and operating room storage area in the New Inpatient Building will be appropriately sized to efficiently serve the perioperative floor and through the interconnectedness of the buildings described above, will enhance work flows.

Additional design elements of the New Inpatient Building Project that will improve continuity of care and generate efficiencies include the following:

- Expanded capacity in public, patient, service, soiled, clean, and freight elevators;
- Increase in number of truck bays from three to four, making loading and unloading more efficient;
- Enhanced technological infrastructure capable of supporting current and future communication and medical technologies; and

- A new satellite kitchen, to be located in the Rosenberg Building, with additional resources that will enable BIDMC to meet dietary needs, with proximity for efficient delivery to patient rooms.

The New Inpatient Building will also include much-needed conference and other education space that will be utilized for teaching, education, and meetings with patients and families. By locating conference and other education space in the New Inpatient Building, providers will not have to leave the facility to meet teaching obligations and attend meetings. This will enhance provider efficiency by reducing time spent traveling from one location to another.

C. Connections to Primary Care

BIDMC collaborates with and serves as the community hospital for many primary care practices and clinics, community health centers, and the patients they serve. This includes provision of exceptional, personalized, culturally and linguistically appropriate care for the urban population that resides near BIDMC. This patient population cannot readily travel to other suburban community hospital alternatives for care. Thus, BIDMC serves as the community hospital for this group of patients.

BIDMC works in partnership with Bowdoin Street Health Center (which is operated and licensed by BIDMC), The Dimock Center, Fenway Health and its affiliate, Sidney Borum Jr. Health Services, Charles River Community Health (formerly Joseph M. Smith Community Health Center), and South Cove Community Health Center, all of which are members of the Community Care Alliance. These community providers are uniquely positioned to offer access to community based primary care (refer to ***F.1.b.iii*** subsection C, *Reducing Emergency Department Boarding*) to Boston's most vulnerable patient populations. BIDMC works closely with these providers to ensure that Boston residents have access to on-site specialty care, as well as laboratory, radiology, mammography, and culturally and linguistically appropriate health services. The New Inpatient Building facilities and services will allow for increased access for these patients to the high quality, coordinated care that BIDMC offers.

BIDMC began participating in the MassHealth Accountable Care Organization ("ACO") Program through its clinically integrated network affiliate, Beth Israel Deaconess Care Organization ("BIDCO") in March 2018 (refer to ***Question 2.1***). BIDCO recently achieved Massachusetts Health Policy Commission-certification as an ACO, indicating that the organization met the Health Policy Commission's standards, including population health management and ability to coordinate cross-continuum care.[149] Through its participation in the MassHealth ACO Program, BIDCO strives to increase

[149] Mass.gov, *Health Policy Commission Certifies 17 Health Care Organizations Through New ACO Program.* Massachusetts Health Policy Commission*. Available at* http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/hpc-certifies-17-organizations-through-new-aco-program.html

access to high quality care for residents that are more negatively impacted by social determinants of health than the commercially insured population. A significant portion of BIDCO's efforts to improve health care for this patient population are accomplished by BIDCO members through the primary care setting. For example, BIDMC's Community Health Implementation Plan includes the goal of chronic disease management and care transition. Through BIDCO, data analysis and care and risk management tools are provided to BIDMC providers, including a Population Health Management Tool that helps primary care physicians keep people healthy and manage chronic conditions. BIDMC's links to primary care providers are vital to its success in providing vulnerable patients with continuity and coordination of care. These primary care linkages will continue to enhance care for BIDMC patients, including those with chronic conditions, and the state-of-the-art New Inpatient Building will be available when such patients need inpatient care. (Refer to ***F1.b.iii*** D, *Community Outreach for Vulnerable Populations* for additional discussion of linkages to patients' primary care.)

D. Future Flexibility

The New Inpatient Building is designed to retain flexibility to respond to changes in patient volume, patient and staffing needs, and the evolving health care environment. This flexible design will enable BIDMC to renovate existing clinical floors and procedural suites more efficiently in the future. Each clinical floor is designed so that specific service lines can be reallocated to different floors with minimal effort. Additionally, since the floors have very similar layouts, physicians and staff will be able to navigate each floor with familiarity, further enhancing operational efficiency.

Application Narrative: Question 13
Section F1.d – Evidence of Consultation

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

Since a broad range of input is valuable to the planning of a project, Beth Israel Deaconess Medical Center carried out an extensive consultative process with representatives from various regulatory agencies regarding the proposed Project. The following provides a list of some of the individuals who were consulted for this Project:

1. **Department of Public Health:**
    - Jennifer Barrelle, Chief of Staff to the Commissioner of Public Health
    - Torey McNamara, Assistant Director, Policy and Regulatory Affairs
    - Nora Mann, Director, Determination of Need Program
    - Rebecca Rodman, Deputy General Counsel
    - Ben Wood, Director, Office of Community Health Planning and Engagement
    - Halley Reeves, Office of Community Health Planning and Engagement
    - Sabrina Selk, Director, Office of Health Equity
    - Samuel Louis, Office of Health Equity

2. **Executive Office of Health & Human Services**
    - Marylou Sudders, Secretary

3. **Health Policy Commission:**
    - Lois Johnson, General Counsel
    - Katherine Mills, Policy Director for Market Performance
    - Megan Wulff, Deputy Policy Director for Market Performance

4. **Attorney General's Office:**
    - Sandra Wolitzky, Assistant Attorney General, Health Care Division
    - Elana Brochin, Health Care Project Manager

5. **Centers for Health Information and Analysis:**
    - Ray Campbell, Executive Director
    - Andrew Jackmaugh, Director of Communications and External Affairs
    - Dianne McCarthy, General Counsel

6. **Department of Mental Health:**
    - Lester Blumberg, General Counsel
    - Dr. Kathy Sander, State Medical Director
    - Janet Ross, Assistant Commissioner/Director of Licensing

7. **Executive Office of Energy and Environmental Affairs, MEPA Office:**
    - Deirdre Buckley, Director
    - Eve Schluter, Assistant Director

8. **Boston Public Health Commission:**
    - Monica Valdes Lupi, Executive Director, Boston Public Health Commission
    - Margaret Reid, Boston Public Health Commission

9. **City of Boston and Boston Planning & Development Agency - Attendees at one or more meetings included:**
    - Sonal Gandhi, Senior Policy Advisor, Director's Office
    - Jonathan Greeley, Director of Development Review, Development Review Department
    - Katelyn Sullivan, Senior Project Manager, Development Review Department
    - David Carlson, Deputy Director for Urban Design, Urban Design Department
    - Mike Christopher, Deputy Director for Development Review/Government Affairs, Development Review Department
    - Edward Hesford, Supervising Traffic Engineer, Boston Transportation Department
    - Charlotte Fleetwood, Senior Transportation Planner and Project Manager, Boston Transportation Department
    - Sarah Leung, Architectural Access Project Coordinator, Mayor's commission for Persons with Disabilities

Application Narrative: Question 13
Section F1.e.i – Process for Determining Need/Evidence of Community Engagement

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.*

Beth Israel Deaconess Medical Center ("BIDMC") has not built a new inpatient or ambulatory building on its campus in more than 20 years. Additional, modernized inpatient facilities are now needed to better serve BIDMC's diverse patient population. BIDMC also faces growing capacity constraints given its unique role as an academic medical center within a larger health care network, serving the tertiary and quaternary needs of the community-based affiliate hospitals and other providers. As inpatient volume and patient complexity have increased, BIDMC has maximized the use of its existing campus space for inpatient care through a series of renovations. Prior to proposing the New Inpatient Building Project, over time, BIDMC streamlined its delivery of care, and expanded its services within the existing East and West Campuses, while actively participating in efforts to ensure the right care, at the right time, in the right location as part of the Beth Israel Deaconess Care Organization.

The ongoing interactions of BIDMC leadership, including senior administration, the Boards of Directors, Trustees and Overseers, clinical leaders, frontline staff, and employees, with patients, their families, and community members over the past few years have underscored the broader BIDMC community's keen awareness of the patient panel's increasing need for the single-bedded patient rooms and other inpatient clinical facilities that will be met by the New Inpatient Building Project. As a result, BIDMC initiated a robust multi-year strategic planning process to determine how to most effectively meet the needs of patients and their families with more modernized inpatient care space. This process was guided by administrative as well as clinical and Board leadership. The primary alternatives of (a) further renovations to existing space, (b) building off-campus and (c) building on-campus were studied. After careful evaluation the best option was found to be building on-campus, as this alternative was determined to be the most cost-effective and to provide the greatest opportunities for improving overall efficiencies in the delivery of care. Further planning efforts were conducted to select a campus site and develop a conceptual plan for the New Inpatient Building Project that would meet patient panel needs and support and improve BIDMC's strategic, operational, and clinical goals.

The entire planning process was collaborative and inclusive, and many outreach meetings were held with various stakeholders throughout the BIDMC community to gather their input and feedback. Options were developed and rigorously evaluated, and this iterative process eventually led to the Board decision in 2017 to pursue the design and development of the New Inpatient Building Project now being proposed.

While in the early stages of the New Inpatient Building Project planning process, BIDMC undertook its tri-annual Community Health Needs Assessment ("CHNA"), in 2013 and

2016, consistent with the Affordable Care Act requirements for not-for-profit hospital organizations and the Attorney General Office's Community Benefit Guidelines for Non-Profit Acute Care Hospitals. This process is actively overseen by the BIDMC Board of Directors, and led by a Board subcommittee on Community Benefits. BIDMC used a three-phased, iterative approach designed to assess the health-related needs of residents within BIDMC's Community Benefits Service Area ("CBSA"), which includes the Boston neighborhoods of Bowdoin/Geneva, Roxbury, Fenway/Kenmore, Allston/Brighton, and Chinatown, with a focus on the most vulnerable populations. The simultaneous development of the CHNAs and the New Inpatient Building Project has ensured that the needs of vulnerable cohorts of patients served by BIDMC and residing in the CBSA helped to inform the plans for the New Inpatient Building.

Issues identified by the CHNA's stakeholders have been incorporated along with the health-related needs of BIDMC's broader patient population. The New Inpatient Building Project responds to BIDMC's CHNA Priority Need: Access to Care, identified during both 2013 and 2016 CHNAs and included in BIDMC's Community Health Implementation Plan ("CHIP"). As outlined in BIDMC's CHNA, vulnerable cohorts face barriers and obstacles to attaining good health and to accessing health care and health services. Such barriers may exist due to race and ethnicity, language, socio-economic status, insurance status, and/or gender identity and sexual orientation. Coupling data gathered from CHNA sources and stakeholders with the information gathered from BIDMC's Patient Family Advisory Council, BIDMC's Respect and Dignity Initiative, the Universal Access/ADA Staff and Advisory Council, patient complaints, and patient satisfaction surveys, the need for greater capacity and improved access, especially for single-bedded rooms, was apparent and is being addressed by the New Inpatient Building Project.

In 2017 and 2018, BIDMC's senior leadership met many times with various stakeholders, including the Community Care Alliance and the Community Benefits Committee, to help inform the development of the New Inpatient Building Project. These discussions reinforced the need for greater inpatient capacity; modernized and updated inpatient rooms; and greater privacy for patients and families during inpatient stays. The patient panel's need for interpreter services, proper support for patients of size, improved accommodation of privacy concerns for LGBT patients, and other vulnerable patients, and appropriate space for patients, their families and visitors are further discussed in ***F1.a.ii***.

Along with patients, families and staff, BIDMC has also actively engaged with local community residents to discuss the New Inpatient Building Project planning. As detailed in ***F1.e.ii***, BIDMC has met with and will continue to meet with neighborhood groups and local residents including the Longwood Medical and Academic Area Forum and the Roxbury Tenants of Harvard. In addition, BIDMC maintains a New Inpatient Building Project webpage to keep patients, family members, staff, residents, public officials, and community members updated on the project and to provide an important vehicle for ongoing community feedback and engagement.

Application Narrative: Question 13
Section F1.e.i – Process for Determining Need/Evidence of Community Engagement

BIDMC is committed to continued robust and meaningful community engagement as the New Inpatient Building Project design advances and the Project becomes operational. BIDMC will engage regularly with key stakeholders such as the Patient Family Advisory Council, and the Community Care Alliance, comprised of leaders of BIDMC's licensed and affiliated community health centers, and the other community stakeholders. BIDMC leadership, through its community benefits, community relations, workforce development, interpreter services, and government relations teams, maintains strong relationships with local community partners. These relationships provide opportunities for dialogue and engagement on an ongoing basis to facilitate BIDMC's understanding and engagement with diverse stakeholders regarding community health needs and social determinants of health. In addition, BIDMC will create an advisory committee representing a broad range of organizations and individuals to meet Massachusetts Department of Public Health Determination of Need requirements. Consistent with the Department's guidelines, the Community Advisory Committee will provide critical community-driven input and assist BIDMC with the community engagement process for the New Inpatient Building Project and requisite community-based health initiatives.

