STAFF REPORT TO THE PUBLIC HEALTH COUNCIL FOR A DETERMINATION OF NEED	
Applicant Name	UMass Memorial Health Care, Inc.
Applicant Address	One Biotech Park, 365 Plantation Street Worcester, MA 01605
Filing Date	July 5, 2022
Type of DoN Application	Substantial Capital Expenditure, Substantial Change in Service
Total Value	$143,242,167
Project Number	UMMHC-22042514-HE
Ten Taxpayer Group (TTG)	2 Formed: • Saint Vincent TTG, and • Mass General Brigham (MGB) TTG.
Community Health Initiative (CHI)	$7,162,108.35
Staff Recommendation	Approval with Conditions
Public Health Council	November 9, 2022

Project Summary and Regulatory Review

UMass Memorial Health Care, Inc. (UMMH or Applicant) submitted an application for a Proposed Project at UMass Memorial Medical Center (UMMMC) that will contain the following components:

- Renovation of a six-story building adjacent to UMMMC's University Campus that will contain 72 additional medical/surgical (M/S) beds, one additional computed tomography (CT) unit, and shell space for future build out to accommodate clinical services.
- The addition of 19 M/S beds on UMMMC's Memorial Campus.
- Other renovation projects at UMMMC's Memorial Campus to improve the existing services and facilities.

The capital expenditure for the Proposed Project is $143,242,167. The CHI contribution is $7,162,108.35.

This Determination of Need (DoN) Application falls within the definition of Substantial Capital Expenditure and Substantial Change in Service, which are reviewed under the DoN regulation 105 CMR 100.000. The Department must determine that need exists for a Proposed Project, on the basis of material in the record, where the Applicant makes a clear and convincing demonstration that the Proposed Project meets each DoN Factor set forth within 105 CMR 100.210.

The Department received written comments and held a virtual public hearing on August 23, 2022. Two Ten Taxpayer Groups (TTGs) were formed. Summaries of the comments can be found in Appendix D.

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Application Overview

The following entities are relevant to the current application:

UMass Memorial Health Care, Inc. (UMMH) is a Massachusetts nonprofit corporation that owns and operates an integrated health care system comprised of a network of hospitals and other health care providers that serve the residents of Central Massachusetts. The UMMH system provides the full continuum of care including trauma and tertiary care, behavioral health services (through CommunityHealthlink), primary care, a full range of medical specialists, urgent care (through CareWell Urgent Care), home health, and hospice.[1] UMMH is the largest health care system in Central Massachusetts. UMMH had 6.5% of all Massachusetts Acute Care Hospital Inpatient Discharges in FY19.[a] UMMH is comprised of one academic medical center (AMC), and three community hospitals (CH).

Table 1: UMMH Hospitals

Acute Hospital	Type (Per CHIA Category)[b,2]	Licensed Bed Count
UMass Memorial Medical Center	Academic Medical Center High Public Payer	749
HealthAlliance-Clinton Hospital	Community-High Public Payer	152
Marlborough Hospital	Community-High Public Payer	79
Harrington Hospital	Community-High Public Payer	129

UMass Memorial Medical Center (UMass Memorial or UMMMC) is a 749-bed academic medical center (AMC) in Worcester. Table 2 shows UMass Memorial's current licensed bed count. UMass Memorial's University and Memorial Campuses provide acute inpatient and outpatient services, and the Psychiatric Treatment and Recovery Center (PTRC) provides psychiatric services. The University Campus operates the only Level 1 Adult and Pediatric Trauma Center in Central Massachusetts, and it is a designated Primary Stroke Service (PSS) hospital and therefore needs to ensure timely access to computer tomography (CT) imaging services for all emergency department (ED) patients in the service area. UMass Memorial is a tertiary care referral center for Central and Western Massachusetts. UMass Memorial is a High Public Payer (HPP) hospital.[3]

[1] UMMH has been recognized by the Lown Institute as part of its Hospital Index 4 which emphasizes civic leadership, value of care and patient outcomes. Three UMMHC hospitals, including UMMMC, have achieved top ratings in the state: (comparing 55 hospitals):#1 HealthAlliance-Clinton Hospital, #3 UMMMC, and #9 Marlborough Hospital. Further, it received high national rankings: (comparing 3,282 hospitals): #8 HealthAlliance-Clinton Hospital, #24 UMMMC, and #94 Marlborough Hospital. https://lowninstitute.org/projects/lown-institute-hospitals-index/
https://www.telegram.com/story/news/regional/2020/09/30/umass-clinton-hospital-among-top-10-in-index/42710005/

[2] Based on CHIA definitions: **Academic Medical Centers** are a subset of teaching hospitals. AMCs are characterized by (1) extensive research and teaching programs and (2) extensive resources for tertiary and quaternary care, and are (3) principal teaching hospitals for their respective medical schools and (4) full service hospitals with case mix intensity greater than 5% above the statewide average. **Teaching hospitals** are those hospitals that report at least 25 full-time equivalent medical school residents per one hundred inpatient beds in accordance with Medicare Payment Advisory Commission (MedPAC) and do not meet the criteria to be classified as AMCs. **Community hospitals** are hospitals that are not teaching hospitals and have a public payer mix of less than 63%.
https://www.chiamass.gov/assets/docs/r/hospital-profiles/2020/FY20-Massachusetts-Hospital-Profiles-Technical-Appendix.pdf

[3] High Public Payer (HPP) hospitals receive a minimum of 63% of gross patient service revenue from public payers.

Table 2: Current UMMMC Licensed Bed Count[4]

Acute	Memorial	University	Psychiatric Treatment & Recovery Center (PTRC)[5]	Total
Medical/Surgical	187	275		462
Intensive Care Unit	9	64		73
Coronary Care Unit	14	14		28
Burn Unit		2		2
Pediatric Service		41		41
Pediatric Intensive Care Unit		11		11
Obstetrics Services	65			65
Neonatal Intensive Care Unit	27			27
Psychiatric Service		14	26	40
Total Number of Beds	**302**	**421**	**26**	**749**

Application Summary

The Proposed Project includes:

- Renovation of a six-story building adjacent to UMMMC's University Campus that will contain 72 additional medical/surgical (M/S) beds, one additional computed tomography (CT) unit, and shell space for future build out to accommodate clinical services.
- The addition of 19 M/S beds on UMMMC's Memorial Campus.
- Other renovation projects at UMMMC's Memorial Campus to improve the existing services and facilities.[6]

Table 3: Overview of Proposed Project

	Current # at UMMMC	# New at UMMMC	Total at UMMMC after project implemented
Licensed Beds			
M/S Beds	462	91 (M/S)	553
University Campus	275	72 (M/S)	347
Memorial Campus	187	19 (M/S)	206

	University Campus	Memorial Campus	Total
Current CT Units	3	2	5

[4] University Campus: 238 Single Occupancy Rooms, All Licensed Beds; and 195 Double Occupancy Rooms, All Licensed Beds. Memorial Campus: 225 Single Occupancy Rooms, All Licensed Beds; and 62 Double Occupancy Rooms, All Licensed Beds.

[5] The PTRC is an acute-care unit that specializes in the evaluation and treatment of individuals with psychiatric disorders.

[6] The other renovation projects consist of the expansion of morgue services, and the replacement of a Nuclear Medicine Machine with a larger machine, and renovations of existing space to accommodate the larger machine.

Recently DPH Approved Units[7]	1	0	1
Proposed CT Units	1	0	1
Proposed Total CT Units	5	2	7

Through the Proposed Project, the Applicant seeks to address inpatient capacity constraints at UMMMC that it attributes to increasing demand and projected future demand. Currently, UMMMC lacks sufficient inpatient capacity which is limiting access to care: the Patient Panel is experiencing high wait times in the ED and high ED boarding rates; and the Hospital is unable to accept a number of transfer requests from area community hospitals for high-acuity patients requiring more complex care. 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. UMMMC is the only academic medical center in Central Massachusetts. The Proposed Project seeks to increase inpatient capacity to provide more timely access to inpatient services, reduce wait times for access to such services, and improve the hospital's efficiency with the goal of improving health outcomes and quality of life for the Patient Panel.

Patient Panel[8]

The UMMH Patient Panel consisted of 393,429 patients at its hospitals, urgent care clinics, and physician groups, in fiscal year 2021 (FY21). [9] As shown in Table 4, the number of patients utilizing UMMH's services increased by 5.9% between FY19 and FY21.

Table 4: UMMH Patient Panel

FY19	FY20	FY21	Change Rate (%) FY19-FY21
371,488	345,864	393,429	5.9%

Patient Population Information (FY21)

Table 5 presents UMMH and UMMMC patient population information for FY21. Staff notes the following observations about these data below:

- **Age** – UMMH and UMMMC patient populations are similar across age cohorts; just over 60% of UMMH patients and just under 60% of UMMMC patients are between the ages

[7] Currently, UMMMC has five CT units. With the approval of DoN# UMMH-21120810-RE in May 2022, which approved the addition of a CT scanner within University Campus' ED, UMMMC anticipates six CT units will be in operation by the end of Calendar Year 2022.

[8] As defined in 105 CMR 100.100, Patient Panel is the total of the individual patients regardless of payer, including those patients seen within an emergency department(s) if applicable, seen over the course of the most recent complete 36-month period by the Applicant or Holder.

[9] The Applicant notes that UMMH's Patient Panel does not include Harrington Care System, which was acquired by UMMH effective July 1, 2021. The Applicant did provide the following patient population information for Harrington Hospital: 66,230 patients in FY19, 62,701 in FY20, and 83,035 in FY21. Staff note the demographic makeup of Harrington Hospital for FY21 is very similar to UMMH and UMMMC: 81% of patients originate from Central Mass, 27% of patients are aged 65 and older, and 78% of patient identified as White and 9% of patients identified as Hispanic/Latino. Applicant notes that FY20 results were likely impacted by the COVID-19 pandemic and in FY21, there was an increase in the Patient Panel due to vaccine clinic activity. Patient population information for Harrington Hospital patients can be found in Responses to DoN Questions.

of 18 and 64, and almost a quarter of UMMH (21.2%) and UMMMC (22.3%) patients are aged 65 and older.

- **Race –** The majority of UMMH (75.7%) patients and UMMMC (74.6%) patients self-identified as White.
- **Ethnicity –** Approximately 15% of UMMH and UMMMC patients identified as Hispanic or Latino.
- **Patient Origin** - The majority, ~89%, of UMMH and UMMMC patients reside in Central Massachusetts.
- **Payer Mix** – Commercial payers are the primary payer source for UMMH and UMMMC patients followed by Medicare.

Table 5: Overview of UMMH and UMMMC Patients, FY21

	UMMH	UMMMC
Total Patients (FY21)	393,429	295,417
Gender		
Female	55.5%	55.6%
Male	44.4%	44.3%
Unknown	0.1%	0.1%
Total Gender	100.0%	100.0%
Age		
0-17	18.4%	18.9%
18-64	60.4%	58.8%
65+[10]	21.2%	22.3%
Total Age	100.0%	100.0%
Race[11]		
American Indian or Alaska Native	0.2%	0.3%
Asian	3.8%	4.0%
Black or African American	5.9%	6.5%
Declined	0.8%	1.0%
Multi-Racial	0.0%	0.0%
Native Hawaiian or Other Pacific Islander	0.0%	0.1%
Other/Unknown[12]	13.5%	13.7%
White	75.7%	74.6%
Total Race	100.0%	100.0%
Ethnicity		
Decline to Answer	1.6%	1.9%
Hispanic or Latino	15.0%	14.8%
Not Hispanic or Latino	80.7%	81.1%
Unknown	2.7%	2.3%
Total Ethnicity	100.0%	100.0%
Patient Origin		

[10] Includes "Unknown" for confidentiality due to regulations regarding data containing fewer than 11 individuals.
[11] Self-reported
[12] Patients that either chose not to report or reported in a category not reported here.

Central Mass	89.6%	89.0%
Eastern Mass	5.0%	4.7%
Western Mass	2.3%	2.9%
Out of State	3.2%	3.4%
Total Patient Origin	100.0%	100.0%
Payer Mix[13]		
Commercial PPO/Indemnity	3.0%	3.4%
Commercial HMO/POS	26.7%	27.0%
MassHealth	17.5%	18.1%
Managed Medicaid	6.4%	6.1%
Commercial Medicare	14.8%	14.1%
Medicare FFS	28.4%	28.3%
All other (e.g. HSN, self-pay, TriCare)	3.2%	3.1%
Total Payer Mix	100.0%	100.1%

Factor 1a: Patient Panel Need

The following sections will assess if the Applicant has sufficiently demonstrated need for the Proposed Project components by the Applicant's Patient Panel. The elements addressed in this section are: Medical/Surgical inpatient beds, and Computer Tomography (CT).

Medical/Surgical Inpatient Beds

The Applicant is proposing to add a total of 91 M/S beds at UMMMC to address existing inpatient capacity constraints. The Proposed Project includes the addition of 72 M/S beds at UMMMC's University Campus and the addition of 19 M/S beds at UMMMC's Memorial Campus. Current and projected licensed M/S bed count are shown in Table 6. UMMMC's M/S capacity will increase by 20% through the Proposed Project.

Table 6: Current and Proposed UMMMC M/S Beds by Campus

UMMMC	Current # M/S Licensed Beds[14]	# New M/S Beds	Total # M/S beds after project implementation
University Campus	275	72	347
Memorial Campus	187	19	206
Total	**462**	**91**	**553**

University Campus has 275 M/S beds, 114 are in private rooms (41%) and 161 are in semi-private rooms. The Applicant states that the 72 beds in the new inpatient building will provide additional capacity to focus on tertiary patients with certain exclusions.[15] UMMMC anticipates

[13] UMMH payer mix includes HealthAlliance Hospital – Clinton, UMass Memorial Medical Center, Marlborough Hospital, and Harrington Hospital.

