FORUM

translating research into quality health care for veterans

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Information Technology and Primary Care at the VA: Making a Good Thing Better

By Thomas Parrino, M.D., Chief of Staff, West Palm Beach VA Medical Center

Advances in information technology (IT) have brought a powerful array of new clinical and management tools to VA medical centers (VAMCs), and continue to change in very fundamental ways how we think about and provide primary care. This is particularly important as VA makes the transition from visit-based primary care management to a model of patient-centered primary care management that monitors and provides as many services as possible to veterans in their homes. Among the IT-based tools now at our disposal:

■ **Electronic Medical Records.** The Computerized Patient Record System (CPRS) is now available to every VA clinician, putting integrated text, images, reminder systems, and tools for communications at clinicians' fingertips. This is the cornerstone upon which VA's clinical information systems are built.

■ **Care Management Dashboards.** This function of the CPRS allows clinicians to look at whole panels of patients, such as those with diabetes or high blood pressure, and determine how well they are doing and who needs immediate attention. This is also an excellent tool for managers, who can use the dashboard function to assess clinical performance of all the physicians in a practice.

■ **Internet Access for Veterans.** *My HealtheVet* will extend the range of CPRS from the clinician's desktop to the patient's home computer. Participating veterans will be able to obtain electronic copies of key portions of their electronic health records and enter data concerning their health status, which will be accessible to their providers. In this way, veterans will supply information

that will improve their health care, help their providers meet their needs better, and reduce the need for office visits. They also will have access to the Health Ed Library containing information about health conditions, medical procedures, medications, and recent health news.

■ **Decision Support Systems.** VA clinicians can get electronic decision-making support for pharmacy and lab orders, formal and informal patient consultations, and can employ telemedicine services to reach patients who cannot travel. These support systems can help reduce errors and complications, improve communication with patients, shorten treatment delays, and cut down on stress and travel expenses for veterans with serious medical conditions.

■ **Outpatient and Inpatient Applications of Telemedicine.** Telemedicine is the use of electronic communications and IT to provide and support health care across distances. On the outpatient side, VA has fostered the development of a number of basic telemedicine services for radiology, post-op surgical case management, mental health care, and others. And in rural settings where maintaining a full complement of specialty consultants is not feasible, telemedicine allows for the sharing of life-saving expertise with physicians on the scene.

■ **Administrative Surveillance for Care Management and Patient Safety.** VA's Performance Measurement System is perhaps the best example of VA's use of IT to improve clinical performance and outcomes. Here, population data are assembled regularly to

Director's Letter

The summer and fall have been an extremely busy and exciting time for the Office of Research and Development (ORD) and the Health Services Research and Development Service (HSR&D). Many new initiatives and solicitations have been developed and disseminated to the field.

We have three new mentored research training programs, a solicitation for Clinical Research Centers of Excellence, and a solicitation for up to three HSR&D Centers of Excellence. All are described more fully on page 7.

To support VA's goal to become a learning organization that systematically translates research into practice, ORD has created an Implementation unit within HSR&D to facilitate use of research and evidence-based clinical practices. Two targeted research announcements have been released to jump-start our focus on Implementation.

One initiative targets collaborations between HSR&D and VA's Veterans Integrated Service Networks (VISNs). Applicants can request up to $50,000 for planning activities to prepare the full proposal, and partnering VISNs will be asked to contribute matching direct or in-kind support for approved proposals. Projects will facilitate implementation of evidence-based practices, and/or generate knowledge to spread the use of evidence-based practices nationally. The other research announcement is for investigator-initiated research on implementation methods and processes.

ORD's vision, *Today's VA Research Leading Tomorrow's Health Care*, fully supports VA's efforts to improve the quality and outcomes of our health care services. These new initiatives will support and encourage translation of research into practice.

John G. Demakis, M.D.
Director, HSR&D

track clinicians' adherence with established guidelines for disease prevention and chronic disease management. Over the past five years, this dynamic application of systematic data collection and results reporting, with feedback to clinical groups and individual clinicians, has produced broad improvements in health care process and outcomes.

■ **Care Coordination.** The new Office of Care Coordination will centralize efforts to provide as many services as possible to veterans in their homes. Pilot programs using Internet video links will allow health care teams to track almost every aspect of patient status, including vital signs, home laboratory testing, adherence to clinical regimens, and functional capacity.

