

TRANSFORMING IDEAS INTO ACTION:

THE UNIVERSITY OF MICHIGAN/ANN ARBOR VA MEDICAL CENTER'S PATIENT

SAFETY ENHANCEMENT PROGRAM

– EXECUTIVE SUMMARY –

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To address the concerns raised by the report from the Institute of Medicine, we developed the Patient Safety Enhancement Program (PSEP), an effort jointly sponsored by the University of Michigan and the Ann Arbor Veterans Affairs Medical Center. The Patient Safety Enhancement Program directly responded to the major recommendation made by the Institute of Medicine, namely that safety systems be developed within healthcare systems. The mission of the Patient Safety Enhancement Program is to improve the quality of patient care by preventing adverse patient outcomes. The objectives of the Patient Safety Enhancement Program are therefore three-fold: first, to conduct, synthesize, and disseminate research aimed at reducing healthcare-associated patient complications; second, to systematically evaluate errors in processes that undermine patient safety; and third, to operationalize these research findings by systematizing methods to improve the safety of hospitalized patients. The PSEP has three components, each paralleling the mission of most academic medical centers: Research, Operations (i.e., patient care), and Education.

Our approach focuses on systemic problems rather than isolated, haphazard events using a proven epidemiological approach. Preventing hospital-acquired infections is a good example of how principles of epidemiology can be successfully used to prevent illness in hospitalized patients. In our work thus far, we have targeted the reduction of device-related nosocomial infections, particularly those associated with the use of central venous and indwelling urinary catheters. In this testimony, I provide two infection prevention examples of the systematic approach we have used to improve the quality and safety of patient care. The interventions we put in place will improve patient safety while likely saving the healthcare system money.

Assuring the safety of patients is vital. Most experts agree that ensuring patient safety is a critical first step in improving the overall quality of patient care. Given the complexity of maintaining a safe environment for our patients, system-wide solutions – especially those targeted within healthcare organizations – are needed. As we have shown, Michigan hospitals are well positioned to take a leading role in enhancing the safety of all patients. Goethe argues: “Knowing is not enough, we must apply. Willing is not enough, we must do.” This program aims to do just that.

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Topic area addressed by my written testimony: Implementing Safety Systems in Health

Care Organizations: Meaningful Patient Safety Programs

Simply put, patient safety is important. The Institute of Medicine's report entitled *To Err is Human* first galvanized the attention of the public, payers, and providers approximately five years ago by concluding that thousands of Americans die each year as a result of medical error.¹ Importantly, errors lead not only to increased economic costs (estimated to be between \$17 billion and \$29 billion), but also to patient distrust and diminished satisfaction for both physicians and patients. The Institute of Medicine wrote that "healthcare is a decade or more behind other high risk industries in its attention to ensuring basic safety."¹

To address the concerns raised by the report from the Institute of Medicine, we developed the Patient Safety Enhancement Program (PSEP), an effort jointly sponsored by the University of Michigan and the Ann Arbor Veterans Affairs Medical Center (www.med.umich.edu/psep). The Patient Safety Enhancement Program – which formally began in 2000 – directly responded to the major recommendation made by the Institute of Medicine, namely that safety systems be developed within healthcare systems. Below, I list the objectives of the Program and describe each of its three components. I then provide two examples of how we have translated research into practice at our institution, using the resources of the PSEP. My goal in providing this written testimony is to encourage other Michigan clinical leaders to develop patient safety programs at their own hospitals by providing one approach for such an endeavor.

THE PATIENT SAFETY ENHANCEMENT PROGRAM

The mission of the Patient Safety Enhancement Program is to improve the quality of patient care by preventing adverse patient outcomes. The objectives of the Patient Safety Enhancement Program are therefore three-fold: first, to conduct, synthesize, and disseminate research aimed at reducing healthcare-associated patient complications; second, to systematically evaluate errors in

processes that undermine patient safety; and third, to operationalize these research findings by systematizing methods to improve the safety of hospitalized patients.

The PSEP has three components, each paralleling the mission of most academic medical centers: Research, Operations (i.e., patient care), and Education. Each is described below.

