

UMASS MEMORIAL HEALTH CARE, INC.

**DON APPLICATION #UMMHC-22042514-HE
SUBSTANTIAL CAPITAL EXPENDITURE
SUBSTANTIAL CHANGE IN SERVICE
UMASS MEMORIAL MEDICAL CENTER**

JUNE 10, 2022

BY

**UMASS MEMORIAL HEALTH CARE
55 LAKE AVE NORTH
WORCESTER, MA 01655**

**UMASS MEMORIAL HEALTH CARE, INC.
DON APPLICATION # UMMHC-22042514-HE**

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APPLICATION FORM



Massachusetts Department of Public Health Determination of Need Application Form

Version: 11-8-17

Application Type: Application Date: 06/24/2022 10:39 am

Applicant Name:

Mailing Address:

City: State: Zip Code:

Contact Person: Title:

Mailing Address:

City: State: Zip Code:

Phone: Ext: E-mail:

Facility Information

List each facility affected and or included in Proposed Project

1 Facility Name:

Facility Address:

City: State: Zip Code:

Facility type: CMS Number:

1. About the Applicant

1.1 Type of organization (of the Applicant):

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

1.3 What is the acronym used by the Applicant's Organization?

1.4 Is Applicant a registered provider organization as the term is used in the HPC/CHIA RPO program? Yes No

1.5 Is Applicant or any affiliated entity an HPC-certified ACO? Yes No

1.6 Is Applicant or any affiliate thereof subject to M.G.L. c. 6D, § 13 and 958 CMR 7.00 (filing of Notice of Material Change to the Health Policy Commission)? Yes No

1.7 Does the Proposed Project also require the filing of a MCN with the HPC? Yes No

1.8 Has the Applicant or any subsidiary thereof been notified pursuant to M.G.L. c. 12C, § 16 that it is exceeding the health care cost growth benchmark established under M.G.L. c. 6D, § 9 and is thus, pursuant to M.G.L. c. 6D, §10 required to file a performance improvement plan with CHIA? Yes No

1.9 Complete the Affiliated Parties Form

2. Project Description

2.1 Provide a brief description of the scope of the project.

See attached Narrative

2.2 and 2.3 Complete the Change in Service Form

3. Delegated Review

3.1 Do you assert that this Application is eligible for Delegated Review? Yes No

4. Conservation Project

4.1 Are you submitting this Application as a Conservation Project? Yes No

5. DoN-Required Services and DoN-Required Equipment

5.1 Is this an application filed pursuant to 105 CMR 100.725: DoN-Required Equipment and DoN-Required Service? Yes No

5.2 If yes, is Applicant or any affiliated entity thereof a HPC-certified ACO? Yes No

5.3 See section on DoN-Required Services and DoN-Required Equipment in the Application Instructions

6. Transfer of Ownership

6.1 Is this an application filed pursuant to 105 CMR 100.735? Yes No

7. Ambulatory Surgery

7.1 Is this an application filed pursuant to 105 CMR 100.740(A) for Ambulatory Surgery? Yes No

8. Transfer of Site

8.1 Is this an application filed pursuant to 105 CMR 100.745? Yes No

9. Research Exemption

9.1 Is this an application for a Research Exemption? Yes No

10. Amendment

10.1 Is this an application for a Amendment? Yes No

11. Emergency Application

11.1 Is this an application filed pursuant to 105 CMR 100.740(B)? Yes No

12. Total Value and Filing Fee

Enter all currency in numbers only. No dollar signs or commas. Grayed fields will auto calculate depending upon answers above.

Your project application is for: Hospital/Clinic Substantial Capital Expenditure

12.1 Total Value of this project:	\$143,242,167.00
12.2 Total CHI commitment expressed in dollars: (calculated)	\$7,162,108.35
12.3 Filing Fee: (calculated)	\$286,484.33
12.4 Maximum Incremental Operating Expense resulting from the Proposed Project:	\$118,577,591.00
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.	

13. Factors

Required Information and supporting documentation consistent with 105 CMR 100.210

Some Factors will not appear depending upon the type of license you are applying for.

Text fields will expand to fit your response.

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

F1.a.i Patient Panel:

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

See attached Narrative

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.

See attached Narrative

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.

See attached Narrative

F1.b.i Public Health Value /Evidence-Based:

Provide information on the evidence-base for the Proposed Project. That is, how does the Proposed Project address the Need that Applicant has identified.

See attached Narrative

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.

See attached Narrative

F1.b.iii Public Health Value /Health Equity-Focused:

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

See attached Narrative

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

See attached Narrative

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

See attached Narrative

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

See attached Narrative

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.

See attached Narrative

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

See attached Narrative

Factor 2: Health Priorities

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

F2.a Cost Containment:

Using objective data, please describe, for each new or expanded service, how the Proposed Project will meaningfully contribute to the Commonwealth's goals for cost containment.

See attached Narrative

F2.b Public Health Outcomes:

Describe, as relevant, for each new or expanded service, how the Proposed Project will improve public health outcomes.

See attached Narrative

F2.c Delivery System Transformation:

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

See attached Narrative

Factor 3: Compliance

Applicant certifies, by virtue of submitting this Application that it is in compliance and good standing with federal, state, and local laws and regulations, including, but not limited to M.G.L. c. 30, §§ 61 through 62H and the applicable regulations thereunder, and in compliance with all previously issued notices of Determination of Need and the terms and conditions attached therein .

F3.a Please list all previously issued Notices of Determination of Need

Add/Del Rows	Project Number	Date Approved	Type of Notification	Facility Name
<input type="checkbox"/> + <input type="checkbox"/> -	21120810-RE	05/06/2022	DoN-Required Equipment	UMass Memorial Medical Center
<input type="checkbox"/> + <input type="checkbox"/> -	20121712-TO	05/21/2021	Transfer of Ownership	Harrington Memorial Hospital, Inc.
<input type="checkbox"/> + <input type="checkbox"/> -	2-3C60	06/15/2017	Hospital/Clinic Substantial Change in Service	UMass Memorial Medical Center
<input type="checkbox"/> + <input type="checkbox"/> -	1-3C59	02/08/2017	Hospital/Clinic Substantial Change in Service	UMass Memorial Medical Center

Factor 4: Financial Feasibility and Reasonableness of Expenditures and Costs

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

F4.a.i Capital Costs Chart:

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

Add/Del Rows	Functional Areas	Present Square Footage		Square Footage Involved in Project				Resulting Square Footage		Total Cost		Cost/Square Footage	
		Net	Gross	New Construction		Renovation		Net	Gross	New Construction	Renovation	New Construction	Renovation
<input type="checkbox"/> + <input type="checkbox"/> -	New Inpatient Building	73,852	75,944	12,121	12,121	73,852	75,944	85,973	88,065	\$8,239,059.00	\$90,707,650.00	\$679.73	\$1,194.40
<input type="checkbox"/> + <input type="checkbox"/> -	Memorial West 4 Inpatient Bed Unit	9,050	11,584			9,050	11,584	9,050	11,584		\$11,530,241.00		\$995.36
<input type="checkbox"/> + <input type="checkbox"/> -	Memorial A Building Ground Radiology Renovation	6,791	6,791			6,791	6,791	6,791	6,791		\$5,650,845.00		\$832.11
<input type="checkbox"/> + <input type="checkbox"/> -	Memorial A Building LL1 Morgue Expansion	908	908			908	908	908	908		\$1,488,000.00		\$1,638.77
<input type="checkbox"/> + <input type="checkbox"/> -													
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	Total: (calculated)	90,601	95,227	12,121	12,121	90,601	95,227	102,722	107,348	\$8,239,059.00	\$109,376,736.00	\$679.73	\$4,660.64

F4.a.ii For each Category of Expenditure document New Construction and/or Renovation Costs.				
	Category of Expenditure	New Construction	Renovation	Total (calculated)
	Land Costs			
	Land Acquisition Cost		\$3529556.	\$3529556.
	Site Survey and Soil Investigation			
	Other Non-Depreciable Land Development			
	Total Land Costs		\$3529556.	\$3529556.
	Construction Contract (including bonding cost)			
	Depreciable Land Development Cost			
	Building Acquisition Cost		\$21496816.	\$21496816.
	Construction Contract (including bonding cost)	\$7352362.	\$97605490.	\$104957852.
	Fixed Equipment Not in Contract	\$102633.	\$1362499.	\$1465132.
	Architectural Cost (Including fee, Printing, supervision etc.) and Engineering Cost	\$389349.	\$5168760.	\$5558109.
	Pre-filing Planning and Development Costs	\$14063.	\$186686.	\$200749.
	Post-filing Planning and Development Costs			
Add/Del Rows	Other (specify)			
<input type="checkbox"/> + <input type="checkbox"/> -				
	Net Interest Expensed During Construction	\$380652.	\$5053301.	\$5433953.
	Major Movable Equipment			
	Total Construction Costs	\$8239059.	\$130873552.	\$139112611.
	Financing Costs:			
	Cost of Securing Financing (legal, administrative, feasibility studies, mortgage insurance, printing, etc)		\$600000.	\$600000.
	Bond Discount			
Add/Del Rows	Other (specify)			
<input type="checkbox"/> + <input type="checkbox"/> -				
	Total Financing Costs		\$600000.	\$600000.
	Estimated Total Capital Expenditure	\$8239059.	\$135003108.	\$143242167.

Factor 5: Relative Merit

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

Proposal:

See attached Narrative

Quality:

See attached Narrative

Efficiency:

See attached Narrative

Capital Expense:

See attached Narrative

Operating Costs:

See attached Narrative

List alternative options for the Proposed Project:

Alternative Proposal:

See attached Narrative

Alternative Quality:

See attached Narrative

Alternative Efficiency:

See attached Narrative

Alternative Capital Expense:

See attached Narrative

Alternative Operating Costs:

See attached Narrative

Add additional Alternative Project

Delete this Alternative Project

F5.a.ii 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.

