COE QS Research Grant Fall 2015 - Application

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Proposal Information
Title: Meta-M&Ms: A Novel Systematic Approach to Improving Surgical Outcomes

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RESEARCH NARRATIVE

Problem to be addressed: The surgery Morbidity and Mortality (M&M) conference has been a highly valued tradition of virtually all academic medical centers. It is one of the very few conferences where a significant number of surgery attendings, fellows, residents, and medical students converge and engage in a single medical dialogue. Such a comprehensive audience makes M&Ms a superb opportunity for teaching. In addition to education, M&Ms also serve as an opportunity to reflect on the medical mistakes and to discuss the potentially preventable errors leading to suboptimal patient outcomes. Over the years, M&Ms have taken on this dual role of education and quality improvement (QI). Though the efficacy of education during M&Ms is seldom questioned, the QI component remains relatively underdeveloped. Indeed, the structure of M&Ms has not changed substantively in the last century (Hutter 2006). This is particularly remarkable in light of how much the rest of healthcare has transformed in just the last decade. An effective QI system requires standardized input, systematic data analyses, identification of patterns of errors, and appropriate intervention with clear endpoints to measure outcomes. Unfortunately, our current M&Ms lack many of these critical components. There is no standardized input, as presented M&M cases are often chosen based on arbitrary criteria, including the rarity of the disease, the complexity of the patient, the egregiousness of the error, the severity of the morbidity/mortality, among many others. At Brigham and Women’s Hospital, there currently exists no systematic analysis or identification of error patterns of past M&M cases. Finally, though there is usually a set of takeaways from each M&M meeting, it is typically only expressed verbally without any substantive interventions. Briefly, we propose to develop a user-friendly M&M data form that standardizes and codifies the specific errors contributing to the poor surgical outcome. All residents submitting M&Ms will be required to fill this short form before submitting to the attending for selection for conference presentation. The M&M forms collect identifier metrics and validated contributors to error, including communication factors, systems factors, and human factors. Given that we have 5-10 surgical M&M submissions per week, we expect to collect up to 500 prospective cases a year. Additionally, we plan to leverage our historical M&M database (ranging back 10 years, with approximately 3,000 submitted cases) to apply this analysis. We ultimately hope to gather descriptive data that elicit patterns and prevalence of errors from specific surgical procedures/services. We will then leverage these error patterns to conduct more detailed case reviews and to develop interventions/guidelines for preventing further similar errors. The QI platform developed by this project should be readily translatable to other specialties and institutions. There is immense opportunity to systematically learn from our surgical mistakes with M&Ms. The standardization and codification of our surgical errors would be a significant step towards that goal.

Literature Review (1-2 paragraph summary and a maximum of 6 references): Surgery M&Ms, though often labeled as the “golden hour” of learning, have often fallen short in providing its attendees with effective quality improvement education (Sacks 2015). This is in part driven by the lack of a standardized structure, haphazard case selection (McVeigh 2013), and inadequate underscoring of key takeaways of what to do differently. Surgery departments from other institutions have already taken significant steps in addressing these
shortcomings. For example, UCLA has implemented standardized case selections along with root cause analysis (Sacks 2015). MGH has implemented a standardized online reporting system for all submitted M&M cases (Hutter 2006). Georgia Regents University has adopted the Matrix M&M, which assigns presentations 2-5 weeks in advance to give residents to prepare the presentation, and publishes a newsletter after each meeting to highlight teaching points and clinical pearls (Bhalla 2015). This matrix M&M format has been demonstrated to be more efficient, educational, and have higher quality, as perceived by residents and attendings. Though there have been various studies on improvement of educational satisfaction after M&M modifications (Kim 2010, Mitchell 2013), there are no data on clinical outcome improvements with these interventions. Standardizing and analyzing M&Ms to generate effective QI interventions would be much needed next step in improving delivery of surgical care.  


Study hypothesis: There exist predictable patterns of errors among the submitted surgical M&M cases at Brigham and Women’s Hospital (BWH), and these patterns can guide interventions to reduce similar errors in the future.

Population: There will be 2 phases of this project. We are applying for this grant only for the first phase. In Phase I, patterns of surgical errors will be gathered from both past submitted M&M cases and ongoing submitted M&M cases. These cases are identified by sen

