Fineout-Overholt, Melnyk, and Schultz (2005), in a powerful and informative article about evidence-based practice, state that: “Major professional and healthcare organizations as well as federal agencies and policy-making bodies are emphasizing the importance of evidence-based practice (EBP). Using this problem-solving approach to clinical care that incorporates the conscientious use of current best evidence from well-designed studies, a clinician’s expertise, and patient values and preferences, nurses and other healthcare providers can provide care that goes beyond the status quo.”

The desire to increase evidence-based practice is not new; it merely has a different name. The previous term for the EBP phenomenon was “dissemination of research findings into practice,” and it has been written about in the 1970s, 1980s, and into the 1990s.

Stross and Harlan (1979) and Freemantle and Watt (1994) wrote about challenges of disseminating research findings: “Systematic overviews of interventions bring together the relevant evidence to provide overall estimates of the effectiveness of health service interventions. However, there remains the difficulty of bringing them to the attention of health professionals in a manner which will enable them to improve the effectiveness of their clinical practice.” Indeed, Fineout-Overholt, Melnyk, and Schultz indicate that it can take as long as 17 years until a research finding is adopted in practice.

I have anecdotal validation of this. In 1988, I was a research assistant for Ackerman in a study entitled, “The Effect of Normal Saline Bolus Instillation in Artificial Airways” (Ackerman & Gugerty, 1990). We demonstrated that squirting two to five milliliters of normal saline down a patient’s endotracheal (breathing) tube immediately before suctioning—a widely practiced action—yielded no more secretions than suctioning without the normal saline, and led to drops in arterial blood oxygen saturation—an undesirable short-term outcome—for the group that received normal saline compared with those who did not. The practice recommendation from this, and other studies that replicated it, was to not instill normal saline before suctioning. However, it took eight to 12 years for this recommendation to lead to the discontinuation of the practice of pre-suction normal saline instillation in most hospitals. To this day, a few hospitals still use this practice.

Past Approaches

For at least 30 years, experts have proposed publishing scholarly work and formal education as the prime methods of disseminating research findings into practice. These approaches have worked quite slowly, and now, with more than 2 million articles published annually in some 20,000 biomedical journals, it is a more suboptimal solution than ever.
Clinicians are simply overwhelmed with the rate of new evidence creation (Mulrow & Cook, 1998).

Using nursing evidence as a case in point, Figure 1 demonstrates the growth in evidence over time and informaticians’ and organizations’ approaches to making the evidence available for clinicians at the point of decision-making, where they need it most.

Budgets for the National Institute of Nursing Research, by far the largest source of funds for nursing research in the nation, can serve as an example for rates of research conducted by nurses. In 1986, the budget of the Nursing Research Center at the National Institutes of Health, NINR’s predecessor, was $16 million. The 1996 and 2006 budgets of the NINR were $61 million and $138 million respectively. (Considering that nurses comprise 54 percent of the healthcare workforce and that $138 million is relatively low funding compared with the other institutes, the NINR annual budget is grossly under-funded.) Nonetheless, this represents a nearly ninefold increase in funding over 20 years, demonstrating how the sharp increase in nursing research, which is the main source of evidence for nursing care, has made far more nursing evidence available. The majority of these studies yield findings that are applicable to practice. Thus, it’s clear from looking at the first row of Figure 1 that there is a lot more evidence available now.

In the 1980s, the federal government, healthcare professional organizations, and healthcare delivery organizations started to address the sub-optimal dissemination of evidence into practice by creating clinical practice guidelines and a wide array of mostly manual mechanisms to put them into practice. Because of the lack of comprehensive evidence and wide variances in practice, healthcare delivery organizations had to piece together evidence for their operations one hospital or healthcare entity at a time.

The government, and professional societies and standards organizations produced evidence, but there were significant omissions in what was available. As a result, health delivery organizations had to identify their best practices and use that as evidence—in effect producing their own evidence.
These organizations developed or packed all of this into usable forms for their organizations. This was costly, but the real expense was not readily apparent because they were mostly related to the reduced productivity of clinicians, who worked diligently for a great number of hours creating from scratch or adopting clinical practice guidelines for their organizations.

Affecting Care

All this work by individual health delivery organizations did not necessarily wind up affecting care at the bedside during this era. Rather, it ended up in books at nurses’ stations, in journal articles in physicians’ lounges, and in paper clinical pathway forms used for documentation. The utility of this evidence was negligible. The clinical pathway forms were not flexible enough to accommodate care for patients who had multiple problems, and they required constant updating, which generally was not done in a timely manner. As a result, they fell out of favor and use. The work done in the 1980s didn’t speed the diffusion of evidence into practice, but it was an essential start in the effort to drive evidence into practice.