See attached Narrative

Documentation Check List

The Check List below will assist you in keeping track of additional documentation needed for your application. Once you have completed this Application Form the additional documents needed for your application will be on this list. E-mail the documents as an attachment to: DPH.DON@state.ma.us

- Copy of Notice of Intent
- Affidavit of Truthfulness Form
- Scanned copy of Application Fee Check
- Affiliated Parties Table Question 1.9
- Change in Service Tables Questions 2.2 and 2.3
- Certification from an independent Certified Public Accountant
- Articles of Organization / Trust Agreement
- Community Engagement Plan form
- Current IRS Form, 990 Schedule H CHNA/CHIP and/or Current CHNA/CHIP submitted to Massachusetts AGO's Office
- Community Engagement Stakeholder Assessment form
- Community Engagement-Self Assessment form

Document Ready for Filing

When document is complete click on "document is ready to file". This will lock in the responses and date and time stamp the form.

To make changes to the document un-check the "document is ready to file" box. Edit document then lock file and submit

Keep a copy for your records. Click on the "Save" button at the bottom of the page.

To submit the application electronically, click on the "E-mail submission to Determination of Need" button.

This document is ready to file:



Date/time Stamp: 06/24/2022 10:39 am

E-mail submission to
Determination of Need

Application Number: UMMHC-22042514-HE

Use this number on all communications regarding this application.

Community Engagement-Self Assessment form

APPENDIX 2

NARRATIVE

2. Project Description

UMass Memorial Health Care, Inc. (the “Applicant” or “UMMH”), with a principal place of business at One Biotech Park, 365 Plantation Street, Worcester, MA 01605, intends to file a Notice of Determination of Need (“DoN”) with the Massachusetts Department of Public Health for a substantial change in service and substantial capital expenditure by UMass Memorial Medical Center (“UMMMC” or the “Hospital”), located at 55 Lake Avenue North, Worcester, MA 01655. This Application includes the following: (A) the renovation of a 6-story building adjacent to UMMC’s University Campus, located at 378 Plantation St, Worcester, MA 01605, that will contain 72 additional medical/surgical beds, one (1) additional computed tomography unit, and shell space for future build out to accommodate clinical services; (B) 19 additional medical/surgical beds on UMMC’s Memorial Campus; and (C) other renovation projects to improve the existing services and facilities at Memorial Campus (the “Proposed Project”).

UMMH is the largest health care system in Central Massachusetts and is comprised of one teaching hospital, UMMC, and three acute care hospitals: HealthAlliance-Clinton Hospital, Marlborough Hospital, and Harrington Hospital. All four of these acute care hospitals are designated by the Center for Health Information and Analysis (“CHIA”) as High Public Payer Hospitals (“HPP”).^{1,2} UMMH also provides primary care, specialists, urgent care, behavioral health services through CommunityHealthlink, home health, and hospice.

UMMMC is a 749-bed academic medical center with multiple campuses and satellites in Worcester and the surrounding communities. The Hospital’s University and Memorial Campuses provide acute inpatient and outpatient services, and the Psychiatric Treatment & Recovery Center (“PTRC”) provides psychiatric services. The Hospital provides the full spectrum of tertiary acute care, including emergency care, inpatient and outpatient medical and surgical services, including cardiology, neurology, oncology, and radiology. In addition, the Hospital operates a Hospital at Home program for eligible patients to receive hospital-level care from home. Lastly, University Campus operates the second largest emergency department (“ED”) in Massachusetts and is the only Level 1 trauma center in Central Massachusetts.

As discussed more fully in this Application, the Proposed Project seeks to address inpatient capacity constraints at UMMC due to increased demand and projected future demand. Moreover, as a tertiary hospital offering specialized care not available elsewhere in Central Massachusetts, sufficient inpatient capacity will ensure that the Hospital can accept transfers from area community hospitals. Medical/surgical utilization at UMMC increased significantly in recent years. As a result of the increased demand for inpatient care, the Hospital’s patient panel is experiencing long wait times in the ED as well as high ED boarding rates. Furthermore, due to a lack of available beds, UMMC is unable to accept a significant number of transfer requests from community hospitals for patients who require more complex care. Additional inpatient capacity is needed to improve ED throughput, provide sufficient access to tertiary care in Central Massachusetts, and to plan for the demands of an aging population. Through the Proposed Project, UMMC will address these capacity constraints, thereby improving health outcomes and patient satisfaction.

The Proposed Project will compete on the basis of price, total medical expenses, provider costs, and other recognized measures of health care spending because it will enable the Hospital to provide more timely access to inpatient services, which will reduce ED boarding, in turn improving health outcomes and maximizing overall hospital efficiency. Furthermore, the Proposed Project will meaningfully contribute to and further the Commonwealth’s goals for cost containment by ensuring timely and equitable access to inpatient services in the most appropriate setting.

In conclusion, the Proposed Project is needed to ensure the Hospital has adequate capacity to provide timely access to inpatient care. Without additional inpatient medical/surgical bed capacity, the Hospital will continue to operate above an industry standard occupancy rate, resulting in high ED boarding and patients being denied transfer the region’s only tertiary hospital. The proposed additional beds will provide access

¹ Center for Health Information and Analysis. Massachusetts Hospital Profiles. Technical Appendix.

<https://www.chiamass.gov/assets/docs/r/hospital-profiles/2019/FY19-Massachusetts-Hospital-Profiles-Technical-Appendix.pdf>

² Includes all Medicare, Medicaid and other government payments for healthcare. <https://www.chiamass.gov/high-public-payer-hospitals/>

for low acuity patients, freeing up capacity at the University campus to care for the region's sickest patients. Accordingly, the Proposed Project meets the factors of review for Determination of Need approval.

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

F1.a.i Patient Panel

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

A. UMass Memorial Health Care

UMMH serves a large and diverse patient panel, caring for over 370,000 patients each year at its hospitals, urgent care clinics, and physician groups. The UMMH patient panel during FY19 through FY21³ was approximately 56% female and 44% male for each of the three years. Age demographics show that the majority (approximately 60%) of patients were ages 18-64. Approximately 21% of UMMH patients are aged 65 plus and 19% are aged 0-17. With respect to race and ethnicity as self-reported by UMMH patients, the predominant race served by UMMH hospitals is White, making up approximately 76% of the patient panel. Additionally, patients identified as Hispanic/Latino - 15%; Black/African American - 6%; and Asian - 3.8%. As noted earlier, these are self-reported figures and accordingly there is a significant percentage (13.5% in FY19, 14.1% in FY20 and 13.5% in FY21) of patients that either chose not to report or reported in a category not reported here. Lastly, the majority of hospital patients (approximately 90%) reside in Central Massachusetts, while less than 4% come from out of state.

³ Please note UMMH's Patient Panel data does not include Harrington Health Care System, which was acquired by UMMH effective July 1, 2021.

Table 1: UMMH Patient Panel Demographics

	FY19		FY20		FY21	
	Count	%	Count	%	Count	%
Total Patients	371,488	100.0%	345,864	100.0%	393,429	100.0%
GENDER						
Female	208,885	56.2%	194,323	56.2%	218,434	55.5%
Male	161,945	43.6%	151,096	43.7%	174,530	44.4%
Unknown	658	0.2%	445	0.1%	465	0.1%
Total Gender	371,488	100.0%	345,864	100.0%	393,429	100.0%
AGE						
0-17	71,193	19.2%	62,821	18.2%	72,425	18.4%
18-64	220,271	59.3%	206,373	59.7%	237,664	60.4%
65+ ⁴	80,024	21.5%	76,670	22.2%	83,340	21.2%
Total Age	371,488	100.0%	345,864	100.0%	393,429	100.0%
RACE						
American Indian or Alaska Native	820	0.2%	749	0.2%	894	0.2%
Asian	12,622	3.4%	11,220	3.2%	15,024	3.8%
Black or African American	22,274	6.0%	20,595	6.0%	23,378	5.9%
Declined	2,258	0.6%	1,898	0.5%	3,275	0.8%
Multi-Racial	454	0.1%	120	0.0%	0	0.0%
Native Hawaiian or Other Pacific Islander	139	0.0%	127	0.0%	190	0.0%
Other/Unknown	50,135	13.5%	48,793	14.1%	52,988	13.5%
White	282,786	76.1%	262,362	75.9%	297,680	75.7%
Total Race	371,488	100.0%	345,864	100.0%	393,429	100.0%
ETHNICITY						
Decline to Answer	5,460	1.5%	4,930	1.4%	6,472	1.6%
Hispanic or Latino	53,935	14.5%	51,607	14.9%	59,041	15.0%
Not Hispanic or Latino	307,105	82.7%	282,540	81.7%	317,480	80.7%
Unknown	4,988	1.3%	6,787	2.0%	10,436	2.7%
Total Ethnicity	371,488	100.0%	345,864	100.0%	393,429	100.0%
PATIENT ORIGIN						
Central Mass	334,998	90.2%	313,051	90.5%	352,496	89.6%
Eastern Mass	14,363	3.9%	13,932	4.0%	19,587	5.0%
Western Mass	8,434	2.3%	7,650	2.2%	8,881	2.3%
Out of State	13,693	3.7%	11,231	3.2%	12,465	3.2%
Total Patient Origin	371,488	100.0%	345,864	100.0%	393,429	100.0%

As illustrated in the table below, the majority of UMMH's patients between FY19-FY21 were commercially insured (avg. 30.4%), though there was a slight decline from 31.2% to 29.7%. There was a corresponding increase amongst patients with Commercial Medicare, 12.7% to 14.8%. Patients were also insured by

⁴ Includes "Unknown" for confidentiality due to regulations regarding data containing fewer than 11 individuals.

Original Medicare (avg. 28.7%), MassHealth (avg. 17.5%) and Managed Medicaid (avg. 6.1%), as well as self-pay, Worker’s Compensation, and TriCare (avg. 3.6%).