Application Narrative: Question 13
Section F1.e.ii – Community Engagement Evidence

F1.e.ii Community Engagement Evidence: *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".*

Beth Israel Deaconess Medical Center ("BIDMC") took numerous actions to ensure sound community engagement throughout the planning for the proposed Project. BIDMC conducts a comprehensive Community Health Needs Assessment ("CHNA") every three years (refer to ***F1.e.i***). The New Inpatient Building Project builds upon information obtained during the 2013 CHNA and was developed concurrently with the 2016 CHNA, incorporating community, patient and family perspectives. BIDMC also regularly consults with its Patient Family Advisory Council ("PFAC") which meets every other month. Its feedback about the patient and family experience was considered in the planning process for the New Inpatient Building Project which responds to the identified patient panel need for access to additional single-bedded rooms as well as other inpatient clinical facilities at BIDMC. In addition, BIDMC is collaborating with community groups, local residents, state and local officials, government agencies, and neighboring institutions. BIDMC met with the following on various dates:

- BIDMC PFAC;
- BIDMC Universal Access/Americans with Disabilities Act Staff and Advisory Council;
- Community Care Alliance Board of Managers, including leaders of Bowdoin Street Health Center, Charles River Community Health, The Dimock Center, Fenway Health, Outer Cape Health Services and South Cove Community Health Center;
- BIDMC Community Benefits Committee comprised of Trustees and Overseers;
- Medical Academic and Scientific Community Organization, Inc.;
- The Center for Community Health Education Research and Service, Inc.;
- The Boston Alliance for Community Health;
- Community Forums and Organizations, including Longwood Medical and Academic Area Forum, BIDMC Institutional Master Plan Task Force (part of City of Boston development review process), Fenway CDC, Roxbury Tenants of Harvard, and others;
- Neighboring Institutions, including Brigham and Women's Hospital, Boston's Children's Hospital, the Winsor School, Emmanuel College, Temple Israel, Dana Farber Cancer Institute, and Joslin Diabetes Center; and
- Neighboring Property Owners, including National Development (owner of One Longwood Center), The Druker Company (owner of Longwood Galleria) and MATEP (owner of the Medical Area Total Energy Plant).

Application Narrative: Question 13
Section F1.e.ii – Community Engagement Evidence

BIDMC prepared and shared presentations for these meetings, outlining the New Inpatient Building Project, on-going community engagement, and BIDMC's patient panel needs and Project objectives, including its public health value. Questions and discussion from stakeholders were encouraged and welcomed at all meetings. For additional information and a representative sample of presentations refer to Exhibit 5.

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 New Inpatient Building will help Beth Israel Deaconess Medical Center ("BIDMC") continue to serve as a high value, competitive academic medical center alternative in the community that addresses the clinical needs of, and reduces the health care cost burden on, BIDMC's patient panel. According to the Annual Health Care Cost Trends Report issued by the Massachusetts Health Policy Commission, "The Commonwealth seeks to contain health care spending while ensuring equal or better quality of care for all residents."[150] The biggest driver of the Commonwealth's cost challenge and rising expenditures has been identified as unwarranted price variation, and the utilization of higher-priced providers when lower priced providers of the same or higher quality are available.[151] In support of the Commonwealth's cost-containment goals, the New Inpatient Building Project will enable BIDMC to improve the high quality inpatient medical and surgical care that BIDMC already provides at a lower cost and make possible integrated service enhancements and other efficiencies.

The New Inpatient Building will provide facilities for core inpatient service lines currently provided by BIDMC, with some expansion in the number of medical/surgical beds, operating and procedure rooms, and commensurately-sized upgraded ancillary clinical services and support areas. The expanded and modernized facilities and services will allow BIDMC to improve quality and reduce cost as described throughout this Application in the following areas:

- By adding more single-bedded rooms, BIDMC hopes to realize:
  - The efficiencies of streamlined patient admissions and reduced Emergency Room interval time; and
  - Improved care delivery and patient outcomes through a reduction in hospital-acquired infections and increased patient satisfaction which will contribute to BIDMC's efforts to reduce length of stay and risk of re-admission;
- By adding more state-of-the-art operating rooms, BIDMC can:
  - Improve care delivery and patient outcomes by offering minimally invasive surgical techniques and other advanced surgical procedures and techniques, with the goal of reducing length of stay and readmissions; and
- By redesigning the pre-operative and post-operative/procedure areas, designing optimally sized medical/surgical and intensive care units, rooms

[150] *Massachusetts Health Policy Commission Annual Health Care Cost Trends Report 2016*. *Available a*t http://www.mass.gov/anf/budget-taxes-and-procurement/oversight-agencies/health-policy-commission/publications/2016-cost-trends-report.pdf
[151] Ibid.

and floors, and making other improvements to workflows, BIDMC will be able to:

- Provide patient care in a more efficient manner while further enhancing the satisfaction of patients and their families. (Refer to ***F1.c***.)

For more detailed descriptions of the above, refer to ***F1.b.i*** and ***F1.b.ii***. Through the New Inpatient Building Project, BIDMC can continue to meet the clinical needs of complex patients in the patient panel who might otherwise seek or be compelled to seek care at higher-priced facilities. (Refer to ***F1.a.iii*** subsection E, *Provider Costs* for discussion). BIDMC's lower cost, high quality position in the market increases access to affordable, equitable health care for Massachusetts residents. The New Inpatient Building will make BIDMC an even more accessible option for patients who need tertiary or quaternary care and will help lower total medical expenditures in the Commonwealth (refer to ***F1.a.iii)*** by providing access to enhanced facilities within their network.

BIDMC sought to minimize costs of the New Inpatient Building throughout the design and development process. The proposed design and construction process and project location is the most cost-effective option of all alternatives explored, and has the shortest time-to-completion, putting the new facility in service sooner (refer to ***F5.a.i***). Construction of the New Inpatient Building was determined to be more cost effective than renovation, as the capital costs associated with renovating existing facilities were significantly higher. Additionally, the existing facilities cannot be renovated within their current footprint to create an equivalent number of single-bedded rooms without significant loss of total medical/surgical beds and reduced clinical capacity. (Refer to ***F1.a.ii*** and ***F5.a.i***). The site selected does not require demolition of existing structures or the costly relocation of existing patient care services, and allows full and uninterrupted clinical functions to be maintained during construction. The New Inpatient Building design is efficient in that it ties into adjacent existing patient care facilities to leverage existing clinical and operational support services, such as pharmacy, loading dock and materials management, clinical equipment engineering and operating room storage areas. In addition, BIDMC will conduct a major capital campaign to raise philanthropic support to offset a significant portion of the total Project costs. This philanthropy will provide additional resources to the Commonwealth and reduce the required borrowing and financing costs associated with the Project.

As a large, non-profit, public charity, academic medical center, BIDMC is committed to making concerted efforts and investments that reduce health care costs. BIDMC has invested significant capital and effort to enhance the clinical capabilities at its affiliated community hospitals to enable more care to be provided at lower cost in the community. BIDMC is committed to the Commonwealth's goals for cost containment and works diligently to help achieve these goals through innovative payments models, such as

participation through the Beth Israel Deaconess Care Organization[152] in the MassHealth Accountable Care Organization, supporting the delivery of ancillary health care services provided by its network of community providers, and through ongoing clinical and administrative efforts to improve and streamline the delivery of care.

[152] The Beth Israel Deaconess Care Organization is a physician and hospital network and accountable care organization that partners with providers to achieve success in a value-based delivery system. Refer to ***F2.c*** for more information about BIDCO programs.

F2.b Public Health Outcomes**:** *Describe, as relevant, for each new or expanded service, how the Proposed Project will improve public health outcomes. Applicant must address, for each new or expanded service, how the Proposed Project will improve public health outcomes and how, in its entirety and without Disaggregation, the Proposed Project itself meets one or more or the Health Priorities and associated strategies set out in the Health Priorities Guidelines.*

As noted in ***F2.a***, the New Inpatient Building will provide modernized facilities for core inpatient service lines currently provided at Beth Israel Deaconess Medical Center ("BIDMC"). These facilities will address capacity constraints and enable BIDMC to continue to meet the clinical needs of its patient panel. BIDMC is a lower cost, high quality health care provider in Massachusetts (refer to ***F1.a.iii***), and the New Inpatient Building will provide patients with improved access to care at BIDMC. This improved access to enhanced inpatient facilities will contribute to the overarching public health value of increased access to care at the lowest reasonable cost.

The New Inpatient Building will address aspects of the Commonwealth's DoN Health Priority *Social Environment* as well as Executive Office of Health and Human Services ("EOHHS")/Department of Public Health focuses issues of mental illness, mental health and chronic disease.[153] Social support, specifically emotional support in the context of a relationship, can protect against stress.[154] The increased number of single-bedded rooms at BIDMC will provide an improved environment for patients to visit with, and derive support from their social network. Patient rooms will incorporate features that improve family presence and engagement in patient care.[155] The size of the new single-bedded rooms will make it more comfortable for families and guests to visit and stay by the bedside of loved ones. The increased privacy will enable patients and their visitors to speak candidly. Single-bedded rooms will also support the care of behavioral health patients, an EOHHS priority. And the addition of these single-bedded rooms, particularly those in the intensive care unit ("ICU"), will enhance BIDMC's ability to deliver high quality care to increasingly complex patients such as those with chronic diseases, another EOHHS priority.

In 2015, BIDMC introduced an application known as MyICU, an online communication tool for ICU patients, as well as their families and caregivers. MyICU is an initiative of BIDMC and is funded by a grant from the Gordon and Betty Moore Foundation[156] .

[153] See also F.2.c.A regarding Post-Acute Care Transition ("PACT") Team work to address all six DoN health priorities.
[154] Galea, S., Tracy, M., Hoggatt, K. J., DiMaggio, C., & Karpati, A. (2011*), Estimated Deaths Attributable to Social Factors in the United States*. AMERICAN JOURNAL OF PUBLIC HEALTH, 101(8), 1456–1465. *Available at* http://doi.org/10.2105/AJPH.2010.300086
[155] *Goal 14: Improve Family Presence and Engagement in Patient Care*., THE CENTER FOR HEALTH DESIGN'S MEDICAL-SURGICAL PATIENT ROOM DESIGN CHECKLIST. *Available at* https://www.healthdesign.org/insights-solutions/patient-room-design-checklist-and-evaluation-tool
[156] *Beth Israel Deaconess Medical Center introduces MyICU*. (October 26, 2015). *Available at* https://www.moore.org/article-detail?newsUrlName=beth-israel-deaconess-medical-center-introduces-myicu

As ICUs become a more family-friendly environment, encouraging visitors to stay and provide support for patients during the ICU stay, this application helps "provide people with a source of support; protect people from stressors; buffer the effects of stress; connect people with resources; and influence health behaviors". [157,158] Each ICU room in the New Inpatient Building will be equipped with technology that will enable patients, family members, and caregivers to access the MyICU application. BIDMC's MyICU team of doctors, nurses, social workers, and health care quality experts spent months working with members of the Patient and Family Advisory Council and ICU staff to gather information about the types of resources that would be most helpful to patients and their families. MyICU allows users to learn more about the patient's medical condition, communicate with members of the BIDMC care team, and to upload information about the patient. Family members can actively participate in care as MyICU lists the tests and procedures that can be expected on a given day and offers information on how to communicate with the team. MyICU is a convenient tool for patients and family members to note information they want to discuss with providers, to ask questions of the care team when they come to mind, and to request a family meeting with the care team. The design of each room in the New Inpatient Building will enable BIDMC to offer improved social support to patients including those with behavioral health issues, and the 30 new ICU beds will expand the use of the MyICU application as a tool to support ICU patients and their families.

[157] Ibid.
[158] *Determination of Need Health Priority Guidelines, January 2017,* MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH. *Available at* https://www.mass.gov/files/documents/2017/01/tr/guidelines-health-priority.pdf

F2.c Delivery System Transformation**:** *Because the integration of social services and community-based expertise is central to the goal of delivery system transformation, discuss how the needs of the 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 development of the New Inpatient Building included extensive consultation with a wide range of community-based stakeholders and organizations. (For a detailed description of the community engagement process, refer to ***F1.e.i*** and ***F1.e.ii***). This community engagement, along with Beth Israel Deaconess Medical Center's ("BIDMC's") 2016 Community Health Needs Assessment ("CHNA") informed and identified the priority needs of BIDMC's patient panel.

BIDMC utilized feedback from the Patient and Family Advisory Council ("PFAC") and Press Ganey surveys (which include required questions from the Hospital Consumer Assessment of Healthcare Providers and Systems) to assess the needs of the patient panel during the New Inpatient Building Project planning process. BIDMC also regularly convenes a multidisciplinary Respect and Dignity Workgroup (the "Workgroup"), comprised of stakeholders from across the medical center including health care quality, patient safety, ethics, social work, interpreter services, patient relations, and the PFAC. The Workgroup is engaged to ensure that BIDMC provides a reliable culture of respect and comfort for patients and addresses ways to prevent emotional harm by demonstrating respect for the patient as a person.

One of the key factors affecting patients' perceptions of respect and dignity indicated in patient feedback mechanisms is the lack of perceived and actual privacy that results from sharing a room. Therefore, capacity constraints and lack of privacy inherent to double-bedded rooms were considered as patient panel needs through these processes. (For additional detail, refer to ***F1.a.ii*** subsection B, *Patient Panel Need for Single-Bedded Rooms and Other Modernized Clinical Facilities*).

