Form Follows Function: Pursuing a World-Class System for Health

Independent Review Panel on Military Medical Construction Standards

Annual Progress Report

February 1, 2015

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San Antonio Military Medical Center Lobby photo courtesy of RTKL Associates Inc.

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
HEALTH AFFAIRS
7700 ARLINGTON BOULEVARD, SUITE 5101
FALLS CHURCH, VA 22042-5101

Independent Review Panel on Military Medical Construction Standards

MEMORANDUM FOR SECRETARY OF DEFENSE

SUBJECT: Annual Progress Report of the Independent Review Panel on Military Medical Construction Standards

I, the Chairperson of the Independent Review Panel on Military Medical Construction Standards, on behalf of the Panel and pursuant to our charter, hereby submit our annual progress report's findings and offer our best recommendations.

A. Ray Pentecost III, DrPH,
FAIA, FACHA, LEED AP
Chairperson

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INDEPENDENT REVIEW PANEL ON MILITARY MEDICAL CONSTRUCTION STANDARDS MEMBERS

A. Ray Pentecost III, DrPH, FAIA, FACHA, LEED AP
Professor, Public Health and Architecture, Texas Tech University
Panel Chairperson

Mark Erath, CPA, CGMA, CTS-MC, FACHE, FHFMA
Healthcare Executive; Former Chief Financial Officer of Parkland Health and Hospital System and Geisinger Medical Center; Retired Healthcare Partner, PricewaterhouseCoopers, LLP

Anjali Joseph, PhD, EDAC
Associate Professor and Endowed Chair of Architecture and Health Design and Research
Clemson University

Paul Kearns, MBA, CPA, CHE, LFACHE, FHFMA
Colonel (Retired), United States Air Force
Senior Executive Service (Retired), Veterans Health Administration

Christine Malcolm, MBA
West Coast Leader, Managing Director, Healthcare
Navigant Consulting, Inc.

Eileen Malone, RN, MSN, MS, EDAC
Colonel (Retired), United States Army
Senior Partner, Mercury Healthcare Consulting, LLC

Donald Orndoff, AIA, MS
Captain (Retired), United States Navy
Senior Vice President, National Facilities Services
Kaiser Permanente

William Rowley, MD
Rear Admiral (Retired), United States Navy
Independent Consultant

Joseph G. Sprague, FAIA, FACHA, FHFI
Principal and Senior Vice President/Director of Health Facilities
HKS, Inc.

Philip E. Tobey, FAIA, FACHA
Senior Vice President
SmithGroupJJR

EXECUTIVE SUMMARY

The Department of Defense's (DoD's) Military Health System (MHS) has undergone significant transformation over the past decade as a result of myriad challenges and opportunities, which included supporting and deploying a medically ready force fighting two wars, reorganizing governance functions, implementing enterprise-wide common business processes, and creating shared services in a more integrated fashion. During this dynamic period, the MHS continued providing quality medical care to its Service members and beneficiary population. At the same time, the health care industry was being reimagined and reconfigured in response to health care reform legislation and advances in technology to achieve the national quality improvement goals of better care, healthy people and communities, and affordable care;[1] a journey that continues today. The impacts of these significant changes have the potential to redefine world-class health care facility requirements and supporting standards, since form should always follow function.

The general recommendations contained in this annual progress report are designed to provide the Department with opportunities for enterprise-wide improvements that can be used to drive systematic, positive change, and facility requirements, which should be based on strategic and business goals that reflect the MHS's recent transformation. The Independent Review Panel on Military Medical Construction Standards (Panel) recommends that the MHS update the 2010 Comprehensive Master Plan (CMP) for the National Capital Region (NCR) as quickly as possible to reflect current MHS strategy, business plans, and technological advances to help achieve strategic goals and targeted outcomes. The Panel encourages the MHS to continue shaping its future with an emphasis on health; employ a strategic vision that reaches beyond world-class facilities; and focus on a world-class integrated delivery system (IDS).

The imperative for this new direction seems clear: change in health care is happening at an unprecedented pace and on a scale that touches every aspect of the health care industry. Current legislative mandates have prioritized the quality of care over the volume of care provided, with renewed focus on affordable services that result in healthy individuals and communities. Health care technology advances provide new virtual or non-facility based options for care delivery, disrupting the strategic planning that represents the first step in determining health care facility requirements and standards. As a result, facility and information management and technology infrastructure investments and standards should be determined, executed, and evaluated together. Changes in health care require leaders to think outside the traditional facilities-based platform to establish a high reliability IDS.

As the MHS evolves in its efforts to become an IDS that rivals other high reliability, top performing health care systems, it should continue to adapt to environmental, scientific, and technological changes; align itself with industry and evidence-based design best practices; and continue to focus on providing safe, high quality, accessible, and affordable patient care. The Panel commends the MHS for the progress it has made so far during its transformational journey. However, in its quest to become a top-tier health care system,[2] where average is unacceptable,[3] the DoD should also focus on the continuous improvement of its facility requirements and supporting standards, using better analytics to understand and improve the role that facilities play in the delivery of quality and affordable care.

CHARGE TO THE INDEPENDENT REVIEW PANEL ON MILITARY MEDICAL CONSTRUCTION STANDARDS

Section 2852 of the Ike Skelton National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2011 required the establishment of an Independent Review Panel on Military Medical Construction Standards (Panel) whose objectives and scope of activities include the provision of advice and recommendations regarding a construction standard for military medical centers to provide a single standard of care. Specifically, the Panel's charges include:

> (A) Reviewing the unified construction standards established pursuant to subsection (a) to determine the standards [*sic*] consistency with industry practices and benchmarks for world class medical construction;
> (B) Reviewing ongoing construction programs within the Department of Defense to ensure medical construction standards are uniformly applied across applicable military medical centers;
> (C) Assessing the approach of the Department of Defense approach [*sic*] to planning and programming facility improvements with specific emphasis on –
>
> > (i) Facility selection criteria and proportional assessment system; and
> > (ii) Facility programming responsibilities between the Assistant Secretary of Defense for Health Affairs and the Secretaries of the military departments [*sic*];
>
> (D) Assessing whether the Comprehensive Master Plan for the National Capital Region Medical, dated April 2010, is adequate to fulfill statutory requirements, as required by section 2714 of the Military Construction Authorization Act for Fiscal Year 2010 (division B of Public Law 111-84; 123 Stat. 2656), to ensure that the facilities and organizational structure described in the plan result in world class military medical centers in the National Capital Region; and
> (E) Making recommendations regarding any adjustments of the master plan referred to in subparagraph (D) that are needed to ensure the provision of world class military medical centers and delivery system in the National Capital Region.[4]

The Panel was charged with providing to the Secretary of Defense, not later than 120 days after its first meeting, an initial report containing an assessment of the adequacy of DoD's plan to address the above items and the Panel's recommendations to improve the CMP.[4] The Initial Report was delivered on June 5, 2014 and can be found at the following link: https://database.faca.gov/committee/historyreportdocuments.aspx?flr=15308&cid=2450&fy=2014.

The Panel also was charged to provide an annual report on the Panel's findings and recommendations to address any identified deficiencies each February 1 until the termination of the Panel. This report is the first annual progress report of the Panel and provides an overview of the Panel's findings and recommendations based on its work to date (see Appendix A for member biographies and Appendix B for the entire legislation).

ABOUT THE REPORT

The annual progress report is organized in the context of a typical facility project life cycle. The facility life cycle begins with strategic planning and programming activities, followed by design, construction, commissioning, and on-going operational activities. Following this approach, the report addresses Charge C, Approach to Planning and Programming Facility Improvements, first, followed by Charge A, Consistency of Unified Construction Standards with Industry Practices and Benchmarks. Charges B, D, and E complete the report.

The Panel approached each of the five FY 2011 NDAA duties described above using the following three key frameworks:

- The *world-class medical facility* definition, which was developed as part of the work of the NCR Base Realignment and Closure Health Systems Advisory Subcommittee of the Defense Health Board in May 2009, shaped the Panel's analysis, advice, and recommendations. The definition includes 18 conditions in 6 domains that must be met for a medical facility to be considered world-class: (1) Basic Infrastructure; (2) Leadership and Culture; (3) Processes of Care; (4) Performance; (5) Knowledge Management; and (6) Community and Social Responsibility (see Appendix C).
- Seven Guiding Principles, created and adopted by the Panel, established the foundation for its work, reflected the Panel's core beliefs, and provided a lens through which the Panel established goals and developed recommendations (see Appendix D).
- The components of the MHS Quadruple Aim, increased readiness, better care, better health, and lower cost, guided the Panel's inquiries.

FINDINGS AND RECOMMENDATIONS

The MHS has made significant progress toward improving the quality, access, and safety of the health care it provides, while also maintaining military medical readiness, improving health, and lowering costs. These advances include establishing the Defense Health Agency (DHA) and its shared services, forming six enhanced Multi-Service Markets (eMSMs), pursuing an enterprise-wide approach to modernizing and optimizing the MHS, developing plans to recapture workload and increase productivity, and emphasizing the importance of creating world-class medical facilities. This progress has occurred in the face of a rapidly evolving health care industry and is the result of fundamental changes in thinking, dedicated leadership, and the continued integration of the Services. The work of the DHA Facilities Division has been a positive force in the MHS and includes integrating evidence-based design in the construction of medical facilities, creating the World-Class Checklist and Toolkit, and continuing to develop and maintain standards and criteria for the facility life cycle.

To address the five charges outlined in the NDAA, the Panel visited several military treatment facilities (MTFs) to understand the differences in creating world-class facilities under a variety of circumstances and during various phases of construction. Based on the information analyzed for this annual progress report, the Panel found that DoD's facility standards are consistent with the industry and in many ways lead the industry with their use of evidence-based design across the facility life cycle as a tool to help improve health care outcomes. The Department is to be commended for its extensive work in the pursuit of world-class facility criteria and goals and

other major initiatives to optimize facility investments in support of the MHS Quadruple Aim. However, a number of MHS system enhancements remain to be realized, and then used, to further drive facility standards refinement. As the MHS strives to become a high reliability organization based on continuous performance improvement, it should analyze the impact of the environment, which shapes patient experiences and the care provided. This analysis should be used to refine facility standards and realize a maximum return on these investments. It appears certain practices, structures, and processes are barriers to an enterprise-wide approach to facility planning and programming and contribute to a lack of understanding about the effect of certain design decisions on health outcomes. Future facility standards, requirements, and investments should be integrated with information management and technology infrastructure standards, requirements, and investments.

Although the MHS has made great strides, the Panel has observed the outcomes associated with previous decisions, policies, guidelines, and business models that are no longer supportive of current MHS goals and objectives. Since the creation of new facilities represents one of the largest, longest-lasting capital investments the MHS makes, the MHS should continue to evolve toward a world-class IDS to optimize its approach to planning and programming facility improvements, reduce underutilization, and maximize the use of its facility resources. Furthermore, due to the rapid evolution of health care models and technology during a time of dynamic health care reform and transformation, developing and maintaining up-to-date facility standards is particularly challenging, especially while also striving to achieve quality, safe, and affordable care. Future facility standards, requirements, and investments should be refined based on the routine evaluation of EBD features on targeted patient, staff, and resource outcomes, as an integral component of the MHS's and Services' performance improvement programs. Finally, as mentioned above, when the Comprehensive Master Plan for the National Capital Region was published in 2010, it met the requirements to ensure that the facilities and organizational structure resulted in world-class medical centers, but now requires an update to reflect current and future MHS strategy, business plans, technology, and health care outcome goals.

The Panel makes the following specific findings and recommendations based on information received to date, which will be further crystallized in the Final Report.

<table>
<tr><th colspan="2">The Independent Review Panel on Military Medical Construction Standards
Findings and Recommendations</th></tr>
<tr><td colspan="2">Charge C: Department of Defense Approach to Planning and Programming Facility Improvements</td></tr>
<tr><td>Finding 1: Although the Military Health System (MHS) is evolving as a newly formed integrated delivery system (IDS), planning and programming for past military construction (MILCON) investments was often driven by Service strategies that did not always reflect the MHS's newly adopted IDS model and did not always result in full facility asset utilization. Specifically:
a) Individual health care facilities, rather than an IDS model, were the framework for the 2009 definition of a world-class facility.
b) The full continuum of care is not led by a single organization focused on serving the local population at the most appropriate site of care.
c) Enhanced Multi-Service Markets (eMSMs) lack a single command and control structure with single budgetary authority for all military treatment facilities (MTFs) in their region, which complicates facility investment requirements and life-cycle management.
d) eMSM MTFs do not always share administrative and support services, which would enable consolidation and reduce programming requirements.</td><td>Recommendation 1: The MHS should:
a) Expand its IDS definition and framework to include a description of a high reliability care delivery organization that reflects direct and purchased care services, its core services, resource requirements, concepts of operation, and expected health care outcomes, which are then used to drive planning and programming facility requirements. Specifically, this IDS framework should:
1) Be developed by MHS clinical leaders and experts, rather than by facility design professionals.
2) Use single command, control, and budgetary authority to drive the facility requirements and planning processes by establishing a process for integrated facility life-cycle budget requirements with IDS fiscal accountability to better inform facility investment requirements.
b) Expand and refine the current world-class medical facility definition and its supporting domains and conditions to be consistent with a world-class IDS structure and to promote broader strategic thinking, planning, and resource management.</td></tr>
<tr><td rowspan="4">Finding 2: The Panel observed that all seven of the MTFs they visited were not operating at full capacity. The DoD Space Planning Criteria for most of the primary and specialty clinics that require outpatient exam rooms were recently updated to reflect a model similar to that used in the private sector. The MTFs visited by the Panel were all programmed using the previous criteria, which may have overstated capacity requirements.</td><td>Recommendation 2.1: The MHS should continue to update DoD Space Planning Criteria to reflect current industry best practices.</td></tr>
<tr><td>Recommendation 2.2: The MHS should establish asset utilization standards, based on enhanced Multi-Service Market (eMSM) business plans that use a medical tri-Service staffing distribution model, which are consistent with industry standards and applied in the planning process to reduce underutilized facility assets.</td></tr>
<tr><td>Recommendation 2.3: The Defense Health Agency (DHA), together with the Services, should analyze low-volume service lines and adjust facility planning and programming criteria accordingly.</td></tr>
<tr><td>Recommendation 2.4: The MHS should examine and refine facility planning and programming standards to reflect current thinking about the planned recapture of purchased care, in alignment with eMSM business plans.</td></tr>
<tr><td>Finding 3: Frequent changes in health care personnel requirements, distribution, and availability confound facility planning and programming standards and criteria.</td><td>Recommendation 3: The Services should develop a medical tri-Service human capital distribution plan to assist with development of more accurate facility planning and programming standards.</td></tr>
</table>

The Independent Review Panel on Military Medical Construction Standards Findings and Recommendations	
Finding 4: Graduate medical education (GME) program distribution represents an important facility planning and programming variable, as the maintenance of medical skills requires access to certain quantities and types of cases.	**Recommendation 4.1:** To realign and optimize MHS GME programs, the MHS should conduct an enterprise-wide GME-specific modernization study which addresses the quantity and type of cases needed to maintain health professional skills, including medics and corpsmen, while considering the best locations for the provision of GME given population demand and facility assets.
	Recommendation 4.2: The MHS should review the case mix volume and complexity requirements established by the Accreditation Council for Graduate Medical Education as a component of the planning standards for each service line included in a facility project.
Finding 5: MHS Centers of Excellence, such as the U.S. Institute for Surgical Research Burn Center, the Center for the Intrepid, and the National Intrepid Center of Excellence, are essential for readiness skills training.	**Recommendation 5:** The MHS should: a) Identify all centers of excellence essential to GME and readiness training as a variable in facility investment prioritization and asset utilization standards; and b) Consider a hub and spoke model using individual centers of excellence to help providers maintain their competencies.
Finding 6: The uneven and complex nature of past MILCON funding resulted in significant issues. For example: a) Base Realignment and Closure (BRAC) and MILCON facility funding restrictions and the complex MHS budget structure complicated efficient and effective planning and programming across the facility life cycle; and b) Phased funding hinders medical facility construction, resulting in potential issues with regard to operational resource requirements and project budget, schedule, and facility life-cycle maintenance.	**Recommendation 6.1:** The MHS should work with appropriate stakeholders associated with any future BRAC legislation that results in a more holistic, cost-efficient approach to planning, design, and construction.
	Recommendation 6.2: The MHS should: a) Request authority to use incremental funding from Congress whenever possible, consistent with best practices in the private sector; and b) Comprehensively manage projects, when phased funding is deemed necessary, to coordinate work between project phases to avoid unnecessary costs, schedule delays, and long-term facility life-cycle costs and issues.
Finding 7: DoD has made significant progress delineating and streamlining MILCON planning and programming responsibilities between DHA and the Services by creating DHA shared facility services.	**Recommendation 7:** The MHS should continue its work to streamline MHS MILCON planning and programming responsibilities using benchmark industry practices.
Finding 8: The MHS replaced the proportional assessment system with the Capital Investment Decision Model (CIDM), which continues to require refinement to help yield a high reliability IDS.	**Recommendation 8:** The MHS should continue to refine CIDM to better forecast demand. Specifically, the MHS should: a) Align the planning and prioritization of projects based on an IDS market strategy that supports MHS strategic goals; b) Base programming on forecasted utilization instead of staffing models, as reflected in the recently updated DoD Space Planning Criteria by DHA and the Services; and c) Examine and refine surge-capacity related standards.

The Independent Review Panel on Military Medical Construction Standards Findings and Recommendations	
Charge A: Consistency of Unified Construction Standards with Industry Practices and Benchmarks	
Finding 9: DoD standards are generally consistent with those found in industry. While seeking to embrace new industry-driven evidence-based design solutions, DoD faces the challenge of maintaining standards that respond to the rapidly evolving health care environment.	**Recommendation 9.1:** To respond to the rapidly evolving health care environment, DoD must continue to actively partner with key military and civilian stakeholders organizations and should: a) Continue developing formal partnerships with federal and industry organizations to streamline resources required to create and maintain standards; and b) Continue collaborating with the Department of Veterans Affairs and consider maintaining a single set of standards to reduce duplication of effort.
	Recommendation 9.2: The MHS should evaluate the use and effectiveness of flexibility tools found in the design and construction standards, such as use of interstitial building space and shelled-space to enable cost-effective facility modifications over the life cycle.
	Recommendation 9.3: The MHS should: a) Develop a collaborative process by engaging industry partners to expeditiously refine or create standards in response to major health care practice changes and challenges; and b) Identify and import the benefits of innovation, technology advances, and evidence-based research into DoD design and construction standards.
Finding 10: The MHS has embraced the world-class framework by using innovative evidence-based design (EBD) strategies to support standards development, but has not evaluated the impacts of these standards and design decisions on health care outcomes.	**Recommendation 10:** The MHS should evaluate the impact of innovative EBD solutions on key health care outcomes and financial measures, including affordability across the facility life cycle to refine standards and criteria.
Finding 11: Information management/information technology (IM/IT) provides the backbone for world-class care delivery, enabling the provision of non-facility based health care services. However, there is no indication that new virtual care alternatives have influenced the size of the facilities being built in the MHS. DoD facility and IM/IT standards and policy require greater integration in order to maximize investments.	**Recommendation 11.1:** The MHS should continue the work of the Facilities, Logistics, Information Technology Collaboration Group to integrate facility and IM/IT funding, policies, standards criteria, and outcome measurement, including identifying patient, staff, and resource measures to evaluate operational success.
	Recommendation 11.2: MHS clinicians, along with IM/IT and facility experts, should identify non-facility based care options within the continuum of care and then refine facility standards and criteria accordingly.
Finding 12: The current DoD Information Assurance Certification and Accreditation Process (DIACAP) is an impediment to the full use of medical IM/IT systems and equipment capabilities, thus resulting in workaround processes for newly purchased systems and equipment needed to provide world-class health care services to beneficiaries and a poor return on investment.	**Recommendation 12:** DoD should review and improve current IM/IT security requirements for medical equipment and systems to allow full utilization of these expensive investments.

The Independent Review Panel on Military Medical Construction Standards Findings and Recommendations	
Charge B: Uniform Application of Medical Construction Standards in Ongoing Construction Programs	
Finding 13: The Department of Defense (DoD) employed a variety of new acquisition strategies during the past decade of construction in order to improve project outcomes.	**Recommendation 13:** With key stakeholders, the DHA should evaluate this past decade's project acquisition strategies, including the evidence and analysis underpinning acquisition and project decisions as they impact budget, scope, and schedule outcomes, to refine associated DoD construction standards and criteria as appropriate.
Finding 14: The current MILCON project cycle length is longer than that in the private sector.	**Recommendation 14:** The MHS should streamline and shorten the MILCON project life-cycle processes with key stakeholders.
Finding 15: Frequent reassignment of military personnel over the course of a facility project often results in a loss of understanding of original building design intent, the evidence and thinking that underpinned project decisions, and lessons learned about the application and refinement of medical construction standards.	**Recommendation 15:** DoD should consider the balance, duration, and transition planning of the civilian, military, and contractor personnel assigned to a project to enable leadership continuity, complete decision-supporting documentation, and identify lessons learned and outcomes that can be used to refine standards and criteria.
Finding 16: The Panel identified intended and unintended variability in the application of standards. Understanding the impacts of such variability on health care and project management measures is key to the future refinement of the standards and criteria.	**Recommendation 16:** DoD should analyze standards application variability for planning, programming, design, construction, and commissioning decisions to refine standards and criteria.
Finding 17: The MHS is to be commended for the development of the infrastructure domain of the world-class medical facility definition; however, most MTFs visited by the Panel were unaware of the definition of a world-class medical facility, and the tools were not consistently deployed.	**Recommendation 17:** For the infrastructure domain, DHA should: a) Refine the World-Class Checklist based on validity and reliability testing as a performance enhancement tool; b) Streamline the tool for practical use during project decision-making; c) Develop a process and budget to keep the World-Class Toolkit current; d) Develop and implement a process for capturing the rationale for all design decisions, new research findings, and MHS post occupancy evaluation (POE) findings to explain and justify significant variation from the World-Class Checklist strategies; and e) Disseminate and institutionalize the use of the definition of a world-class medical facility, as well as the World-Class Checklist and Toolkit, across the MHS.
Finding 18: DHA is underway with the creation of a valid and reliable POE framework to assess the impact of design decisions on building systems and health care outcomes.	**Recommendation 18.1:** DHA should commit adequate resources to conduct a standard POE within one to two years after facility occupancy for major capital investments.
	Recommendation 18.2: DHA should use POE results and lessons learned to inform project decision making and refinement of standards and criteria.

<table>
<tr><th colspan="2">The Independent Review Panel on Military Medical Construction Standards
Findings and Recommendations</th></tr>
<tr><td rowspan="2">Finding 19: The MHS lacks enterprise-wide policies and procedures to maximize the use and systemic evaluation of EBD features as a tool to improve health care outcomes.</td><td>Recommendation 19: The MHS should:
a) Create a database that profiles variance in EBD features across newly constructed MTFs;
b) Develop a routine process to collect key EBD-related outcome metrics at the MHS and MTF level as a component of routine quality improvement initiatives; and
c) Evaluate the impact of EBD features on health care outcomes and care delivery processes using nationally defined outcome metrics.</td></tr>
<tr><td>Finding 20: The MHS’s Facility Innovation and Research Model (FIRM) provides a research-based approach for evaluating health care outcomes, which may help inform DoD facility design standards, but there is lack of awareness about FIRM beyond the DHA Facilities Division, with no clear MHS-driven research agenda identified to direct research efforts in the areas of facility design.</td><td>Recommendation 20: The MHS should:
a) Develop a DHA FIRM research agenda that supports continuous evaluation and improvement of DHA design criteria;
b) Require FIRM to actively engage with the MHS Innovation Center so clinical leaders, policy makers, and facility leaders collaborate in the development of a research agenda that is driven by health care delivery requirements and innovation and corresponding facility innovations; and
c) Provide the necessary resources to support MHS facility research.</td></tr>
<tr><td colspan="2">Charges D and E: Adequacy of and Adjustments to the Comprehensive Master Plan</td></tr>
<tr><td rowspan="2">Finding 21: The 2010 CMP was a critical element in assessing and coordinating the complex processes associated with the completion of multiple major construction projects, as well as merging of staff and cultures to create Walter Reed National Military Medical Center (WRNMMC) and Fort Belvoir Community Hospital (FBCH). It has been very successful in achieving these original goals. However, with subsequent changes in care delivery and the MHS governance structure, the CMP now is insufficient to meet its mandate of creating world-class military medical facilities and an integrated system of health care delivery in the NCR. To realize the new MHS enterprise strategic goals, an updated CMP is necessary.</td><td>Recommendation 21.1: The MHS should update the 2010 CMP to reflect:
a) Single authority and budgetary control for all MTFs in the region;
b) Full distribution of graduate medical education (GME) assets between WRNMMC and FBCH, which served as an important planning variable for the new FBCH, in order to provide community-based specialty care in Northern Virginia and further GME medical training experiences; and
c) A plan to achieve full facility and staff asset utilization within the NCR.</td></tr>
<tr><td>Recommendation 21.2: The CMP should be updated to reflect the National Capital Region-Medical Directorate(NCR-MD) eMSM strategic and business plan goals, current facility asset utilization, and future facility requirements, with the goal of developing a new strategic plan to transform the entire NCR-MD into a model IDS and high reliability organization.</td></tr>
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The Independent Review Panel on Military Medical Construction Standards Findings and Recommendations	
Finding 22: Walter Reed National Military Medical Center's Addition/Alteration (MCAA) project requires revalidation and funding to realize world-class facility status.	**Recommendation 22:** DHA should: a) Revalidate the appropriate care capacity, infrastructure, and support functions included in the MCAA project based on recently updated DoD Space Planning Criteria, changing venues of care delivery, plans to recapture care, and GME training requirements that maximize existing facility assets; and b) Following revalidation, proceed in an expeditious manner to complete the creation of a world-class medical center at Walter Reed.

CONCLUSION

The MHS finds itself in promising but challenging times as a consequence of ongoing national health care reform, the establishment of the DHA with its shared facility services, and the shift toward an IDS model with a market-based approach that uses common business planning processes, all of which profoundly affect facility requirements, standards, and criteria. The Panel was impressed with the commitment and dedication of MHS leaders to realize Quadruple Aim goals through collaboration between the DHA and the Services. Several recommendations in this report focus on necessary MHS-wide system enhancements and provide a framework for continuous performance improvement, the results of which should be institutionalized through the refinement of DoD facility standards. Though the Panel has recommended areas for improvement, it also has observed profound changes over the past few years, which will continue to transform the culture and care delivery in the MHS to achieve increasingly world-class care.

This annual progress report represents a snapshot of the Panel's current findings and recommendations, which we realize is incomplete with respect to answering all five of the congressional charges and may be refined based on receipt of additional information to address some of the concerns we have noted. In the time that remains before the Panel concludes its work and submits its Final Report on September 30, 2015, the Panel will continue to refine its recommendations. The Panel also will examine the DHA and Service's structure, processes, and outcomes that shape MHS facility infrastructure programming requirements. Since facility investments represent a costly, capital commitment and are an important tool in MHS's quest to become a high-reliability, world-class health care system, it is critical that form should always follow function.

EXECUTIVE SUMMARY REFERENCES

1. U.S. Department of Health & Human Services. *Report to Congress: National Strategy for Quality Improvement in Health Care.* 2011.
2. U.S. Department of Defense. *Military Health System Review: Final Report to the Secretary of Defense.* August 29, 2014.
3. Kime P. 'We cannot accept average,' surgeons general say. *Military Times.* 2014.

4. 111th Congress 2nd Session. Ike Skelton National Defense Authorization Act for Fiscal Year 2011. Pub. L. No. 111-383. 2011.

1.0 INTRODUCTION

> *"...Every member of the Military Health System must be vigilant in our efforts to properly assess our strengths, intelligently identify our weaknesses, and propose steps forward that uphold the trust and confidence of the people we serve, of our brothers and sisters in service, and of the American people...."*[5]
>
> -Dr. Jonathan Woodson, Assistant Secretary of Defense for Health Affairs

During the past 13 years, the Military Health System (MHS) has undergone significant transformation in response to myriad challenges including:

- Operations involving 2.6 million deployed warriors in two theaters of war;[2]
- The restructuring, repositioning, growth, and downsizing of military operational units;
- The establishment of enterprise-wide MHS business processes;[6] and
- The transformation of the MHS governance structure with the creation of the Defense Health Agency (DHA) and its shared services in Fiscal Year (FY) 2014.[7]

Throughout this dynamic period, the MHS has worked diligently to provide quality health care at a lower cost, all the while maintaining a high state of military medical readiness. The Department of Defense (DoD) is to be commended for these conscientious efforts conducted in the face of a rapidly evolving health care industry driven by health care reform and technological advances. DoD and its leaders continue to emphasize the importance of providing high-quality, affordable health care to its beneficiaries and, accordingly, have recommended ways to realign care in the National Capital Region (NCR), improve overall MHS structure and governance, and create world-class medical facilities.

The MHS provides the full continuum of health care services for 9.6 million beneficiaries, some of whom are deployed to battlefields or austere operational environments around the world, as well as care to all eligible beneficiaries in fixed military treatment facilities (MTFs), in private sector facilities, and tertiary military medical centers in the United States and overseas.[2] In FY 2013, 84.9 percent of eligible beneficiaries utilized the MHS, which includes services provided in the direct care system, as well as contracted purchased care services made available in the civilian marketplace.[2] During an average week in the direct health care system, based on FY 2013 data, there are 834,000 outpatient visits, 61,000 behavioral health visits, 28,000 emergency department visits, 5,000 admissions, and 943 births, and just under one million prescriptions filled.[2] The direct care system employs 86,051 military personnel and 60,389 civilians across 56 hospitals, 361 ambulatory care clinics, and 249 dental clinics.[2] This facility infrastructure, and the standards and policies that shape its life cycle, serves as one of the focus areas in this report.

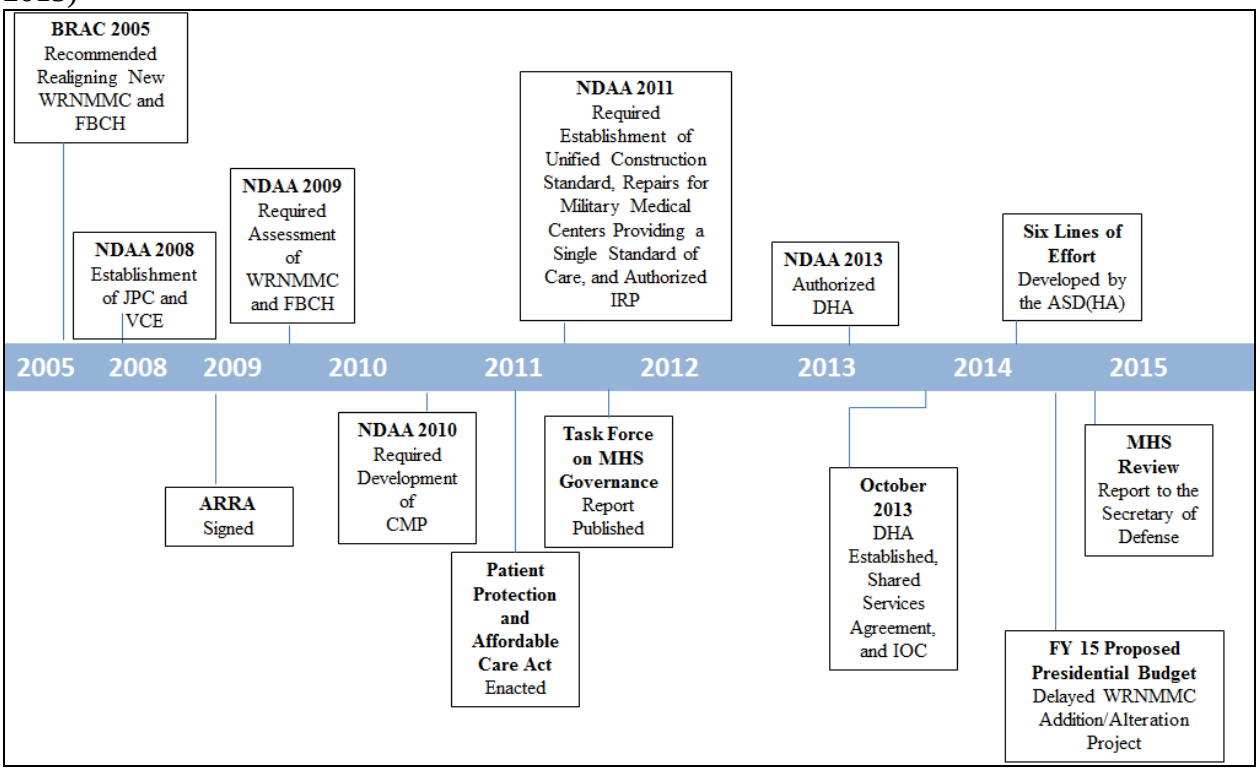
This report consists of several sections, beginning with an overview of key legislation, reports, and policy decisions that have shaped MHS facility investments and services; a description of the charge of the Independent Review Panel on Military Medical Construction Standards (Panel); and a description of policies, standards criteria, and guidelines regarding effective facility life-

cycle management. The Panel then describes its overarching methodology and approach, before describing its findings and recommendations for each of its five charges. The report concludes with the methodology and strategy used for developing the Final Report.

1.1 Military Medical Construction Legislation, Reports, and Studies Related to Facility Standards

A plethora of key legislative actions, as well as relevant reports and studies, have had a transformative effect on DoD's ability to deliver care over the past decade and laid the foundation for the establishment of the Panel (Figure 1).

Figure 1. Legislative Actions, Reports, and Studies Affecting the Military Health System (2005-2015)



These legislative actions, reports, and studies include:

- The 2005 DoD Base Closure and Realignment Commission Report provided findings and recommendations regarding the bases and military installations recommended to be closed and/or realigned by DoD, including realigning Walter Reed Army Medical Center, Washington, DC, with the National Naval Medical Center, Bethesda, Maryland, and relocating all non-tertiary patient care functions to a new community hospital at Fort Belvoir, Virginia.[8]
- The National Defense Authorization Act (NDAA) for FY 2008, Section 722, called for the establishment and maintenance of a Joint Pathology Center that would serve "as the reference center in pathology for the Federal Government," and Section 1632, which

called for the establishment of a vision center of excellence in the prevention, diagnosis, mitigation, treatment, and rehabilitation of military eye injuries.[9]

- The Duncan Hunter NDAA for FY 2009, Section 2721, recommended that beneficiaries living in the NCR deserve to be treated in world-class facilities.[10]
- The American Recovery and Reinvestment Act of 2009 established three primary goals: to create new jobs and save existing ones; to spur economic activity; and to invest in long-term growth and foster levels of accountability and transparency in government spending.[11]
- The NDAA for FY 2010, Section 2714, required a comprehensive master plan be developed and implemented that provides sufficient world-class military medical facilities and an integrated system of health care delivery for the NCR.[12]
- The Ike Skelton NDAA for FY 2011, Section 2852, required establishment of 1) a unified construction standard for military construction and repairs for military medical centers that provides a single standard of care and 2) the Independent Review Panel on Military Medical Construction Standards.[4]
- The Patient Protection and Affordable Care Act of 2010 aims to increase access to health care insurance using a variety of programs and incentives; increase prevention and wellness provisions; and improve health care quality, system performance, and efficiency.[13]
- The 2011 Task Force on Military Health System Governance evaluated the MHS and multi-service health care markets' long-term governance structure.[14]
- The NDAA for FY 2013, Section 731, authorized the Defense Health Agency (DHA), established in October, 2013, to accomplish the MHS Quadruple Aim of increased readiness, better health, better care, and lower costs.[15]
- The proposed FY 2015 Budget delayed the Walter Reed National Military Medical Center Addition/Alteration project until FY 2017.[16]
- The Six Lines of Effort for the Military Health System developed six strategic lines of effort to position the MHS to be stronger and more flexible in providing care.[6]
- The 2014 Military Health System Review: Final Report to the Secretary of Defense provided a comprehensive review of patient access, patient safety, and quality of care across the MHS.[2]

Additional information on these legislative actions, reports, and studies can be found in Appendix E. A glossary of acronyms can be found in Appendix F.

1.2 Charge to the Independent Review Panel on Military Medical Construction Standards

Section 2852 of the FY 2011 Ike Skelton NDAA required the Secretary of Defense to establish a unified construction standard for military construction (MILCON) and repairs for military medical centers that provides a single standard of care and to establish an independent advisory panel for the purposes of:

- Reviewing the unified construction standards' consistency with industry practices and benchmarks for world-class medical construction;
- Reviewing DoD's ongoing construction programs to ensure standards are uniformly applied;

- Assessing DoD's approach to planning and programming facility improvements;
- Assessing whether the Comprehensive Master Plan (CMP) for the NCR , dated April 2010, is adequate to fulfill the requirements from Section 2714 of the NDAA for FY 2010 to ensure that the facilities and organizational structure described in the plan result in world-class military medical centers in the NCR; and
- Making recommendations regarding adjustments to the CMP that are needed to ensure the provision of world-class military medical centers and delivery system in the NCR.[4]

The Panel was constituted on February 6, 2014. As mandated by law requiring its establishment, the Panel must submit an annual report to the Secretary of Defense no later than each February 1 until the Panel terminates.[4] This report, "Form Follows Function: Pursuing a World-Class System for Health," is the Panel's Annual Progress Report.

1.3 Department of Defense Military Medical Construction Policy, Standards Criteria, and Guidelines

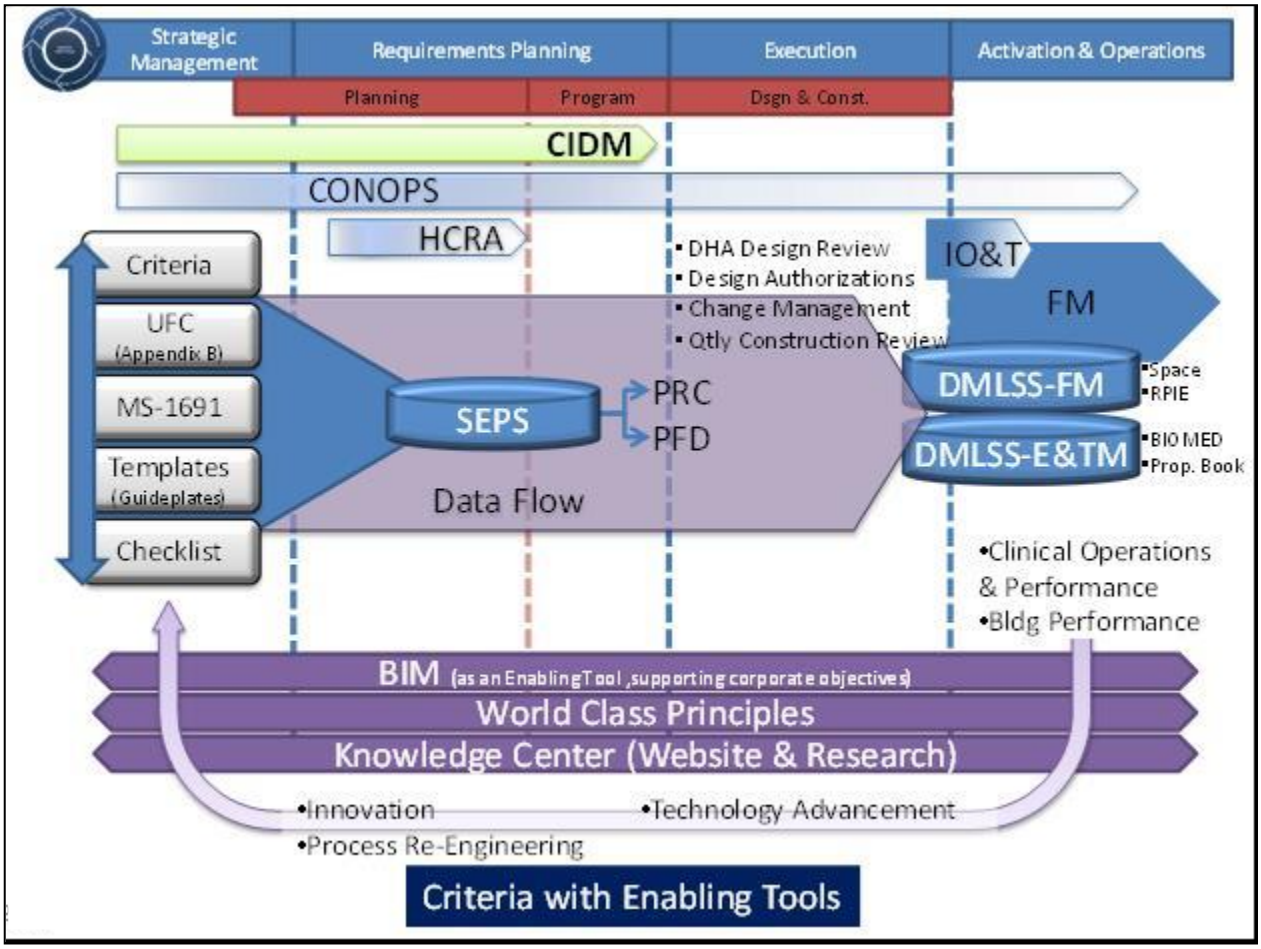
"Design guidelines are intended to provide designers and design decision makers with specific performance oriented tactical guidelines on how to achieve world-class and evidence- based design strategies, meet related objectives, and ultimately achieve MHS Guiding Principles through the design of the built environment." [17]

-MHS Facilities Design Guidelines, Criteria, and Policy

The MHS has defined policies, standards criteria, and guidelines for effective facility life-cycle management in support of the MHS standard of care. These were established by the Office of the Secretary of Defense for Health Affairs Portfolio Planning and Management Division with the goal of "delivering world-class medical facilities that support a care experience that is patient- and family-centered, compassionate, convenient, equitable, safe and always of the highest quality."[18]

Figure 2 portrays the facility life-cycle process used for planning MHS facilities. This cycle shows four major phases: Strategic Management, Requirements Planning, Execution, and Activation and Operations. The process begins when the need for a capital investment is identified and continues through construction, operation, and, ultimately, decommissioning. The cycle repeats when another new requirement surfaces and lessons learned are incorporated.

