

## Annotated Bibliography of Selected Publications from the Armstrong Institute

**Marsteller JA, Pronovost PJ. Creating a fractal-based quality management infrastructure. Journal of Health Organization and Management. 2014 Oct.**

The authors describe in detail how a fractal organizational structure is used to inspire, implement, evaluate, and disseminate work in quality improvement and patient safety. They explain how the fractal concept is based on building repeating units of similar structure, process, and approach and how these units are linked both vertically for accountability and horizontally to peer learning. In addition, the authors provide the conceptual steps needed to create a fractal quality improvement structure in a health system.

**Pronovost PJ, Armstrong CM, Demski R, et al. Creating a high-reliability health care system: Improving performance on core processes of care at Johns Hopkins Medicine. Academic Medicine. 2015 Feb.**

In this article, the authors describe an initiative that established an infrastructure to manage quality and safety efforts throughout a complex health care system and that improved performance on core measures for acute myocardial infarction, heart failure, pneumonia, surgical care, and children's asthma at two academic hospitals and three community hospitals. The authors argue that, to improve quality and safety, health care systems should establish a system-wide governance structure and accountability process. They also should define and communicate goals and measures and build an infrastructure to support peer learning.

**Pronovost PJ, Holzmüller CG, Molello NE, et al. The Armstrong Institute: An academic institute for patient safety and quality improvement, research, training, and practice. Academic Medicine. 2015 Oct.**

The authors describe the development, purpose, governance, function, and challenges of a novel patient safety institute, the Armstrong Institute for Patient Safety and Quality, within the context of the Johns Hopkins Medicine health system. In their detailed description, the authors aim to help other academic medical centers replicate a similar structure with the goal of accelerating progress in safety and quality improvement.

**Gould LJ, Wachter PA, Aboumatar H, et al. Clinical communities at Johns Hopkins Medicine: An emerging approach to quality improvement. The Joint Commission Journal on Quality and Patient Safety. 2015 Sep.**

The authors describe a novel approach to quality improvement in the concept of clinical communities. They detail how the clinical communities at Johns Hopkins represent a bottom-up approach to quality improvement that supports peer learning and reinforces or establishes shared norms. Clinical communities are led by clinicians, have interdisciplinary membership, and focus on patient safety and QI in a clinical setting for a specific patient population or for a type of process and include support from an administrative core for project management, data analysis, and improvement tools. The authors describe how these communities were established and provide examples of the work being addressed within 14 clinical communities at Johns Hopkins.

**Kravet SJ, Bailey J, Demski R, et al. Establishing an Ambulatory Medicine Quality and Safety Oversight Structure: Leveraging the Fractal Model. Academic Medicine. 2016 Jan.**

The authors detail the challenges that ambulatory practices face in the governance and oversight of quality and safety. In addition, they specifically describe the model implemented within Johns Hopkins Medicine across all its ambulatory settings. The authors explain how establishing an Ambulatory Quality Council which includes leaders from all ambulatory settings within the health system provided the framework and accountability for engaging in quality and safety work. The integration of this council within the larger quality and safety infrastructure within the health system is also described. In addition a description of improvements in key outcome measures resulting from implementation of this ambulatory model are also provided.

**Mathews SC, Demski R, Pronovost PJ. Management's Discussion and Analysis: A tool for advancing quality and safety. Healthcare. 2016 Mar.**

This article describes how Johns Hopkins Medicine adapted a concept from financial accounting and reporting, the Management's Discussion and Analysis, to bring greater standardization and accountability to health care. The authors describe how this tool provides a tangible way to convey the priorities, challenges, and successes in an organizational framework defined by safety, quality, patient experience, and value. In addition, they also explain how this tool is used in practice at the department, hospital, and health system levels to provide a common language for describing progress in quality and safety.

**Sutcliffe KM, Paine L, Pronovost PJ. Re-examining high reliability: actively organising for safety. BMJ Quality and Safety. 2016 Mar.**

The authors describe the challenges that hospital's face in becoming high reliability organizations with respect to quality and safety. They specifically highlight the characteristics of high reliability organizations with a particular focus on the social-relational foundations of high reliability, which include: high performance work practices; trust and respect; heedful inter-relations; and actively organizing for a culture of high reliability.

**Ishii L, Demski R, Lee KK, et al. Improving healthcare value through clinical community and supply chain collaboration. Healthcare 2016 May.**

The authors describe how integrating supply chain with clinical communities allows for clinician-led supply cost reduction and improved value in an academic health system. They specifically describe how three clinical communities within Johns Hopkins Medicine (spine, joint, and blood management) partnered with supply chain teams to standardize supply utilization resulting in cost savings of \$3 million dollars, \$1.5 million dollars, and \$1.2 million dollars respectively. The authors conclude that this is an effective, practical, and scalable approach to improving value and engaging physicians in other academic health systems.

**Ghaferi AA, Myers CG, Sutcliffe KM, et al. The Next Wave of Hospital Innovation to Make Patients Safer. Harvard Business Review. 2016 Aug.**

In this article, the authors describe the three major waves of innovation in patient safety including technical advancements, standardization of procedures, and high reliability organizing. Particular focus is spent on describing the five characteristics of high reliability, which include: preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, and deference to expertise. The application of these principles to the health care setting are subsequently detailed.

**Mathews SC, Demski R, Hooper JE, et al. A Model for the Departmental Quality Management Infrastructure Within an Academic Health System. Academic Medicine. 2016 Sep.**

In this article the authors highlight the critical role that academic departments play in leading quality and safety initiatives and describe the model of departmental quality management infrastructure that has been implemented at the Johns Hopkins Hospital. The model is based on a fractal concept in which smaller units that are similar in structure, process, and approach are integrated both vertically and horizontally. The authors describe the infrastructure, function, and support system for this model in detail as well as the practical and essential steps for its implementation. They also provide examples of its early success.

**Mathews SC, Demski R, Pronovost PJ. Redefining Accountability in Quality and Safety at Academic Medical Centers. Quality Management in Health Care. 2016 Oct.**

The authors describe how accountability in medicine is underdeveloped and evolving from an individual provider level issue to a broader definition encompassed by the concept of shared leadership accountability - where leaders at every level share in the responsibility, control, and contribution of quality and safety efforts within the health system. The authors then detail how this concept is operationalized at Johns Hopkins Medicine by detailing how it fits within the health system's general framework for quality and safety and by providing examples of tools and processes used to support it.

**Pronovost PJ, Mathews SC, Chute CG, et al. Creating a Purpose Driven Learning and Improving Health System: The Johns Hopkins Medicine Quality and Safety Experience. Learning Health Systems. (In Press)**

The authors posit that creating a learning and improving health system that is purpose driven will ultimately lead the next transformation in health care. They share the experience within Johns Hopkins Medicine that established a learning and improving health system in quality and safety. The system is built around a clear and compelling patient centered purpose and leverages a fractal framework that provides horizontal links for peer learning and vertical links for accountability. It dismantles traditional research and clinical silos, and combines basic and applied research with health system operations. As a result, the system aligns the goals and strengths of a diverse set of stakeholders including clinicians, patients, researchers, and administrators toward a common goal.