The potential of these new computerized technologies seems boundless. Primary care clinicians can retrieve patient medical records instantaneously, quickly assemble relevant notes on specific problems, graph out blood-sugar trends or other vital health measures for their patients, order medications and lab tests electronically, and ensure that patients are getting their flu shots and other preventive health measures on time. Managers can use our dynamic new databases to assess clinical performance at the physician, VAMC, and network levels, and track costs as well.

As both a VA physician and manager, I can testify that there is another side to all this. Clinicians need to make sure that their new electronic tools don't interfere in their interactions with patients. Some patients complain that their doctors are too busy entering medical notes on the computer during office visits and not paying enough attention to what their patients are trying to tell them. And some physicians complain that the numerous computerized clinical reminders that may pop up on their screens while they're trying to attend to patients are a nuisance. Many physicians wind up turning off or bypassing the reminders because they sometimes stand between the doctor, the patient, and the essential problem-solving process at the center of the patient-doctor relationship.

So the challenge for clinicians and managers is to step back and think about how they can use IT to support patient care without losing the intimacy of the doctor-patient relationship. Every caregiver develops a personal style of

interacting with the desktop PC in the clinical office. I try to review the patient's record on the computer prior to the visit. I take care of clinical reminders then, too, automatically delegating certain tasks—like handling flu shots—to another member of the primary care team.

Since I have reviewed the situation in advance, the patient has my undivided attention. Our conversation is not interrupted by recurrent excursions to the PC to look up information or key in data. The computer is an adjunct to the encounter, but it doesn't dominate the encounter.

Managers, too, are challenged to use new information technologies effectively. It's great to be able to get the "big picture" on clinical performance, cut the data different ways, and zero in on areas in need of improvement. It is also extremely useful to be able to track costs in such detail and with such ease. However, managers must remember that information is power, and it is up to us to share information with physicians and other clinical staff in a productive way. The goal is to improve care, not embarrass or punish staff. A great deal has been learned on how to use comparative information for positive, motivating purposes.

There are other difficulties as well. Some physicians, for example, just aren't ready for the Information Age. It can take time for doctors to become adept with new information technologies. This would suggest that it is prudent when recruiting for doctors to find out if they are computer literate. Unfortunately, some never master the necessary skills.

Sometimes, alternative methods of data entry are more effective. When patient visits are routinely scheduled only five or 10 minutes apart, it makes sense to use a dictation machine and a low-cost transcription service, rather than manual data entry.

Clinicians and managers must keep in mind that, although new computerized technologies are transforming medicine, some things remain the same: You still need a concerned clinician who knows the patient and works with the patient continuously to improve his or her health. New technologies will help make a good thing better. ■

Response to Commentary

Information Technology and Primary Care at VA: Interdisciplinary Partnership Opportunities for Providers, Managers, and Researchers

By Brad Doebbeling, M.D., M.Sc., Director, HSR&D, Roudebush VAMC, Indianapolis

Dr. Parrino's commentary is a timely, thoughtful, concise discussion of the great challenges and opportunities in integrating information technology (IT) into primary care. Two reports by the Institute of Medicine, "Crossing the Quality Chasm" and "To Err is Human," advocate the use of electronic medical records to improve gaps in quality of care and decrease medical errors. Recommended informatics components include:

■ Point-of-contact care access to health literature and evidence-based guidelines;

■ Computer-assisted decision support systems;

■ Computerized patient clinical data;

■ Automation of decisions to reduce errors; and

■ Electronic communication between providers and between providers and patients.

Industry organizations such as the Leapfrog Group, as well as professional associations, also support implementation of electronic medical records to improve service delivery and decrease costs. VA's Computerized Patient Record System (CPRS) is the most widely implemented electronic medical record in a federal health care system, and is being considered for wider implementation in other federal systems elsewhere. VA is quickly entering a new era of using IT to engage providers, patients, and managers in improving the health of our population.

Everett Rogers' *Diffusion of Innovation Theory* outlines the process through which an innovation is communicated through certain channels over time among the members of a social system. Its key dimensions must be considered in implementing any new technology, which include characteristics of the 1) innovation, 2) communication channels, 3) time, and 4) the social system.