The Research Component

The research component was the initial focus of the program because, without research, scientifically sound recommendations would not be possible. The goal of the research component is to use rigorously applied epidemiological methods to synthesize and evaluate methods for reducing error, thereby informing decisions regarding the processes of healthcare that must be modified in order to enhance patient safety.

The Operational Component

Study results from the research component of PSEP are implemented in the operational component. Through this mechanism, suggestions and findings of the research component have been translated into improved clinical care using many of the resources already in place at the Ann Arbor VA Medical and the University of Michigan Health System. In effect, we have developed a patient safety “bench-to-bedside” translation.

The Educational Component

Perhaps the most appropriate time to teach healthcare providers about the importance of patient safety is during their training. One of the important issues that we are attempting to address is developing an educational curriculum for training medical students and houseofficers about the importance of hospital-acquired complications and patient safety. Through the leadership of two

PSEP-affiliated faculty members (Marilynn Rosenthal, PhD, and Rajesh Mangrulkar, MD) and via grant funding from the Agency for Healthcare Research and Quality, we are developing a patient safety education portfolio that can be disseminated, once completed, to other educators.

THE PSEP APPROACH TO PATIENT SAFETY

Our approach focuses on systemic problems rather than isolated, haphazard events, using the following approach:

- 1) Review the scope of a particular patient safety problem, which includes describing the attributable morbidity, mortality, and cost of the problem.^{2,3}
- 2) Delineate risk factors – both modifiable and non-modifiable – for the problem.
- 3) Critically and rigorously evaluate methods to prevent the problem using various research methods, such as meta-analysis, cost-effectiveness analysis, and primary data collection.
- 4) Assess whether or not the University of Michigan and Ann Arbor VA Medical Center are using proven methods for decreasing the incidence of the patient safety problem.
- 5) Identify the best strategy for implementing proven methods of enhancing patient safety via guideline or pathway use, administrative or purchasing decisions, or provider education. This final step focuses on improving the *system* of care, thereby translating the research findings into improved quality of patient care at our institution.

HEALTHCARE-ASSOCIATED INFECTIONS: TRANSFORMING IDEAS INTO ACTION

Hospital-acquired infections are common, costly, and morbid. In order to prevent infection, most hospitals rely upon the advice of infection control professionals. Infection control is a good example of how principles of epidemiology can be successfully used to prevent illness in hospitalized patients, since most modern hospitals employ individuals to perform surveillance,

prevention, and control of infectious diseases that occur after patients are hospitalized.^{4,6} Much work, however, remains. The CDC estimates that hospital-acquired infections affect about two million patients hospitalized in acute care settings annually in the U.S. and lead to approximately \$3.5 billion in direct costs per year.^{1, 7-11} Harbarth and colleagues recently performed a systematic review and concluded that, overall, at least 20% of nosocomial infections are avoidable, and about 60% of vascular catheter-related bloodstream infections are preventable.¹² These data update Haley et al.'s conclusion two decades ago that approximately one-third of hospital-acquired infections could be prevented through the use of efficient and effective infection control programs.⁵ Thus, while infection control is a step in the right direction, several additional steps are necessary for infection control to match its potential.

In our work thus far, we have targeted the reduction of device-related nosocomial infections, particularly those associated with the use of central venous and indwelling urinary catheters. Since medical devices are frequently used and their use is so strongly associated with costly and preventable complications, most hospitals have procedures in place for preventing device-related infections. We intended to build on these procedures. Additionally, the importance of preventing hospital-acquired infection in order to enhance patient safety has become highlighted,^{13, 14} leading us to believe that change in this area would meet minimal resistance. We provide below two examples of the systematic approach we have used to improve the quality and safety of patient care.