Description of intervention or study design: In Phase I of our project, we propose to develop a user-friendly M&M data form that standardizes and codifies the specific errors contributing to the poor surgical outcome. The data collection form has already been designed, and will be e-mailed to you along with my CV. All residents submitting M&Ms will be required to fill this short form (takes <3 minutes) before submitting to the attending for selection for conference presentation. The output would be standardized, descriptive data highlighting trends of surgical errors on specific services/procedures. Focusing on the submitted M&M cases as opposed to the presented M&M effectively bypasses the arbitrary case selection bias. The M&M forms collect identifier metrics including medical record number, surgery service, surgical procedure, location of incidence, and type of morbidity/mortality. Importantly, they collect detailed, validated contributors to error, including communication factors (e.g., delayed communication, lack of communication, inaccurate communication), systems factors (e.g., EMR, documentation error, resource availability, equipment issue, inadequate/absent policy), and human factors (e.g., practitioner skill-based error, practitioner knowledge-based error, patient non-compliance). The form prompts the user to check off all errors that occurred surrounding the case, and to then select among those errors the primary contributor to error. This will help narrow the focus to the primary source of error that led to the poor outcome. Given that we have 5-10 surgical M&M submissions per week, we expect to collect 250-500 cases in our prospective data (11/1-2015 to 11/1/2016). Additionally, we plan to leverage our historical M&M database (ranging back 10 years, with approximately 3,000 submitted cases) to run through this analysis. We ultimately hope to collect descriptive data that elicit patterns and prevalence of errors from specific surgical procedures/services. An example error pattern would be: on general surgery service, patients with chronic cholecystitis are at high risk for practitioner technical error, namely common bile duct (CBD) transection. A potential finding would be that certain patient
characteristics/laparoscopic visual findings make distinguishing the cystic duct particularly difficult. In phase II of our project, interventions will be designed to address these trends of errors. In regards to the prior CBD transection example, an appropriate intervention would then be to create a protocol or newsletter highlighting the precise characteristics that should alert the surgeon for increased likelihood of CBD transection. We are applying to this grant for support only for Phase I. Funding for Phase II interventions will likely come from surgery departmental resources. In summary, the purpose of Phase I is to highlight themes of surgical errors that can then catalyze QI projects to develop interventions/guidelines to prevent further similar errors. Importantly, the QI platform developed by this project should be readily translatable to other specialties and institutions.

**Description of comparison group (if relevant):** The comparison group is irrelevant in Phase I, as we are only gathering descriptive data and eliciting patterns of errors in Phase I. In Phase II, we identify potential interventions or policy changes that can decrease the errors identified in Phase I. We will then determine if our interventions have reduced the prevalence of those specific error types. Thus in Phase II, the control/comparison group would be the surgical patient M&M cases at BWH prior to the implementation of the intervention.

**Outcome variable to be used to determine the efficacy of the intervention (if relevant):** Phase I of this project is designed to catalyze a series of QI opportunities for intervention by eliciting the most common types of errors on specific surgical services. Efficacy of Phase I would involve identifying highly prevalent or recurrent types of surgical errors made on specific surgical services. In Phase II, the efficacy of the interventions will be assessed by tracking the prevalence of error types that the interventions were specifically designed to address. An efficacious intervention would significantly reduce the prevalence of a specific error after being implemented. These changes in error prevalence will be statistically analyzed to generate p values.

**Power analysis to determine feasibility (when relevant):** During Phase I, we will have over 3,000 past submitted M&M cases for error type prevalence analysis and 500 prospective submitted M&M cases. In Phase II, power analysis will be conducted for each intervention implemented. As we currently do not have the actual prevalence and reduction goal of these errors, we are currently unable to conduct a statistical power analysis.

**Timeline:** Phase I of the project will consist of retrospective analysis of the last 10 years of M&M data, which with the help of a research analyst, should take approximately 3 months. The same research analyst will continue to aggregate ongoing M&M cases from 11/1/2015 to 11/1/2016. This year’s worth of data should generate an n-count of 250-500. To allow for sufficient time to develop proof of concept, and to allow time to arrange the logistics of implementing this M&M form, the first meta-M&M meeting where these patterns will be discussed will be scheduled to be on 2/1/2016. Meta-M&M meetings would then be held every 4 months subsequently (within the funding cycle, on 6/1/2016 and 10/1/2016). Each M&M meeting will focus on discussing the prior 4 months’ worth of surgical errors, any patterns identified, and potential QI projects to address those errors.

**IRB status of project:** Dr. Jonathan Gates’ research coordinator, Elizabeth Bryant, is presently working to obtain IRB approval for this project. The PI, Danny Mou, has already completed his CITI training. The protocol will be submitted for IRB.

**BUDGET**

**Line item budget and budget narrative:** $1,500 Laptop for data analysis and result presentation $2,000 for research analyst at $20/hr $1,000 for food for 4 meetings ($250 per meeting). The first introduction meeting will be in 11/2015 with chief residents/attendings will be designed to introduce the new error codification system, the usage of the form, and the format of data collection. The 3 subsequent meetings will be meta-M&M meetings every 4 months starting on 2/1/2016 (other 2 meetings on 6/1/2016 and 10/1/2016) with chief residents and attendings. During these meetings, we will discuss newly elicited patterns of errors in the past 4 month period, and talk about ideas to potentially further analyze trends and/or to design interventions.
addressing these errors. Additionally, any necessary changes to the data collection will be discussed, and the data collection form will be iterated upon appropriately.

**Disclosure of other funding sources.** (Will receipt of this grant augment or replace other funding sources for your research?) This grant would be sole source of funding.

**OTHER**

**Previous COE involvement to date:** No prior involvement with Centers of Expertise to date.

**Previous COE funding:** None