Table 2: UMMH⁵ Payer Mix

	FY19	FY20	FY21
Commercial PPO/Indemnity	2.50%	3.30%	3.00%
Commercial HMO/POS	28.70%	27.10%	26.70%
MassHealth	17.40%	17.60%	17.50%
Managed Medicaid	5.40%	6.50%	6.40%
Commercial Medicare	12.70%	13.40%	14.80%
Medicare FFS	29.20%	28.70%	28.40%
All other (e.g. HSN, self-pay, TriCare)	4.10%	3.50%	3.20%
Total	100.00%	100.00%	100.00%

B. UMass Memorial Medical Center Patient Panel

UMMMC served almost 300,000 unique patients in FY21. As reported on the next page, the UMMMC patient panel is very similar to the overall UMMH patient panel. For FY19-21, approximately 56% of the patients served by UMMMC were female and approximately 44% were male. UMMMC’s patients were roughly the same age as the overall panel. In FY21, approximately 19% were aged 0-17, 59% aged 18-64, and 22% are 65 and older. Consistent with the overall UMMH patient panel, the predominant self-reported race of patients cared for at UMMMC is White (approximately 74%). Additionally, the UMMMC patient panel identified as: Hispanic/Latino – 14.8%; Black/African American – 6.5%; and Asian – 4%. Lastly, 89% of UMMMC patients reside in Central Massachusetts while only 3.4% of patients came from out of state.

⁵ Includes: HealthAlliance Hospital – Clinton; UMass Memorial Medical Center; Marlborough Hospital; and Harrington Hospital.

Table 3: UMMC Patient Panel Demographics

	FY19		FY20		FY21	
	Count	%	Count	%	Count	%
Total Patients	278,919	100.0%	257,326	100.0%	295,417	100.0%
GENDER						
Female	155,682	55.8%	144,075	56.0%	164,339	55.6%
Male	122,900	44.1%	113,123	44.0%	130,911	44.3%
Unknown	337	0.1%	128	0.0%	167	0.1%
Total Gender	278,919	100.0%	257,326	100.0%	295,417	100.0%
AGE						
0-17	56,818	20.4%	50,622	19.7%	55,748	18.9%
18-64	161,610	57.9%	149,042	57.9%	173,745	58.8%
65+ ⁶	60,491	21.7%	57,662	22.4%	65,924	22.3%
Total Age	278,919	100.0%	257,326	100.0%	295,417	100.0%
RACE						
American Indian or Alaska Native	711	0.3%	650	0.3%	762	0.3%
Asian	10,565	3.8%	9,490	3.7%	11,852	4.0%
Black or African American	18,514	6.6%	17,042	6.6%	19,195	6.5%
Declined	2,283	0.8%	1,952	0.8%	2,850	1.0%
Multi-Racial	237	0.1%	43	0.0%	0	0.0%
Native Hawaiian or Other Pacific Islander	124	0.0%	122	0.0%	153	0.1%
Other/Unknown	37,221	13.3%	35,647	13.9%	40,327	13.7%
White	209,264	75.0%	192,380	74.8%	220,278	74.6%
Total Race	278,919	100.0%	257,326	100.0%	295,417	100.0%
ETHNICITY						
Decline to Answer	5,137	1.8%	4,571	1.8%	5,528	1.9%
Hispanic or Latino	40,365	14.5%	38,033	14.8%	43,675	14.8%
Not Hispanic or Latino	230,892	82.8%	210,580	81.8%	239,526	81.1%
Unknown	2,525	0.9%	4,142	1.6%	6,688	2.3%
Total Ethnicity	278,919	100.0%	257,326	100.0%	295,417	100.0%
PATIENT ORIGIN						
Central Mass	248,964	89.3%	230,632	89.6%	262,968	89.0%
Eastern Mass	11,167	4.0%	10,295	4.0%	13,865	4.7%
Western Mass	8,042	2.9%	7,345	2.9%	8,519	2.9%
Out of State	10,746	3.9%	9,054	3.5%	10,065	3.4%
Total Patient Origin	278,919	100.0%	257,326	100.0%	295,417	100.0%

The chart included below shows the similarity of socioeconomic status of the populations served by UMMH and UMMC as indicated by payor mix, such as the high percentage of patients insured through government insurance programs. For FY19-21, the majority of UMMC's patients were commercially insured (31%), followed closely by patients with Original Medicare (28.6%). The remaining percentage of

⁶ Includes "Unknown" for confidentiality due to regulations regarding data containing fewer than 11 individuals.

patients were insured through Medicaid (18.2%), Managed Medicare (12.8%) and Managed Medicaid (5.7%), as well as self-pay, Worker’s Compensation, and TriCare (3.5%).

Table 4: UMMMC Payer Mix

	FY19	FY20	FY21
Commercial PPO/Indemnity	2.80%	3.60%	3.40%
Commercial HMO/POS	28.90%	27.50%	27.00%
MassHealth	18.20%	18.30%	18.10%
Managed Medicaid	5.10%	6.10%	6.10%
Commercial Medicare	11.80%	12.60%	14.10%
Medicare FFS	29.10%	28.50%	28.30%
All other (e.g. HSN, self-pay, TriCare)	4.10%	3.40%	3.10%
Total	100.00%	100.00%	100.00%

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.

The Applicant seeks DoN approval to add 91 licensed medical/surgical beds at UMMMC. As part of the Proposed Project, the Applicant will renovate an existing building located adjacent to UMMMC’s University Campus. The renovated building will contain 72 medical/surgical beds and one (1) CT scanner dedicated to the building’s inpatients and targeted outpatient populations. The remaining 19 beds will be added to the Hospital’s Memorial Campus. The Proposed Project will result in a total of 347 medical/surgical beds in operation at University Campus, 206 medical/surgical beds in operation at Memorial Campus, for a total of 553 medical/surgical beds on the UMMMC license, and seven (7) CT units across both campuses⁷.

UMMMC is the only academic medical center (“AMC”) and tertiary hospital in Central Massachusetts. It provides a full range of hospital services, including specialty care in cardiology, orthopedics, cancer, women’s health, liver and kidney transplants, advanced GI endoscopy, and pediatrics. It is designated as a primary stroke service and is the only Level 1 trauma center serving the region. In FY21, the Hospital had almost 40,000 discharges, of which the majority (67%) are medical/surgical discharges. Furthermore, the Hospital’s emergency department is the busiest in Central Massachusetts, serving over 100,000 patients a year. The Proposed Project seeks to address inpatient capacity constraints at UMMMC due to increased demand and to accommodate projected future demand. Moreover, as a tertiary hospital offering specialized care not available elsewhere in Central Massachusetts, sufficient inpatient medical/surgical capacity will ensure that the Hospital can accept transfers of high-acuity patients from area community hospitals.

⁷ Currently UMMMC has five CT units. With the approval of DoN # UMMH-21120810-RE, which approved the addition of a CT scanner within University Campus’s ED, UMMMC anticipates six CT units will be in operation by the end of calendar year 2022.

A. INPATIENT MEDICAL/SURGICAL SERVICE

Historical Utilization

As evidenced in the table below, medical/surgical bed utilization at UMMMC has increased significantly since FY19. Specifically, between FY19 and FY21, patient days increased 18%, bed occupancy increased 14%, and ALOS increased 21%. The following metrics are based on medical/surgical inpatient discharges pursuant to UMMMC’s Massachusetts Hospital Cost Report.

Table 5: UMass Memorial Medical Center Historical Medical/Surgical Utilization

	FY19	FY20	FY21
ALOS	4.7	5.1	5.7
Case Mix Index	1.97	2.00	2.06
Days	129,691	131,448	153,013
Discharges	27,759	25,636	26,676
Occupancy	79.3%	78.0%	90.3%

As such, the cost report utilization data does not reflect for additional factors which, when accounted for, more accurately demonstrate UMMMC’s current situation. A more accurate understanding of the Hospital’s occupancy is reflected through the Hospital’s midnight census reporting, which also includes observation and post-procedure recovery patients who occupy a medical/surgical bed but are not reflected as inpatient discharges for cost reporting purposes. Accordingly, UMMMC’s current medical/surgical occupancy rate for FY22⁸ is 94% based on midnight census.

Furthermore, utilization and acuity increases with age and both are most prominent among the Hospital’s 65+ patients. The table below demonstrates that patients aged 65 and older represent a higher acuity (case weight) than other age cohorts and the average length of stay for the age cohort has increased by 35%. Moreover, the provision of secondary medical/surgical inpatient care is often the result of age-related chronic diseases/conditions. As a result, 40% of all medical/surgical discharges in the first half of 2022 were patients aged 65 and older.

Table 6: UMass Memorial Medical Center Historical Medical/Surgical Utilization by Age

	Discharges				Avg Length of Stay				Avg Case Weight			
	FY19	FY20	FY21	FY22 ⁹	FY19	FY20	FY21	FY22 ¹⁰	FY19	FY20	FY21	FY22 ¹¹
0-17	386	452	482	269	3.9	3.1	3.2	3.7	1.30	1.22	1.18	1.24
18-64	15,420	14,689	14,935	7,074	5.6	6.1	6.6	7.3	1.90	1.95	2.05	2.00
65+	14,084	13,571	14,324	6,937	5.8	6.3	7.0	7.7	2.06	2.08	2.10	2.05
Grand Total	29,890	28,712	29,741	14,280	5.7	6.2	6.7	7.4	1.97	2.00	2.06	2.01

A direct result of UMMMC’s high occupancy rates and insufficient medical/surgical inpatient capacity is ED boarding. A patient is considered to “board” in the ED if they remain in the ED for more than two hours after the decision to admit has been made.¹² FY21, total ED boarder hours amounted to 282,600 hours, representing a 91% increase from FY19. However, the number of patients boarding in the ED has remained

⁸ Oct 2021 – March 2022

⁹ Oct 2021 – March 2022

¹⁰ Oct 2021 – March 2022

¹¹ Oct 2021 – March 2022

¹² MA DPH Circular Letter DHCQ 09-09-522. <https://www.acep.org/globalassets/uploads/uploaded-files/acep/advocacy/state-issues/crowding/ma-dph-letter-to-hospitals-to-address-boarding-09.pdf>

relatively consistent between FY19 and FY21 (15,559 and 15,636, respectively), which means patients are currently spending significantly more time in the ED waiting for an available bed once the decision to admit has been made.