Decision support systems are only as good as the quality and quantity of the data available. If such data are not accurate and complete, the system loses credibility and the intervention is ignored. Similarly, tele-health has considerable potential. Initial experiences show patients like the personal contact from real live providers, and often fear that telehealth will mean more computers, fewer people. We need to make certain that patients will have adequate direct access to providers when needed.

Within VA, clinicians and managers vary widely in their use of IT. This variation provides multiple opportunities to identify patterns of usage, determine the best means for integrating IT into patient care delivery, and develop interventions for internal transfer of best practices. We need to focus on strengthening the provider-patient relationship and improving care on a population basis. To accomplish this, physicians and other health professionals, patients, and administrators will need to work together to craft a system of care that is efficient, economical, and enhances the interpersonal relationship between the physician and patient.

The key factors that ultimately make or break a new technology are its usability and acceptability. Thus, understanding the culture of the medical practice and its realities is as important as understanding the bene-fits of the technology. Many providers, for example, still have difficulty with typing. As long as typing is required, use of electronic medical records and decision support systems will be seen as a burden by many providers and its potential not fully realized. New technology does not always result in improved care or increased efficiency; it must be adapted and customized for the environment in which it will be used.

However, we need to learn how to streamline this process of adaptation, so that new technologies are incorporated swiftly and effectively. Health services researchers should work with managers, clinical informaticians, and providers to meet this challenge.

> "New technologies sometimes create new work for busy clinicians— mainly in the form of additional documentation tasks, such as manual entry of diagnosis code designations on electronic orders."

Used carefully, performance benchmarks can identify system problems and opportunities for improvement. However, research demonstrates that assessing individual provider performance for even common conditions is often fraught with reliability and validity problems. Benchmarking performance with IT data should be used primarily to improve systems of care—not to evaluate individual physicians and other providers.

New technologies sometimes create new work for busy clinicians—mainly in the form of additional documentation tasks, such as manual entry of diagnosis code designations on electronic orders. As a national health care

Research Highlight

Unique VA Database Provides Solid Foundation for Future Research

By Stephan D. Fihn, M.D., M.P.H., Mary B. McDonell, M.S., Stephan M. Anderson, M.S., HSR&D Center of Excellence, Seattle

Many large health care organizations are developing sophisticated, transaction-oriented clinical databases that are accessible only through limited or proprietary software tools. These databases are being used in a variety of ways by administrators and directors of clinical programs to identify patterns and potential areas for improvement. Over the past decade, the emergence of standard methods for managing very large databases, such as Structured Query Language (SQL), has promoted the widespread implementation of relational databases.

Simultaneously, the number and quality of application development tools have improved dramatically. Many organizations, including VA, have also begun developing data warehouses or data marts. These systems draw some or all of their data from existing systems and use updated technologies to meet specific project goals. They typically have the following characteristics:

■ Combine multiple data sources into an integrated set;

■ Are routinely updated;

■ Include data maintenance and cleaning; and

■ Are not used to update the original data sources.

Data marts also offer enormous value for conducting research. As part of the Ambulatory Care Quality Improvement Project (ACQUIP) we developed a data mart that is a rich resource for a variety of research applications. ACQUIP was a clinical trial designed to determine whether outcomes of health care could be improved by giving primary care providers access to systematic assessments of their patients' self-reported health, function, and satisfaction, combined with routine clinical data and information about clinical guidelines. A group-randomized effectiveness trial was conducted between 1997 and 1999 involving discrete firms or practices within seven VA general internal medicine clinics (Seattle, Birmingham, West Los Angeles, San Francisco, Richmond, Little Rock, and White River Junction).

As part of the study, we created a dynamic, multi-site information system to track more than 90,000 patients. The system routinely extracted selected clinical data from existing VA databases and integrated those data with serial, self-administered health status and satisfaction questionnaires that were mailed to patients. Respondents to a baseline health inventory were regularly mailed the SF-36 survey and, as relevant, questionnaires dealing with six chronic conditions (ischemic heart disease, diabetes, chronic lung disease, depression, alcohol use, and hypertension) and on satisfaction with care. We used SQL databases, PC-based software tools, and other technologies to build an integrated, comprehensive information system that provided audit and feedback of patient information to providers at individual patient visits over a two-year period of study.