[14] Current number of operational beds is 448: 275 at University Campus and 173 at Memorial Campus.

[15] Patients unstable for transfer or require ICU level of care; Patients with known difficult airway; Patients admitted to the Hematology/Oncology Service; Patients who weigh > 400 lbs or have a Body Mass Index >40 kg/m2; Patients admitted to acute care service with known or anticipated urgent or emergent therapeutic procedure, within 24 hours of admission; Patients who have had a trauma activation during this encounter; Pediatric patients requiring admission for acute care; and Patients with

that 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 based on analysis of patients awaiting bed placement in its EDs and current team structures which showed urgent need for inpatient units for patients with those diagnoses. The Applicant states it will centralize the care of patients with similar diagnoses and acuity levels in the new inpatient building, which will improve care delivery and coordination, and the patient care experience.

To better understand Patient Panel utilization of UMMMC inpatient services, staff examined the top ten cities/towns for M/S discharges from UMMMC's University and Memorial Campuses. Table 7 displays patient origin for M/S discharges for University and Memorial campuses (Massachusetts patients only). As shown in Table 7, ~30% of University Campus M/S discharges and ~40% of Memorial Campus M/S discharges originate from the city of Worcester.

Table 7: UMMMC M/S Discharges Patient Origin by Campus (FY21)

	University					Memorial			
			M/S Discharges					M/S Discharges	
		Grand Total	16,551	100%			Grand Total	11,384	100%
	City/Town	Region	Count	%		City/Town	Region	Count	%
1	Worcester	Central MA	4,567	27.6%	1	Worcester	Central MA	4,434	38.9%
2	Shrewsbury	Central MA	889	5.4%	2	Shrewsbury	Central MA	494	4.3%
3	Leominster	Central MA	499	3.0%	3	Webster, Dudley Hill	Central MA	263	2.3%
4	Fitchburg	Central MA	469	2.8%	4	Auburn	Central MA	260	2.3%
5	Marlborough	Central MA	436	2.6%	5	Millbury	Central MA	248	2.2%
6	Auburn	Central MA	422	2.5%	6	Marlborough	Central MA	244	2.1%
7	Webster, Dudley Hill	Central MA	379	2.3%	7	Holden	Central MA	240	2.1%
8	Westborough	Central MA	370	2.2%	8	Spencer	Central MA	221	1.9%
9	Holden	Central MA	324	2.0%	9	Leominster	Central MA	220	1.9%
10	Millbury	Central MA	300	1.8%	10	Fitchburg	Central MA	218	1.9%
Total			**8,655**	**52.20%**	**Total**			**6,842**	**59.90%**

The UMMMC Hospital Profile from the Center for Health Information and Analysis (CHIA) displays the communities where the hospital's inpatients reside. This provides additional information on where UMMMC hospital inpatients patients reside and the percent of discharges from the community that went to UMMMC. This is shown in Table 8. The cities and

suspected measles. These exclusions are only applicable to the New Inpatient Building and patients who fall into one of these categories will continue to receive care through UMMMC's existing inpatient units.

towns with the highest number of discharges treated at UMMMC is similar to the top 10 cities/towns from which UMMMC M/S discharges originate.

Table 8: Proportion of each community's total discharges attributed to UMass Memorial Medical Center (FY20)[c]

City/Town (Community)	Discharges by Community (Count)	% of Community discharges treated at UMMMC (FY20)
Worcester	12,558	60%
Shrewsbury	1,650	59%
Marlborough	1,083	26%
Fitchburg	951	20%
Leominster	886	21%
Auburn	834	49%
Webster	833	38%
Holden	777	55%
Southbridge	769	35%
Westborough	719	43%

The Applicant attributes Patient Panel need for new inpatient capacity to the following:

1. ***Historical Utilization***

The Applicant provided data points to demonstrate increasing M/S bed utilization at UMMMC since FY19. These measures are presented in Table 9. Between FY19 and FY21, M/S patient days increased by 18%, M/S bed occupancy increased by 14% and average length of stay (ALOS) increased by 21%.[16]

Table 9: UMMMC M/S Historical Utilization

	FY19	FY20	FY21	Change Rate (%) FY19-FY21
ALOS	4.7	5.1	5.7	21.3%
Case Mix Index	1.97	2.00	2.06	4.6%
Patient Days	129,691	131,448	153,013	18.0%
Discharges	27,759	25,636	26,676	-3.9%
Bed Occupancy	79.3%	78.0%	90.3%	13.9%

The Hospital's midnight census reporting also includes observation and post-procedure recovery patients who occupy a M/S bed but who are not reflected as inpatient discharges for cost reporting purposes. Based on midnight census, UMMMC's current M/S occupancy rate for FY22 is 94%.[17]

Table 10 provides an overview of M/S utilization measures by UMMMC Campus to better understand Patient Panel need for new M/S beds. Licensed beds refers to the total number of

[16] Based on medical/surgical inpatient discharges pursuant to UMMMC's Massachusetts Hospital Cost Report.
[17] October 2021 – March 2022.

beds for which the Hospital is licensed by the Department and Operational Beds refers to the total number of licensed beds that are set up, staffed and available for use. As shown in Table 10, M/S occupancy rates at University Campus and Memorial Campus are above industry standards (85%). University Campus has a slightly higher case mix index and longer ALOS than Memorial Campus. In addition, University Campus accounts for 64% of patient days and 64% of M/S discharges.[18]

Table 10: UMMMC M/S Historical Utilization by Campus (FY21)

	FY21 Results					
	University Campus	**Memorial Campus**	**Total**	**DCU[19]**	**Hospital at Home (HAH)[20]**	**Total w/ DCU and HaH**
All Licensed Beds, Excl Bassinets	447	302	749		N/A	
All Operational Beds, Excl Bassinets	433	287	720		N/A	
Single Occupancy Rooms, All licensed beds	238	225	463		N/A	
Double Occupancy Rooms, All licensed beds	195	62	257		N/A	
Avg LOS; excludes NB	7.4	5.5	6.6	5.1	5.8	6.5
Case Mix Index, All patients	2.1743	1.4785	1.8355	1.7425	1.4204	1.8339
Patient Days, excl newborns	147,648	84,201	231,849	2,749	184	234,782
Newborn Patient Days	0	9,255	9,255	0	0	9,255
Discharges, excl newborns	20,077	15,245	35,322	542	32	35,896
Newborn Discharges	0	3,893	3,893	0	0	3,893
M/S Discharges	17,992	10,240	28,232	542	32	28,806
Occupancy (Based on Operational Beds, excl NB)	93.4%	80.4%	88.2%		N/A	
M/S Census Days	95,725	54,451	150,176		N/A	
M/S Operational Beds	275	173	448		N/A	
M/S Occupancy (Based on Operational Beds)	95.4%	86.2%	91.8%		N/A	

The Applicant states further that M/S utilization and patient acuity increase with age and this is reflected in UMMMC's M/S utilization when stratified by age, as shown in Table 11. UMMMC

[18] Staff note that historical discharge data differ in the tables because the source of the data is different, and the reporting time periods are different.

[19] A temporary hospital that UMMH set up to respond to the COVID pandemic inpatient needs.

[20] Discharges represent one of the measures implemented to improve care delivery and reduce occupancy at UMMMC.

patients age 65 and older represent a higher acuity (case weight)[21] and longer ALOS than other age cohorts.

Table 11: UMass Memorial Medical Center Historical M/S Utilization by Age

	Discharges				Avg Length of Stay				Avg Case Weight			
	FY19	FY20	FY21	Change Rate (%) FY19-FY21	FY19	FY20	FY21	Change Rate (%) FY19-FY21	FY19	FY20	FY21	Change Rate (%) FY19-FY21
0-17	386	452	482	25%	3.9	3.1	3.2	-18%	1.3	1.22	1.18	-9%
18-64	15,420	14,689	14,935	-3%	5.6	6.1	6.6	18%	1.9	1.95	2.05	8%
65+	14,084	13,571	14,324	2%	5.8	6.3	7	21%	2.06	2.08	2.1	2%
Total	**29,890**	**28,712**	**29,741**	0%	**5.7**	**6.2**	**6.7**	18%	**1.97**	**2**	**2.06**	5%

In addition, secondary M/S inpatient care (care that could be provided in community hospitals) often results from age-related chronic diseases/conditions, the number of which increases with increasing age. UMMMC patients age 65 and older make up approximately 22% of UMMMC's patient population, but comprised almost 50% of M/S discharges, as shown in Table 12.

Table 12: UMass Memorial Medical Center Historical M/S Discharges by Age

	M/S Discharges							
	FY19	% of Total	FY20	% of Total	FY21	% of Total	FY22[22]	% of Total
0-17	386	1%	452	2%	482	2%	269	2%
18-64	15,420	52%	14,689	51%	14,935	50%	7,074	50%
65+	14,084	47%	13,571	47%	14,324	48%	6,937	49%
Total	**29,890**	**100%**	**28,712**	**100%**	**29,741**	**100%**	**14,280**	**100%**

2. ED Boarding

The Applicant states that high occupancy rates and insufficient M/S inpatient capacity are contributing to ED boarding. The Applicant used DPH's definition of boarding as a patient remaining in the ED for more than two hours after the decision to admit has been made.[23] The Applicant's ED boarding data demonstrate that patients are spending more time in the ED waiting for an available bed once the decision to admit has been made. Between FY18 and FY21, total ED boarder hours increased by 91%.[24] This is shown in Table 13.

Table 13: Total ED boarder hours for UMMMC

FY18	FY19	FY20	FY21	Change Rate (%) FY18-FY21
147,651	208,711	201,924	282,600	91%

[21] Case mix intensity is determined by totaling the Centers for Medicare & Medicaid Services (CMS) Diagnoses Related Group (DRG) weight for all discharges and dividing the sum by the total number of discharges.
[22] Oct 2021 – March 2022
[23] 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-adress-boarding-09.pdf
[24] Total ED boarder hours are calculated by totaling the number of hours each patient boarded in the ED from decision to admit to departure, minus two hours. In FY21, 282,600 hours represents the total boarding hours of 21,459 patients.

As shown in Table 14, patients are boarding in the ED an average of 17 hours.

Table 14: UMMMC Average ED Boarder Hours Per Patient by Campus

	FY19	FY20	FY21	FY22[25]
University	11.5	11	15.3	20.3
Memorial	6.2	6.5	7.4	8.2
UMMMC Total	10.3	9.9	13.2	17

Table 15 shows that ED boarder hours have increased from FY19-FY21 at both campuses.

Table 15: UMMMC Average ED Boarder Hours Per Patient by Campus

	FY19	FY20	FY21	Change Rate (%) FY19-FY21
University	11.5	11	15.3	33%
Memorial	6.2	6.5	7.4	19%
UMMMC Total	10.3	9.9	13.2	28%

Table 16 displays ED Boarding data elements defined by the Department's Emergency Department Data collection for Calendar Year (CY) 21. There was a total of 107,827 ED visits in CY21, 66% of which were at University Campus.

Table 16: Emergency Department Data FY21[26]

	ED 1: ED Visits		ED 2: Median time (in mins) from ED arrival to ED departure for admitted ED Pts, per month		ED 3: Median time (in mins) from ED arrival to ED departure for discharge ED Pts, per month		ED 4: Total number of all Pts remaining in the emergency dept for 12 or more hours from arrival to ED departure including ED obs-stay		ED 5: Total # of Pts Defined as BH	
October to September	University	Memorial	University	Memorial	University	Memorial	University	Memorial	University	Memorial
Grand Total	71,192	36,635	859	541	331	228	20,875	2,526	4,910	329

Boarding in the ED contributes to ED crowding. When patients receive care in a crowded ED, they may experience longer wait times to receive care, poor communication, insufficient care, and lack of privacy. The Applicant states that negative experiences when seeking care can create reluctance to seek care in the future and delaying care can adversely impact health outcomes. In addition, waiting longer to receive care as a result of ED boarding, or being unable to access care through denied transfers, can negatively impact health outcomes. The Applicant states that in FY21, 7.3% of patients left the UMMMC ED without being seen. Hospital Compare, a federal website operated by the Centers for Medicare and Medicaid Services (CMS),

[25] October 2021 to March 2022.

[26] Emergency Department Data Circular Letter. https://www.mass.gov/doc/12-01-555-emergency-department-data-collection-update-232012-0/download?_ga=2.250765318.1227958744.1657543284-942243966.1646934097. See responses to DoN Question for data broken down by month. Arrival to Depart time is define as the point a patient is admitted into an ED area until they are discharges from the ED area; this excludes Triage and ED Lobby time.

which publishes hospital performance data, reported that in 2020, of 102,307 UMMMC ED patients, 6% left the ED without being seen, a measure of timely and effective care.[27] The Massachusetts average was 2%.

The negative impact of ED crowding has been documented and includes longer wait times to be seen, increase in patient mortality for patients admitted through the ED during periods of ED crowding, inability to move patients between the appropriate care settings, increased LOS for all patients, and impact on clinicians and their ability to triage care. The Applicant cites a study stating that one of the primary factors driving ED crowing and boarding is "access block" where patients in the ED requiring inpatient care are unable to be admitted to appropriate beds within a reasonable timeframe. Further, reducing access block, through additional inpatient capacity, can decrease ED boarding, and improve inpatient flow.[d]

3. Transfers

The Applicant states that the Hospital has declined a significant number of transfer requests from community hospitals due to increased demand for inpatient services and lack of adequate inpatient capacity. In FY21, 24.6% of eligible transfer requests for admission at UMMMC were declined because a bed was not available, and for the first quarter of FY22, UMMMC declined an average of 43% of eligible transfers. The Applicant states that when patients requiring tertiary care cannot access it at UMMMC, they are sent out of the region for such care. Transferring patients to other facilities to receive care can pose a challenge to those facilities, and result in patient dissatisfaction and poorer outcomes from the inability to obtain care closer to home.