The New Inpatient Building will also increase access to inpatient care for members of the patient panel. The alleviation of capacity constraints and enhanced efficiencies will enable BIDMC to meet one of the priority areas defined in BIDMC's CHNA, "Access to Care." (Refer to ***F1.c*** for additional detail.) BIDMC's CHNA reported that "segments of the population, particularly low income and racially/ethnically diverse populations face significant barriers to care and struggle to access services due to lack of insurance, cost, transportation, cultural/linguistic barriers, and shortages of providers willing to serve Medicaid or low income, uninsured patients."[159] The capacity and efficiency of the

[159] *Community Health Needs Assessment (CHNA) – 2016*, Final Report, BETH ISRAEL DEACONESS MEDICAL CENTER, p.3 (2016). *Available at* https://www.bidmc.org/-/media/files/beth-israel-org/community-benefits/bidmc-2016-chna-community-health-needs-assessment.ashx?la=en&hash=250FB0AF225C6F2255CB73C6066A9A82FD054D7F

New Inpatient Building will permit members of BIDMC's patient panel, including those within the identified vulnerable populations, to have enhanced access to high quality care at BIDMC.

A. Transformation of Care Through Integration of Coordinated Care

The New Inpatient Building will be a resource for BIDMC in its continuing efforts to transform care delivery to improve population health and the coordination of care across settings. Many aspects of this transformation are pursued through Beth Israel Deaconess Care Organization ("BIDCO"), a physician and hospital network and accountable care organization ("ACO") that partners with providers to achieve success in a value-based delivery system. BIDCO coordinates with community-based social services organizations to address the social determinants of health and health risk factors most prevalent in its communities. BIDCO "promotes the highest quality of coordinated patient care, patient safety and cost-effective care among its participating providers through our integrated and coordinated managed care contracts and related medical management programs."[160] Through BIDCO, BIDMC participates in alternative payment models with commercial insurers, Medicare, and MassHealth, thus covering a high proportion of the BIDMC patient panel. In these value-based contracts, BIDCO addresses social determinants of health within its care coordination functions as these are critical factors to successful population health management. The BIDCO MassHealth ACO program, specifically through the Post-Acute Care Transition ("PACT") Team at BIDMC, addresses all six of the DoN health priorities and targets MassHealth members in particular. Some of BIDCO's programs that address both coordination of care and social determinants of health include:

- Population Health Management Tool: helps primary care physicians keep people healthy and manage chronic conditions;
- Complex Care Management: provides extra support from nurse care managers for patients with complex care needs and issues arising from social determinants of health;
- Post-Acute Care/Preferred Networks: ensures smooth transitions of care and reduces readmissions;
- PCP Advisory Committee Meetings: enhances delivery of primary care;
- Patient Ping: enhances care coordination with community-based providers through rapid notification of Emergency Department visits and admissions; and
- Rising Risk Management: identifies patients who are at risk for increasing medical needs and require earlier intervention to avoid exacerbations of their conditions.

[160] *Beth Israel Deaconess Care Organization*, BETH ISRAEL DEACONESS CARE ORGANIZATION. *Available at* https://bidpo.org/

BIDMC's PACT program specifically identifies social determinants of health that impact coordination of care for patients admitted to BIDMC for medical/surgical services. The PACT team is comprised of nurse care managers, pharmacists, and community resource specialists, who conduct face-to-face evaluations with BIDCO's MassHealth ACO members admitted to BIDMC and follow their care for 30 days post discharge. While patients are hospitalized, the PACT team performs standardized social determinants of health assessments and provide referrals and/or resources, as necessary. Two of BIDMC's important outpatient partners, Bowdoin Street Health Center and HealthCare Associates at BIDMC, are also in the process of implementing the Protocol for Responding to and Assessing Patients' Assets, Risks and Experiences ("PRAPARE") tool to screen MassHealth patients for social determinants of health needs.

B. Transformation of Care Through Integration of Community Connections

BIDMC recognizes its responsibility to collaborate with community-based leaders and organizations to understand the needs of their respective communities. In addition to participating in BIDCO's MassHealth ACO (as described above an in ***F1.c***), BIDMC partners with the community to develop programs and policies to ensure access to health care services and improve health status, particularly for residents of underserved communities.

BIDMC founded and is an active participant in the Community Care Alliance, a network of Boston neighborhood community health centers licensed and/or affiliated with BIDMC. Community Care Alliance health centers provide a safety net for those in need and ensure access to health care for the disenfranchised, underinsured, and uninsured by offering culturally-responsive, community-based primary care and social services. The five Community Care Alliance health centers located in Boston serve 100,000 patients annually[161] and support numerous educational, outreach, and community-strengthening initiatives. All Community Care Alliance health centers focus on serving underserved populations who face existing barriers and obstacles to accessing care. These health centers are a vital component of BIDMC's community health implementation strategy. Through collaboration in the Community Care Alliance, BIDMC supports outreach to underserved cohorts to improve access to primary care and specialty care by serving as a clinical and academic resource for the Community Care Alliance health centers.

BIDMC has involved the Community Care Alliance in planning for the New Inpatient Building and continues to work collaboratively with the Community Care Alliance to

[161] *Community Benefits Report to the Attorney General*, BETH ISRAEL DEACONESS MEDICAL CENTER. *Available at* https://www.bidmc.org/-/media/files/beth-israel-org/community-benefits/community-benefits-2017-attorney-general-report.ashx?la=en&hash=897F2E9CD452C09F4457A575F32A6F1AFEF3CB08

address the complex social needs of its community and meet the goals established in BIDMC's Community Health Implementation Plan. These goals include, but are not limited to:

- Increasing access to quality medical services, including primary care, OB/GYN, and specialty care in BIDMC's community benefits service area;
- Promoting equitable care and support for those with limited English proficiency;
- Improving chronic disease management and care transitions for those with chronic health conditions;
- Increasing cancer screening;
- Supporting older adults to age in place;
- Promoting greater health equity and reducing disparities in access for LGBT populations;
- Promoting behavioral health care and primary care integration, and identifying those at risk for behavioral health conditions to provide enhanced care management; and
- Reducing the burden of opioid use.

Please see Exhibit 4 for further information on how BIDMC works with the Community Care Alliance to promote Department of Public Health's Health Priorities.

C. Social Determinants of Health

BIDMC is committed to improving the health status of the communities it serves. To do so effectively, BIDMC strives to best understand the unique characteristics of its patient panel, as well as the underlying social, economic, and environmental factors that impact health and health equity. To meet the needs of the community and address the six social determinants of health included in the DoN Health Priorities, as well as other health priorities of the Executive Office of Health and Human Services. BIDMC supports and/or provides numerous community health initiatives, many in conjunction with community partners such as BIDCO and the Community Care Alliance clinics, as described above. Exhibit 4 provides examples of BIDMC's work with community partners to address five of the six DoN Health Priorities: Social Environment, Built Environment, Violence and Trauma, Employment, and Education.[162]

BIDMC will continue efforts to address the social determinants of health for the patient panel through connections with social service agencies, care planning, BIDCO initiatives, and support of the Community Care Alliance.

[162] *Community Health Implementation Plan.* BETH ISRAEL DEACONESS MEDICAL CENTER. p. 4. (September 2016). *Available at* https://www.bidmc.org/-/media/files/beth-israel-org/community-benefits/community-health-implementation-plan.ashx?la=en&hash=34ABD4FEC2D8FBB7D060A94A74351C9EFE4F0699

Application Narrative: Question 13
Section F5.a.i – Relative Merit

F5.a.i Relative Merit: *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 to construct a 10-story building that will house a range of clinical inpatient facilities and programs, including intensive care and medical/surgical inpatient beds, as well as operating and procedure rooms, a range of support services including other ancillary inpatient functions, conference and education space, and the relocated helipad.

Quality: The proposed Project is a superior alternative, designed to incorporate sustainable and evidence-based concepts to improve clinical outcomes, cost-efficiencies, and decrease the Project's overall environmental impact.

Efficiency: As discussed, the existing campus facilities can no longer be renovated to support the existing demand for single-bedded rooms by BIDMC's medical/surgical patients. Operating and procedure rooms are aged and undersized relative to current industry norms and regulatory requirements applicable to new facilities. The new facility design incorporates patient flow efficiencies and accommodates innovative and advanced technologies for treating critically ill patients and provides an improved family-centered experience for BIDMC's patients and their caregivers. The location of the proposed site adjacent to the West Campus inpatient facilities leverages existing support services which will reduce duplication of services. The Project also reduces the time to completion and costs because there are fewer services to build and no need to acquire additional land. Furthermore, while major construction can always be expected to cause minor disruptions in a campus environment, ongoing patient and administrative operations will not be interrupted to accommodate the construction of the project.

Capital Expense: $593,560,750

Operating Costs: $12,100,000

ALTERNATIVE OPTIONS:

Option #1

Alternative Proposal: Renovate existing space within BIDMC's existing campus facilities.

Alternative Quality: The footprints of the existing buildings are insufficient in size for any renovation project to comply with current Department of Public Health (DPH) guidelines, without significant loss of medical/surgical beds and reduced clinical capacity, due to the fact that current DPH guidelines require additional square footage for most inpatient spaces when compared to the guidelines that were in effect when BIDMC's existing facilities were built (refer to ***F1.a.ii***).

Alternative Efficiency: Since BIDMC's existing campus buildings are currently fully occupied, the alternative renovation project would require multiple, expensive, and disruptive relocations of existing patient services in order to create appropriately sized renovated inpatient units, and to allow for the current building infrastructure and utilities to be altered to meet appropriate Facilities Guidelines Institute Guidelines[163]. As noted above, under Alternative Quality, following such expensive relocations and renovations, there would also be a significant reduction of overall clinical capacity within the existing buildings.

Alternative Capital Expense: At the initial stages of evaluating which option would be superior for BIDMC's proposed Project, it was quickly determined that pursuing a renovation strategy would yield a diminished capacity to care for the patient panel due to the greater space requirements under current regulatory guidelines for construction for inpatient facilities. The Capital Expense for Option #1 was not determined because this option was deemed not feasible.

Alternative Operating Costs: Operating costs for Option #1 were not determined because this option was deemed not feasible as stated above in the discussion concerning Alternative Capital Expense.

Option #2

Alternative Proposal: Build an off-campus fully functional medical center, sufficient to provide appropriate inpatient care to patients in the existing patient panel.

[163] Under DPH oversight, new hospital construction must comply with applicable Facilities Guidelines Institute guidelines and specified design and construction requirements. The Department of Public Health requirements currently reference the 2014 Edition of the FGI Guidelines for Design and Construction of Hospital and Outpatient Facilities. The New Inpatient Building will be designed to meet the 2018 FGI Guidelines, anticipating the Department's adoption of the latest version in advance of this Project's plan approval.

Alternative Quality: An off-campus medical center would be designed to incorporate sustainable and evidence-based concepts to improve clinical outcomes. A new off-campus facility would not benefit as readily from full integration with the main hospital campus clinical, academic and research programs.

Alternative Efficiency: In order to develop a self-supporting fully functional inpatient facility, BIDMC would need to build an entire medical center, including all relevant inpatient supporting functions such as radiology, pathology, pharmacy, dietary, environmental services, and related infrastructure. Although a new off-campus building would certainly be able to meet architectural and regulatory requirements, duplicate construction of numerous existing campus support services required for an off-campus site would lead to excessive cost not realized with an on-campus site.

Alternative Capital Expense: $1,200,000,000
During the cost analysis process of this option, BIDMC recognized the challenges related to building a self-supporting medical center, as opposed to creating a new inpatient building on the existing campus. Assuming suitable land could be located, the proposed land acquisition presented time delays and additional costs that needed to be factored into the overall cost analysis.

Alternative Operating Costs: Operating costs were not determined as the high Capital Expense makes this option infeasible.

SUPPLEMENTAL NOTES TO APPLICATION FORMS

Supplemental Notes to Application Forms
1. Supplemental Note to Question 12.5

Supplemental Note to Question 12.5

Question 12.5: *Total proposed construction costs specifically related to the Proposed Project, if any, which will be contracted out to local or minority, women or veteran-owned businesses expressed in estimated total dollars.*

The amount provided in response to Question 12.5 is an estimate due to the fact that as of the time of submission no construction contracts have been awarded by BIDMC.

Supplemental Note to Chart F4.a.ii.

F4.a.ii: *Capital Costs Chart*

As part of the Project scope, enabling work renovations approved by the Department of Public Health are being made to maintain patient and ambulance access to the existing Emergency Department in the Rosenberg Building during construction and to temporarily relocate the loading facilities and permanently relocate the oxygen farm from the Project site. The costs for such enabling work renovations are included in ***Chart F4.a.ii*** submitted as part of this Application.

