

# Highly Reliable Health Care in the Context of Oncology Nursing: Part I

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Oncology care is delivered under challenging circumstances. The principles of reliability science are used extensively in numerous high-risk and high-tech industries to improve quality and safety. This two-part series will discuss the concept of reliability science in the context of oncology nursing practice as a way to improve the quality and safety of care provided to patients with cancer.

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Oncology care is delivered by staff with varying roles, education, responsibilities, and authority and in different clinical environments (i.e., inpatient, ambulatory care clinics, private offices, a patient's home). These clinical environments often are chaotic, complex, and ever changing. No matter the clinical setting, one role of an oncology nurse is to be an advocate for patient safety. Oncology nurses play an important part in ensuring safe and high-quality care. The goal of patient safety is to minimize events that cause real or potential harm to patients. Adverse events remain a pressing issue within the healthcare system, requiring organizations to seek methods to minimize adverse events by developing a comprehensive approach to quality and safety. Evidence shows that high-reliability principles have the potential to help reduce flaws in care processes, increase the consistency with which appropriate care is delivered, and improve patient outcomes (Riley, Davis, Miller, & McCullough, 2010).

## Reliability Science

The principles of reliability science are used extensively in numerous high-risk industries, such as the nuclear and aviation industries. The principles help compensate for the natural limits of human performance and attention, as a means to improve operational performance and safety (Niedner, Muething & Sutcliff, 2013). Quality and safety in delivering patient care has been a primary concern for healthcare organizations. Three Institute of Medicine (IOM) reports (IOM, 1999, 2001, 2004) have alerted the nation regarding errors in health care and have made recommendations regarding practices that promote safe patient care. In addition, a growing number of peer-reviewed articles in the literature are raising awareness through examples of highly reliable healthcare. As a result, some healthcare organizations have embraced the concept of a zero-defect environment, and the implementation of safety interventions from

other high-risk industries. Reliability science has the potential to help healthcare providers minimize defects in care or care processes, increase the consistency with which appropriate care is delivered, and improve patient outcomes. Some progressive healthcare organizations have applied lessons learned from highly reliable organizations to reduce risk and strengthen defenses against preventable harm by making care more reliable.

A definition of reliability, modified for healthcare, is the measurable capability of a healthcare process, procedure, or health service to perform its intended function in the required time (Berwick & Nolan, 2003). The Institute for Healthcare Improvement (IHI) defined reliable health care as a “failure-free operation over time” (Nolan, Resar, Haraden, & Griffin, 2004, p. 3). Melynk (2012) described a high-reliability healthcare organization as one that provides safe care and minimizes errors while achieving exceptional performance in quality and safety.

Reliability often is measured as a defect rate in units of 10 and generally represents the number of defects per opportunity for that defect. Therefore,  $10^{-1}$  means one defect per 10 attempts,  $10^{-2}$  is one defect per 100 attempts, and so on (Nolan et al., 2004). Putting these performance levels into a broader context, highly reliable organizations, such as those in the nuclear industry, operate at  $10^{-6}$ , which is one defect per one million tasks. Performance at the  $10^{-1}$  level is the level where most healthcare organizations currently perform (Niedner et al., 2013), indicating the need to focus on initial failure prevention through standardization,