To better understand the impact of capacity constraints on patient transfers to UMMMC, the Applicant provided additional information on the origin of patient transfers, including patient transfers from UMMH community hospitals to UMMMC. This is shown in Table 17. The Applicant was not able to identify facilities where denied transfer requests are sent due to the lack of a formal process for tracking such information.

Table 17: Patient Transfers to UMMMC (FY22)

	Pt Count			% of Grand Total			
By Hospital:	**Transfers**	**Declined**	**Total Requested**	**Transfers**	**Declined**	**Total Requested**	**Percent of Requests Declined**
Harrington	223	209	432	13.8%	10.7%	12.1%	48.4%
Marlborough	257	144	401	15.9%	7.4%	11.2%	35.9%
HealthAlliance	497	354	851	30.8%	18.1%	23.9%	41.6%
Subtotal UMMH Community Hospitals	**977**	**707**	**1,684**	**60.5%**	**36.2%**	**47.2%**	**42.0%**
Other Hospitals in UMMH Service Area[28]	371	547	918	23.0%	28.0%	25.7%	59.6%

[27] Percentage of patients who left the emergency department before being seen.
[28] Refers to non-UMMH hospitals in the Worcester service area.

Hospitals Outside of UMMH Service Area[29]	266	698	964	16.5%	35.8%	27.0%	72.4%
Grand Total	**1,614**	**1,952**	**3,566**	**100.0%**	**100.0%**	**100.0%**	**54.7%**
Annualized	***3,228***	***3,904***	***7,132***				

Table 17 shows From October 21 – March 22 (FY22),

- 1,648 or 47% of transfer requests came from UMMH Community Hospitals, 918 or 26% came from Other Hospitals in UMMH's Service Area, and 964 or 27% were from Hospitals Outside of UMMH's Service Area.
- More than half (55%) of all transfer requests were declined: 42% of Community Hospital transfer requests, 60% of transfer requests from Other Hospitals in UMMH's Services area, and 72% of transfer requests from Hospitals Outside of UMMH's Services Area were declined.

Staff asked the Applicant about its efforts to expand capacity at its community hospitals, in order to address existing capacity constraints. The Applicant states that it has the following efforts in place to increase utilization of its community hospitals and keep care in the appropriate setting:

- **UMMMC Transfer and Access Center (TRAC)**. Facilitates two daily inpatient access calls with representatives from each UMMH community hospital during which each hospital provides updates on existing capacity, available beds, and appropriate patient transfers from the community hospitals to UMMMC.
- **Hospital Medicine Admission Team (HMAT).** Entails screening M/S transfer requests to UMMMC to assure only appropriate patient transfers to UMMMC based on level of care that is needed.
- **UMass Memorial Medical Group.** Provides coverage at most UMMH community hospitals for emergency medicine, e-ICU, Hospital Medicine, and Anesthesia. Physician providers who provide coverage at UMMMC provide coverage at UMMH community hospitals helping to ensure that care remains in the community when appropriate. Additionally, community hospital patients are able to receive specialty consult from a provider at UMMMC electronically, allowing for care to remain in the community.
- **"Round Trip" Program.** Allows for community hospital inpatients to undergo specialty procedures at UMMMC and then return to their inpatient bed at the community hospital.

The Applicant states that its efforts to keep care local and in the appropriate setting through available capacity at its community hospitals, has resulted in year over year growth in occupancy at UMMH community hospitals. This is shown in Table 18. The Applicant notes that patient choice and demand impacts where patients access care.

[29] Refers to hospitals outside of the Worcester service area.

Table 18: UMMH Community Hospital Occupancy

UMMH Community Hospital	FY21 Occupancy	FY22 Occupancy[30]	Growth Change Rate (%) FY21 to FY22
Harrington	56.6%	65.6%	16%
HealthAlliance Clinton	75.5%	81.3%	7.7%
HealthAlliance Leominster	85.7%	92.5%	7.9%
Marlborough	66.8%	75.5%	13%

Two additional initiatives at HealthAlliance Clinton – Leominster Campus will also expand use of UMMH community hospitals.

- The addition of nine M/S beds in fall 2022 (pending licensure approval) for patients with a prolonged patient stay requiring acute level of care, particularly for respiratory conditions. These are patients who may have been admitted to UMMMC for intensive care unit (ICU) level care and can be transferred back to the community in a M/S bed for continued care.
- Care for long-term UMMMC patients at Health Alliance Clinton-Clinton Campus. This is focused on patients that no longer require tertiary level care but who may not have options available for post-acute care services.

4. Projected Growth and Future Demand

The Applicant is projecting an increase in demand for inpatient care at UMMMC and cited several reasons for the anticipated increase:

- The Hospital's patient population increased by 6% from FY19-FY21.

Table 19: UMMMC Patient Population

FY19	FY20	FY21	Change Rate (%) FY19-FY21
278,919	257,326	295,417	5.9%

- UMass Donohue Institute projects the Central Massachusetts population will grow by 2.3% between 2020 and 2025, and another 2.0% between 2025 and 2030. In addition, there will be significant growth among older age cohorts: the age cohorts 65-69, 70-74, 75-79, and 80-84 are projected to grow by 17%, 19%, 35%, and 29%. Because these age cohorts account for a higher percentage of M/S discharges than other age cohorts, require a higher level of care, and have longer lengths of stay, it is expected that the age 65 and older populations will contribute to increased utilization as the population increases and ages.
- Limited inpatient bed availability in the region, along with a higher volume of inpatient demand caused by delayed care, COVID-19-related illness and a growing staffing crisis

[30] FY22= October 1-June 30

will contribute to increasing need for inpatient capacity. Licensed bed capacity in the region is lower than other areas of the state. This is shown in Table 20.[31]

Table 20: Licensed beds based on CHIA 2019 cost report data

Location	Hospitals	Inpatient Licensed Beds	AMCs	Beds/1,000 Population	Beds Per Capita
Eastern Mass (Including Cape and Islands)	40	10,985	5	2.19	15% more
Central Mass	11	2,058	1	1.9	
Western Mass	9	1,875	0	2.28	20% more

In 2020, the Kaiser Family Foundation reported that the national average per 1,000 U.S. residents was 2.4 hospital beds, and in Massachusetts it was 2.3 hospital beds per 1,000 residents.[32,e,f]

The Applicant expects Year 1 of project implementation to occur in FY 2025, based on its timeline. Table 21 displays projected M/S utilization measures, previously presented in Table 21 above, during project implementation. The Applicant asserts that UMMMC needs 318 new M/S beds to adequately address Patient Panel need for such services, however, its existing footprint and the available space at existing facilities limited the number of new beds that could be physically added to 91. Therefore, while the addition of new beds will address capacity constraints, demand will outpace need beginning in Year 1 of operation.

Table 21: UMMMC M/S 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	89.80%	89.80%	89.80%	89.80%	89.80%
Average Daily Census	759	759	759	759	759

The Applicant outlined strategies for staffing the new M/S bed which include:

- Partnering with labor unions to agree on competitive contracts with extended period lengths to help support cohesion among leadership and staff.
- Partnering with area schools to support program and student growth in areas such as nursing, allied health, respiratory therapy, and others.

31 Licensed beds based on CHIA 2019 cost report data; excludes nursery. Projected 2019 population using UMass Donohue Institute population estimates. Physician estimates based on ratios of physicians to population in AHA Statistical Guide, by nation and state.

32 A ranking from the Kaiser Family Foundation. The data is based on an analysis of the American Hospital Association's annual survey from 2015 to 2019.

- Expanding recruitment efforts outside of Massachusetts, throughout New England and into a number of key metropolitan areas across the country; and increasing marketing campaigns with a focus on UMMH's history and mission.

Need for access to CT Imaging

Table 22: Current and Proposed CT Capacity

	University Campus	Memorial Campus	Total
Current CT Units	3	2	5
Recently DPH Approved Units[33]	1	0	1
Proposed CT Units	1	0	1
Proposed Total CT Units	**5**	**2**	**7**

CT is a well-established, non-invasive imaging technique that is employed in a variety of clinical and research settings for diagnosis, planning or guiding interventional or therapeutic procedures, and for monitoring the effectiveness of therapy.

Currently UMMMC has five CT units, and with the recent approval (May 2022) of 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. The sixth unit is currently in the process of being implemented and is not yet operational.

The Applicant is proposing to add one CT unit to be located at University Campus and co-located with the 72 proposed M/S beds, to serve those who may require CT imaging during their inpatient admission. The Applicant states that the CT unit within the proposed inpatient building is needed in order to reduce the need for transporting patients elsewhere on campus for advanced imaging, thereby ensuring that patients receive the majority of their care within the same building. The proposed CT unit will accommodate historical and projected demand for inpatient and outpatient CT imaging.

The Applicant attributes Patient Panel need for an additional CT unit to the following:

1. ***Historical CT Utilization***

Table 23 lists hours of operation of the UMMMC's existing CT units. The emergency and inpatient CT units at University Campus are available to scan 24 hours per day, seven days per week in order to ensure that the hospital is able to meet the needs of stroke and trauma patients.

[33] Currently, UMMMC has five CT units. With the approval of DoN# UMMH-21120810-RE in May 2022, which approved the addition of a CT scanner within University Campus' ED, UMMMC anticipates six CT units will be in operation by the end of Calendar Year 2022.

Table 23: Hours of Operation for Existing Imaging CT Units at UMMMC

	University Campus	Memorial Campus
Emergency/Inpatient CT Units[34]	Operates 24 hours per day, seven days per week. Prime time use for these units is between the hours of 7am and 7pm.	Operates24 hours per day, seven days per week.
Outpatient CT units	Monday through Friday from 7am-6pm and Saturday from 7am-5pm	Monday through Saturday from 7am-8pm

The capacity of the existing five CT units is 67,288 scans each year. In FY21, UMMMC performed 85,730 scans, which the Applicant states is 27 percentage points above its maximum capacity. The Applicant notes that there are other factors that are not considered in the calculation of existing CT capacity. While the Hospital's CT units each have a primary use, they also are used interchangeably depending on demand. UMMMC is a Level 1 Trauma Center, Stroke Center, and Acute Cardiovascular Center and therefore the Hospital needs to have capacity on the main CT scanners to do an immediate study on patients immediately upon arrival. And because multiple types of scans are performed and under unique circumstances, the scanner is used for shorter or lesser periods of time depending on the type of study performed and patient condition.

Table 24 shows wait times for existing CT units.

Table 24: Current CT Wait times by UMMMC Campus

	University	Memorial	Both Campuses
Emergency	161 minutes	125 Minutes	
Inpatient	7.7 Hours	8.4 Hours	
Outpatient			15 days[35]

The Applicant provided historical CT volume and unique patients for FY21 shown in Table 25.

Table 25: Historical CT Volume at UMMMC by Campus

	University Campus		Memorial Campus	
	CT Volume	Unique Patients	CT Volume	Unique Patients
Emergency	37,648	16,636	11,585	7,692
Inpatient	9,644	4,081	3,275	1,954
Outpatient	10,708	6,630	12,858	9,663
Total	**58,002[36]**	**27,349**	**27,728[37]**	**19,316**

[34] The Applicant states that these units are and must be available 24/7 to support emergent patients due to the Hospital's status as a Level 1 Trauma Center, Primary Stroke Center, and acute Cardiovascular Center.
[35] Based on the 3rd available appointment.
[36] Includes two (2) unlisted scans by two (2) unique patients.
[37] Includes 10 unlisted scans by seven (7) unique patients.

The Hospital's University campus, where the proposed new CT unit will be sited, has three existing CT units. The Applicant states that CT volume has increased annually. Between FY19 and FY21, inpatient CT utilization increased 8% and outpatient CT utilization increased 26%. This is shown in Table 26.

Table 26: University Campus Historical CT Volume

	FY19	FY20	FY21	Change Rate (%) FY19-FY21
Emergency	36,628	37,172	37,648	3%
Inpatient	8,906	9,624	9,644	8%
Outpatient	8,482	8,449	10,708	26%
Total[38]	54,020	55,246	58,002	7%

Table 27 shows that ED patients comprise a significant portion of CT volume at UMMMC's University Campus.

Table 27: University Campus Historical CT Volume by Patient Status

	FY19	% Total	FY20	% Total	FY21	% Total
Emergency	36,628	68%	37,172	67%	37,648	65%
Inpatient	8,906	16%	9,624	17%	9,644	17%
Outpatient	8,482	16%	8,449	15%	10,708	18%
Total[39]	54,020	100%	55,246	100%	58,002	100%

A review of CT utilization by age at the University Campus shows that CT utilization increased by 11% among the aged 65 and older age cohort, the most among all age cohorts. This is shown in Table 28.

Table 28: University Campus Historical CT Volume by Age

	FY19	FY20	FY21	Change Rate (%) FY19-FY21
0-17	1,308	1,263	1,309	0%
18-64	28,162	28,485	29,558	5%
65+	24,550	25,498	27,135	11%
Total	54,020	55,246	58,002	7%

And as shown in Table 29, patients aged 65 and older represented nearly half of all CT scan volume at the University Campus.

Table 29: University Campus Historical CT Volume by Age

	FY19	% Total	FY20	% Total	FY21	% Total
0-17	1,308	2%	1,263	2%	1,309	2%

[38] 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.
[39] 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.