Example 1: Vascular Catheter-Related Infection Prevention

After critically appraising the medical literature using techniques endorsed by advocates of evidence-based medicine, we realized that vascular catheter-related infection is common and costly and leads to increased morbidity and mortality in hospitalized patients.^{15, 16} Based on discussions with the Chair of Infection Control at the University of Michigan Medical Center, it also became clear

that this was an important problem at our medical center. Risk factors for vascular catheter-related infection, identified through literature review, were categorized by whether or not they were modifiable.¹⁵ Preventive methods were also critically evaluated.^{17,18} From the literature review, it was discovered that several small trials had compared antiseptic-coated vascular catheters to standard, non-coated catheters. Unfortunately, no single study provided definitive results regarding the efficacy of antiseptic-coated catheters; thus, a formal meta-analysis was performed. We found that catheters coated with antiseptic agents significantly decreased the risk of catheter-related bloodstream infection by approximately 40% compared with standard catheters.¹⁹ However, given the extra cost of \$25 per antiseptic catheter, the question became, “Is the decrease in risk of infection worth the extra money?” Thus, we performed a formal cost-effectiveness analysis from the perspective of an individual hospital and found that not only would these antiseptic-coated catheters decrease the risk of catheter-related bloodstream infection and save lives but should save money within the health system.²⁰

Using antiseptic-coated vascular catheters should theoretically lead to improved patient safety *and* decreased health care costs. However, at the time, the University of Michigan was not using these catheters. After discussion with the Chair of Infection Control (to whom we provided our data and manuscripts), the decision was made by the Infection Control Committee and the Office of Clinical Affairs to pilot the use of these catheters in several of the intensive care units.

Our final step was to monitor the incidence of catheter-related bloodstream infections to assess whether or not an actual decrease would be observed. We have recently completed analyses of data using an interrupted times series design. We found that antiseptic-coated catheters were associated with a 35% reduction in catheter-related bloodstream infections and will likely save the University of Michigan approximately \$100,000 per year.

Example 2: Indwelling Urinary Catheter-Related Infection Prevention

Using evidence-based medicine techniques to hone our literature review, we discovered that urinary catheter-related urinary tract infection was the most common nosocomial infection and was associated with increased morbidity, mortality, and hospital cost.²¹ Several studies have found that, for approximately one-third of the days that a patient is catheterized, the catheter is unjustified and unnecessary. We addressed the issue of inappropriate indwelling catheter use through a multi-center study designed to assess whether physicians are aware of the presence of a urinary catheter in their own patients. We found that about one-fourth of housestaff and over one-third of attending physicians were unaware that their own patients were catheterized.²² We thought this finding might explain, at least in part, why patients are sometimes catheterized for unjustified reasons: physicians are often unaware that the catheter is in place and thus do not write an order to have the catheter removed. If so, we could reduce this error by system changes that heightened awareness of patient catheterization.

We have implemented and evaluated such an intervention in two medical centers. The first venue, a Veterans Affairs Medical Center, uses computerized physician order-entry, and therefore it employed a computerized reminder. Using a crossover group design, our study had two main findings.²³ First, having a computerized order dramatically increased the rate of documentation for indwelling urinary catheter placement (92% vs. 21%, study wards vs. control wards; $p < 0.001$). Second, the mean duration of catheterization was shortened by one-third (approximately 3 days; $P = 0.03$) on the study wards compared to the existing standard practice. In the second venue – the University of Michigan Medical Center (which does not yet have computerized physician order entry) – we received funding from the Blue Cross Blue Shield of Michigan Foundation and designed a simple written reminder for the hospitalized patient's team to assist recollection of urinary catheter use in their patients. Two of four wards were assigned to the intervention group (where the

reminder was used); the other two wards served as controls. A research nurse monitored the urethral catheter status of each patient daily. We found that the average proportion of time patients were catheterized increased by 15.1% in the control group but decreased by as much as 26% in the intervention group ($p=0.007$). After performing an economic evaluation, we found that the hospital cost savings provided by the intervention offset the necessary costs of this nurse-based intervention.

CONCLUSIONS

Assuring the safety of patients is vital. Most experts agree that ensuring patient safety is a critical first step in improving the overall quality of patient care. Given the complexity of maintaining a safe environment for our patients, system-wide solutions – especially those targeted within healthcare organizations – are needed. As we have shown, Michigan hospitals are well positioned to take a leading role in enhancing the safety of all patients. If we don't do it, who will?

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