OFFICE OF THE UNDER SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

PERSONNEL AND
READINESS

JUL 31 2017

The Honorable Kay Granger
Chairwoman
Subcommittee on Defense
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Madam Chairwoman:

The enclosed report is a response to House Report 114-139, page 280, which accompanied H.R. 2685, the Department of Defense Appropriations Bill, 2016, requesting a report on the feasibility and costs associated with implementing the Military Acuity Model (MAM) throughout the Military Health System (MHS) and the potential benefits that employing this model would achieve.

The MAM referenced above is a product of a congressional special interest project initially awarded to Process Proxy, Inc. in September 2011, and a subsequent research effort between Process Proxy and the U.S. Department of the Air Force under a Cooperative Research and Development Agreement. This pilot validated the relevance and informed a more accurate account of the resources necessary to scale-up and deploy the MAM across the MHS. The enclosed report finds that the feasibility of scaling the MAM across the MHS is low, costs would be high, and the direct potential benefits to patient care are not clearly correlated.

A similar letter is being sent to the other congressional defense committees. Thank you for your interest in the health and well-being of our Service members, veterans, and their families.

A. M. Kurta
Performing the Duties of the Under Secretary of
Defense for Personnel and Readiness

Enclosure:
As stated

cc:
The Honorable Peter J. Visclosky
Ranking Member

OFFICE OF THE UNDER SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

PERSONNEL AND
READINESS

JUL 31 2017

The Honorable John McCain
Chairman
Committee on Armed Services
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

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A. M. Kurta
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Enclosure:
As stated

cc:
The Honorable Jack Reed
Ranking Member

OFFICE OF THE UNDER SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

PERSONNEL AND
READINESS

JUL 31 2017

The Honorable William M. "Mac" Thornberry
Chairman
Committee on Armed Services
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

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A. M. Kurta
Performing the Duties of the Under Secretary of
Defense for Personnel and Readiness

Enclosure:
As stated

cc:
The Honorable Adam Smith
Ranking Member

OFFICE OF THE UNDER SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

PERSONNEL AND
READINESS

JUL 31 2017

The Honorable Thad Cochran
Chairman
Subcommittee on Defense
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

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A. M. Kurta
Performing the Duties of the Under Secretary of
Defense for Personnel and Readiness

Enclosure:
As stated

cc:
The Honorable Richard J. Durbin
Vice Chairman

Report on Feasibility, Costs, and Potential Benefits of Scaling the Military Acuity Model

June 2017

Requested by: House Report 114-139, page 280, which accompanies H.R. 2685, the Department of Defense Appropriations Bill, 2016

The estimated cost of this report for the Department of Defense (DoD) is $4,000.00 for the 2017 Fiscal Year. This includes $2,000.00 in expenses and $2,000.00 in DoD labor.

Executive Summary

House Report 114-139, page 280, which accompanies H.R. 2685, the Department of Defense (DoD) Appropriations Bill, 2016, requests the Assistant Secretary of Defense for Health Affairs determine the feasibility, costs, and potential benefits to scale the Military Acuity Model (MAM) across the Military Health System (MHS).

The MAM was first developed by the Air Force Medical Service (AFMS) in partnership with Process Proxy Corporation in 2011, as part of a congressional special interest project through the U.S. Army Medical Research & Materiel Command. The MAM was piloted from 2014-2017, at one medical-surgical unit at Wright-Patterson Air Force Base Medical Center (WPMC) and one medical-surgical unit at Keesler Air Force Base Medical Center (KMC) as part of a portfolio of quality and patient safety improvement initiatives.

This particular model combines process improvement methodologies with electronic patient care data, to support dynamic management of health care delivery in a patient care setting. MAM was piloted by clinical managers to help balance overall patient care workflow, as well as help care teams avoid task saturation and cognitive overload.

While improvements to patient safety and patient satisfaction were made during the pilot period, it is unclear if these are directly attributable to MAM alone. Moving forward, implementing the MAM model would require significant conceptual buy-in at many levels of the organization and a large investment in personnel resources and proprietary software.

The DoD believes the feasibility of scaling the MAM across the MHS is low, and that costs would be high, while the direct potential benefits to patient care are not clearly correlated. The concept of preventing task saturation is a valid risk area that should be considered as part of future health care safety and quality improvement initiatives.

Introduction

House Report 114-139, page 280; which accompanies H.R. 2685, the DoD Appropriations Bill, 2016, requests an assessment of the feasibility, estimated costs, and potential benefits with scaling the MAM across the MHS. The information was gathered from a three-year pilot conducted at two U.S. Department of the Air Force military medical centers.

The MAM is a health care process improvement tool developed and studied by the AFMS in partnership with Proxy Process Corporation under a series of research and development projects.

