Minimizing Risk, Maximizing ROI:
The MC2020 Recapitalization Story

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Today's Presenters

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The Team Behind The Scenes
Learning Objectives

1. Learn how to best involve stakeholders throughout the process to receive feedback, buy-in, and community support.

2. Learn how to utilize Lean principles in the design and planning process to achieve the greatest return on investment.

3. Learn how to implement modular and pre-fabricated construction to improve efficiency in construction while reducing risk and waste.

4. Learn about the heightened stakes of construction within an occupied, active hospital campus, and how to creatively overcome these challenges to maintain compliance.
Problem Statement - Owners Viewpoint

- Renovate or Build New
- Engage Community
- Time, Space, Money
UMass Memorial Medical Center

- Trusted academic medical center
- Part of UMass Memorial Health Care system
- Worcester, MA - Central Massachusetts
- Three main campuses:
  - University Hospital
  - Memorial Hospital
  - Hahnemann (Outpatient)
Project Overview

UMass Memorial Medical Center

- 345,000 sq. ft. across 2 million sq. ft. academic center
- Refresh 407 patient beds into private & semi-private
- Renovation occurring on entire floors of the hospital as well as room-by-room
- Desire for a hospitality look for a more comfortable patient experience, corporate branding
- Project duration: May 2016 - Ongoing
Aligning UMMMC Bricks and Mortar to UMMHC Strategy

In 2015 a study was done to assess our current facilities and evaluate options for growth.

With an emphasis on the Medical Center, UMMHC has defined the following scope of effort around three preliminary, core Master Facilities Planning Options.

**Scope of Effort**
- Demand and financial analysis related to a potential new inpatient bed tower on the University campus as a means to consolidate patient care

**UMMMC Master Facility Plan Options**

- **Option 1** - Refresh + New ASC
- **Option 2** - Programmatic Reconfiguration
- **Option 3** - Consolidation at University Campus

In 2015 a study was done to assess our current facilities and evaluate options for growth.
High-Level Demand and Financial Modeling Process Strategy

Defining Nine Core UMMHC Programs
- Heart & Vascular
- Medicine
- MSK
- Oncology
- Pediatrics
- Neonatology
- Surgery
- Women’s Health
- Behavioral Health

Analyzing Historical and Potential Future Trends by Program
- Discharges
- Patient Days
- Length of Stay
- Average Daily Census

Developing 2022 Demand/Financial Model, with Sensitivity Analysis (Considers Incremental Impact)
- Levers include:
  - Volume trends
  - Revenue/Reimbursement
  - Expenses
  - Length of Stay
  - All Private M/S Beds**

This effort was driven by an interactive, iterative process with input from UMMHC Department Chairs and UMMHC/UMMMC Team Members from Facilities and Finance.
Comparing Options

Option 1 - Refresh + ASC (Baseline)
- Pros:
  - Shortest timeframe and lowest cost option to implement
  - Lowest capital requirements ($90-100 M)
- Cons:
  - Minimal efficiency gains
  - No substantial cost structure improvements
  - Does not decompress University campus
  - Does not leverage other UMMHC sites

Option 2A - Programmatic Reconfiguration
- Pros:
  - Moderate capital requirements ($95-105 M)
  - Shift of Behavioral Health off campus allows some level of decompression to the University campus, but limited overall ability to enhance efficiency and cost structure
- Cons:
  - Opposition/dissatisfaction by transferred departments
  - Potential cross campus coverage issues

Option 2B - Programmatic Reconfiguration ENHANCED
- Pros:
  - Greatest financial /NPV benefit to UMMHC
  - Ability to decompress University campus
  - Leverages community hospitals to promote regional care management and cost structure improvements
  - Greatest flexibility to address potential market changes
  - Philanthropic opportunity for WBC’s Hospital
- Cons:
  - Potential opposition/dissatisfaction by transferred departments
  - Potential cross campus coverage issues
  - Significant capital requirement ($175-200 M)

