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

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.

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 & 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). Melyn (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, $10^{-2}$ means one defect per 10 attempts, $10^{-3}$ 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 $10^{-4}$, which is one defect per one million tasks. Performance at the $10^{-5}$ 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,