Table 7: UMass Memorial Medical Center Average ED Boarder Hours Per Patient

	FY19	FY20	FY21	FY22 ¹³
University	11.5	11.0	15.3	20.3
Memorial	6.2	6.5	7.4	8.2
UMMMC Total	10.3	9.9	13.2	17.0

In addition to the impact of high medical/surgical bed occupancy rates on ED boarding, the Hospital is also forced to decline a significant number of transfer requests due to increased demand for inpatient services and the corresponding lack of adequate medical/surgical capacity. In FY21, approximately 24.6% of eligible transfer requests for admission at UMMC were declined because a bed was not available. For the first quarter of FY22, UMMC declined an average of 43% of eligible transfers. This means that patients in need of tertiary care are sent out of the region.

Impact of High Utilization on Care Delivery

As described above, current demand for inpatient services at the Hospital impacts both medical/surgical and ED operations. The average occupancy rate of medical/surgical beds at the Hospital for FY22¹⁴ is 94% and patients are boarding in the ED an average of 17 hours. As a result of inadequate medical/surgical capacity, the majority of admitted patients board in the ED until a bed is available, in turn contributing to ED crowding. The downstream effect of insufficient inpatient capacity is threefold. First, patient satisfaction and experience are diminished by ED crowding and ED boarding. Second, patients are more likely to experience negative health outcomes the longer they wait for an inpatient bed or to be seen in the ED due to boarder crowding. Lastly, public health outcomes are negatively impacted when fewer patients have access to UMMC due to declined transfers.

For many patients, going to the ED represents a patient’s first experience with a hospital or health care system. Accordingly, the experience may have a lasting impact on how patients view the system as a whole. If a patient seeks medical attention during busy or crowded times, they may experience long waits to receive care, poor communication, insufficient care, and lack of privacy.¹⁵ The negative experiences may result in reluctance to seek emergency or routine medical care in the future, potentially resulting in long-term negative health outcomes.

Moreover, numerous studies have documented the adverse impact of ED crowding and ED boarding on health outcomes. First, ED crowding may result in longer wait times to be seen in the ED, delaying a patient’s access to timely care and treatment.¹⁶ More significantly, patient mortality increases for patients admitted through the ED during periods of ED crowding.¹⁷ Additionally, insufficient inpatient capacity often limits the ED’s ability to efficiently move patients between the more appropriate care setting, further compounding crowding within the ED. Emergency clinicians and the teams they staff are designed to provide episodic care, as opposed to the type of care suited to manage and treat inpatients.¹⁸ Similarly, ED clinicians must prioritize new patients, which limits the availability of care provided to boarded patients,

¹³ Oct 21 – March 22

¹⁴ Oct 21 – March 22

¹⁵ Sonis, Jonathan D et al. “Emergency Department Patient Experience: A Systematic Review of the Literature.” *Journal of Patient Experience* (2018). Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6022944/>

¹⁶ *Id.*

¹⁷ *Supra* note 15.

¹⁸ Laam LA, Wary et al. “Quantifying the impact of patient boarding on emergency department length of stay: All admitted patients are negatively affected by boarding.” *Journal of the American College of Emergency Physicians* (2021). Available at: <https://pubmed.ncbi.nlm.nih.gov/33718931/>

furthering impacting the care boarded patients are able to receive.¹⁹ However, all ED patients are negatively impacted by the presence of ED boarders as a result of increased ED lengths of stays for all patients.²⁰

Lastly, high inpatient occupancy significantly effects the availability of inpatient services and potentially limits access for patients who require tertiary care. As demonstrated by the Hospital's high rate of declined transfers, patients in the service area may need to leave Central Massachusetts in order to access the appropriate care. Transferring to a facility further away from their home can present difficulties for facilities to provide support for high acuity patients, potentially impacting the healing process. When patients are unable to access care close to home, it presents opportunities for patient dissatisfaction and poorer outcomes.

The Proposed Project

The Proposed Project seeks to ensure patients receive care in their community, in the right care setting, and in a timely manner. Therefore, for the reasons articulated in the above section, the Proposed Project is needed to improve access to inpatient medical/surgical services for the Applicant's Patient Panel. As a result of improved access, UMMMC will improve ED throughput, patient satisfaction, and most importantly, health outcomes.

The Proposed Project includes the licensure of a new inpatient facility on the UMMMC license through the renovation of an existing building recently purchased by the Applicant. The additional 72 medical/surgical beds will provide UMMMC additional capacity to focus on lower acuity inpatients. UMMMC anticipates the most prevalent diagnoses of patients admitted to the new inpatient building will be Septicemia/Severe Sepsis, Chronic Obstructive Pulmonary Disease, respiratory infection, pneumonia, heart failure, and pulmonary edema. By centralizing the care of patients with similar diagnoses and acuity levels, the Applicant anticipates patients will experience improved care delivery and coordination, as well as an improved care experience.

Projected Growth and Future Demand

Based on historical utilization trends as well as aging population, the Hospital anticipates that demand for inpatient care will continue to grow. From FY19 to FY21, the Hospital's panel increased by 4%. Continued growth among UMMC's patient panel is supported by UMass Donohue Institute which projects that Central Massachusetts' population will grow by 2.3% between 2020 and 2025 and another 2.0% between 2025 and 2030. However, modest growth to the region is the result of significant growth among residents aged 65-85.²¹ For reference, between 2020 and 2025, the age cohorts 65-69, 70-74, 75-79, and 80-84 are projected to grow by 17%, 19%, 35%, and 29%, respectively. As discussed previously, these age cohorts account for a higher percentage of medical/surgical discharges than other age cohorts, require a higher level of care, and remain admitted for longer periods of time. To that end, it is expected the 65+ age cohort will contribute to utilization growth as the populations grows and ages. The following projections are supported by historical inpatient utilization as well as the projected growth of the Hospital's patient panel.

¹⁹ Sun, Benjamin C et al. "Effect of emergency department crowding on outcomes of admitted patients." *Annals of Emergency Medicine* (2013). Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3690784/#:~:text=In%20summary%2C%20we%20found%20that,who%20might%20require%20hospital%20admission.>

²⁰ *Supra* note 18.

²¹ UMass Donohue Institute, Population Estimates Program. http://pep.donahue-institute.org/publications/AgeSexDetails_UMDI-DOT_V2018.xlsx

Table 8: UMMMC Medical/Surgical Projected Utilization with Proposed Project

	Year 1	Year 2	Year 3	Year 4	Year 5
ALOS	5.8	5.8	5.8	5.8	5.8
Days	178,756	178,756	178,756	178,756	178,756
Discharges	31,439	31,439	31,439	31,439	31,439
Occupancy	89.8%	89.8%	89.8%	89.8%	89.8%
ADC	759	759	759	759	759

Through improved access to inpatient services, UMMMC anticipates ED throughput will improve and as a result, ED crowding and ED boarding will decrease. With improvements to ED crowding, patients will be able to receive more timely treatment in the ED, reducing the number of patients who leave without being seen while also improving patient satisfaction and health outcomes as described previously. Moreover, ED boarding is expected to decrease, in turn improving expected health outcomes for patients who are admitted to the Hospital, as well as all patients who receive care in the ED. Furthermore, the additional capacity created will increase the number of accepted transfer requests for patients in need of tertiary level of care. To that end, not only will the Proposed Project improve the timeliness of care delivery, but it will also increase number of people who are able to receive tertiary care at UMMMC by providing access close to home.

B. CT SERVICE

In order to fully support patients admitted to the proposed inpatient building, the Applicant is requesting DoN approval for the acquisition of one CT unit to be co-located with the 72 proposed medical/surgical beds. As noted above, the proposed building will accommodate lower acuity patients who are unlikely to require tertiary level of care, but who may require CT imaging during their inpatient admission. The additional CT unit will be located in the proposed inpatient building in order to reduce the need for transporting patients elsewhere on campus for advanced imaging. Therefore, the co-location of CT imaging within the proposed inpatient building will ensure patients receive the majority of their care within the same building. In addition to inpatient imaging, the Applicant plans to accommodate historical and projected demand for outpatient CT.

Historical Utilization

At the Hospital's University Campus, the number of inpatient and outpatient CT scans performed on its existing 3 CT units has increased year over year. Between FY19 and FY21, inpatient and outpatient CT utilization increased 17%. The table below illustrates inpatient and outpatient CT demand between FY19 and FY21 at University Campus.

Table 9: University Campus Historical CT Volume

	FY19	FY20	FY21
Emergency	36,628	37,172	37,648
Inpatient	8,906	9,624	9,644
Outpatient	8,482	8,449	10,708
Total ²²	54,020	55,246	58,002

²² Between FY19 and FY21, seven (7) scans were not categorized as emergency, inpatient, or outpatient, therefore scans (7) scans appear in the "Total" column, but are not represented as an emergency, inpatient, or outpatient scan.

In FY21, patients aged 65+ represented nearly half of all CT volume at University Campus (46%). More specifically, patients ages 65+ experienced increased demand of 17.5%, partially offsetting decreased utilization by the 0-17 age cohort as evidence in the table below.

Table 10: University Campus Historical CT Volume by Age

	FY19	FY20	FY21
0-17	1,308	1,263	1,309
18-64	28,162	28,485	29,558
65+	24,550	25,498	27,135
Total	54,020	55,246	58,002

Projected Utilization

The Applicant anticipates that patients admitted to the new building will require approximately 2,550 CT scans annually. To maximize the proposed unit's efficiency, the Applicant anticipates approximately 7,450 outpatient scans will also be performed by the proposed unit, resulting in a total of 10,000 scans annually for Year 1 through 5 post-implementation.