EXHIBITS TO APPLICATION NARRATIVE

1. CareGroup, Inc. Patient Panel Demographic Summary

Patient Panel Summary
CareGroup
FY 2015 - FY 2017

Demographic Measure	FY 2015 Count	FY 2015 Percent	FY 2016 Count	FY 2016 Percent	FY 2017 Count	FY 2017 Percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gender						
Female	377,179	58.9 %	390,345	58.8 %	385,363	59.1 %
Male	263,378	41.1	273,134	41.1	266,264	40.8
Other	315	0.0	341	0.1	351	0.1
Total:	**640,872**	**100.0 %**	**663,820**	**100.0 %**	**651,978**	**100.0 %**
Age						
0 to 17	37,352	5.8 %	38,630	5.8 %	37,354	5.7 %
18 to 64	442,745	69.1	454,400	68.5	439,088	67.3
65+	160,775	25.1	170,790	25.7	175,536	26.9
Total:	**640,872**	**100.0 %**	**663,820**	**100.0 %**	**651,978**	**100.0 %**
Race						
White	440,244	68.7 %	448,116	67.5 %	434,076	66.6 %
Asian	47,421	7.4	49,642	7.5	50,670	7.8
Black or African American	48,265	7.5	50,121	7.6	49,053	7.5
Hispanic/Latino	13,280	2.1	13,261	2.0	13,395	2.1
American Indian or Alaska Native	1,008	0.2	902	0.1	903	0.1
Native Hawaiian or Other Pacific Islander	790	0.1	600	0.1	559	0.1
Other	89,864	14.0	101,178	15.2	103,322	15.8
Total:	**640,872**	**100.0 %**	**663,820**	**100.0 %**	**651,978**	**100.0 %**
Diagnoses for Inpatients						
Chronic Condition	19,602	31.1 %	19,719	30.7 %	20,659	31.1 %
Non-Chronic Condition	43,447	68.9	44,592	69.3	45,851	68.9
Total:	**63,049**	**100.0 %**	**64,311**	**100.0 %**	**66,510**	**100.0 %**
Behavioral Health	2,428	3.9 %	2,078	3.2 %	2,196	3.3 %
Non-Behavioral Health	60,621	96.1	62,233	96.8	64,314	96.7
Total:	**63,049**	**100.0 %**	**64,311**	**100.0 %**	**66,510**	**100.0 %**
Payor						
Commercial	341,268	53.3 %	349,610	52.7 %	332,232	51.0 %
Medicare	144,575	22.6	151,821	22.9	154,023	23.6
Medicaid	82,472	12.9	91,691	13.8	93,424	14.3
Multiple Payors	32,042	5.0	29,695	4.5	31,661	4.9
Other	32,866	5.1	32,980	5.0	30,422	4.7
Unknown	7,649	1.2	8,023	1.2	10,216	1.6
Total:	**640,872**	**100.0 %**	**663,820**	**100.0 %**	**651,978**	**100.0 %**
Patient Origin						
02360	33,093	5.2 %	34,145	5.1 %	34,938	5.4 %
02169	11,602	1.8	12,706	1.9	13,018	2.0
02472	13,385	2.1	13,817	2.1	12,774	2.0
02186	11,306	1.8	11,671	1.8	11,696	1.8
02368	10,307	1.6	10,763	1.6	10,696	1.6
02478	10,842	1.7	11,059	1.7	10,267	1.6
02138	10,463	1.6	10,798	1.6	10,096	1.5
02492	9,818	1.5	9,939	1.5	9,562	1.5
02474	9,353	1.5	9,544	1.4	8,691	1.3
02124	8,250	1.3	8,508	1.3	8,634	1.3
02135	8,726	1.4	8,871	1.3	8,581	1.3
02446	8,850	1.4	8,676	1.3	8,543	1.3
02130	7,983	1.2	8,046	1.2	8,247	1.3
02148	7,701	1.2	7,854	1.2	7,707	1.2
02453	7,524	1.2	8,578	1.3	7,557	1.2
02026	6,705	1.0	6,822	1.0	7,124	1.1
02184	6,356	1.0	6,919	1.0	7,097	1.1
02155	7,779	1.2	7,793	1.2	7,060	1.1
02170	6,282	1.0	6,620	1.0	7,035	1.1

Patient Panel Summary
CareGroup
FY 2015 - FY 2017

Demographic Measure	FY 2015		FY 2016		FY 2017	
	Count	Percent	Count	Percent	Count	Percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)
02136	6,580	1.0	6,899	1.0	6,926	1.1
02139	7,349	1.1	7,400	1.1	6,862	1.1
02132	5,728	0.9	5,957	0.9	6,071	0.9
02171	5,613	0.9	5,913	0.9	5,969	0.9
02445	6,017	0.9	6,001	0.9	5,860	0.9
02459	5,673	0.9	5,885	0.9	5,837	0.9
02364	5,504	0.9	5,640	0.8	5,774	0.9
02330	5,350	0.8	5,628	0.8	5,631	0.9
02131	5,472	0.9	5,596	0.8	5,620	0.9
02476	5,800	0.9	6,037	0.9	5,586	0.9
02125	5,449	0.9	5,637	0.8	5,568	0.9
02140	5,700	0.9	5,961	0.9	5,492	0.8
02119	5,249	0.8	5,340	0.8	5,385	0.8
02467	5,178	0.8	5,386	0.8	5,244	0.8
02151	5,039	0.8	5,093	0.8	5,085	0.8
02021	4,628	0.7	4,810	0.7	4,943	0.8
02421	4,867	0.8	4,987	0.8	4,807	0.7
01760	4,698	0.7	4,923	0.7	4,716	0.7
02144	5,037	0.8	5,094	0.8	4,644	0.7
02122	4,402	0.7	4,639	0.7	4,599	0.7
02332	4,307	0.7	4,426	0.7	4,555	0.7
02346	3,878	0.6	4,215	0.6	4,479	0.7
02494	4,425	0.7	4,615	0.7	4,472	0.7
02143	4,829	0.8	4,867	0.7	4,453	0.7
02067	4,097	0.6	4,342	0.7	4,388	0.7
02050	4,203	0.7	4,489	0.7	4,385	0.7
02121	4,215	0.7	4,354	0.7	4,370	0.7
02451	4,204	0.7	4,570	0.7	4,329	0.7
02126	4,036	0.6	4,145	0.6	4,232	0.6
02062	3,777	0.6	4,035	0.6	4,227	0.6
02072	3,683	0.6	4,113	0.6	4,171	0.6
02118	4,088	0.6	4,248	0.6	4,149	0.6
02301	3,944	0.6	4,142	0.6	4,126	0.6
02420	4,242	0.7	4,346	0.7	4,043	0.6
02134	4,143	0.6	4,250	0.6	4,032	0.6
02115	4,203	0.7	4,173	0.6	4,025	0.6
02127	3,863	0.6	4,017	0.6	3,917	0.6
02090	3,718	0.6	3,826	0.6	3,820	0.6
02116	3,588	0.6	3,698	0.6	3,655	0.6
01701	3,328	0.5	3,528	0.5	3,585	0.5
02150	3,706	0.6	3,567	0.5	3,578	0.5
02452	3,579	0.6	3,904	0.6	3,531	0.5
02149	3,361	0.5	3,452	0.5	3,396	0.5
02145	3,526	0.6	3,617	0.5	3,347	0.5
Other	240,271	37.5	248,926	37.5	244,771	37.5
Total:	**640,872**	**100.0 %**	**663,820**	**100.0 %**	**651,978**	**100.0 %**

Notes: "CareGroup" includes BIDMC, BID-Milton, BID-Needham, BID-Plymouth, MAH, and NEBH.

Counts represent the number of unique patients that visited a facility on a CareGroup hospital license for inpatient or outpatient services, including patients who were admitted through the emergency department. Unique patients are identified at the hospital level. Patients visiting multiple CareGroup hospitals in a given year are not uniquely identified.

Patients for whom a gender is not specified or whose gender varies across visits over the time period are included in "Other."

Patients who fall into multiple age categories in a given year are included in the younger category.

Race information is self-reported. Only data provided by BIDMC includes a separate Hispanic/Latino category. Patients for whom a race is not specified or whose race varies across visits over the time period are included in "Other."

A patient is included in the "Chronic Condition" category in a given year if the primary ICD diagnosis code for any inpatient

Patient Panel Summary
CareGroup
FY 2015 - FY 2017

Demographic Measure	FY 2015		FY 2016		FY 2017	
	Count	Percent	Count	Percent	Count	Percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)

visit during the year is associated with a chronic condition identified by CMS for Medicare ACOs. Only inpatients are included in the chronic condition counts.

A patient is included in the "Behavioral Health" category in a given year if the primary ICD diagnosis code for any inpatient visit during the year is classified under the Clinical Classifications Software "Mental Illness" Level I Description. Only inpatients are included in the behavioral health counts.

Patients whose primary payor is missing in the data are included in "Unknown." Patients whose primary payors within a given fiscal year fall into more than one payor category are included in "Multiple Payors." "Other" includes the following payor categories: self pay, worker's compensation, other government payment, free care, health safety net, auto insurance, Commonwealth Care/ConnectorCare plans, and dental plans.

Patients were assigned the ZIP Code from their last visit in the given fiscal year. Patients with a missing or invalid ZIP Code or from a ZIP Code from which less than 0.5% of the hospital's patients originate in all years are included in "Other."

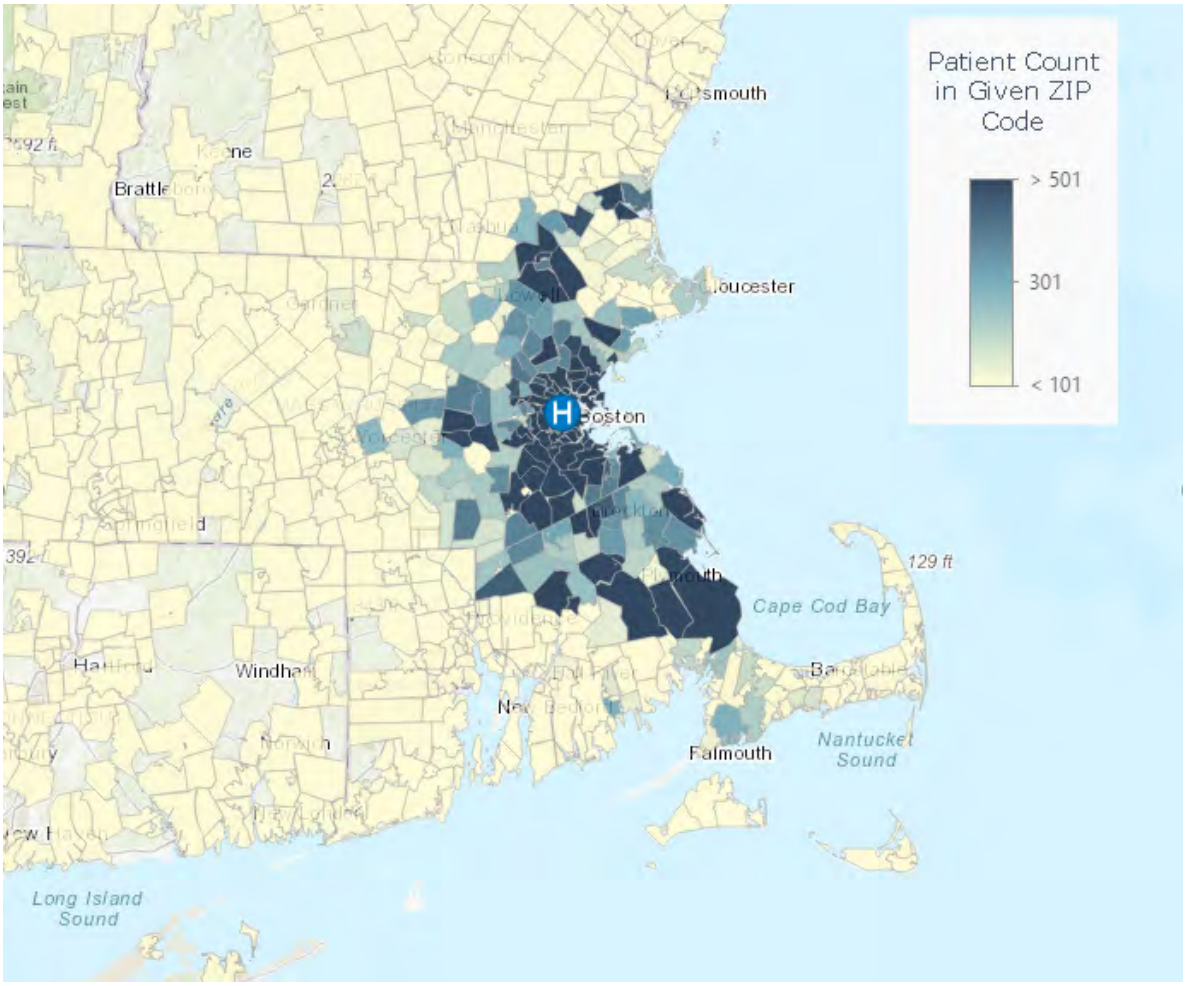
A fiscal year spans October 1 of the previous year to September 30 of the given year. For example, fiscal year 2015 spans October 1, 2014 to September 30, 2015.

Source: Internal inpatient and outpatient visit data submitted by the CareGroup hospitals.