18-64	28,162	52%	28,485	52%	29,558	51%
65+	24,550	45%	25,498	46%	27,135	47%
Total	54,020	100%	55,246	100%	58,002	100%

2. Projected CT Utilization

Through studying existing patient populations, UMMMC determined the projected utilization of the proposed CT unit. This is shown in Table 30.

Table 30: Hours of Operation and Capacity for Proposed CT Unit at University Campus

Hours of Operation	• 24/7 to accommodate emergent needs of inpatients in the building, with the majority of inpatient scans being performed between the hours of 7am and 7pm
Capacity	• 8-10 inpatient CT transports to main campus per day (2,500 per year) will be avoided by having a CT on site. • Remaining capacity will be utilized for expansion of access to outpatient scans (8a-8p M-F and 8a-4p on Saturday) for the identified categories in the application. • Maximum capacity for the proposed CT unit is 9,256[40]

The Applicant projects that patients admitted to the new building will require ~2,550 CT scans annually comprising ~25% of the utilization. The Applicant further outlined projected outpatient utilization of the proposed CT unit, which is intended to maximize the unit's efficiency and improve health outcomes through providing convenient access to early detection, and timely treatment. This is shown in Table 31.

Table 31: Projected Incremental CT Volume from Proposed Unit

	Projected Volume	% of Total
New Inpatient Facility Volume	**2,550**	**25%**
Outpatient Volume	**7,450**	**75%**
Firefighter Cancer Screening Program	260	3%
Lung Cancer First Screening	1,500	15%
Lung Cancer Follow-up Screening	700	7%
ED Avoidance Program	1,520	15%
Computed Tomography Angiography	1,200	12%
Outpatient, all other	2,270	23%
Total	**10,000**	**100%**

- **Firefighter Cancer Screening Program:** 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.

[40] Calculated by using the available capacity during 7a-8p M-F, 7a-7p Saturday and Sunday as this covers outpatient and peak inpatient hours.

- **Chest CT Scans:** Performed on patients eligible for low-dose lung cancer screening. Projection is based on historical utilization and newly expanded eligibility guidelines for lung cancer screening and corresponding increased insurance coverage.[41]
- **ED Avoidance Program:** Newly launched program to help patients receive timely care outside of the ED. UMMMC partnered with providers participating in the UMass Memorial Managed Care Network to refer patients directly to UMMMC imaging for urgent conditions that warrant same-day CT imaging.
- **Computed Tomography Angiography:** Recently expanded program to increase cardiac imaging, as an alternative to more invasive and more complex cardiac catherization.
- **Outpatient, all Other:** 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.

Analysis

Medical/Surgical Inpatient Beds

Staff find that based on the historical and projected data provided by the Applicant, it has demonstrated need to increase inpatient capacity, increase imaging capacity, and co-locate CT imaging and inpatient care to address Patient Panel need for these services.

Staff finds that overall, the Applicant has demonstrated sufficient need for additional M/S inpatient beds at UMMMC to improve patient throughput and support the UMMMC's efforts to provide access care across the continuum from low to high acuity patients. The Applicant maintains that the additional capacity will likely alleviate the capacity constraints across care areas, including in the ED, and increase the ability to accept transfer patients to allow for these patients to be treated in the appropriate setting, locally.

Staff finds that there is support for the proposed expansion including:

- Improved access to inpatient services that will in turn improve ED throughput and decrease ED crowding.
- More timely treatment in the ED will improve health outcomes for patients who are admitted to the Hospital, as well as all patients who receive care in the ED, and will improve patient satisfaction.
- Increasing the number of accepted transfer requests for patients in need of tertiary level of care to increase access to tertiary care locally and improve timeliness of care.
- Increasing the number of single-bedded rooms. New inpatient beds will provide care for the most prevalent diseases triaged through the ED.

[41] In March 2021, the U.S. Preventative Services Taskforce (USPSTF) updated its lung cancer screening guidelines, which lowered the age for inclusion and intensity of smoking to qualify as high risk. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/lung-cancer-screening#:~:text=Recommendation%20Summary&text=The%20USPSTF%20recommends%20annual%20screening,within%20the%20past%2015%20years.

The Applicant determined that need for new inpatient capacity across the UMMH system was greatest at UMMMC because M/S occupancy is the highest at UMMMC compared to other UMMH community hospitals, and because ED boarding is highest at UMMMC, and high ED boarding further intensifies high occupancy rates. And the addition of inpatient capacity at UMMH community hospitals would not serve to alleviate the existing capacity constraints at UMMMC.

The Applicant chose the location for the inpatient building because of its close proximity to University campus (~.25 miles from University Campus Emergency Department), which the Applicant asserts will ensure ease of transportation and convenient access to the support services available throughout the Campus.

Table 32 compares the approximate distance and drive times from UMMH hospitals to Worcester, the city with the largest number of UMMMC's M/S discharges.

Table 32: UMMH Hospitals Distance from Worcester[42]

Acute Hospital	Location (City/Town)	Miles from Worcester	Drive Time to Worcester (Minutes)
UMass Memorial Medical Center	Worcester	0	0
HealthAlliance-Clinton Hospital	Clinton	20	26
	Leominster	24	31
	Fitchburg	28	40
Marlborough Hospital	Marlborough	18	24
Harrington Hospital	Southbridge	24	30
	Webster	18	22

To better understand how the Applicant determined the number of beds needed to address existing capacity constraints, Staff requested an explanation, with data, of how the Applicant calculated the need for 91 new M/S beds including data sources and methodology used in the calculation. The Applicant replied that it conducted an analysis of the number of beds per 1,000 residents in each region of Massachusetts (Cape & Islands, Eastern MA, Central MA, and Western MA) using UMass Donahue 2020 Population Estimates, and CHIA's 2020 Licensed Beds Data. From this analysis, the Applicant determined that Central MA has 236 fewer beds than the State, on average, and 318 fewer beds when compared to Eastern MA.

CT Imaging

Staff finds that the Patient Panel information provided demonstrates sufficient need for and expansion of co-located CT services at UMMMC's University Campus. The addition of a CT unit will allow for timely and better diagnosis and co-locating the unit with the new M/S beds will allow patients to receive their care in one location. Co-locating these

[42] Use Google Maps to estimate distance in miles and drive time in minutes from Worcester to each hospital.

services in the new building will reduce the number of places patients will need to visit to obtain their care and will allow for collaboration among providers to improve quality of care and outcomes.

Staff agrees that this Proposed Project will address existing inpatient M/S beds and CT imaging issues on capacity and meet the growing demand of the Patient Panel for these services. UMMMC is the sole provider of a number of services in Central MA and serves a high percentage of public payer patients: UMMMC qualifies as a Disproportionate Share Hospital (DSH)[43] and is designated by CHIA as a High-Public Payer Hospital. The Proposed Project will allow more patients in the region to receive timely access to care locally and in the appropriate setting.

Factor 1: b) Public health value, improved health outcomes and quality of life; assurances of health equity

Public Health Value: Improved Outcomes and Quality of Life
As mentioned above, inpatient capacity constraints lead to ED boarding, and ED boarding adversely impacts the care and well-being of patients and staff in various ways, including longer inpatient stays and higher costs of care. Private rooms provide more patient-centered care, reduce the spread of infection, and will reduce ED boarding and improve flow of patients recovering from surgery to inpatient rooms.

To address the needs of a growing aging population, and increasing demand for inpatient services, age-friendly features will be incorporated into the design of the new inpatient building to provide a safer, quieter, family-focused environment with enhanced patient control.[44] The Applicant outlined a number of age-friendly design features will allow adequate space in patient rooms to accommodate families; allow for new and innovative technologies that will assist with providing information about the patient's condition, patient's appointments, and patients medication/care routine; improve patient access and patient safety in the patient's room and around the facility; and improve patient comfort and autonomy.

The clinical benefits of CT have already been established and will not be discussed further. The Applicant cited the use of routine and emergency CT imaging as an essential component of Hospital care. Delayed access to high-quality care can have a negative impact on patient satisfaction, quality of life, and health outcomes as a result of delayed diagnosis and treatment. In terms of the Proposed Project, the addition of a CT unit will improve health outcomes and quality of life for specific patients requiring CT.

- *Chronic Obstructive Pulmonary Disease with Major Complication or Co-morbidity*
  COPD refers to a group of diseases that cause airflow blockage and breathing-related problems. It includes two main conditions: emphysema and chronic bronchitis.[g] Sixteen

[43] Disproportionate Share Hospitals serve a significantly disproportionate number of low-income patients and receive payments from the Centers for Medicaid and Medicare Services to cover the costs of providing care to uninsured patients.
[44] The full list of features can be found in the Responses to DoN Questions.

million American have COPD.[h] COPD can lead to hypoxia, which is a state in which oxygen is not available in sufficient amounts at the tissue level to maintain adequate homeostasis.[i] Up to 10% of patients with COPD exacerbations result in an inpatient admission, and some patients experience hypoxia; a chest CT may be ordered to identify the cause of the hypoxia.[j]

- *Low-dose CT- (LDCT)*
  Lung cancer is the leading cause of cancer death in United States taking more lives than colon, breast and prostate cancer combined, and it is the second most diagnosed cancer in both men and women.[k,l,m] Every year, 200,000 Americans are diagnosed with lung cancer and 160,000 die from it.[n] Early detection of lung cancer using CT scanning can detect lung cancer in its earliest stage, which can result in a five-year survival rate of 90%. In Massachusetts, 18% of those at high risk were screened (compared to the national rate of 6%).[o] The US Preventative Services Task Force (USPSTF) recommends yearly lung cancer screening with LDCT for people who have a 20 pack-year or more smoking history, and smoke now or have quit within the past 15 years, and are between 50 and 80 years old.[p]
- *Computed Tomography Angiography*
  Computed tomography angiography (CTA) is a type of medical test that combines a CT scan with an injection of a special dye to produce detailed images of blood vessels and tissues in a part of the body to help diagnose and evaluate blood vessel disease or related conditions, such as aneurysms or blockages.[q,r]
- *Stroke*
  UMMMC is a DPH- designated Primary Stroke Service (PSS) Hospital providing 24/7 care to patients experiencing stroke and stroke symptoms.[45] Recommendations recommend best practices for stroke care and outline the critical importance of patients receiving immediate medical treatment when experiencing a stroke due to the rapid decline in brain function as a stroke progresses. This includes receiving a CT within 25 minutes (door-to-CT time) and interpretation of the CT scan within 45 minutes.

The Applicant states that the Hospital uses American College of Radiology Clinical Decision Support software to meet Protecting Access to Medicare Act (PAMA) guidelines to reduce low-value and unnecessary care by delivering real-time and relevant analytics that are used to guide physician decisions and patient outcomes.[46]

Analysis: Improved Outcomes and Quality of Life

Staff find that the various elements of the Proposed Project will contribute to improved health outcomes, quality of life, and patient satisfaction. The Applicant has provided several measures, including wait times and patient satisfaction, which may indicate improved outcomes. Staff reviewed the suggested measures that will become part of the annual reporting to DPH. To ensure that the Proposed Project will add measurable public health value in terms of improved

[45] Massachusetts Department of Public Health. Designated Primary Stroke Services Hospitals. https://www.mass.gov/info-details/designated-primary-stroke-services-hospitals

[46] The Protecting Access to Medicare Act of 2014 (PAMA) requires an AUC consult to be documented via a CMS-qualified clinical decision support mechanism (qCDSM) prior to ordering advanced diagnostic imaging for Medicare patients. Without a documented consult, rendering providers will not receive Medicare payment for the procedure once the penalty phase begins.

health outcomes and quality of life, staff has suggested additional reporting measures. The revised measures are described in Appendix A below.

Public Health Value: Health Equity
The Applicant states that UMMH hospitals treat all patients regardless of ability to pay and provide patients with the highest quality care and patient experience. UMMMC in particular is a disproportionate share (DSH) Hospital, and a High Public Payer Hospital (HPP), thereby providing access to a socioeconomically diverse patient population. The Applicant outlined its efforts to increase healthy equity for the Patient Panel.

- Participation in the "Healthcare Anchor Network" of the Democracy Collaborative. "Purchasing Pillar, Investment Pillar, and Hiring Pillar" committees are addressing the needs in the community by emphasizing purchasing, investing, and hiring.
- UMMMC's community-based response to the COVID-19 pandemic, which included providing access to vaccines and testing.
- UMMH released its first Health Equity Report outlining efforts to address health disparities during the COVID-19 pandemic.[47] The Applicant outlined actions it has taken to dismantle systemic racism and identified goals that include partnering with community-based organizations (CBOs), language access, and assessing hiring practices.

Language Accessibility: UMMMC provides medical interpreters to patients and families to receive health information in a language other than English including, including American Sign Language (ASL) Interpreters. Interpreters are available free of charge, 24 hours a day, seven days a week across all campuses for all hospital services, and for services provided through the hospital's free clinics. Additional features of UMMMC's language accessibility include:

- Interpreters available over the phone and via video remote interpretation for over 100 languages spoken by UMMMC's patient population.
- ASL interpreters available 24/7 through Video Remote Interpreter (VRI) Solution which offers 34 video language remote interpreters on demand, and 250 telephonic-only relay interpreters, with a majority accessible 24/7.
- Interpreters available to respond to calls from patients for both medical and nonmedical issues.
- TTYs and assistive listening devices available for deaf and hard of hearing patients.

In the new inpatient building, UMMMC will implement new technology to allow for embedded telehealth (which will allow medical professional or family to "call" into the patient's room). The Applicant states that there will be ample access to remote interpreters via in-room smart TVs. Further, entertainment and education options will be available in multiple languages. If this is successful, the hospital plans to implement this technology in other areas in the hospital.

