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Playing Well with Others: "Translocational Research" in Patient Safety

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Perspective

Translational research is all the rage in biomedicine. In its purest form, the concept refers to the translation of basic research discoveries into clinical applications, followed by patient-oriented studies to demonstrate benefit.(1) Increasingly, it also refers to the ability to successfully steer these biomedical discoveries into and through a commercial pipeline. Many academic medical centers have established centers and institutes to create the infrastructure and break down the silos to catalyze translational work.

It strikes me that much of the progress that we have made in the patient safety field over the past decade reflects a different kind of translational research: the translation not of basic research discoveries into clinical applications, but of insights and practices from non–health care fields into health care. To highlight the movement from non-medical fields into medicine, I propose that we call this *translocational research*.

Here's how translocational research works: an investigator or systems leader eyes an apparently effective practice from outside of health care and wonders whether there might be some relevance to a safety-related problem in medicine. He or she proposes a new clinical practice, involving the adaptation of the non–health care practice into the appropriate medical context. A series of studies, sometimes observational and sometimes interventional, are undertaken. If the practice proves to be successful in fixing a safety-related problem, the change may be widely adopted, sometimes promoted by a mandate (ie, a new regulation or law) or a change in professional norms (Figure).

Let's consider a few examples. The concept of appropriate ratios of "providers" to "consumers" was not invented by nursing researchers. Rather, we are well familiar with teacher-to-student ratios, with better ratios associated with improved educational outcomes. Aiken's pioneering observational studies demonstrating the association between higher nurse-to-patient ratios and better outcomes applied this line of reasoning to health care.(2) Her studies helped fuel a California law mandating minimum nurse staffing ratios.

The link between excessive work hours and poor performance is also well known from other industries, enforced by regulations limiting consecutive duty hours among truck drivers and airline pilots.(3) Research demonstrating that the effect of 24 hours of sustained wakefulness results in performance equivalent to a blood alcohol level of 0.1 helped lead the Accreditation Council on Graduate Medical Education (ACGME) to adopt duty hour limitations in 2003. More recently, Landrigan and colleagues demonstrated that shorter shifts among intensive care unit residents led to fewer medical errors.(4) Although the study did not find that the benefits of shorter shifts were compromised by the necessity of more "handoffs," this concern has been raised in enough quarters that the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) made improving handoffs one of its 2006 National Patient Safety Goals. Interestingly, as institutions struggle with how to improve handoffs specifically, and how to accurately transmit key information more generally, they are looking to the military (including the use of the NATO alphabet; alpha for A, bravo for B, etc.) and the take-out restaurant industry (which has long used read-backs to ensure that orders have been correctly transmitted) for guidance.(5)

A third example comes from aviation, in the form of crew resource management (CRM). In the late 1970s and early 1980s, commercial aviation began to require interdisciplinary teamwork training designed to improve communication and break down hierarchies. As the detrimental impact of poorly functioning teams on patient safety has been recognized, it has been posited that using CRM techniques might yield similar benefits. Preliminary studies have supported this hypothesis.(6) If additional studies bear this out, we can also expect pressure for CRM or other forms of teamwork training to be required (perhaps by JCAHO as a National Patient Safety Goal, or by the ACGME as a requirement of training) to grow.

The Table cites these examples and several more, including the use of simulators to improve technical and team-based performance (7), executive walk rounds to promote management involvement in safety (8), and bar coding to improve identification.(9) I have not listed several other major techniques, such as human factors engineering, root cause analysis, and failure mode effects analysis, now used commonly in safety but drawn from other disciplines. Nor have I chronicled the mental models that have been translocated to safety, including "practice makes perfect" (popularized by many sports stars long before it found its place in health care [10]) and the application of heuristics and other cognitive psychology approaches to clinical reasoning.(11) In fact, the overarching modern paradigm for patient safety—moving away from individual blame to a richer understanding of systems thinking and engineering principles—was a marvelous example of translocational work. Reason and Rasmussen initially developed the concept of system safety outside of health care (their examples were drawn from fields like commercial aviation, oil drilling, and nuclear power).(12,13) Leape's seminal 1994 *JAMA* article was the first to propose the relevance of this paradigm to patient safety.(14)

When translocating practices from other disciplines to health care, one should nearly always expect unexpected consequences. For example, as American Nurses Association president Barbara Blakeney recently described in this space, the law mandating certain nurse-to-patient ratios in California has led some institutions to cut the number of non-nurse providers, possibly compromising any potential benefits. And the recent spate of literature demonstrating negative consequences from health care information technology (IT) (15-17) is neither unexpected nor entirely unwelcome. Rather, it represents the inevitable maturation of the field, as the early literature (which looked at highly developed homegrown systems

developed by IT pioneers) gives way to literature describing more broad-based implementation of store-bought systems.(18) Unlike biomedicine, where foundational work can be conducted using animals or even computer models, there is presently no shortcut to this rather messy cycle as we struggle to improve patient safety. Each "failure" brings us a step closer to understanding how practices can be successfully implemented at a wide range of institutions using a variety of real-world systems.

Why does health care depend so much on the experiences of others to improve safety? Other enterprises have been better than we have in recognizing the diverse expertise that must be mined to produce a product of the highest quality at the lowest cost. In health care, the absence of an incentive to focus on quality and safety, the huge volume of new knowledge within biomedicine itself, our siloed approach to professional training and socialization, and, frankly, professional hubris have traditionally led us to be reluctant to look beyond our own professional shores for answers. The fact that we are now willing—and increasingly able—to seek insights from aviation, manufacturing, education, and other industries, and to embrace paradigms from engineering, sociology, psychology, and management, may prove to be the most enduring benefit of the patient safety movement.

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References

Back to Top

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Table

Back to Top

Table. Examples of Translocational Research in Patient Safety

Strategy	Non–health care example	Study demonstrating value in health care	Impetus for wider implementation
Improved ratios of providers to "customers"	Teacher-to-student ratios (ie, class-size initiatives)	Aiken, 2002 (2)	California legislation; other pressure
Decrease provider fatigue	Consecutive work-hour limitations for pilots, truck drivers	Landrigan, 2004 (4)	ACGME regulations limiting duty hours
Improve teamwork and communication	Crew resource management in aviation	Morey, 2002 (6)	None yet, but on the horizon if evidence becomes more robust
Use of simulators	Simulator use in aviation and the military	Reznek, 2003 (7)	Now required for credentialing for certain procedures; growing interest
Executive walk rounds	"Management by Walking Around" in business	Thomas, 2005 (8)	Not required, but increasingly popular practice
Bar coding	Use of bar coding in manufacturing, retail, and food sales	Poon, 2005 (9)	U.S. Food and Drug Administration now requires bar codes on most prescription medications; bar coding (or radiofrequency identification) may ultimately be required in many identification processes

Figure

Back to Top

Figure. Translocational Research and Progress in Patient Safety