The projected outpatient volume will come from a number of sources as outlines below. First, UMMMC was awarded a contract to provide no-cost, low-dose chest CT scans to eligible Massachusetts firefighters as part of the Department of Fire Services cancer awareness, detection, and prevention program. Based on historical utilization, UMMMC anticipates approximately 260 additional CT scans annually will originate through this program.

Next, UMMMC projects a total of 2,220 additional chest CT scans (1,500 new lung cancer screenings and 700 follow-up screenings) will be performed on patients eligible for low-dose lung cancer screening. This projection is based in part on historical utilization as well as newly expanded eligibility guidelines for lung cancer screening and corresponding increased insurance coverage. In March of 2021, the U.S. Preventative Services Taskforce ("USPSTF") updated its lung cancer screening guidelines by lowering the recommended age range to begin screening and reduced the minimum pack-year smoking history^{23,24}, in effect doubling the number of individuals eligible for screening. Moreover, mandatory commercial insurance coverage based on the updated guidelines began on March 31, 2022. Due to these systemic changes, UMMMC will continue to promote new and routine lung cancer screening in order to increase early detection and improve health outcomes through timely treatment.

An additional 1,520 scans are expected to be performed as a result of a newly launched program to help patients receive timely care outside of the ED. UMMMC has partnered with providers that participate in the UMass Memorial Managed Care Network to refer patients directly to UMMMC imaging for urgent conditions, such as abdominal pain, that warrant same-day CT imaging. This will help reduce the number of patients sent to the ED for a CT scan.

Through a recently expanded program to increase cardiac imaging, UMMMC anticipates an additional 1,200 scans annually for vascular and cardiac disease patients. Specifically, UMMMC is working to increase the number of patients receiving cardiac computed tomography angiography ("CTA") as an alternative to a more invasive and more complex cardiac catheterization.

Lastly, UMMMC anticipates approximately 2,270 outpatient CT scans will be performed on the new machine as a result of 2% annual CT growth across UMMH. Given historical growth between FY19 and FY21 for outpatient CT was 26%, this portion of CT procedures represents modest growth for the Hospital's outpatient CT service.

The table below illustrates where the Applicant anticipates new CT volume will originate.

²³ American Lung Association, *Understanding the New Lung Cancer Screening Guidelines*. April 5, 2022. <https://www.lung.org/blog/new-lung-cancer-screening-guidelines#:~:text=As%20a%20result%20of%20the,will%20ultimately%20save%20even%20more.>

²⁴ Current guidelines are discussed further in Section F1.b.i..

Table 11: Projected Incremental CT Volume from Proposed Unit

	Projected Volume
New Inpatient Facility Volume	2,550
Outpatient Volume	7,450
<i>Firefighter Cancer Screening Program</i>	260
<i>Lung Cancer First Screening</i>	1,500
<i>Lung Cancer Follow-up Screening</i>	700
<i>ED Avoidance Program</i>	1,520
<i>Computed Tomography Angiography</i>	1,200
<i>Outpatient, all other</i>	2,270
Total	10,000

Through these initiatives to expand and improve access to inpatient and outpatient CT scans, the Applicant believes the Proposed Project will improve health outcomes for its patient panel by providing convenient access to early detection, and timely treatment.

F1.a.iii Competition:

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

The Proposed Project will compete on the basis of price, total medical expenses, provider costs, and other recognized measures of health care spending because it will enable the Hospital to provide more timely access to inpatient services, which will reduce ED boarding, in turn improving health outcomes and maximizing overall hospital efficiency. Moreover, UMMC is the only Level 1 Trauma Center in Central Massachusetts²⁵, and as such it must have sufficient medical/surgical bed capacity due to the lack of tertiary level care in Central Massachusetts. Through the Proposed Project, the Hospital seeks to ensure timely access to inpatient care without negatively impacting overall health care costs.

As further described in F1.b.1, ED crowding negatively impacts patients, staff, and hospital efficiency. First, Patients who wait in the ED during periods of overcrowding are more likely to experience negative health outcomes, including morbidity, mortality, adverse events, and preventable errors.²⁶ Once admitted, patients who have boarded in the ED are more likely to have longer inpatient stays and higher costs of care.²⁷ In addition, ED boarding is often the result of high inpatient occupancy rates which limits the ability of hospitals to accept high acuity patients. For patients in Central Massachusetts, this increases the potential for patients to be transferred to higher cost hospitals outside of the service area. Moreover, routinely crowded EDs are more likely to create stressful environments for staff, increasing turnover rates, which in turn creates additional costs to the hospital, particularly during the current staffing shortages requiring the use of higher-cost contract nurses and other clinical staff.

²⁵ Massachusetts Department of Public Health, *Hospital Trauma Destinations*. <https://www.mass.gov/service-details/trauma-hospital-destinations>

²⁶ GD Kelen et al. *Emergency Department Crowding: The Canary in the Health Care System*. New England Journal of Medicine. Available at: <https://catalyst.nejm.org/doi/full/10.1056/CAT.21.0217#:~:text=Outcomes%20are%20worse%20for%20patients.and%20higher%20costs%20of%20care.&text=ED%20crowding%20has%20also%20been.admissions%2C%20further%20exacerbating%20the%20problem.>

²⁷ ML McCarthy et al. Crowding delays treatment and lengthens emergency department length of stay, even among high-acuity patients. *Annals of Emergency Medicine* (2009). Available at: <https://www.sciencedirect.com/science/article/pii/S019606440900239X>.

Furthermore, the Applicant asserts the Proposed Project competes on the basis on price because the new inpatient facility will be the result of renovating an existing healthcare building, rather than constructing a new facility. The Applicant recently acquired the building and will undertake construction to renovate the building for inpatient use; However, the total cost of renovation will be significantly less than if the Applicant were to pursue new construction. Given the proximity of the existing building to University Camps, new construction was not considered as an alternative.

Based on these considerations, the Applicant asserts the Proposed Project will improve access to inpatient services, which will reduce wait times for an inpatient bed, and in turn will reduce ED boarding. Moreover, the Proposed Project is necessary to ensure timely access to tertiary care unavailable elsewhere in the region. Therefore, the Proposed Project will not negatively impact overall health care 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 Applicant has identified.**

Through the Proposed Project, the Applicant seeks to address ED boarding, meet the growing demand for inpatient services, and ensure timely access to tertiary care at the region's only academic medical center. As discussed in Factor F1.a.ii, the expansion of the Hospital's medical/surgical beds will meaningfully impact each of these goals. As detailed herein, the Proposed Project is supported by evidence illustrating the role of academic medical centers as well as the importance of inpatient capacity on hospital throughput. Finally, the need for additional CT capacity is supported by well-documented evidence.

A. Expansion of Medical/Surgical Inpatient Beds at an Academic Medical Center ("AMC")

Academic medical centers serve an essential role in the delivery of health care as evidenced by their provision of highly specialized clinical care, advanced, innovative research, and the education and training of future health care providers. As a result of these features, AMCs are critical to the provision of care for complex, high acuity patients. Often academic medical centers provide communities with the specialized care that may not be available at a community hospital. Therefore, academic medical centers often receive patients referred to them by hospitals who do not have the expertise or the technology to provide the necessary level of care.

Similarly, community hospitals and the availability of secondary medicine beds are vital to the well-being and health of each community. While UMMMC is the only AMC in Central Massachusetts, it also serves as one of two community hospitals in the area and having adequate inpatient capacity for less acute patients is equally important to ensuring capacity for higher acuity patients. A mix of secondary and tertiary inpatient beds ensures hospitals can support patients across the spectrum of care.

Effect of Inpatient Capacity on Emergency Department Throughput and Patient Outcomes

One of the primary factors driving ED crowding and boarding is "access block", which refers to a scenario where patients in the ED requiring inpatient care are unable to be admitted to appropriate inpatient beds within a reasonable time frame.²⁸ Studies have shown one of the best methods for reducing access block, and in turn decreasing ED boarding, is improving inpatient flow.²⁹ Specifically, when hospitals are experiencing high occupancy among its medicine beds, additional inpatient capacity is required to improve access.³⁰

ED crowding is detrimental to the well-being of patients and staff alike.³¹ First, patients are more likely to leave without being seen as a result of prolonged waiting. Patients who do wait in the ED during periods of overcrowding are more likely to experience negative health outcomes, including morbidity, mortality, adverse events and preventable errors, and ambulance diversion.³² Moreover, ED crowding has also been

²⁸ DM Fatovich, *Access block causes emergency department overcrowding and ambulance diversion in Perth, Western Australia*. *Emergency Medicine Journal* (2005). Available at: <https://pubmed.ncbi.nlm.nih.gov/15843704/>

²⁹ *Id.*

³⁰ *Id.*

³¹ *Supra note 25.*

³² *Supra note 25.*

shown to increase violence towards staff, decrease staff productivity, and result in staff burnout and turnover.³³ The presence of patients boarding in the ED compounds ED crowding, including the negative health outcomes described above. For a patient subsequently admitted to the hospital as inpatient, prolonged boarding in the ED often results in longer inpatient stays and higher costs of care.³⁴

B. Computed Tomography Technology

CT is a form of x-ray technology that uses a series of radiation beams to create detailed internal images.³⁵ These images are referred to as slices and can be used to construct 3-dimensional images of soft tissue, internal organs, and bone.³⁶ Moreover, CT imaging provides the option to rotate the 3-dimensional image and view the slices in succession so that the exact location of the abnormality can be identified.³⁷ CT is frequently used by providers to diagnose abnormalities, such as cancerous tumors or determine what type of stroke a patient is experiencing by imaging blood vessels in the brain.³⁸ Because of the level of detail available in a CT image and the speed at which the scan can be completed, CT imaging is considered an essential component of hospital care.³⁹

1. *Chronic Obstructive Pulmonary Disease with Major Complication or Co-morbidity*

Chronic obstructive pulmonary disease (“COPD”) is an overwhelmingly prevalent chronic disease that causes inflammation of the lungs and results in restricted airflow.⁴⁰ More than 16 million individuals in the United States has been diagnosed with COPD.⁴¹ One of the most common causes of COPD is smoke from cigarettes. Individuals with COPD may experience difficulty breathing, coughing, mucus production, and wheezing.⁴² COPD is most frequently the result of long-term exposure to irritating gases or particulate matter. In addition to the symptoms described above, individuals with COPD are at increased risk of developing heart disease, lung cancer, respiratory infections, and pulmonary hypertension.⁴³

Because of the severity of symptoms and complications resulting from COPD, up to 10% of COPD exacerbations result in an inpatient admission.⁴⁴ Despite receiving standard of care COPD treatment, some patients may experience worsening hypoxia. A thoracic (chest) CT may be ordered to identify the cause of the hypoxia.