Figure 2. Defense Health Agency Planning and Programming Process[19]



From Becker, J., 2014.

The process begins with strategic management decisions made by MHS senior leadership early in the planning process to determine if health care operations and the market it serves warrant a facility solution. The DHA uses the Capital Investment Decision Model (CIDM), a step-wise process to prioritize MILCON funding.[20] The left side of Figure 2 shows the five primary standards, criteria, guidelines, and references that provide the framework used to shape all medical MILCON projects.

Specifically, the DoD medical MILCON policy, standards, criteria, and guidelines define policies, standards criteria, and guidelines for effective facility life-cycle management, including:

- DoD Medical Space Planning Criteria for Health Facilities, which identifies authorized space based on specific planning criteria, including current and projected staffing, mission, and workload.[17,21]
- Unified Facilities Criteria, which provide programming, planning, design, and construction policies and procedures throughout the capital investment life cycle.[17,20]
- Military Standard 1691 Master Equipment List, which provides a database of furnishings and equipment.[22]

- Military Health System Templates, which represent the recommended layout of equipment to support the function and flow of a space/room and reflect the net square feet of the space/room from the Space Planning Criteria chapter.[17,23]
- World-Class Toolkit and Checklist, which provide designers and design decision makers with specific performance-oriented tactical guidance on how to achieve world-class and evidence-based design strategies.[24]
- Health Care Requirements Analysis, which forecasts future requirements based on a range of considerations, including the size and demographics of the market population and demand/utilization of health care services by that population within and outside the MHS direct care system.[25,26]
- Capital Investment Decision Model, which prioritizes MILCON projects.[20,17]

The Medical Space Planning Criteria for Health Facilities, Unified Facilities Criteria (UFC) Appendix B, Military Standard-1691 (MILSTD 1691) Master Equipment List, MHS Templates, and the World-Class Checklist provide the strategy and identify required medical functions, room sizes, configurations, and contents.[20] Project requirements are processed through the Space and Equipment Planning System (SEPS) application to create the Project Room Contents (PRC) list and Program for Design (PFD) that can be used to identify more refined project costs. The HCRA process considers key input variables when determining what is required to plan and program a medical facility. The initial/preliminary phase is used to provide a level of detail necessary for enterprise level strategic decisions regarding a given facility and current health care practices in the context of the requested project. The primary difference between the preliminary HCRA and the final HCRA is the level of detail required for each of the four components.[26,25,26]

As depicted in Figure 2, project execution begins after the CIDM process concludes. Design and construction activities occur as the gaining hospital staff begin to refine the Concept of Operations (CONOPS) in preparing for operational changes to maintain safe quality care while maximizing the capabilities of the new building. Initial outfitting and training (IO&T) planning, procurement, and transition activities also begin during execution and continue into the activation and operations stage.[20] This includes turnover of a substantially completed facility; activating building maintenance operations using DoD's Facility Management tool (DMLSS-FM); establishing a new property book and equipment maintenance schedule (DMLSS-E&TM); training the staff based on the refined CONOPS; and moving the health care operations from the existing areas to new facilities. Activation and operations also include establishing access, quality, and safety metrics designed to achieve the intended outcomes identified during the strategic planning process, along with any changes that have occurred in the health care industry. This life-cycle process should result in improved facility capabilities to provide better health care, as well as setting the stage for performance measurement, evaluation, and standards improvement for the next project.

Additional information on DoD medical military construction policy, standards criteria, and guidelines can be found in Appendix G.

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2.0 OVERARCHING METHODOLOGY/APPROACH

The Independent Review Panel on Military Medical Construction Standards (Panel) was charged with providing an annual report to the Secretary of Defense on its findings and recommendations to address any identified deficiencies each February 1 until its termination in September 30, 2015.[4]

The Panel approached each of its five duties, as established in the Fiscal Year 2011 National Defense Authorization Act (see Appendix B for more information on the Panel's charge), using three key frameworks:

- The *world-class medical facility* definition, which was developed as part of the work of the National Capital Region Base Realignment and Closure Health Systems Advisory Subcommittee of the Defense Health Board in May 2009, shaped the Panel's analysis, advice, and recommendations. The definition includes 18 conditions in the following 6 domains that must be met for a medical facility to be considered world-class:
    1. Basic Infrastructure;
    2. Leadership and Culture;
    3. Processes of Care;
    4. Performance;
    5. Knowledge Management; and
    6. Community and Social Responsibility (see Appendix C).
- Seven Guiding Principles, created and adopted by the Panel, established the foundation for its work, reflected the Panel's core beliefs, and provided a lens through which the Panel established goals and developed recommendations (see Appendix D).
- The components of the MHS Quadruple Aim, increased readiness, better care, better health, and lower cost, guided the Panel's inquiry (see Figure 15).

The Panel also established Terms of Reference, which can be found in Appendix H, to guide its work. The Panel has convened on multiple occasions in person and via teleconference and webcast. It has received briefings from subject matter experts in facility design, construction, and repair standards; engaged in discussions with Defense Health Agency and Department of Defense leaders, national leaders of health care organizations and groups; toured multiple military treatment facilities (MTFs); and reviewed relevant reports and presentation files. A complete list of meetings, presentations, and MTFs visited is included in Appendix I.

The Annual Progress Report is organized in such a way as to address each of the five charges in the context of a typical facility project life cycle, which starts with planning and programming activities, followed by design, construction, and activation/operation-related activities. As such, the report has been intentionally organized so that Charge C, Approach to Planning and Programming Facility Improvements, will be introduced first in Section 3.0, followed by Charge A, Consistency of Unified Construction Standards with Industry Practices and Benchmarks, which is next in the life cycle, in Section 4.0. Charge B, Uniform Application of Medical Construction Standards in Ongoing Construction Programs, and Charges D/E, Adequacy of and

Adjustments to the Comprehensive Master Plan, complete the report in Section 5.0 and Section 6.0, respectively.

The Panel submitted its Initial Report to the Secretary of Defense on June 5, 2014, and held a meeting on January 14, 2015, to publically deliberate its Annual Progress Report. The Initial Report can be found at the following link: https://database.faca.gov/committee/historyreportdocuments.aspx?flr=15308&cid=2450&fy=2014.

Guiding Principles and Definition of a World-Class Medical Facility

The Panel believed that it was especially important to establish Guiding Principles that laid the foundation for and shape its work. The Panel's core beliefs and principles provide the lens through which the Panel conducted its inquiry, document its findings, develop its recommendations, and write its reports. A full version of the Guiding Principles document can be found in Appendix D.

These principles require that the Panel's advice and recommendations, when taken as a whole, indicate:

1. World class is not viewed as an end point, but rather as a pursuit of multidimensional processes that constantly evolve over time.
2. Clinical care requires a systems-wide approach across the continuum of care for which excellence is measured using meaningful outcomes.
3. Military Health System (MHS) strategic goals, including integration, virtualization, population health prevention, and personalization, will shape facility investments.
4. Striking a balance between innovation and affordability is required to optimize health care services and infrastructure investments.
5. The development and approval of facility, information management, and technology investments must be integrated using an evidence-based design framework in order to maximize the return on investment, as measured through the achievement of MHS strategic outcomes.
6. Best health care practices found in the federal, private, and international sectors will be shared.
7. The enterprise-wide improvements accomplished by the MHS over the past decade will be properly acknowledged.

Panel members also adopted the following definition for a world-class medical facility to guide their work:

> A *world-class medical facility* is one where the best of the art and science of medicine come together in a focused effort to meet the needs of the patient by providing the best in physical, mental, social, and spiritual care. A *world-class medical facility* routinely performs at the theoretical limit of what is possible and consistently and predictably delivers superior healthcare value – i.e., high quality care and optimal treatment outcomes at a reasonable cost to the patient and society.[27 (P.B-1)]

See Appendix C for the full definition of a world-class medical facility.

SECTION REFERENCES

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3.0 CHARGE C. DEPARTMENT OF DEFENSE APPROACH TO PLANNING AND PROGRAMMING FACILITY IMPROVEMENTS

> *"(C) Assessing the approach of the Department of Defense … to planning and programming facility improvements with specific emphasis on – (i) Facility selection criteria and proportional assessment system; and (ii) Facility programming responsibilities between the Assistant Secretary of Defense for Health Affairs and the Secretaries of the military departments [sic]."*[4]
>
> -Ike Skelton NDAA for FY 2011, Section 2852

INTRODUCTION

Many forces shape facility investment requirements related to the creation, expansion, modification, or closure of military treatment facilities (MTFs) in the Department of Defense (DoD). During the past decade-plus, significant changes in troop strength, the repositioning of military units around the world, and combat casualty care and rehabilitation requirements shaped the planning and programming for many new hospitals and clinics, which were designed to enable changes in care delivery models. The nation also began an era of health care reform,[13] adding more complexity to the challenge of forecasting demand for health care services and capacity in both the commercial and military sectors.

The Independent Review Panel on Military Medical Construction Standards (Panel) observed that the challenge of matching capacity to demand is exacerbated in military health care, in which base-closings, troop surges and reductions, and strategies around purchased care combine to create a level of volatility in the demand forecast that is unlike the commercial sector. In the commercial sector, based on Panel experience, gradual shifts in population or physician preference, merger and acquisition activity, and poor business performance are often linked to an array of competitive forces, including investment and disinvestment. The Panel believes these market signals are rarely experienced in the MHS, the risk of not having enough capacity is perceived to be higher than the risk of having excess capacity in the MHS, and this phenomenon is reversed in the private sector.

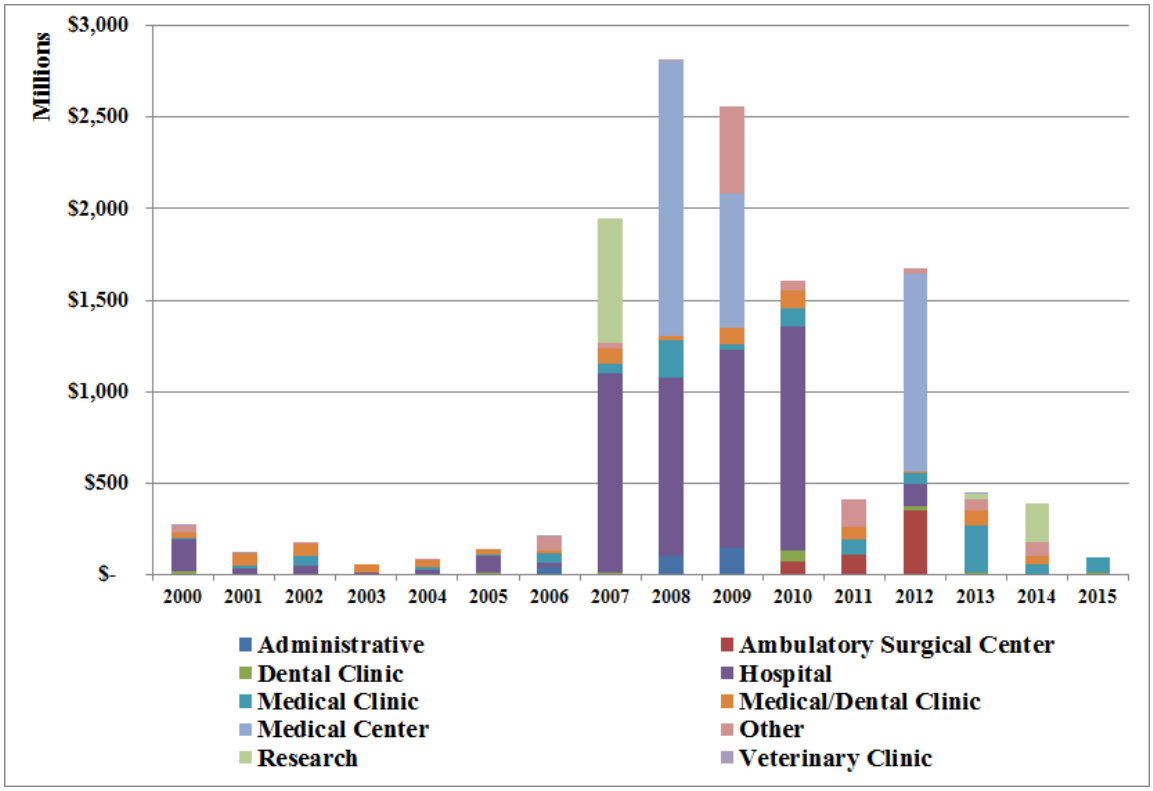
In the private sector, "capital allocation is a strategic, organizational process used to make capital investment decisions."[28] Through the capital allocation process, an organization deploys its available capital in a few ways: for investment in future growth, re-investment in the organization, or, in a private organization, as cash reserves on its balance sheet. Sound corporate finance-based capital allocation approaches used by private health care delivery systems are instructive for the development and sustainment of world-class military health systems. That is because the "purpose of true, corporate finance-based capital allocation is to ensure the continued financial strength and mission effectiveness of the organization through a process that enhances organization-wide decision making."[28] A capital allocation process based on best practices supports the organization's strategic goals by:

- Linking financial planning and capital planning to the organization's strategic plan;

- Providing a process that is rigorous and highly-organized;
- Providing a financial context for allocation decisions that also incorporates the strategic, mission and operational aspects of alternative investment decisions; and
- Ensuring rational comparisons among projects and strategic initiatives emerging throughout the entire organization.[28]

Congress has always played a critical role in the routine review, authorization, and appropriation of medical military construction (MILCON) programs. Between 2005 and 2012, Congress responded to DoD's requirements with authorization and appropriation for a large investment in medical MILCON projects. Between these years, Congress appropriated $11.4 billion for 27 new or addition/alteration hospitals, 4 ambulatory surgery centers, 43 medical clinics, 12 dental clinics, and 32 other health care-related facilities, such as veterinary clinics, research facilities, and supporting administration buildings, as depicted in Figure 3.[29] In addition, annual DoD appropriations provide the necessary operations and maintenance funding, which supports sustainment, restoration, and modernization projects (see Appendix J for a full project list).[29]

Figure 3. Medical Military Construction Funding by Facility Type and Year (In Millions)[29]



Adapted from Defense Health Agency (DHA) Facilities Division, 2014.
*The chart reflects aggregated amounts in the year of authorization.

METHODOLOGY

In this section, the Panel addressed each part of the congressional Charge C question by examining the enterprise-wide strategy for facility planning and programming, as well as the

facility funding and budget structures, and facility selection criteria through briefings, site visits, and review of DoD policies.

3.1 Enterprise Strategy

Care Design in an Integrated Delivery System

> *"We must not only focus on creating world-class facilities, but also on how the Military Health System's choices and strategic direction enable success and empower individuals to work toward the shared vision of a world-class system of care."* [30]
>
> -Lt Gen Thomas Travis, Air Force Surgeon General

All successful facility planning and programming begins with an enterprise-wide, strategic vision of a preferred future, supported by detailed goals and objectives that describe the functions that facility investments enable so that "form ever follows function."[31] The MHS is evolving as a newly formed integrated delivery system (IDS), an "organized, coordinated, and collaborative network that links various health care providers to provide a coordinated, vertical continuum of services to a particular patient population or community. It is also accountable, both clinically and fiscally, for the clinical outcomes and health status of the population or community served, and has systems in place to manage and improve them."[32] The approach to health care is changing in the sense that function is and has been redefined, whereas the traditional approach has been to focus on form/built environment. Accordingly, to be world class, the orientation of thinking/planning needs to be reset to one of optimum IDS function for the MHS, one that includes all types of facilities (inpatient, outpatient, physician offices, core functions, and support services) that are utilized together, creating a system of care.

The Panel has been charged to compare the MHS to health systems that are world class. Based on Panel experience, these world-class health systems normally employ forecasting, care design, modeling, innovation, clinical and business planning, and cost analysis to arrive at their solutions. Once a view of the market and strategy is developed and is determined to be affordable for the health system, facility professionals are engaged to create physical options to meet the need within established financial and planning constraints. Organizations that might be considered world class, such as those in the top tier of *U.S. News and World Reports* ratings, nearly always work to incorporate the latest evidence-based design (EBD),[33-35] in addition to reflecting the characteristics of an IDS.[36]

Similar to private sector organizations, the Defense Health Agency (DHA) planning and programming process begins with strategic management (see Section 1.3 and Figure 2). It appears that, in the past, exacting facility planning requirements often drove local and regional strategic planning activities, such as clinical and administrative process reengineering and organizational culture transformation, without consideration for the MHS' strategic requirements.[37] Fort Belvoir Community Hospital's (FBCH's) laudatory Culture of Excellence program was created using successful culture models from Baptist Health Care System and Disney, in response to the new hospital project and newly created National Capital Region (NCR) integrated health care delivery system.[38] However, it appears that this program exists only at the FBCH and has not been adopted by all MTFs in the NCR or across the MHS as a

whole. Ideally, programs such as this should be developed, evaluated, and adopted in advance of project planning and programming work in order to make the best use of facility design opportunities and maximize facility project investments.

Based on what the Panel has seen to date, the MHS does not appear to have a standard business model for health care delivery, a characteristic of an IDS that reduces variance. For example, not all planned projects considered all of the military health care assets for the local market. The Panel observed that, even when that approach was used in the planning of inpatient services for the NCR, subsequent leaders may not have used the facilities as planned and programmed (see Section 6.1 and 6.3). The establishment of the DHA "to assume responsibility for shared services, functions and activities of the MHS and other common clinical and business processes"[2] represents an important first step in correcting this deficit.

Demand Signal and Business Process Engineering

The demand signal to justify any new or renovated MTF is shaped by the MHS Quadruple Aim's priorities and expressed as regional strategies to meet the MHS strategic objectives of increased readiness, better care, better health, and lower cost.[39] The Panel believes the four goals of the Quadruple Aim are interconnected and interdependent. For example, it is unlikely that better care and lower cost will be created in a low-volume environment. The success of each aim is dependent on carefully planned and aligned resource investments of trained staff, operational funding, and infrastructure investments, such as facilities, in order to support specific population health requirements. Services that operate within this context appear to have a higher likelihood of achieving the desired outcome.

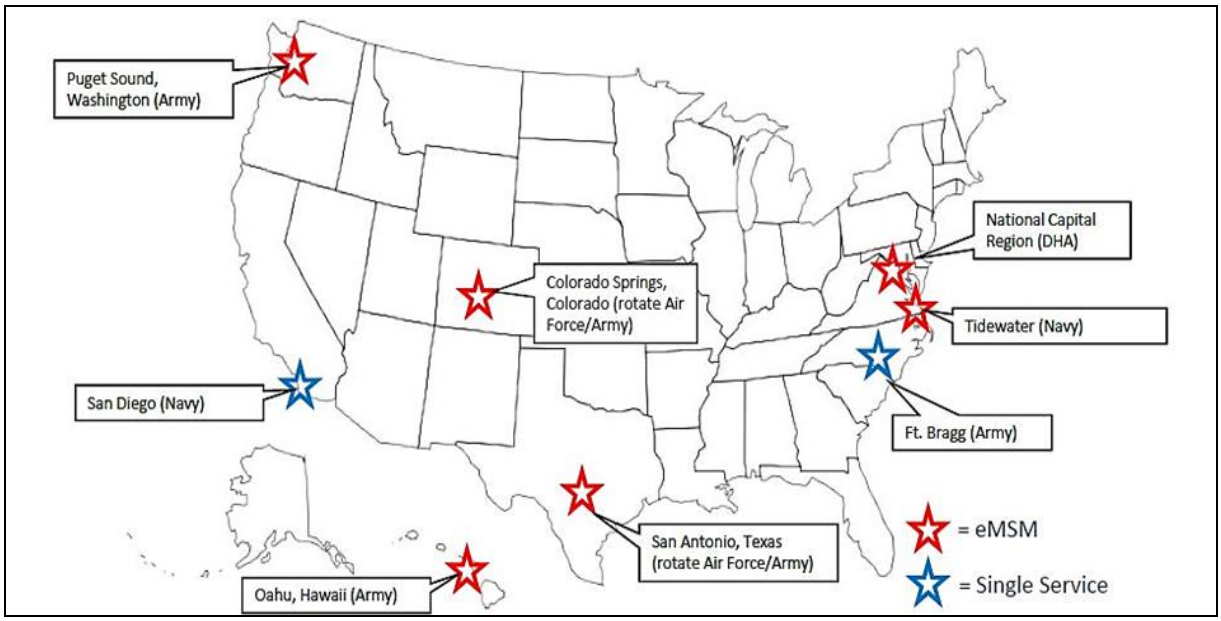
The Panel viewed the recent consolidation of facilities programming responsibilities under the DHA organizational structure as an important positive step towards ensuring prioritized investments based on a clearly understood demand signal as a critical first step in the design and construction of safe, efficient, flexible, adaptable, and world-class medical facilities. However, implementing a planning and portfolio management process that is based on improved asset utilization standards should be considered. The savings created through effective portfolio management greatly outweighs other forms of capital intervention, which was furthered through the establishment of a health market approach with the formation and implementation of the enhanced Multi-Service Markets (eMSMs) in FY 2014.

MILITARY HEALTH SYSTEM GOVERNANCE CHANGES

Enhanced Multi-Service Markets

The DHA has taken the first step to create an IDS through the implementation of eMSMs. The term Multi-Service Market (MSM) refers to a health care market that is serviced by multiple Services and their subordinate MTFs. Enhanced refers to enhanced authorities granted to the military officer assigned to the role of Market Manager. These authorities include developing a five-year business plan for the market; authority to direct short-term reassignment of personnel regardless of service; allocation of the Defense Health Program budget for the market; and management of MSM-specific shared services and related functions.[7] There are six eMSMs, five of which are led by a single-Service and one managed by the DHA (the NCR), and two single-Service markets in San Diego, CA, and at Fort Bragg, NC (see Figure 4). However, Service leadership rotates every few years in each eMSM, and leadership has to rely on collaboration between DHA and among the Services.[7] The Panel learned in a briefing that, eMSM leadership will have enhanced authority including responsibility for eMSM budgets,[40] although ultimate budgetary control still remains with the MTF's parent Service Surgeon General.

Figure 4. eMSM and Single Service Market Geographic Distribution[41]



From Robb, D., 2014.

Currently, the principal facilities that are included in the eMSM structure are hospitals and major campuses. However, ambulatory facilities, which frequently are the entryway to a health system, operate under the control of their sponsoring Service.[42-47] This results in a natural organizational barrier to being a world-class IDS. Though the Panel encountered multiple examples of voluntary collaboration between Services and the eMSM leadership, the MHS in these markets does not mirror what is found in a successful private-sector IDS, where the full continuum of care is led by a single organization focused on serving the local population at the most appropriate site of care.[32] eMSMs lack a single command and control structure with single

budgetary authority for all MTFs in their region, which complicates facility investment requirements and life-cycle management. Given that the eMSM structure and the DHA are so new, this may be an interim phase in its development. Another key difference between eMSMs and private or commercial IDSs is that shared administrative service structures appear to be somewhat underdeveloped, which could enable consolidation and reduce programming requirements. There is normally a tiered local regional strategy designed to achieve the most efficient support in facilities, laboratory, supply chain, dietary, finance, and other support services. Currently, each Service MTF manages most of its own support services. However, some of these support services, such as patient appointment and referral management could be consolidated as an eMSM function, such as was the case at the San Antonio Military Health System.

Therefore, there is a key structural limitation for eMSMs because the personnel structure, responsibilities, scope of command and control, and budgetary authority all vary from one location to another, and shared services are new and continuing to develop. A single command, control, and budgetary authority could drive the facility requirements and planning processes by establishing a program for integrated facility life-cycle budget requirements with IDS fiscal accountability to inform facility investments. As affordability becomes a greater issue for the MHS, it is likely that this structure will need to quickly evolve.

To help address these issues, DHA Facilities Division staff are conducting initial visits to eMSM sites to introduce DHA facility capabilities and their role in facility planning and socialize the shared service concept (see Appendix K for a list of MTFs in each eMSM). These introductory visits revealed that eMSM staff do not include facility subject-matter-experts.[48] The stage has now been set for FY 2015 facility planning assessment visits, which will use approved FY 15-19 eMSM business plan requirements.

National Capital Region Medical Directorate

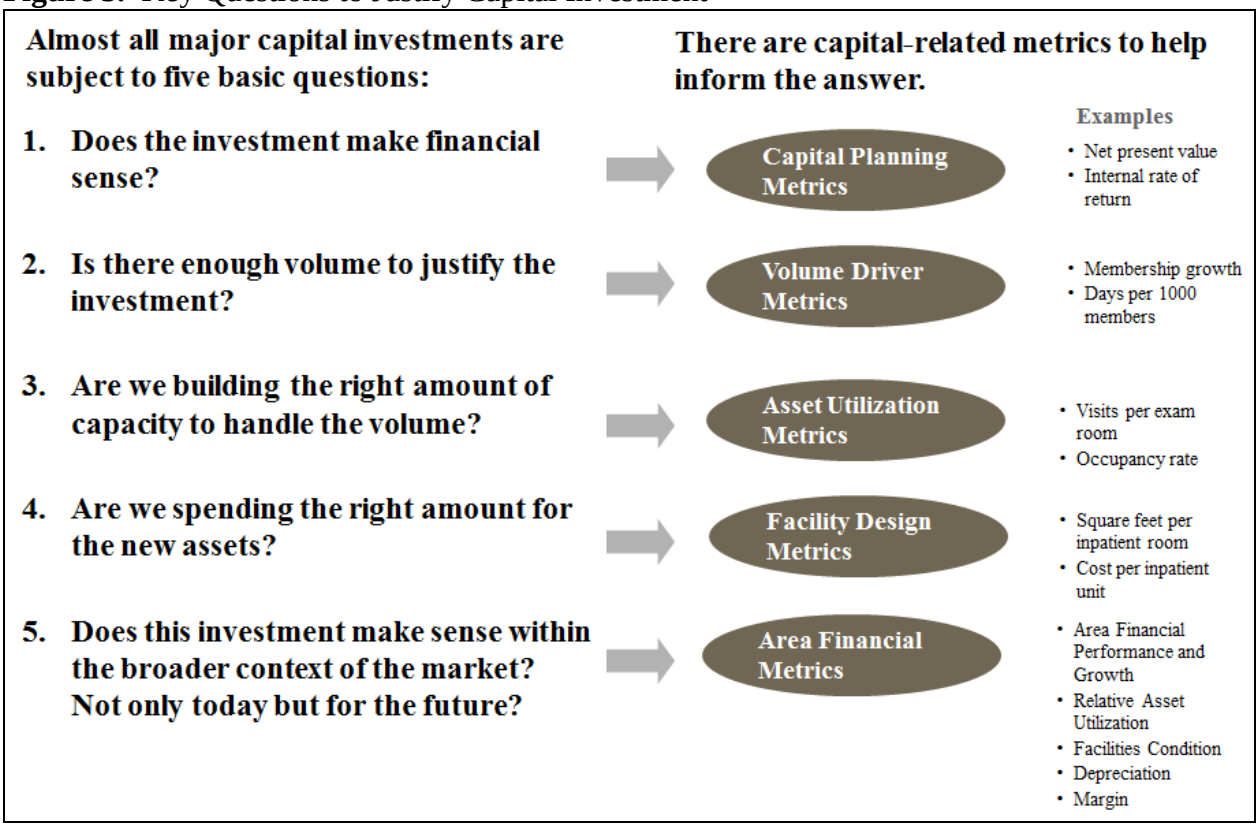
The newly formed DHA has authority, direction, and control for the National Capital Region-Medical Directorate (NCR-MD).[7] The NCR-MD includes the management of the two inpatient medical facilities, Walter Reed National Military Medical Center (WRNMMC) and FBCH, and only some of the primary care and ambulatory care facilities found in the 40-mile geographic region that surrounds the Nation's capital (see Appendix K for the list of the facilities in the NCR-MD).[42] However, unlike true IDS organizations, NCR-MD lacks the authority, control, and single budgetary authority for all of the MTFs found in its region (see Section 6.1 for more discussion about the impacts on facility comprehensive master planning activities for the NCR).

Military Treatment Facility Capacity and Asset Utilization

Based on information provided by the leadership at each of the MTFs visited by the Panel and data provided in the eMSM's business performance plans, none appeared to be operating at full capacity.[43,45,46] Recognizing the challenges associated with optimizing capacity, the creation of appropriately sized buildings prevents high costs associated with an oversized facility's life cycle. Capacity for the new facility projects built over the past decade was determined using the Health Care Requirements Analysis (HCRA) (see Section 1.3 and Appendix G). HCRA includes four main components to determine capacity requirements: projected population demographics demand and alternative sources of care, workload history, staffing analysis and finally, space

requirements.[25,26] Once a new facility is open, many variables can impact its full utilization, such as an increased surge in care demand, similar to the surges experienced during the recent wars; a decrease in demand because troop units have been moved or reduced; staffing assignment and availability; and the services available and the amount of care provided in the purchased care network.

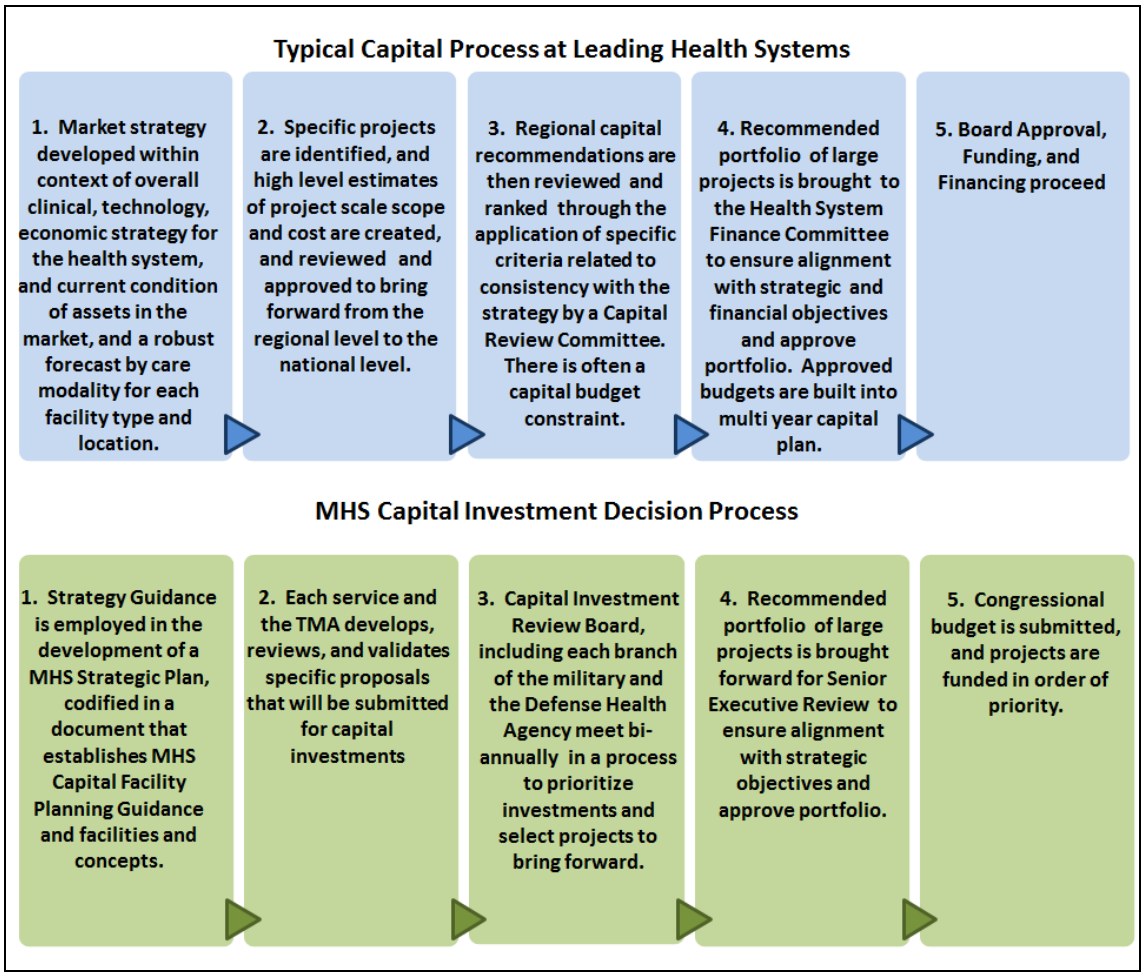
Figure 5. Key Questions to Justify Capital Investment[49]



From Malcolm, C.

In world-class IDSs, there are several key questions that are addressed to justify a capital investment, as shown in Figure 5. Ideally, the MHS should address all five of these questions and monitor the outcomes associated with each using capital-specific metrics. The Panel compared the Capital Investment Decision Model (CIDM) phased-approval process, as displayed in Figure 16, with a typical capital planning process in leading health systems, summarized in Figure 6. It is evident that large projects, both in the MHS and leading private sector health systems, follow a parallel process. The Panel considered why the MHS appears to have lower asset utilization when compared with leading, private health systems, by first examining the four HCRA components.

Figure 6. Comparison of Leading Health System and Military Health System Capital Investment Decision Model [50,51]



Adapted from Malcolm, C. 2014 and Boenecke, C., 2014.

A World-Class High-Reliability Integrated Delivery System

> *"We are aggressively moving from a healthcare system – a system that primarily focused on injuries and illness – to a System for Health that now incorporates and balances health prevention and wellness as part of the primary focus for readiness."* [52]
>
> -Lt. Gen. Patricia Horoho, U.S. Army Surgeon General

The MHS has recognized the need to migrate from Service-centric management of health care to that of an IDS model. The Office of Strategy Management presentation to the Institutional Review Board highlighted five "True North Measures" for the MHS related to Improved Readiness, Better Health, Better Care, Lower Cost, and Engaged Workforce, and a logic model for health and medical readiness that showed how the elements of the MHS would work together to better achieve these goals (see Appendix L for the True North Measures and logic model).[37]

Entirely consistent with the best thinking in the commercial health sector and aligned with Panel experience, the Office of the Secretary of Defense for Health Affairs Office of Strategy Management believes the future of health facilities requirements will be based on:

- Disrupting the hospital model, through solution shops specializing in diagnoses and value adding process clinics creating focus and precision in treatment;
- Moving from health care to health by shifting the point of intervention;
- Emphasizing patient and family involvement, including designing for an expanded care team; and
- Using condition-based care and a patient-centric model.[37]

While this vision is highly consistent with the private sector, one key difference is the relative lack of emphasis on the use of technology to transform care (see Section 4.4 for a discussion about technology and facility infrastructure integration and the subsection below, Military Treatment Facility Capacity and Asset Utilization, that further contrasts DoD with the private sector).

In 2009, the Defense Health Board defined a world-class facility as "one where the best of the art and science of medicine come together in a focused effort to meet the needs of the patient by providing the best in physical, mental, social and spiritual care" which is characterized by six domains and eighteen elements (see Appendix C for the complete list of domains and conditions).[27] Individual health care facilities, rather than an IDS, were the focus for this world-class facility definition. However, because of financial incentives driven by health care reform[13], IDS approaches to care delivery should reflect the current best practices found in the private sector. As a result, the MHS's decision to move to an IDS necessitates a review of the foundational tenets of a world-class facility to expand the definition to include a description of a high reliability IDS that reflects direct and purchased care services, its core services, resource requirements, concepts of operation, and expected health care outcomes to drive facility planning and programming requirements. This work would benefit from development by clinical leaders with the involvement of facility design professionals.

Achieving a world-class IDS status will require the type of systems, culture, processes, and infrastructure investments that have been successfully demonstrated by leading private sector health care systems in the United States to achieve desirable cost, access, quality, and patient safety outcomes, many of which were recently reviewed in the Military Health System Review: Final Report to the Secretary of Defense.[2] The report stated, "the MHS provides good quality care that is safe and timely, and is comparable to that found in the civilian sector. However, the MHS demonstrates wide performance variability with some areas better than civilian counterparts and other areas below national benchmarks."[2] In addition, six external reviewers recommended opportunities to improve health care delivery and an optimal health care environment by using effective strategies proven by high-performing organizations.[2] System enhancements should foster a decrease in performance variance at the individual facility level by creating a high reliability health system (see Section 4.3 for a discussion about high reliability in health care and facility design). A number of the report's recommended action plans to create a high reliability MHS are tied to variables which affect facility planning and programming decisions. Of note, a number of the EBD features that were included in recently built facilities

have been shown to improve some of the targeted outcomes identified for improvement in the report (see Section 5.4, Table 4 for a list of the EBD features and outcomes).[2]

The Panel believes that a world-class facility is only one component of a true IDS, which should include all health care facilities needed to support the continuum of care for a geographic region in order to deliver world-class care. When the Panel evaluated the MHS against comparable private health care systems, several opportunities for improvement emerged, including reengineering care delivery processes, shifting care delivery to other locations, shifting care to lower cost settings (see Section 4.4), balancing workload more appropriately across the region, and combining clinical support functions, such as the pharmacy and other support services. For example, a new facility's square footage may be reduced if every Service's MTF real estate in a catchment area is considered based on population requirements. In these cases, staff should be deployed to create health care facilities with the appropriate population-based services, near where the population resides. In an IDS, administrative, non-patient functions are often merged to gain efficiencies, and, as a result, alter the concept of operations that shape programming and design standards.[53]

Non-facility, technology-enabled based care options play a role in determining the continuum of care requirements (see Section 4.4). For example, use of two recent non-facility access solutions, the Nurse Advice Line and Secure Messaging System, have the potential to reduce patient demand for care at a facility because patient needs are managed in a virtual fashion. There was no mention in the *Military Health System Review: Final Report to the Secretary of Defense* about the use of telehealth applications as another tool that requires less facility space to improve patient access to care; a tool that was developed by the military and has been used in a variable fashion for the past fifteen years.[2] It is the Panel's opinion that a world-class, high-reliability integrated delivery system requires a clearly envisioned and articulated continuum of health care delivery options, as an important step in determining facility capacity and ultimately, asset utilization.

Population Demand and Workload

Determining the services and the capacity for each project begins with an analysis of population demand and historic workload to forecast requirements. However, as we noted in the introduction of this section, population analysis estimates used in planning may be undone because major force structure changes sometimes occur after a project is underway or completely finished.

Projected workload based on a population demand analysis and historic workload represents the second step in the HCRA analysis.[25,26] For some of the MTFs that the Panel visited, it was clear that surges associated with wartime casualty care displaced some of the direct care used to plan and program the new facilities into the purchased care market. The Panel believes that this shift in workload, from the direct care system to the purchased care market, has contributed to the underutilization of new facility assets. Now that wartime care demand has waned, the MHS has MTFs that have excess facility capacity, which should enable the recapture of workload from the network. The December 2007 Final Report of the Task Force on the Future of Military Health Care, Recommendation 1, stated that "DoD should develop a planning and management strategy that integrates the direct health care system with the purchased care system and promotes such

integration at the level where care is provided."[54] Under the DHA concept of shared clinical and business processes, some of which are expressed in eMSM five-year business plans, MHS leaders have begun the work to recapture beneficiary care from the civilian market.

FY 2014 first quarter performance data for the six eMSMs, as well as the Fort Bragg and San Diego markets, demonstrates the continued systemic underutilized capacity. Although, recapturing care from the purchased care network is the top priority for all eMSMs, as reflected in their FY15-19 eMSM Business Performance Plans,[42-47] the Panel believes that barriers still exist with the current structure of the private sector contracts. The Panel perceives an apparent lack of aligned strategy, systems, financial incentives, communication, and processes between the direct care system and the current TRICARE contractors, which appears to contribute to the underutilization of direct care services, fragmentation in the delivery of services, and inefficiency in paying for services. Facility planning and programming standards should be examined and refined to reflect current thinking about the planned recapture of purchased care, in alignment with eMSM business plans.

In addition, in discussion with eMSM MTF leaders, Panel members understood that the eMSM realizes no specific financial benefit by recapturing purchased care. The realized recapture savings (market cost-avoidance) are not accrued to the MTF that provides the services, which further diminishes incentives to recapture care. This contrasts sharply with civilian integrated delivery systems, which actively manage the entire care system, both contracted and directly provided, in a harmonious way within an overall strategy for the market. Some eMSMs, such as the NCR, are developing strategies to redistribute workload within the direct care system to support patients closer to where they live for both primary and community-based specialty care, as well as increase graduate medical education (GME) opportunities for the many residents, fellows, and other health care professionals in training.[42] In San Antonio, the Panel learned about an integrated centralized referral system that has allowed the San Antonio Military Health System to recapture workload by assigning the patient to one of several facilities based on availability and location. The Panel believes that accountability measures and incentives require development to help realize business plan goals.

Surge capacity planning and programming represents another important variable, which appears to be described in the DoD Space Planning Criteria for medical mobilization requirements. Panel members were unclear if these requirements reflect the lessons-learned about surge demand consequent to the casualties treated over the past decade. In addition, the Panel was impressed with the Department's innovative mass casualty contingency design to meet surge demand in the Rhine Ordnance Barracks Medical Center Replacement project.[55] The MHS may benefit from examining and refining surge-capacity related standards based on recent surge demand experience.

Another variable in the workload analysis is the relationship between the volume of care delivered and quality outcomes, a correlational relationship demonstrated in the field of health care quality and safety. Robust and safe programs must have adequate clinical throughput to justify staffing, clinical management, and desired clinical outcomes.[56] Anecdotally, the Panel spoke with a number of care providers who described the need to supplement their work outside of the direct care system in order to maintain clinical proficiency. The DHA, together with the

Services, would benefit from analyzing low-volume service lines and adjusting facility planning and programming criteria accordingly.

STAFFING

Projected staffing requirements and manpower distribution play an important role in the planning and programming of facilities. During discussions with senior leaders, the Panel learned that each of the Services has different staff requirements and distribution planning models, especially for providers, whose presence drives product lines that are included in a facility project.[57] Differences in staffing methodology between the Services and the overall availability of certain providers and support personnel may lead to different programming decisions by the Services and make standardization across the MHS more difficult to achieve.