2. BIDMC Patient Panel Map

Exhibits to Application Narrative
Exhibit 2

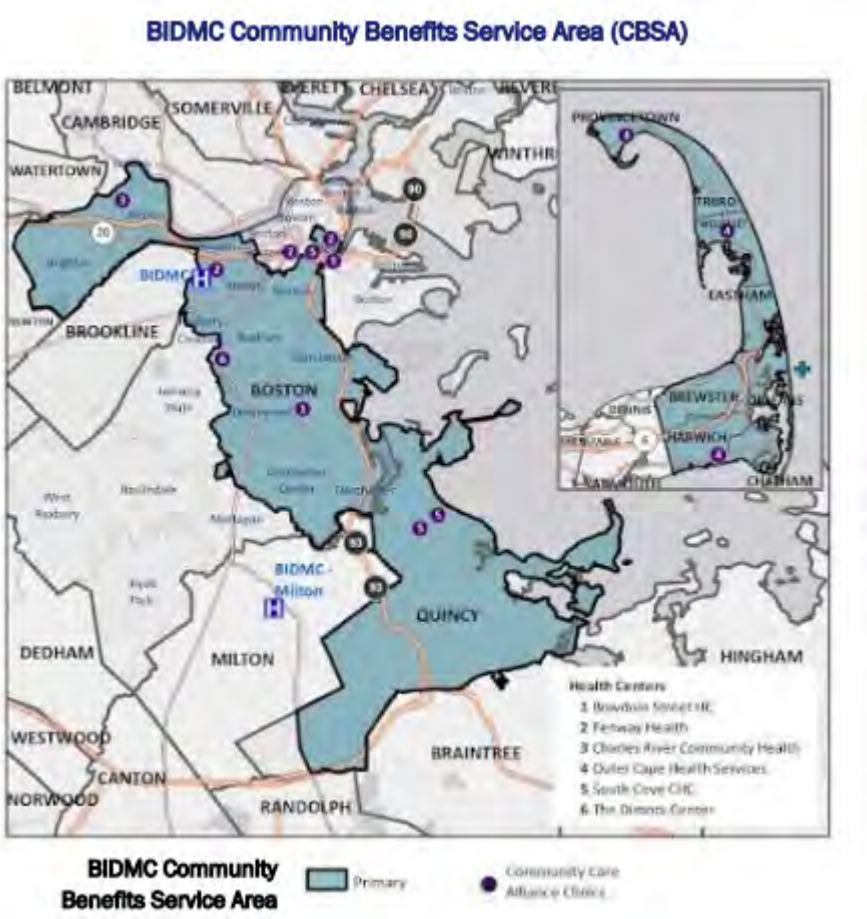
Exhibit 2



3. BIDMC Community Benefits Service Area (CBSA)

Exhibits to Application Narrative
Exhibit 3

Exhibit 3



4. BIDMC Programs with Community Care Alliance

Exhibits to Application Narrative
Exhibit 4

Exhibit 4

BIDMC Programs with Community Care Alliance		
Programmatic Objectives	**Community Activities / Strategies**	**Community Partners**
Social and Built Environment (DoN Health Priorities 1 and 2)		
Increase the number of children, youth, and adults who are physically active Implement programs at Bowdoin Street Wellness Center Increase access to healthy and affordable foods in community Improve nutritional quality of the food supply Decrease the number of individuals and families who suffer from food insecurity Promote transportation equity for employees and patients at BIDMC	Support and promote the development of walking and other physical activity groups in schools, community-based and primary care-based settings (e.g., Bowdoin Street Wellness Center) Support and collaborate with BPHC and community-based organizations (e.g., Daily Table, GBFB, BACH, etc.) to promote accessible/affordable healthy food including Bounty Bucks, Farmers Markets, and Community Supported Agriculture (CSA) program Increase access to healthy food choices available at BIDMC for patients and staff Support Healthy Champions, a group of teenagers in healthy cooking and education workshops at BSHC Green Commuting at BIDMC Reduce transportation barrier for patients accessing care at BIDMC Partnership with the Charles River Community Health Center to promote healthy eating and active lifestyle	Community Care Alliance Boston Public Health Commission Boston Alliance for Community Health Bowdoin Street Health Center Boston Public Schools Daily Table Greater Boston Food Bank Charles River Community Health BIDMC Environmental Sustainability Committee
Violence and Trauma (DoN Health Priority 4)		
Increase access to mental health services at Bowdoin Street Health Center for affected victims Maintain participation in Advocate Education and Support Project Provide counseling and other medical services to sexual assault victims Provide grieving support activities Conduct neighborhood campaigns to engage community and create greater community cohesion	Support programs in Bowdoin Street Health Center that integrate services provided by behavioral health specialists and monitor, assess, and treat those experiencing trauma from violence Hold healing services when appropriate for community residents Participate in community interventions that raise awareness about violence, engage the community, address factors associated with violence (e.g., “Broken Window” theory, Block Captains Program, etc.), and promote a sense of community Support and promote the implementation of training programs, support groups for advocates and affected community members Provide overnight stays for domestic violence and/or sexual assault victims without safe shelter	Bowdoin Street Health Center Boston Public Health Commission Other Bowdoin/ Geneva Neighborhood organizations

Exhibits to Application Narrative
Exhibit 4

BIDMC Programs with Community Care Alliance		
Programmatic Objectives	**Community Activities / Strategies**	**Community Partners**
	Conduct public policy advocacy for safe shelters and long-term housing support Empower youth to develop leadership skills, prevent violence and create change in their community through the Youth Leadership Program at Bowdoin Street Health Center Continue to offer Defending Childhood Program	
Employment (DoN Health Priority 5)		
Support workforce development and creation of employment opportunities Increase mentorship, training, and employment opportunities for youth, young adults, and adults residing in BIDMC CBSA as well as BIDMC employees Workforce training and leadership opportunities in health and wellness careers is offered to patients and residents in the Bowdoin and Geneva community; Job training opportunities available through Bunker Hill Community College, for which BIDMC provides scholarships; and Shadow days, paid summer internships and jobs for high school students.	Organize and support Pipeline Programs to enhance skills and career advancement Provide opportunities through Employee Career Initiative for college-level courses as well as counseling Offer English Speakers of Other Languages classes, GED classes, a basic computer skills course, citizenship classes, and a financial literacy class Provide job and career introductory opportunities for community residents Provide job and career introductory opportunities for middle and high school students Continue Train4Change at BSHC Implement and expand Learn and Earn Program through Bunker Hill Community College	BIDMC Admin. and Clinical Staff Boston Public Schools Boston Private Industry Council Bowdoin Street Health Center Bunker Hill Community College Jewish Vocational Services One-Stop Career Centers St. Mary's Center for Women and Children
Education (DoN Health Priority 6)		
Social support through maternal and child health care at Bowdoin Street Health Center that includes group visits, support, and education Diabetes management offered through multi-disciplinary care management using a patient centered medical home model at Bowdoin Street Health Center		Bowdoin Street Health Center

5. Evidence of Community Engagement

Exhibit 5

Presentations to Neighboring Institutions, Government Agencies and Community Groups		
Date	**Organization**	**Organization Link**
11/6/2017	Medical Academic and Scientific Community Organization, Inc.	https://www.masco.org/
11/9/2017	Medical Academic and Scientific Community Organization, Inc.	https://www.masco.org/
11/15/2017	Patient and Family Advisory Council	N/A
12/11/2017	Community Care Alliance Board of Managers	N/A
12/20/2017	Roxbury Tenants of Harvard	https://www.missionpark.com/rth.htm
1/22/2018	Longwood Medical and Academic Area	https://www.masco.org/
2/1/2018	Roxbury Tenants of Harvard	https://www.missionpark.com/rth.htm
2/2/2018	Department of Public Health	https://www.mass.gov/orgs/department-of- public-health
2/8/2018	National Development - Longwood Center	http://www.natdev.com/
2/8/2018	Boston Alliance for Community Health	http://bostonalliance.org/
2/26/2018	The Center for Community Health Education Research and Service, Inc.	https://www.cchers.org/
2/27/2018	Joslin Diabetes Center	http://www.joslin.org/
2/28/2018	Universal Access/ADA Staff and Advisor Council	N/A
3/1/2018	The Druker Company – Longwood Galleria	N/A
3/1/2018	Emmanuel College	https://www.emmanuel.edu/
3/6/2018	BIDMC Community Benefits Committee	N/A
3/7/2018	Harvard Medical School	https://hms.harvard.edu/
3/12/2018	Community Care Alliance Board of Managers	N/A
3/15/2018	Brigham & Women's Hospital	https://www.brighamandwomens.org/
3/22/2018	Boston Children's Hospital	http://www.childrenshospital.org/
3/26/2018	The Winsor School	https://www.winsor.edu/
3/27/2018	Temple Israel	http://www.tisrael.org/
4/18/2018	Dana-Farber Cancer Institute	http://www.dana-farber.org/
5/23/2018	Center for Health Information and Analysis	https://www.mass.gov/orgs/center-for-health- information-and-analysis

Exhibits to Application Narrative
Exhibit 5

Presentations to Neighboring Institutions, Government Agencies and Community Groups		
Date	**Organization**	**Organization Link**
5/29/2018	Health Policy Commission	https://www.mass.gov/orgs/massachusetts- health-policy-commission
5/30/2018	Attorney General's Office	http://www.mass.gov/ago/
5/31/2018	Department of Mental Health	https://www.mass.gov/orgs/massachusetts- department-of-mental-health
6/11/2018	Community Care Alliance Board of Managers	N/A
6/12/2018	Department of Public Health	https://www.mass.gov/orgs/department-of- public-health
6/26/2018	Fenway Community Development Corporation	http://www.fenwaycdc.org/
6/26/2018	Roxbury Tenants of Harvard	https://www.missionpark.com/rth.htm
7/18/2018	Patient and Family Advisory Council	N/A
7/18/2018	Universal Access/ADA Staff and Advisor Council	N/A

LMA Forum Presentation

Beth Israel Deaconess Medical Center
Proposed Project:
West Campus New Inpatient Building

New Inpatient Building Project - Introduction

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School

BIDMC is proposing a new inpatient building on its West Campus to better serve our patients, their families and caregivers

- New facilities are needed to
  - meet the increasingly acute, complex needs of the seriously ill patients referred to BIDMC from our network of community providers, and
  - continue caring for local Boston residents, including patients from underserved neighborhoods who may face special challenges

The Proposed Project – **BIDMC's first new building on the Boston campus in 20 years** – will meet needs for more

- Single-bedded, family-friendly patient rooms that facilitate healing and recovery
- Intensive care beds
- Expanded surgery and clinical support spaces

Public Review & Community Engagement

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School

- IMPNF/PNF filed on January 11, 2017 to begin the process for:
  - Amending and extending for 5 years BIDMC's IMP to allow BIDMC to build the Proposed New Inpatient Building Project
  - Large Project Review of the Proposed Project
- BIDMC is committed to open communication and collaboration with community groups, residents, state and local officials and agencies and neighboring institutions regarding the proposed New Inpatient Building

Next Steps in City's Article 80 Development Review process:

- LMA Forum/Task Force Meetings: January 22, 2018
- IMP Amendment & DPIR expected to be filed: mid-May 2018
- LMA Forum/Task Force Meetings: May and/or June 2018 (after filing of IMP Amendment/DPIR)

About BIDMC

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School

- BIDMC is a **non-profit academic medical center** and a **major teaching affiliate of Harvard Medical School** that is renowned for excellence in patient care, biomedical research, teaching and community service.
- BIDMC provides
  - 673 licensed beds including 77 ICU beds
  - 40,000+ inpatient discharges each year, along with more than 638,000 outpatient visits, and approximately 5,000 births a year
  - Level 1 Trauma Center with roof-top helipad
  - Approximately 57,000 Emergency Department visits each year

About BIDMC – Our Mission

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School

Our Mission: To provide extraordinary care, where the patient comes first, supported by world-class education and research.

- **Patient Care:** *Compassionate, patient-centered care is at the heart of our mission*
- **Education:** *We train physicians and other health care professionals to support the creation of a healthy future for patients and families*
- **Research:** *At BIDMC outstanding scientists work to develop new knowledge to improve human health and transform medical care*
  - Research funding totals over $229 million annually; One of top recipients of NIH Research Funding nationally among independent hospitals
- **Community Service:** *Is a vital component of BIDMC's patient care mission*
  - BIDMC is strongly committed to providing care to the underserved and works to address disparities to health care, through its work with affiliated community health centers and other community partners

What BIDMC Brings to Boston

Community Health & Community Benefits:

- BIDMC's **5** licensed or affiliated community health centers in Boston provide care for nearly **100,000** patients each year
- **50,000+** Boston residents receive their primary care at BIDMC, Bowdoin Street Health Center and affiliated physician practices
- **$77.5** million - total investment by BIDMC for our Community Benefits mission, including
  - **$26.4** million to reducing barriers to care and improving health and well-being of Boston residents
  - **$3.6** million - for health disparities research

What BIDMC Brings to Boston

Beth Israel Deaconess Medical Center
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- Employs approximately 2,800 Boston Residents, as part of a diverse Workforce of over 9,000 employees (FT/PT)
- BIDMC jobs start at $15/hour and offer benefits
- Recognized leader in Workforce Development
  - Offers innovative pipeline program that trains incumbent workers into key positions, providing career growth and higher wages
  - Provides pre-college courses, ESOL classes, computer skills classes, financial wellness program and a citizenship program
  - Provides paid summer jobs for over 40 young Boston residents each year, and hosts interns during the school year from Sociedad Latina and other Boston area community organizations
- The New Inpatient Building Project will create 80 to 100 permanent jobs