2. *Low-dose CT*

The leading cause of cancer-related death in the United States is lung cancer, resulting in approximately 135,720 deaths per year.⁴⁵ Lung cancer remains under screened in the United States despite both disease prevalence and increased mortality with early detection.⁴⁶ In 2021, only 18% of eligible, high-risk individuals in Massachusetts received low-dose CT screening.⁴⁷ High-risk individual, for whom annual screening is recommended by the U.S. Preventative Services Task Force, are defined as people who:

³³ *Supra* note 25.

³⁴ *Supra* note 26.

³⁵ Medical News Today. *How does a CT or CAT scan work?* Available at: <https://www.medicalnewstoday.com/articles/153201#uses>

³⁶ National Institutes of Health, *Computed Tomography*. Available at: <https://www.nibib.nih.gov/science-education/science-topics/computed-tomography-ct>

³⁷ *Id.*

³⁸ *Supra* note 34; Envision Radiology, *How CT Scans and MRIs Are Used to Diagnose Strokes*. Available at: <https://www.envrad.com/how-ct-scans-mris-used-to-diagnose-strokes/>

³⁹ FK Korley, Use of advanced radiology during visits to US emergency departments for injury-related conditions, 1998-2007.

Journal of the American Medical Association. (2010). Available at: <https://pubmed.ncbi.nlm.nih.gov/20924012/>

⁴⁰ <https://www.mayoclinic.org/diseases-conditions/copd/symptoms-causes/syc-20353679>

⁴¹ American Lung Association, *Learn about COPD*. Available at: <https://www.lung.org/lung-health-diseases/lung-disease-lookup/copd/learn-about-copd#:~:text=COPD%20is%20the%20third%20leading,term%20disability%20and%20early%20death.>

⁴² Mayo Clinic, *COPD*. Available at: <https://www.mayoclinic.org/diseases-conditions/copd/symptoms-causes/syc-20353679>

⁴³ *Id.*

⁴⁴ “On average, patients with COPD experience 4 episodes of exacerbation [per year]. Up to 10% of exacerbation episodes require hospital admission.”

<https://rc.rcjournal.com/content/60/9/1288#:~:text=On%20average%2C%20patients%20with%20COPD%20experience%204%20exacerbations%2Fy.life%2C%20and%20reduce%20health%20expenditure.>

⁴⁵ American Cancer Society, *First Population-Based Study Finds State-Level Lung Cancer Screening Rates Not Aligned With Lung Cancer Burden in the U.S.* Nov 12, 2020. Available at: <http://pressroom.cancer.org/LDCTScanLCS>

⁴⁶ American Lung Association, *Lung Cancer Fact Sheet*. Available at: <https://www.lung.org/lung-health-diseases/lung-disease-lookup/lung-cancer/resource-library/lung-cancer-fact-sheet>

⁴⁷ American Lung Association, *State of Lung Cancer – Massachusetts*. Available at: <https://www.lung.org/research/state-of-lung-cancer/states/massachusetts#:~:text=20%20Massachusetts%20%3A%2017.8%25->

- Have a 20 pack-year⁴⁸ or more smoking history, and
- Smoke now or have quit within the past 15 years, and
- Are between 50 and 80 years old.⁴⁹

Screening is recommended each year an individual is eligible based on the above criteria.⁵⁰ Improving access to LDCT will reduce barriers for eligible individuals to receive screening, in turn increasing the number of lung cancer cases that are detected early and ultimately improving health outcomes.

3. *Computed Tomography Angiography*

This form CT uses an intravenous contrast agent (dye) to produce CT imagines of blood vessels and tissue.⁵¹ Computed tomography angiography (“CTA”) is often used to help provides view blood vessels of in the brain, heart, lungs, and kidneys.⁵² Most commonly, CTA is used to identify aneurysms (a blood vessel that has become enlarged and may be in danger of rupturing), blood vessels that have become narrowed by atherosclerosis (fatty material that forms plaques in the walls of arteries); abnormal blood vessel formations inside the brain; blood vessels damaged by injury; blood clots; as well as to evaluate tumors fed by blood vessels.

**F.1.b.ii Public Health Value /Outcome-Oriented:
Describe the impact of the Proposed Project and how the Applicant will assess such impact. Provide projections demonstrating how the Proposed Project will improve health outcomes, quality of life, or health equity. Only measures that can be tracked and reported over time should be utilized.**

To assess the impact of the proposed Project, the Applicant will report on the following measures of patient satisfaction and quality of care. The measures are discussed below and will be reported to DPH on an annual basis following implementation of the Proposed Project.

1. **Patient Experience/Satisfaction:** Patients who are satisfied with care are more likely to seek additional treatment when necessary.

Measure: Using the Press Ganey Patient Experience Survey (Inpatient), this measure will look at the likelihood to recommend as demonstrated by selection of “Very Good”.

Projections: As the Proposed Project will not be implemented for several years, the Applicant will provide baseline measures and three years of projections one year following implementation of the Proposed Project.

2. **Hospital Acquired Pressure Injuries (HAPI):** UMMC will review the incidence of HAPI across its medical/surgical patients. With additional medical/surgical inpatient beds, patient will receive care in the appropriate setting, thereby improving quality of care.

Measure: This measure will be reported annually showing data by month. Applicant will collect and provide data using the National Database of Nursing Quality Indicators (“NDNQI”) measure on pressure injuries as follows:

Numerator = number HAPI;

Denominator = total med/surg census.

[End%20of%20interactive%20chart.it%20in%20the%20top%20tier.](#)

⁴⁸ A pack-year is defined as 20 cigarettes smoked every day for one year, or 40 cigarettes smoked every day for 6-months.

⁴⁹ Centers for Disease Control and Prevention. *Who Should be Screened for Lung Cancer?* Available at: www.cdc.gov/cancer/lung/basic_info/screening.htm; US Preventative Services Task Force. *Lung Cancer: Screening.* March 09, 2021. Available at: <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/lung-cancer-screening>

⁵⁰ *Id.*

⁵¹ John Hopkins Medicine, *Computed Tomography Angiography (CTA).* Available at: <https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/computed-tomography-angiography-cta#:~:text=CT%20angiography%20is%20a%20type,in%20your%20arm%20or%20hand.>

⁵² *Id.*

Projections: As the Proposed Project will not be implemented for several years, the Applicant will provide baseline measures and three years of projections at least one year following implementation of the Proposed Project.

3. Inpatient Falls with Injury: UMMMC will review the incidence of inpatient falls resulting in injury.

Measure: The Applicant will collect and provide data using the NDNQI measure as follows: the number of falls per 1,000 inpatient days resulting in a “minor” or greater category of injury.

Numerator = number of falls with injury;

Denominator = (number of patient days/1000)

Projections: As the Proposed Project will not be implemented for several years, the Applicant will provide baseline measures and three years of projections one year following implementation of the Proposed Project.

4. ED Boarding: This measure reviews the amount of time a patient must wait in the ED for a medical/surgical inpatient bed prior to being admitted to UMMMC. Through additional medical/surgical capacity, UMMMC anticipates that ED boarding time will be reduced.

Measure: The Applicant will collect and provide data related to the ED boarding time for inpatients.

Projections: As the Proposed Project will not be implemented for several years, the Applicant will provide baseline measures and three years of projections one year following implementation of the Proposed Project.

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 needbase, please justify how the Proposed Project will reduce the health inequity, including the operational components (e.g. culturally competent staffing). For Proposed Projects not specifically addressing a health disparity or inequity, please provide information about specific actions the Applicant is and will take to ensure equal access to the health benefits created by the Proposed Project and how these actions will promote health equity.

As discussed throughout Factor 1, the Proposed Project is centered on improving health outcomes and quality of life for UMMMC’s patient panel by ensuring timely access to inpatient services within the community. In order to provide high-quality care, UMMMC is committed to providing comprehensive patient education through language accessibility and utilizing data to maximize its potential to improve care and outcomes. Beyond care delivery, UMMH has invested heavily in its ability to address social determinants of health as part of its mission of improving health. To that end, the Proposed Project will promote health equity through the Applicant’s long-standing commitment to improve health care access and health outcomes across Central Massachusetts.

A. Language Accessibility

A large part of a patient’s experience is influenced by their ability to communicate with and understand their providers. To that end, UMMMC provides qualified medical interpreters to patients and families who want to receive health information in a language other than English, including American Sign Language interpreters for patients who are deaf or hard of hearing. Interpreters are available free of charge 24 hours a day, seven days a week across all campuses for all hospital services, as well as for services provided through the Hospital’s free clinics. Interpreters are available in person, over the phone and via remote video interpretation to ensure support for over 100 languages spoken by UMMMC’s patient population. UMMMC ensures the availability of ASL interpreters 24/7 through Video Remote Interpreter (VRI) Solution, which consists of a mobile device (e.g., iPad) secured to a cart with a speaker incorporated to amplify the mobile device’s sound output. The mobile device is connected to the hospital’s secure Wi-Fi to allow users the

ability to connect to readily available, qualified medical interpreters to provide language access for limited English proficient patients and for the deaf and hard of hearing. The VRI Solution offers 34 video language interpreters on demand, and 250 telephonic-only relay interpreters, with a majority accessible 24/7. VRI is available across the ED, ambulatory clinics, inpatient areas, as well as patient service areas, radiology and procedure areas. In addition to on-site capabilities, the Interpreter Services can help respond to calls from patients for both medical and nonmedical issues (e.g., medication refills, urgent visits, billing, financial services, appointment scheduling, etc.). For deaf or hard of hearing patients, TTYs and assistive listening devices are available. Accordingly, the Proposed Project will continue to ensure comprehensive language access in furtherance of the Project's goal of improved health outcomes and patient experience.