The system involved a distributed database linking the participating hospitals and the coordinating center in Seattle where questionnaires were printed individually for each patient, mailed, scanned, and processed. Each week, relevant data were downloaded from hospital computers to the computers at the project sites. Demographic data, selected lab tests, outpatient visits, future appointments, hospitalizations, and medications were downloaded for study patients and transmitted to the coordinating center. In turn, the coordinating center transmitted relevant data to the participating sites, where feedback reports were produced for distribution to participating primary care providers. Needless to say, substantial assistance was obtained from the Information System Services (ISS) department at each site.

> "The ACQUIP study has produced a major benefit for VA: an exceptional database that houses longitudinal data on participating patients and their providers."

The main results from the ACQUIP trial are currently in press. Aside from those results, the ACQUIP study has produced a major benefit for VA: an exceptional database that houses longitudinal data on participating patients and their providers. In fact, with information on more than 90,000 veterans, ACQUIP represents one of the very few longitudinal databases that links information on health status, utilization of health services, laboratory results, prescribed medications, provider characteristics, patient satisfaction, and vital status. Enhanced by the recent addition of Medicare data, this unique database continues to be actively used for secondary analyses by numerous VA investigators and trainees.

Already, this database has been the basis of more than 20 research articles on a wide variety of topics ranging from regional variations in health-related quality of life to predicting outcomes of ischemic heart disease and chronic lung disease to describing newly recognized toxicities of commonly used medications to identifying correlates of excessive alcohol use. Moreover, the ACQUIP database continues to provide the foundation for several new research endeavors involving researchers throughout VA that will update this repository into the future. ■

Research Highlight

Informatics and Quality Improvement for Depression in Primary Care

By Richard R. Owen, M.D., Center for Mental Healthcare and Outcomes Research (CeMHOR); Dale Cannon, Ph.D., Mental Health Strategic Health Care Group, VA Salt Lake Health Care System; and Carol Thrush, M.A., CeMHOR, Central Arkansas Veterans Healthcare System

Through timely translation of research knowledge into clinical and organizational practice, investigators associated with VA's Mental Health QUERI are setting the pace for creating a data-driven national program to improve the quality of care for veterans with mental disorders. At the same time, the MH QUERI is working with others in VA to develop information technology tools that will support that goal.

One of our major quality improvement efforts involves translating research findings for the treatment of depression into routine care settings. Previous studies have demonstrated considerable variation in the treatment of depressed patients in both primary care and mental health care settings. Depression is frequently undetected in primary care settings. Even when detected, patients often do not receive evidence-based mental health treatments.

To address this problem, we have worked to identify the computerized data elements needed to evaluate the implementation of VA's practice guidelines for major depressive disorder (MDD). We have assessed the validity of uniform data elements related to MDD treatment and identified barriers to the recording of uniform data elements in both primary care and mental health settings. Despite this progress and the increasing availability of efficacious treatments for mental disorders, substantial gaps remain between best practices and routine care.

For example, a recent study sponsored by Mental Health QUERI examined how well automated performance measures assess guideline implementation for new-onset depression in VA. We found good to excellent agreement with indicators of guideline-concordant care, using automated and manual chart review methods. But we also found that only about a third of patients with new-onset depression received antidepressants or psychotherapy within one or six months of the index visit. Individuals seen in mental health settings were 10 times more likely to have received psychotherapy than patients seen in primary care settings and four times more likely to have been prescribed antidepressants.

Clinical Reminders As Treatment Supports

Information technology, in the form of computerized clinical reminders, may help enhance depression treatment. These reminders facilitate physician decision-making processes at the point of care delivery. Randomized clinical trials have shown clinical reminders to increase compliance with clinical practice guidelines.

The MH QUERI worked with the Office of Information System Design and Development (OISD&D), the National Clinical Practice Guideline Council, and practicing clinicians and IT staff at six field facilities to develop a set of national clinical reminders for depression screening in primary care. These reminders, released this spring, prompt clinicians to screen for depression and to conduct further evaluation for patients with positive screens. In addition, the reminders suggest follow-up treatment or referral for patients with depression.

Drawing on data entered into the electronic medical record during routine care, clinical reminders could also be used to assess key aspects of the quality of care. OISD&D is enhancing the Clinical Reminders Package to aggregate findings, such as results of depression screening or subsequent evaluation and treatment decisions (including watchful waiting and referral to mental health specialty care), from the national depression screening reminders into a national database. This enhancement is expected to be released by 2004. When it is, the MH QUERI plans to evaluate the validity and utility of the national data set.