New Inpatient Building – Needs & Objectives

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School

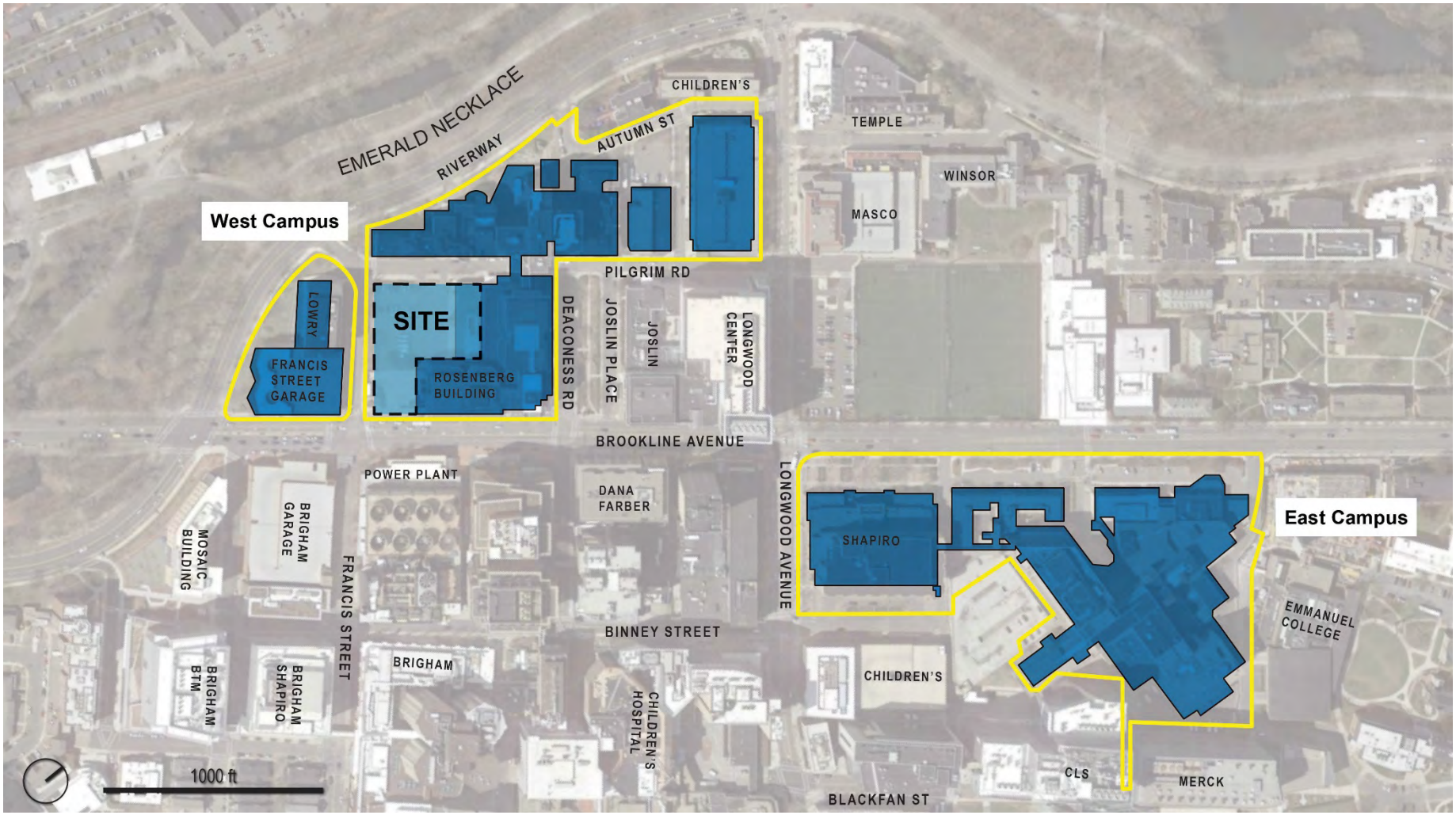
With this New Inpatient Building we are committed to:

- Ensuring that our patients and families have access to modern, single-bedded, family-friendly rooms that facilitate healing and recovery
- Designing spaces that can accommodate the latest technology and team-based care
- Leveraging adjacencies and operational efficiencies by integrating and interconnecting the new inpatient facilities and services with existing services and workflows
- Designing the building to be energy-efficient and environmentally sustainable, consistent with our commitment to a healthy community

BIDMC Campus & Proposed Project Location

Beth Israel Deaconess Medical Center

A teaching hospital of Harvard Medical School

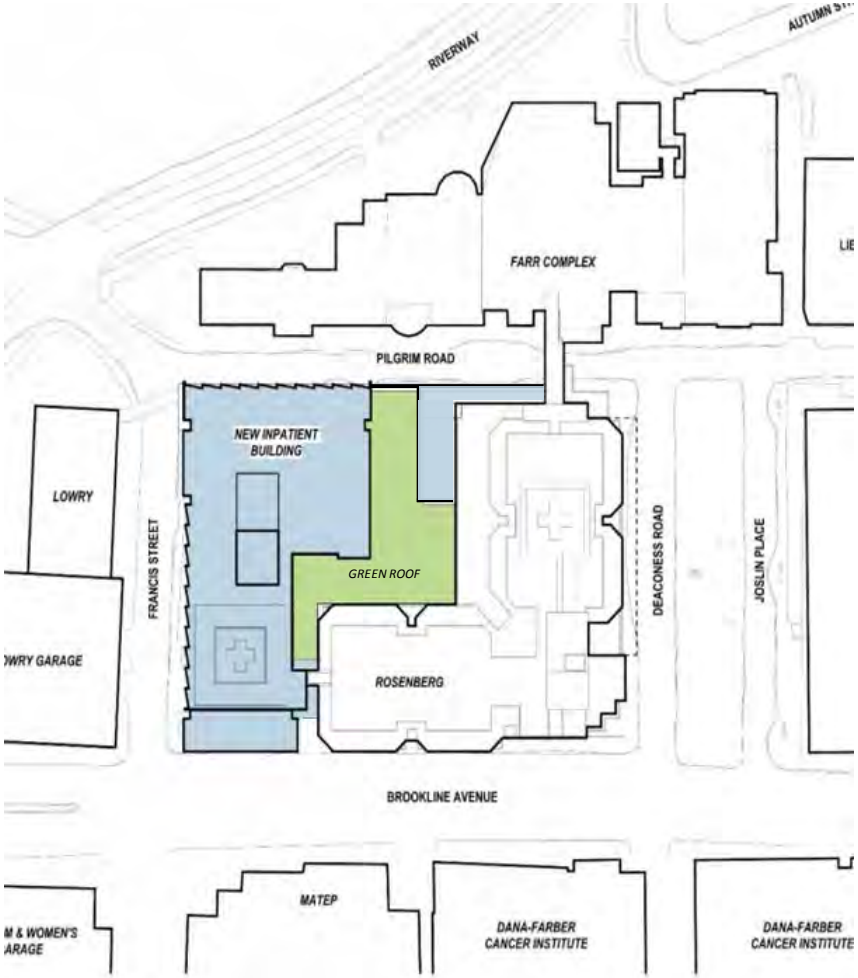


New Inpatient Building – Site Selection

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School

- Project site is largely unbuilt, allowing cost-efficient construction of the New Inpatient Building, with least disruption to ongoing operations.
- Site is adjacent to Rosenberg Building and other existing West Campus inpatient facilities. This facilitates:
  - Access for Patients, Families and Caregivers throughout West Campus facilities
  - Shared and efficient use of clinical support services by New Inpatient Building and existing buildings, reducing construction costs and operating costs, consistent with BIDMC's commitment to delivering high-quality, lower cost care.

Description of Proposed Project



New Inpatient Building Project:

Modernize and upgrade patient care and clinical environments to respond to the increasingly acute, complex needs of BIDMC's patients and BIDMC's capacity constraints

- Up to 128 Single-Bedded Medical/Surgical Rooms, many of which will replace double-bedded rooms elsewhere on BIDMC's West Campus
- Up to 30 ICU Rooms
- Inpatient Operating Rooms
- High Complexity Procedure Rooms

Approximate Floor Area: 345,000 GFA SF

Approximate Height: 10 Stories (+/- 200')

No Parking Spaces

New Inpatient Building - Transportation

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School

- The New Inpatient Building will include **no new parking**; all parking for this facility will be accommodated by the existing parking supply within the BIDMC Campus
- BIDMC actively supports efforts to reduce auto use for people traveling to the hospital campus
  - Member of CommuteWorks Transportation Management Association
  - Subsidies for transit passes for employees
  - Carpool assistance
  - Park & Ride service
  - Location based parking
  - Telecommuting and compressed workweeks
  - Bicycling/walking incentives and amenities, including sponsorship of 3 Hubway bike stations
- Studying ways to improve bicycle amenities on campus

New Inpatient Building - Planning & Programming

Beth Israel Deaconess Medical Center
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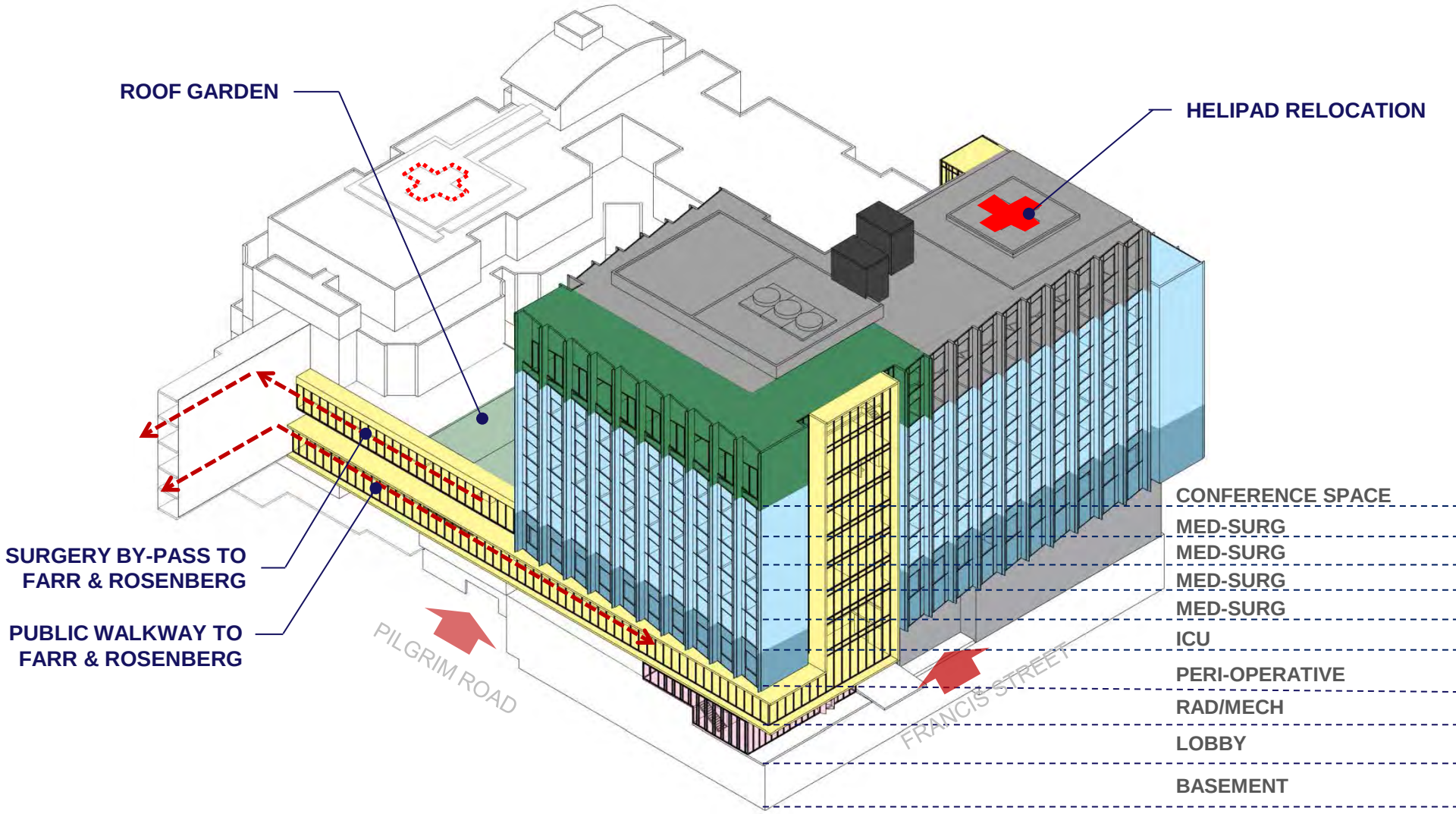
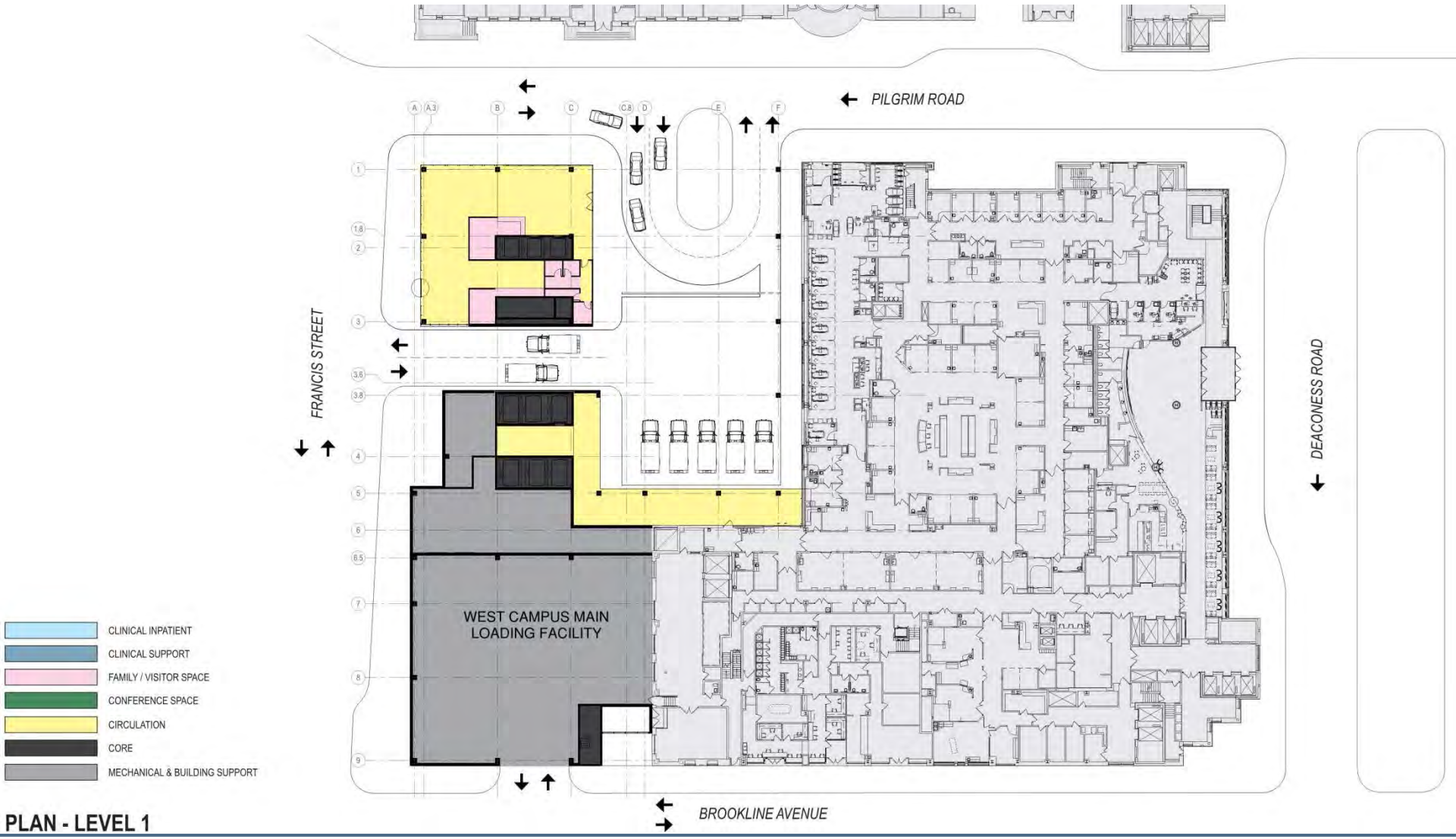