B. Health Equity

UMMMC is a disproportionate share hospital and, as a result, is part of the health care safety net for the most vulnerable populations. UMMH hospitals treat all patients regardless of ability to pay and provide all patients with the highest quality care and patient experience. UMMH is experienced in providing access, and high-quality care, to vulnerable populations and will continue to support at-risk members of its community through the Proposed Project.

UMMH is deeply committed to health equity and has been an early participant in the “Healthcare Anchor Network” of the Democracy Collaborative, where it looks at the socio-economic determinants of health, and incorporates these in its medical records for greater understanding of the needs of its patients and its approaches to health care delivery. Further, UMMH believes that it can work toward improvements in the socio-economic factors of the community through its “Purchasing Pillar, Investment Pillar, and Hiring Pillar” committees that are addressing the needs of its communities in creative ways, by emphasizing local purchasing, investing, and hiring.

UMMH has been recognized by the Lown Institute as part of its Hospital Index⁵³ which emphasizes civic leadership, value of care and patient outcomes. Three UMMH hospitals, including UMMMC, have achieved top ratings in the state and high ratings in the national rankings:

Massachusetts Hospital Rankings (comparing 55 hospitals):

- #1 HealthAlliance-Clinton Hospital
- #3 UMass Memorial Medical Center
- #9 Marlborough Hospital

National Hospital Rankings (comparing 3,282 hospitals):

- #8 HealthAlliance-Clinton Hospital
- #24 UMass Memorial Medical Center
- #94 Marlborough Hospital

More recently, UMMMC was recognized by the American Hospital Association (“AHA”) and selected as one of the top four finalists in the country for the AHA’s esteemed Foster G. McGaw Prize. for its community-based response to the COVID-19 pandemic, the Hospital’s role within the public health infrastructure, and the commitment and involvement of the Applicant’s leadership in these efforts. Specifically, UMMMC was recognized for its neighborhood-based strategies to provide access to vaccines and testing within at-risk populations. Strategies include a mobile care team for outreach, education, and testing in neighborhoods using “Feet on the Street” and Mobile Vaccination Equity Expansion programs. Moreover, UMMH applied lessons learned from this work to further inform its ongoing efforts to address health equity. The success of these programs was largely attributable to the use of community-level COVID-19 data, including positivity and vaccination rates. UMMMC was also recognized for its longstanding commitment to combating food insecurity, equitable access to healthy foods, and “Food is Medicine” advocacy.

⁵³ Lown Institute, *Hospital Index*. <https://lowninstitute.org/projects/lown-institute-hospitals-index/>

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

In March of 2022, UMMH released its first Health Equity Report outlining its efforts to address health disparities during the COVID-19 pandemic. As documented throughout the report, UMMH is working to dismantle systemic racism with the clear understanding that systemic racism permeates the business world, educational system and even our health care industry. As part of its commitment to improving equity in the care UMMH provides and being a more inclusive workplace, UMMH took the following actions:

- Formed a Health Equity Steering Committee.
- Created a COVID-19 Equity Task Force in partnership with the City of Worcester to address racial disparities related to COVID-19.
- Developed a \$1M program to fund ideas for promoting equity in health care delivery and fostering a more equitable and inclusive workplace culture.
- Pledged to triple its purchases with minority- and women-owned businesses over the next five years.
- Created an Office of Diversity, Equity, Inclusion and Belonging.

UMMH has established goals for the future including: (1) partnering more with local community-based organizations, (2) tailoring its messaging to be culturally appropriate or in a language that is the primary language for those in diverse communities, (3) making treatment available and affordable, and (4) embracing the community model for wraparound services that address physical, mental, and social determinants of health. Additional goals include the establishment of systemwide unconscious biases, anti-discrimination and anti-harassment training; establishing resource groups for those underrepresented in the caregiver population; and intentionally revising its hiring practices to ensure the organization is not promoting or making itself vulnerable to structural racism.

The Proposed Project is an integral component of UMMH's mission to provide equitable care to its Patient Panel and the community it serves. As described above, the Applicant is investing heavily in a multi-prong approach to improve population health outcomes by meeting individuals where they are. Despite evidence of the effectiveness of providing care to individuals in the community, UMMH must be able to also provide high-quality inpatient services to patients who require a higher level of care. Without sufficient inpatient capacity within the Hospital, the Applicant will continue to face capacity constraints as exhibited by high ED boarding and declined transfer requests.

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

A. Coordination of Care and Linkages

Care coordination across the continuum of care is the key to successfully impacting the health of patients. The Applicant has programs in place to facilitate care coordination as described below. All UMMH hospitals and campuses utilize Epic for an electronic health record which provides efficiencies, economies of scale, consistency, shared learnings and protocols, and superior continuity and coordination of care through improved shared documentation. UMMH has a patient-centric approach and has developed a significant infrastructure to support this approach to care. Additionally, UMMH has developed and implemented clinical pathways, collaborative initiatives, and coordinated care. The longitudinal care approach stems from the realization that in order to significantly impact the quality, utilization, and patient experience, UMMH must view population health beyond the walls of UMMH itself. From the community and homes of UMMH's patients, through its emergency departments and hospitals, and reaching across the post-acute care

settings, UMMH's care must include the entirety of the community. UMMH's infrastructure is well-positioned to support care coordination across the entirety of a patient's care team.

Specific to the Proposed Project, inpatients will be followed by case management and be assessed in daily multi-disciplinary rounds to ensure coordination of care for both acute and post-acute episodes of care. Upon discharge, patients will be given instructions for follow-up care, including any follow up appointments with their specialist or primary care physician in the appropriate timeframe.

B. Community-Based Care

UMMH is committed to ensuring care extends beyond the walls of its campuses and providers. With respect to the Proposed Project, ED case managers and social workers are embedded within in the ED to meet with patients and families and connect them with the appropriate services. For many years, UMMH has cultivated relationships with community-based organizations ("CBO") that provide excellent resources for its patients, culminating in a web- based platform, CommunityHELP.⁵⁴ This search engine provides caregivers, individuals, care managers, and health care teams with community resources across the entire spectrum of needs. It provides immediate translation into over 100 languages and enables electronic referrals to the CBOs to connect patients with resources. This is one of many tools UMMH has developed to meet the needs of UMMH's patients, understanding that health care alone cannot conquer chronic disease and poor health.

Locally, food insecurity, access to dental care, and housing have emerged as consistent stressors. Enhancing CBO collaboration directly targeting these areas such as "food pharmacies", free clinics for the housing threatened population brought to them with mobile services, and identifying preventative dental care are a few examples of how UMMH has responded to community needs.

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

The Applicant carried out a diverse consultative process with individuals at various regulatory agencies and departments regarding the Proposed Projects. The following individuals and agencies are some of those consulted regarding this Project:

- Rebecca Rodman, Esq., General Counsel, Department of Public Health
- Elizabeth Kelly, Interim Director, Determination of Need Program, Department of Public Health
- Jennica Allen, Manager of Community Engagement Practices, Bureau of Community Health and Prevention, Department of Public Health
- Elizabeth Maffei, Program Manager, Bureau of Community Health and Prevention, Department of Public Health
- Massachusetts Executive Office of Health and Human Services
- Health Policy Commission
- Center for Health Information and Analysis
- The Centers for Medicare & Medicaid Services

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.

⁵⁴ <https://www.communityhelp.net/>

As more fully described in Section F1.a.ii, the Applicant determined the need for the Proposed Project based on the historical utilization metrics, including patient days, ED boarding, and declined transfers, as well as projected growth of its existing Patient Panel. Additionally, the Applicant presented the Proposed Project to the community, in a number of forums to engage the community and solicit their feedback in the development of the Proposed Project. Through each community presentation, attendees were provided background information addressing the need for additional medical/surgical beds at UMMMC, including higher utilization and increased declined transfers, as well as how the Proposed Project will benefit UMMMC's Patient Panel and the Greater Worcester community. Following the presentation, attendees were able to share feedback and ask the presenters questions.

First, the Proposed Project was presented to the Steering Committee of the Coalition for a Healthy Greater Worcester's (the "Coalition") on March 15, 2022. The Coalition is comprised of public, non-profit, and private sector stakeholders and plays a critical role in community engagement. Additionally, it serves as a forum to convene partners including the Worcester Division of Public Health (WDPH), service providers, local health departments, consumers, and residents to promote continuous improvement of health status for Greater Worcester residents. In total, the Coalition encompasses over 200 engaged "CHIPed-In" community-based organizations and individuals including representation from local stakeholders, including health and social service providers, advocates, elected and appointed officials, faith leaders, community organizations, Boards and Commissions, and community residents. The virtual presentation was attended by 22 Coalition Steering Committee members and hosted by UMMMC's President, Dr. Michael Gustafson.

Second, the Proposed Project was presented to the UMMMC Patient and Family Advisory Council on March 24, 2022, by Dr. Gustafson and Justin Precourt. The presentation was attended by 13 individuals in attendance, including 10 PFAC members and three (3) representatives from UMMMC.

Additionally, the Proposed Project was presented to the Worcester Together Coalition ("WTC") on March 22, 2022 with 35 representatives in attendance. WTC was organized in response to the critical and rapidly emerging COVID-19 needs of Worcester's vulnerable populations in March 2020 and has grown to include over 230 members. The goal of Worcester Together is to address immediate and long-term needs, complementing the work of public health officials and expanding local capacity to address the impact of this public health crisis on our region's vulnerable populations.