Option 3 - Consolidation at University Campus
- Pros:
  - Single campus facility efficiency gains and ability to mothball Memorial, Hahnemann
  - Staff coverage efficiency gains
  - Philanthropic opportunity around consolidated entity
- Cons:
  - Significant capital requirements ($4 - 1.2 B)
  - Substantial increase in UMMHC cost structure
  - Negative NPV
  - Significantly limits flexibility of UMMHC to respond to market changes
MC 2020 is a Multi-year, $200M+ Recapitalization Effort

Goals:
- Enhance patient and family privacy, safety and comfort
- Improve caregiver environment and standardize staff areas on the units and across campuses
- Improve ADA accessibility and DPH compliance
- Support infrastructure upgrades and EPIC implementation

Scope:
- Refresh all inpatient medical surgical rooms, team stations, and common public areas at the University and Memorial campuses
  - 254 beds at University
  - 153 beds at Memorial
**MC2020 Project Team Charter**

**OUR PATIENTS**
- Improve our environment of care; Patient Privacy & Comfort
- Move to private rooms; increase bed count in flex mode
- Standardize spaces
- Simplify space/reduce clutter
- Intuitive travel paths & wayfinding
- Hospitality style bathrooms
- Clear patient/family/staff zones
- Infection control
- New technologies

**OUR PEOPLE**
- Improve circulation/reduce corridor clutter
- Standardize staff work locations/zones (huddle, quiet work, minimize disruptions)
- EPIC integration
- Repeatable work process in standardized spaces
- Staff access to Nurse Manager
- Improve “off-stage” spaces
- Incorporate ceiling lifts
- Meeting DPH requirements - functions on unit vs. functions on the floor vs. off the floor

**OUR LONG-TERM FINANCIAL HEALTH**
- Improve HCAHPS
  - Clean Room
    - Balancing aesthetics & maintenance
    - Remove clutter
  - Quiet Room
    - Privacy at night
    - Sound absorption/lighting control
    - Reduced paging
- Comply with all Building & Regulatory Codes (DPH, ADA, Life Safety Codes)
- Optimize standardized workflow (*test first*)

**OUR DISCOVERIES**
- New ways to deliver care
- New processes to deliver construction
Executive Oversight Team (EOT)
- Provides guidance during the planning, design and construction of the project to ensure the project’s successful execution
- Members include, President, COO, CFO, CNO, Department Chairs, and SVP’s

Project Leadership Team (PLT)
- Develops consistent design standards for both campuses. Provides clarifications to the PIT for all questions and discrepancies during construction
- Chaired by COO
  - MD’s, Nursing, Clinical Staff, Facilities, Housekeeping, Food Services, IS, CE, A/E Team

Project Implementation Team (PIT)
- Implementation of project designs; ensures consistent design across the Units/campuses. The team resolves issues that arise during construction and is responsible for escalating issues
Problem Statement - Architects Viewpoint

- Stakeholder Engagement
- Brand Acknowledgement
- Flexible Design
Capital Planning - Target Value Design Approach

Time
- Traditional Build & Approval Process
  - DoN Application, Design, Build
  - Delayed Results

Space
- Analyze Site Constraints
  - (3) Hospital Sites
  - Consolidate or serve Community

Money
- What does it cost, what are my options?
  - $1.2B vs. $200M
Staff & Patient Involvement

Team Home
- Collaborative space
- Website
- Standard meeting schedule

Lean Working
- Mocked-up rooms on active floors (2 Campuses)
- Put room into use
- Held Kaizen & 3P events with over 600 participants
- Modified standard room based on feedback
Encourage Interaction

- Move to private bedrooms at Memorial
- Community campus to include Simulation & Education spaces
- Allow for spontaneous interactions by adding Academic Hub at Memorial
Value Proposition

Product Selection
- Performance Specify products
- Test compatibility (everything the patient sees or touches)
- Choosing by Advantages
Rolling Phasing Plan