The Panel learned that the Medical Deputy Action Group has asked the Services to comment on creating a medical tri-Service human capital distribution plan. The Panel observed that, even when a partial IDS approach was used in the planning and programming of clinical services for the NCR, specialty provider staff were not assigned to FBCH from WRNMMC, resulting in under-utilization of the new hospital, an issue presently being addressed by the NCR- MD (see Sections 6.1 and 6.3 for more information).[42] Appropriate allocation of staffing based on workload is important so providers are able to maintain their skills, facility capacity is used, and most importantly, the MTF team is able to maintain the health status and clinical outcomes of the population it serves. A medical tri-Service human capital distribution plan would assist with the development of more accurate facility planning and programming standards.

GRADUATE MEDICAL EDUCATION

> *"Let's have a health care culture that embraces safety practices and removes for good any chance of preventable harm. . . Let's abolish unsafe practices -- no more incorrect medications, no more wrong-site surgeries, no more infections and communication issues with our patients, just to name a few."*[58]
>
> -Lt. Gen. Patricia D. Horoho (Remarks made at the annual Association of the United States Army meeting)

The staffing associated with MHS graduate medical education programs represents an important sub-set of staffing requirements. During the past decade of wars, care moved from the direct care system to the purchased care market. This was especially true in the largest eMSMs that had medical centers, such as the NCR, where much of the wartime related specialty care was provided and in which there was both an increased demand in the direct care system and a corresponding loss of market share to network providers.[59] Retirees and their family members were particularly affected in these locations, which is now problematic for GME training requirements dependent on the case-mix complexity found with older patients, especially given that there are fewer war-related casualties, essential to support GME training. The Military Compensation and Retirement Modernization Commission stated in their just published report, "The military medical force requires access to the desired volume and mix of complex medical cases and trauma to maintain medical force readiness."[60] Each GME training program has

requirements for a volume and variety of encounters that residents experience during their training.[61,62] Comments received during briefings that the Panel received during their visits to MTFs suggested there may be an insufficient diversity of challenging clinical cases to adequately support GME programs and maintain clinical wartime readiness skills for the health care team.

Another essential component of medical readiness is the continuous maintenance of wartime-related clinical skills through the daily practice of comprehensive and challenging medical care for all military medical professionals, including corpsmen and medics, in busy medical centers. The Panel believes staffing, workload, and GME appear to be best supported by maximizing the volume of care at the largest medical centers and community hospitals on bases with large active duty populations. The MHS may find value in conducting an enterprise-wide GME specific modernization study, which addresses the quantity and type of case needed to maintain health professional skills, including medics and corpsmen, while considering the best locations for the provision of GME given population demand and facility assets. The case mix volume and complexity requirements established by the Accreditation Council for Graduate Medical Education could be included as a component of the planning standards for each service line included in a facility project.

There are some centers of excellence in the MHS, such as San Antonio Military Medical Center's (SAMMC's) world-class U.S. Institute for Surgical Research Burn Center, which receives military patients from around the world along with civilian patients. SAMMC also has DoD's only Level 1 Trauma Center[63] supported by the military's busiest Emergency Department seeing a large volume of high acuity diseases. The utilization of this critical readiness asset was achieved because the U.S. Army committed to being one of two trauma centers supporting the entire population (including the non-military civilian populations) of the greater San Antonio metro area.[63] Additional examples of excellence include the National Intrepid Center of Excellence (NICoE) at WRNMMC for traumatic brain injuries and psychological health conditions and the Center for the Intrepid for amputees. The Panel believes that these are true national treasures that are essential for readiness skills training and caring for wartime casualties. The MHS may benefit from identifying all centers of excellence essential to GME and readiness training as a variable in facility investment prioritization and assets utilization standards.

Private sector systems are increasingly using some form of a hub-and-spoke model to establish centers of excellence with enough patient volume and expert staff necessary to achieve the best outcomes.[64,65] Within the MHS, these centers need to maintain sufficient civilian and military patient workload to maintain readiness clinical skills. Accordingly, DoD should consider pursuing a hub and spoke model with individual centers of excellence to which patients are transported for care, to help providers maintain their competencies, excel at their craft, and maintain essential medical readiness skills. In the Panel's opinion, there appears to be a few high capacity MTFs in large catchment areas that can be properly resourced to support GME and maintain staff skills, but this requires shifting assets where there are other alternatives for beneficiary care in the market place. The Panel observed underused operating rooms, inpatient beds, clinic exam rooms, and specialty care capacity at mid-sized MTFs, such as Naval Hospital Camp Pendleton, Wilford Hall Ambulatory Surgical Center (WHASC), and FBCH, in the three largest eMSMs. Their eMSM leaders told the Panel they are exploring ways to shift specialty staff from nearby major academic centers (Naval Medical Center San Diego, SAMMC, and

WRNMMC, respectively) to these new facility locations. The Panel believes actions such as these are essential for maintaining readiness skills and sustaining GME programs, by bringing patients back into the direct care system.

Space Requirements and Utilization

Space requirements are determined as the last HCRA component of analysis. The Panel compared current DoD Space Planning Criteria with commercial planning standards for five room types commonly found in an MTF project, as summarized in Table 1. In the inpatient setting, MHS planning criteria for medical-surgical rooms, operating rooms, and labor, delivery, and recovery rooms closely mirrors private sector criteria. Until 2013, it appears most of the programming for outpatient exam rooms, including primary care, was based on the projected number of full-time equivalent providers, rather than on the expected number and length of visits or encounters that each room was expected to support, as is the case in the private sector. This appears to have contributed to current overcapacity issues for some facilities.

Prior to 2012, updates to the DoD Space Planning Criteria chapters did not occur on a regular cycle (see Section 4.1 for more detail). In 2013, the DoD Space Planning Criteria for most of the primary and specialty clinics that require outpatient exam rooms were updated to reflect a model similar to that used in the private sector. Likewise, in 2015, the Emergency Department criteria were updated. The MTFs visited by the Panel were all programmed using the previous criteria, which may have overstated capacity requirements. In the Panel's opinion, the MHS should continue to update DoD Space Planning Criteria to reflect industry best practice.

Table 1. Comparison of DoD Space Planning Criteria with Commercial Planning Standards[21,66]

Room Type	DoD Space Planning Criteria	Widely Used Industry Criteria
Medical-Surgical Inpatient Rooms	80% Single Bedroom Annual Occupancy	80 to 85% Annual Occupancy
Operating Rooms (ORs)	909 Annual Cases Per General OR (Average Case Length of 95 Minutes)	800 to 1,200 Annual Cases Per Inpatient OR
Labor, Delivery, and Recovery Rooms	2013 to Present: 350 Annual Deliveries Per Room At A 75% Annual Occupancy	250 to 400 Annual Deliveries Per Room
Outpatient Exam Rooms	Prior to 2013: In Primary Care, Two Exam Rooms Per Projected FTE Provider 2013 to Present: 2,304 Encounters Per Non-GME	2,000 Annual Visits
Emergency Department (ED) Beds	Prior to 2015: 90% Average Number of Projected ED Patient Visits Per Day 2015: 1,800 Annual Exam Beds Per ED Bed (Including Trauma); 1,700 Annual Exams Per ED Bed (Not Including Trauma)	1,200 to 1,800 Annual Exams Per ED Bed

Adapted from U.S. Department of Defense and Malcolm, C.
*The widely used industry criteria reflect propriety strategic planning data used by the architects and Kaiser Permanente leadership on the Panel, as well as data used by the Medical Group Management Association.

Individual MTFs often have space management committees to consider the effective and efficient utilization of space to support specific organizational goals. However, there appears to be no enterprise-wide standard reflecting industry facility asset utilization best practices. These standards should be based on eMSM business goals reflecting a tri-Service staffing model that can be used during planning and programming activities and ultimately at a local MTF level to improve the best use of existing facility assets.

3.2 Facility Funding and Budget Structure

> *UFC are used regardless of the source of funding and should be employed "in non-[Military Construction] MILCON sustainment, restoration or modernization projects, in facility additions or alteration projects or in operations maintenance (O&M) upgrade projects" in addition to being employed for MILCON.* [20]
>
> -Unified Facilities Criteria

In the Panel's experience, in light of the complex demands of stakeholders and the changing health care environment, few health care delivery systems, public or private, have sufficient capital investment funds to meet all of their strategic needs. Decisions about how to prioritize the spending of scarce capital resources are critical because of the lasting consequences with regard to future risk and success in achieving balanced mission objectives. Unlike governmental organizations, private sector health systems need to either earn a positive economic return, or profit, to generate capital for future investment or repayment of borrowings or have the capacity to fundraise, if a non-profit health system. All health systems aspiring to perform at a world-class level must set priorities and allocate resources to the most important strategies. They must balance all mission objectives in terms of quality care delivery, superior outcomes for stakeholders, and economic stewardship at the time funds are initially invested and then used for ongoing operations. Prudent spending within fiscal limits, cost efficiency, and optimizing economic returns on investment, despite the absence of a profit motive, are equally important in the military health system environment.[28]

Affordability Considerations

As described, the Panel has learned that MHS facility planning and programming does not rely on exactly the same drivers as those in the private sector, whose methods for medical infrastructure construction are primarily driven by affordability objectives and best business practices. Private sector decisions are driven by the evolution of construction industry standards and practices, which continue to change as technology, construction methods, materials research, quality, and safety standards evolve. Affordability considerations, which will be further examined in the Panel's Final Report, are a strong determinant of medical infrastructure decisions and investments in the private sector.

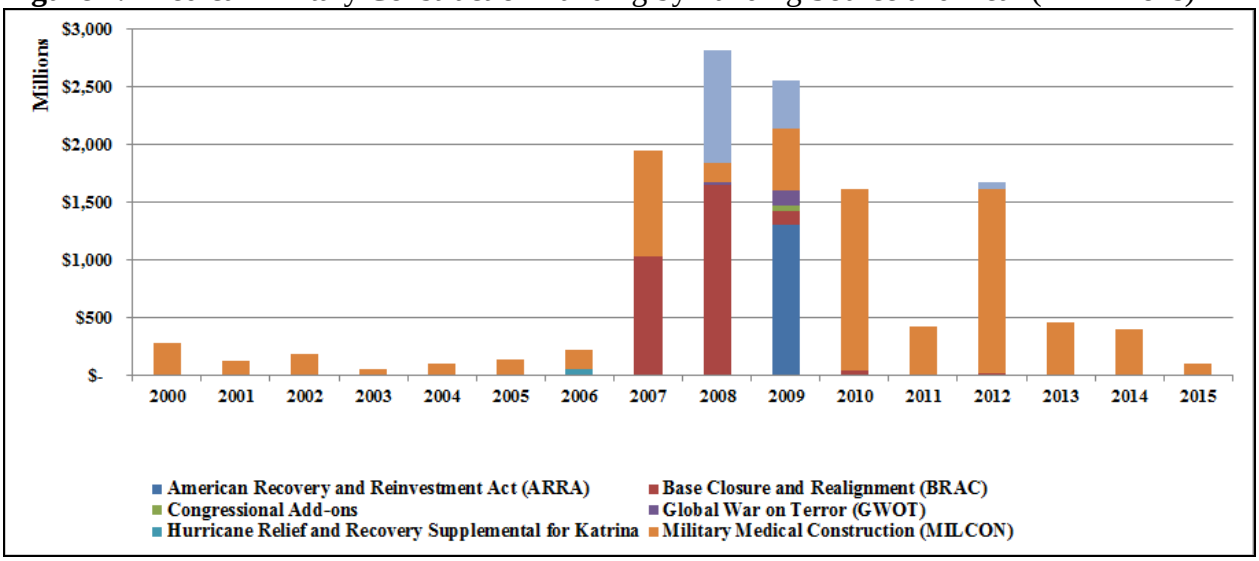
Congressional Appropriations

Four separate appropriations support the funding required for MHS facilities:

- Military construction appropriation provides funds to build new medical centers, hospitals, and clinics;
- Research and development appropriation supports research protocols and projects;
- Other procurement appropriation provides funds to purchase major pieces of equipment; and
- Operations and maintenance appropriation provides funds to support normal operations of all MHS activities and functions.

Between 2000 and 2013, DoD spent $12.5 billion to create 33 major additions/new hospitals, 104 major additions/new clinics, and 59 medical support facilities, excluding Unspecified Minor Construction projects (Figure 7). As described in Section 1.1, the funds originated from a variety of congressional acts.

Figure 7. Medical Military Construction Funding by Funding Source and Year (In Millions)[29]



Adapted from Defense Health Agency Facilities Division, 2014.
*The chart reflects aggregated amounts in the year of authorization.

DoD worked closely with Congress to identify critical health care facility requirements consequent to Base Realignment and Closure (BRAC) decisions, wartime demand, and the repositioning of troops. A variety of congressional appropriations were used to replace and modernize health care infrastructure that were operationally inefficient, hindered the integration of required technology, and had resulted in the extensions of building systems and infrastructure beyond their intended life cycle. However, the Panel learned that some of the appropriations came with restrictions that encumbered the planning and programming process across the facility life cycle, as will be discussed in Section 6.0 with the BRAC NCR projects. The MHS may benefit from working with appropriate stakeholders associated with any future BRAC legislation to enable a more holistic, cost-efficient approach to planning, design and construction.

These "spikes" of additional funding during the past decade enabled the MHS to correct the results of uneven MILCON funding in the past and make significant progress renewing their facility portfolio to reflect current health care demand and integrate state-of-the- art technology. As of January 8, 2015, the Facility Condition Index, a metric used by DHA to assess the condition of the real property, was 88 with a target floor of 90 for direct patient care facilities; 90 with a target of 80 for support facilities, and 85 with a target of 60 for all other facilities. Even with the infusion of capital over the past decade, 27 percent of the direct patient care facilities remain below the target threshold.[48] MILCON funding levelled off in FY 2015, though are still double the amount appropriated before the wars.

PHASED FUNDING

Projects typically are funded in one fiscal year using one authorization. However, in cases where projects are funded over multiple years, they can be funded using a phased or an incremental approach. An incrementally funded project is defined as one that does not result in a complete and usable facility in a single year appropriation. An incrementally funded project is complete and usable when all construction increments are completed.[67] Each method of funding can work, but each comes with its own unique challenges. In the case of phased funded projects, the decision to use it should have considered the specifics of the project it supports. Phased funding requires that each funded phase be complete and useable as a stand-alone project. Subsequent phases are considered separate projects, which allow for competitive bidding and may result in an award to an entirely different general construction contractor. This approach can have unintended consequences on the quality of the construction because contractors for each phase can use different materials and equipment that have different maintenance requirements, software, repair parts, training and certification warrantees, and wear patterns. For example, the Panel learned that the new WHASC is being constructed using a phased approach, and, as a result has two different elevator systems, which may complicate life-cycle operations and maintenance activities. With a phased approach, the potential for frequent changes in project and MTF personnel can hinder effective project management, which results in negative impacts to project schedule, budget, and scope. Using incremental funding whenever possible would be consistent with the best practices in the private sector. However, when phased funding is deemed necessary, projects need to be comprehensively managed to coordinate work between project phases to avoid unnecessary costs, schedule delays, and long-term facility life-cycle costs and issues.

3.3 FACILITY SELECTION CRITERIA

Prior to 2008, the MHS used a proportional distribution system to allocate MILCON funds across the three Services. In the past, both the TRICARE Management Activity (TMA) and the Services had overlapping responsibility for identifying and prioritizing medical MILCON projects. The MHS leadership issued guidance to subordinate facility organizations consistent with the latest DoD guidance/defense strategy, as well as any relevant trends in the health care industry. The MHS also issued guidance to each Service regarding the amount of funds, the Total Obligation Authority, to program when developing their individual multi-year capital investment MILCON programs. Each Service received a proportion of the MILCON Total Obligation Authority based on each Service's total square footage of Plant Replacement Value (PRV). Since the U.S. Army had, and still does have, proportionally the largest PRV, it generally received the largest proportion of the funding.[68]

As a next step, the Services would internally consolidate and prioritize projects for their programs and submit them to the Portfolio Planning Management Division, now referred to as DHA Facility Division, for MHS consolidation, review, and validation. Next, TMA and the Services would have mutually agreed to make adjustments to the proportion depending on additional factors. For example, a Service's proportion may have been adjusted to accommodate funding the next phase or increment of project already under construction, or a small project originally scheduled for the out-years might be moved forward because its cost more easily fit in a given year based on availability of funds, after priority projects had been programmed. This

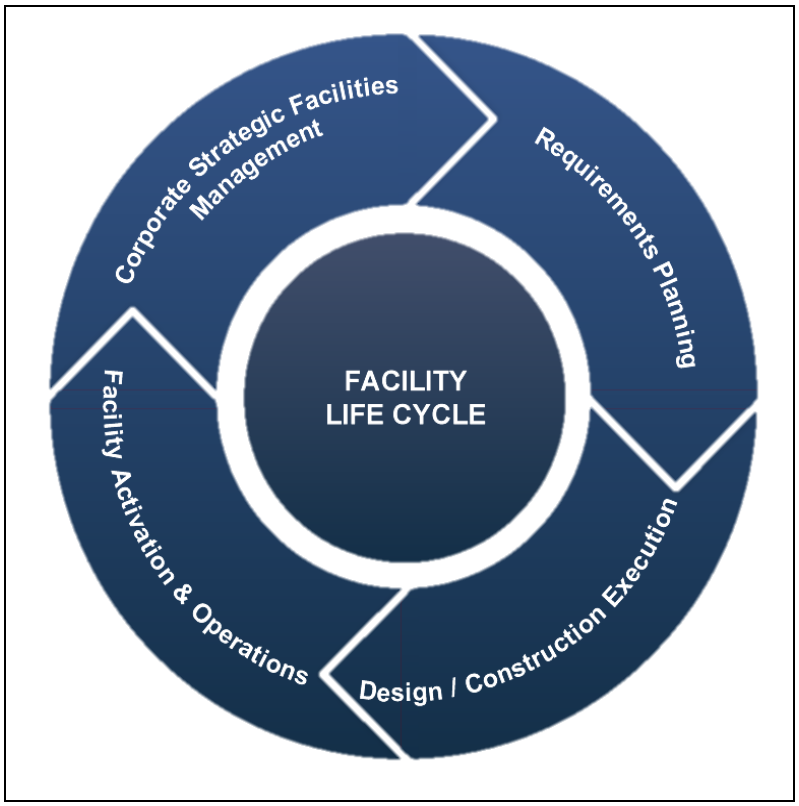
methodology considered the priorities of the individual services. The MHS's approach to project selection and assessment needed to evolve to better focus on enterprise strategy with less subjective criteria that is also more auditable.[68]

Military Construction Capital Investment Decision Model Evolution

In 2007, TMA's Portfolio, Planning, and Management Division began the development of a unified approach to the prioritization of medical MILCON projects through the creation of the Capital Investment Decision Model (CIDM), which is described in further detail in Section 1.3 and Appendix G. The proportional assessment system was replaced by the CIDM in 2008. CIDM is based on MHS strategic goals and uses established and standardized methods for program formulation and review, while balancing facility infrastructure modernization, given the historic reality of limited funds. The goal is to provide "a mechanism for neutral and dispassionate decision-making, balancing the traditional aspects of Service preferences for facility-specific solutions with Departmental concerns expressed in system-wide priorities and published guidance."[69] This transparent, auditable, and strategically aligned process has been used to prioritize and execute many hospital and clinic projects over the past six years.

The CIDM prioritization model plays a key role during the Requirements Planning phase of the facility life cycle. The entire life cycle includes four major phases: Corporate Strategic Facilities Management, Requirements Planning, Design/Construction Execution, and Facility Activation and Operations (see Figure 8). The facility life cycle, which is described in detail in Section 1.3, begins when the need for a capital investment is identified and continues through construction, operation, and, ultimately, decommissioning.

Figure 8. Department of Defense Facility Life Cycle[20]



From U.S. Department of Defense, 2012.

CIDM 3.0 provided opportunities to review projects during the approval process in order to help achieve world-class standards. The standards employed in conducting these reviews should be revised to create facilities that can achieve appropriate clinical activity and throughput to achieve high satisfaction and clinical responsiveness (see Appendix G for more information about CIDM). The Panel found that the MHS has an objective and rigorous prioritization process for sizing, evaluating, and ranking various construction projects. However, a couple of factors may have contributed to the facility asset underutilization observed by the Panel as previously discussed, including:

- Past programming for ambulatory care clinics based on projected staffing rather than room utilization, a formula now fixed in the recently updated Space Planning Criteria standards capacity; and
- A high proportion of beneficiaries receiving care in the private sector, rather than in the direct care system

The decision-making methodology has evolved, as DHA Facilities Division currently uses CIDM 4.0, which now includes an update that links scoring and weighting criteria to MHS strategic goals and priorities and includes analysis of alternatives beyond new construction. CIDM 4.0 is being used in FY 2015 with evaluation criteria approved by the MDAG. The Panel believes the next round of CIDM refinement should reflect the new MHS strategic goals associated with a high reliability IDS.

The MHS should continue to refine the demand signal used in the model to better forecast demand using industry practices to align the planning and prioritization of projects based on an IDS market strategy that supports MHS strategic goals.

CHARGE C FINDINGS AND RECOMMENDATIONS

Finding 1**:** Although the MHS is evolving as a newly formed IDS, planning and programming for past MILCON investments was often driven by Service strategies that did not always reflect the MHS's newly adopted IDS model and did not always result in full facility asset utilization. Specifically:

a) Individual health care facilities, rather than an IDS model, were the framework for the 2009 definition of a world-class facility.
b) The full continuum of care is not led by a single organization focused on serving the local population at the most appropriate site of care.
c) eMSMs lack a single command and control structure with single budgetary authority for all MTFs in their region, which complicates facility investment requirements and life-cycle management.
d) eMSM MTFs do not always share administrative and support services, which would enable consolidation and reduce programming requirements.

Recommendation 1: The MHS should:

a) Expand its IDS definition and framework to include a description of a high reliability care delivery organization that reflects direct and purchased care services, its core services, resource requirements, concepts of operation, and expected health care outcomes, which are then used to drive planning and programming facility requirements. Specifically, this IDS framework should:

1) Be developed by MHS clinical leaders and experts, rather than by facility design professionals.
2) Use single command, control, and budgetary authority to drive the facility requirements and planning processes by establishing a process for integrated facility life-cycle budget requirements with IDS fiscal accountability to better inform facility investment requirements.

b) Expand and refine the current world-class medical facility definition and its supporting domains and conditions to be consistent with a world-class IDS structure and to promote broader strategic thinking, planning, and resource management.

Finding 2: The Panel observed that all seven of the MTFs they visited were not operating at full capacity. The DoD Space Planning Criteria for most of the primary and specialty clinics that require outpatient exam rooms were recently updated to reflect a model similar to that used in the private sector. The MTFs visited by the Panel were all programmed using the previous criteria, which may have overstated capacity requirements.

Recommendation 2.1: The MHS should continue to update DoD Space Planning Criteria to reflect current industry best practices.

Recommendation 2.2: The MHS should establish asset utilization standards, based on eMSM business plans that use a medical tri-Service staffing distribution model, which are consistent with industry standards and applied in the planning process to reduce underutilized facility assets.

Recommendation 2.3: The DHA, together with the Services, should analyze low-volume service lines and adjust facility planning and programming criteria accordingly.

Recommendation 2.4: The MHS should examine and refine facility planning and programming standards to reflect current thinking about the planned recapture of purchased care, in alignment with eMSM business plans.

Finding 3: Frequent changes in health care personnel requirements, distribution, and availability confound facility planning and programming standards and criteria.

Recommendation 3: The Services should develop a medical tri-Service human capital distribution plan to assist with development of more accurate facility planning and programming standards.

Finding 4: GME program distribution represents an important facility planning and programming variable, as the maintenance of medical skills requires access to certain quantities and types of cases.

Recommendation 4.1: To realign and optimize MHS GME programs, the MHS should conduct an enterprise-wide GME-specific modernization study which addresses the quantity and type of cases needed to maintain health professional skills, including medics and corpsmen, while considering the best locations for the provision of GME given population demand and facility assets.

Recommendation 4.2: The MHS should review the case mix volume and complexity requirements established by the Accreditation Council for Graduate Medical Education as a component of the planning standards for each service line included in a facility project.

Finding 5: MHS Centers of Excellence, such as the U.S. Institute for Surgical Research Burn Center, the Center for the Intrepid, and the National Intrepid Center of Excellence, are essential for readiness skills training.

Recommendation 5: The MHS should:

a) Identify all centers of excellence essential to GME and readiness training as a variable in facility investment prioritization and asset utilization standards; and

b) Consider a hub and spoke model using individual centers of excellence to help providers maintain their competencies.

Finding 6: The uneven and complex nature of past MILCON funding resulted in significant issues. For example:

a) BRAC MILCON facility funding restrictions and the complex MHS budget structure complicated efficient and effective planning and programming across the facility life cycle; and
b) Phased funding hinders medical facility construction, resulting in potential issues with regard to operational resource requirements and project budget, schedule, and facility life-cycle maintenance.

Recommendation 6.1: The MHS should work with appropriate stakeholders associated with any future BRAC legislation that results in a more holistic, cost-efficient approach to planning, design, and construction.

Recommendation 6.2: The MHS should:

a) Request authority to use incremental funding from Congress whenever possible, consistent with best practices in the private sector; and
b) Comprehensively manage projects, when phased funding is deemed necessary, to coordinate work between project phases to avoid unnecessary costs, schedule delays, and long-term facility life-cycle costs and issues.

Finding 7: DoD has made significant progress delineating and streamlining MILCON planning and programming responsibilities between DHA and the Services by creating DHA shared facility services.

Recommendation 7: The MHS should continue its work to streamline MHS MILCON planning and programming responsibilities using benchmark industry practices.

Finding 8: The MHS replaced the proportional assessment system with CIDM, which continues to require refinement to help yield a high reliability IDS.

Recommendation 8: The MHS should continue to refine CIDM to better forecast demand. Specifically, the MHS should:

a) Align the planning and prioritization of projects based on an IDS market strategy that supports MHS strategic goals;
b) Base programming on forecasted utilization instead of staffing models, as reflected in the recently updated DoD Space Planning Criteria by DHA and the Services; and
c) Examine and refine surge-capacity related standards.

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4.0 CHARGE A. CONSISTENCY OF UNIFIED CONSTRUCTION STANDARDS WITH INDUSTRY PRACTICES AND BENCHMARKS

"(A) Reviewing the unified construction standards established … to determine the standards [sic] consistency with industry practices and benchmarks for world class medical construction."[4]
- Ike Skelton NDAA for FY 2011, Section 2852

INTRODUCTION

As described in Section 1.3, the Unified Facilities Criteria (UFC) 4-510-01 provides policies and procedures for the programming, planning, design, and construction of military treatment facilities (MTFs) such that the resultant facility is "safe, functional, and durable, with reasonable and appropriate sustainment maintenance, and operations costs."[20] These standards are based on federal law, executive orders, Department of Defense (DoD) directives and instructions, private sector standards and publications, and technical data.[20]

The development and application of facility standards is particularly challenging in the present health care environment. Currently, there is a rapid evolution of health care models and technology, particularly information technology, during a time of dynamic health care reform and transformation. The health care industry is debating the relative merits of minimum versus innovative health care facility standards as the best approach to achieve quality, safe, and affordable care. The Independent Review Panel on Military Medical Construction Standards (Panel) addressed these and other issues related to achieving world-class medical construction, and provides findings and recommendations.

METHODOLOGY

Using the three-dimensional perspective described in Section 2.0, the Panel examined the UFC 4-501-01 and then compared its standards, criteria, checklists, and guidelines against industry standards, practices, and benchmarks. The Panel reviewed processes used by DoD, the Department of Veterans Affairs (VA), the Facility Guidelines Institute (FGI), and Kaiser Permanente to develop medical facility construction standards. The Panel reviewed various factors that affect the development and implementation of construction standards, including: their currency, the process for updating them, their relevance to changing health care technology and standards of care, and the time required to implement them in completed construction projects. Specifically, the Panel examined DoD standards development responsibilities, the creation of meaningful standards in a rapidly evolving health care environment, DoD's standards development framework, and the relationship between facility and information technology standards.

4.1 Department of Defense Standards Development Responsibilities

Current Standards Development Process

The *Oxford English Dictionary* defines a standard as "a definite level of excellence, attainment, wealth, or the like or a definite degree of any quality, viewed as a prescribed object of endeavor or as the measure of what is adequate for some purpose."[70]

DoD has developed the Unified Construction Standards, a comprehensive set of guidance documents that enable design and construction professionals to create health care facilities that meet the needs of the operational mission within a prescribed budget. DoD standards are developed using and aligned with medical health care industry standards. Periodic review and feedback facilitates the maintenance of standards that are correct and adequate to meet the evolving DoD health care delivery model.

DoD is actively involved in key industry forums to review and improve design standards. For example, DoD participates with the FGI as it refreshes its guidelines on a four-year cycle. DoD then references and requires conformance to FGI guidance as part of the DoD standards, which, the Panel learned in discussions with DoD facility leaders, have grown in size and complexity, are expensive to maintain, and require frequent refinement or review to reflect the dynamic health care environment.

DoD standards are broad and inclusive of all types of DoD health care facilities and recognize that construction can take place in both domestic and international locations. The challenge with any design and construction standard is how to rapidly adapt and improve as the health care delivery model changes driven by innovation in methods of care and the supporting technology.

According to the Panel's experience, most health care systems have developed a set of design and construction standards, which set targets on key variables, such as quantity (size), quality, functionality, and cost, to guide and inform the process of creating the built environment platform for care delivery. DoD is now working with the Construction Industry Institute and other large owner systems to develop medical facilities design and construction industry cost benchmarking. However, this effort is in its preliminary stages with limited comparable cost benchmark output.

Department of Defense Standards Benchmarked Against Industry Standards

In those instances where there are comparable standards, the Panel observed that DoD standards are generally consistent with industry practices and benchmarks. However, even within industry practices and benchmarks, construction standards vary in scope, as organizations are challenged to keep standards current given rapid changes to technology and care delivery paradigms, reconcile minimum standards with best practices, and determine how prescriptive standards can and should be while still encouraging innovation. Although DoD standards have been developed and are largely consistent with those found in industry, the challenge is in developing life-cycle facility standards that are appropriate for an enterprise-wide strategy. The FGI's *Guidelines for the Design and Construction of Hospitals and Outpatient Facilities* represent a consensus of health care industry thought leaders on fundamental requirements for design and construction of

medical facilities,[71] and more than 40 States and 60 countries have adopted or reference the guidelines.[72] The guidelines are reviewed and updated on a four-year cycle,[73] which, until recently, appeared to be more frequent than the update cycles used by DoD.

Updating standards requires significant time and other resources and creates challenges in designing and building a medical facility that is both world-class and technologically current. Prior to 2012, updates to Space Planning Criteria chapters did not occur on a regular cycle; however, with the stand-up of Defense Health Agency (DHA), there are now dedicated resources to sustain Space Planning Criteria chapters and space templates and to develop regular update schedules. Updates to Space Planning Criteria chapters began in early 2012; this effort was undertaken to align the chapters with current care models and technologies and to transition from a staffing-based to a workload-based planning metric. To date, 34 out of 36 total chapters have been updated; 13 chapters (10 clinical, 3 non-clinical) are used by DHA planners within the Space Equipment Planning System application and are available for public use on the World-Class Toolkit. The remaining 21 chapters will be available within Space Equipment Planning System and posted for public use on the Toolkit by early 2015. The two remaining chapters, Medical Mobilization and Chapel, will be updated in late 2015.[74]

The Space Template Board completed their review of 187 templates in 2014; 94 were deleted, and 19 new templates were developed, which equals 112 templates at end-state. Forty-three updated templates are currently posted on the Toolkit, and 39 additional templates will be posted in early 2015. All templates will be evaluated for relevancy and applicability on a project-by-project basis each time a project is completed and specific templates are referenced.[74] Table 2 illustrates the most recent updates. Some criteria are updated and published as individual sections or chapters, allowing frequent updates to sections as needed, while maintaining other sections that have not changed. Other references, such as the UFC, are updated in total each time. It is important to emphasize that the Space Planning Criteria chapters, the Templates, the Military Standard 1691, and the UFC Appendix B are integral elements of the DoD construction standards that do not stand alone, but are interrelated and synchronized. The Panel commends DHA on its recent, intensive efforts to update the standards and encourages DHA to immediately post these updates on the Military Health System: DoD Space Criteria for Medical Facilities website.

Table 2. DoD Standards by Year of Publication[21,22,20,23]

Criteria	2011	2012	2013	2014	Totals
Room Templates			*	112*	112
Space Planning Criteria Chapters		*	*	34*	36
MIL-STD 1691 Master Equipment				ALL	
UFC 4-510-01		ALL			

Adapted from U.S. Department of Defense.
*The asterisks acknowledge update activities which occurred, but exact numbers for those years were unavailable. Numbers in 2014 provide the current status as of the date of this report.

Based on Panel experience, design and construction strategies to enable future flexibilities are frequently used during the creation of new health care facilities to accommodate new and changing missions over the lifetime of a facility, which for most major investments can be several decades. DoD has several standards in place to provide future flexibility, ranging from standards for rooms and individual clinics to an entire facility and its supporting campus. Examples of standards that enable future flexibility include:

- Select clinical and administrative rooms are sized the same to promote interchangeability between clinical and administrative uses;[21,23]
- Private offices are built with examination room utilities that are capped behind walls to simplify future conversions from office to examination space [21,23]
- Where clinically appropriate, modular systems furniture is used throughout a space to support configuration changes and relocations;[21]
- Radiology rooms are designed with a universal template that supports a wide variety of equipment and future re-configurations;[23] and
- Single patient rooms are designed with headwalls capable of supporting two patients in the event of a mass casualty event.[21,23]

In a larger facility, to the degree possible, individual clinics share the same room, waiting, and corridor layouts not only to simplify orientation for patients, but also to support clinic relocations and expansions. When supported by a business case, inpatient facilities may include interstitial building space (IBS) to facilitate facility maintenance and future modifications. Each design includes a campus master plan to accommodate lateral building expansion, as well as roofs and other building systems designed to allow for vertical growth.[20]

Some of the new projects at MTFs the Panel visited include IBS, such as Carl R. Darnall Army Medical Center (CRDAMC); others, such as Naval Hospital Camp Pendleton (NHCP), do not. The justification associated with the decision to use IBS or other strategies was not clear to Panel members. While the private sector routinely uses shelled space as a means to provide space to accommodate future missions, this strategy is prohibited in DoD because Title 10 of the United States Code (U.S.C.) §2801, in part, defines a military construction project as work to produce a complete and usable facility.[75] Shelled space by its nature would be incomplete and unusable. At the time of this Annual Progress Report, the Panel had not had the opportunity to evaluate any Military Health System (MHS) studies on the efficacy and effectiveness associated with the use of flexibility strategies to accommodate new missions, technology changes, and routine maintenance and repair work as a means to explain the return on investment of these decisions.

Current Department of Defense Partners in Standards Development

The Panel found that DoD maintains extensive volumes of medical facility construction standards, some of which may not be always current (see Table 2). Developing, maintaining, and updating these standards is a complex, labor-intensive, and time-consuming process, in which the Services and DHA participate. The VA also maintains its own set of standards, and, although the two Departments develop standards to meet unique medical mission requirements, there are potential areas of duplication and redundancy.

The VA/DoD Capital Asset Planning Committee, formally the Construction Planning Committee, was established in 2005 to provide a formalized structure to facilitate cooperation and collaboration in achieving an integrated approach to planning, design, construction (major and minor), leasing, and other real property related initiatives for medical facilities that are mutually beneficial to both Departments. The Committee provides the oversight necessary for collaborative opportunities for joint capital asset planning to explored, evaluated, and maximized to enhance service delivery.[76] DoD and the VA collaborate for some standards development, and similarly, both participate with FGI in developing their standards.

DHA's Facility Service, formerly the TRICARE Management Activity's Portfolio, Planning and Management Division, has worked diligently to create active partnerships with other leading industry standards-creating organizations. However, the Panel wonders if these relationships could be further expanded in an effort to reduce potential duplication of effort in standards development and more fully synchronize standards development especially for those standards that must respond to rapidly changing care delivery models and technology advances in care.

Additionally, continuing current partnerships could promote greater consistency, alignment, and efficiency with industry practices. Because there is potential duplication of effort in standards development between these entities, there could be opportunities to synchronize standards development with federal and industry partners. The Panel believes this could provide DoD the opportunity to reduce investment in standards development and maintenance while still ensuring its standards are current.

4.2 Meaningful Standards in a Rapidly Evolving Health Care Environment

One of the main challenges to maintaining current standards is the rapid rate of change in health care technology and care delivery models against a backdrop of multi-year timelines associated with building a new facility. Emerging models of care, such as population-based planning, community-based medical home, integrated health care markets, pharmacy home delivery, virtual visits, focus on health and prevention rather than illness, and disease management all have the potential to significantly alter facility requirements. Consequently, these evolving models of care can reshape industry practices and benchmarks, which then affect the MHS as it embraces these new models of care. For example, the patient-centered medical home concept is driving design considerations in ambulatory care to accommodate patient- and family-centered care, teamwork rooms, patient throughput, and enhanced use of the electronic health record.

Frequently health care delivery challenges emerge in which the physical environment may play a role. For example, in 2013, The Joint Commission published a Sentinel Alert about Medical Device Alarm Safety in Hospitals, describing the degree to which staff alarm fatigue contributes to patient harm. Alarms significantly contribute to noise and are both a patient irritant and create a known error-provoking environment.[77] One of The Joint Commission recommendations was for health care organizations to assess the degree to which acoustics in patient care areas allowed alarm signals to be audible. Ensuring that alarms can be heard requires a bundle of solutions, to include acoustic design standards, which includes how walls are designed to isolate sound and the use of materials to increase sound absorption and decrease sound reverberation.[71] FGI has

already intensively focused on alarm fatigue by engaging nationwide experts who have researched and created white papers to inform its Guidelines standards.[78,79] Thus, this is work the MHS does not need to replicate.

Staff fatigue is another error-provoking condition that results in patient harm as outlined in another The Joint Commission Sentinel Alert in 2011, in which it was recommended that organizations provide an integrated bundle of solutions to include a cool, dark, quiet, comfortable room to enable staff rest.[80] The recent Ebola epidemic has forced all health care organizations to reassess how they would identify, isolate, and care for such patients. This has profound facility implications, such as the need for patient isolation support; the use and maintenance of heating, ventilating and air conditioning systems; and the effective cleaning of surfaces, equipment and furniture.

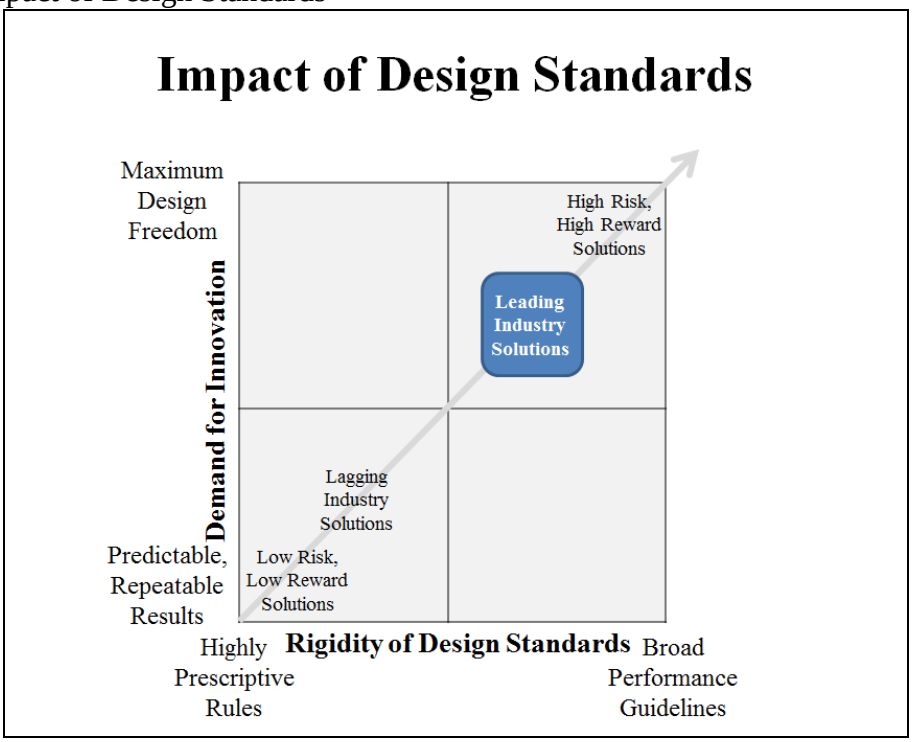
4.3 Standards Development Framework

Standards Development Philosophy and Impact

There is an ongoing debate in the national health care facility construction community about the philosophic framework that standards should reflect. The fundamental question is the degree to which standards should reflect proven methods over time versus altering standards to reflect emerging best practices and opportunities for innovation. This quandary occurs during a health care era that increasingly relies on evidence-based decision-making versus experiential practices, that is, "this is the way we've always done it."

Design standards should reflect the organization's desire and tolerance for change and variation. Figure 9 attempts to depict that there are potentially competing objectives.

Figure 9. Impact of Design Standards[81]



From Orndoff, D., 2014

The horizontal dimension of the figure illustrates that the owner organization's design and construction standards have a range of rigidity. On the extreme left is a highly prescriptive set of rules, limiting designer and constructor options in the delivery of a facility. On the extreme right is a broadly defined set of guidelines, allowing designers and builders maximum freedom to meet the owner's intent.

The vertical dimension of the chart illustrates that owner organizations have a range of demand for innovation. On the extreme bottom of the scale is a need for highly predictable, repeatable results. On the extreme top of the scale there is maximum design freedom to incorporate innovative, even experimental solutions to meet the owner's intent.

Organizations that operate in the lower left quadrant tend to value "standardization" to generate predictable, repeatable results (e.g., functionality, quality, cost, and schedule). This philosophic approach typically generates low-risk and high reliability solutions that result in minimum design variation and that generally avoid design failures. Organizations embracing this approach tend to lag behind the greater medical design and construction industry in terms of embracing innovative but unproven facilities solutions.

Organizations that operate in the upper right quadrant tend to value "creative solutions" to generate greater performance improvement (functionality, quality, cost, and schedule) over what would be anticipated by a more conservative standards driven approach. The innovation approach tolerates higher risk for potentially higher reward solutions. These organizations accept variation and occasional failure as an acceptable cost of business. Organizations

embracing this approach tend to lead the greater medical design and construction industry in terms of embracing innovative facilities solutions. However, it is too early to tell if either approach is best associated with improved health care outcomes or more a cost-effective method over time.