New Inpatient Building – Level 1 and Site Access

Beth Israel Deaconess Medical Center

A teaching hospital of Harvard Medical School



PLAN - LEVEL 1

New Inpatient Building – Perioperative Floor

Beth Israel Deaconess Medical Center

A teaching hospital of Harvard Medical School

CLINICAL INPATIENT
CLINICAL SUPPORT
FAMILY / VISITOR SPACE
CONFERENCE SPACE
CIRCULATION
CORE
MECHANICAL & BUILDING SUPPORT

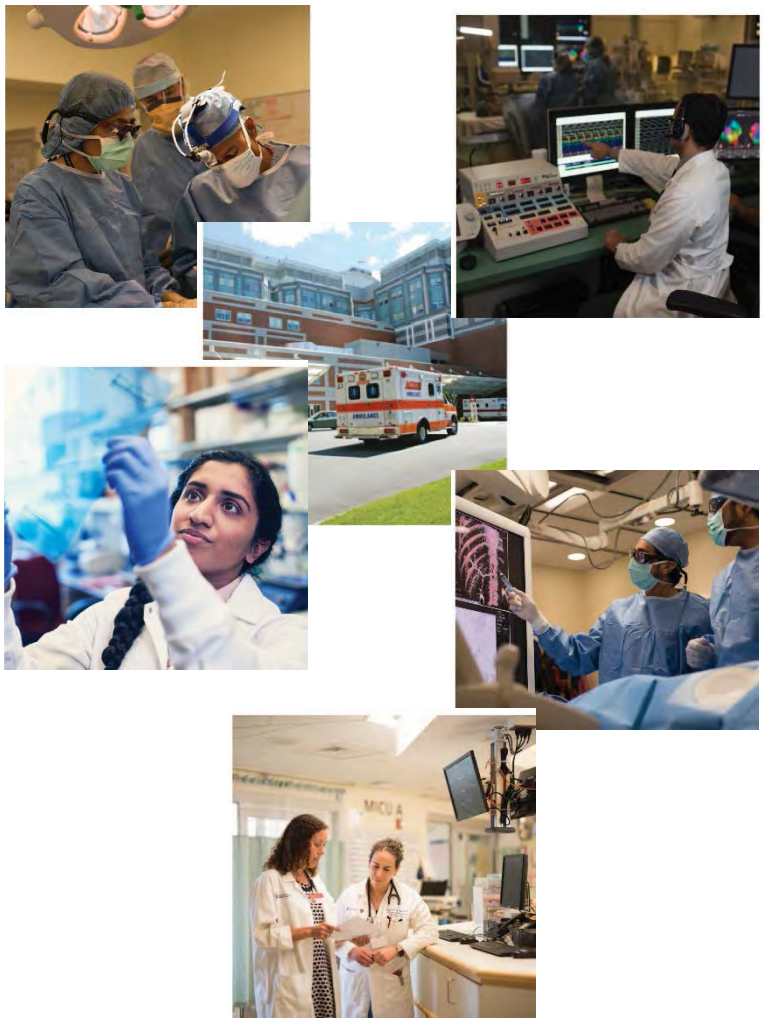
New Inpatient Building – Further Studies & Filings

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School

- Project Schematic Design is ongoing. Further design elements will be included in the IMP Amendment and Draft Project Impact Report (DPIR) for the Project that is expected to be filed in mid-May
- Further studies will be completed and incorporated into the DPIR in compliance with the Scoping Determination

Questions, Comments & Discussion

Beth Israel Deaconess Medical Center
A teaching hospital of Harvard Medical School



Our Mission: To provide extraordinary care, where the patient comes first, supported by world-class education and research.

See BIDMC Project Webpage for more information: http://www.bidmc.org/About-BIDMC/New-Inpatient-Building.aspx

Public comments on the IMPNF/PNF should be submitted in writing to Katelyn Sullivan, Project Manager, BPDA, Boston City Hall, Boston, MA 02201, or by email to: katelyn.Sullivan@boston.gov, on or before February 12, 2018

LMA Forum Sign In Sheet

Sign-In Sheet
(If your contact information has changed, please update it. Thank you)

Committee Name: LMA Forum Meeting **Date:** 01/22/2018

Name/Title	Organization	Phone#	E-mail	Address Changes
Charlotte Fleetwood Planner	BTD Boston Transp.			
ALVIN HUNG / Sr. Project Architect	BCH			
Nicole Lecuivre / Planner	BCH			
Jennifer Kritz	BIDMC			
Jane Mallard	BIDMC			
Susan O'Malley	TSG			
Howard Moshier	VHB			
EMILY RYZAK	BIDM			
Sarah Hamilton	M			
Cindy Schlessinger	Epsilon			
Cindy Phelan	BIDMC			
Michelle McGrory	BIDMC			
Frederick Berkley				
Patricia McMullin	BIDMC			
Betsy Gerlach	BIDMC			

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Committee Name: LMA Forum Meeting **Date:** 01/22/2018

Name/Title	Organization	Phone#	E-mail	Address Changes
Patricia Twomey	MAPC			
Katelyn Sullivan	BPDA			
Mark Fuehrer	The Boston Guardian			
Jessica Stubbins	HDR			
John Hasson	REFLEX LIGHTING			

Sign-In Sheet
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Committee Name: LMA Forum Meeting **Date:** 01/22/2018

Name/Title	Organization	Phone#	E-mail	Address Changes
MK O'Connor	BCH			
Lisa Hogarty	BCIT			
Sheri Rullen	DFCI			
Ryan White	VHB			
Harold Dennis	TBC			
Bob Foster	LMP			
David Flanagan	BDMC			
Russell De Martino	Skanska			
ALEXANDRA KIRK	SKANSKA			
Janice Henderson	MASCO			

Sign-In Sheet
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Committee Name: LMA Forum Meeting **Date:** 01/22/2018

Name/Title	Organization	Phone#	E-mail	Address Changes
Ronald Gorham	Perkins Will			
Nancy Kasen	BIDMC			
Jack Anderson	RSE			
Zhen Lin	RTH			
Emily Resnevic	MH Gazette			
Sophia Dos	RTH			
Jack Gadsson	RTH			
Jeremy Solomon	Simmons College			
Alicia DelVento	Epsandler			
Nick Carter	Rakim			
David Welsh				
Rich Giordano	Fenway CDC			
John Riordan	BCH			

Neighboring Institutions and Community Groups Presentation

Beth Israel Deaconess Medical Center
Proposed Project:
West Campus New Inpatient Building

Joslin Diabetes Center - February 27, 2018

NEW INPATIENT BUILDING | Introduction

BIDMC is proposing a new inpatient building on its West Campus to better serve our patients, their families and caregivers

- New facilities are needed to
  - meet the increasingly acute, complex needs of the seriously ill patients referred to BIDMC from our network of community providers, and
  - continue caring for local Boston residents, including patients from underserved neighborhoods who may face special challenges

The Proposed Project – BIDMC's first new building on the Boston campus in 20 years – will meet needs for more

- Single-bedded, family-friendly patient rooms that facilitate healing and recovery
- Intensive care beds
- Expanded surgery and clinical support spaces

NEW INPATIENT BUILDING | Public Review & Community Engagement

IMPNF/PNF filed on January 11, 2017 to begin the process for:

- Amending and extending for 5 years BIDMC's IMP to allow BIDMC to build the Proposed New Inpatient Building Project
- Large Project Review of the Proposed Project
- LMA Forum/Task Force Meetings were held on January 22, 2018

BIDMC is committed to open communication and collaboration with community groups, residents, state and local officials and agencies and neighboring institutions regarding the proposed New Inpatient Building

Next Steps in City's Article 80 Development Review process:

- IMP Amendment & DPIR expected to be filed: mid-May 2018
- LMA Forum/Task Force Meetings: May and/or June 2018 (after filing of IMP Amendment/DPIR)

NEW INPATIENT BUILDING | About BIDMC

BIDMC is a non-profit academic medical center and a major teaching affiliate of Harvard Medical School that is renowned for excellence in patient care, biomedical research, teaching and community service.

BIDMC provides

- 673 licensed beds including 77 ICU beds
- 40,000+ inpatient discharges each year, along with more than 638,000 outpatient visits, and approximately 5,000 births a year
- Level 1 Trauma Center with roof-top helipad
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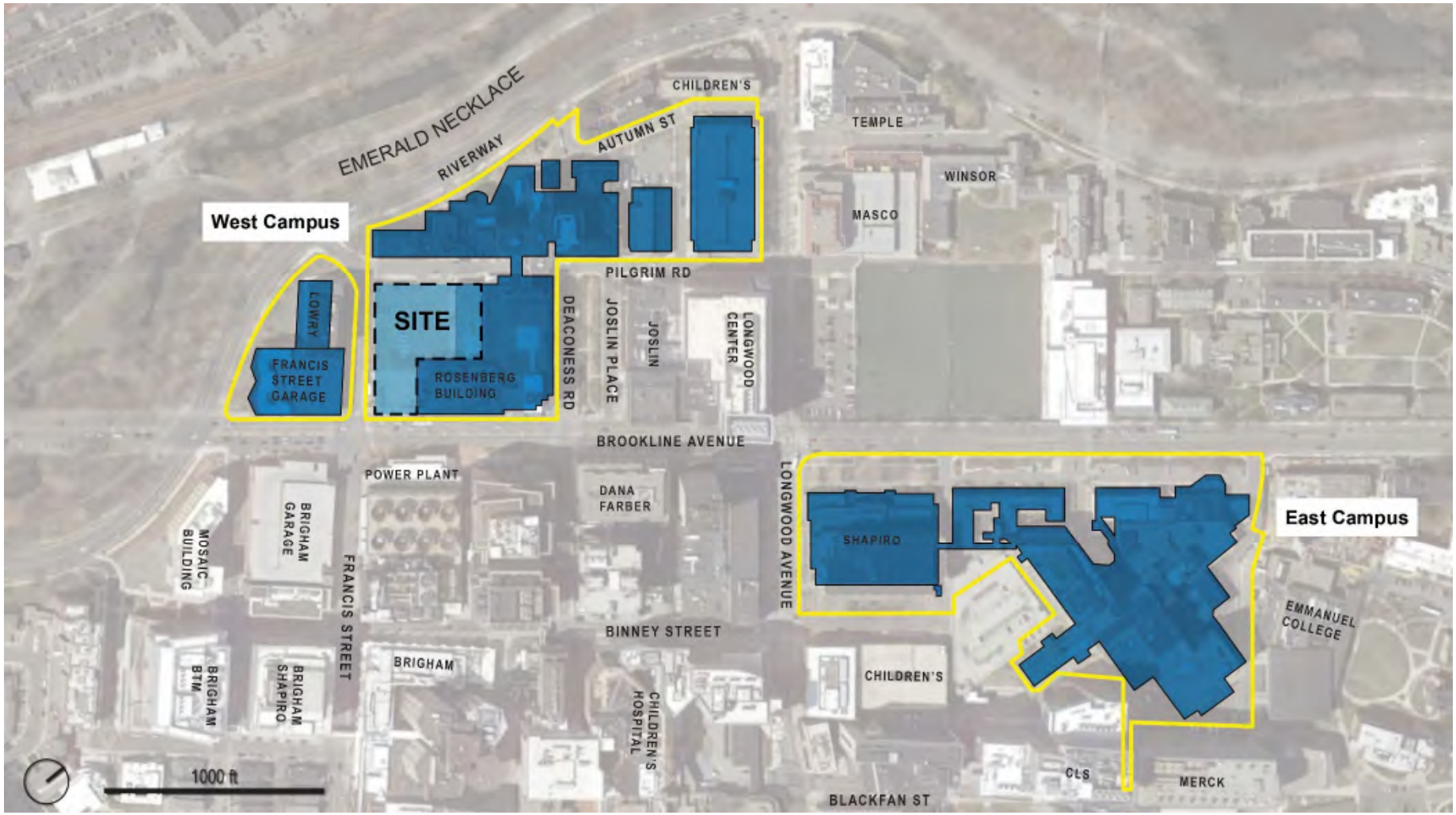
NEW INPATIENT BUILDING | BIDMC Campus & Proposed Project Location



NEW INPATIENT BUILDING | Site Selection

Project site is largely unbuilt, allowing cost-efficient construction of the New Inpatient Building, with least disruption to ongoing operations.