Patient Rooms Renovated in Sequential Groupings

Phasing Game Plan

- DPH Direction on Whole project
- Standard Components
- Field Fit so open-ended design
- Design Matrix for Field solutions
Problem Statement - Engineers Viewpoint

- Improve Infrastructure
- Energy Reductions
- Appropriate Budget
 MEP Goals

- Improve Patient Satisfaction
- Design Consideration for Active Healing environments
- Improve Infrastructure Systems
- Reduce Energy
- Establish Accurate Budget
Infrastructure Challenges

- Buildings constructed in 1970’s
- Low Floor-to-Floor
  - 12’ Floor-to-Floor
  - 10’-2” Bottom of Beam
- Existing Conditions / Discovery
- Phased Construction - Nearly 100 Projects since 2015
- Budget
Integrated Design Team

Communicate - Communicate - Communicate

Project Implementation

Facility Assessment

Concept Design

Budgeting

Design/Construction
ENERGY CODE: IECC 2015

Project is a renovation and does not fall under stretch code, therefore prescriptive requirements in IECC 2015 were met.

APPROACH:
- Active Chilled Beams
- Building Control Optimization
- LED Lighting
- Automated Lighting controls
- Reduced Airside System Velocity
- Fan Wall
Energy Reduction Strategy - Active Chilled Beams

- Envelope Testing (Turner Building Systems)
- Detailed Evaluation of Results (Owner, A/E, CM)
- Design Custom Chilled Beam (Owner, A/E, CM)
- Building Prototype (Dadanco)
- Test chilled beam Prototype in Mock-up (Environmental Chamber)
Envelope Testing

BUILDING OPERATING PRESSURE

Corridor to Basement Mechanical Room
Enclosure PD
Stair to Penthouse Mechanical Room
OA to Basement Mechanical Room
OA to Penthouse Mechanical Room
Chilled Beams

- Neutral Construction Cost
- Slightly lower maintenance cost
- Operational energy cost savings
Design Custom Chilled Beams

- Provide additional Drain Pan supports to maintain pitch integrity. 1/8”/ft
- Piped Drain Pan
- Screw Type piping connections
- MERV 8 Filters
- Vertical Coils to allow for drain pan
- Smooth Covers to prevent lint collection
Test Prototype in Mock-Up

Test 1:
Cooling Mode Design Conditions
Occupant Load
Results:
Maintained 74°F / 50%RH
No Condensation
Room Space Velocity <35fpm

Test 2:
Same as test 1: Space RH Raised to 60%
No Evidence of Condensation

Test 3:
Same as test 1: Space Rh raised to 75%
Some Condensation Visible on pan/coil
No Condensation dripping/Dry Pan

Test 4:
Heating Mode
Energy Results

- Robust savings from project and supporting infrastructure projects
- $24 Million combined annual savings over ten years.
- $1.1 Million in annual savings from combined heat and power generation
- $300,000 savings from solar net metering
Problem Statement - Contractors Viewpoint

• Reduce Impact of Material Delivery
• Control Costs through Standardization
• Reduce Onsite Labor
Materials shipped to off-site warehouse

Materials organized by construction sequence pre-packaged into four “Construction Kit” categories

Materials delivered “just-in-time” for their installation at the same time every day
Bulk Material Purchasing Strategy

- Materials purchased direct from suppliers in lieu of from subcontractors
- Used Choosing By Advantages (CBA) for material selection
- Reduced costs by $4,000/room through bulk material purchasing
Pre-fabrication

- Activities completed in off-site multi-trade pre-fabrication shop or at the supplier’s fabrication shop

- Fewer workers, labor & trucks on-site

- Reduces noise, packaging & amount of materials on-site at a time

- 20,000 labor hours removed from the jobsite to date
Kitting & Material Handling - RESULTS

1,200 Total kits of parts being delivered to the site

600 Fewer truck deliveries to Hospital loading docks

5 TONS Of cardboard will be recycled & disposed at the Consigli warehouse

1,000 SF Of material storage space not needed at Hospital

20,000 Man hours removed from the jobsite

$600K In shipping & handling cost savings