The Panel's assessment is that DoD, as an "owner" design and construction organization, currently would be plotted near the middle of the chart. The Panel believes DoD values predictability, conformity, and reliability. However, over the past decade DoD has led the industry in embracing industry-driven, evidence-based design (EBD) solutions as evident in the World-Class Toolkit described in Appendix G to shape the most current generation of MTFs. Just as is true in the private sector, as far as the Panel can ascertain, no evaluation of this innovative approach has been completed to better understand the impact of these solutions on targeted health care outcomes or a formal return-on-investment analysis.

Since the creation of the MHS World-Class Toolkit, the MHS has completed a 90-day review of its health care system with regard to access, quality, and safety outcomes and has identified an aspirational goal to become a high reliability organization (HRO). Five principles are shared by HROs: preoccupation with failure, reluctance to simplify, sensitivity to operations, commitment to resilience, and deference to expertise.[82] Inherent in the HRO approach is the use of human factors engineering as a tool to understand and analyze contributing safety-related variables, including the built environment. "Human factors engineering is the study of human capabilities, limitations, and behaviors and the integration of that knowledge into the systems we design for them with the goals of enhancing safety, performance and the general well-being of the operators of the system."[83]

The HRO concept has been used widely in other high-risk industries, such as aviation, nuclear aircraft carrier operations, and wild-land firefighting to improve safety outcomes. The aviation community applied human factors engineering research in cockpit design to address human operator limitations and capabilities in order to achieve improved safety outcomes.[84] The Joint Commission has developed a HRO-based framework, which encourages health care organizations to commit to becoming HROs "to achieve and sustain the elusive goal of consistent excellence in safety and quality."[56]

Standardization of facility design represents an important tool for aspiring HRO systems such as the MHS. It can lead to improved safety and other key outcomes and may be important in facilitating the ability of military medical personnel to provide care at any MTF to which they are assigned. However, the MHS has not yet fully considered the financial implications and long-term affordability issues that may emerge across a facility's cycle, especially issues related to the creation and operation of world-class facilities.

The Panel commends the MHS for leading the way with its definition of a world-class medical facility and development of the World-Class Toolkit, encouraging innovation during this last decade of construction. However, it must now evaluate the impact of these design decisions on key health care outcome measures and expected and realized returns on investment, in support of changing missions.

4.4 Relationship Between Facility and Information Technology Standards

Facility and Technology Integration

Information management and information technology (IM/IT) requirements increasingly serve as the backbone for health care delivery, representing a key component in the design and construction of any world-class health care facility. New diagnostic and treatment equipment, virtual care options, the implementation and use of electronic health records, and other digital systems (e.g., imaging) influence health care standards. For the most part, across the industry as well as in DoD, major IM/IT infrastructure investments have been made in a parallel fashion with little analysis or understanding about the impacts of one investment on the other.

Brick and mortar and IM/IT infrastructure significantly interact with regard to requirements, design, construction, and operations and maintenance. No health care facility can be designed and built today without a detailed understanding of the impacts of technology on cost and project delivery. Improved outcomes for patients and staff require greater understanding about how a facility and all the objects in it can be ideally used, based on human factors considerations. The use of sophisticated technology and equipment, such as robotic surgery, Smart Beds, radio-frequency identification, and other applications, should be fully integrated with care delivery processes and included in a facility designed to maximize their safe and efficient use. Achieving this goal requires integrated strategies and standards that enable successful execution of technology and facility infrastructure investments across the facility life cycle.

DoD focuses primarily on architectural elements in the development of its construction standards without fully incorporating the impacts of technology integration and use on concepts of operation, space requirements, design, construction and operations, and maintenance activities. Standards have not yet been adopted to reflect an integrated physical environment and technology infrastructure. However, recently DHA Facility Division and IM/IT leaders established the Facilities, Logistics, Health Information Technology Collaboration Group, whose charge is to increase collaboration among the relevant communities supporting the MHS. The goals of the group include increasing synergy among the communities; reducing duplication and conflicting efforts; achieving standardization to the extent practicable or feasible; reducing the training burden as people move across facilities; and increasing interoperability.[85]

Virtual Versus Facility-Based Care

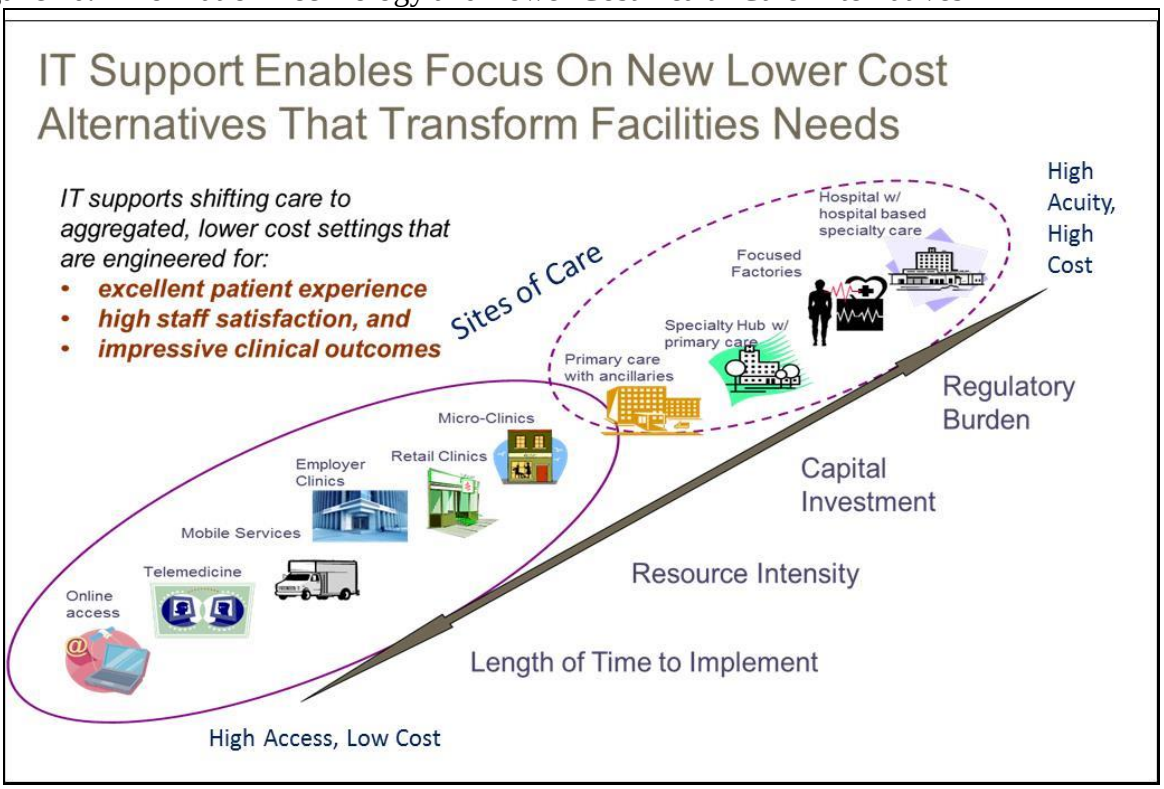
Technology advances that facilitate virtual care delivery are fundamentally altering the planning and programming of health care facilities. Telemedicine was developed and has been used by DoD for more than 15 years to provide care services to beneficiaries in remote locations, including theaters of war. The Panel's review of the current Space Planning Criteria found that the MHS does provide one telehealth examination room for specialty medical, behavioral health, general, and specialty surgical clinics. This space can be used to manage health care remotely, including online communication with health care providers, remote monitoring of vital signs, and video or online doctor visits. Depending on the clinic's concept of operations, the space can include video camera capability.[21] However, it is not clear to the Panel how the use of telemedicine has substituted for the planning and programming of space in MTFs. Today, given

all of the smart-phone technology and other wireless applications, the health care market is moving even more care out of the hospital, with many services now being provided in the patient's home.[86]

A leading health care organization indicated to the Panel that they are actively implementing IM/IT applications system-wide that could dramatically transform practice patterns and enhance the provision of care. They are installing high-speed wireless internet, video conferencing capabilities, and team rooms that encourage a collegial and collaborative atmosphere. These technological changes, which affect building design and delivery of care, allow for tailored health education in waiting areas, text messaging to patients when the provider is available to see them, and multiple provider visits during one patient encounter. By increasing the use of social technology, they are creating "touch points" that are available 24 hours a day, 7 days a week, that reduce face-to-face interaction between patients and providers. The organization believes this implementation of technology will allow systems to be more flexible in response to surges and reductions in demand, whereas facilities cannot be as easily adapted. Harnessing technology removes space and time limitations, ultimately allowing for increased amounts of care to be provided virtually.

Figure 10 illustrates the low-resource intensity, capital investment, regulatory burden, and length of implementation time required for IM/IT-focused health care solutions.

Figure 10. Information Technology and Lower Cost Health Care Alternatives[87]



Adapted from Malcolm, C., 2014.

With an increasing focus on health promotion and disease prevention, world-class health care systems are responding to patient expectations for services that include a variety of virtual "touch points" rather than requiring that all care be provided through a patient visit to a health care facility. It was not clear to the Panel how the MHS is planning for and adapting to significant shifts in health care delivery modalities, moving from a facility-based model to a seamless, virtually based model using available communications and technology devices. The *Military Health System Review: Final Report to the Secretary of Defense* discussed two non-facility access solutions, Secure Messaging and the Nurse Advice Line, which already have shown significant and growing use. The impact of systems such as these on facility-based primary care services needs evaluation and should be reflected in facility standards and the capital investment decision-making processes, an important next step for DoD to realize world-class processes of care and services.

Military Information Management/Information Technology Security Impacts

Not only must the MHS stay abreast of rapidly changing health care technologies, but it also must cope with unique military security requirements, which can negatively affect current health care operations and use of technology investments. For example, the state-of-the-art magnetic resonance imaging equipment purchased by Fort Belvoir Community Hospital (FBCH) for use in the diagnosis and treatment of breast cancer cannot be used as designed because of security restrictions imposed by the DoD Information Assurance Certification and Accreditation Process (DIACAP). The requirements of the DIACAP program also limit the full use of purchased hands-free communications equipment bought to enable provider communication while reducing ambient noise, an error-provoking condition. As a result, health care personnel use multiple work-around solutions to support care requirements and to comply with these restrictions. The Panel found similar negative DIACAP impacts on current operations at Walter Reed National Military Medical Center, FBCH, San Antonio Military Medical Center, CRDAMC, WHASC, Naval Medical Center San Diego, and NHCP, which, in the Panel's view, have the potential to alter care delivery processes, limit the full use of technology capabilities, and as a result, not realize the full value of these expensive investments. The Panel has been told, however, that the DHA is transitioning away from DIACAP, a regulatory process, to a risk management framework, which may mitigate some DIACAP-related concerns.

In summary, across the health care industry and within the MHS, IM/IT investments require better integration with facility investments. IM/IT and communications investments continue to be an MHS-wide concern for a variety of reasons, including: restrictions of the DIACAP requirements; failure to achieve an effective electronic health record that supports the inpatient and ambulatory care and virtual care environments; and communications redundancy and interoperability challenges resulting from the Services using different networks. Although the DHA is transitioning its medical operations to a single, non-Service-specific network that will eliminate redundant accreditation processes, it will still be regulated by DoD security requirements, such as DIACAP.

Charge A Findings and Recommendations

Finding 9: DoD standards are generally consistent with those found in industry. While seeking to embrace new industry-driven evidence-based design solutions, DoD faces the challenge of

maintaining standards that respond to the rapidly evolving health care environment.

Recommendation 9.1: To respond to the rapidly evolving health care environment, DoD must continue to actively partner with key military and civilian stakeholders organizations and should:

a) **Continue developing formal partnerships with federal and industry organizations to streamline resources required to create and maintain standards; and**
b) **Continue collaborating with the VA and consider maintaining a single set of standards to reduce duplication of effort.**

Recommendation 9.2: The MHS should evaluate the use and effectiveness of flexibility tools found in the design and construction standards, such as use of interstitial building space and shelled-space to enable cost-effective facility modifications over the life cycle.

Recommendation 9.3: The MHS should:

a) **Develop a collaborative process by engaging industry partners to expeditiously refine or create standards in response to major health care practice changes and challenges; and**
b) **Identify and import the benefits of innovation, technology advances, and evidence-based research into DoD design and construction standards.**

Finding 10: The MHS has embraced the world-class framework by using innovative EBD strategies to support standards development, but has not evaluated the impacts of these standards and design decisions on health care outcomes.

Recommendation 10: The MHS should evaluate the impact of innovative EBD solutions on key health care outcomes and financial measures, including affordability across the facility life cycle to refine standards and criteria.

Finding 11: IM/IT provides the backbone for world-class care delivery, enabling the provision of non-facility based health care services. However, there is no indication that new virtual care alternatives have influenced the size of the facilities being built in the MHS. DoD facility and IM/IT standards and policy require greater integration in order to maximize investments.

Recommendation 11.1: The MHS should continue the work of the Facilities, Logistics, Information Technology Collaboration Group to integrate facility and IM/IT funding, policies, standards criteria, and outcome measurement, including identifying patient, staff, and resource measures to evaluate operational success.

Recommendation 11.2: MHS clinicians, along with IM/IT and facility experts, should identify non-facility based care options within the continuum of care and then refine facility standards and criteria accordingly.

Finding 12: DIACAP is an impediment to the full use of medical IM/IT systems and equipment

capabilities, thus resulting in workaround processes for newly purchased systems and equipment needed to provide world-class health care services to beneficiaries and a poor return on investment.

Recommendation 12: DoD should review and improve current IM/IT security requirements for medical equipment and systems to allow full utilization of these expensive investments.

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5.0 CHARGE B. UNIFORM APPLICATION OF MEDICAL CONSTRUCTION STANDARDS IN ONGOING CONSTRUCTION PROGRAMS

"(B) Reviewing ongoing construction programs within [DoD] to ensure medical construction standards are uniformly applied across applicable military medical centers"[4]
-Ike Skelton NDAA for FY 2011, Section 2852

INTRODUCTION

The Defense Health Agency (DHA) requires each Service's construction agent to reference Unified Facilities Criteria (UFC) 4-510-01 during the acquisition process. Regional construction practices, site constraints, timing of new or revised codes, sustainability approaches, and project design team decision making must all be considered when applying construction standards.

METHODOLOGY

The Independent Review Panel on Military Medical Construction Standards (Panel) addressed the congressional question and developed findings and recommendations related to reviewing ongoing construction programs within the Department of Defense (DoD) to determine whether medical military construction (MILCON) standards are uniformly applied across military treatment facilities (MTFs). The Panel interpreted the term "uniformly applied" to mean that the UFC were applied the same way at each construction project and that the UFC standards were included in the development of every project's planning, design, and construction effort. The Panel examined the effectiveness of processes that enable uniform application of standards in ongoing MILCON projects, as well as how they function in practice. Specifically, the Panel examined the uniform application of medical MILCON standards in ongoing construction programs by reviewing DoD acquisition responsibilities and approaches; standardized versus highly adaptive application of standards; the World-Class Toolkit and uniform standards application; and the evaluation of evidence-based design (EBD).

While acknowledging the uniqueness of the DoD mission and the health care services it provides, the Panel reviewed the processes used by DoD to evaluate key decisions during planning, design, and construction in order to determine whether those decisions resulted in desired outcomes. The Panel also visited ongoing military construction projects, such as Wilford Hall Ambulatory Surgical Center and Carl R. Darnall Army Medical Center, and engaged with MTF leadership and various stakeholders. The Panel viewed its visits to MTFs as an opportunity to understand the differences in creating world-class facilities under a variety of circumstances and during various phases of construction. To enable comparison between recent and ongoing construction projects, the Panel requested that each MTF visited provide a briefing that explained the measures taken to achieve the 6 domains and 18 conditions associated with a world-class medical facility.

5.1 Acquisition Responsibilities and Approaches

Military Construction Acquisition Strategies

Private sector and DoD construction acquisition strategies have evolved over the past decade in order to improve project management and delivery, as measured by budget, scope, and schedule outcomes.[88] Table 3 summarizes DoD hospital projects from 2005-2015, depicting the programmed amount for the project, the acquisition strategy used, and the approximate schedule, measured from contractor notice-to-proceed to the government's building acceptance. It does not include the time associated with planning or programming activities that precede design and construction. The table includes various acquisition/delivery methods ranging from those that are conducted sequentially to methods that overlap design and construction activities.

Table 3. Military Construction Project Acquisition Strategies, Programmed Amount, and Duration[29]

Location/Base	Project Title	Programmed Amount (Millions)	Acquisition Strategy	Schedule Duration Years (Rounded)
Ft Benning	Hospital Replacement	$506.9	DB	5
Ft Hood	Hospital Replacement	$621.0	DB	4
Bethesda NSA	Medical Center Addition-Alteration	$700.7	DB	4
Ft Carson	Hospital Alteration	$ 39.1	DB	2
Guam JRM	Hospital Replacement Incr 1	$259.2	DBB	4
Camp Lejeune	Hospital Renovation & MRI Suites	$42.3	DBB	4
Vicenza	Enhanced Health Service Center	$52.0	DBB	3
Langley JBLE	Hospital Addition	$65.1	DBB	3
Keesler AFB	Community Hospital (Addition)	$48.5	DBB	3
Camp Lejeune	Hospital Addition	$64.3	DBB	3
Jacksonville NAS	Hospital Alteration	$14.6	DBB	2
Camp Pendleton	Hospital Replacement	$564.0	DBIO	3
Eglin AFB	Hospital Alteration	$64.9	DBIO	3
Ft Riley	Hospital Replacement	$404.0	ECI	5
Ft Sam Houston JBSA	San Antonio Regional Med Center	$802.3	IDBB	5
Ft Belvoir	Hospital Replacement	$1,030.0	IDBB	5

Location Abbreviations	**Acquisition Methods:**
NAS - Naval Air Station JBLE - Joint Base Langley-Eustis JBSA - Joint Base San Antonio AFB Air Force Base	Design Build (DB) Design Bid Build (DBB) Design Build Initial Outfit (DBIO) Integrated Design Bid Build (IDBB) Early Contractor Involvement (ECI)

Adapted from U.S. Department of Defense, 2014.
*This table shows projects that were greater than 87% complete as of September 2014.

In the private sector, these DBB project delivery methods accounted for 52 percent of the U.S. commercial construction market in 2013, a decrease from 67 percent in 2005.[89] Although the Military Health System (MHS) has not officially identified a preferred delivery method, hospital projects completed between 2005 and 2015 reflect only 44 percent of completed projects used a DBB delivery method (see Table 3).[29] The remaining MHS projects were executed using methods, such as Design Build (DB) and Early Contractor Involvement.[29] Representatives from a major health care system indicated to the Panel that their capital investment program rarely uses a DBB approach as they favor using delivery methods that incorporate construction expertise earlier in the process, such as DB. Overall, methods that rely on construction expertise earlier than DBB delivery methods seem to be gaining popularity.

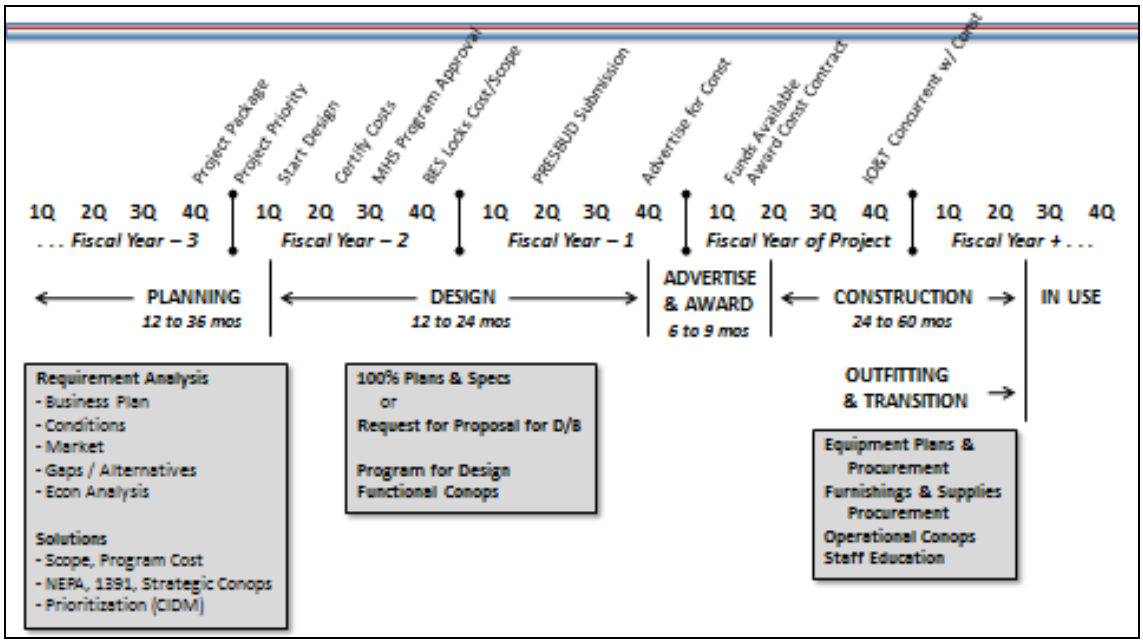
The DHA does not prefer a particular acquisition strategy, but has initiated an assessment to evaluate the advantages associated with each one. Industry professional organizations, such as the American Institute of Architects and Construction Management Association of America, also suggest there is no single project delivery method more appropriate for any given project type, let alone a single method for an entire capital investment portfolio.[90] Each project should be evaluated based on a number of factors, one of which is how the acquisition strategy chosen impacts the project schedule. This includes the evidence and analysis underpinning acquisition and project decisions as they impact budget, scope, and schedule outcomes, to refine associated DoD construction standards and criteria as appropriate.

Military Construction Project Cycle Timeline

Prior to the last decade, some MILCON hospital projects required in excess of 10 years to complete. This historic timeline was incompatible with the requirements of the 2005 Base Closure and Realignment Commission (BRAC), which required that DoD meet specific time constraints, which included the creation of new hospitals by September, 2011, or, in other words, in less than 6.5 years (see Section 1.0 and Appendix E for more detailed BRAC information). DoD is to be commended for its progress in reducing the time associated with BRAC medical MILCON projects. However, since the BRAC projects, the project cycle timeline appears to be lengthening for some hospital projects.

Although Table 3 begins to explain some of the variability associated with the amount of construction time required for projects potentially consequent to the use of different acquisition strategies, the Panel requires more information to understand the actual project cycle length for non-BRAC hospitals over the past decade. The DoD project cycle length should reflect the same or equivalent industry phases, to include concept development, land acquisition, programming, design, construction, licensing and occupancy. Figure 11 suggests a maximum MILCON project cycle timeline of 10-11 years. According to a briefing received from Kaiser Permanente, hospital projects usually take about eight years to complete, including concept development, land acquisition, programming, construction, licensing, and occupancy. Reducing the amount of time needed to achieve a new facility is a critical goal to avoid functional obsolescence and usefulness, because of care evolution, technological advances, and MHS changes in forecast demand and project requirements.

Figure 11. Typical Timeline for Realizing a Military Construction Project[19]



From Becker, J., 2014.

The Panel believes reducing the amount of time needed to achieve a new facility is critical in order to avoid functional obsolescence and usefulness, because of care evolution, technology advances, and MHS changes in forecast demand and project requirements.

PROJECT DELIVERY TEAM

The Project Delivery Team (PDT) is a multidisciplinary group composed of those individuals necessary for successful development and execution of all phases of the project.[91] The composition of the team may vary based on the Service and the construction agent organization responsible, such as Naval Facilities Engineering Command (NAVFAC), U.S. Air Force Civil Engineer Center (AFCEC), or U.S. Army Corps of Engineers (USACE). This section describes the U.S. Army's approach, but it is configured similarly for the other Services. Though operational application and staff reassignments are not directly governed by the UFC, they can become a barrier to the desired uniform application of design standards.[91]

DHA Facilities Division and the USACE Medical Facilities Center of Expertise assign project managers to provide oversight and technical guidance throughout the design and construction process. These members of the PDT provide support remotely and travel to the site as deemed necessary. The USACE District provides an onsite project team responsible for the actual management of the day-to-day construction, contract administration, and contract management of the project. The district onsite team includes architects, engineers, quality assurance and contract administration personnel. For some facilities, the USACE leadership onsite may include a Service member.[91]

Depending on the Service, a health facility project office is typically established inside or adjacent (or within close proximity) to the USACE project team office onsite. The health facility project office represents the Service Surgeon General by acting as the "owner's representative." Specifically, the owner's representative is responsible for ensuring the facility is designed and constructed in accordance with the UFC, room templates, and space planning criteria. In addition, the owner's representative assists the medical staff with design reviews, change orders, and other critical decisions requiring their input. The representative confirms the medical facility staff's requirements are articulated and integrated into the project as much as possible within the scope and authority of the project. The health facility project office includes a project manager (often a Service member), clinical, technical, and medical equipment planning and transition personnel.[91]

In addition to the two organizations on the project site, there are others who bring expertise and resources to the project. The hospital facility manager is responsible to the hospital leadership and is responsible for assisting with development of project requirements, reviewing designs for functional requirements, and maintaining the project after construction is complete and turned over. The installation's director of public works, or similar, assigns a representative to facilitate compliance with local design and environmental codes, policies, and regulations as well as assist with various permitting activities.[91]

Several factors can complicate the application of the current UFC standards. Prime among these is a lack of PDT continuity. Examples include the frequent reassignment of key military personnel on the project team, especially during this past decade of war; frequently changing key MTF leaders, including commanders who rotate every two years; and within some enhanced Multi-Service Markets (eMSMs), market manager positions that are held by different Services on a rotating basis. Onsite members of the PDT maintain files to document various aspects of the project to aid in execution, monitoring, controlling, and archiving project activities. Files include contract administration (e.g., contracts, schedules, change orders, quality control reports, equipment procurement); progress reports (e.g., meeting minutes, photos, briefings, visitor logs); and transition activities (e.g., concept of operations, training schedules, move planning).

Each artifact provides a history for decisions throughout the project, but may not always document the factors that led up to the decision. In those instances, PDT continuity is key to maintaining understanding, perspective, and overall team collaboration. The historic understanding of the evidence and analysis that underpinned project decisions, and the specific lessons learned related to the application of standards is easily lost, which can have implications for the project schedule and, consequently, the budget.

When the Panel toured recently constructed MTFs, current personnel lacked knowledge about the design features and their intended use to enable care delivery and improve outcomes. The Panel's visits provided MTF leaders with information about design intent and expected outcomes. It appears there is inadequate documentation and communication of project intentions. Where documentation exists, there is a lack of understanding about how a facility was designed using staffing models, information management and information technology (IM/IT) requirements, and reengineered care processes, all of which are key components associated with a major capital investment.

5.2 Standardized Versus Highly Adaptive Application of Standards

"If you are a beneficiary . . . you may get your care in a Navy hospital one day and the next week in an Air Force facility. We have to be congruent." [3]
-VADM Matthew Nathan, U.S Navy Surgeon General

The Panel believes the UFC are uniformly applied in a number of ways. DoD has processes and practices in place through its business relationships with NAVFAC, AFCEC, and USACE designed to enforce the uniform application of standards. For example, each project delivery team should brief the DHA Facilities Division at specific milestones to verify that designs comply with the UFC before they can obtain approval to move to the next milestone. Additionally, each Service should justify the validity of each project during the programming process. Architect/Engineer (AE) firms are also required to use the MHS World-Class Checklist during design (see Section 5.3), and each project delivery team is required to follow the UFC by regulation and by contract.

Despite these measures, which are intended to ensure consistency, each project is unique in its execution. For example, patient bedrooms frequently do not have the same design layout or equipment manufacturer; and expedited delivery method projects are not awarded with the same scope of services. Civilian health care facilities frequently evaluate initial and long-term costs associated with the selection of different materials and finishes, establish a standard, and apply it across their inventory, whereas materials and finishes used in MTFs vary considerably. For example, one MTF included terrazzo flooring, which is seen less commonly in civilian facilities today because of significant initial costs, although it is aesthetically pleasing and may be a better investment over the life cycle.[92] The DHA could benefit by evaluating which world-class standards are affordable and add sufficient value in specific types of facilities. This could prove beneficial in reducing initial and long-term life-cycle costs.

Flexibility is clearly intended by the UFC 4-510-01, as evidenced in section 1-4.6, which favors flexible project planning to support future expansion, and separating building systems so that future changes affecting one utility do not require wholesale system replacements to accommodate change.[20] Although not directly stated in the UFC, it appears that flexibility is also part of DoD's planning and programming process in which the majority of the key strategic and tactical decisions are made (see Section 4.1 for a discussion about standards that enable design flexibility).

After carefully evaluating and considering these inconsistencies, the Panel concluded that the content in the UFC, particularly in the first two chapters, reflects principles rather than standards. Even when principles are applied uniformly, they may not yield consistent outcomes because they allow for variability, such as inboard versus outboard toilets in patient rooms, ceiling mounted lifts that extend into bathrooms versus those that do not, and centralized versus decentralized nursing stations. Since the UFC criteria are principles rather than prescriptive standards, some degree of variability is acceptable. EBD, which has been used by the MHS in its facilities projects, is defined as a process that involves the use of the best available research to inform design decision making and, as a design framework, is not meant to be prescriptive.[93] In cases where definitive evidence is not available, design teams will weigh different types of

information, such as research, processes, best practice, principles, and standards, to make decisions that are appropriate for a particular project. Some degree of variability is thus expected. It is important, however, to document the basis for different design decisions and the reasons for variations from principles and standards where they exist, and to evaluate the impact of such decisions on meaningful health care outcomes.

The Panel observed intended and unintended variability at the MTFs it visited, some of which seemed appropriate. In some cases, the variation appears appropriate to reflect current care delivery practices and best practices, rather than using a previous standard. During site visits to Fort Belvoir Community Hospital (FBCH) and Naval Hospital Camp Pendleton (NHCP), the Panel observed that single patient medical-surgical bedrooms were designed differently. The patient bathrooms at FBCH were on the outside wall, while NHCP's bathrooms were on the inside wall. Both approaches have advantages and disadvantages, but it was not clear to the Panel which approach met the original intended design principle.

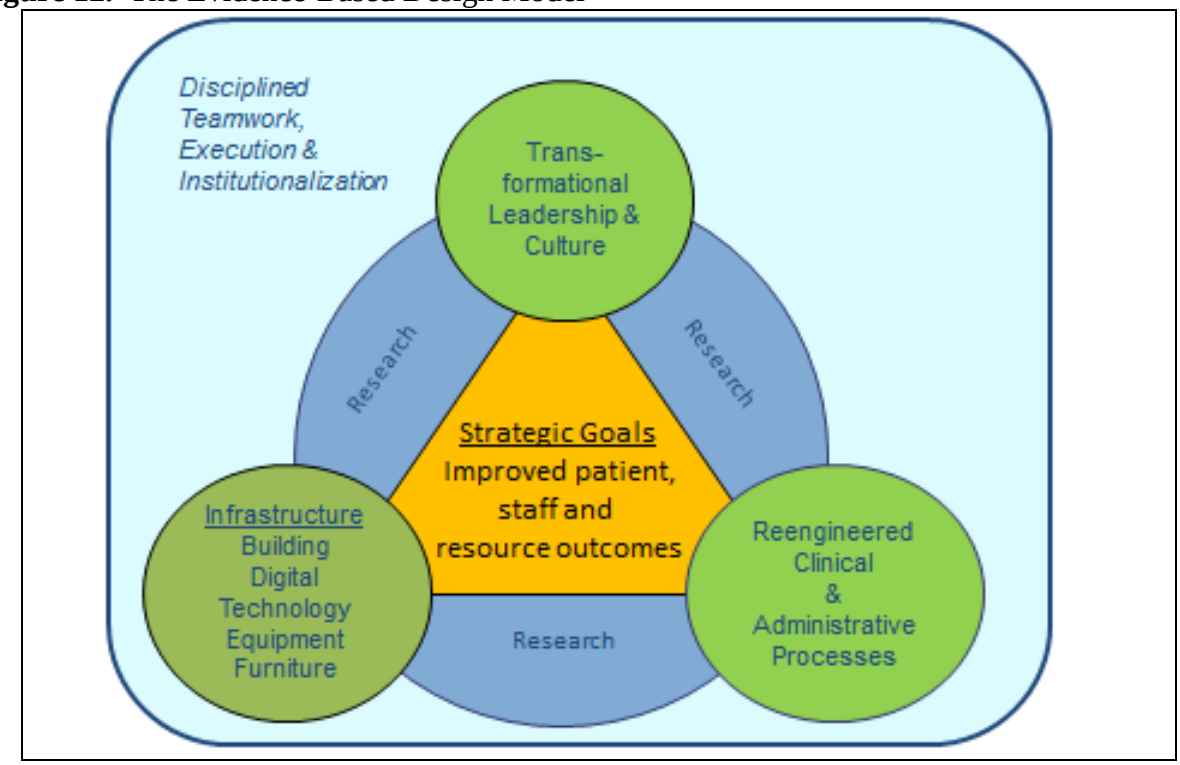
The Panel questions whether all possible design features reflect the original principles on which they were based when the same planning principles result in different outcomes because of their inherent flexibility. In another example, Walter Reed National Military Medical Center and FBCH both had single patient bedrooms with ceiling mounted patient lifts. However, one design included lifts and a track to carry patients into the bathroom, whereas the other design would only bring the patient to the bathroom door. Again, it is not clear which design met the intended principle or how these different results affect care delivery processes and healthcare outcomes. The Panel believes that careful examination of the variance in design features for the same rooms on key health care outcomes might yield important insights that should be used to refine standards and criteria (see Sections 5.3 and 5.4).

5.3 The World-Class Toolkit and Uniform Standards Application

The World-Class Toolkit and Evidence-Based Design

As described above, EBD is the "process of making decisions about the built environment based on research to achieve the best possible health care outcomes."[93] However, EBD is not meant to be a set of prescriptive design strategies, the implementation of which should result in improved outcomes for patients, staff, and the health care organization. Rather, it is clearly defined as a process in which published and emerging research is continuously evaluated in the context of project goals, technology, and clinical and administrative processes (see Figure 12 – Evidence Based Design Model) to identify innovative solutions, which will facilitate the best possible outcomes. Infrastructure, which includes building design and IM/IT, is one part of a three-legged stool that includes transformative leadership and reengineered clinical and administrative processes.[94] When all these changes are implemented effectively together, the best outcomes are achieved for patients, staff, and families and for the health care enterprise. Further, EBD is a continuous looped cycle in which lessons learned from implemented projects inform future projects. As such, an EBD process by its very definition would support variation among projects. Lessons learned from a finished project, along with evolving new research findings, would likely lead to changes and modifications in the design of future projects. This sort of variation is healthy and can support innovation.

Figure 12. The Evidence-Based Design Model[94]



From Malone, E.

The MHS adopted EBD as the framework for its health care projects beginning with the 2007 report, *Evidence-Based Design: Application in the MHS*. [95] An EBD checklist was developed in 2008 to evaluate various design iterations for WRNMMC and FBCH and to provide feedback to the project team.[96] This checklist was further developed in the context of several projects and formalized as the World-Class Toolkit and Checklist that is now required for the design and planning of all new MILCON projects as reflected in Section 2-3.4.7 of the UFC. Although key design strategies linked to health care outcomes are identified in the Checklist, they are not prescriptive and allow for variation in interpretation.

The Panel also learned about the MHS's *World-Class Strategic Roadmap* and World-Class Toolkit, as described in Appendix G. The World-Class Toolkit uses EBD theory as its theoretical framework and provides the project team with design insights based on the literature and best practices to support the development of world-class facilities.[24] The World-Class Toolkit represents one of the most carefully constructed set of design and construction resources in the field and should be a source of pride for the DHA. Even though it is an excellent tool, it needs testing for validity and reliability to address several items that include multiple variables. However, based on the Panel's visits to MTFs, these tools did not appear to be widely known outside of the DoD facilities community.

During Panel visits to MTFs, commanders and their teams were asked to use the definition of a world-class medical facility (see Appendix C) as a framework to present the progress they had made in meeting the definition of a world-class medical facility. The Panel found that most

MTFs were unaware of the definition of a world-class medical facility. After learning of the definition, MTF team members stated that using the framework would have stimulated thinking, planning, and action, which might have led to greater compliance with the world-class standard, especially as it relates to the reengineering of clinical processes. Although many locations were performing well when compared to requirements contained in the World-Class Toolkit, most MTF leaders had not yet incorporated the world-class components as part of the organizational management culture.

While the UFC requires the AE firms to use the World-Class Checklist and present their analysis during their 35% design submission to the government, it is not clear whether DHA in conjunction with the AE firms has used the EBD process consistently across its projects (see Section 5.2 for more information). Thus, it is unclear whether the observed variability arises from thoughtful review of previous projects' post occupancy evaluations (POEs) and their application to different project contexts or whether it is due to variation in the interpretation of EBD strategies by different AE firms, without due consideration of research or lessons learned. To enable consistent, replicable results across projects, DHA should conduct validity and reliability testing on the Checklist to improve its value and usefulness. DoD may benefit from implementing a process for capturing the rationale for all design decisions, new research findings, and MS POE findings to explain and justify significant variation from the World-Class Checklist strategies.

As stated in Section 5.2, in the absence of clearly documented information supporting design decisions for MHS projects, it is not clear whether some of the observed variations are intentional or unintentional. The briefings provided for completed MHS projects included a discussion regarding design features that have been incorporated (e.g., gardens, decentralized nursing stations). However, the Panel could not ascertain the degree to which project teams based their design decision on research-based evidence or lessons learned as a result of conducting a POE.

Since EBD and the definition of a world-class medical center were intended to shape the design of world-class hospitals within DoD, the Panel believes it is time to begin evaluating the contribution of EBD features on any observed variation in the application of medical MILCON standards across MTFs.

POST-OCCUPANCY EVALUATION

A POE is a tool for evaluating the actual performance of a building's design, its operational flow, and maintainability. Evaluating these impacts is a critical part of the EBD process because POE results, identified lessons learned, and focused research studies provide critical evidence that should be used to refine standards. Although not all civilian facilities conduct POEs, the first POE is often conducted between 12 and 18 months after a new facility has opened to capture first impressions by the staff related to how the building helps or hinders care and the facility manager's assessment of the ease or difficulty of maintaining installed systems.[97]

The Panel investigated DoD's efforts to institutionalize POE findings and EBD research as a way to support improvement and updates to the medical construction standards. The Panel commends its efforts to date to establish a valid and reliable POE framework that evaluates not

just the building systems but also the impact of the design on health care outcomes, as seen in the their project report with Clemson University.[98-100] However, conducting a POE, identifying its lessons-learned and then using that information is a resource-intensive process. Four POEs have been conducted on recently completed medical MILCON projects, which have been operational for at least a year. There are 46 additional projects, a representative sample of which may also provide additional important insights needed to shape future standards and criteria. The DHA team explained that they are further developing the POE so the evaluation includes the impact of design decisions on health care operations.

5.4 Evaluation Of Evidence-Based Design Impacts on Health Care Outcomes

> *"The Military Health System (MHS) is committed to improving patient experience, outcomes, and readiness through a system of cost-effective, world-class care. This system of care must serve a wide range of needs, including emerging requirements and care models such as patient-centered medical homes, decreased recovery time, behavioral health, traumatic brain injuries, pain management, and suicide prevention. The built environment plays a critical role in supporting this system of care, as do other infrastructure elements such as equipment and health information technology."* [101]
>
> - MHS FIRM: Facilities Innovation and Research Model

A growing body of research shows that the health care built environment influences a range of safety and quality outcomes that are a high priority for health care organizations, including the MHS. This includes safety outcomes, such as reduced falls, health care-associated infections, medication errors, and other hospital-acquired conditions; staff safety outcomes, such as reduced musculoskeletal injuries related to patient handling; as well as patient satisfaction and experience measures (see Table 4). The environment is one of the latent conditions that affect patient safety in health care settings and, as a result, there is an opportunity during the facility design process to identify and mitigate the potential impact environmental factors may have on safety. In the Panel's experience, failure to proactively address these issues leads to expensive renovations and potentially adverse outcomes for patients and staff.

Links between design principles and health care outcomes are inherent in the World-Class Toolkit and Checklist. However, the evaluation of the impact of the physical environment on key health care outcomes has not been adequately considered, in spite of an intense decade of newly-created, EBD-informed facility investments. The recent *Military Health System Review: Final Report to the Secretary of Defens*e focuses on access, quality of care, and patient safety, but does not mention facility design as a tool to help resolve a number of targeted outcomes, summarized in Table 4.[2]

Table 4. MHS Action Plan for Access, Quality of Care, and Patient Safety Targeted Outcomes for Improvement and EBD Features[2]

Targeted Outcomes for Improvement	EBD Feature
Health care-associated Infections	• Single inpatient patient rooms • Sink and alcohol gel placement and design • Material finishes to enable cleaning of high-touch surfaces • Heating and air conditioning systems that include high-efficiency particulate air filters; ultra-violet gamma irradiation
Obstetrical Patient Satisfaction	Patient- and family centered care designed rooms
Waiting Time	Positive distractions, such as art work and views of nature; small, moveable seating areas
Readmission Rates	Family zone space in the patient room to enable family presence as part of the care team to enable home transitions

Adapted from U.S. Department of Defense, 2014.

It is the Panel's view that the MHS lacks the enterprise-wide policies and procedures needed to fully maximize the use of EBD features included in facilities being designed and built. Examples include a lack of a comprehensive MHS patient handling and movement program to take advantage of the ceiling mounted lifts included in recently constructed facilities to help reduce injury to patients and staff. Also, there is no mandatory reporting of contributing factors that include many EBD features in the current MHS Patient Safety Reporting Tool, which serves as an important data source in the evaluation of environmental variables related to patient harm and near-miss episodes of care. Few recommended Global Trigger Tools include environmental variables in the identification and assessment of patient harm events. The Panel believes this quality improvement approach, coupled with the results of POEs and EBD research, is critical to support innovation and continuous improvement in the MHS. It would also be beneficial to develop a database of POE findings and EBD research that is integrated with other quality improvement metrics that are already being collected within the MHS.