Analysis: Health Equity
Staff finds that the Applicant's planned language access services are appropriate for patients receiving care at UMMMC. Further, the Applicant has described community-based health initiatives that seek to support health equity among the Patient Panel. The Applicant has

[47] See DoN Application Narrative for more information about each initiative.

appropriately outlined at a high level a case for improved health outcomes and has provided reasonable assurances of health equity for the Patient Panel.

Factor 1: c) Efficiency, Continuity of Care, Coordination of Care

UMMMC views population health beyond the walls of UMMH itself to include the entirety of the community and its infrastructure supports care coordination across the entirety of a patient's care team. The Applicant states that it has the following programs in place to facilitate care coordination:

- **Electronic Health Records (EHR)**. All UMMMC hospitals and campuses utilize Epic for an EHR, the benefits of which include efficiencies, economies of scale, consistency, sharing learnings and protocols, and superior continuity and coordination of care through shared documentation.
- **Patient-centric Approach**. UMMMC has developed an infrastructure to support patient-centric care. UMMMC has developed and implemented clinical pathways, collaborative initiatives, and coordinated care.

Specific to the Proposed Project, inpatients will receive case management (followed by a case manager) to ensure care coordination for acute and post-acute episodes of care. Further, upon discharge, patients will be given instructions for follow-up care. ED case managers and social workers are embedded within the ED. UMMH has cultivated relationships with community-based organizations (CBO) that resulted in the development of CommunityHELP, a web-based platform that provides resources to patients. The platform provides translation into over 100 languages and enables electronic referrals to CBOs to connect patients with resources.

Analysis

Staff finds that the Applicant's care coordination and discharge processes will contribute positively to efficiency, continuity and coordination of care. The co-location and expansion of services will make them more efficient, which will contribute to increased patient satisfaction and support continuity and coordination of care.

Factor 1: d) Consultation

The Applicant has provided evidence of consultation, both prior to and after the Filing Date, with all government agencies that have licensure, certification, or other regulatory oversight, which has been done and will not be addressed further in this report.

Factor 1: e) Evidence of Sound Community Engagement through the Patient Panel

The Department's Guideline[48] for community engagement defines "community" as the Patient Panel, and requires that at minimum, the Applicant must "consult" with groups representative of the Applicant's Patient Panel. Regulations state that efforts in such consultation should consist of engaging "community coalitions statistically representative of the Patient Panel."[49]

To ensure sound community engagement throughout the development of the Proposed Project, the Applicant took the following actions:

- **Presentation to the Steering Committee of the Coalition for a Healthy Greater Worcester**. March 15, 2022. Twenty-two Coalition Steering Committee members were in attendance. The Coalition, encompassing over 200 engaged community-based organizations and individuals, is comprised of non-profit, and private sector stakeholders. 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. The virtual presentation was hosted by UMMMC's President, Dr. Michael Gustafson.
- **Presentation to the UMMMC Patient and Family Advisory Council (PFAC)**. March 24, 2022. Thirteen people attended, including 10 PFAC members and three representatives from UMMMC.
- **Presentation to the Worcester Together Coalition (WTC)**. March 22, 2022. WTC was organized in March 20202 in response to the emerging COVID-19 needs of Worcester's populations and has grown to include 230 members. Thirty-five representatives of WTC attended.
- **Presentation to the Public via in-person and virtual forum**. April 14, 2022. The forum was advertised through various news outlets and through UMMMC's social media channels, and the Worcester Together Now listserv. Two community representatives attended virtually, including City Councilor Candy Mero, and State Senator Harriette Chandler.

The Applicant states that through each community presentation, attendees were provided background information addressing the need for additional M/S beds at UMMMC and the benefits of the Proposed Project to the Patient Panel and Greater Worcester community. The Applicant provided copies of the presentation slides.

Analysis

Staff reviewed the information on the Applicant's community engagement and finds that the Applicant has met the minimum required community engagement standard of Consult in the planning phase of the Proposed Project.

[48] Community Engagement Standards for Community Health Planning Guideline. https://www.healthit.gov/faq/what-are-advantages-electronic-health-records

[49] DoN Regulation 100.210 (A)(1)(e). https://www.mass.gov/files/documents/2018/12/31/jud-lib-105cmr100.pdf

Factor 1: f) Competition on price, total medical expenses (TME), costs and other measures of health care spending

The Applicant asserts that the Proposed Project will compete on the basis of price, total medical expenses (TME), provider costs, and other recognized measures of health care spending because it will increase timely access to inpatient services to reduce ED boarding, improve health outcomes, and maximize the hospital's efficiency. The Applicant asserts the Proposed Project competes because:

- Current capacity constraints, result in the inability to accept high acuity transfer patients, who are currently transferred to higher cost hospitals outside of the service area.
- Crowded EDs create stressful environments for staff, and this increases staff turnover rates, and can require the use of higher-cost contract nurses and other clinical staff.
- The new inpatient facility will minimize costs, through renovation of an existing healthcare building, rather than construction of a new facility.

Analysis

Cost containment on a statewide level is impacted through pricing, which is a function of what providers charge payers, what payers agree to pay, and which services are rendered. While payment contracts between providers and Medicare and Medicaid are relatively transparent, those between individual providers and commercial payers are confidential.[s] As a result, staff cannot assess how UMMMC's contracts with payers, which may incentivize more or less utilization of services, are structured.

Staff find that the Proposed Project has the potential to decrease spending through reducing delays in access to care as well as diagnosis and treatment, which contribute to improved health outcomes. Increasing inpatient capacity at UMMMC and in the region, can help to retain patients that may otherwise go outside the region to higher-priced facilities to access care. Additionally, improving efficiency of services and access to care can also serve to reduce spending. Based on the variation in prices among hospitals in the region, staff find that potential spending impacts of the Proposed Project can result from a shift of commercially insured patients from lower cost settings to UMMMC for inpatient care. Staff note that this spending impact is limited to commercially insured patients and balanced against the fact that UMMMC is a high public payer mix hospital with over 66% of the payer mix made up of public payers.

To better understand potential spending impacts resulting from shifts in commercial patient volume from other hospitals to UMMMC, staff examined inpatient relative price data published by CHIA for Calendar Year 2020. The data allow for comparison of hospital inpatient relative price within a payer network. A relative price of 1.0 represents each payer network's average price across inpatient services. Providers with a RP above 1.0 receive higher-than-average payments in a payer's network. A relative price of 1.2 means that the provider's price level is 20% above the average inpatient price in a payer's network.

Staff focused on inpatient RP data since the project entails the expansion of new inpatient capacity and focused on Blue Cross Blue Shield of Massachusetts (BCBS), because is it the largest commercial payer for all of the hospitals under examination. Staff compared inpatient RP data for UMMMC and hospitals in the Central MA Region (as defined by CHIA) and included Marlborough Hospital since it is a community hospital in the UMMH system. In addition, staff compared inpatient RP data for UMMMC and AMCs in its peer cohort. This is shown in Table 33.

Table 33: Inpatient Relative Price (RP), Blue Cross Blue Shield of Massachusetts (BCBS)

Acute Hospital Name	Hospital Cohort	Inpatient Relative Price (RP)	Compared to Network Average (RP=1.0)	Price Difference if Patients Shift to UMMMC (RP=1.14)
Central Mass				
Athol Hospital	Community-High Public Payer	0.71	-29%	61%
Harrington Memorial Hospital	Community-High Public Payer	0.77	-23%	48%
HealthAlliance-Clinton Hospital	Community-High Public Payer	0.88	-12%	30%
Heywood Hospital	Community-High Public Payer	0.71	-29%	61%
Marlborough Hospital	Community-High Public Payer	0.91	-9%	25%
Saint Vincent Hospital	Teaching Hospital, High Public Payer Hospital	0.97	-3%	18%
UMass Memorial Medical Center	Academic Medical Center, High Public Payer Hospital	1.14	14%	0%
Academic Medical Centers				
Beth Israel Deaconess Medical Center	Academic Medical Center	1.20	20%	-5%
Tufts Medical Center (Non-Floating)	Academic Medical Center, High Public Payer Hospital	1.06	6%	8%
UMass Memorial Medical Center	Academic Medical Center, High Public Payer Hospital	1.14	14%	0%
Boston Medical Center	Academic Medical Center, High Public Payer Hospital	1.03	3%	11%
Massachusetts General Hospital (Urban)	Academic Medical Center	1.33	33%	-14%
Brigham and Women's Hospital (Urban)	Academic Medical Center	1.33	33%	-14%

UMMMC has higher inpatient RPs compared to hospitals in the Central MA region and UMMMC is the only hospital with an inpatient RP above the network average. Saint Vincent Hospital, a teaching hospital, has an inpatient RP that is slightly higher compared to the community hospitals in the region. UMMMC's inpatient RP is fourth highest among AMCs in the state. Inpatient RPs for all AMCs are above the network average.

For inclusiveness, staff reviewed inpatient relative price date for two additional payers: Harvard Pilgrim Health Care (HPHC) and Tufts Health Plan (THP). Examining two additional payers demonstrates how inpatient RP variers across payers, and it is particularly meaningful when

examining inpatient RP at AMCs, that have a high volume of patients associated with each payer. UMMMC's inpatient RP relative to UMMH's community hospitals is higher for Harvard Pilgrim Health Care (HPHC) than it is for BCBS. Further UMMMC's inpatient RP is slightly higher than other AMCs for HPHC, but for Tufts Health Plan (THP), it is third highest among AMCs after Brigham and Women's Hospital and Massachusetts General Hospital. Inpatient RP tables for HPHC and THP are located in Appendix E.

The Applicant will report on occupancy rates at UMMMC as well as UMMH community hospitals to continue to demonstrate efforts to provide care in the most appropriate, lower-cost setting.

FACTOR 1 SUMMARY

As a result of information provided by the Applicant and additional analysis, staff finds that with the standard reporting requirements outlined below, the Applicant has demonstrated that the Proposed Project has met Factor 1(a-f). The Applicant proposed specific outcome, and process measures to track the impact of the Proposed Project which staff has reviewed, and which will become a part of the reporting requirements.

Factor 2: Cost containment, Improved Public Health Outcomes and Delivery System Transformation

Cost Containment

The Applicant asserts that the Proposed Project will contribute to and further the Commonwealth's cost containment goals by ensuring timely and equitable access to inpatient services for both tertiary and secondary cases. As demonstrated in Factor 1, the UMMMC is experiencing capacity constraints that have been shown to be associated with delayed access to care, which can worsen patient outcomes and lead to higher costs of care. Improving access for patient transfers from community hospitals to UMMMC for tertiary care will allow for more patients to be care for in the appropriate setting, which will also contribute to a decrease in costs.

Analysis: Cost Containment

Staff finds that the Applicant has adequately explained how the Proposed Project aligns with the Commonwealth's cost containment goals through increasing access to high-quality, coordinated care, and efficient care that will reduce existing capacity constraints and address projected need for inpatient beds, and CT imaging, to allow for those services to be made available to the Patient Panel locally.

Pursuant to M.G.L. c. 111, § 25C(h), the Department of Public Health (Department) may require an Applicant to provide an independent cost-analysis (ICA). The Department shall make such request no later than 30 days following the Filing Date. The Department did not require the Applicant to conduct an ICA.

Factor 2 requires that the Proposed Project meaningfully contribute to the Commonwealth's cost containment goals. In response to this factor, staff examined the Proposed Project's ability to improve Patient Panel access to high-quality care while minimizing costs.

The literature affirms that AMCs tend to care for higher complexity and riskier patients, serve as referral centers for many community hospitals and provide important safety net services.[t] UMMMC is the only AMC serving the Central MA region and provides a level of care that cannot be provided by UMMH's community hospitals and in some cases, other hospitals in the region. In FY20, UMMMC's case mix index (CMI), was 1.53, which was higher than the statewide average CMI (1.16) and is in the middle when compared to the CMI of peer (AMCs') hospitals (1.63).[50] UMMMC receives a number of high acuity patient transfer requests from UMMH community hospitals as well as other hospitals in the state, to provide care that they themselves are not able to provide. In some cases, transfer requests are declined due to insufficient capacity to accept them, which limits access to UMMMC's care for patients in the region. To demonstrate improved access to UMMMC's services, the Applicant will report annually, on transfers and patient acuity to continue to demonstrate that it is improving access to care for appropriate patients.

UMMC has demonstrated its ability to coordinate care with its community hospitals with the goal of providing care to patients in the most appropriate setting, which has been demonstrated through an increase in occupancy rates at UMMH community hospitals. This also serves to reduce unnecessary care in a higher cost setting and maintains access to tertiary care when appropriate. However, staff note that inpatient RP at UMMMC is higher than its community hospitals and increasing capacity at UMMMC has the potential for patients to shift from lower cost settings to UMMMC. The Applicant will report on occupancy rates at UMMMC as well as UMMH community hospitals to continue to demonstrate efforts to provide care in the most appropriate, lower-cost setting.

UMMMC is a Disproportionate Share Hospital (DSH) as designated by the Federal Government, and a high-public payer (HPP) hospital as designated by CHIA, and as such is an important provider of access for patients in the region relying on government-sponsored insurance programs. Reporting on the Massachusetts health care system shows that a higher mix of public-payer patients is associated with lower commercial relative prices.[u,v,w] Additionally, providers that are federally designated as DSHs receive high volumes of publicly insured patients and simultaneously receive lower reimbursement rates from commercial insurers.[x] The Applicant has demonstrated that increasing capacity at UMMMC can positively impact Patient Panel access to care. When patient access to care is delayed due to capacity constraints, this can create additional barriers to access for patients. When access to care is delayed it can lead to the need for more advanced care and treatment and higher healthcare spending. It has been well documented that avoidance or delayed care because of COVID-19 related concerns, can exacerbate medical conditions and increase morbidity and mortality risk, particularly for older patients with chronic conditions, who utilize multiple providers.[y,z,aa]

[50] Center for Health Information and Analysis (CHIA). UMass Memorial Medical Center. 2020 Hospital Profile. https://www.chiamass.gov/assets/docs/r/hospital-profiles/2020/ummc.pdf

The Applicant also provided additional information on alternatives to address existing inpatient bed capacity on its University and Memorial campuses that were considered but not undertaken, to demonstrate the cost-effectiveness of the Proposed Project. The Applicant dismissed two higher cost alternatives in favor of the Proposed Project because it would alleviate existing capacity constraints in a timely manner, with less interruption to patient care, and at a lower cost to implement.

