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.

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 10⁻⁴, which is one defect per one million tasks. Performance at the 10⁻³ 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,
Principles of Anticipation

Five core principles help operationalize the framework of reliability science (Weick & Sutcliffe, 2007). The first three are called the principles of anticipation and consist of (a) preoccupation with failure, (b) reluctance to simplify, and (c) sensitivity to operations. The principles of anticipation are used to detect an error before it occurs. The final two principles are called the principles of containment and describe how organizations respond to errors after they occurred. They are (d) commitment to resilience and (e) deference to expertise. Together, these five principles are called mindfulness. How these five principles are implemented will differ depending on the specific organization, with its unique setting, resources, and constraints (Christianson, Sutcliffe, Miller, Iwashyna, 2011). The principles of anticipation are described in this article and the principles of containment will be discussed in part two of this series.

Preoccupation With Failure

The first principle considers any small lapse in the current process as a warning sign of a large failure that could happen in the future. Noticing and acting on these small variations allows organizations to correct small problems before they escalate into patient harm (Christianson et al., 2011). In this instance, healthcare organizations make concerted efforts to anticipate potential errors, using systems thinking. Learning to see interdependent relationships rather than linear cause and effect and grasping the concept of change as a process are essential for understanding the way systems work. Systems thinking involves looking at the process of care rather than the provider of the care. This may represent a paradigm shift for organizations used to having environments where staff members are blamed when errors occur. An example of this is when a nurse makes a medication error, as documented in the case study in this article. In this scenario, numerous system breakdowns in the process lead to the error that occurred. The clinic was short staffed and treatments were delayed for hours, dose packs of medication where mixed by pharmacy, and, when retrieving them from the dispensing system, the nurse assumed that, because she removed a dose pack from the bin labeled ondansetron, the medication was correct. If the organization used a systems approach, its leaders would see the error as an opportunity to improve processes rather than to blame the nurse for the error, threatening to fire him or her for repeated errors.

Thorough evaluations of adverse events are necessary to prevent future occurrences. Front-line staff must perceive that, whatever the action taken, it will be fair; otherwise, future event reporting will be discouraged. In the case study example, the nurse is only allowed three “non-serious” medication errors before being fired. How often will a nurse report systems issues and adverse effects in patient care if he or she is fearful of being fired? The process for reviewing adverse events should be transparent and sets of guidelines should be in place used with any staff involved in an error.

Reluctance to Simplify

Humans working in complex situations, such as healthcare, tend to simplify complexity through the use of common assumptions and mindset (Luria et al., 2006). In a highly reliable organization, diverse opinions are embraced, and alternative ways of addressing problems are encouraged. Every detail about an adverse event must be studied and not lumped into broad categories. The nurse had extensive experience discharging patients with take-home dose packs of antinausea medication. In a rush, the nurse did not notice that the bin of medication labeled ondansetron did not have the correct medication inside it. The nurse had become accustomed to finding the correct medications and, when retrieving them from the dispensing system. Therefore, the nurse assumed that, because she removed a dose pack from the bin labeled ondansetron, the medication was correct. If the organization used a systems approach, its leaders would see the error as an opportunity to improve processes rather than to blame the nurse for the error, threatening to fire him or her for repeated errors.

Sensitivity to Operations

This principle calls for management to understand that front-line staff are the

checklists, training, feedback, and reminders. Performance at the 10⁻² level indicates care processes with medium to high variation. These organizations are more likely to be intentionally designed with tools and concepts based on principles of human factors engineering, such as decision aids, redundancy, scheduling, taking advantage of habits and patterns, and default actions. Performance at a 10⁻³ level indicates a well-designed system with low variation and cooperative relationships (Luria, Muething, Schoettker, & Kotogal, 2006).

Case Study

A.L. works in a busy outpatient chemotherapy clinic that is part of a freestanding hospital in a metropolitan setting. Three nurses called in sick and the clinic is running five hours late all day. At 10 pm, A.L. completes treatment for her patient, a 55-year-old woman on her fourth course, day one, of FAC (5-FU 400 mg/m² and doxorubicin 40 mg/m²), and she mentions that she used up all her take-home medication pills for nausea. The patient also states that the ondansetron pills her doctor gave her worked very well. A.L. calls the doctor for an order and, because the hour is late, she takes a three-dose pack from the medication dispensing unit (this practice is allowed by the organization) for the patient.

The patient leaves the clinic with her husband. A half hour later, while A.L. cleans up for the night, the telephone rings. The patient’s husband is calling and asking why the pills A.L. gave his wife look different than usual. A.L. checks the dispensing cabinet, opens the drawer, and realizes that the bin has the wrong medication in it. This mix-up caused A.L. to make an error because, in her rush, she did not double-check the label on the dose pack. The husband confirms that his wife has not yet taken the medication and A.L. asks the husband to return the medication to the clinic. He does so and A.L. gives him the correct medication.

That night, before going home, A.L. calls the pharmacy and the night supervisor and notifies them of what has happened. A.L. completes a safety report the next day, explaining how the error occurred and makes a recommendation that all dispensing units be checked to make sure medications are stored in the right places. However, instead of acknowledging A.L. for reporting the error, the evening shift supervisor reprimands A.L., explaining that the organization allows three “non-serious” errors per year before termination of an employee.
key to error prevention. Leaders incorporating this principle spend more time with front-line staff and less time in the office. Examples include daily huddles and walking rounds where the nurses and leadership analyze together how patient care takes place. Most oncology organizations have policies and procedures that define care of patients with cancer. However, in many cases, differences exist between what policies and procedures dictate and how the work actually gets done. In the example, it was routine to dispense take-home packs of medications for patients. In fact, this procedure had become so automatic for the nurse that he or she reached for the medication where it typically is stored, without checking whether it had been stored properly.

**Conclusion**

Oncology care, no matter the setting, challenges nurses to become knowledgeable in techniques to improve the safety and quality of care. Reliability science, when carefully implemented, can enhance a culture of safety and quality in the practice environment. Part two of this article, appearing in the June issue of the *Clinical Journal of Oncology Nursing*, will discuss the principles of containment after an error has occurred and how to use the five principles in everyday oncology nursing practice.

**References**