In the Panel's opinion, DoD has the opportunity to more fully evaluate changes in care delivery as well as in supporting analyses of innovative solutions. A robust, tri-Service staffed innovation center could serve as a catalyst to stimulate innovation, experiment with new delivery processes, and institutionalize successes across the MHS. The MHS Facility Innovation and Research Model (FIRM) provides a promising structure and framework for conducting standardized research across MTFs to examine the impact of design and related factors on health care outcomes. The FIRM report outlines features such as a detailed structure, processes to include forms and templates, and methodologies for individuals and teams at MTFs interested in conducting EBD research.[101] However, this effort is in its early stages and internal awareness within the MHS about this resource seems limited. Some of the initial study templates that were shared with the Panel were focused on facility-only outcomes, again reflecting the lack of engagement and endorsement by clinical leaders who understand the critical role that human factors play in the built environment, which can affect preferred health care outcomes. The

Panel suspects that only the facility community is aware of FIRM. The Panel believes FIRM should actively engage with the MHS Innovation Center so clinical leaders, policy makers, and facility leaders collaborate in the development of a research agenda that is driven by health care delivery requirements and innovation and corresponding facility innovations.

The FIRM report indicates that a research agenda will be developed at a future date. However, in the absence of a research agenda, it is difficult to identify and prioritize research resources. A range of different research possibilities exist, but the Panel suggests that topics and types of studies that would be most useful to the MHS should be identified and clearly outlined so that limited resources, both human and financial, are effectively used for conducting research. Potential research areas may include the relationship between staff proximity and patient satisfaction; the sustainability of decentralized nursing stations given the availability of direct care personnel; and the preference for double occupancy versus single occupancy rooms across age and diagnosis groups. A DHA FIRM research agenda could be developed that supports continuous evaluation and improvement of DHA design criteria.

A variety of health care associated infection rates, patient satisfaction scores, and fall rates are being measured and should be included in the POE and used to refine UFC standards. If POEs were conducted more frequently and in a more structured, comparative manner, there would be opportunities to align outcomes with metrics available in the private sector and nationally. As previously discussed in Section 5.2, it appears that EBD features have been implemented in a variable fashion across recent medical MILCON projects. Efforts to evaluate the impact of different design decisions on key health care outcomes would prove instructive for subsequent refinement of DoD standards and criteria and clinician understanding about the role the environment plays in shaping care delivery and the patient experience.

Institutionalizing Evidence-Based Design

The EBD process will yield optimum results in terms of improved health care outcomes when considered in conjunction with re-engineered clinical processes and technology. For EBD to be effective, the principles of EBD need to be institutionalized across the MHS as depicted in Figure 13. As previously described, it appeared from the briefings by MTF leaders that even though EBD might have been used in the design and construction of the facilities in which they worked, they were not familiar with the formal constructs of EBD or "world class" until they were asked to provide a World-Class Facility briefing to the Panel, as previously described. Frequent transfers of staff within the MHS might explain poor retention of institutional knowledge about EBD and the World-Class Toolkit. There is a need to develop a mechanism to introduce EBD as part of the training or orientation of new clinical and administrative MTF staff, so they understand how the facility design is intended to function together with technology and processes to achieve safety and quality outcomes.

MTF briefings suggested to the Panel that DoD does not systematically evaluate the impact of EBD features on health care outcomes in its medical MILCON projects. An important aspect of institutionalizing EBD within the DHA is to incorporate POEs and research on EBD strategies as part of regular operations within the MTFs. The MHS FIRM team should collaborate more closely with research efforts within MTFs and actively reach out to researchers within the MHS to promote EBD research. There is also a need to conduct standardized POEs on major MHS

facilities projects so that lessons learned can be developed. The Panel believes the data obtained from these POEs should be stored in a database to facilitate ease of access for future projects.

Figure 13. Institutionalizing Infrastructure Investments[94]

Military Formula DOTMLPF+	Civilian Translation
Doctrine	Review and update policies and procedures
Organization	Review and restructure the organization as needed
Training/Marketing	Training integration and synchronization. Tell your story using a variety of methods.
Material/Data Quality	Life cycle approach, with data quality focus on the targeted healthcare outcomes using national measures. Integrate work with Performance Improvement program
Leader Development	Engage and develop leaders at every level to transform culture and processes.
Personnel Support	Find and reward your champions
Funding	Life cycle approach ROI planning that results in realistic budgets.

From Malone, E., 2014.

CHARGE B FINDINGS AND RECOMMENDATIONS

Finding 13: DoD employed a variety of new acquisition strategies during the past decade of construction in order to improve project outcomes.

> **Recommendation 13: With key stakeholders, the DHA should evaluate this past decade's project acquisition strategies, including the evidence and analysis underpinning acquisition and project decisions as they impact budget, scope, and schedule outcomes, to refine associated DoD construction standards and criteria as appropriate.**

Finding 14: The current MILCON project cycle length is longer than that in the private sector.

> **Recommendation 14: The MHS should streamline and shorten the MILCON project life-cycle processes with key stakeholders.**

Finding 15: Frequent reassignment of military personnel over the course of a facility project often results in a loss of understanding of original building design intent, the evidence and thinking that underpinned project decisions, and lessons learned about the application and

refinement of medical construction standards.

Recommendation 15: DoD should consider the balance, duration, and transition planning of the civilian, military, and contractor personnel assigned to a project to enable leadership continuity, complete decision-supporting documentation, and identify lessons learned and outcomes that can be used to refine standards and criteria.

Finding 16: The Panel identified intended and unintended variability in the application of standards. Understanding the impacts of such variability on health care and project management measures is key to the future refinement of the standards and criteria.

Recommendation 16: DoD should analyze standards application variability for planning, programming, design, construction, and commissioning decisions to refine standards and criteria.

Finding 17: The MHS is to be commended for the development of the infrastructure domain of the world-class medical facility definition; however, most MTFs visited by the Panel were unaware of the definition of a world-class medical facility, and the tools were not consistently deployed.

Recommendation 17: For the infrastructure domain, DHA should:

- **a) Refine the World-Class Checklist based on validity and reliability testing as a performance enhancement tool;**
- **b) Streamline the tool for practical use during project decision-making;**
- **c) Develop a process and budget to keep the World-Class Toolkit current;**
- **d) Develop and implement a process for capturing the rationale for all design decisions, new research findings, and MHS POE findings to explain and justify significant variation from the World-Class Checklist strategies; and**
- **e) Disseminate and institutionalize the use of the definition of a world-class medical facility, as well as the World-Class Checklist and Toolkit, across the MHS.**

Finding 18: DHA is underway with the creation of a valid and reliable post occupancy evaluation (POE) framework to assess the impact of design decisions on building systems and health care outcomes.

Recommendation 18.1: DHA should commit adequate resources to conduct a standard POE within one to two years after facility occupancy for major capital investments.

Recommendation 18.2: DHA should use POE results and lessons learned to inform project decision making and refinement of standards and criteria.

Finding 19: The MHS lacks enterprise-wide policies and procedures to maximize the use and systemic evaluation of EBD features as a tool to improve health care outcomes.

Recommendation 19: The MHS should:

a) **Create a database that profiles variance in EBD features across newly constructed MTFs;**
b) **Develop a routine process to collect key EBD-related outcome metrics at the MHS and MTF level as a component of routine quality improvement initiatives; and**
c) **Evaluate the impact of EBD features on health care outcomes and care delivery processes using nationally defined outcome metrics.**

Finding 20: The MHS's Facility Innovation and Research Model (FIRM) provides a research-based approach for evaluating health care outcomes, which may help inform DoD facility design standards, but there is lack of awareness about FIRM beyond the DHA Facilities Division, with no clear MHS-driven research agenda identified to direct research efforts in the areas of facility design.

Recommendation 20: The MHS should:

a) **Develop a DHA FIRM research agenda that supports continuous evaluation and improvement of DHA design criteria;**
b) **Require FIRM to actively engage with the MHS Innovation Center so clinical leaders, policy makers, and facility leaders collaborate in the development of a research agenda that is driven by health care delivery requirements and innovation and corresponding facility innovations; and**
c) **Provide the necessary resources to support MHS facility research.**

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6.0 CHARGES D AND E. ADEQUACY OF AND ADJUSTMENTS TO THE COMPREHENSIVE MASTER PLAN

> *"(D) Assessing whether the Comprehensive Master Plan, dated April 2010, is adequate to fulfill statutory requirements, as required by section 2714 of the Military Construction Authorization Act for Fiscal Year 2010 (division B of Public Law 111-84; 123 Stat. 2656), to ensure that the facilities and organizational structure described in the plan result in world class military medical centers in the National Capital Region; and*
>
> *(E) Making recommendations regarding any adjustments of the master plan referred to in subparagraph (D) that are needed to ensure the provision of world class military medical centers and delivery system in the National Capital Region."*[4]
>
> -Ike Skelton NDAA for FY 2011, Section 2852

INTRODUCTION

The National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2010, Section 2714, required a comprehensive master plan be developed and implemented that provides "sufficient world class military medical facilities and an integrated system of health care delivery for the National Capital Region (NCR)."[12] This plan, the "Comprehensive Master Plan (CMP) for the National Capital Region Medical" and its supplement, "Supplement to the Comprehensive Master Plan for the National Capital Region Medical: Schedule for Completion of Requirements and Updated Cost Estimates," were published in April 2010 and August 2010, respectively.

The CMP reflects the Department of Defense's (DoD's) vision for integrating the NCR health care delivery system, resulting in world-class facilities in the NCR. Since the CMP report and its supplement were published in 2010, the Military Health System (MHS) has been restructured, resulting in the creation of the National Capital Region-Medical Directorate (NCR-MD) under the command and control of the Defense Health Agency (DHA). The NCR-MD has been identified as an enhanced Multi-Service Market (eMSM)[7] (see Section 3.1 for more discussion about eMSMs and the role of the DHA as a Combat Support Agency), and, as a result, the Panel believes the CMP needs to reflect the refined goal of creating an integrated delivery system (IDS) in the NCR.

METHODOLOGY

The Panel addressed each part of the congressional question and developed findings and recommendations related to whether the CMP is adequate to fulfill statutory requirements to ensure that the facilities and organizational structure described in the plan result in world-class military treatment facilities (MTFs) in the NCR and making recommendations regarding adjustments to the CMP needed to ensure the provision of world-class MTFs and a world-class delivery system in the NCR. As the findings of Charge D informed the recommendations for

Charge E, the Panel intentionally addressed both charges together in Section 6.0. Specifically, the Panel examined the NCR-MD's organizational structure and facility requirements, requirements for the Walter Reed National Military Medical Center Addition/Alteration (MCAA) Project, and the NCR-MD's graduate medical education requirements.

6.1 Organizational Structure and Facility Requirements

The 2010 CMP "provides the framework and specific action plans for world-class military medical hospitals and an integrated system of health care delivery for the NCR."[59] It is focused on Walter Reed National Military Medical Center (WRNMMC) and Fort Belvoir Community Hospital (FBCH), as well as their freestanding primary care clinics, and describes a single command with budget and operational authority for the NCR. The CMP delineates the process for developing budgets, prioritizing requirements, and allocating construction-related funds. It also mandates world-class performance expectations for the future integrated health care delivery system, including robust information management and information technology (IM/IT) support and expanded support services. The CMP required a facilities needs assessment that incorporated evidence-based design (EBD) features into WRNMMC, as well as specified required personnel authorizations and personnel systems. Overall, the CMP plans include constructing several facility buildings at Naval Support Activity Bethesda and transitioning personnel and resources to create two fully functioning MTFs.

The CMP is driven by the 2005 Base Closure and Realignment Commission (BRAC); recommendations from the NCR BRAC Health Systems Advisory Subcommittee of the Defense Health Board; and information from the President's Commission on Care for America's Returning Wounded Warriors. The BRAC law included a number of stipulations, including not changing the total inpatient bed capacity in the NCR after closing the former Walter Reed Army Medical Center, Washington, DC, and discontinuing the inpatient services at Malcolm Grow Medical Center at Joint Base Andrews, MD. FY 2004 workload and population data underpinned the BRAC planning and programming requirements. Project planning coincided with the peak wartime casualty rates, and it became clear that additional project scope and funding would be necessary to meet returning wounded warrior requirements.

All of the original BRAC construction as well as many additional construction projects at the Naval Support Activity Bethesda campus have been completed. These new facilities were designed using many of the EBD features described in Section 5.4. The complex transition of merging two massive medical center staffs, systems, processes, and cultures was undertaken in FY 2011, and now WRNMMC and FBCH are well-functioning health delivery institutions.

As described in the CMP report, one additional military construction (MILCON) project is needed to achieve the world-class mandate: the MCAA. In 2009, DoD conducted an in-depth analysis of the NCR to determine the reliant population, estimate workload demand, understand market dynamics, and project future care demand. The planning and programming analysis relied on available data, as well as on a comprehensive survey of hospital infrastructure requirements that needed to be replaced or upgraded. The project is currently at 35-percent design (see Section 6.2).

At the time of the 2005 BRAC, each Service managed its own health care facilities independently with little coordination among the Services to provide easy access to care for the large number of beneficiaries distributed throughout the NCR. Today, WRNMMC and FBCH are under the authority, direction, and control of the Director of the NCR-MD reporting to the Director of the DHA. Several facilities are included in the NCR-MD; however, most of the primary care and ambulatory care facilities, the front door to the health care system, remain under Service control as summarized in Table 5.

Table 5. Facilities in the National Capital Region Medical Directorate [7,42]

Service/Directorate	Facility Name	Type	Authority
NCR-MD	Walter Reed National Military Medical Center	Hospital	Direct & Control
NCR-MD	Dilorenzo TRICARE Health Clinic	Clinic	Direct & Control
NCR-MD	BMC Carderock	Clinic	Direct & Control
NCR-MD	National Intrepid Center of Excellence	Clinic	Direct & Control
NCR-MD	Fort Belvoir Community Hospital	Hospital	Direct & Control
NCR-MD	Fairfax Health Center	Clinic	Direct & Control
NCR-MD	Dumfries Health Center	Clinic	Direct & Control
U.S. Army	Kimbrough Ambulatory Care Center	Clinic	Enhanced
U.S. Army	Fort McNair Army Health Clinic (AHC)	Clinic	Enhanced
U.S. Army	Andrew Rader AHC	Clinic	Enhanced
U.S. Navy	Naval Health Clinic (NHC) Annapolis	Clinic	Enhanced
U.S. Navy	Naval Branch Health Clinic (NBHC) Bancroft Hall	Clinic	Enhanced
U.S. Navy	NHC Quantico	Clinic	Enhanced
U.S. Navy	NBHC Washington Navy Yard	Clinic	Enhanced
U.S. Navy	Branch Medical Clinic (BMC) Officer Candidate School Brown Field	Clinic	Enhanced
U.S. Navy	NBHC The Basic School	Clinic	Enhanced
U.S. Air Force	Malcolm Grow Medical Clinics and Surgery Center	Clinic	Enhanced
U.S. Air Force	Joint Base Anacostia-Bolling Clinic	Clinic	Enhanced

Note: eMSM authorities as stated in the DepSecDef Memo subject: Implementation of MHS Governance Reform, dated 11 Mar 2013.

The table lists facilities in the NCR-MD. DHA has command and control over facilities listed as "direct & control," as they are part of the NCR-MD. The NCR-MD has eMSM authority for the other facilities shown, which are managed by their Service.

From Carter, AB., 2013 and U.S. Department of Defense, 2014.

Subsequently, there has been a dramatic shift in thinking about MHS care delivery. The decision was made in FY 2014 to embrace an IDS model to manage the health and required health care of the population of beneficiaries within an entire geographic area in a rational, coordinated, convenient, high-quality, and cost-effective manner. The MHS created six eMSMs serving metropolitan areas with multiple service medical facilities. The NCR-MD is the largest eMSM, serving about 450,000 beneficiaries.[42] The ultimate long-term goal is for all beneficiary care to be managed within a capitated budget by a single authority using a coordinated system of military and civilian health care providers and facilities. Although the CMP proposed comprehensive requirements for integrated health care delivery, it did not envision an eMSM operating as a true IDS.

The NCR-MD has completed its first five-year business plan for FY 2015-2019, which is primarily focused on bringing beneficiaries back to MTF care by increasing Prime enrollment, distributing specialty providers from WRNMMC to FBCH to improve patient access and staff training and skills maintenance, and implementing cost control strategies. The DHA Facilities Division is in the midst of conducting visits to each eMSM to introduce the concept of facilities as a shared service, which should lead to a master eMSM-wide facilities master plan.

Optimizing existing infrastructure is a key component of creating a successful IDS, as discussed in Section 3.1. In addition, the current CMP will not have achieved its mandate without addressing additional planning requirements, such as comprehensive plans that address culture, clinical, and administrative process reengineering to achieve targeted outcomes. For example, there is no "Patient Experience and Population Health Master Plan" addressing how the NCR beneficiary population can easily access a full range of world-class integrated health care services. Furthermore, there is no "Integrated Delivery System Management Plan" in determining a comprehensive, stable leadership and management structure and processes to manage a complex interconnected system of military, TRICARE, and private sector health resources to cost effectively deliver high-quality health care. In order to transition toward a true IDS for the NCR, there should be a comprehensive strategic execution plan to address these issues. The NCR provides an excellent location for developing an IDS-model eMSM, which eventually could be implemented at the other eMSMs. The MHS should update the 2010 CMP to reflect single command authority and budgetary control for all MTFs in the NCR-MD, eMSM strategic and business plan goals, including a plan to achieve full facility and staff asset utilization and future facility requirements to transform the NCR into a model IDS and high reliability organization.

6.2 Requirements for the Walter Reed National Military Medical Center Addition/Alteration Project

The MCAA project represents the remaining major new construction required to support WRNMMC. This project is necessary to replace several 70-year-old legacy buildings that comprise the medical center's central clinical core. New and remodeled clinical spaces will include many features intended to achieve world-class standards and accounts for 57 percent of the size of the MILCON project.[102] These spaces include the conversion of all remaining hospital double occupancy rooms to single-patient rooms and construction of a new women's health center; a neonatal intensive care unit; an ambulatory surgery center; and units for vision

care, psychiatry and addiction services, and other clinical services. The other 43 percent of the project includes 16 percent for medical education services and a simulation center and 27 percent for public and patient amenities and supporting activities.

The MCAA project was originally scheduled to begin in FY 2015; however, it was deferred to FY 2017 in the Presidential Budget 2015 Defense Health Agency Future Years Defense Plan.[16] The clinical missions in the CMP are based on FY 2009 data, which do not reflect current and future demand.[59,102] FY 2013 eMSM workload data continue to reveal significant underutilization of current inpatient beds, operating rooms, labor and delivery rooms, and other clinical area capacity.[42] In addition, the 2010 CMP was programmed using prior DoD Space Planning Criteria, which may contribute to potential excess capacity in the current architectural design.[59,102] If the project is validated in some form, funding, redesign, and construction should proceed in an expeditious manner to complete the creation of a world-class medical center at WRNMMC.

6.3 Graduate Medical Education

The planning and programming associated with the 2005 BRAC projects for WRNMMC and FBCH were based on the distribution of graduate medical education (GME) trainees and their teaching staff to provide a continuum of learning experiences in a variety of clinical settings, ranging from a tertiary medical center at WRNMMC to community-based care at FBCH. However, in the three years since both new facilities opened, the Panel has been told that most specialty GME remains firmly entrenched at WRNMMC, which has resulted in underutilization of the new hospital at FBCH and, potentially, increased purchased care costs. Likewise, once the new Malcolm Grow MILCON project is completed, it will be important to fully utilize its ambulatory surgery capability and other services by optimizing staffing and GME experiences across all three MTFs. NCR-MD leaders are aware of the situation and are in the process of implementing corrective action plans.

Charges D and E Findings and Recommendations

Finding 21: The 2010 CMP was a critical element in assessing and coordinating the complex processes associated with the completion of multiple major construction projects, as well as merging of staff and cultures to create WRNMMC and FBCH. It has been very successful in achieving these original goals. However, with subsequent changes in care delivery and the MHS governance structure, the CMP now is insufficient to meet its mandate of creating world-class military medical facilities and an integrated system of health care delivery in the NCR. To realize the new MHS enterprise strategic goals, an updated CMP is necessary.

Recommendation 21.1: The MHS should update the 2010 CMP to reflect:

- **a) Single authority and budgetary control for all MTFs in the region;**
- **b) Full distribution of graduate medical education (GME) assets between WRNMMC and FBCH, which served as an important planning variable for the new FBCH, in order to provide community-based specialty care in Northern Virginia and further GME medical training experiences; and**
- **c) A plan to achieve full facility and staff asset utilization within the NCR.**

Recommendation 21.2: The CMP should be updated to reflect the NCR-MD eMSM strategic and business plan goals, current facility asset utilization, and future facility requirements, with the goal of developing a new strategic plan to transform the entire NCR-MD into a model IDS and high reliability organization.

Finding 22: Walter Reed National Military Medical Center's Addition/Alteration (MCAA) project requires revalidation and funding to realize world-class facility status.

Recommendation 22: DHA should:

- **a) Revalidate the appropriate care capacity, infrastructure, and support functions included in the MCAA project based on recently updated DoD Space Planning Criteria, changing venues of care delivery, plans to recapture care, and GME training requirements that maximize existing facility assets; and**
- **b) Following revalidation, proceed in an expeditious manner to complete the creation of a world-class medical center at Walter Reed.**

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7.0 METHODOLOGY AND STRATEGY FOR THE FINAL REPORT

In the time that remains before the Panel concludes its work and submits its Final Report on September 30, 2015, the Panel will continue to refine its recommendations, as well as examine the DHA's and Service's structure, processes, and outcomes that shape MHS facility infrastructure programming requirements. The Panel intends to convene regularly scheduled teleconference calls and will meet in person at least quarterly until the submission of its Final Report. To crystallize its findings and recommendations, the Panel will continue to receive briefings from subject matter experts in facility design, construction, and repair standards and engage in discussions with Defense Health Agency, Department of Defense, and industry leaders.

APPENDIX A. PANEL MEMBER BIOGRAPHIES

A. Ray Pentecost III, DrPH, FAIA, FACHA, LEED AP

Dr. Ray Pentecost III is the President of Design and Health, LLC in Norfolk, VA, as well as a Professor with appointments in both Public Health and Architecture at Texas Tech University, in Lubbock, TX. He is a licensed Architect, Board Certified in the healthcare architecture specialty, and a Fellow in both the American Institute of Architects (FAIA) as well as in the American College of Healthcare Architects (FACHA). He is a Leadership in Energy and Environmental Design Accredited Professional (LEED AP) and was formerly a Licensed Long Term Care Administrator.

Dr. Pentecost is the Immediate Past President of the International Academy for Design and Health based in Stockholm and a Past President of the American Institute of Architects (AIA) Academy of Architecture for Health. In 2012, Dr. Pentecost was named to Healthcare Design Magazine's list of The Most Influential People in Healthcare Design.

Dr. Pentecost currently serves as Chairman of the Board of Direction for the Building Research Information Knowledgebase (BRIK), an AIA/ National Institute of Building Sciences joint venture, building the world's premier online portal for building research information. BRIK went live on January 9, 2013. Dr. Pentecost also served as one of three co-chairs of the AIA's America's Design and Health Initiative, and currently serves as a member of the Design and Health Leadership Group for the AIA, which is focused on ways architecture can favorably impact the nation's health.

From 2008 to 2009, Dr. Pentecost served as a subject matter expert on the Achieving World Class study as a member of the Defense Health Board's National Capital Region Base Realignment and Closure Health Systems Advisory Subcommittee and helped assess whether the new WRNMMC and the new FBCH were being designed and constructed to be world-class medical facilities and, if not, what remedy was recommended.

Mark E. Erath, CPA, CGMA, CTS-MC, FACHE, FHFMA

Mr. Mark Erath most recently completed service as the Executive Vice President and Interim Chief Financial Officer of Parkland Health and Hospital System. The integrated, community-supported health system's hospital serves over 53,000 inpatients annually, includes over 860 beds, and will move into its new 2.5 million square foot, state-of-the-art facility in 2015. Parkland delivers high quality care to Dallas County residents through its centers of excellence, which include a large network of clinics (over one-million visits annually), the region's first and busiest Level I Trauma Center anchoring emergent and urgent care operations (over 240-thousand visits annually), the second largest civilian burn unit in the nation, and the Level III Neonatal Intensive Care Unit which provides the most acute care in North Texas.

Mr. Erath also served Geisinger Health System as Chief Financial Officer of Geisinger Medical Center, the flagship tertiary/quaternary care, teaching and research hospital platform, and led system-wide financial oversight for 10 clinical service lines.

A retired Partner with PricewaterhouseCoopers, Mr. Erath served diverse industry clients, concentrating on health care providers and payers, throughout his 30-year career as a consultant and auditor.

His first job, beginning at age 13, was as a volunteer stationed in the Surgery Department at Hotel Dieu Hospital in New Orleans.

A former Board Member and Board Treasurer for the Foundation for Critical Care and a former faculty member for The Governance Institute, Mr. Erath earned his Bachelor of Science degree in Accounting from Louisiana State University in Baton Rouge. He is a licensed Certified Public Accountant (CPA), Chartered Global Management Accountant (CGMA), Certified Technical Specialist-Managed Care (CTS-MC), board certified in healthcare management as a Fellow of the American College of Healthcare Executives (FACHE), board certified in healthcare finance as a Fellow of the Healthcare Financial Management Association (FHFMA), and trained as a Lean Six Sigma Greenbelt. He also serves the nation as a member of the Board of Examiners of the Malcolm Baldrige National Quality Award program.

Anjali Joseph, PhD, EDAC

Dr. Anjali Joseph currently is an associate professor and endowed chair of Architecture and Health Design and Research at Clemson University, and formerly was the Vice President and Director of Research at the Center for Health Design, leading and coordinating research activities. Dr. Joseph's work focused on understanding the relationship between the health care built environment and health care outcomes, specifically focusing on tools and guidelines that support the implementation of built environment research in health care practice to result in improved outcomes for patients, staff, and families.

She leads a number of grant funded research projects at the center including "Developing and Disseminating a Safety Risk Assessment Toolkit for Integrating Safety in the Healthcare Facility Design Process," "Designing for Patient Safety: Developing methods to integrate patient safety concerns into the facility design process," and "Patient Room Interior Design Checklist and Evaluation Tool." Dr. Joseph also works closely with the center's member health care organization, the Pebble Partners, throughout their evidence-based health care facility design projects. Many of these studies incorporate aspects of patient safety, such as hospital acquired infections and medication errors. Dr. Joseph also is a regular speaker at national and international conferences, including the Architecture, Construction, and Capital Equipment Summit and Exposition, Conference for Safe and Sustainable Hospitals, and Environments for Aging in 2013.

William Paul Kearns III, MBA, CPA, CHE, LFACHE, FHFMA

Mr. Paul Kearns, a member of the Senior Executive Service, served as Chief Financial Officer (CFO) of the Veterans' Health Administration (VHA) from November 17, 2006 until January 31, 2013. In this position, he served as the principal financial advisor to the Under Secretary for Health and was responsible for the management of VHA's $57 billion dollar budget system. This included budget formulation, justification, allocation, and execution processes; the financial management systems and assistance functions; and the managerial cost accounting decision support system. This financial system supports VHA's integrated health care delivery system for over eight million enrolled veterans through 21 integrated networks of 153 medical centers and over 828 outpatient clinics. Mr. Kearns joined the VA as VHA's Associate CFO for Resource Allocation and Analysis in February 2001. He was named Associate CFO for Resource Management in October 2003 and Deputy CFO in June 2004.

Mr. Kearns also served in senior health care financial management positions within the Office of the Secretary of Defense and the Department of the Air Force. While on the staff of the Assistant Secretary of Defense for Health Affairs, he was responsible for management of the MHS's $15 billion dollar annual budget, including the allocation of resources to the medical departments of the Services and for oversight of budget execution within the three Services. His career experience includes over 25 years as an active duty U.S. Air Force Medical Service Corps officer where he attained the rank of Colonel. During that period he served in senior financial management positions ranging from the Air Force's largest medical center, to the Office of the Command Surgeon in Europe, the Office of the Surgeon General in Washington, D.C., and the Office of the Assistant Secretary for Health Affairs, DoD, in Washington, D.C. He is a certified public accountant (CPA) licensed in California, a life fellow of the American College of Healthcare Executive (LFACHE), and a fellow of the Healthcare Financial Management Association (FHFMA).

Christine Malcolm, MBA

Ms. Christine Malcolm is a Managing Director for Navigant Healthcare, based in San Francisco, California. Ms. Malcolm is a nationally recognized strategic health care leader with experience in leading transformational change in some of the leading health care systems, academic medical centers and children's hospitals in the United States. She has a distinguished track record in the areas of health care leadership most important today, including network development, clinical transformation, accountable care organization development, physician integration and alignment, performance improvement, information technology, facilities, service line and clinical program development, funds flow, mergers and acquisitions, and strategy and growth.

Ms. Malcolm has been involved with a number of professional organizations over her career, including The Healthcare Executives Network (a network of 25 senior health care CEOs, academics and entrepreneurs), a number of societies of the American Hospital Association, and the Healthcare Strategy Institute. She also served on the Faculty of Rush University. While at Kaiser Permanente, she was influential in the green movement in health care including the formation of an alliance of 10 of the leading health systems in the United States, including

Partners, Ascension, Catholic Healthcare West, University of California San Francisco, Kaiser Permanente, and the Center for Health Design, Healthcare Without Harm and Practice Green Health to encourage hospitals to achieve the triple objective of health care that is safe for patients, health care workers, and the environment. Ms. Malcolm also served on the board of the Hospital Energy Alliance of the Department of Energy and actively collaborated with the Centers for Disease Control and Prevention and other federal agencies interested in safer, more environmentally-sensitive hospitals. She was also honored to be named to be a leader in healthcare design, by Healthcare Design Magazine.

Often quoted, and an active speaker, Ms. Malcolm has presented research and facilitated planning retreats in over 60 academic health centers, children's hospitals and health systems. She has been published in numerous journals on a variety of topics, including market evolution, capital formation for health systems, and specialty contracting.

Eileen B. Malone, RN, MSN, MS, EDAC

Ms. Eileen Malone is the Senior Partner of Mercury Healthcare Consulting, LLC, which supports clients in their use of EBD solutions for health facility projects as a means to improve patient, staff, and resource outcomes. Mercury Healthcare's recent clients include the MHS in their effort to implement and institutionalize EBD in the creation and life-cycle maintenance of their health care facilities. Ms. Malone also is a volunteer consultant, having recently served as a board member of the Facility Guidelines Institute, as well as a member of their 2014 Healthcare Guideline Revision Committee, charged with reviewing and updating the *Guidelines for Design and Construction of Health Care Facilities*. From 2008-2014, Ms. Malone served as a member of The Center for Health Design's Research Coalition and its Co-Chair from 2012-2014. She also participates as an advisory board member for several of CHD's grants projects focused on patient safety and the built environment.

From 2005 to 2010, Ms. Malone served as the on-call Senior Principal in the Center for Science and Technology for Noblis in Falls Church, Virginia and later with Mercury Health Consulting, LLC, assisting with the MHS's planning and transformation of an integrated-health care delivery system serving 450,000 beneficiaries in the Washington, D.C., area.

Her career experience includes over 26 years as an active duty Army Nurse Corps officer during which she served as the Army Medical Department Chief Information Officer, responsible for a world-wide IM/IT portfolio in excess of $500 million. Ms. Malone also served as the Senior Executive Medical Assistant to the Secretary of the Army's Business Transformation team, responsible for developing a prototype model of the Army Workload and Performance System for the medical community, Commander of DeWitt Community Hospital and Health Care Network at Fort Belvoir, Congressional Affairs Officer for Assistant Secretary of the Army for Manpower and Reserve Affairs, and in many clinical leadership positions, including numerous nurse practitioner assignments.

Don Orndoff, AIA, MS

Mr. Don Orndoff is Senior Vice President of National Facilities Services at Kaiser Permanente, one of America's leading health care providers and not-for-profit health plans, with an annual operating revenue of more than $50 billion. Mr. Orndoff is accountable for Kaiser Permanente's 78-million-square-foot real estate portfolio, including more than 1,000 facilities with a replacement value of $32 billion. He oversees an annual capital program of $3 billion and an annual operating budget of $1.5 billion. Mr. Orndoff leads National Facilities Services (NFS), a national organization of nearly 3,000 people who provide products and services to support the complete facilities management life cycle. Organized into five collaborative business lines, NFS supports Kaiser Permanente's business strategies with facilities planning and design, construction acquisition, real estate acquisition, facilities operations, and clinical technology.

Mr. Orndoff oversees Kaiser Permanente's energy strategy, which focuses on reducing energy intensity and pursuing green power opportunities to reduce greenhouse gas emissions. He has committed to spending $331 million this year with construction suppliers that are owned by minorities, women, and veterans to support Kaiser Permanente's continued commitment to diversity.

Prior to joining Kaiser Permanente in 2010, Mr. Orndoff served in the federal Senior Executive Service as director of the VA Office of Construction and Facilities Management in Washington, D.C. Prior to his work with the VA, he served as a commissioned officer for more than 29 years in the Civil Engineer Corps of the U.S. Navy, retiring at the rank of Captain.

William R. Rowley, MD

Dr. William Rowley is currently the Senior Fellow at the Institute for Alternative Futures in Alexandria, Virginia. His career experience includes over 28 years as an active duty Navy Officer, culminating his career as the Fleet Surgeon for the U.S. Atlantic Fleet, Command Surgeon for U.S. Joint Forces Command, and Medical Advisor for Allied Command Atlantic. Dr. Rowley held several other leadership positions in military health, including Commander of the Naval Medical Center Portsmouth and Lead Agent for the TRICARE Mid-Atlantic Region; Assistant Chief for Plans, Analysis, and Evaluation at the Navy Bureau of Medicine and Surgery (BUMED); and Deputy Assistant Chief for Health Care Operations of BUMED in Washington, D.C. He also served as an Associate Clinical Professor of Surgery at the Uniformed Services University of the Health Sciences for 25 years.

Dr. Rowley is Board Certified with the American Board of Surgery, with a Certification of Special Qualifications in General Vascular Surgery. He has authored chapters in the book *Decision Making in Vascular Surgery* and published articles on numerous health topics in peer-reviewed journals including Military Medicine.

Joseph G. Sprague, FAIA, FACHA, FHFI

For more than 40 years, Mr. Joseph Sprague has continued to promote design excellence within the health care industry for a multitude of project types including academic medical centers, cancer treatment facilities, specialty and community hospitals, and medical teaching facilities. As a principal and director of health facilities at Harwood K. Smith, Inc. (HKS) Architects, an internationally recognized leader in health facilities design, Mr. Sprague serves as health facilities principal and technical advisor on numerous health care projects. He oversees project execution, while providing substantive input in the areas of functional and space planning, master planning, and facility design.

Prior to joining HKS, Mr. Sprague was director of design and construction at the American Hospital Association. Responsible for representing hospitals nationwide including managing state-of-the-art resources in both government and voluntary standard setting bodies, Mr. Sprague developed a high degree of understanding of the principles utilized in health facilities standards affecting design.

Widely published in national health care design magazines for his work contributions and a frequent lecturer in health facility planning, design and construction, Mr. Sprague is a Fellow in the American Institute of Architects (FAIA), a Fellow in the American College of Healthcare Architects (FACHA), and a Fellow in the Health Facility Institute (FHFI). He is past president of the AIA Academy of Architecture for Health and is chairman emeritus of the FGI "Guidelines for Design and Construction of Health Care Facilities," a nationally recognized standard. In addition, he is president emeritus of FGI and former president of the American College of Healthcare Architects.

Most recently, Mr. Sprague has received the Individual Distinction Award from the Symposium on Healthcare Design organization. The award recognizes an individual in the field of architecture who has displayed leadership and vision within their organizations or project teams, and has gone above and beyond to enhance the healing environment. He also received the Lifetime Achievement Award from the American College of Healthcare Architects (ACHA), the highest honor that the ACHA can bestow on an architect.

Philip E. Tobey, FAIA, FACHA

Mr. Philip Tobey is Senior Vice President and a national health care leader of SmithGroupJJR, one of the nation's largest architectural/engineering firms. He has over 45 years of experience in health care planning and design for the country's leading academic medical centers and health care systems.

Mr. Tobey is a Fellow of the American Institute of Architects (FAIA) and Fellow and Founding Member of the American College of Healthcare Architects (FACHA). He is the recipient of the national 2012 Urbahn Medal for "eminent and notable contributions in the field of architecture" from the Society of American Military Engineers.

Widely recognized and highly regarded as one of the profession's leaders in health care architecture, Mr. Tobey has addressed many national and regional organizations concerning issues and trends that affect health care, including American Society of Hospital Executives, American Society of Hospital Engineers, American Society of Military Engineers, and AIA Academy of Architecture for Health.

Much of Mr. Tobey's career has focused on health care for DoD and VA. His planning experience includes master planning for all U.S. Army hospitals worldwide and planning for numerous U.S. Navy facilities and more than 20 VA hospitals. Recent projects of note include DoD Center for the Intrepid for Amputee Rehabilitation, DoD Intrepid Center for Traumatic Brain Injury, and a program of nine additional DoD Traumatic Brain Injury centers across the United States. In 2008, Mr. Tobey was appointed to the DHB's NCR BRAC HSAS that authored the study on Achieving World Class. The NDAA for FY 2010 subsequently codified the term world-class medical facility as it was defined in the 2009 report.

Prior to entering private practice, Mr. Tobey served as an officer with the U.S. Air Force Office of the Surgeon General with review responsibility for medical projects worldwide, and where for almost a year, he was on special assignment to the White House.

APPENDIX B. IKE SKELTON NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2011, SECTION 2852

SEC. 2852. REQUIREMENTS RELATED TO PROVIDING WORLD CLASS MILITARY MEDICAL CENTERS.

(a) UNIFIED CONSTRUCTION STANDARD FOR MILITARY CONSTRUCTION AND REPAIRS TO MILITARY MEDICAL CENTERS.—Not later than 180 days after the date of the enactment of this Act, the Secretary of Defense shall establish a unified construction standard for military construction and repairs for military medical centers that provides a single standard of care. This standard shall also include—

(1) size standards for operating rooms and patient recovery rooms; and

(2) such other construction standards that the Secretary considers necessary to support military medical centers.

(b) INDEPENDENT REVIEW PANEL.—

(1) ESTABLISHMENT; PURPOSE.—The Secretary of Defense shall establish an independent advisory panel for the purpose of—

(A) reviewing the unified construction standards established pursuant to subsection (a) to determine the standards consistency with industry practices and benchmarks for world class medical construction;

(B) reviewing ongoing construction programs within the Department of Defense to en-

sure medical construction standards are uniformly applied across applicable military medical centers;

(C) assessing the approach of the Department of Defense approach to planning and programming facility improvements with specific emphasis on—

(i) facility selection criteria and proportional assessment system; and

(ii) facility programming responsibilities between the Assistant Secretary of Defense for Health Affairs and the Secretaries of the military departments;

(D) assessing whether the Comprehensive Master Plan for the National Capital Region Medical, dated April 2010, is adequate to fulfill statutory requirements, as required by section 2714 of the Military Construction Authorization Act for Fiscal Year 2010 (division B of Public Law 111–84; 123 Stat. 2656), to ensure that the facilities and organizational structure described in the plan result in world class military medical centers in the National Capital Region; and

(E) making recommendations regarding any adjustments of the master plan referred to in subparagraph (D) that are needed to ensure the provision of world class military medical centers and delivery system in the National Capital Region.

(2) MEMBERS.—

(A) APPOINTMENTS BY SECRETARY.—The panel shall be composed of such members as determined by the Secretary of Defense, except that the Secretary shall include as members—

(i) medical facility design experts;

(ii) military healthcare professionals;

(iii) representatives of premier health care centers in the United States; and

(iv) former retired senior military officers with joint operational and budgetary experience.

(B) CONGRESSIONAL APPOINTMENTS.—The chairmen and ranking members of the Committees on the Armed Services of the Senate and House of Representatives may each designate one member of the panel.

(C) TERM.—Members of the panel may serve on the panel until the termination date specified in paragraph (7).

(D) COMPENSATION.—While performing duties on behalf of the panel, a member and any adviser referred to in paragraph (4) shall be reimbursed under Government travel regulations for necessary travel expenses.

(3) MEETINGS.—The panel shall meet not less than quarterly. The panel or its members may make other visits to military treatment centers and military headquarters in connection with the duties of the panel.

(4) STAFF AND ADVISORS.—The Secretary of Defense shall provide necessary administrative staff support to the panel. The panel may call in advisers for consultation.

(5) REPORTS.—

(A) INITIAL REPORT.—Not later than 120 days after the first meeting of the panel, the panel shall submit to the Secretary of Defense a written report containing—

(i) an assessment of the adequacy of the plan of the Department of Defense to address the items specified in subpara-

graphs (A) through (E) of paragraph (1) relating to the purposes of the panel; and

(ii) the recommendations of the panel to improve the plan.

(B) ADDITIONAL REPORTS.—Not later than February 1, 2011, and each February 1 thereafter until termination of the panel, the panel shall submit to the Secretary of Defense a report on the findings and recommendations of the panel to address any deficiencies identified by the panel.

(6) ASSESSMENT OF RECOMMENDATIONS.—Not later than 30 days after the date of the submission of each report under paragraph (5), the Secretary of Defense shall submit to the congressional defense committees a report including—

(A) a copy of the panel's assessment;

(B) an assessment by the Secretary of the findings and recommendations of the panel; and

(C) the plans of the Secretary for addressing such findings and recommendations.

(7) TERMINATION.—The panel shall terminate on September 30, 2015.

(c) DEFINITIONS.—In this section:

APPENDIX C. WHAT IS A WORLD-CLASS MEDICAL FACILITY?

Excerpted from Achieving World Class - An Independent Review of the Design Plans for the Walter Reed National Military Medical Center and the Fort Belvoir Community Hospital. National Capital Region Base Realignment and Closure Health Systems Advisory Subcommittee of the Defense Health Board. U.S. Department of Defense. May 2009. (Prepared in partial fulfillment of Section 2721, Public Law 110-417)

APPENDIX B

What Is a *World-class Medical Facility*?