Based on this information, staff find that Factor 2, Cost Containment goals is met.

Improved Public Health Outcomes

As described above in Factor 1, UMMMC's existing capacity constraints impact patient outcomes, and patient experience, resulting in more acute diagnoses and longer inpatient stays. Alleviating capacity constraints will allow UMMMC to improve access to care for the Patient Panel leading to improved health outcomes and patient satisfaction.

Analysis: Public Health Outcomes

As detailed elsewhere in this Report, improvements in patient health outcomes result from increasing access to care and reducing delays in diagnosis and treatment. More efficient operations across care settings can improve care efficiencies, patient experience and patient satisfaction. Making care more coordinated and efficient can also reduce the time between diagnosis and treatment, which has been shown to improve outcomes, quality of life and patient satisfaction. The Applicant has demonstrated its commitment to improving public health outcomes and this part of Factor 2 has been met.

Delivery System Transformation

In recognition of the various factors that impact a person's wellbeing and contribute to individual physical health, UMMH and UMMMC have undertaken the following efforts:

Anchor Mission

UMMH's Anchor Mission work is focused on improving the health and welfare of its community beyond its Hospital's walls particularly in areas where there is pervasive inequality and social disadvantage.[bb] The Applicant's Anchor Mission work focuses on four areas:

- **Investing** in local projects to improve the welfare of its community.
- **Hiring** through working with other workforce organizations in its community to ensure the employee profile is reflective of the community.
- **Purchasing** to support local businesses, with a focus on areas of social disadvantage or ongoing inequality within its community.
- **Volunteering** opportunities for employees.

Social Determinants of Health (SDoH) Screening

The Applicant states that all patients are screened for SDoH needs through its primary care practices at least once per year. Thirty-eight UMass Memorial Medical Group (UMMMG) practices are screening patients during office visits using Medical Assistants. In addition, 45,285

patients have been screened for SDoH needs through July 31, 2022, representing 21.3% of all UMMMG patients.

Medical Assistants help to identify areas of need, including housing, legal assistance, childcare, and food. Medical assistants can provide patient referrals through the EHR; provide patients with a printed list of resources directing patients to the CommunityHELP[51] website; and help with placing calls in the event of an urgent or emergency need. Primary care physicians (PCPs) provide additional follow-up with the patient. Additionally, case managers in the inpatient setting screen for SDOH needs and provide referrals to CBOs. The Applicant states that it will continue to work with patients and PCPs to ensure patients are connected to services as needed.

All adult inpatients are screened using a nursing assessment as well as a nurse case manager admission assessment. If an SDoH need is identified, these groups of staff will consult the social worker. The social worker will then do a complete social work assessment and use an SDoH flowsheet to document the categories of need and then the type of need in a narrative note. As of today, screenings done inpatient are not tracked in the same manner as those performed in UMMMG practices.

SDoH screening is conducted regardless of PCP and payer. Patients that screen positive for SDoH needs are connected to resources via CommunityHELP. Resources are provided based on patient preference via printed, email, text or e-referral to CBO. Additionally, UMMH has the ability to track analytics from CommunityHELP regarding caregiver activity to address patient's identified needs.

Community Health Workers (CHWs)

UMMHC implemented a pilot through its Maternal Fetal Medicine Department utilizing a multi-lingual community health worker (CHW) working with high-risk Latina/x mothers. The intervention, which 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, had a focus on identifying and addressing SDOH needs as a means of addressing chronic disease disparities and risk factors.

Medical-Legal Partnership

The Medical-Legal Partnership was established in 2015 as a collaboration of the Hospital's Legal Department and Community Legal Aid, Inc. and pro-bon private lawyers and clinicians to address SDoH and legal needs. Services are available to low-income and Medicaid-eligible patients at five clinic practices. Providers at the five clinics work with patients to address health-harming legal needs.

[51] CommunityHELP is a web-based platform sponsored by UMMH and Reliant Medical Group to help connect patients with engaged, community-based organizations (CBO).

Analysis: Delivery System Transformation

Through its SDoH screening and programming, and Anchor Institution strategies, the Applicant has demonstrated its commitment to delivery system transformation and this part of Factor 2 has been met.

FACTOR 2 SUMMARY

As a result of information provided by the Applicant and additional analysis, staff finds that with the standard reporting conditions, the Applicant has demonstrated that the Proposed Project has met Factor 2.

Factor 3: Relevant Licensure/Oversight Compliance

The Applicant has provided evidence of compliance and good standing with federal, state, and local laws and regulations and will not be addressed further in this report. As a result of information provided by the Applicant, staff finds the Applicant has reasonably met the standards of Factor 3.

Factor 4: Demonstration of Sufficient Funds as Supported by an Independent CPA Analysis

Under factor 4, the Applicant must demonstrate that it has sufficient funds available for capital and operating costs necessary to support the Proposed Project without negative effects or consequences to the existing Patient Panel. Documentation sufficient to make such finding must be supported by an analysis by an independent CPA.

The CPA analysis included a review of numerous documents in order to form an opinion as to the reasonableness and feasibility of the projections regarding the Proposed Project including: eight-year financial projections for the Applicant (fiscal years ending September 30, 2022 through FY 2029), documents produced by Management, and third party industry data sources.[52,53] The review included analysis of key metrics that fall into three categories: profitability, liquidity, and solvency. The projections exclude the impact of inflation on both operating revenue and operating expenses after FY21 and therefore the projections consider

[52] Data sources include: 1. Financial Model for UMMH for the periods ending September 30, 2017 through September 30, 2029; 2. Fiscal Year 2022 UMMH Budget Presentation to the UMMH Finance Committee on September 21, 2021, which also includes discussions regarding fiscal year 2021 performance; 3. Draft UMMH Application Form for DON Application; 4. Geotechnical Engineering Services Proposal from McPhail Associates, LLC, dated April 5, 2022; 5. New Inpatient Building Information Systems Estimate, dated March 23, 2022; 6. New Inpatient Building Equipment Estimate; dated March 17, 2022; 7. Signage Quote from Ready 2 Run Graphics & Signs, dated March 23, 2022; 8.Architectural and Engineering Design Services Proposal from Perkins&Will, dated January 14, 2022; 9.Land Surveying Services Estimate from VHB, dated February 11, 2022; 10. P-Tube Cost Study dated February 25, 2022; 11. Artwork Estimate from Lattitude Art Gallery, dated March 24, 2022; 12. New Inpatient Building Furniture Estimate, dated March 24, 2022; 13. New Inpatient Building Schematic Design Estimate from The Whiting-Turner Contracting Company, dated March 28,2022; 14. Exterior Wayfinding Signage Design Services Proposal from Roll Barresi & Associates, dated February 11, 2022; 15. New Debt Activity Presentation Slides for UMMH; 16. Audited Financial Statements for UMass Memorial Health Care, Inc. for Fiscal Years Ended September 30, 2021, 2020, 2019, 2018, and 2017; 17. Definitive Healthcare data; and 18. IBISWorld Industry Report, Hospitals in the US, dated November 2021.

[53] The CPA report states that the Projections exclude the impact of inflation on both operating revenue and operating expenses after FY2022 and consider only the impact of volume on both projected revenue and operating expenses for the remainder of the projection period (FY2023 to FY2029).

only the impact of volume on both projected revenue and operating expenses for FY 2022 through FY 2025.

Revenues

The CPA analyzed projected revenue within the Projections. The basis of the revenue projection were historical operating results and anticipated demographic trends in UMMH's service area.[54] Patient Service Revenue (PSR) comprises 93.3% of the cumulative total operating revenue from FY 2022 to FY 2029. Total PSR for the Projections is expected to grow by 10.6% in FY 2022 compared to FY 2021. The PSR growth is largely attributed to an expectation that operations will return to normal after the impact of the COVID-19 pandemic. Total operating revenue is expected to increase 4.6% in FY 2022 compared to FY 2021 and this expected growth is attributed to several UMMH initiatives that have been or will be implemented in FY 2022.[55] The remainder of the Projection Period (FY 2023 to FY 2029) projected revenue growth of 0% except for FY 2025 and FY 2026. The impact of the Proposed Project, with FY 2025 being the first year of implementation, on PSR was a 4% increase in FY 2025 and a 0.2% increase in FY 2026, and 0% thereafter. The report looked at the revenue growth anticipated for FY 2022, FY 2025, and FY 2026, and found that it is below the historical compound annual growth rate (CAGR) and within or below the range of annual revenue growth rates for the Applicant between FY 2017 and FY 2021. Based upon the foregoing, the CPA's opinion is that the revenue growth projected by Management reflects a reasonable estimation of future revenue of UMMH.

Expenses

The operating expenses in the analysis include salaries and wages, employee benefits, depreciation and amortization, interest expenses, and supplies and other expenses. Total operating expenses are expected to grow 6.5% in FY 2022 compared to 9.4% in FY 2021. Increased salaries and wages, benefits and supplies due to inflation, supply constraints and labor shortages, as well as additional expense from Harrington Hospital contributed to 9.4% expense growth in FY 2021. These expenses are expected to moderate in FY 2022 resulting in a 6.5% growth rate. From FY 2023 to FY 2029, operating expenses are expected to grow 0%, except for interest expense. Projected increase in FY 2022 and FY 2025 are within range of historical annual expense growth rates between FY 2017 and FY 2021.

The CPA points out that the projected total operating expenses as a percentage of total operating revenue range from 99.5% to 99.9% from FY 2022 to FY 2025, and which is in-line with the historical total operating expenses as a percentage of total operating revenue which ranged from 98.0% to 101.1% from FY 2017 to FY 2021. Thus, it is the CPA's opinion that the projected operating expenses reflect a reasonable estimation of future expenses of the Applicant.

[54] Management provided FY 2021 financials only include three months of Harrington Hospital's performance while the FY 2022 represents a full year.

[55] This includes UMMH's ambulatory transformation, addition of telemedicine, and finding alternative sites of care.

Capital Expenditure

The CPA report included a review of the projected costs related to the Proposed Project, which are included in the Projections in FY2023 and FY2024. The total project costs include the cost related to the New Inpatient Building (NIB) and the other components of the Proposed Project. In addition, it also reviewed the financing plans for the Proposed Project with the understanding that the expenditures related to the Proposed Project are expected to be funded through a mix of debt financing (accounts for expenditures related to the NIB) and routine capital expenditures (additional components).

CPA's Conclusion of Feasibility

As a result of its analysis the CPA states that "*Within the projected financial information, the Projections exhibit a cumulative operating EBITDA[56] surplus of approximately 5.3 percent of cumulative projected operating revenue for the eight years from FY 2022 through FY 2029. Based upon our review of the relevant documents and analysis of the Projections, we determined the anticipated EBITDA surplus is a reasonable expectation and based upon feasible financial assumptions. Accordingly, we determined that the Projections are reasonable and feasible, and not likely to have a negative impact on the patient panel or result in a liquidation of assets of UMMH*."

Analysis

Staff is satisfied with the CPA's analysis of the Applicant's decision to proceed with the Proposed Project. As a result, staff finds the CPA analysis to be acceptable and that the Applicant has met the requirements of Factor 4.

Staff examined CHIA's most recent quarterly acute hospital and health system financial performance report with data through June 30, 2022. The report showed that UMMH has a Current Ratio of 1.9 and a ratio of 1.0 or higher indicates that UMMH can meet current liabilities adequately with its current assets.[cc] Staff note that while this is a positive financial ratio when isolating UMMH, its Current Ratio is in the middle as compared to some of their peers (health systems with AMCs).[57]

Factor 5: Assessment of the Proposed Project's Relative Merit

The Applicant has provided sufficient evidence that the Proposed Project, on balance, is superior to alternative and substitute methods for meeting the existing Patient Panel needs identified by the Applicant pursuant to 105 CMR 100.210(A)(1). Evaluation of 105 CMR 100.210(A)(5) 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.

The Applicant considered and rejected one alternative to the Proposed Project.

- **Maintain status quo**. This alternative entails forgo opening new inpatient beds and continuing to serve patients with existing inpatient capacity. The Applicant dismissed

[56] EBITDA ("Earnings before Depreciation, Interest and Tax")

[57] Beth Israel Lahey Health's (BILH's) Current Ratio is 2.3, Mass General Brigham's' (MGB's) Current Ratio is 2.5, Boston Medical Center Health System's Current Ratio is 1.6, and Wellforce's Current Ratio is 0.9.

this alternative because it would not address existing capacity constraints and Patient Panel need for timely access to inpatient services thereby negatively impacting health outcomes and patient experience.

In response to staff inquiry about other alternatives to the Proposed Project that were considered to address capacity constraints, the Applicant states that it also evaluated three main areas to address existing inpatient bed capacity on its University and Memorial campuses.

- Identified the most appropriate site of care to meet inpatient's level of care needs, which has resulted in increased occupancy rates across UMMH community hospitals. This alternative, however, did not resolve capacity constraints at UMMMC's University and Memorial Campuses.
- Considered new construction to accommodate new beds needed to address capacity constraints, including expanding University Campus Lakeside building to add two new inpatient floors. This alternative was dismissed because it would require a higher capital cost (500Million), would not be completed is as timely a manner as the Proposed Project, and would result in operational challenges, including closure of existing beds and OR's in the building to allow for new construction.
- Considered the option of adding a new inpatient building on the University Campus. This alternative was also dismissed because of the cost estimate (1Billion) and the time delay required to construct a new building.