Lastly, the Proposed Project was presented to the public via an in-person and virtual forum on April 14, 2022. The forum was advertised through the Worcester Telegram & Gazette, Spectrum News, Worcester Business Journal, MassLive, UMMMC's social media channels as well as through the Worcester Together Now listserv for community-wide distribution. Two community representatives attended virtually, including City Councilor Candy Mero Carlson and State Senator Harriette Chandler.

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

For materials related to the activities described in the previous section, please refer to Appendix 3, which includes copies of the presentations. In addition, the Applicant published a legal notice for the Proposed Project in the Worcester Telegram & Gazette on May 27, 2022 and posted a copy of the legal notice prominently on the UMMH's website. Please refer to Appendix 8 for copies of the legal notices.

Factor 2: Health Priorities

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

F2.a. Cost Containment:

Using objective data, please describe, for each new or expanded service, how the Proposed Project will meaningfully contribute to the Commonwealth's goals for cost containment.

The Proposed Project will meaningfully contribute to and further the Commonwealth's goals for cost containment by ensuring timely and equitable access to inpatient services for both tertiary and secondary cases. As demonstrated in Factor 1, the Proposed Project is necessary to provide additional inpatient capacity to address constraints across UMMC. The Hospital has experienced high occupancy rates well above the industry standard over recent years. As a result of occupancy rates at or above 95%, patients are waiting significantly longer for an available inpatient bed. Using annualized figures based on the first half of FY22, total ED boarding hours have increased 78% from FY19 and patients are boarding in the ED for an average of 17 hours, a 66% increase from FY19 (10.3 hours). Several studies have demonstrated an association between delayed inpatient admission with worse patient outcomes, in turn resulting in higher costs of care.⁵⁵ Costs may also be further addressed through improved access for community hospitals transfers to UMMC for tertiary care resulting in timely care being provided in the most appropriate setting. The Applicant anticipates that through improved care delivery access and corresponding improved health outcomes, the Proposed Project will meaningfully contribute to the Commonwealth's goals of cost containment.

F2.b. Public Health Outcomes:

Describe, as relevant, for each new or expanded service, how the Proposed Project will improve public health outcomes.

As discussed more thoroughly throughout Factor 1, the Proposed Project seeks to provide more timely access to inpatient care. Due to insufficient inpatient bed capacity, the Hospital's patient panel is experiencing long waits in the ED as well as long wait times for admission to an inpatient bed. Similarly, tertiary patients who require more complex care are being denied access to the Region's only tertiary facility. Additional inpatient medical/surgical capacity is needed to improve ED throughput, provide access to tertiary care in Central Massachusetts, and to meet the needs of an aging population. Through the Proposed Project, patients will have more timely access to care in the ED and inpatient setting, thereby improving public health outcomes in Central Massachusetts.

ED boarding, as noted in the previous section, significantly impacts patient outcomes, often resulting in more acute diagnoses and longer inpatient stays.⁵⁶ In particular, patients are more likely to experience adverse events while waiting prolonged periods for an available bed.⁵⁷ Moreover, patients are at significantly higher risk for in-hospital mortality after boarding in the emergency department for more than four hours before being admitted.⁵⁸ Improving timely access to inpatient beds decreases the prevalence of ED boarding, reducing the risks described above and in turn improving health outcomes. Additionally, public health outcomes will be improved by creating additional access to tertiary care. On average in FY22, more than 40% of patients each month seeking tertiary care at UMMC were denied transfer (a total of 1,597

⁵⁵ *Supra note 25.*

⁵⁶ *Supra note 26.*

⁵⁷ SW Liu et al. A Pilot Study Examining Undesirable Events Among Emergency Department–Boarded Patients Awaiting Inpatient Beds. *Annals of Emergency Medicine* (2009). Available at: <https://pubmed.ncbi.nlm.nih.gov/19303168/>

⁵⁸ T Boulain et al. Association between long boarding time in the emergency department and hospital mortality: a single-center propensity score-based analysis. *Internal and Emergency Medicine* (2020). Available at: <https://pubmed.ncbi.nlm.nih.gov/31728759/>

patients). The Proposed Project will improve public health outcomes by ensuring more patients receive the appropriate level of care in the most appropriate setting.

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

UMMH and UMMMC recognize that an individual’s physical health is only one aspect of their overall health and that there are many factors that impact a person’s wellbeing. To that end, UMMH continually strives to meet the needs of the community beyond the care provided by its clinicians. This includes intentional efforts to fulfil its Anchor Mission, screening for Social Determinants of Health (“SDOH”), utilization of community health workers, and a medical-legal partnership.

Anchor Mission Institution

As an Anchor Mission Institution, UMMH is committed to pursuing initiatives to ensure its community members have access to resources that will improve their overall social, physical, and financial health. The pillars of UMMH’s Anchor Mission are:

- **Investing** – Redirect 1% of its long-term investment portfolio, or \$4 million, to invest in local projects to improve the welfare of its community. These may be projects that address affordable housing, homelessness, food insecurity and the like.
- **Hiring** – Work with other workforce organizations in its community to intentionally hire individuals from some of the most disadvantaged areas of its community. In this way, UMMH seeks to transform neighborhoods and ensure its employee profile is truly reflective of its community.
- **Purchasing** – Support local businesses by buying locally whenever possible, with a focus on areas of social disadvantage or ongoing inequality within its community.
- **Volunteering** – Offer its employees volunteer opportunities where they can get involved and contribute to the mission of UMMH outside of their traditional roles.

Social Determinant of Health Screening

UMMH strives to screen all patients for Social Determinant of Health (“SDOH”) needs through its primary care practices at least once per year. Currently, 38 UMass Memorial Medical Group practices are screening patients during office visits. During the office visit, the Medical Assistant facilitates an SDOH screening which asks patients to identify all areas they would like information on or assistance with, including housing, legal assistance, childcare, and food. If the patient identifies an area of concern, the medical assistant can submit an electronic referral to the appropriate community resource through the patient’s electronic medical record, as well as provide the patient with a printed list directing them to the CommunityHELP⁵⁹ website or placing a direct call in the case of an urgent or emergency need. CommunityHELP is a web-based platform sponsored by UMMH and Reliant Medical Group to help connect patients with engaged community-based organizations (“CBOs”). The primary care provider will follow-up with the patient at their next appointment to confirm the patient accessed the services identified or explore why the referral was not successful and continue work to address the patient’s needs. In addition to primary care office screening, case managers in the inpatient setting also screen for SDOH needs and assess patients for referrals to community services. Following discharge, follow up to ensure compliance varies and in most instances the primary care physician is responsible for following the patient. The Applicant will continue to work with patients and primary care providers to ensure patients are connected to services as needed.

⁵⁹ *Supra* note 53.

Community Health Worker Pilot for High-Risk Mothers

In addition to SDOH screening, UMMC, through its Maternal Fetal Medicine Department, implemented a pilot utilizing a multi-lingual community health worker (“CHW”) working with high-risk Latina/x mothers. The CHW works closely with high-risk patients to help ensure the health and well-being of the mother and baby during and after pregnancy to help in preventing infant mortality. The intervention is part of a Centers for Disease Control and Prevention Racial and Ethnic Approaches to Community Health grant received by the Worcester Division of Public Health in 2018. A focus on identifying SDOH such as food insecurity and access to nutrition is incorporated as a means of reducing chronic disease disparities and risk factors such as hypertension, heart disease, Type 2 diabetes, and obesity. Due to the pandemic, the program adopted a virtual home visiting model. The CHW provided bilingual breastfeeding support services with nutrition and lactation counseling. Approximately 40 patients were enrolled and referred in FY21.

Medical-Legal Partnership with Community Legal Aid

Beginning in 2015, the Medical-Legal Partnership (“MLP”) was established as a collaboration of the Hospital's Legal Department and Community Legal Aid, Inc. (“CLA”), as well as pro-bono private lawyers and clinicians to address SDOH and the legal needs. Services are available to low income and Medicaid-eligible patients at five clinical practices. CLA’s MLP staff attorney holds on-site office hours⁶⁰ at the clinics to identify patients needing legal services. During the pandemic, services were provided remotely via virtual clinic hours. In 2021, 190 referrals were made to the MLP and an additional 118 legal consultations were provided, representing a nearly 50% increase from the prior year. During the consultations, providers at the five clinics, including the UMass Memorial Medicare Accountable Care Organization worked with patients to address their health-harming legal needs.

Factor 5: Relative Merit

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

This Proposal: The Proposed Project includes 72 additional medical/surgical beds and one (1) new CT unit to be located in a renovated building adjacent to University Campus as well as 19 additional medical/surgical beds at Memorial Campus.

Quality: The Proposed Project will improve quality of care and patient satisfaction because the additional inpatient capacity will provide the Hospital's Patient Panel timely access to inpatient services, in turn reducing ED overcrowding and ED boarding hours.

Efficiency: The Proposed Project will improve efficiency through improved ED throughput by creating additional inpatient capacity to move patients out of the ED. In addition, the co-location of inpatient and CT services will enable access to inpatient imaging without the need for transport by ambulance to one of the CT units elsewhere on campus.

Capital Expense: The total capital expenditure for the Proposed Project is \$143,242,167.

Operating Costs: The first-year operating expenses for the CT unit are anticipated to be \$118,577,591.

⁶⁰ Office hours continued virtually during the COVID-19 pandemic.

Alternative Proposal: Do not open new inpatient beds and continue to serve patients with existing inpatient capacity.

Alternative Quality: This alternative does not address the need of UMMMC's patient panel to receive timely access to inpatient services. This option would not address existing high ED boarding times, in turn delaying diagnosis and treatment. These consequences will negatively impact health outcomes as well as patient experience.

Alternative Efficiency: Hospital throughput will continue to be negatively impacted, as well as the negative effect on community hospital that rely on UMMMC to accept transfers of high acuity, tertiary patients requiring care that can only be provided at a tertiary hospital.

Alternative Capital Expenses: There are no capital expenses under this alternative.

Alternative Operating Costs: There would be no changes to UMMMC's current operating costs.