As we men of medicine grow in learning we more justly appreciate our dependence on each other. The sum total of medical knowledge is now so great and wide spreading that it would be futile for any one man... to assume that he has even a working knowledge of any part of the whole... The best interest of the patient is the only interest to be considered, and in order that the sick may have the benefit of advancing knowledge, union of forces is necessary... It has become necessary to develop medicine as a cooperative science; the clinician, the specialist, and the laboratory workers uniting for the good of the patient, each assisting in elucidation of the problem at hand, and each dependent upon the other for support.

William J. Mayo, M.D.
Commencement Address
Rush Medical College, 1910

General Description

A *world-class medical facility* is one where the best of the art and science of medicine come together in a focused effort to meet the needs of the patient by providing the best in physical, mental, social and spiritual care.[1] A *world-class medical facility* routinely performs at the theoretical limit of what is possible and consistently and predictably delivers superior healthcare value – i.e., high quality-care and optimal treatment outcomes at a reasonable cost to the patient and society.

A medical facility achieves the distinction of being considered *world class* by doing many things in an exceptional manner, including applying evidence-based healthcare principles and practices, along with the latest advances in the biomedical, informatics and engineering sciences; using the most appropriate state of-the-art technologies in an easily accessible and safe healing environment; providing services with adequate numbers of well trained, competent and compassionate caregivers who are attuned to the patient's, and his or her family's culture, life experience and needs; providing care in the most condition appropriate setting with the aim of restoring patients to optimal health

[1] In most settings the term *healthcare facility* would be used instead of *medical facility*, but because the legislation requiring this report used the term *medical facility* that term is used here with the intent that it be viewed as being interchangeable with *healthcare facility*.

and functionality; and being led by skilled and pragmatic visionaries. The practices and processes of a *world-class medical facility* are models to emulate.

Many of the elements of a *world-class medical facility* can be objectively assessed and measured with existing methods, as reflected in the characteristics enumerated in the following section entitled Defining Characteristics; however, a *world-class medical facility* is more than the sum of its parts. Much of what distinguishes an institution, or facility, as being *world class* results from synergies between and among its parts and cannot be measured with currently available methods.

A *world-class medical facility* regularly goes above and beyond compliance with professional, accreditation and certification standards. It has a palpable commitment to excellence. A *world-class medical facility* has highly-skilled professionals working together with precision and passion as practiced teams within an environment of inquiry and discovery that creates an ambience that inspires trust and communicates confidence. A *world-class medical facility* constantly envisions what could be and goes beyond the best known medical practice to advance the frontiers of knowledge and pioneer improved processes of care so that the extraordinary becomes ordinary and the exceptional routine.

Defining Characteristics of a *World-class Medical Facility*

What is a Medical Facility?

In trying to define what it means to be a *world-class medical facility* it is understood that the physical structure, or facility per se, only provides the setting in which persons with health conditions are housed while doctors, nurses and myriad supporting personnel diagnose, administer treatment and provide other services needed to address health-related conditions and improve a person's health and functioning. While the facility does not diagnose, treat or provide any specific service, it is now well established that the design and construction of facilities can substantially affect the efficiency and effectiveness of making correct and timely diagnoses; the ease and accuracy of administering appropriate therapy; the attitude and morale of patients, visitors and healthcare workers; the culture of the organization and an environment that promotes the healing process.

In the following discussion, reference to *medical facility* is taken to mean the composite of the physical structure, the healthcare professionals who work there, the technology that they employ, and the processes and procedures used to accomplish their work, among other things.

Operational Characteristics of a World-class Medical Facility

To be considered world class, a medical facility must meet at least the 18 conditions in the 6 domains specified below.

I. Basic Infrastructure

The facility:

1. Has attained and maintains all accreditations and certifications that satisfy licensure and other statutory and regulatory requirements relating to the provision of the services offered at the facility.[2]

2. Provides comprehensive and definitive acute healthcare services in an integrated and coordinated manner that meets patient needs from birth (including the pre-term neonate) through the end of life, as demonstrated by, but not limited to:

a. providing services in all the specialty areas recognized by the American Board of Medical Specialties (ABMS), in so far as these specialties are reasonable and appropriate for the needs of the patient population and community served;

b. offering services in a preponderance of the subspecialty areas recognized by the ABMS; and

c. having clearly specified policies and procedures for referral and transfer of patients for highly specialized services that are generally centralized to a few locations, if such services are not provided at the facility.[3]

3. Has a high degree of facility readiness to provide high quality care as demonstrated by at least the following characteristics:

a. application of contemporary evidence-based knowledge and principles of design and construction and the utilization of state-of-the-art technology to, among other things:

1) create a healing environment and continuous healing relationships;

2) optimize the patient room environment and functionality for:

a) providing patient/family-centered care;

b) supporting the patient's and family's direct involvement in care delivery;

c) minimizing the need for patient movement; and

[2] For example, the Joint Commission, American Osteopathic Association (AOA) or Det Norske Veritas (DNV)accreditation; Accreditation Council for Graduate Medical Education (ACGME) postgraduate physician residency program accreditation; certifications by the American Association of Blood Banks, American College of Radiology, American College of Surgeons, College of American Pathologists, Nuclear Regulatory Commission, and the Food and Drug Administration's Division of Mammography Quality and Radiation Programs

[3] For example, definitive burn care, organ transplants, and spinal cord injury care and rehabilitation

d) allowing direct visual monitoring by caregivers.

3) facilitate effective communication between and among caregivers, patients and families;

4) support information management, as reflected by attaining at least stage 6 of the Healthcare Information and Management Systems Society (HIMSS) Electronic Medical Record Adoption Model;

5) minimize the occurrence of healthcare-related infections;

6) facilitate real time location tracking of patients and staff;

7) reduce patient and staff stress;

8) encourage retention of staff;

9) utilize unified communications;

10) support facility navigation and way-finding; and

11) achieve functional integration of component parts and processes into a coordinated
system;

b. assurance of equal access for all patients, families and staff to all clinical and routine nonclinical areas and activities throughout the interior and exterior areas of the facility by providing a physical barrier-free environment that exceeds minimum American with Disabilities Act(ADA) requirements;

c. development and regular testing of plans for continuity of operations during times of emergency or catastrophe due to epidemic, weather or other acts of nature, technological failure or terrorism, inter alia;

d. incorporation of significant flexibility and adaptability in the facility design and construction to accommodate changing practices and processes of care resulting from new knowledge, as well as optimization of surge capacity to accommodate the need to treat and manage unexpected large numbers of additional patients as might occur with an epidemic or disaster.

4. Assures that caregivers and other staff are prepared to perform competently and otherwise appropriately by, among other things:

a. promulgating policies for and standards of performance, conduct, and ethical behavior for all personnel, including job-specific and specialty-specific standards, as appropriate;

b. monitoring the performance of all employee's on a regular basis (at least annually) by direct observation of performance, formal testing, supervisor and peer review, patient feedback and/or other methods, as appropriate to the position;

c. providing feedback of monitoring results to the employee and, if relevant, concerned parties, together with counseling, mentoring and personal improvement or remediation programs, as needed;

d. promptly investigating all complaints or concerns voiced about the competence or safety of a caregiver's performance; and

e. carrying out whatever other actions are necessary to ensure that all caregivers and other staff are properly trained, equipped, fit and otherwise fully prepared to perform their assigned jobs.

II. Leadership and Culture

1. Provides executive leadership that is:

a. visionary and mission-focused;

b. experienced with demonstrated competence in the critical competencies identified by the National Center for Healthcare Leadership and the American College of Healthcare Executives (1);

c. stable over time; and

d. empowered with organizational and fiscal authority.

2. Organizes its governance structure and processes to, among other considerations:

a. ensure that the governing body is composed of appropriately knowledgeable and dedicated individuals who reflect and represent the interests of the organization and its stakeholders and who recognize the competencies required for excellent leaders;

b. facilitate effective communication with its medical staff and employee representatives;

c. assure that patient and patient family's views and perspectives about facility operations are known to facility management and the governing board; and

d. ensure that the governing board is actively involved in overseeing the operation of the institution, and especially in overseeing the quality and safety of care provided.

3. Manifests an organizational culture that:

a. continually strives for excellence, as demonstrated by, among other things:

1) the organization's mission, vision, core values, bylaws and strategic objectives;

2) the attainment of, or being in the process of attaining, the highest level of certification or designation for specialty services having generally recognized tiered levels of service;[4]

3) having been awarded "magnet status" by the American Nurses Credentialing Center (ANCC);

4) receipt of awards for excellence in organizational performance;[5]

5) establishment of multidisciplinary Centers of Excellence; and

6) the reputation and professional accomplishments of its staff;

b. seeks to be a high reliability organization by demonstrating, among other characteristics, proactive and relentless vigilance in

1) avoiding preventable patient harm, and

2) improving process effectiveness and efficiency;

c. actively encourages and rewards innovation;

d. promotes and supports teamwork, collaboration and partnerships, as demonstrated by, among other manifestations:

1) formally established collaborative relationships with other institutions and professional organizations;

2) routine utilization of one or more formal teamwork training methodologies for staff; and

3) recognition and awards for exceptional team performance and success;

e. creates a work environment that promotes employee satisfaction and well being by, among other things;

1) fostering an environment of civility and respect for patients and employees;

[4] For example, level 1 trauma center or comprehensive cancer center.

[5] For example, Malcolm Baldrige National Quality Award or state or regional quality awards.

2) reporting and addressing lateral violence;

3) supporting professional development; and

4) offering services such as child and elder care programs, telecommuting, flexible work schedules, and employee wellness and fitness programs;

f. is pro-active and non-punitive in identifying medical errors and recognizes medical errors and preventable adverse events as opportunities for process improvement, as demonstrated by, among other things:

1) utilization of a formal adverse event and near-miss reporting system;

2) routine application of clearly defined policies and procedures for root cause analysis and failure mode and effects analysis; and

3) establishment of formal processes of learning from the occurrence of adverse events;

g. recognizes the importance of culture, education, spiritual beliefs, life experience and health literacy on a person's response to injury or illness, their understanding and acceptance of diagnostic interventions and treatment, and in the healing process;

h. nurtures efforts to advance the frontiers of knowledge and to pioneer improved processes of care; and

i. understands that its responsibility does not stop at the hospital walls and recognizes the need to support, among other activities:

1) patient-focused care coordination, and

2) systematic examination of antecedents of hospitalization to reduce the need for such care.

III. Processes of Care

1. Organizes its services so that they are integrated and seamless between and among services in the facility and with home and community-based services.

2. Consistently applies contemporary evidence-based knowledge and principles and utilizes state-of-the-art technology in executing the following processes, among others:

a. diagnosis;

b. treatment;

c. documentation and records keeping;

d. medication management;

e. communication and care coordination;

f. knowledge management;

g. materiel management; and

h. business processes.

3. Routinely operationalizes evidence-based practices and processes in the delivery of care, including, but not limited to, those that:

a. implement the most recent set of "Safe Practices" endorsed by the National Quality Forum (2);

b. minimize the likelihood of the occurrence of the "never events" identified by the National Quality Forum (3);

c. implement the 6 aims and 10 "design rules" for healthcare in the 21st century espoused by the Institute of Medicine (4);

d. comply with the most recent National Patient Safety Goals and related specific expectations set by The Joint Commission (5);

e. are connected with known life-saving interventions such as evidence-based care for myocardial infarction, medication reconciliation and the ventilator bundle;

f. evaluate the quality of care provided to its sickest patients (i.e., those who die) by routinely utilizing the autopsy for quality assurance and education; and

g. utilize formal quality and process improvement methodologies as an integral element of all care processes.

4. Demonstrates transparency of processes by, among other manifestations:

a. routinely involving patients, patient families and employees in reviewing and determining the processes of care;

b. ensuring that patients are provided with complete information about their care that is appropriate to their level of healthcare literacy so that they can make informed decisions and fully participate in all decisions about their care;

c. responding openly, promptly and honestly when patients are injured by unanticipated adverse events or anticipated complications by:

1) informing the patient and/or the patient's designated representative, as appropriate, of what has happened and what will be done to remediate any injury and mitigate further injury;

2) investigating the cause(s) of the event and reporting the findings to the patient and/or the patient's designated representative, as appropriate;

3) providing emotional support for the patient as well as the caregivers involved in the adverse event; and

4) apologizing to the patient and his/her family and/or the patient's designated representative, as appropriate, when the institution or caregivers are responsible for the event; and

5) compensating the patient for costs associated with injury.

d. making publicly available performance data and de-identified results of root cause analyses.

IV. Performance

1. Complies with all relevant federal government performance reporting requirements;

2. Demonstrates superior performance (e.g., greater than the 90th percentile) against standardized industry metrics, including but not limited to those for:

a. clinical care;[6]

b. patient satisfaction and loyalty;[7]

c. employee satisfaction;

d. employee sick leave, absenteeism and retention;

e. work-related injuries and illnesses; and

f. stewardship of resources as reflected by expense control, operating efficiency and adequacy of revenue or appropriation to support sustained high level performance, among other considerations.

[6] For example, NQF endorsed performance measures for hospital and ambulatory care

[7] For example, NQF endorsed performance measures for patient satisfaction(H-CAPHS) or the American Consumer Satisfaction Index

V. Knowledge Management

1. Is regularly engaged in a full spectrum of scholarly activities, including, but not limited to:

a. providing graduate medical education and other health professional training;

b. conducting research, having its faculty and staff speak at scientific meetings and publish in peer-reviewed professional journals; and

c. utilizing a dedicated process to monitor, translate and apply research findings into clinical care, including a process for evaluating the results of new processes or pilot programs.

2. Has simulation laboratories for surgery, cardiac catheterization, endoscopy and emergency care, at a minimum.

VI. Community and Social Responsibility

1. Demonstrates a population health focus by routinely being involved in activities aimed at improving the community and constituency that it serves, as demonstrated by, but not limited to:

a. hosting or supporting health maintenance and disease early detection programs;

b. participating in local and regional disaster readiness programs; and

c. working with other organizations on community improvement projects.

2. Demonstrates environmental responsibility and sustainability in the facility design, construction and operation by, but not limited to:

a. having achieved Leadership in Energy and Environmental Design (LEED) certification;

b. embracing the recommendations contained in the latest edition of the *Green Guide for Healthcare*; and

c. disposing of potentially reusable medical devices with a Food and Drug Administration (FDA) cleared medical device reprocessor.

3. Demonstrates prudent use of resources by continually striving to reduce waste and inefficiencies.

The Spectrum of *World-class* Healthcare Facilities

A spectrum of healthcare facilities may seek to achieve world-class status, and the above defining characteristics may require modification when appropriate to a specific organization's mission. For example, a world-class community hospital may provide services in fewer specialties and subspecialties than a world-class academic medical center and may be engaged in relatively few scholarly activities, but would otherwise be expected to demonstrate the same characteristics. Likewise, a world-class military medical center must meet the requirements for being a world-class healthcare facility but also needs to ensure that it addresses the unique needs of active duty and retired military personnel, as well as the needs of the branch or branches of the Armed Forces served.

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APPENDIX D. GUIDING PRINCIPLES

Across the continuum of health care delivery, facilities set the stage for every patient experience and all services provided. America's sons and daughters who defend our Nation deserve world-class facilities within which they receive world-class health care. Achieving this worthy goal requires focused leadership and an organizational culture that embraces both patient-centered principles along with evidence-based patient care processes and infrastructure investments. Collectively, these characteristics allow for quality patient, staff, and organizational outcomes. Health care professionals must be well trained and practiced in the latest advances in care delivery in all settings; information technology systems must seamlessly integrate daily operations to support timely and accurate delivery; and medical facilities must provide a sustainable and healing environment that does not contribute to patient or staff harm, but rather enhances the patient and family member experience and provides positive working conditions for the health care team. During the past 10 years, DoD embarked on an ambitious program to improve its facility and technology infrastructure. It is now poised to evaluate the impact of these investments on desired outcomes, including its unique care delivery solution in the NCR, and to encourage current MILCON standards to be aligned with industry benchmarks.

Background Information: Several key legislative actions have had a transformative effect on DoD's ability to deliver care over the past decade. The 2005 BRAC Commission recommended realigning WRAMC with NNMC, establishing it as the new WRNMMC in Bethesda, Maryland, providing all complex care for both the region and as a world-wide referral facility, and relocating all non-tertiary (primary and specialty) patient care functions to a new community hospital at Fort Belvoir, Virginia. Section 2721 of the Duncan Hunter NDAA for FY 2009 recommended that beneficiary personnel living in the NCR deserve to be treated in world-class medical facilities. The DHB's NCR BRAC HSAS, in its 2009 report "Achieving World Class – An Independent Review of the Design Plans for the Walter Reed National Military Medical Center and the Fort Belvoir Community Hospital," defined the operational characteristics of a world-class medical facility. Section 2721 (a) of the FY 2010 NDAA required a comprehensive master plan be developed and implemented to provide sufficient world-class military medical facilities and an integrated system of health care delivery for the NCR. Section 2852 (b) of the Ike Skelton NDAA for FY 2011 required that an independent advisory panel provide advice and recommendations regarding a construction standard for military medical centers to provide a single standard of care.

Context: The MHS has faced multiple challenges over the past decade in providing medical care to its Service members and beneficiary population. These challenges included deploying a medically ready force fighting two wars, reorganizing governance functions, implementing enterprise-wide common business processes, and creating shared services in a more integrated delivery system. Further complicating matters in an ever-changing health care landscape are new regulatory stipulations, technology advancements, security requirements constraints, budgetary pressures, and base realignment and closure requirements. With each challenge, the MHS leadership responded diligently, taking decisive actions to address opportunities and mitigate risks.

World-Class Medical Facilities: In 2009, the DHB NCR BRAC HSAS defined the characteristics of a world-class medical facility, which consists of six domains including: basic infrastructure, leadership and culture, processes of care, performance, knowledge management, and community and social responsibility. A world-class medical facility must meet the 18 conditions specified in the 6 domains, including the four conditions found within the basic infrastructure domain: (1) Attain and maintain all accreditations and certifications that satisfy licensure and other statutory and regulatory requirements; (2) Provide comprehensive and definitive acute health care services in an integrated and coordinated manner that meets patient needs from birth through end of life; (3) Maintain a high degree of facility readiness; and (4) Assure caregivers and other staff are prepared to perform competently and appropriately.

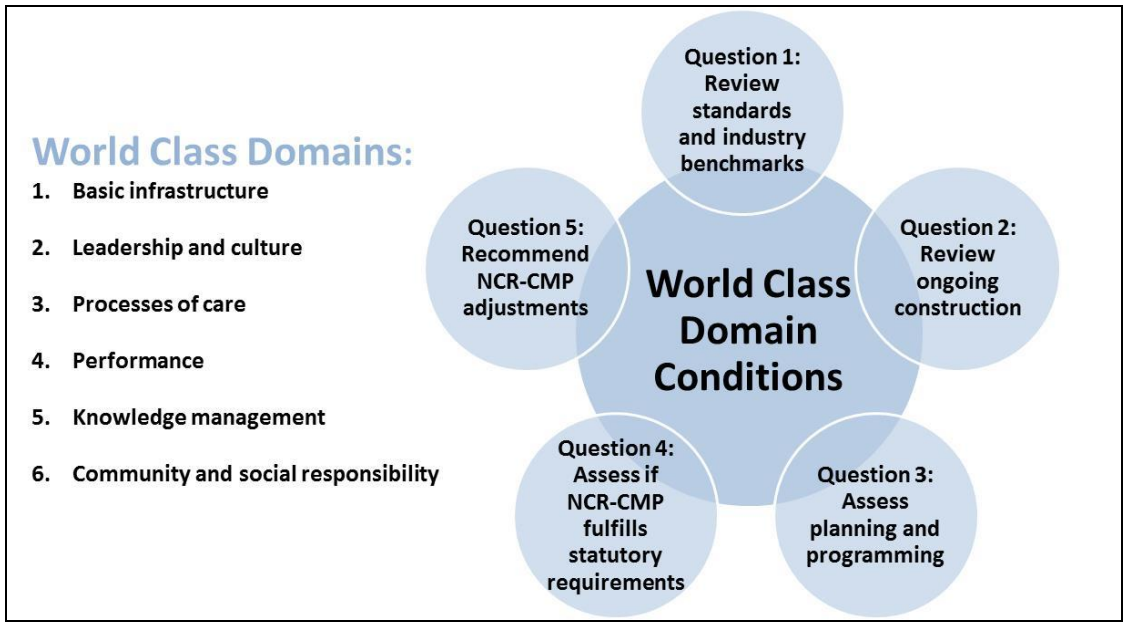
The design and physical structure of a medical facility can substantially affect the efficiency and effectiveness of the delivery of care. That is why it is critical that EBD and construction principles must be applied and utilized in developing state-of-the-art treatment facilities. In order to achieve world-class recognition within its MTFs, leadership must pursue excellence in multi-dimensional domains that are constantly evolving. Once achieved, world-class status cannot be viewed as an end point, but rather as a continuing pursuit of ever-changing processes.

Overarching Principle: The members of the Panel are charged with providing independent advice and recommendations on the following five issues found in Section 2852 (b) of the Ike Skelton FY 2011 NDAA: (1) Review the unified military construction standards and comparing them with industry practices and benchmarks; (2) Review DoD ongoing construction programs to ensure that medical construction standards are being uniformly applied; (3) Assess DoD's planning and programming approach for facility improvements; (4) Assess the CMP; and (5) Make recommendations to the master plan in order to ensure the provision of world-class military medical centers and delivery system in the NCR.

Panel members adopted the following definition of a world-class medical facility to guide their work:

> A *world-class medical facility* is one where the best of the art and science of medicine come together in a focused effort to meet the needs of the patient by providing the best in physical, mental, social and spiritual care. A *world-class medical facility* routinely performs at the theoretical limit of what is possible and consistently and predictably delivers superior healthcare value – i.e., high quality care and optimal treatment outcomes at a reasonable cost to the patient and society.[3(p.B-1)]

Building upon the work of the 2009 DHB Subcommittee, Panel members will use the world-class medical facility's 6 domains and 18 conditions as a framework to shape their analysis, advice, and recommendations in response to the five congressional issues, as depicted below.



Guiding Principles: Panel members also adopted seven specific guiding principles. These principles require that the Panel's advice and recommendations, when taken as a whole, indicate:

1. World class is not viewed as an end point, but rather as a pursuit of multidimensional processes that constantly evolve over time.
2. Clinical care requires a systems-wide approach across the continuum of care for which excellence is measured using meaningful outcomes.
3. MHS strategic goals, including integration, virtualization, population health prevention, and personalization, will shape facility investments.
4. Striking a balance between innovation and affordability is required to optimize health care services and infrastructure investments.
5. The development and approval of facility, information management, and technology investments must be integrated using an evidence-based design framework in order to maximize the return on investment, as measured through the achievement of MHS strategic outcomes.
6. Best health care practices found in the federal, private, and international sectors will be shared.
7. The enterprise-wide improvements accomplished by the MHS over the past decade will be properly acknowledged.

The Panel has been charged with developing recommendations to ensure that the medical facilities serving the Services are world class in their design and construction. Its reports and recommendations are made with the intent and hope that the users of DoD facilities are provided with the best possible medical care in the world. However, as the health care design and construction industry is continually evolving, we cannot ensure, warrant, or guarantee world-

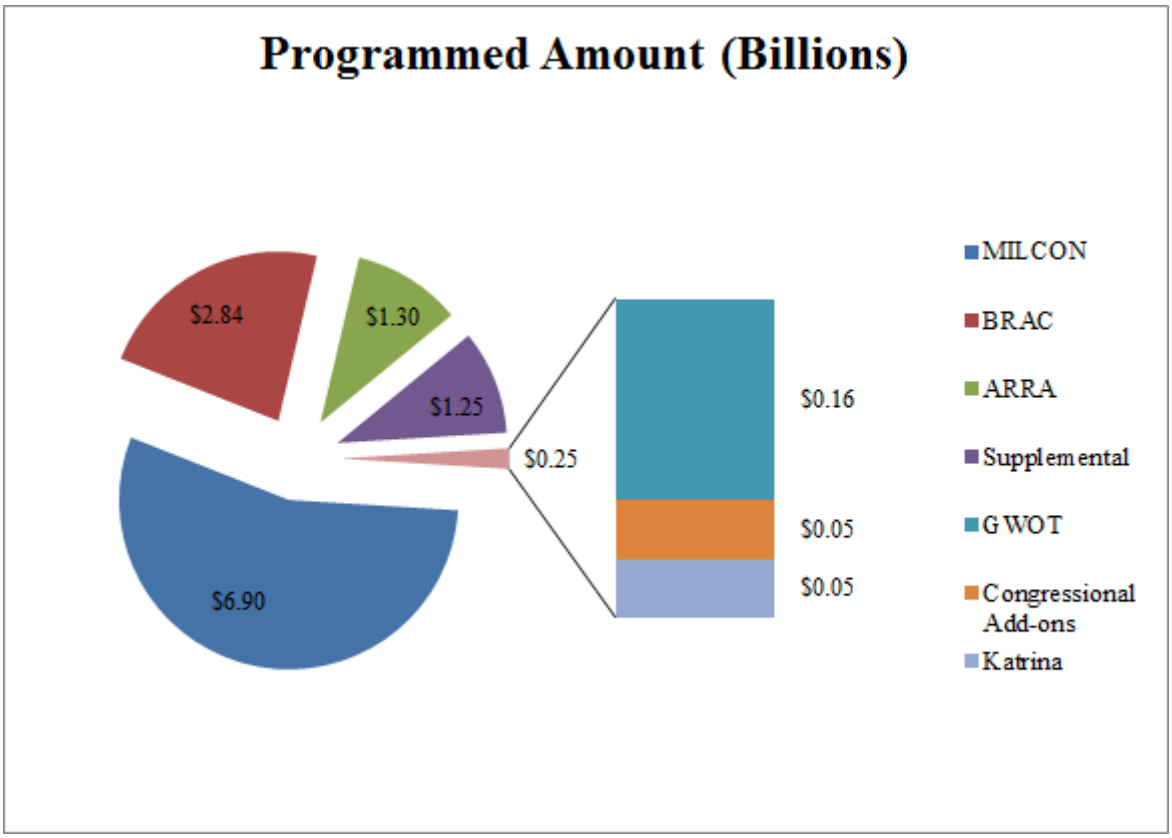
class outcomes or that the recommendations provided by the Panel are perfect, will be implemented without error, or cannot be improved upon in the future.

APPENDIX E. BACKGROUND INFORMATION: LEGISLATION, REPORTS, AND STUDIES

Congress plays a critical role in the routine review, authorization, and appropriation of funds for medical military construction (MILCON) programs. Between Fiscal Years (FYs) 2000 and 2013, Congress authorized $12.5 billion, depicted in Figure 14, to create 33 major additions/new hospitals, 104 major additions/new clinics, and 59 medical support facilities, excluding Unspecified Minor Construction projects.[29] The funds originated from various congressional acts, including the Base Closure and Realignment (BRAC) for FY 2005, the National Defense Authorization Act (NDAA) for FY 2008, the NDAA for FY 2009, American Recovery and Reinvestment Act (ARRA) of 2009, the NDAA for FY 2010, and the Ike Skelton NDAA for FY 2011.[29] The details for each act are summarized in this section, beginning with the enactment of the transformative 2005 BRAC legislation. Other funding sources include the FY 2006 Hurricane Relief and Recovery Supplemental for Katrina, the FY 2008 Global War on Terrorism, the FY 2012 Grow the Army Initiatives, Overseas Contingency Operations, and other supplemental sources, such as congressional add-ons.[29]

Additionally, medical MILCON specific legislative acts, general health care legislation, MHS services legislation, reports to Congress, and MHS studies shaped the evolution of DoD medical facility standards. These include: the enactment of the Patient Protection and Affordable Care Act (PPACA) in 2010, the issuance of the Task Force on Military Health System (MHS) Governance Report in 2011, and the establishment of the Defense Health Agency (DHA) in 2013, the proposed Presidential Budget for FY 2015, the Assistant Secretary of Defense for Health Affairs Six Lines of Effort, and the *Military Health System Review: Final Report to the Secretary of Defense* in August, 2014.

Figure 14. Programmed Amounts for Capital Investments (In Billions), Fiscal Years 2000-2013[29]



Adapted from DHA Facilites Division, 2014.

2005 Department of Defense Base Closure and Realignment Report

The 2005 BRAC Commission provided findings and recommendations regarding the bases and military installations recommended to be closed and/or realigned by DoD,[103] which were to be implemented no later than September 15, 2011. In total, BRAC funded 11 medical MILCON projects, including projects at Keesler Air Force Base, Fort Belvoir, Fort Sam Houston, Eglin Air Force Base, Dover Air Force Base, and Bethesda Naval Support Activity.

Specifically, the 2005 BRAC Commission recommended:

- Realigning Walter Reed Army Medical Center (WRAMC) with the National Naval Medical Center (NNMC), Bethesda, Maryland;
- Establishing the realigned facilities as the new Walter Reed National Military Medical Center (WRNMMC) to provide tertiary care for the region and serve as a worldwide referral facility; and
- Relocating "all non-tertiary … patient care functions"[8] to a new community hospital at Fort Belvoir, Virginia.

The purpose of these recommendations were to "transform legacy medical infrastructure into a premier, modernized joint operational medicine platform" and reduce "excess capacity within the [NCR] Multi-Service Market … while maintaining the same level of care for the beneficiaries."[8]

National Defense Authorization Act for Fiscal Year 2008, Section 722 to Establish a Joint Pathology Center and Section 1623 to Establish the Vision Center of Excellence

In the 2005 BRAC, the Secretary of Defense recommended the disestablishment of all elements of the Armed Forces Institute of Pathology (AFIP), with the exception of the National Medical Museum and the Tissue Repository.[8] The BRAC Commission, however, altered the proposed recommendations, requesting that the AFIP's "capabilities not specified in this recommendation will be absorbed into other DoD, federal, or civilian facilities,"[8] allowing the Joint Pathology Center to be maintained as a DoD or federal entity. In Section 722 of the FY 2008 National Defense Authorization Act (NDAA), Congress highlighted the importance of the medical capabilities of the AFIP and called for the establishment and maintenance of a Joint Pathology Center by the President. The Joint Pathology Center would serve "as the reference center in pathology for the Federal Government."[9]

Section 1623 of the FY 2008 NDAA also called for the Secretary of Defense to establish, in DoD, a center of excellence in the prevention, diagnosis, mitigation, treatment, and rehabilitation of military eye injuries. The 2008 NDAA also mandated collaboration with the "Secretary of Veterans Affairs, institutions of higher education, and other appropriate public and private entities (including international entities)." The center of excellence was to include a registry, named the Defense and Veterans Eye Injury and Vision Registry, requiring electronic exchanges with the VA, as well as access to the registry by the VA.[9]

Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Section 2721, Defense Health Board Recommendations, and Definition of a World-Class Medical Facility

The Duncan Hunter NDAA for FY 2009, Section 2721, recommended that beneficiaries living in the NCR deserve to be treated in world-class medical facilities, which incorporate "the best practices of the premier private health facilities in the country as well as the collaborative input of military health care professionals into a design that supports the unique needs of military personnel and their families."[10] Additionally, it identified the 2005 BRAC as an opportunity to offer "the highest quality of joint service care for members of the Armed Forces and their families."[10]

Section 2721 of the FY 2009 NDAA also established a panel to recommend whether the design plans for WRNMMC and Fort Belvoir Community Hospital (FBCH) would achieve the goal of providing world-class medical facilities. In May 2009, this panel, the NCR Base Realignment and Closure Health Systems Advisory Subcommittee (HSAS) of the Defense Health Board (DHB), subsequently published *Achieving World Class – An Independent Review of the Design Plans for the Walter Reed National Military Medical Center and the Fort Belvoir Community Hospital*. The NCR BRAC HSAS was charged with reviewing "the design and construction plans for the new WRNMMC and the new FBCH to determine if they were being designed and

constructed to be world-class medical facilities and, if not, what should be done to remedy any perceived deficiencies."[27]

The group's 2009 report issued five primary recommendations:

A. Further planning for the new WRNMMC and FBCH, as well as development of the NCR [integrated delivery system], should be guided by the definition of *world-class medical facility* [developed by the Subcommittee].
B. One official should be empowered with singular organizational and budgetary authority and staffed appropriately to manage and lead the health care integration efforts and operations in the NCR. This should be accomplished as quickly as possible, and this official's authority should extend over all DoD healthcare facilities and resources that impact healthcare operations within the NCR …
C. Deficiencies in the current plans for the WRNMMC should be corrected, and the funding needed to correct these [deficiencies] should be identified as soon as possible ...
D. A plan to assess the outcomes, benefits, and return on investment, among other things, of the design processes used for the new WRNMMC and FBCH, as well as the benefits of incorporating [evidence-based design] principles in these facilities, should be developed, funded, and implemented.
E. New construction should proceed as currently planned, assuming that the needed master plans are developed in a timely manner.[27]

Additionally NCR BRAC HSAS defined the term *world-class medical facility*. This definition consists of 6 domains and 18 conditions that a facility must meet to be considered world class. The full definition of a world-class medical facility can be found in Appendix D.

American Recovery and Reinvestment Act of 2009

ARRA, more commonly known as the Stimulus Package or the Recovery Act, had three primary goals: to create new jobs and save existing ones, to spur economic activity, and to invest in long-term growth and foster unprecedented levels of accountability and transparency in government spending. ARRA strived to achieve those goals by funding federal contracts, grants, and loans. The law was signed February 17, 2009, and included $1.3 billion for DoD hospitals. DoD submitted a construction plan in May 2009 that included hospital replacements for Fort Hood and Camp Pendleton and an alteration project for Naval Hospital Jacksonville. These projects created and/or preserved jobs in the community, allowed DoD to improve health care capabilities, and improved the quality of the total MHS inventory by addressing aged, poor condition facilities at each location. Additionally, while not the intent of the legislation, it provided DoD the flexibility to use project delivery methods and design standards that could serve as benchmarks for potential future research.[11]

National Defense Authorization Act for Fiscal Year 2010, Section 2714, and Comprehensive Master Plan

The NDAA for FY 2010, Section 2714, required a comprehensive master plan be developed and implemented that provides "sufficient world class military medical facilities and an integrated

system of health care delivery for the NCR."[12] This plan, the "Comprehensive Master Plan (CMP) for the National Capital Region Medical" and its supplement, "Supplement to the Comprehensive Master Plan for the National Capital Region Medical: Schedule for Completion of Requirements and Updated Cost Estimates," was published in April 2010 and August 2010, respectively. The NDAA for FY 2010 also codified the term *world-class military medical facilities* as it was defined in the HSAS' May 2009 report.

As part of the CMP process, DoD initiated a medical facilities master plan. The CMP "provide[d] the framework and specific action plans for world-class military medical hospitals and an integrated system of healthcare delivery for the NCR" and estimated the NCR needed an additional $781 million to achieve a world-class standard.[59]

In response to a NCR BRAC HSAS recommendation related to "singular organizational and budgetary authority" and to allow for more efficient operations, the CMP assigned operational control of WRAMC, NNMC, and DeWitt Army Community Hospital to the Commander of the Joint Task Force National Capital Region Medical (JTF CapMed), who also would maintain authority over the new WRNMMC and FBCH. DoD also instituted a tri-Service merger and established WRNMMC and FBCH as joint hospitals with joint manning in order to effectively staff the two MTFs.

The CMP also included information management/information technology improvements to support the development of world-class medical facilities, such as Smart Suite Technology, Real Time Location System Technology, and a Joint Medical Network that allows for sharing of patient information between WRNMMC and FBCH.

Ike Skelton National Defense Authorization Act for Fiscal Year 2011, Section 2852, and Establishment of the Independent Review Panel on Military Medical Construction Standards

This act, described in the Section 1.0 of this report, required the establishment of a unified construction standard for MILCON and repairs for military medical centers that provides a single standard of care and the establishment of the Independent Review Panel on Military Medical Construction Standards, charged with addressing five key tasks.

Patient Protection and Affordable Care Act

The Patient Protection and Affordable Care Act (PPACA) represents the most significant and comprehensive health care reform legislation in half a century. It was enacted March 23, 2010, with the Triple Aim goals of better care, healthier people and communities, and affordable care. Specifically, it aims to increase access to health care insurance using a variety of programs and incentives; increase prevention and wellness provisions; and improve health care quality, system performance, and efficiency of health care by incentivizing health care providers to improve care, reduce errors, and decrease costs. It intends to prevent chronic disease and improve public health; increase the supply of health care professionals; enhance transparency and program integrity; and increase the availability of effective and low-cost medication. Additionally, it aims to increase access to long-term care services; reduce personal health care costs and increase the affordability of health care; and modernize the American Indian health care system.[13]

The legislation intends to make care safer by reducing harm, such as healthcare-associated infections, falls, and medication errors that occur in the delivery of care. This is to be accomplished by creating several Pay-for-Performance programs, including the FY 2013 Hospital Value-Based Purchasing Program, the FY 2013 Hospital Readmissions Reduction Program, and, in FY 2015, the Hospital Acquired Conditions Reduction Program. This legislation also builds on the 2003 Medicare Prescription Drug Improvement and Modernization Act provision that established the Hospital Inpatient Quality Reporting Program and the 2005 Deficit Reduction Act. These initiatives created the Hospital-Acquired Condition Program in reaction to the Institute of Medicine (IOM) study, *To Err is Human*, which estimated between 44,000 and 98,000 Americans are killed each year by hospital-acquired conditions.[104] More recent studies have shown that rates of preventable patient harm are closer to four times higher than indicated in the IOM report,[105] representing the third leading cause of death in America as estimated by patient safety experts.[106] Another priority of the PPACA is to engage patients as partners in their care and improve their health care experience. Evidence-based design (EBD) research reveals that the design and operation of the physical environment plays an important role in these patient-harm events.

The MHS shares these PPACA priorities in its goal of becoming a high reliability, high-performing organization by creating "…an optimal health care environment..."[2] that focuses on continuous quality improvement. In addition, since two-thirds of the care provided to DoD beneficiaries occurs in the private sector,[107] using the same outcome measures could potentially provide a more direct comparison about the quality of care received by DoD beneficiaries in both the direct care system and purchased care system.

Task Force on Military Health System Governance

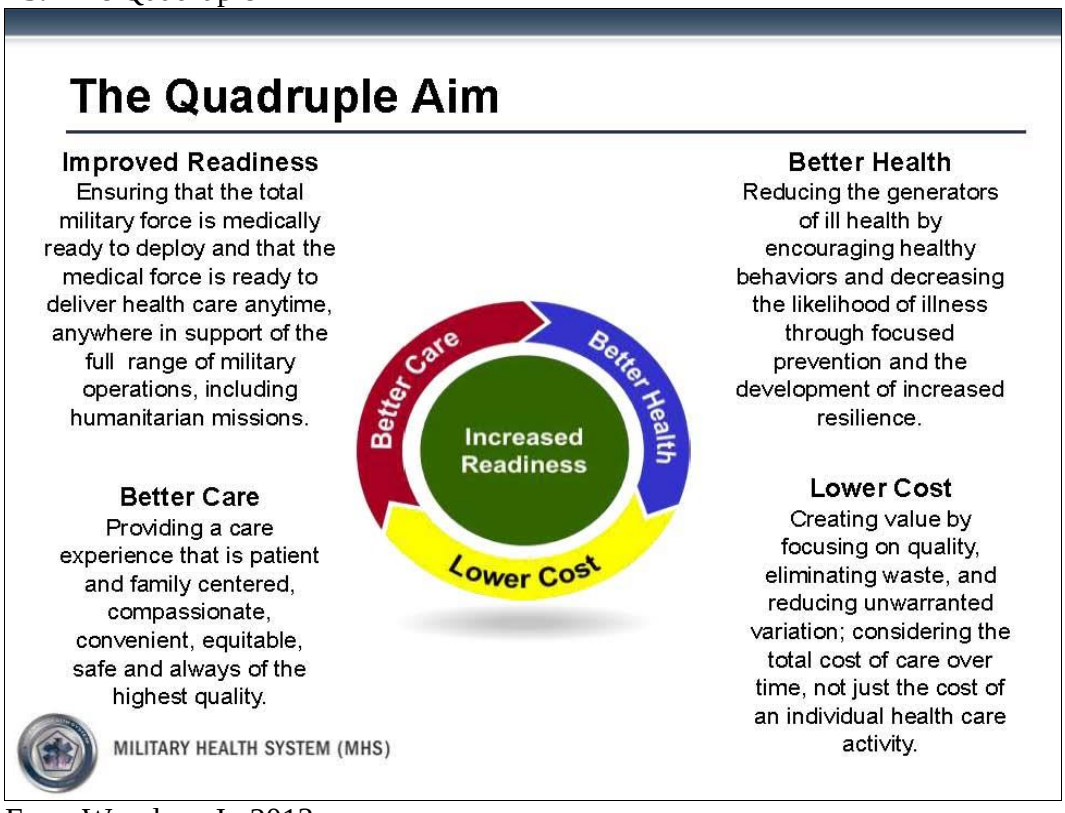
The Task Force on MHS Governance, established June 14, 2011, "consisted of representatives from the Military Departments, the Joint Staff, and the Office of the Secretary of Defense." It was directed "to evaluate options for the long-term governance of the MHS as a whole and the governance of multi-Service health care markets."[14] This report describes the governance structure that was in place at the time and reviews the organizational changes from 2003, which introduced the concept of a Multi-Service Markets, as well as changes in 2007 with the creation of the Joint Task Force Capital Medical (JTF CapMed) and its responsibilities specific to the NCR. The Task Force used these two changes as the basis for its analysis to develop and evaluate a variety of models related to overall MHS governance, multi-Service market governance, and NCR governance using a set of criteria outlined in the Task Force's Terms of Reference. The NCR was addressed in more detail due to required oversight of the consolidation and realignment of military health care resources within the Joint Operating Area in accordance with BRAC obligations.