Based on an evaluation of alternatives explored to addressed existing capacity constraints at UMMMC's campuses, the Applicant determined that the Proposed Project was the superior option for meeting Patient Panel need.

Analysis
Staff finds that the Applicant has appropriately considered the quality, efficiency, and capital and operating costs of the Proposed Project relative to potential alternatives. As a result of information provided by the Applicant and additional analysis, staff finds the Applicant has reasonably met the standards of Factor 5.

Factor 6: Fulfillment of DPH Community-based Health Initiatives Guideline: Overall Application

Summary and relevant background and context for this application: This is a DoN project for a substantial capital expenditure that will result in a Tier 3 CHI. The Applicant successfully applied for Tier 1 project (DoN # UMMHC-21120810-RE), and in anticipation of this larger project application, through communication with DPH staff and pending approval, Applicant will pool the CHI contributions for the two projects. The Applicant and DPH have agreed to combined CHI funds for a transparent local CHI investment process, subject to DoN project approval.

In anticipation of this agreement, to fulfill Factor 6 requirements, the Applicant submitted its existing Community Health Assessment (CHA) and corresponding Community Health Improvement Plan (CHIP), a Community Engagement Plan and Supplement, Stakeholder Assessments, and a CHI Narrative.

The Community Health Assessment was conducted in 2021 by the applicant, UMass Memorial Health in partnership with the Central Massachusetts Regional Public Health Alliance. The final Community Health Assessment utilized secondary data analysis, and primary data gathered through stakeholder interviews, focus groups, and a community survey. The Assessment and corresponding Community Health Improvement Plan (CHIP) identify priority populations and describes key findings and themes from the service area and participating communities. The priority populations include People of Color, Immigrants, refugees, and non-English speakers, Youth and adolescents, Individuals with disabilities and chronic/complex conditions, Individuals and families with limited economic means, and Older adults. The priority areas are Social Determinants of Health, mental health, substance use, and Chronis/complex conditions and risk factors, with Racism, discrimination, and health equity identified as a 'cross-cutting issue'. The CHIP additionally identifies Core Principles to guide their community health planning work. The Core Principles are (1) Invest in the Community First (2) Elevate, listen to, and respect the community's voice (3) Eliminate gaps between services, and (4) Honor trauma-informed resilient approaches to care. The CHIP highlights policy changes across partners and identifies an Action Agenda for the community.

The Self-Assessment was provided with the previous application (UMMHC-21120810-RE), and because it summarized activities for the same timeline and process as covered by this current project, the Applicant did not need to resubmit. The original Self-Assessment provided a summary of community engagement processes and socio-demographic information, data and highlights related to topics and themes of community needs. Through data analysis, existing surveys, and primary data collection and community engagement, the participating community groups and residents identified the key concerns outlined in the 2021 Community Health Assessment.

Stakeholder Assessments submitted provided information on the individuals' engagement levels (e.g. their personal participation and role) and their analysis of how the Applicant engaged the community in community health improvement planning processes. The information provided in these forms were largely consistent with the self-assessment conducted by the Applicant.

The Community Engagement Plan and Supplement provide background information for, and explanation of existing CHA/CHIP planning processes. The Plan outlines the lessons learned from the 2021 Community Health Assessment and how the Applicant is using these in designing and implementing the upcoming CHA for the Greater Worcester community. In the Community Engagement Plan, the Applicant describes engagement across the geography and identifies the level of engagement in all activity areas.

The CHI Narrative provided background and overview information for the CHI processes. The narrative also outlines advisory duties for the advisory and allocation committees, and planned use of funding for evaluation and administrative activities. Additionally, the narrative outlines the CHI funds breakdown and the anticipated timeline for CHI activities.

The anticipated timeline for CHI activities includes a meeting of the Advisory Committee six weeks post approval, identifying the Health Priorities Strategies 3 months post approval, and releasing an RFP six months post approval, with funding awarded to successful RFP applicants 3-4 months thereafter.

With the administrative funds, the applicant's early plans are to support planning processes and to develop and disseminate communication materials.

The timeline, RFP processes, and preliminary planned use of evaluation and administrative funds are all appropriate and in line with CHI planning guidelines. The Applicant will further be expected to use administrative funds to support reduction in barriers to participation for communities across the CHI process. In order to select strategies that meet Health Priority Guideline principles, the Applicant will need to focus on the priority areas in the assessment that allow for implementation at the root cause level. This includes the Social Determinants of Health and the cross-cutting area of Racism, Discrimination, and Health Equity. Based on strategies in the Applicant's ongoing community benefit work, staff have determined the if Applicant agrees to address community conditions and root causes while continuing to engage their DoN Advisory Committee in decision making around prioritization focus areas, and their Allocation Committee in investment processes, their work will align with the Health Priorities Guideline.. The Applicant has recruited for the missing constituencies on their Advisory Committee, and DPH will continue to work with them to ensure the group's make up is sufficient to help them make decisions in line with CHI and Health Priority principles. The Applicant will also need additional touchpoints with DPH staff to establish processes for planning and implementation work moving forward. Specifically, if this project is approved, DPH will work with the Applicant on timeline, investment strategy, and project planning. Regarding the implementation of specific CHI strategies, DPH can work with the Applicant in moving upstream, and identifying needs at the root cause to support sustainable systems level solutions.

Summary Analysis: As a result of information provided by the Applicant and additional analysis, staff finds that with the conditions outlined below, and the ongoing communication on items outlined above, the Applicant will have demonstrated that the Proposed Project has met Factor 6.

Public Comments on the Application

Any person, and any Ten Taxpayer group, may provide written or oral comment at any time during the first 30 days following the Filing Date of an Application, or during the first ten days after a public hearing.

Public Hearing

The Department held a virtual public hearing in connection with the Proposed Project on August 23, 2022. A total of 30 people provided oral comments at the public hearing. Oral comments provided at the public hearing for consideration in DoN's review and analysis would be ones that address the Applicant's ability to meet the requirements of each of the relevant factors. The names of the speakers are listed in Appendix C and a summary of the written comments is provided in Appendix D. The transcript of the public hearing is available online on the DoN website.

Written Comment

The Department received a total of 16 written comments. Comments for consideration in DoN's review and analysis would be ones that address the Applicant's ability to meet the requirements of each of the relevant factors. The names of those submitting written comments are listed in Appendix B and a summary of the written comments is provided in Appendix D. The full text of written comments is available online on the DoN website.

Ten Taxpayer Groups (TTGs)

Per the DoN Regulation, any ten taxpayers, organized as a group, may participate in the review of an Application for Determination of Need or request to amend a previously issued Notice of Determination of Need. Said group must register with the Department at any time during the first 30 days following the Filing Date of an Application, or during the first ten days after a public hearing held pursuant to 105 CMR 100.445.

Two ten taxpayer groups (TTGs) registered in connection with the Proposed Project. Both of the TTG's were in opposition to the Proposed Project. Registration information for each TTG is available on the DoN website. Table 34 below provides a brief overview of each registered TTG and their participation in the application review process.

Table 34: TTGs Overview

TTG Name	Date Formed	Representative	Requested Public Hearing	Requested Independent Cost Analysis (ICA)	Oral Comments Provided at Public Hearing	Written Comments Provided
Saint Vincent Hospital	7/22/2022	Carolyn Jackson	✓	✓	✓	✓
Mass General Brigham	8/3/2022	Christopher Philbin	✓	✓		✓

Staff analyzed comments on the Proposed Project and found that comments in support of the Proposed Project provided data about Factor 1 demonstrating existing capacity constraints experienced by UMMMC, and the need for additional inpatient and CT capacity to address

these constraints. In particular, inpatient capacity constraints are contributing to ED crowding and boarding, and delays for EMS providers, and lack of inpatient capacity is impacting other hospitals seeking to transfer high acuity patients to UMMMC for care. This is discussed in greater detail in Factor 1a. Comments also addressed improved Public Health Value and noted the Proposed Project's potential for improving health equity in the region, through increasing capacity locally to support patients and their families in Worcester and surrounding communities, some who experience barriers to accessing care and are disproportionately impacted when they are transferred outside of the region to receive such care. Patient transfers is addressed further in Factor 1a.

Comments received in opposition to the Proposed Project were focused on Factors 1a Patient Panel Need and whether there is in fact need for new inpatient beds, when existing providers in the region, could address the current demand; and Factor 2 Cost Containment and the increased spending that would result from the Proposed Project. Staff balanced the cost concerns associated with the Proposed Project, against the potential for diminished access to care that could result from not doing the Proposed Project. In terms of need for new inpatient beds in the region, staff considered comments that were focused on UMMMC's role as the only AMC in the region, and initiatives undertaken at UMMH's community hospitals to mitigate capacity constraints, initiatives that increased occupancy at UMMH community hospitals but that were not sufficient in alleviating capacity constraints at UMMMC in particular. This is discussed further in Factors 1 and 2. The Applicant will report on occupancy rates and acuity at UMMMC and its community hospital to demonstrate that patients are accessing care in the appropriate setting.

Findings and Recommendations

Based upon a review of the materials submitted, staff finds that, with the addition of the recommended conditions detailed below, the Applicant has met each DoN Factor for the Proposed Project and recommends that the Department approve this Determination of Need, subject to all applicable standard and Other Conditions.

Other Conditions

1. Of the total required CHI contribution of $7,162,108.35
    a. $1,754,716.54 will be directed to the CHI Statewide Initiative
    b. $5,264,149.64 will be dedicated to local approaches to the DoN Health Priorities
    c. $143,242.17 will be designated as the administrative fee.
2. To comply with the Holder's obligation to contribute to the Statewide CHI Initiative, the Holder must submit a check for $1,754,716.54 to Health Resources in Action (the fiscal agent for the CHI Statewide Initiative).
        i. The Holder must submit the funds to HRiA within 30 days from the date of the Notice of Approval.
        ii. The Holder must promptly notify DPH (CHI contact staff) when the payment has been made.

Appendix A: Assessing the Impact of the Proposed Project

To assess the impact of the Proposed Project, the Applicant has developed the following quality metrics and reporting schematic, as well as metric projections for quality indicators that will measure patient satisfaction and access. The measures were suggested by Applicant and revised by staff. Reporting must include a description of numerator and denominators, where applicable.

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):** UMMMC 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.

   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.

5. **Transfer of patients to UMMMC for inpatient care**
   a. The number of patients who transfer to UMMMC by campus.
      i. Number of lost transfers.
      ii. List of facilities from which transfers originate
      iii. The acuity level by case mix index of the transferred patients.
   b. Separately by Campus:
      i. Annual ED volume
      ii. The number of ED boarders awaiting a M/S bed (with boarding defined as 2 hours from the request for a bed).
      iii. Total hours of M/S boarding and the average hours of boarding per patient.

6. **Annual operating capacity and occupancy rate at UMMMC by Campus and at UMMH community hospitals.**
   a. Staffed bed days at UMMMC and UMMH community hospitals.

7. **Number of discharges for M/S patients at UMMMC by Campus and UMMH Community Hospitals**
   a. Acuity level by case mix index, and number of discharges for Adult M/S patients (with exclusion of obstetric, pediatric, and psychiatric discharges) at UMMMC and UMMH community hospitals.

8. **Percent of patient volume at UMMMC that required tertiary level care.** Include a definition of tertiary level care.
   a. List top ten zip codes for M/S discharges for University and Memorial Campuses.

9. **Imaging**
   a. Upon implementation of the CT, provide baseline data on capacity (scan volume) and inpatient and outpatient wait times for all UMMMC CT units.
   b. CT utilization
      i. for ED, inpatient, and outpatient.
   c. Wait times (average and median)
      i. for ED, inpatient, and outpatient.

