

## Human Factors Engineering and Graduate Medical Education in Patient Safety

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Virtually all health care organizations prior to the 1999 publication of the Institute of Medicine's landmark report, **To Err is Human**, engaged in investigations of events that resulted in harm to patients. Few of these investigations, however, participated in a systems-based approach to problem solving. Traditionally the focus had been on individuals and their mistakes, rather than on system-level vulnerabilities and events that combine in an unfortunate sequence to cause an incident. Based on a name and blame culture, the emphasis of such investigations was not on prevention, but on individual correction or discipline. Since its establishment in 1999, VA's NCPS's goal of the reduction and prevention of inadvertent harm to patients, as a result of their care, has remained unchanged and is reflected in all its programs. By shifting the emphasis from eliminating errors and focusing on blaming an individual to reducing or eliminating harm to patients through investigating system-level vulnerabilities, much has been accomplished in VA. Reducing or eliminating harm to patients is the real key to patient safety.

Two educational initiatives illustrate efforts to spread the NCPS approach more broadly outside the boundaries of VA's health care organization: faculty development **workshops** for residency programs and a core curriculum for the Chief Residents in Quality and Safety (CRQS). NCPS has offered workshops since 2003 for faculty development in teaching patient safety in graduate medical education. More than half of the Nation's residents train in VA health care facilities; therefore, NCPS recognizes the crucial resource of residents, as the front-line where change is possible. Working with faculty enables patient safety curriculum to reach more physicians-in-training. Faculty development workshops include an introduction to human factors engineering and hands-on methods for teaching. Workshop participants gain the ability to teach using hands-on, interactive teaching methods, to perform basic human factors engineering evaluations of health care devices, medications, and architecture in an operational environment, and to recognize the importance of a professional human factors engineering consult when change within the complex health care system is indicated. Even if only the most basic of concepts are acquired, requesting evidence of usability testing prior to purchasing decisions may advance safety efforts.

A unique program for board eligible physicians offers the opportunity to spend a year as a CRQS. The program encourages learning and teaching combined with problem solving project work. The program benefits the CRQS with unique additions to his or her resume and portfolio. It also benefits the residency-training program with the ability to meet recently established milestones and in preparation for Accreditation Council for Graduate Medical Education's (ACGME) Clinical Learning Environment Review (CLER) visits. The ACGME established the CLER

program to assess the graduate medical education learning environment of a sponsoring institution and its participating sites. CLER emphasizes quality and safety of the environment for learning and patient care, at the sponsoring institution.

Human factors engineering is at the core of teaching patient safety in graduate medical education. An individual CRQS may be nearly powerless in showing the way to effectively change the system, especially in places where name and blame culture remains existent. However, the use of published case studies and close calls allow rigorous human factors



*Figure 3, CRQS orientation*

engineering evaluation without fear. The insights revealed by an engineering evaluation will pave the way for future trust in a systems approach. This ability to learn from close calls is significant because they occur at a much higher frequency than actual adverse events. Addressing problems in this way not only results in safer systems, but it also focuses everyone's efforts on continually identifying potential systems-based problems and fixing them.

One of the most encouraging impacts about this program is a change in the way physicians see their work environment; knowing that design can either contribute to intuitive correct use, fail to inform the user or even mislead to the point of harming the patient becomes transformative. If NCPS existed only to perform patient safety problem solving, change would occur slowly and it would be primarily based on retrospective analysis. The investment in educational initiatives changes the perspective of the clinician and arms them with the evidence to demand better design and to address problem solving preemptively.