The Task Force ultimately recommended in its September 29, 2011 report the establishment of the DHA to provide shared health care support services and the creation of an enhanced-Multi Service Market (eMSM) management model for the NCR and the 14 other multi-Service Markets.[14]

National Defense Authorization Act for Fiscal Year 2013, Section 731, and Establishment of the Defense Health Agency

The DHA was established by the Secretary of Defense on October 1, 2013, as a result of the Deputy Secretary of Defense's March 11, 2013, memorandum, "Implementation of Military Health System Governance Reform," to accomplish the MHS Quadruple Aim of increased readiness, better health, better care, and lower cost, as shown in Figure 15. This memorandum directed implementation of MHS governance reform described in the Deputy Secretary of Defense's March 2, 2012, memorandum, "Planning for Reform of the Governance of the Military Health System," and had been included in Section 731 of the FY 2013 NDAA. The March 11, 2013, memorandum directed the Under Secretary of Defense for Personnel and Readiness (USD(P&R)) and the Assistant Secretary of Defense for Health Affairs (ASD(HA)) to create a Defense Health Governance Council that included representatives from the Services. This council was charged to take steps to support efforts to achieve jointness, enhance fiscal sustainability, and integrate health care delivery. The memorandum also created six eMSMs of which ASD(HA) was given management oversight. The Deputy Secretary of Defense provided DHA with eMSM authority over NCR facilities with specific authority, direction, and control over the NCR inpatient facilities and its supporting clinics (unlike the other five eMSMs). Enhanced authority gave each eMSM the authority to allocate a budget for their market, direct common clinical and business functions, optimize readiness, and direct the movement of both workload and workforce within their respective markets.[7]

Figure 15. The Quadruple Aim[39]



From Woodson J., 2013.

The DHA is "responsible for driving greater integration of clinical and business processes across the [MHS], implementing shared services with common measurement of outcomes, enabling rapid adoption of proven practices, helping reduce unwanted variation, and improving the coordination of care across time and treatment venues."[108] The DHA also is a Combat Support Agency that meets the needs of the combatant commanders by ensuring that "Service members are medically ready to perform their mission, and [DoD's] military medical personnel are ready to perform their mission."[108]

> The DHA is a Combat Support Agency supporting the Military Services. The DHA supports the delivery of integrated, affordable, and high quality health services to beneficiaries of the MHS, and executes responsibility for shared services, functions, and activities of the MHS and other common clinical and business processes in support of the Military Services. The DHA serves as the program manager for the TRICARE health plan, medical resources, and the market manager for the [NCR] eMSM. The DHA manages the execution of policy as issued by the Assistant Secretary of Defense for Health Affairs and exercises authority, direction, and control over the inpatient facilities and their subordinate clinics assigned to the DHA in the NCR Directorate.[108]

Prior to the establishment of the DHA, the TRICARE Management Activity (TMA) was responsible for managing the TRICARE health plan, and JTF CapMed had authority over the NCR Medical Directorate. TMA was established February 10, 1998, to: oversee TRICARE, DoD's managed health care program for uniformed Service members and their families; enhance TRICARE performance worldwide; and provide "availability and affordability of high-quality, accessible health care to DoD beneficiaries worldwide."[109,110]

JTF CapMed was established September 12, 2007 in response to the Deputy Secretary of Defense's September 12, 2007, Memorandum, "Establishing Authority for Joint Task Force - National Capital Region/Medical (JTF CapMed) and JTF CapMed Transition Team (Unclassified)." JTF CapMed was created to "ensure the effective and efficient delivery of world-class military healthcare within the NCR" and to "oversee the consolidation and realignment of military healthcare within [the joint operating area] in accordance with [BRAC]."[111] The formation of DHA disestablished TMA and JTF CapMed.[7]

PROPOSED FISCAL YEAR 2015 BUDGET

The MCAA project was originally scheduled to begin in FY 2015; however, it was deferred to FY 2017 in the Presidential Budget 2015 Defense Health Agency Future Years Defense Plan.[16] As described in Section 6.0 of this report, the Panel assessed the adequacy of the 2010 CMP and provided recommendations in light of a changing MHS.

Six Lines of Effort for the Military Health System

Over the last 12 years of war, the MHS has made steady progress toward greater integration, both among the Services and with external partners. Dr. Jonathan Woodson, Assistant Secretary of Defense for Health Affairs, developed six strategic lines of effort to position the MHS to be stronger and more flexible in providing care to beneficiaries.[6]

1. **Modernize enterprise management:** The establishment of DHA with its 10 shared services represents one of the signature changes to modernizing MHS management with an enterprise focus.
2. **Continually improve medical capabilities:** DoD has completed the MHS Modernization Study and is focused on telehealth and teleradiation, which will enable providers world-wide to provide care. Advanced simulation platforms also have been developed.
3. **Ensure ready medical force is balanced to meet Combatant Commanders' requirements:** DoD is reforming policies and procedures related to pulling medical providers from the Reserves as it balances its Active and Reserve Component resources in order to meet any future contingency.
4. **Develop and support strategic partnerships to support readiness, clinical skills, training, and research:** DoD is developing relationships with key professional and academic organizations to position itself to be well prepared in the 21st century and to advance military medicine.
5. **Transform the TRICARE Benefit Program to ensure the program's long-term viability:** DoD is committed to modernizing TRICARE and is conducting analyses to determine what needs modernization.
6. **Define and develop the MHS core resources and competencies to support Global Health Engagement:** DoD is defining requirements and core competencies in global health management.

Military Health System Review: Final Report to the Secretary of Defense, August 2014

On May 28, 2014, the Secretary of Defense ordered a comprehensive review of the MHS to assess whether: 1) access to medical care in the MHS meets defined access standards; 2) the quality of health care in the MHS meets or exceeds defined benchmarks; and 3) the MHS has created a culture of safety with effective processes for ensuring safe and reliable care of beneficiaries. This was the first enterprise review of such scope in these areas. Based on information analyzed during the working group's review, the group concluded that the "MHS provides good quality care that is safe and timely, and is comparable to that found in the civilian sector. However, the MHS demonstrates wide performance variability with some areas better than civilian counterparts and other areas below national benchmarks."[2(p. 1)]

Among the major findings of relevance to this report are the following:

- The new MHS governance structure has resulted in significant gains in terms of collaboration and alignment among the Services and the Defense Health Agency. However, no single set of metrics is used across the enterprise to monitor performance in the areas of access, quality, and safety, nor are there performance reviews of the system as a whole in these areas. Moreover, the purchased care component is not aligned with the direct care component in terms of data collected or metrics used, making it difficult to draw comparisons between the two components.[2(p.3)]
- On average, access to care meets the identified standards; however, performance varies across the system and purchased care data are incomplete.[2(p.4)]
- Overall, the review of quality measures showed mixed results. Although there are areas in which the MHS excels, there is considerable variation across the system, both for specific clinical measures and for individual MTFs. Additionally, there is a general deficiency of data concerning clinical quality and outcome measures for care provided in the purchased care component.[2(p.5)]

Relevant recommendations include:

- Establishing clear enterprise performance goals with standardized metrics and holding the system accountable for improvement;
- Making good decisions by relying on accurate data; and
- Leveraging common standards and processes to facilitate improvement.[2]

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APPENDIX F. LIST OF ACRONYMS

Acronym	Definition
AB	Air Base
ABMS	American Board of Medical Specialties
ACHA	American College of Healthcare Architects
ADA	American with Disabilities Act
ADAL	Additions and Alterations
AE	Architect/Engineer
AFB	Air Force Base
AFMSA	Air Force Medical Support Agency
AHC	Army Health Clinic
AIA	American Institute of Architects
ANCC	American Nurses Credentialing Center
ARRA	American Recovery and Reinvestment Act
ASD(HA)	Assistant Secretary of Defense for Health Affairs
BEE	Bioenvironmental Engineering
BES	Budget Estimate Submission
BIM	Building Information Modeling
BIOT	British Indian Ocean Territory
BMC	Branch Medical Clinic
BRAC	Base Realignment and Closure
BRIK	Building Research Information Knowledge
BUMED	Navy Bureau of Medicine and Surgery
CFO	Chief Financial Officer
CFOIC	Chief Financial Officer Integration Committee
CGMA	Chartered Global Management Accountant
CIDM	Capital Investment Decision Model
CIRB	Capital Investment Review Board
CMP	Comprehensive Master Plan for the National Capital Region Medical
CONG ADD	Congressional Add
CONOPS	Concept of Operations
CPA	Certified Public Accountant
CRDAMC	Carl R. Darnall Army Medical Center
CTS-MC	Certified Technical Specialist-Managed Care
DAR	Defense Access Roads
DB	Design-Build
DBB	Design-Bid-Build
DBIO	Design Build Initial Outfit
DHA	Defense Health Agency
DHB	Defense Health Board
DHHQ	Defense Health Headquarters

Acronym	Definition
DIACAP	Department of Defense Information Assurance Certification and Accreditation Process
DMLSS-E&TM	Defense Medical Logistics Standard Support – Equipment and Technology Management
DMLSS-FM	Defense Medical Logistics Standard Support – Facility Management
DoD	Department of Defense
EBD	Evidence-Based Design
ECI	Early Contractor Involvement
ED	Emergency Department
EHR	Electronic Health Record
eMSM	Enhanced Multi-Service Market
EPMU	Environmental and Preventive Medicine Unit
FACHA	Fellow of the American College of Healthcare Architects
FACHE	Fellow of the American College of Healthcare Executives
FAIA	Fellow of the American Institute of Architects
FBCH	Fort Belvoir Community Hospital
FDA	Food and Drug Administration
FGI	Facilities Guidelines Institute
FHFMA	Fellow of the Healthcare Financial Management Association
FIRM	Facility Innovation and Research Model
FM	Facility Manager
FTE	Full Time Equivalent
FY	Fiscal Year
GME	Graduate Medical Education
GWOT	Global War on Terror
HCRA	Health Care Requirements Analysis
HIMSS	Health Information and Management Systems Society
HRO	High Reliability Organization
HSAS	Health Systems Advisory Subcommittee
IDBB	Integrated Design Bid Build
IBS	Interstitial Building Space
IDS	Integrated Delivery System
IM	Information Management
IT	Information Technology
IO&T	Initial outfitting and training
IRP	Independent Review Panel on Military Medical Construction Standards
JBER	Joint Base Elmendorf-Richardson
JBLE	Joint Base Langley-Eustis
JBSA	Joint Base San Antonio
JPC	Joint Pathology Center
JTF CapMed	Joint Task Force National Capital Regional Medical
JRM	Joint Region Marianas

Acronym	Definition
KP	Kaiser Permanente
LDR	Labor, Delivery, and Recovery
LEED	Leadership in Energy and Environmental Design
LFACHE	Life Fellow of the American College of Healthcare Executives
LRC	Logistics Readiness Center
MCAA	Medical Center Addition/Alteration
MCB	Marine Corps Base
MHS	Military Health System
MILCON	Military Construction
MIL-STD	Military Standard
MRI	Magnetic Resonance Imaging
MTF	Military Treatment Facility
MX	Medical Facilities Center of Expertise
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NBHC	Naval Branch Health Clinic
NCR	National Capital Region
NCR-MD	National Capital Region Medical Directorate
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NFS	National Facilities Services
NHC	Naval Health Clinic
NHCP	Naval Hospital Camp Pendleton
NIBC	National Interagency Biodefense Campus
NICoE	National Intrepid Center of Excellence
NMCSD	Naval Medical Center San Diego
NNMC	National Naval Medical Center
NS	Naval Station
NSA	Naval Support Activity
NSF	Naval Support Facility
NWS	Naval Weapons Station
O&M	Operations and Maintenance
OP	Other Procurement
OR	Operating Room
OSD(HA)	Office of the Secretary of Defense for Health Affairs
PDT	Project Delivery Team
PFD	Program for Design
POE	Post-Occupancy Evaluation
PPACA	Patient Protection and Affordable Care Act
PRC	Project Room Contents
PRV	Plant Replacement Value
RAF	Royal Air Force
SAMHS	San Antonio Military Health System

Acronym	Definition
SAMMC	San Antonio Military Medical Center
SEPS	Space and Equipment Planning System
SME	Subject Matter Expert
SMMAC	Senior Military Medical Action Council
SUPP	Supplemental
TMA	TRICARE Management Activity
TMC	Troop Medical Clinic
UFC	Unified Facilities Criteria
UMC	Unspecified Minor Construction
USACE	U.S. Army Corps of Engineers
USAMRIID	U.S. Army Medical Research Institute of Infectious Diseases
USC	United States Code
USD(P&R)	Under Secretary of Defense for Personnel and Readiness
USUHS	Uniformed Services University of the Health Sciences
VA	Veterans Affairs
VCE	Vision Center of Excellence
VHA	Veterans Health Administration
WHASC	Wilford Hall Ambulatory Surgical Center
WRAMC	Walter Reed Army Medical Center
WRM	War Readiness Material
WRNMMC	Walter Reed National Military Medical Center

APPENDIX G. DEPARTMENT OF DEFENSE MEDICAL MILITARY CONSTRUCTION POLICY, STANDARDS CRITERIA, AND GUIDELINES

The MHS has defined policies, standards criteria, and guidelines for effective facility life-cycle management in support of the MHS standard of care, which are summarized in Section 1.3.

DEPARTMENT OF DEFENSE MEDICAL SPACE PLANNING CRITERIA FOR HEALTH FACILITIES

The Office of the Secretary of Defense for Health Affairs Portfolio Planning and Management Division established the "DoD Medical Space Planning Criteria for Health Facilities," requirements that "define and provide specialized working environments within medical facilities according to departments and function areas within the departments" and "provide current guidance for the most efficient utilization of space to meet medical requirements." The primary purpose of this document is to identify how much space is authorized for a given medical function based on specific planning criteria, including current and projected staffing, mission, and workload. These criteria are regularly updated and recent care models, standards of care, and technology are considered during their development.[17,20]

UNIFIED FACILITIES CRITERIA

Unified Facilities Criteria (UFC) 4-510-01 provide mandatory programming, planning, design, and construction policies and procedures throughout the capital investment life cycle. UFC are used regardless of the source of funding and should be employed "in non-[Military Construction] MILCON sustainment, restoration or modernization projects, in facility additions or alteration projects or in operations maintenance (O&M) upgrade projects" in addition to being employed for MILCON.[20]

The Unified Facilities Criteria (UFC) system is prescribed by Military Standard (MIL-STD) 3007, which provides planning, design, construction, sustainment, restoration, and modernization criteria, used by the Services, the Defense Agencies, and the DoD Field Activities in accordance with the Under Secretary of Defense for Acquisition, Technology, and Logistics Memorandum dated May 29, 2002. UFC 4-510-01 provides mandatory policies and procedures for programming, planning, design, and construction throughout the life cycle of MTFs, including medical and dental treatment facilities, medical training facilities, medical research facilities, and veterinary facilities in the MHS. Where necessary, the UFC refers to civilian codes and standards, such as the National Fire Protection Agency and the American Society of Heating, Refrigeration, and Air Conditioning Engineering.[20]

UFC were written to allow for the building of safe, functional, durable, and economical facilities that can be described as *world-class*. Additionally, construction is designed to be sustainable, life-cycle cost effective, and flexible.[20] The criteria are influenced by DoD and non-DoD standards, subject matter experts, and evidence-based research.

Military Standard 1691 Master Equipment List

The Military Standard 1691 (MILSTD 1691) provides a database of furnishings and equipment typically found in a medical facility. Each item is referenced using a unique number (Joint Stock Number) that is linked to a furniture or equipment record. The database provides the planner, architect, engineer, and cost estimator with a functional description and size, weight, and utility requirements for each item. With the MILSTD 1691, the user is able to verify each item is appropriately planned (i.e., the item fits in the intended room and has the correct utilities to function appropriately). It also dictates which items are funded (built) into the construction contract for programming purposes.[112]

Military Health System Templates

The MHS Templates (formerly known as Design Guide Plates) describe how certain functional spaces/rooms should be designed and are intended to supplement the UFC 4-510-01. Each room template displays the geometry of a room and the positioning of furnishings and equipment. It also provides a list of every item in the room and the subsequent utility requirements for each. Armed with this information, the designer of record has a clear understanding of how each templated room is expected to be configured in order to reduce ambiguity during design and maximize standardization across the MHS during health care operations.[113]

World-Class Toolkit and Checklist

The World-Class Checklist (Checklist) is intended to "provide designers and design decision makers with specific performance oriented tactical guidance on how to achieve world-class and evidence-based design strategies, meet related objectives, and ultimately achieve MHS Guiding Principles through the design of the built environment."[17] It is designed for use throughout the project's life cycle, beginning with the programming phase. The Checklist includes mandatory and recommended strategies, each with a supporting list of references. However, designers can explain and justify why they chose not to utilize a certain strategy.[20]

The Checklist provides strategies for all six domains of a world-class medical facility, but most of the effort to date has been on populating the Basic Infrastructure domain with strategies.

The Checklist is housed as part of the World-Class Toolkit which enables "planners, hospital staff, architects, engineers, agents, and facility managers to understand the meaning of world class and how it will affect their facilities and their operations" and helps "[them] to incorporate world-class strategies into [their] projects throughout their life cycles."[24] Although many features of the Toolkit are available to the public, including the World-Class Checklist, some areas of the website, such as the CIDM Tool, are restricted from the general public.

Health Care Requirements Analysis

The HCRA process considers key input variables when determining what is required to plan and program a medical facility. The process can be completed using DoD personnel or with contractor support. The new MHS HCRA process is conducted in two phases to highlight the most important potential projects quickly and focus efforts for further development. The

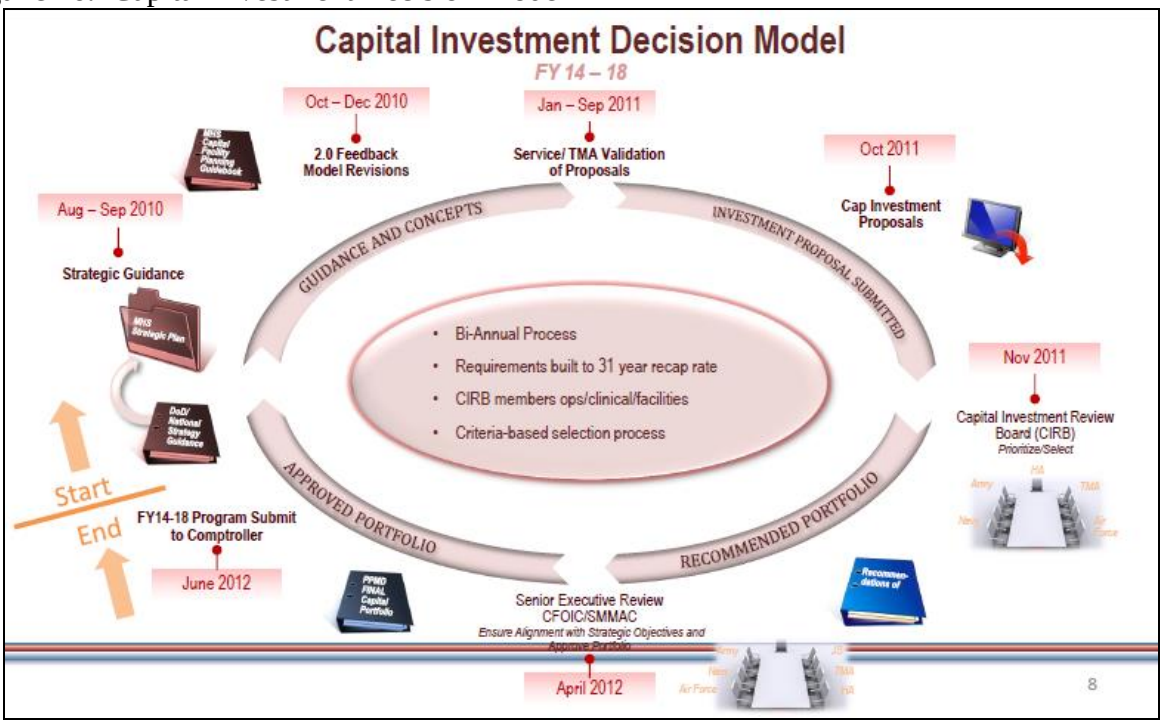
Initial/Preliminary phase is used to provide a level of detail necessary for enterprise level strategic decisions regarding a given facility and current health care practices in the context of the requested project. Once a need has been validated, phase two begins and a Final/Detailed HCRA begins.[25,26]

There are four components of the process. The primary difference between the preliminary HCRA and the final HCRA is the level of detail required for each of the four components. The first component of the process analyzes population supported including access to care, demographics, and availability of alternate sources of care (e.g., purchased care and Veterans Affairs). Next, the process considers the workload history of the existing facility, as well as a forecast based on the results of the population study. Workload analysis considers volumes of procedures, visits, and deliveries, as well as GME-provided care. The staffing analysis includes documenting the required skillsets and quantities necessary to support the workload previously identified as well as any staffing for military mandated programs, such as the Exceptional Family Member Program). Once the population, workload, and staffing requirements have been identified, space requirements are identified and the HCRA process is complete.[25,26]

CAPITAL INVESTMENT DECISION MODEL

Prior to the creation of the DHA, the Services competed for resources via the proportional assessment system. In 2008, the MHS adopted the CIDM, which is now used to prioritize MILCON projects. CIDM standardizes the selection process using multiple data points for each project based on an objective scoring methodology that results in a prioritized list of projects for funding and execution. The DHA continues to refine the CIDM model and is currently underway with a 4.0 version that will include MHS leader input about key system priorities and enterprise-wide demand signals much earlier in the planning process to further reduce the time associated with this decision-making process. Figure 16 illustrates the CIDM process, as of April 2014, including its four major phases: Guidance and Concepts, Investment Proposal Submitted, Recommended Portfolio, and Approved Portfolio.

Figure 16. Capital Investment Decision Model[51]



From Boenecke, C., 2014.

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APPENDIX H. TERMS OF REFERENCE

These terms of reference establish the objectives for the Panel to provide independent advice and recommendations to the Secretary of Defense regarding a construction standard for military medical centers to provide a single standard of care. They outline the scope of the Panel's examination as well as the methodology for responding to DoD's request.

Mission Statement: The Panel was established to fulfill the requirements of Section 2852 of the Ike Skelton NDAA for FY 2011. The Panel will conduct a comprehensive assessment of requirements related to establishing world-class military medical centers/facilities, review DoD's unified construction standard for military construction and repairs to military medical centers/facilities, and assess the adequacy of the CMP.

Issue Statement: DoD established unified planning, design, and construction standards for military medical facilities in Unified Facilities Criteria 4-510-01, Design: Medical Military Facilities, November 1, 2012 and DoD Space Planning Criteria for Health Facilities. The Panel will review those standards to identify any deficiencies and will provide recommendations for improvement.

Objectives and Scope: The Panel will address the following in its reports:

1. Review the unified construction standards established pursuant to subsection (a) of the 2011 Ike Skelton NDAA to determine the standards' consistency with industry practices and benchmarks for world-class medical construction.
2. Review ongoing construction programs within DoD to ensure medical construction standards are uniformly applied across applicable military medical centers.
3. Assess the approach of the DoD to planning and programming facility improvements with specific emphasis on: facility selection criteria and proportional assessment system; and facility programming responsibilities between the Assistant Secretary of Defense for Health Affairs and the Secretaries of the Services.
4. Assess whether the CMP, dated April 2010, is adequate to fulfill statutory requirements as required by section 2714 of the Military Construction Authorization Act for FY 2010 (division B of Public Law 111-84; 123 Stat. 2656), to ensure that the facilities and organizational structure described in the plan result in world-class military medical centers in the NCR.
5. Make recommendations regarding any adjustments of the CMP, dated April 2010, that are needed to ensure the provision of world-class military medical centers and delivery system in the NCR.

Methodology: The Panel members will receive briefings from subject matter experts (SMEs) in facility design and construction and repair standards, as well as from DoD leaders. The members will review the literature and available best practices and visit select federal and private health care facilities. Using this information, its Guiding Principles, as well as the information received from briefings, the Panel will deliberate the findings during which time members may propose recommendations and vote on those recommendations in an open public session.

Deliverables:

1. Not later than 120 days after the first meeting of the Panel, the Panel shall submit to the Secretary of Defense a written report containing:
   a. An assessment of the adequacy of the plan of DoD to address the items specified in the Objectives and Scope above relating to the purposes of the Panel.
   b. The recommendations of the Panel to improve the plan.
2. Not later than February 1, 2015, the Panel shall submit to the Secretary of Defense a report on the findings and recommendations of the Panel to address any deficiencies identified by the Panel.

The Panel shall terminate on September 30, 2015.

Membership: Up to 14 appointed members will comprise the Panel leading the primary investigation; members will consult SMEs as needed.

Support:

1. DHA will provide any necessary administrative, analytical/research, and logistical support to the Panel.
2. Funding for this review is included in the DHA operating budget.

APPENDIX I. MEETINGS AND PRESENTATIONS

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
February 6, 2014, at Defense Health Headquarters (DHHQ)	Col Douglas Rouse	Executive Secretary, Defense Health Board (DHB)	Administrative Requirements /Paperwork
	Mr. Michael Krukar	Executive Secretary, Independent Review Panel (IRP) on Military Medical Construction Standards	Overview of Independent Review Panel Operations
	Ms. Camille Gaviola	Deputy Director, DHB/IRP	Travel Briefing
	Mr. John Becker	Director, Facilities Division, Defense Health Agency (DHA)	DHA Facilities Briefing: Shared Services, Unified Construction Standards, Planning and Programming, Ongoing Construction Program
	Dr. Kenneth Kizer	Director, Institute for Population Health Improvement, University of California Davis Health System; Chairman, Medsphere Systems	Achieving World Class: An Independent Review of the Design Plans for Walter Reed National Military Medical Center (WRNMMC) and Fort Belvoir Community Hospital (FBCH)
	Ms. Laurie Rafferty	Office of General Counsel, DHA	Ethics Briefing
	Mr. Jim Freeman II	Advisory Committee Management Officer, Office of the Secretary of Defense	Federal Advisory Committee Act Overview
	Mr. Allen Middleton	Defense Health Board & Panel Designated Federal Officer, Deputy Assistant Secretary of Defense (Health Budgets and Financial Policy)/Acting Deputy Director, DHA	Opening Remarks and Introductions
	Mr. John Bulick, Jr.	Health Care Facilities Planner, DHA	Overview of the NCR Comprehensive Master Plan (CMP): Integrated Delivery System, Infrastructure/Projects
	Mr. Scott Wardell	Director for Business Operations, National Capital Region (NCR) Medical Directorate	

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
February 7, 2014, at DHHQ- Panel Discussion			
February 19, 2014, Teleconference - Review of Guiding Principles, Terms of Reference, Benchmarking, and Panel Schedule			
March 3, 2014, Teleconference - Panel Discussion, Review of March 4 Schedule			
March 4, 2014, at WRNMMC	Mr. Jeff Getty	Senior Vice President, HDR Architecture, Inc.	CMP/WRNMMC 35% Design
	Mr. Paul Heflin	Senior Vice President, HDR Architecture, Inc.	
	Mr. Julian Jones	Vice President and Senior Project Manager, HDR Architecture, Inc.	
	Ms. Joanne Krause	Director, Naval Facilities Engineering Command Headquarters Medical Facilities Design Office	
	RDML Raquel Bono	Director, NCR Medical Directorate	WRNMMC Leadership Discussion
	CAPT Sarah Martin	Chief of Staff, WRNMMC	
	Ms. Patricia Haley	Senior Associate, Booz/Allen/Hamilton	WRNMMC Site Visit/Facility Tour
	CDR Jeffrey McCoy	Chief, Facilities Management Department, WRNMMC	
	LCDR Roy Ranglin	DHA Project Site Officer	
March 14, 2014, Teleconference	Mr. John Becker	Director, Facilities Division, DHA	World-Class Toolkit Demonstration
	Mr. Clayton Boenecke	Chief, Portfolio Management, Facilities Division, DHA	
	Col Rex Langston	Chief, Portfolio/Planning, Facilities Division, DHA	
	Mr. Russell Manning	Acting Chief, Operations & Life Cycle, Integration Branch, Facilities Division, DHA	
	Mr. Clayton Boenecke	Chief, Portfolio Management, Facilities Division, DHA	Capital Investment Decision Model

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
April 2, 2014, at Hyatt House Hotel	Ms. Brenda McDermott	Health Facility Clinical Planner, Facilities Division, DHA	Criteria Benchmarking with Industry
	Dr. Michael Dinneen	Director, Office of Strategy Management, Office of the Assistant Secretary of Defense (Health Affairs)	DHA Office of Strategy Management
	Mr. John Becker	Director, Facilities Division, DHA	Facilities Update
	VADM (Ret) John Mateczun	Former Commander, Joint Task Force CapMed	History of the CMP
	Lt Gen Douglas Robb	Director, DHA	Military Health System Military Construction Independent Review Panel
	BG Jeffrey Clark	Director, WRNMMC	WRNMMC Leadership Discussion

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
April 3, 2014, at FBCH	COL Jonathan Allison	Director for Medicine, FBCH	FBCH Briefings/Leadership Discussion
	CDR Alex Bustamante	Assistant Chief of Staff, Executive Committee of the Medical Staff, FBCH	
	CDR David DeSantos	Deputy Director for Education and Training, FBCH	
	COL Sandy McNaughton	Deputy Director, Nursing, FBCH	
	LTC John Melvin	Acting Deputy Director, Training, FBCH	
	Dr. Richard Repeta	Director for Healthcare Operations and Strategic Planning, FBCH	
	CAPT Sterling Sherman	Chief of Staff, FBCH	
	CDR Stuart Shippey	Director for Surgery, FBCH	
	LCDR Michael Tiller	Deputy Director, Surgery, FBCH	
	CAPT Jennifer Vedral-Baron	Director, FBCH	
	LTC Wendi Waits	Director for Behavioral Health, FBCH	
	CSM Richard Watson	Senior Enlisted Leader, FBCH	
	Mr. John Zulick	Chief of Facilities, FBCH	FBCH Site Visit/Facility Tour
April 4, 2014, at DHHQ - Panel Discussion			

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
April 16, 2014, Teleconference	Mr. John Becker	Director, Facilities Division, DHA	Landstuhl Regional Medical Center Briefing
	Mr. Clayton Boenecke	Chief, Portfolio Management, Facilities Division, DHA	
	Mr. David Clark	Project Manager and Technical Expert, Landstuhl	
	COL Stephen Wooldridge	Deputy Director, Facilities Division, DHA	
April 30, 2014, Teleconference	Mr. Mark Hamilton	Budget and Program Analyst, Office of the Deputy Assistant Secretary of Defense (Health Budgets and Financial Policy)	MHS Modernization Study Process
May 14, 2014, Teleconference - Panel Discussion, Review Initial Report Draft & Meeting Schedule			
May 22, 2014, at WRNMMC	IRP members		Initial Report Deliberation
	BG Jeffrey Clark	Director, WRNMMC	WRNMMC Command and World Class Domains
	Ms. Patricia Haley	Senior Associate, Booz/Allen/Hamilton	WRNMMC Site Visit/Facility Tour
	LCDR Roy Ranglin	Project Site Officer, DHA	
	Mr. Allen Middleton	DHB & Panel Designated Federal Officer, Deputy Assistant Secretary of Defense (Health Budgets and Financial Policy)/Acting Deputy Director, DHA	DHA: Transforming Military Medicine
May 28, 2014, Teleconference - Panel Discussion, Review Initial Report Draft & Meeting Schedule			

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
June 11, 2014, Teleconference	COL Patrick Grady	Chief of Analytics, DHA	Enhanced Multi-Service Market Process Briefing
	Ms. Erin Lawler	Human Factors Engineer, DoD Patient Safety Analysis Center	Patient Safety Report Tool Demonstration
	Mr. Michael Datena	Patient Safety Analyst	
June 23, 2014, at DHHQ	Mr. Mark Goodge	Chief Technology Officer, Health Information Technology (IT) Directorate, DHA	IT Hospital of the Future
	Mr. Dale Woodin	Senior Executive Director, American Society for Healthcare Engineering	American Society for Healthcare Engineering Briefing
	Mr. Thomas Jung	Chief Executive Officer, Facilities Guideline Institute (FGI)	Introduction and History of the FGI Guidelines
	Dr. Jonathan Woodson	Assistant Secretary of Defense for Health Affairs	Assistant Secretary of Defense for Health Affairs Vision and Strategy
	Dr. Francis McVeigh	Lead, Innovative Information Technology Scientific Domain, and Senior Clinical Consultant/tele-Traumatic Brain Injury Program Manager at Telemedicine and Advanced Technology Research Center	Telehealth Implications on Future Hospital Design
	CAPT Stephen Bree	British Liaison Officer (Deployment Health), U.S. Military Health System	Military Healthcare in the National Health System - Partners in Military Readiness
July 16, 2014, Teleconference – Panel Discussion, Review Meeting Schedule			

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
July 21, 2014, at San Antonio Military Medical Center (SAMMC)	MG Jimmie Keenan	Commanding General, Southern Region Medical Command; Market Manager, San Antonio Military Health System (SAMHS); Chief, Army Nurse Corps	SAMHS Market Brief/Q&A
	LTC Mark Swofford	Deputy Commander for Administration, SAMMC	SAMMC Leadership Brief/Discussion
	Mr. Dewey Mitchell	Chief of Public Affairs, SAMMC	SAMMC and Center for the Intrepid Site Tours
	Mr. Robert Shields	Public Affairs Specialist, SAMMC	
	COL Donald Gajewski	Director, Center for the Intrepid, SAMMC	
	COL Kyle Campbell	Commander, Brooke Army Medical Center	

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
July 22, 2014, at 59th Medical Wing/Wilford Hall Ambulatory Surgical Center (WHASC)	Maj Gen Bart Iddins	Commander, 59th Medical Wing	59th Medical Wing Mission Brief
	Maj Gen Bart Iddins	Commander, 59th Medical Wing	WHASC Site Tour
	Ms. Joann Pinto	Acting Director, Facilities Management, WHASC	
	Maj Gen Bart Iddins	Commander, 59th Medical Wing	59th Medical Wing Leadership Briefing
	CMSgt Maurice James, Sr.	Command Chief Master Sergeant, 59th Medical Wing	
	Maj Candido Ramirez	Executive Officer, 59th Medical Wing	
	Maj Janet Blachard	Chief of Business Innovation, 59th Medical Wing	
	Lt Col Craig Keys	Chief, Financial Manager, 59th Medical Wing	
	Col Nancy Dezell	Vice Commander, 59th Medical Wing	
	Col John Andrus	Commander, 59th Medical Operations Group	
	Lt Col Scot Spann	Chief, Health Facilities Division, AFMSA/SG8F	
	Mr. Gary Forthman	Inspector General, 59th Medical Wing	

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
July 23, 2014, at Carl R. Darnall Army Medical Center (CRDAMC)	COL Patricia Darnauer	Commander, CRDAMC	CRDAMC Briefing/Leadership Discussion
	LTC Michael Williams	Program Manager, Western Region Health Facility Planning Agency	
	MAJ Eric Berard	Chief, Information Management, CRDAMC	
	MAJ Ira Waite	Transition Director, CRDAMC	
	Ms. Erika Provinsal	Project Manager, Health Facility Planning Agency, CRDAMC	
	Mr. Mark Morrissey	Provost Marshall, CRDAMC	
	COL Patricia Darnauer	Commander, CRDAMC	CRDAMC Site Tour
	Ms. Erika Provinsal	Project Manager, Health Facility Planning Agency, CRDAMC	
August 4, 2014, Teleconference	Mr. David Bowen	Chief Information Officer, Health IT Directorate, DHA	Discussion with Mr. David Bowen
August 18, 2014, at Naval Hospital Camp Pendleton (NHCP)	Dr. Benjamin Chu	Executive Vice President, Kaiser Foundation Hospitals and Health Plan; Group President, KP Southern California and Hawaii; President, KP Southern California	Trends in Health Care Discussion
	LT Clayton Beame	NHCP Facilities Management, Navy Medicine West	NHCP Site Tour
	LTJG Kezia Edmonson	Protocol Officer, NHCP	
	CAPT Mark Kobelja	Commanding Officer, NHCP	NHCP Briefing/Leadership Discussion
	LCDR Jerry Brown, III	Senior Health Facility Planning Project Officer, Assistant Specialty Leader, Navy Medicine West	
	Mr. Charles Miranda	Deputy Chief of Staff, Installations and Logistics, Navy Medicine West	

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
August 19, 2014, at Kaiser Permanente (KP) Central San Diego Hospital	COL Stephen Wooldridge	Deputy Director, Facilities Division, DHA	Design Standards Briefing and Roundtable Discussion: Department of Defense, Department of Veterans Affairs, FGI, Kaiser Permanente
	Mr. Clayton Boenecke	Chief, Portfolio Management, Facilities Division, DHA	
	Ms. Brenda McDermott	Clinical Lead, Criteria Working Group, Technical SME Section, Operations & Lifecycle Integration Branch, Facilities Division, DHA	
	Mr. Donald Myers	Director of Facilities Standards Service, U.S. Department of Veterans Affairs Office of Construction & Facilities Management, Office of Facilities Planning	
	Ms. Eileen Malone	COL (Ret), U.S. Army; Senior Partner, Mercury Healthcare Consulting, LLC	
	Mr. Joseph Sprague	Principal and Senior Vice President; Director, Health Facilities,HKS, Inc.	
	Mr. John Kouletsis	Vice President, Facilities Planning, Kaiser Foundation Health Plan	
	Mr. Scott Bell	National Executive Director, Kaiser Permanente	Kaiser Permanente San Diego Central Design Briefing and Tour
	Mr. Sunil Shah	Executive Director, Construction Acquisition, National Facility Services, Kaiser Permanente	
	Mr. Joseph Stasney	Project Director, National Facility Services Capital Investment Group, Kaiser Permanente	
	Ms. Gandrup-Dupre	Vice President, Information Technology, Kaiser Permanente	

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
August 20, 2014, at and Naval Medical Center San Diego (NMCSD)	RDML Bruce Gillingham	Commanding Officer, NMCSD	NMCSD Briefing/Leadership Discussion
	CAPT Lisa Mulligan	Deputy Commander, NMCSD	
	LCDR Kenneth Schwalbe	Facilities Department Head, NMCSD	NMCSD Site Tour
	LCDR Nathan Seaman	NMCSD	
September 18, 2014, Teleconference	COL Matthew Mattner	Commander, Fort Drum Medical Department Activity	Fort Drum Briefing
September 25, 2014, at DHHQ	Mr. John Becker	Director, Facilities, DHA	WRNMMC Addition/Alteration Project
	COL Stephen Wooldridge	Deputy Director, Facilities Division, DHA	
	Mr. Clayton Boenecke	Chief, Portfolio Management, Facilities Division, DHA	
September 26, 2014, at DHHQ - Panel Discussion, Review Annual Progress Report Draft & Meeting Schedule			
October 17, 2014 Teleconference – Panel Discussion of MHS 90-Day Review, Review Draft Annual Progress Report, & Meeting Schedule			
November 12, 2014, at DHHQ	Ms. Phyllis Kaplan	Senior Health Facilities Architect, DHA	MHS Facilities Innovation and Research Model
	Dr. John Kugler	Chief, Clinical Support Division, DHA	MHS 90-Day Review
	Col Thomas Cantilina	Commander, 779th Medical Group	Malcolm Grow Medical Clinics and Surgery Center
	LT William Walders	Chief Information Officer, WRNMMC	WRNMMC IM/IT Brief
November 13, 2014, at DHHQ - Panel Discussion, Review Annual Progress Report Draft & Meeting Schedule			
November 25, 2014, Teleconference - Panel Discussion, Review Draft Annual Progress Report, & Meeting Schedule			
December 10, 2014, Teleconference - Panel Discussion, Review Draft Annual Progress Report, & Meeting Schedule			
December 17, 2014, Teleconference - Panel Discussion, Review Draft Annual Progress Report, & Meeting Schedule			

Briefing Date/Location	Presenter	Title/Organization	Briefing Title
January 9, 2014, Teleconference - Panel Discussion, Review Draft Annual Progress Report, & Meeting Schedule			
January 14, 2015, at DHHQ - Public Deliberation of Annual Progress Report			
January 15, 2015, at DHHQ - Panel Discussion, Review Draft Annual Progress Report, & Meeting Schedule			
January 21, 2015, Teleconference - Panel Discussion, Review Draft Annual Progress Report, & Meeting Schedule			

APPENDIX J. MEDICAL MILITARY CONSTRUCTION PROJECT LIST

The following list of projects were executed as part of the medical military construction (MILCON) program. Listed projects from FY 2000-2014 have been completed or are ongoing. Projects 2015-2019 are in the program for planning purposes, but may change.