Appendix B: Names of People Who Submitted Written Comments

First Name	Last Name	Title and Organization
Joseph	Salois	Chair, Board of Trustees of Saint Vincent Hospital
Carolyn	Jackson	CEO, Saint Vincent Hospital; Representative, Saint Vincent Hospital TTG
Janet	Wilder	Organizer, SHARE/AFSCME Union
Joseph	Petty	Mayor, City of Worcester
James	McGovern	United States Representative representing Massachusetts's 2nd congressional district
Timothy	Garvin	President & CEO, United Way of Central Massachusetts
Michael	Collins	Senior Vice President for the Health Sciences; UMass Chancellor, UMass Chan Medical School
Christopher	Philibin	Vice President Government Affairs, Mass General Brigham; MGB TTG Representative
Anne	Gobi	Massachusetts State Senator
Ethan	Belding	Vice President of Planning and Research, Central Massachusetts Agency on Aging, Inc.
Lora	Pellegrini	President & CEO, Massachusetts Association of Health Plans
Mary	Keefe	State Representative 15th Worcester District
Amy	Rosenthal	Executive Director, Health Care For All
John	Regan	President & CEO, Associated Industries of Massachusetts
Sean	Rose	Worcester City Councilor District 1
Submitted a Joint Comment		
James	O'Day	State Representative 14th Worcester District
Michael	Moore	State Senator 2nd Worcester District
Harriette	Chandler	State Senator 1st Worcester District
Sean	Rose	Worcester City Councilor District 1
Michael	Soter	State Representative 8th Worcester District
Susannah	Whipps	State Representative 2nd Franklin District

Appendix C: Speakers at the Public Hearing

First Name	Last Name	Title and Organization
Eric	Dickson	President & CEO, UMass Memorial Health Care, Inc.; Emergency Physician, UMMMC
Michael	Gustafson	President, UMass Memorial Medical Center
Harriette L.	Chandler	Massachusetts State Senator
David	LeBoeuf	Massachusetts State Representative
Mattie	Castille	Commissioner of Health & Human Services, City of Worcester
David	Hurlbut	Fire Chief, Town of Sterling; Chairman of Fire District 8
Sharon	Henderson	Has been involved in Central Massachusetts and the Worcester community for many years and in different roles
Justin	Precourt	Chief Nursing Executive, UMMH; Chief Nursing Office, UMMMC
Doug	Brown	Chief Administrative Officer for UMMMC
Carolyn	Jackson	CEO, Saint Vincent Hospital; Representative for Saint Vincent Hospital TTG
David D	McManus	Chair of Medicine, UMMMC; Resident of Holden Massachusetts
Tina	Dixson	Executive Director of Central Mass EMS Corp
Anthony	Izzo	President of Medical Staff at Saint Vincent Hospital
Rick	Muhr	Resident, Grafton Massachusetts; Patient of UMMMC
Janet	Cutman	Retired Professional; Resident of the City of Worcester; Patient of UMMMC
Mari	Gonzalez	Executive Director, El Buen Samaritano Food Program Inc. (EBS)
Kathleen	Buchanan	Resident of Princeton Massachusetts, Patient of UMMMC
Kavita	Babu	Emergency Physician, UMMMC
Arvin	Garg	Pediatrician, UMMMC; Associate Chief Quality Office for Health Equity, UMMMC
Charles	Cavagnaro	Internist; Chief Medical Officer, Marlborough and Clinton Hospital
Jesus	Suarez	President & CEO Renaissance Medical Group
Michelle	Muller	Family Nurse Practitioner; Interim Senior Director for the Department of Community Benefits, UMMH
Terence	Flotte	Executive Deputy Chancellor Provost & Dean, T.H. Chan School of Medicine
Greg	Volturo	Emergency Physician; Chairman, Department of Emergency Medicine, UMass Memorial Health Care
Monsignor Peter	Beaulieu	Member, Board of Trustees Saint Vincent Hospital
Nisha	Vats	Nurse Manager, Saint Vincent Hospital
Janet	Wilder	Organizer, SHARE/AFSCME Union
Alex	Guardiola	Vice President Government Affairs and Public Policy, Worcester Regional Chamber of Commerce
Nicole	Kariko	Nurse, Emergency Department UMMMC
Max	Rosen	Chair of Radiology, UMMMC

Appendix D: Summary of Comments Submitted on the Proposed Project (Summarized by Factor)

Summary of comments in support of the Proposed Project

FACTOR 1

Patient Panel Need

UMMMC is the only provider of certain complex services in Central Massachusetts and as the only provider of these services in the region, UMMMC plays a vital role in supporting other hospitals in the region. For example, UMMMC is the only academic medical center in the region, the only Level I adult and pediatric Trauma Center, the only Level III NICU, the only JCAHO certified stroke center, and the only Level III liver transplant center.

In addition, because of the many services it provides, UMMMC experiences unpredictable demand for services that cannot be handled within its current size and scale. Numerous measures show increasing need for inpatient capacity and new CT imaging capacity at UMMMC.

- This year, UMMMC declined 43% of all patient transfer requests from the community due to a lack of inpatient beds. The inability to accept transfers from community hospitals, results in the transfer of patients to other hospitals, some of which are outside of the region, which delays access to care.
- Average occupancy rate for inpatients is consistently above 90% and frequently reaches 100% on both campuses.
- Average daily census is up 9% over the past year.
- UMMMC's ED is the second busiest ED in the Commonwealth with over 120,000 visits annually, and a very high patient acuity level.
    - Twenty eight percent of University Campus patients and 24% of Memorial campus patients require admission.
    - July fiscal year '22 year-to-date, UMMMC saw an average daily, ED census of 335 patients per day. Through the month of August thus far, the Medical Center is seeing an average of 340 patients per day with 65% of these patients seen on University Campus, and many requiring tertiary care services.
    - On any average day, there are 157 patients per day in the ED, a 35% increase over FY19, and 50-80 M/S patients boarding in the ED.
    - Nonpsychiatric patients board for as long as 17 hours in the ED waiting for admission to an inpatient bed. From FY18-FY21, boarding has increased 91%
    - Due to crowding in the ED, patients are waiting for care in the hallways which creates lack of privacy and delays in care.
- Between FY19 and FY21, M/S patient days increased by 18% and overall bed occupancy increased by 14%.
- Between FY19-FY21, inpatient and outpatient CT utilization increased 17%.

Lack of inpatient capacity at UMMMC impacts Emergency Medical Services (EMS). When EMS arrives to the hospital and the patient experiences a delay in admission due to capacity constraints, EMS crews wait with patients for an extended period of time ("hold the wall") and cannot transfer care until there is a space available in the ED for their patient. When EMS crews are delayed returning to the community from which the ambulance originates, it impacts EMS operations in the city/town from which the ambulance originates as well as EMS crews in other communities. Transferring patients further away and out of the region for care, reduces ambulance availability in the region and negatively impacts patients and families.

UMMMC has implemented a number of less expensive alternatives and operational changes to increase and improve patient flow (i.e. Hospital at Home, utilization of Surge space, working with community hospitals). Collaboration with its community hospitals to leverage bed capacity across the system to ensure all beds are utilized by appropriate patients has increased occupancy rates at UMMH community hospitals: Between June FY21 and FY22, Marlborough Hospital M/S inpatient capacity increased by 13%, HealthAlliance M/S capacity increased by 8%, and Harrington Hospital inpatient capacity increased by 16%. However, these efforts have not been sufficient to address UMMMC's existing capacity constraints.

There are predicted national physician shortages, and physician workforce challenges in Massachusetts, and the creation of new inpatient capacity at UMMMC will support the education and training of future Massachusetts physicians at UMass Chan.

Public Health Value: Improved Outcomes and Quality of Life

- Increasing inpatient capacity at UMMMC will relieve congested patient flow, reduce the number of patients that leave without being seen, and improve patient satisfaction and health outcomes.
- The private rooms in the new inpatient building will be equipped with technology enabling patient-centered care at the point of care which will create an enhanced patient family experience.
- The additional CT scanner will reduce the need to transfer patients back and forth across campus for imaging, allowing patients to receive all of their care in one location. This will improve diagnosis for hospital patients and reduce delays in imaging care for outpatients.
- The beds in the new inpatient building will be an extension of the University Campus, and clinical leadership teams in the new inpatient building will be an extension of those teams at the University Campus.

Public Health Value: Health Equity

Western Mass is under-bedded when compared to other regions of the state. This is reflected in the number of beds in the region per 1,000 population.

- Western Mass – 2.28 beds/1000 population (20% more beds per capita)
- Central Mass – 1.9 beds/1,000 population
- Eastern Mass (including Cape and Island) – 2.19 beds/1,000 population (15% more beds per capita)

- Additionally, Central Mass' beds per 1,000 residents is below the national average.

UMMMC is legislatively mandated to provide highly specialized clinical services not available at other hospitals in Central Massachusetts and to be the safety net provider for indigent patients in the region and current capacity constraints are impeding its ability to fulfill this role.[58] UMMMC is designated by the state as a "High Public Payer" hospital and by the federal government as a "Disproportionate Share Hospital" due to its disproportionately high ratio of low-income patients who are either uninsured or on MassHealth/Medicaid (in addition to those on Medicare). UMMMC serves a disproportionate share of patients that are low-income, on government sponsored insurance, and communities of color. UMMMC patients come from marginalized communities and experience barriers to care. The COVID-19 pandemic intensified need for community access to healthcare.

Current capacity constraints are impacting critical neighborhoods that are already impacted by racial inequity and health inequities. Transferring patients outside the region for care, negatively impacts care of patients, and increases cost of care for patients, employers, and insurers. UMMMC has invested in resources to address racial and ethnic inequities in the healthcare system. This includes creating an office of diversity, equity, and inclusion and creating a health equity steering committee to guide its clinical healthcare equity work.

FACTOR 2

Delivery System Transformation
UMMMC is addressing the SDoH and the Department's health priorities, through its community benefits programming and Anchor Mission, which has been adopted by the UMMMC board, and has to date invested 4M in projects across Massachusetts to target the DoN Health Priorities. In addition, UMMMC has been a community partner and engaged the Worcester community and partners to improve the health of the Worcester community.

Summary of comments in opposition to the Proposed Project

FACTOR 1

Patient Panel Need
The Proposed Project does not meet Factor 1 Patient Panel need because the Greater Worcester region is well served by existing lower-cost, high quality providers that have sufficient capacity to meet the needs that are identified in the Proposed Project. This includes existing alternative inpatient medical/surgical capacity in the market for both tertiary and lower acuity care. There is no community need for 91 new beds because of the availability of existing capacity at UMMMC's sister hospitals and other hospitals in and around Worcester.

[58] AN ACT AUTHORIZING THE ESTABLISHMENT IN CENTRAL MASSACHUSETTS OF A HEALTH CARE SYSTEM AFFILIATED WITH THE UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL.https://malegislature.gov/Laws/SessionLaws/Acts/1997/Chapter163

Efficiency, Continuity of Care, Coordination of Care
More efficient operation of UMMMC will help to alleviate some of the capacity constraints that it is currently experiencing.

Competition on price, total medical expenses (TME), costs and other measures of health care spending
The Proposed Project does not compete on the basis of price and other measures of health care spending because UMMMC's prices are higher than those of its sister hospitals and of its competitors. The additional capacity acquired through the Proposed Project will allow the Applicant to negotiate higher manager care reimbursement, negatively impacting patients, payers, and employers in the Commonwealth. Renovating an existing building is more expensive than utilizing existing capacity, and less immediate access to such case.

FACTOR 2

Cost Containment
The Applicant is the largest health care system in Central Massachusetts, has a dominant market share in the region, and is the highest cost provider in the region. UMMMC has higher reimbursement in the region, and health care spending and health care costs will increase as a result of the Proposed Project.
Several requests were made for an independent cost analysis (ICA), to further examine the impact of the Proposed Project. Commenters cited following reasons for conducting an ICA on the Proposed Project:

- To assess the project's health care costs, and its overall impact on health care in the region.
- To assess the Proposed Project's impact on payor's, employers, and patients.
- To determine if expansion will increase quality of care while lowering healthcare
- costs .
- To conduct an unbiased third-party, independent review to confirm the veracity of the claims in the DoN application.
- To assess if the Proposed Project is consistent with the Commonwealth's cost containment goals.
- To demonstrate a community or delivery system need for the Proposed Project that is not duplicative of existing services that will result in increased cost of care.

FACTOR 5

- Better and less expensive alternatives exist to the Proposed Project to improve health outcomes, including making operational improvements at UMMMC and utilizing existing capacity in the region.

APPENDIX E: Inpatient Relative Price

Harvard Pilgrim Health Care (HPHC)				
Acute Hospital Name	**Hospital Cohort**	**Inpatient Relative Price (RP)**	**Compared to Network Average (RP=1.0)**	**Price Difference if Patients Shift to UMMMC (RP=1.33)**
Central Mass				
Athol Hospital	Community-High Public Payer	0.50	-50%	166%
Harrington Memorial Hospital	Community-High Public Payer	0.27	-73%	393%
HealthAlliance-Clinton Hospital	Community-High Public Payer	0.71	-29%	87%
Heywood Hospital	Community-High Public Payer	0.52	-48%	156%
Marlborough Hospital	Community-High Public Payer	0.64	-36%	108%
Saint Vincent Hospital	Teaching Hospital, High Public Payer Hospital	1.17	17%	14%
UMass Memorial Medical Center	Academic Medical Center, High Public Payer Hospital	1.33	33%	0%
Academic Medical Centers				
Beth Israel Deaconess Medical Center	Academic Medical Center	1.26	26%	6%
Tufts Medical Center	Academic Medical Center, High Public Payer Hospital	1.12	12%	19%
UMass Memorial Medical Center	Academic Medical Center, High Public Payer Hospital	1.33	33%	0%
Boston Medical Center	Academic Medical Center, High Public Payer Hospital	1.16	16%	15%
Massachusetts General Hospital	Academic Medical Center	1.24	24%	7%
Brigham and Women's Hospital	Academic Medical Center	1.25	25%	6%

Tufts Health Plan (THP)				
Acute Hospital Name	**Hospital Cohort**	**Inpatient Relative Price (RP)**	**Compared to Network Average (RP=1.0)**	**Price Difference if Patients Shift to UMMMC (RP=1.41)**
Central Mass				
Athol Hospital	Community-High Public Payer	0.48	-52%	194%
Harrington Memorial Hospital	Community-High Public Payer	0.52	-48%	171%
HealthAlliance-Clinton Hospital	Community-High Public Payer	0.65	-35%	117%
Heywood Hospital	Community-High Public Payer	0.58	-42%	143%
Marlborough Hospital	Community-High Public Payer	0.63	-37%	124%
Saint Vincent Hospital	Teaching Hospital, High Public Payer Hospital	1.50	50%	-6%

UMass Memorial Medical Center	Academic Medical Center, High Public Payer Hospital	1.41	41%	0%
Academic Medical Centers				
Beth Israel Deaconess Medical Center	Academic Medical Center	1.17	17%	21%
Tufts Medical Center	Academic Medical Center, High Public Payer Hospital	1.23	23%	15%
UMass Memorial Medical Center	Academic Medical Center, High Public Payer Hospital	1.41	41%	0%
Boston Medical Center	Academic Medical Center, High Public Payer Hospital	1.00	0%	41%
Massachusetts General Hospital	Academic Medical Center	1.48	48%	-5%
Brigham and Women's Hospital	Academic Medical Center	1.53	53%	-8%

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