Background

The AFMS operates seven medical centers globally. The delivery of health care services in these settings is often complex, especially in intensive care units and emergency departments. Many factors influence how health care providers plan and prioritize their work in a given shift. In particular, nurses face many challenges balancing patient care, administrative duties, and family support. All of this contributes to *task saturation* –too much to do in too little time where crucial tasks can be missed as a result.

An inefficient decision-making process can lead to cognitive overload, which may result in increased risks of medical errors, adverse patient outcomes, and even unintended morbidity or mortality. Prioritizing nursing tasks in a scientific and risk-based way has the potential for maximizing use of personnel resources and optimizing patient care delivery.
Task saturation is a major problem throughout the American health care system. Research data gleaned from the MAM pilot study by the AFMS attempt to demonstrate how task saturation among nurses can be predicated and managed.

The Military Acuity Model

The MAM was first developed by the AFMS in partnership with Process Proxy Corporation in 2011 as part of a congressional special interest project. The model combines Lean process improvement methodologies, early warning tools, patient care data fed from the Essentris® electronic medical record, and automated Excel worksheets. The model was initially developed to offer nurses and clinic managers:

- Automated capture of disparate data points from electronic patient records
- Evidence-based scoring of patient care processes
- Assistance with critical thinking and problem-solving within existing workflows
- Morbidity and mortality risk stratification
- Standardized, common operating pictures to facilitate communication about a specific patient's needs or risks

The MAM is used by clinical unit managers to help balance overall patient care workflows and help care teams avoid task saturation that results from cognitive overload. It can also be used to manage administrative assignments, micro-targeting nursing assignment, and patient load balancing within a particular unit.

Application to Clinical Settings

After performing a root cause analysis on a negative health event occurring on a particular unit, an area for improvement is targeted. For example, an opportunity for improvement might be reducing hospital acquired infections in a particular unit. The local clinical safety or quality team then performs a root cause analysis to identify variables that leads to an unsatisfactory patient outcome. A process is redesigned as a result of this information. The updated processes can then be embedded in tools that help nurses manage patient care.

The MAM methodology looks at checklists differently, as described in sequence below:

1. Protected flanks (i.e., workflows of least concern) are determined using MAM tools and methods, predicting where compliance is expected to be high due to low risk of task saturation.
2. Concentrated force can be applied to tasks at risk of failure, such as the six critical tasks to preventing hospital-acquired sepsis.
3. A smaller, more dynamic checklist is created.

The MAM model produces a real-time acuity score to determine the value-added of individual tasks for each patient's care. This information is analyzed and disseminated by a care manager to nursing staff in order to prioritize work. This can be done once per shift or as frequently as every hour.

MAM methodology is based on the notion that cognitive capacity is a zero-sum game. So, if preventing or tending to sepsis is consuming the majority of nursing resources, then this affects other areas of patient care, ultimately delaying timely intervention elsewhere.

Input data elements vary depending on the data available at a particular site or unit. MAM uses laboratory diagnostic data, radiological consults, pharmaceutical orders, documented medication administration, discharge orders, billing claims data, and available patient care notes.

The output is a score for each patient and a specific checklist for an area of patient care at greater risk for failure (e.g., hospital-acquired sepsis, inpatient fall). This updated checklist is made available to the nursing managers or unit provider. Tasks at risk for failure are shown in red, while other tasks not at risk can be shown in other colors, tailored to the needs of that particular unit; patients within a particular unit at risk and tasks at risk of failure, based on task saturation risks.

Results

The MAM was first studied retrospectively at the David Grant Medical Center, at Travis Air Force Base, in cooperation with U.S. Army Medical Research & Materiel Command, Telemedicine and Advanced Technology Research Center working with contracted subject matter experts from the Process Proxy Corporation. The model was applied as a pilot to medical-surgical units at WPMC and KMC between 2014 and 2017.

The MAM pilot was implemented for nursing personnel in one medical-surgical unit at WPMC over an 18-month period, targeting problems in failure to rescue, hospital-acquired conditions, and ultimately inpatient satisfaction scores. In addition, the model was implemented in one medical-surgical unit at KMC over a 24-month period targeting the same problems.

During the period of implementation at WPMC, failure to rescue dropped 87 percent, patient throughput increased 33 percent, venous thrombo-embolism treatment compliance improved 80 percent, readmissions decreased 10 percent, and patient satisfaction increased an estimated 12 percent based on local measures of performance. It cannot be wholly determined that these health care improvements were directly attributable to piloting the MAM; the MHS implemented several process improvement priorities to better patient safety and health care quality across the enterprise during the pilot period.

Given the limited scope of the pilot project, maximizing nursing productivity became the primary focus of the MAM. Nurses were guided and trained to manage task saturation by the research investigators based on the following three assumptions:

1. Nurses are the primary point of patient interaction with the health care team.
2. Patient-nurse interactions are high-impact.
3. Better task management affords more time for patient attentiveness, communication, and care-related problem solving.

No additional bedside nursing resources were required for this process improvement. However, a dedicated process improvement specialist was embedded in the units during the course of the pilot.