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Ft Riley	Consolidated Troop Medical Clinic	KS	U.S. Army	2000	Medical Clinic	MILCON
Wright-Patterson Air Force Base (AFB)	Occupational Health Clinic/Bioenvironmental Engineering (BEE) Replacement	OH	U.S. Air Force	2000	Medical Clinic	MILCON
Davis-Monthan AFB	Ambulatory Health Center Addition/Alteration	AZ	U.S. Air Force	2000	Medical/Dental Clinic	MILCON
Andrews AFB	Medical Logistics Facility Addition/Alteration	MD	U.S. Air Force	2000	Other	MILCON
Sabana Seca Naval Security Group Activity	Medical/Dental Clinic Replacement	Puerto Rico	U.S. Navy	2000	Medical/Dental Clinic	MILCON
Patrick AFB	Medical Logistics Facility Replacement	FL	U.S. Air Force	2000	Other	MILCON
Yongsan	Hospital Addition/Alteration	South Korea	U.S. Army	2000	Hospital	MILCON
Ft Sam Houston Joint Base San Antonio (JBSA)	Veterinary Instructional Facility	TX	U.S. Army	2000	Veterinary Clinic	MILCON
Lakenheath Royal Air Force (RAF)	Dental Clinic Addition/Alteration	United Kingdom	U.S. Air Force	2000	Dental Clinic	MILCON
Ramstein Air Base (AB)	Dental Clinic Addition/Alteration	Germany	U.S. Air Force	2000	Dental Clinic	MILCON
Yongsan	Medical Supply/Equipment Storage Warehouse Replacement	South Korea	U.S. Army	2000	Other	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Cherry Point Marine Corps Air Station	Air Crew Water Survival Training Facility	NC	U.S. Marine Corps	2000	Other	MILCON
Travis AFB	War Readiness Material (WRM) Warehouse /Engineering Support Facility	CA	U.S. Air Force	2000	Other	MILCON
Moody AFB	WRM Warehouse/BEE Facility	GA	U.S. Air Force	2000	Other	MILCON
Los Angeles AFB	Medical/Dental Clinic Replacement	CA	U.S. Air Force	2000	Medical/Dental Clinic	MILCON
Cheatham Annex	Fleet Hospital Support Office Container Holding Yard	VA	U.S. Navy	2000	Other	MILCON
Jacksonville Naval Air Station (NAS)	Branch Medical/Dental Clinic Addition/Alteration	FL	U.S. Navy	2000	Medical/Dental Clinic	MILCON
Ft Lewis	Dental Clinic Replacement	WA	U.S. Army	2000	Dental Clinic	MILCON
Norfolk NAS	Air Crew Water Survival Training Facility	VA	U.S. Navy	2000	Other	MILCON
Pensacola NAS	Air Crew Water Survival Training Facility	FL	U.S. Navy	2000	Other	MILCON
Patuxent River NAS	Air Crew Water Survival Training Facility	MD	U.S. Navy	2000	Other	MILCON
Whidbey Island NAS	Air Crew Water Survival Training Facility	WA	U.S. Navy	2000	Other	MILCON
Fort Wainwright	Hospital Replacement	AK	U.S. Army	2000	Hospital	MILCON
Naples Naval Support Activity (NSA)	Medical/Dental Facility Replacement	IT	U.S. Navy	2001	Hospital	MILCON
Edwards AFB	Medical Clinic Replacement/Dental Clinic Alteration	CA	U.S. Air Force	2001	Medical/Dental Clinic	MILCON
Ft Drum	Veterinary Treatment Facility	NY	U.S. Army	2001	Vet Clinic	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Ft Bliss	Laboratory Renovation	TX	U.S. Army	2001	Lab	MILCON
Eglin AFB	Hospital Addition/Alteration/Life Safety Upgrade	FL	U.S. Air Force	2001	Hospital	MILCON
Weisbaden	Health/Dental Clinic Addition/Alteration	Germany	U.S. Army	2001	Medical/Dental Clinic	MILCON
Kitzingen	Health Clinic Life Safety Upgrade	Germany	U.S. Army	2001	Medical Clinic	MILCON
Tyndall AFB	Medical Clinic Addition/Alteration	FL	U.S. Air Force	2001	Medical Clinic	MILCON
Patrick AFB	Medical Clinic	FL	U.S. Air Force	2001	Medical Clinic	MILCON
Camp Pendleton	Medical/Dental Clinic Replacement (Horno)	CA	U.S. Marine Corps	2002	Medical/Dental Clinic	MILCON
Camp Pendleton	Medical/Dental Clinic Replacement (Las Pulgas)	CA	U.S. Marine Corps	2002	Medical/Dental Clinic	MILCON
Camp Pendleton	Medical/Dental Clinic Replacement (Las Flores)	CA	U.S. Marine Corps	2002	Medical/Dental Clinic	MILCON
Mayport Naval Station (NS)	Medical/Dental Clinic Replacement	FL	U.S. Navy	2002	Medical/Dental Clinic	MILCON
Dyess AFB	Medical Treatment Facility Alteration	TX	U.S. Air Force	2002	Medical/Dental Clinic	MILCON
Andrews AFB	Medical Clinic Addition/Alteration	MD	U.S. Air Force	2002	Medical Clinic	MILCON
FE Warren AFB	Medical Clinic Alteration	WY	U.S. Air Force	2002	Medical Clinic	MILCON
Holloman AFB	Medical Clinic Alteration	NM	U.S. Air Force	2002	Medical Clinic	MILCON
Norfolk - Sewell's Point	Branch Medical Clinic Addition/Alteration	VA	U.S. Navy	2002	Medical Clinic	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Camp Pendleton	Fleet Hospital Operations and Training Command Support Facilities	CA	U.S. Marine Corps	2002	Admin	MILCON
Hurlburt Field	Medical/Dental Clinic Addition/Alteration	FL	U.S. Air Force	2002	Medical/Dental Clinic	MILCON
Whidbey Island NAS	Aircrew Water Survival Training Facility	WA	U.S. Navy	2002	Other	MILCON
Andrews AFB	Naval Air Facility-Washington Branch Medical/Dental Clinic	MD	U.S. Navy	2002	Medical/Dental Clinic	MILCON
Heidelberg Hospital	Hospital Addition/Clinic Alteration	Germany	U.S. Army	2002	Hospital	MILCON
Schriever AFB	Medical/Dental Clinic	CO	U.S. Air Force	2002	Medical/Dental Clinic	MILCON
Lajes Field	Dental Clinic Replacement	Portugal	U.S. Air Force	2002	Dental Clinic	MILCON
Ft Hood	Hospital Addition/Alteration	TX	U.S. Army	2002	Hospital	MILCON
Albany MC Logistics Base	Medical/Dental Clinic Replacement	GA	U.S. Navy	2002	Medical/Dental Clinic	MILCON
Ft Stewart	Consolidated Troop Medical Clinic	GA	U.S. Army	2002	Medical Clinic	MILCON
Twenty-nine Palms	Hospital Labor, Delivery, Recovery, and Post-Partum Conversion	CA	U.S. Marine Corps	2002	Hospital	MILCON
Thule AB	Composite Medical Facility Replacement	Greenland	U.S. Air Force	2002	Medical Clinic	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Naples NSA	Medical/Dental Clinic Replacement and Right of Superficies Purchase	Italy	U.S. Navy	2003	Medical/Dental Clinic	MILCON
Spangdahlem AB	Composite Medical Facility Replacement	Germany	U.S. Air Force	2003	Medical Clinic	MILCON
Hickam JB	Life Skills Clinic Replacement	HI	U.S. Air Force	2003	Medical Clinic	MILCON
Elmendorf JBER	Hospital Construction Claim Payment	AK	U.S. Air Force	2003	Claims	MILCON
US Air Force Academy	Hospital Addition/Alteration	CO	U.S. Air Force	2004	Hospital	MILCON
New London	Dental Clinic Replacement	CT	U.S. Navy	2004	Dental Clinic	MILCON
Washington Navy Yard	Medical/Dental Clinic Conversion/Renovation	DC	U.S. Navy	2004	Medical/Dental Clinic	MILCON
Andersen Joint Region Marianas (JRM)	Medical/Dental Clinic Replacement	Guam	U.S. Air Force	2004	Medical/Dental Clinic	MILCON
Ft Hood	Troop Medical Clinic	TX	U.S. Army	2004	Medical Clinic	Congressional Add (CONG ADD)
Walter Reed Army Medical Center	Hospital Energy Plant Addition	DC	U.S. Army	2004	Utility Building	MILCON
Diego Garcia Naval Support Facility (NSF)	Dental Clinic Replacement	British Indian Ocean Territory (BIOT)	U.S. Navy	2005	Dental Clinic	MILCON
Ft Benning	Consolidated Health Clinic	GA	U.S. Army	2005	Medical Clinic	MILCON
Buckley AFB	Aerospace Medicine Clinic Addition/Alteration	CO	U.S. Air Force	2005	Medical Clinic	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Grafenwoehr	Medical Clinic Addition/Alteration	Germany	U.S. Army	2005	Medical Clinic	MILCON
Parris Island	Medical/Dental Clinic Replacement	SC	U.S. Marine Corps	2005	Medical/Dental Clinic	MILCON
Jacksonville NAS	Hospital Addition/Alteration	FL	U.S. Navy	2005	Hospital	MILCON
Joint Base Langley-Eustis	Hospital Addition	VA	U.S. Air Force	2005	Hospital	MILCON
Defense Language Institute Presidio	Dental Clinic	CA	U.S. Army	2005	Dental Clinic	CONG ADD
Diego Garcia NSF	Medical Warehouse	BIOT	U.S. Navy	2005	WHS	Unspecified Minor Construction (UMC)
Diego Garcia NSF	Dental Clinic	BIOT	U.S. Navy	2005	Warehouse	MILCON
Creech AFB	Flight Medicine Clinic	NV	U.S. Air Force	2005	Medical Clinic	UMC
Beale AFB	Clinic Addition/Alteration	CA	U.S. Air Force	2006	Medical/Dental Clinic	MILCON
Ft Detrick	Joint Medical Logistics Building	MD	U.S. Army	2006	Admin	MILCON
Charleston NWS	Consolidated Medical Clinic	SC	U.S. Navy	2006	Medical Clinic	MILCON
Bethesda NSA	Academic Program GSN Addition	MD	U.S. Navy	2006	E&T	MILCON
JBSA Lackland	Military Working Dog Medical Facility	TX	U.S. Air Force	2006	Vet Hospital	MILCON
Naval Medical Center San Diego	Patient Parking Facility	CA	U.S. Navy	2006	Parking Garage	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Ft Detrick	USAMRIID, Steam Sterilization Plant	MD	U.S. Army	2006	Utility Building	MILCON
Nellis AFB	Biological Environmental Engineering Facility Replacement	NV	U.S. Air Force	2006	Admin	UMC
Bahrain NSA	Medical Clinic Addition/Alteration	BA	U.S. Navy	2006	Medical Clinic	MILCON
Keesler AFB	Keesler Energy Plant to Hospital	MS	U.S. Air Force	2006	Utility Building	KATRINA
Keesler AFB	Diagnostic (Oncology) Imaging Center	MS	U.S. Air Force	2006	Specialty	KATRINA
Ft Sam Houston JBSA	Center for Intrepid	TX	U.S. Army	2006	Site Work Only	UMC
Ft Irwin	Dental Clinic Addition/Alteration	CA	U.S. Army	2007	Dental Clinic	MILCON
MacDill AFB	Clinic Replacement	FL	U.S. Air Force	2007	Medical/Dental Clinic	MILCON
Great Lakes NS	Fed Health Care Parking Structure	IL	U.S. Navy	2007	Parking Garage	MILCON
Ft Drum	Dental Clinic	NY	U.S. Army	2007	Dental Clinic	MILCON
Ft Detrick	U.S. ArmyMRIID Replacement	MD	U.S. Army	2007	Lab	MILCON
Pearl Harbor NS	Environmental and Preventive Medicine Unit (EPMU) 6 Replacement Facility	HI	U.S. Navy	2007	Admin	MILCON
Ft Hood	Women's Health Addition/Alteration	TX	U.S. Army	2007	Medical Clinic	MILCON
Vicenza	Enhanced Health Service Center	Italy	U.S. Army	2007	Hospital	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Joint Base Elmendorf-Richardson (JBER)	Health Clinic	AK	U.S. Army	2007	Medical Clinic	MILCON
San Diego NSB	Bio-Safety Lab 3	CA	U.S. Navy	2007	Lab	UMC
Camp Bullis	Health Clinic Replacement	TX	U.S. Army	2008	Medical Clinic	MILCON
Ft Riley	Hospital Replacement	KS	U.S. Army	2008	Hospital	Supplemental (SUPP)
Spangdahlem AB	Medical Clinic Replacement	Germany	U.S. Air Force	2008	Medical Clinic	MILCON
Norfolk NS	EPMU-2 Replacement	VA	U.S. Navy	2008	Admin	MILCON
JBSA Ft Sam Houston	San Antonio Regional MC	TX	U.S. Army	2008	Medical Center	Base Realignment and Closure (BRAC)
JBSA Ft Sam Houston	Health Clinic	TX	U.S. Army	2008	Medical Clinic	BRAC
Ft Lewis	Medical/Dental Clinic	WA	U.S. Army	2008	Medical/Dental Clinic	MILCON
MacDill AFB	Pharmacare Addition/Alteration	FL	U.S. Air Force	2008	Pharmacy	MILCON
Great Lakes NS	Federal Healthcare Facility	IL	U.S. Navy	2008	Medical Clinic	MILCON
Bethesda NSA	Medical Center Addition/Alteration	MD	U.S. Navy	2008	Medical Center	BRAC
Dover AFB	Bio-Environmental Engineering Facility	DE	U.S. Air Force	2008	Admin	UMC
Ft Sam Houston JBSA	Institute of Surgical Research Burn Unit	TX	U.S. Army	2008	Medical Clinic	Global War on Terrorism (GWOT)
Ft Benning	Hospital Replacement	GA	U.S. Army	2008	Hospital	SUPP

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Camp Lejeune	Hospital Addition	NC	U.S. Marine Corps	2008	Hospital	SUPP
Ft Drum	Health Clinic Addition/Alteration	NY	U.S. Army	2008	Medical Clinic	MILCON
Ft Belvoir	Hospital Replacement	VA	U.S. Army	2008	Hospital	BRAC
Ft Sam Houston JBSA	Medical Instructional Facility	TX	U.S. Army	2009	E&T	MILCON
Guam JRM	Guam Hospital Central Utility Plant	Guam	U.S. Navy	2009	Utility Building	MILCON
U.S. Military Academy, West Point	Hospital Addition/Alteration	NY	U.S. Army	2009	Hospital	SUPP
Ft Leonard Wood	Primary Care Clinic Addition/ Alteration	MO	U.S. Army	2009	Medical Clinic	MILCON
Tinker AFB	Medical/Dental Clinic Replacement	OK	U.S. Air Force	2009	Medical/Dental Clinic	MILCON
Ft Campbell	Medical/Dental Clinic	KY	U.S. Army	2009	Medical/Dental Clinic	MILCON
Buckley AFB	Satellite Pharmacy	CO	U.S. Air Force	2009	Pharmacy	MILCON
Ft Benning	Consolidated Troop Medical Center	GA	U.S. Army	2009	Medical Clinic	MILCON
Jacksonville NAS	Hospital Alteration	FL	U.S. Navy	2009	Hospital	ARRA
Aberdeen Proving Ground	U.S. Army Medical Research Institute of Chemical Defense Replacement	MD	U.S. Army	2009	Lab	MILCON
Keesler AFB	Community Hospital Addition	MS	U.S. Air Force	2009	Medical Center	BRAC

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Landstuhl	Computer Operations Center	Germany	U.S. Army	2009	Information Services Facility	UMC
Ft Carson	Hospital Alteration	CO	U.S. Army	2009	Hospital	ARRA
Ft Irwin	Hospital Replacement	CA	U.S. Army	2009	Hospital	SUPP
Camp Pendleton	Hospital Replacement	CA	U.S. Marine Corps	2009	Hospital	ARRA
Wright-Patterson AFB	Hospital Renovation	OH	U.S. Air Force	2009	Medical Center	SUPP
Camp Lejeune	Hospital Renovation & MRI Suites	NC	U.S. Marine Corps	2009	Hospital	CONG ADD
Ft Hood	Hospital Replacement	TX	U.S. Army	2009	Hospital	SUPP
Bethesda NSA	Vision Center of Excellence	MD	U.S. Navy	2009	Specialty	CONG ADD
Eglin AFB	Hospital Alteration	FL	U.S. Air Force	2009	Hospital	ARRA
Ft Hood	Hospital Replacement	TX	U.S. Army	2009	Hospital	ARRA
Ft Richardson	Dental Clinic Addition/Alteration	AK	U.S. Army	2009	Dental Clinic	MILCON
JBSA Lackland	Ambulatory Care Clinic Renovation	TX	U.S. Air Force	2009	Medical Clinic	BRAC
Ft Detrick	Boundary Gate at Nallin Pond	MD	U.S. Army	2010	Site Work	MILCON
Ft Detrick	Emergency Service Center	MD	U.S. Army	2010	Other	MILCON
Ft Leonard Wood	Dental Clinic Addition/Alteration	MO	U.S. Army	2010	Dental Clinic	MILCON
Ft Belvoir	Dental Clinic	VA	U.S. Army	2010	Dental Clinic	BRAC

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Ft Bragg	Consolidated Troop Medical Clinic	NC	U.S. Army	2010	Medical Clinic	MILCON
Ft Benning	Blood Donor Center Replacment	GA	U.S. Army	2010	Blood Donor	MILCON
Guam JRM	Hospital Replacement	Guam	U.S. Navy	2010	Hospital	MILCON
Ft Detrick	NIBC Truck Inspection Station & Road	MD	U.S. Army	2010	Other	MILCON
Ft Bliss	Health and Dental Clinics	TX	U.S. Army	2010	Medical/Dental Clinic	MILCON
Ft Carson	Behavioral Health Clinic	CO	U.S. Army	2010	Medical/Dental Clinic	MILCON
Ft Bragg	Behavioral Health Clinic	NC	U.S. Army	2010	Medical Clinic	MILCON
Ft Sill	Dental Clinic	OK	U.S. Army	2010	Dental Clinic	MILCON
Ft Richardson	Health Clinic Addition/Alteration	AK	U.S. Army	2010	Medical Clinic	MILCON
Ft Lewis	Health and Dental Clinic	WA	U.S. Army	2010	Medical/Dental Clinic	MILCON
Ft Stewart	Health and Dental Clinic Addition	GA	U.S. Army	2010	Medical/Dental Clinic	MILCON
Ft Campbell	Health Clinic	KY	U.S. Army	2010	Medical Clinic	MILCON
Elmendorf	Aero-Med Services/Mental Health Clinic	AK	U.S. Air Force	2010	Medical Clinic	MILCON
JBSA Lackland	Dental Clinic Replacement	TX	U.S. Air Force	2010	Dental Clinic	MILCON
JBSA Lackland	Ambulatory Care Center, Phase 1	TX	U.S. Air Force	2010	Medical Clinic	MILCON
Alconbury RAF	Medical/Dental Clinic Replacement	UK	U.S. Air Force	2010	Medical/Dental Clinic	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Ft Benning	Dental Clinic	GA	U.S. Army	2010	Dental Clinic	MILCON
Ft Bliss	Hospital Replacement	TX	U.S. Army	2010	Hospital	MILCON
NSA Bethesda	Hospital Traffic Mitigation	MD	U.S. Navy	2010	Site Work	BRAC
Creech AFB	Flight Medicine Addition	NV	U.S. Air Force	2010	Medical Clinic	UMC
Ft Detrick-Forest Glen	Building 509 Alteration of Medical Laboratory	MD	U.S. Army	2010	Lab	UMC
NSA Bethesda	NICoE Site Utility Infrastructure Upgrade	MD	U.S. Navy	2010	Other	BRAC
NSA Bethesda	Fisher House Utility Upgrade	MD	U.S. Navy	2010	Site Work	UMC
Corry Station (NAS Pensacola)	Satellite Pharmacy	FL	U.S. Navy	2010	Pharmacy	UMC
Ft Lewis	Preventive Medicine Service Facility	WA	U.S. Army	2011	Medical Clinic	MILCON
Camp Carroll	Health/Dental Clinic Replacement	KO	U.S. Army	2011	Medical/Dental Clinic	MILCON
Ft Detrick	Information Services Facility Expansion	MD	U.S. Army	2011	Information Services Facility	MILCON
Vilseck	Health Clinic Addition/Alteration	Germany	U.S. Army	2011	Medical Clinic	MILCON
Katterbach	Health/Dental Clinic Replacement	Germany	U.S. Army	2011	Medical/Dental Clinic	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Ft Detrick	NIBC Security Fencing & Equipment	MD	U.S. Army	2011	Site Work	MILCON
Ft Detrick	Water Treatment Plant Repair & Supplement	MD	U.S. Army	2011	Utility Building	MILCON
Ft Detrick	Supplemental Water Storage	MD	U.S. Army	2011	Utility Building	MILCON
White Sands Missile Range	Health and Dental Clinics	NM	U.S. Army	2011	Medical/Dental Clinic	MILCON
Ft Stewart	Health Clinic Addition/Alteration	GA	U.S. Army	2011	Medical Clinic	MILCON
Ft Belvoir	Dental Clinic Replacement	VA	U.S. Army	2011	Dental Clinic	MILCON
Hanscom AFB	Mental Health Clinic Addition	MA	U.S. Air Force	2011	Medical Clinic	MILCON
JBSA Lackland	Ambulatory Care Center Phase 2	TX	U.S. Air Force	2011	Ambulatory Surgery	MILCON
NSA Bethesda	Defense Access Roads (DAR)	MD	U.S. Navy	2011	Site Work	BRAC
Ft Detrick	Consolidated Logistics Facility	MD	U.S. Army	2011	Other	MILCON
Panama City	Joint Navy-VA Project	FL	U.S. Navy	2011	Medical Clinic	UMC
NSA Bethesda	Transient Wounded Warrior Lodging	MD	U.S. Navy	2011	Other	MILCON
NSA Bethesda	NNMC Parking Expansion	MD	U.S. Navy	2011	Parking Garage	MILCON
Camp Zama	New Clinic Addition	Japan	U.S. Army	2011	Medical Clinic	UMC
NSA Bethesda	LRC Extension	MD	U.S. Navy	2011	Admin	UMC
Nellis AFB	Medical Ed. & Training Facility	NV	U.S. Air Force	2011	Admin	UMC

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
JBSA Ft Sam Houston	Hospital Nutrition Care Department Addition/Alteration	TX	U.S. Army	2012	Medical Center	MILCON
Great Lakes NS	Naval Hospital Great Lakes	IL	U.S. Navy	2012	Demo	MILCON
Ft Bragg	Hospital Alteration	NC	U.S. Army	2012	Hospital	Grow the Army
Ft Campbell	Hospital Addition/Alteration	KY	U.S. Army	2012	Hospital	MILCON
Rhine Ordnance Barracks	Hospital Replacement	Germany	U.S. Army	2012	Hospital	MILCON
Ft Drum	Medical Clinic	NY	U.S. Army	2012	Medical Clinic	MILCON
Ft Drum	Dental Clinic Addition/Alteration	NY	U.S. Army	2012	Dental Clinic	MILCON
Eglin AFB	Medical Clinic	FL	U.S. Army	2012	Medical Clinic	BRAC
Gulfport Naval Construction Battalion Center	Branch Health Clinic	MS	U.S. Navy	2012	Medical Clinic	MILCON
Ft Stewart	Hospital Addition/Alteration Phase 2	GA	U.S. Army	2012	Hospital	MILCON
Croughton RAF	Medical/Dental Clinic Replacement	UK	U.S. Air Force	2012	Medical/Dental Clinic	MILCON
JBSA Lackland	Ambulatory Care Center Phase 3	TX	U.S. Air Force	2012	Ambulatory Surgery	MILCON
Joint Base Andrews	Ambulatory Care Center	MD	U.S. Air Force	2012	Ambulatory Surgery	MILCON
NSA Bethesda	Child Development Center	MD	D	2012	Other	MILCON
Joint Base Andrews	Dental Clinic Replacement	MD	U.S. Air Force	2012	Dental Clinic	MILCON
Fairchild AFB	Veterinary Clinic	WA	U.S. Air Force	2012	Veterinary Clinic	UMC

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Ft Belvoir	Site Development, National Intrepid Center of Excellence (NiCOE)	VA	U.S. Army	2012	Site Work	UMC
Camp Lejeune	Site Development, NiCOE	NC	U.S. Marine Corps	2012	Site Work	UMC
Ft Campbell	Site Development, NiCOE	KY	U.S. Army	2012	Site Work	UMC
Pikes Peak	High Altitude Med Research Laboratory	CO	U.S. Army	2013	Laboratory	MILCON
Shaw AFB	Clinic Replacement	SC	U.S. Air Force	2013	Medical Clinic	MILCON
Seymour-Johnson AFB	Medical Clinic Replacement	NC	U.S. Air Force	2013	Medical Clinic	MILCON
Annapolis	Health Clinic Replacement	MD	U.S. Navy	2013	Medical Clinic	MILCON
Ft Leonard Wood	Dental Clinic	MO	U.S. Army	2013	Dental Clinic	MILCON
Osan AB	Hospital Addition/Alteration	South Korea	U.S. Air Force	2013	Medical Clinic	MILCON
Kunsan AB	Medical/Dental Clinic Addition	South Korea	U.S. Air Force	2013	Medical/Dental Clinic	MILCON
Scott AFB	Medical Logistics Warehouse Replacement	IL	U.S. Air Force	2013	Warehouse	MILCON
Twenty-Nine Palms MCB	Medical Clinic Replacement	CA	U.S. Marine Corps	2013	Medical Clinic	MILCON
Ft Drum	Soldier Specialty Care Clinic	NY	U.S. Army	2013	Medical Clinic	MILCON
Cannon AFB	Medical-Dental Clinic Replacement	NM	U.S. Air Force	2013	Medical/Dental Clinic	MILCON
Great Lakes NS	Drug Laboratory Replacement	IL	U.S. Navy	2013	Lab	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Camp Lejeune	Medical Clinic Addition	NC	U.S. Marine Corps	2013	Medical Clinic	MILCON
Norfolk NS	Veterinary Facility Replacement	VA	U.S. Navy	2013	Veterinary Clinic	MILCON
NSA Bethesda	Temporary Medical Facilities	MD	D	2013	Swing Space	MILCON
NSA Bethesda	Base Installation Accessibility & Appearance Plan	MD	D	2013	Site Work	MILCON
NSA Bethesda	Electrical Capacity and Cooling Towers	MD	D	2013	Utility Building	MILCON
Eglin AFB	Veterinary Facility Replacement	FL	U.S. Air Force	2013	Veterinary Clinic	UMC
Aberdeen Proving Ground	Public Health Command Lab Replacement	MD	U.S. Army	2014	Lab	MILCON
Holloman AFB	Cons Medical Clinic	NM	U.S. Air Force	2014	Medical Clinic	MILCON
NSA Bethesda	Mechanical and Electrical Improvements	MD	D	2014	Site Work	MILCON
NSA Bethesda	Parking Garage	MD	D	2014	Parking Garage	MILCON
JBSA Ft Sam Houston	Hyperbarics Addition	TX	U.S. Air Force	2014	Specialty	MILCON
Bahrain NSA	Medical/Dental Clinic Replacement	Bahrain	U.S. Navy	2014	Medical/Dental Clinic	MILCON
Ft Hood	Site Development, NiCOE	TX	U.S. Army	2014	Site Work	UMC
Ft Bragg	Site Development, NiCOE	NC	U.S. Army	2014	Site Work	UMC

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
Kaneohe Bay	Temporary Medical Facility Site Preparation	HI	U.S. Marine Corps	2014	Site Work	UMC
Dover AFB	Addition/Alteration Armed Forces Medical Examiner	DE	U.S. Army	2014	Specialty	UMC
Peterson AFB	Dental Clinic Replacement	CO	U.S. Air Force	2015	Dental Clinic	MILCON
JBSA Ft Sam Houston	Medical Clinic Replacement	TX	U.S. Air Force	2015	Medical Clinic	MILCON
JBLE Langley	Hospital Addition/Central Utility Plant Replacement	VA	U.S. Air Force	2015	Medical Clinic	MILCON
Wright-Patterson AFB	Satellite Pharmacy Replacement	OH	U.S. Air Force	2016	Pharmacy	MILCON
JBSA Lackland	Ambulatory Care Center Phase 4	TX	U.S. Air Force	2016	Ambulatory Surgery	MILCON
Spangdahlem AB	Medical/Dental Clinic Replacement	Germany	U.S. Air Force	2016	Medical/Dental Clinic	MILCON
MCAS Kaneohe Bay	Medical/Dental Clinic Replacement Phase 1	HI	U.S. Navy	2016	Medical/Dental Clinic	MILCON
Schofield Barricks	Med/Den/BH Clinic Addition Phase 1	HI	U.S. Army	2016	Medical/Dental Clinic	MILCON
Ft Bliss	Blood Donor Center Replacement	TX	U.S. Army	2017	Blood Donor	MILCON
Geilenkirchen AB	Medical Clinic Replacement	Germany	U.S. Air Force	2019	Medical Clinic	*MILCON*
Pax River Naval Health Clinic	Medical/Dental Clinic Replacement	MD	U.S. Navy	2017	Medical/Dental Clinic	MILCON

Location/Base	Project Title	State/Country	Service	FY	Facility Type	Type
NSA Bethesda (WRNMMC)	Medical Center Addition/Alteration	MD	D	2017	Medical Center	MILCON
MCAS Kaneohe Bay	Dental Clinic Replacement, Phase 2	HI	U.S. Marine Corps	2017	Dental Clinic	MILCON
Schofield Barricks	Medical Clinic Alteration, Phase 2,	HI	U.S. Army	2017	Medical Clinic	MILCON
NSA Bethesda	Education and Research Building ADAL (USUHS)	MD	USD	2018	Admin	MILCON
Schriever AFB	Medical/Dental Clinic Addition/Alteration	CO	U.S. Air Force	2018	Medical/Dental Clinic	MILCON
Portsmouth Naval Shipyard	Medical/Dental Clinic Replacement	ME	U.S. Navy	2019	Medical/Dental Clinic	MILCON
Ft Gordon	Medical/Behavioral Health Clinic Replacement	GA	U.S. Army	2019	Medical Clinic	MILCON
Sheppard AFB	Medical/Dental Clinic Replacement	TX	U.S. Air Force	2019	Medical/Dental Clinic	MILCON
Ft Hauchuca	Troop Medical Clinic Replacement	AZ	U.S. Army	2019	Medical Clinic	MILCON
Ft Gordon	Blood Donor Center	GA	U.S. Army	2019	Blood Donor	MILCON
Ft Jackson	Behavioral Health Clinic Addition/Alteration	SC	U.S. Army	2019	Medical Clinic	MILCON
Ft Sill	Behavioral Health Clinic Addition/Alteration	OK	U.S. Army	2019	Medical Clinic	MILCON
Ft Riley	Veterinary Facility Replacement	KS	U.S. Army	2019	Veterinary Clinic	MILCON
Wiesbaden Army Airfield	Medical/Dental Clinic Replacement	Germany	U.S. Army	2019	Medical/Dental Clinic	MILCON
Norfolk NS	Medical Dental Clinic Replacement	VA	U.S. Navy	2019	Medical/Dental Clinic	MILCON

APPENDIX K. ENHANCED MULTI-SERVICE MARKET FACILITY LIST

The March 11, 2013, Deputy Secretary of Defense Memorandum directs several actions, including the identification of the six enhanced Multi-Service Market (eMSMs) as well as identifying the types of authority each market manager will have over medical military organizations operating in each market.[7,42-47]

The first level of authority was defined as enhanced management authority which includes the authority to manage the allocation of the budget for the market, direct the adoption of common clinical and business functions for the market, optimize readiness to deploy medically ready forces and ready medical forces, and direct the movement of workload and workforce between or among the medical treatment facilities. The second level of authority defined by the memorandum provides the authority to exercise authority, direction, and control over inpatient facilities and their subordinate clinics.[7] Appendix K indicates which facilities are part of each eMSM and clarifies the level of authority over market facilities.

Service/Directorate	Facility Name	Type	Authority	Enhanced Multi-Service Market (eMSM)
National Capital Region Medical Directorate (NCR-MD)	Walter Reed National Military Medical Center	Hospital	Direct & Control	NCR-MD
NCR-MD	Dilorenzo TRICARE Health Clinic	Clinic	Direct & Control	NCR-MD
NCR-MD	BMC Carderock	Clinic	Direct & Control	NCR-MD
NCR-MD	National Intrepid Center of Excellence	Clinic	Direct & Control	NCR-MD
NCR-MD	Fort Belvoir Community Hospital	Hospital	Direct & Control	NCR-MD
NCR-MD	Fairfax Health Center	Clinic	Direct & Control	NCR-MD
NCR-MD	Dumfries Health Center	Clinic	Direct & Control	NCR-MD

Service/Directorate	Facility Name	Type	Authority	Enhanced Multi-Service Market (eMSM)
U.S. Army	Kimbrough Ambulatory Care Center	Clinic	Enhanced	NCR-MD
U.S. Army	Fort McNair Army Health Clinic (AHC)	Clinic	Enhanced	NCR-MD
U.S. Army	Andrew Rader AHC	Clinic	Enhanced	NCR-MD
U.S. Navy	Naval Health Clinic (NHC) Annapolis	Clinic	Enhanced	NCR-MD
U.S. Navy	Naval Branch Health Clinic (NBHC) Bancroft Hall	Clinic	Enhanced	NCR-MD
U.S. Navy	NHC Quantico	Clinic	Enhanced	NCR-MD
U.S. Navy	NBHC Washington Navy Yard	Clinic	Enhanced	NCR-MD
U.S. Navy	Branch Medical Clinic (BMC) Officer Candidate School Brown Field	Clinic	Enhanced	NCR-MD
U.S. Navy	NBHC The Basic School	Clinic	Enhanced	NCR-MD
U.S. Air Force	Malcolm Grow Medical Clinics and Surgery Center	Clinic	Enhanced	NCR-MD
U.S. Air Force	Joint Base Anacostia-Bolling Clinic	Clinic	Enhanced	NCR-MD
U.S. Army	San Antonio Military Medical Center	Hospital	Enhanced	San Antonio Military Health System (SAMHS)
U.S. Army	Taylor Burk Health Clinic	Clinic	Enhanced	SAMHS
U.S. Army	McWethy Troop Medical Clinic	Clinic	Enhanced	SAMHS
U.S. Army	Fort Sam Houston Primary Care Clinic	Clinic	Enhanced	SAMHS
U.S. Army	Schertz Medical Home	Clinic	Enhanced	SAMHS
U.S. Army	Center for the Intrepid	Clinic	Enhanced	SAMHS
U.S. Air Force	Wilford Hall Ambulatory Surgical Center	Clinic	Enhanced	SAMHS

Service/Directorate	Facility Name	Type	Authority	Enhanced Multi-Service Market (eMSM)
U.S. Air Force	Randolph Air Force Base Clinic	Clinic	Enhanced	SAMHS
U.S. Air Force	Reid Clinic	Clinic	Enhanced	SAMHS
U.S. Air Force	North Central Federal Clinic	Clinic	Enhanced	SAMHS
U.S. Air Force	Langley Hospital	Hospital	Enhanced	Tidewater
U.S. Army	McDonald Army Health Center	Clinic	Enhanced	Tidewater
U.S. Army	Fort Eustis Troop Medical Clinic (TMC) 1	Clinic	Enhanced	Tidewater
U.S. Army	Fort Eustis TMC 2	Clinic	Enhanced	Tidewater
U.S. Army	Fort Story Health Clinic	Clinic	Enhanced	Tidewater
U.S. Navy	NMC Portsmouth	Hospital	Enhanced	Tidewater
U.S. Navy	NBHC Little Creek	Clinic	Enhanced	Tidewater
U.S. Navy	NBHC Norfolk Naval Shipyard	Clinic	Enhanced	Tidewater
U.S. Navy	NBHC Yorktown	Clinic	Enhanced	Tidewater
U.S. Navy	NBHC Dam Neck	Clinic	Enhanced	Tidewater
U.S. Navy	NBHC Oceana	Clinic	Enhanced	Tidewater
U.S. Navy	Sewells Point Branch Medical Clinic	Clinic	Enhanced	Tidewater
U.S. Navy	Northwest Branch Health Clinic	Clinic	Enhanced	Tidewater
U.S. Navy	TRICARE Prime Clinic Virginia Beach	Clinic	Enhanced	Tidewater
U.S. Navy	TRICARE Prime Clinic Chesapeake	Clinic	Enhanced	Tidewater
U.S. Army	Madigan Army Medical Center	Hospital	Enhanced	Puget Sound

Service/Directorate	Facility Name	Type	Authority	Enhanced Multi-Service Market (eMSM)
U.S Navy	Naval Hospital Bremerton	Hospital	Enhanced	Puget Sound
U.S. Navy	Naval Hospital Oak Harbor	Hospital	Enhanced	Puget Sound
U.S. Army	Tripler Army Medical Center	Hospital	Enhanced	Hawaii
U.S. Army	Schofield Barracks AHC	Clinic	Enhanced	Hawaii
U.S. Army	TMC 1 Schofield Barracks	Clinic	Enhanced	Hawaii
U.S. Army	Kahi Mohala Behavioral Health (Civilian)***	ERSCIV	Enhanced	Hawaii
U.S. Army	Queen's Medical Center (Civilian)***	ERSCIV	Enhanced	Hawaii
U.S. Army	Surgicare of Hawaii (Civilian)***	ERSCIV	Enhanced	Hawaii
U.S. Army	Gamma Knife Center of the Pacific (Civilian)***	ERSCIV	Enhanced	Hawaii
U.S. Army	Warrior Ohana Medical Home	Clinic	Enhanced	Hawaii
U.S. Air Force	Joint Base Pearl Harbor Hickam Clinic	Clinic	Enhanced	Hawaii
U.S. Navy	NHC Hawaii	Clinic	Enhanced	Hawaii
U.S. Navy	NBHC Naval Communication Area Master Station East Pacific	Clinic	Enhanced	Hawaii
U.S. Navy	BMC Marine Corps Air Station Kaneohe Bay	Clinic	Enhanced	Hawaii
U.S. Navy	NBHC Marine Corps Base Camp H.M. Smith	Clinic	Enhanced	Hawaii
U.S. Army	Evans Army Community Hopsital	Hospital	Enhanced	Colorado
U.S. Air Force	U.S. Air Force Academy Clinic	Clinic	Enhanced	Colorado

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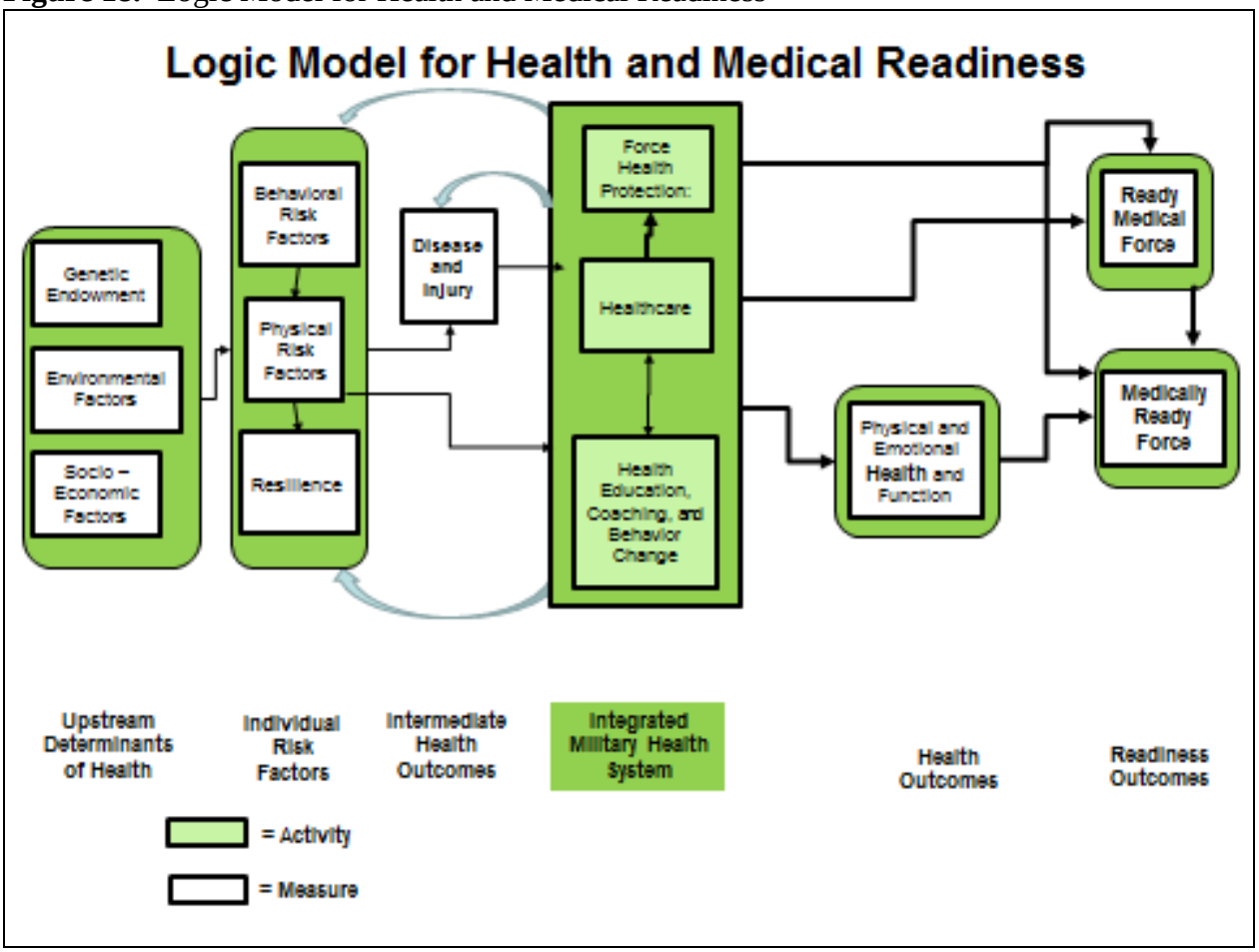
APPENDIX L. TRUE NORTH MEASURES AND LOGIC MODEL

Figure 17. True North Measures[37]

From Dinneen, M., 2014.

Figure 18. Logic Model for Health and Medical Readiness[37]



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APPENDIX M. SUPPORT STAFF

Allen Middleton, SES
Deputy Director, Defense Health Agency/
Designated Federal Officer

Christine Bader, MS, BSN, RN-BC
Executive Director, Defense Health Board and Independent Review Panel on Military Medical Construction Standards

Michael Krukar, MHA, FACHE
Executive Secretary, Independent Review Panel
on Military Medical Construction Standards

Camille Gaviola, MBA
Deputy Director, Defense Health Board and Independent Review Panel on Military Medical Construction Standards

Troy Walker, MS
Health Facility Planner, VW International, Inc.

Katrina Badger, MPH, GSW
Task Lead, Grant Thornton LLP
(Until October 2014)

Lisa Austin, MSHA, MBA
Task Lead, Grant Thornton LLP

Sara Higgins, MPH
Analyst, Grant Thornton LLP

Elizabeth Ribeiro, MSPH, CPH
Analyst, Creative Computing Solutions, Inc.

Ariel Markowitz-Shulman, MS
Analyst, Grant Thornton LLP

Kendal Brown, MBA
Management Analyst, Creative Computing Solutions, Inc.

Margaret Welsh
Management Analyst, Grant Thornton LLP

Kathi E. Hanna, MS, PhD
Editor, Creative Computing Solutions, Inc.

Jean Ward
Defense Health Board Staff Assistant

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