Site is adjacent to Rosenberg Building and other existing West Campus inpatient facilities. This facilitates:

- Access for Patients, Families and Caregivers throughout West Campus facilities
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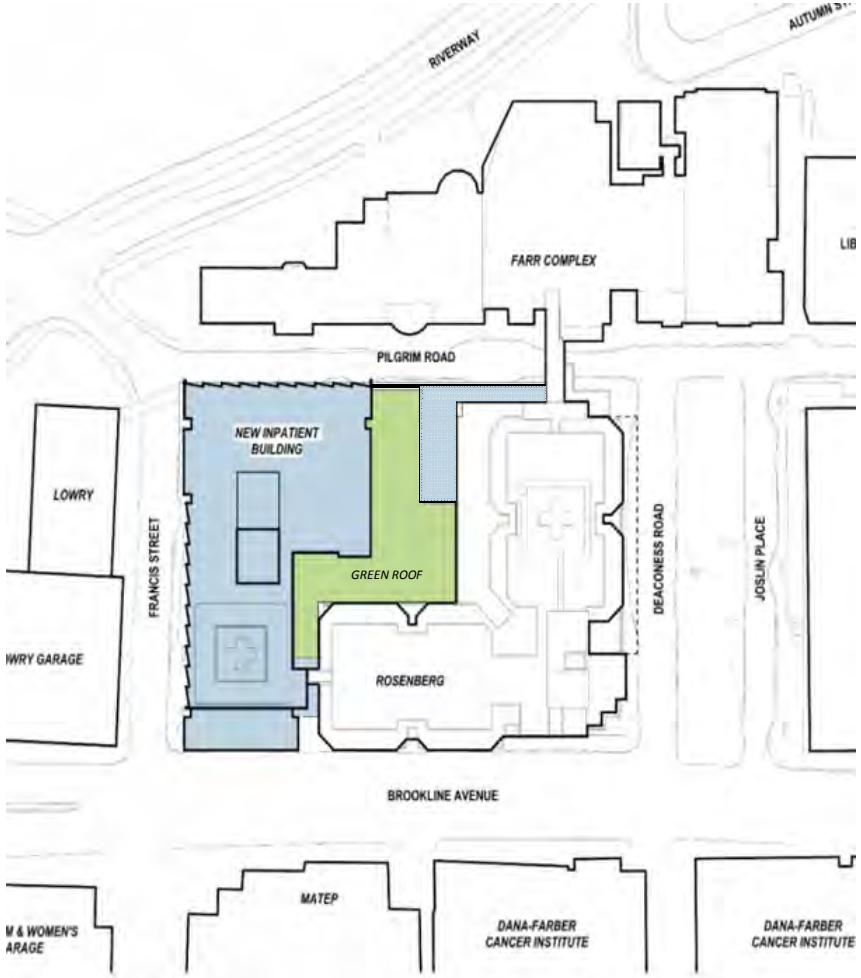
NEW INPATIENT BUILDING | Current State

NEW INPATIENT BUILDING | Interim Condition

NEW INPATIENT BUILDING | Future State

NEW INPATIENT BUILDING | Description of Proposed Project



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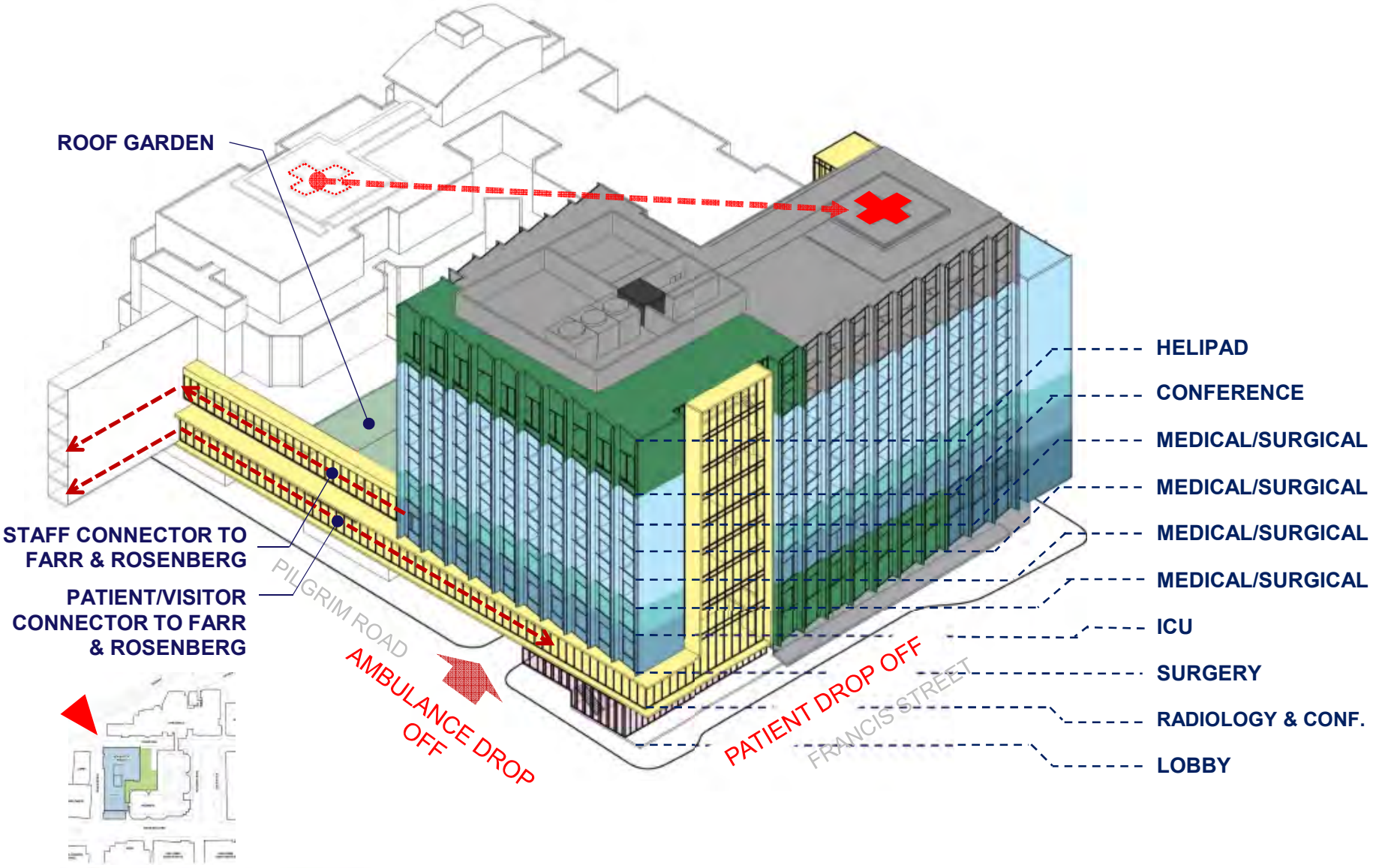
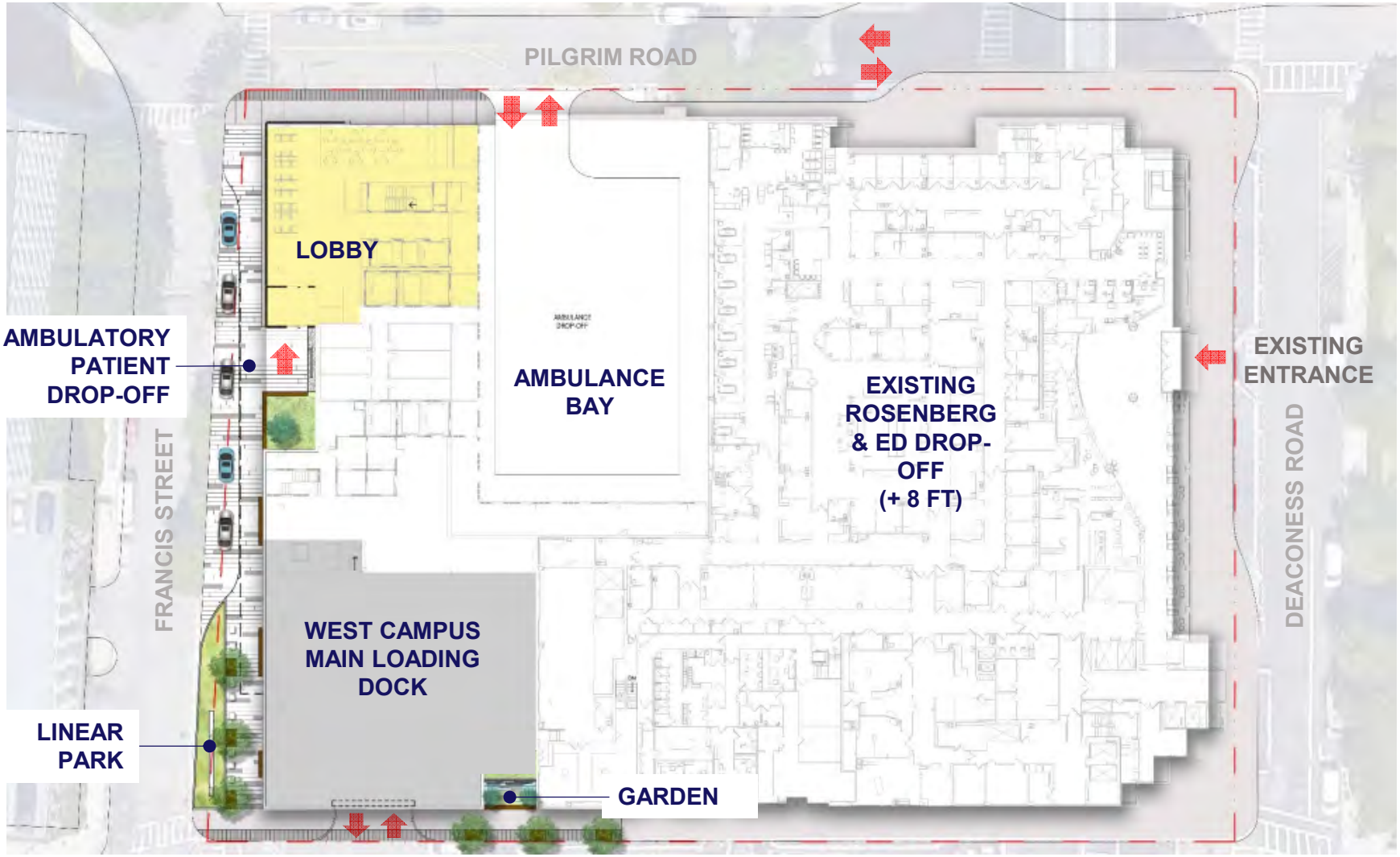
No Parking Spaces

NEW INPATIENT BUILDING | Program Stacking



NEW INPATIENT BUILDING | Site Plan



NEW INPATIENT BUILDING | Surgery Level

NEW INPATIENT BUILDING | Typical Inpatient Level

NEW INPATIENT BUILDING | View from Pilgrim Rd & Francis St

NEW INPATIENT BUILDING | View from Brookline Ave & Francis St

NEW INPATIENT BUILDING | Project Schedule

- **Design Complete** — Winter 2019
- **Enabling Work Complete** — Spring 2019
- **Construction Start** — Spring 2019
- **Construction Complete** — Spring 2022
- **Occupancy** — Fall 2023

Beth Israel Deaconess Medical Center
Proposed Project:
West Campus New Inpatient Building

Joslin Diabetes Center - February 27, 2018