Research investigators hypothesized that patient safety and patient satisfaction with care would increase as a result of the MAM. Patient safety improvements were measured locally and based on the number of failures to rescue and hospital-acquired conditions. A few key improvements at the pilot sites are as follows:

- At WPMC, failure to rescue incidents reduced from 16 to 2 from 2014 to 2015.
- At WPMC, the hospital-acquired condition composite (i.e., catheter associated urinary tract infection, hospital-acquired pneumonia, and pressure ulcers) reduced from five to zero incidents from 2013 to 2015.
- At WPMC, inpatient falls with harm reduced from five to zero incidents from in 2014 to 2015.

- At KMC, the hospital-acquired condition composite (i.e., catheter associated urinary tract infection, hospital-acquired pneumonia, and pressure ulcers) reduced from 14 to 4 incidents from 2014 to 2015 during partial implementation of the MAM. By 2016, the indicator reached zero incidents.

To improve patient satisfaction, piloting the MAM gave nurses more time with each patient and their families and enabled nurses to spend more time at the bedside. During the period of study, patient satisfaction increased from 83 percent in 2014, to 95 percent in 2015 at WPMC; and increased from 79 percent in 2015, to 89 percent in 2016 at KMC. Increasing patient satisfaction is an on-going effort for the AFMS as well as the MHS as a whole. Thus, these improvements cannot be directly correlated to piloting the MAM with a degree of valid scientific significance.

MAM has also been piloted at civilian facilities in different clinical settings, such as the Johns Hopkins Kimmel Cancer Center on an outpatient care basis. Process improve results were similar, although different objectives and metrics were targeted for improvement. Differences in patient acuity and the care setting prohibit direct comparisons between the civilian pilots and the MAM pilot.

Overall, it is unclear if pilot results can be wholly attributed to the MAM tool, given the lack of information about the methods and process used to perform the pilot as well as other factors occurring in the unit environment at that time. Therefore, these health care improvements cannot be directly correlated to piloting the MAM with a degree of valid scientific significance.

Feasibility and Costs to Scale

The DoD believes that scaling the MAM across the MHS feasibility is low, costs would be high, and the direct potential benefits to patient care are not clearly correlated.

While use of the MAM in two Air Force medical-surgical units has demonstrated improvements in patient safety, patient satisfaction, and potential patient costs; it is also complex to understand, operate, and utilize. Beyond significant conceptual buy-in from managers, the model requires a dedicated process improvement manager for each clinic or nursing unit – a significant investment in non-nursing personnel resources.

Beyond personnel resources, there are fees and personnel resources associated with the necessary software tools. MAM is packaged as a training program with deep analysis performed using a proprietary set of tools owned by the Process Proxy Corporation. Each application of its use and local implementation needs to be custom configured for each clinic or unit. MAM requires trainers and consultants to implement; a facility would need to embed process improvement experts within each unit to continue using the package. In its current iteration, the model output is calculated and displayed using Microsoft Excel fed by generated patient reports. MAM was piloted with Essentris®, an electronic medical record keeping system found in acute care settings. This software program is being phased out as the military's new, commercial off the shelf electronic health record implementation, MHS GENESIS, goes live across the enterprise.

The DoD estimates that it would takes several years to implement the model for inpatient and acute care nursing across the MHS at a cost of $240,000.00/man-year (i.e., the amount of work done by an individual throughout the entire year) per unit. Should the tool be implemented, intensive care units would be phased in first, followed by medical-surgical floor units, then emergency departments, and finally outpatient healthcare settings. Overall, implementation costs supplied by the contractor Process Proxy Corporation estimates a cost of $1M per military treatment facility and upwards of $7M for larger medical centers, not including follow-on personnel investments, refreshment training, on-going technical support, software maintenance, or upgrades to integrate future technologies or platforms. Scaling across the MHS beyond the pilot would be cost prohibitive, in addition to slow uptake among nursing staff. Other process improvement projects and priorities may be most cost effective.

Conclusion

The MAM pilot demonstrated process improvement benefits in two inpatient medical-surgical units that resulted in more efficient nursing workload. However, due to many improvement projects across the MHS, improvements to patient safety, quality, and satisfaction cannot be directly correlated to piloting the MAM with a degree of scientific significance.

Given implementation of MHS GENESIS and significant investment in permanent personnel resources, the feasibility of scaling across the MAM across the enterprise is low. Scaling costs would exceed that of other ongoing improvement projects. The MAM does not have the same return on investment.

The DoD knows that the journey to becoming a high-reliable health care system involves trying various improvement strategies and documenting findings. Piloting the MAM within two Air Force medical centers brought to light the concept of task saturation. The DoD will work to reduce task saturation in conjunction with rolling out MHS GENESIS and transforming the MHS into a highly-reliable organization that delivers safe, quality health care to the Warfighter and all beneficiaries of military medicine.