In the 1990s, an already large base of evidence more than doubled as government, academic, and professional organizations increased production of evidence, while health delivery organizations still plugged the holes that remained for uses in their operations.

It was not until late in the 1990s that the Internet began to be used in such a way as to enable the viewing of evidence at the point of care. Before the advent of Internet use in the late 1990s, CDs, online catalogs, and medical library databases helped make evidence more available.

Faxing—considered by some today to be an “ancient” communication technology—was a significant conduit for bringing evidence to the point of care, largely in the form of journal articles. Late in the decade, links to evidence became available on clinical workstation desktops and even within some healthcare information systems. This was progress, but the utility or the ability to act on the evidence was not high.

Things are Heating Up

In the middle of the current decade, things are really changing. Importantly, advocates of evidence-based medicine have essentially won the hearts and minds of the skeptics who decried “cookbook medicine,” which was the classic put-down for evidence-based practice.

Any serious resistance to the value of evidence-based practice was pretty much blown away by the 1999 Institute of Medicine report…

Even though resistance to evidence-based practice has greatly diminished, resistance to any change affecting organizational members remains high, and must be managed.

Another very critical change is that clinical terminologies have finally grown and matured enough to be put into use in clinical information systems. This is a very important development because comprehensive standardized clinical reference terminologies are necessary to make the evidence—in the form of plans of care, order sets, and other manifestations—computable and interoperable on any significant scale. It’s in these forms—plans of care, order sets, standardized rules and alerts, and the like—that evidence will finally be widely, consistently, and reliably used at the point of care.

The use of evidence in practice will be an integral part of clinicians’ daily practice as they use information systems to receive information, document care, and make and execute decisions. Evidence-based practice will be facilitated by making it transparent to the user and, in a way, invisible.

The Impact of EHRs

Healthcare information systems, or electronic health records (EHRs), are changing to accommodate these exciting developments. Reference terminologies are being incorporated into EHR databases, and the fundamental organization of those databases is being changed to accommodate the reference terminologies. Vocabulary servers that are application-independent and yet tightly coupled to the EHR are being built and integrated into the architectures of EHRs. This will lead to the ability to integrate evidence-based practice into the underlying architecture of EHRs.
enabling the influence of care decisions at the point of care.

The evolution in reference terminologies and the technology to manage them is leading to changes in the production, development, packaging, and cost of healthcare evidence. Healthcare delivery organizations are essentially getting out of the evidence-production business, although they still remain in it in one aspect—partnering with pharma, academia, the government, and professional societies and standards organizations for clinical research.

Healthcare delivery organizations are getting out of the business of packaging evidence for consumption by their clinicians. As the amount of evidence overwhelms an individual or even the ability of an enterprise to make the evidence consumable by their clinicians, companies such as Zynx, Wolters-Kluwer, Thomson, and a host of others are growing and stepping into this space.

Some healthcare delivery organizations are balking at the new perceived high cost of evidence. These costs are very low relative to a unit of evidence actually being delivered in usable form by the combination of re-architected EHRs and pre-packaged evidence.

I recall agreeing with other health informaticians in 1990 that the precursor to the EHR, the computer-based patient record, would surely be highly functional and ubiquitous by 2000. The industry has made tremendous progress with EHRs in the past 15 years despite not fully achieving that vision. Today, regarding clinical evidence, the industry is in a similar place to where it was with the EHR in 1990. The industry is essentially taking the first steps on a path to low-cost, highly usable evidence manifest in the information technology tools that clinicians routinely use, but it is something that the healthcare industry has been striving for and working toward for more than 30 years.

Because the industry is just taking the first steps toward providing large amounts of usable evidence at the bedside, the “amount available at POC” and “actionability/utility” cells in the 2006 column of Figure 1 are overstated to make a point. Nevertheless, the industry has surely begun the journey, and 10 or even five years from now, the path will lead to a destination that is probably different than the one that can be imagined today. Yet it will most likely be a place where the use of evidence at the point of care is, if not ubiquitous, predominant and the care that clinicians provide is more effective, efficient, and safe.

About the Author

Brian Gugerty DNS, MS, RN, is a clinical informatician in a research and innovation group at Siemens Medical Solutions, where he models, designs, develops, and prototypes advanced nursing and clinical applications. Before coming to Siemens in 2005, Dr. Gugerty was a faculty member at the University of Maryland School of Nursing, Nursing Informatics Program. He began his informatics career in the early 1990s as Director of Nursing Informatics at Erie County Medical Center in Buffalo, NY.

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