Within VA, we have extraordinary opportunities to measure and ultimately improve the quality of health care by developing, testing, and using information technology tools. By funding the study of the effectiveness of these information technology tools with regard to improving quality of care, VA HSR&D ensures a major focus on the role of informatics in improving clinical decision-making and advancing patient safety.

What is QUERI?

VA launched the Quality Enhancement Research Initiative (QUERI) in 1998, with the specific goal of making quality improvement an integral part of systemwide change. Each of the eight QUERI groups focuses on a clinical condition with a high level of prevalence or risk among VA patients, identifies the state-of-the-art in quality improvement for the target condition, and develops ways to put that knowledge into clinical practice.

Serving as a bridge between research and practice, QUERI translates research discoveries and innovations into better care and system improvements.

Research Highlight

Use of Electronic Medical Record Data and Automated Clinical Databases May Support Efforts to Improve Diabetes Care

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"If the main purpose of quality monitoring is to improve quality of care and patient outcomes, then promoting enhancements in our electronic data systems and enabling the routine use of tightly linked measures shows great potential for achieving those goals."

The development of automated clinical databases and the electronic medical record hold promise for more efficiently, and perhaps more effectively, monitoring and improving health care quality. Automated databases can facilitate more timely distribution of performance measures and profile reports, make it easier to generate reliable reports at different levels within a care system (such as a medical center, clinic, or team), and promote the production of more clinically focused quality measures.

In our previous work, we demonstrated that an automated database can be used to produce reliable assessments of intermediate outcomes among patients with diabetes, such as levels of low-density lipid cholesterol (LDL). However, such a database may also underestimate the performance of simple process measures, like whether an LDL test was performed in a given time period. These types of measures are typical of those found in quality monitoring systems and profile reports both in and outside VA. Generally, they are constructed using data collected through a costly and time-consuming chart review process or a hybrid approach that integrates electronic claims data with chart reviews. However, as the completeness of automated databases improves, it will be increasingly more feasible to produce such profile reports using automated data alone.

The expanding use of automated databases also plays a key role in addressing a major shortcoming with current approaches to assessing quality based on intermediate outcomes. For the most part, such measures do not distinguish between a patient who receives poor care and a patient who is treated appropriately and aggressively but whose condition is unresponsive to presently available medical therapy.

Linking Outcomes with Processes

One potential solution to this problem is the use of more clinically focused or "tightly linked" quality measures that directly link outcomes with recommended care processes. For example, a simple intermediate outcome measure would consider patients with diabetes to have adequate quality only if their LDL level was less than 130 mg/dl. In contrast, a tightly linked measure would also consider whether patients were on a high-dose cholesterol medication at the time of the high LDL value, had a medication started or increased within six months after the high LDL value, or had contraindications to medication therapy.

Performance on tightly linked measures can be improved by appropriate clinical actions, motivating physicians to provide good care instead of motivating them to select "good" patients. Due to their inherent complexity, however, more general use of tightly linked measures for quality improvement is likely to depend heavily on the accessibility of comprehensive, automated clinical databases.

As part of work underway at the QUERI-Diabetes Research Coordinating Center, we have demonstrated that this type of tightly linked measure can be constructed using VA automated data, with high agreement to an equivalently specified tightly linked measure derived entirely from abstracted medical records. Further, when we compared the results from the simple intermediate outcome measure and the tightly linked measure described above to assess quality, the proportion of patients classified as having substandard care quality fell from 27 percent with the simple intermediate outcome to 13 percent with the tightly linked measure.

However, this work also shows there are a number of technical and practical challenges that need to be addressed before promoting the use of such tightly linked measures for systemwide quality monitoring. These challenges include:

■ Extracting the requisite data (e.g., laboratory, pharmacy, vital signs and primary care provider) from the electronic medical record and compiling data elements in a comprehensive, automated data base/registry;

■ Deciding on the appropriate time frame for a clinical action to occur;

■ Dealing with medication dosage information embedded in text files that is difficult to extract or use;

■ Establishing measure reliability and feasibility as part of a profiling and feedback system; and

■ Identifying strategies for more real-time reporting.

Nonetheless, if the main purpose of quality monitoring is to improve quality of care and patient outcomes, then promoting

enhancements in our electronic data systems and enabling the routine use of tightly linked measures shows great potential for achieving those goals. ■

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New Initiatives of VA Research and Development

VA's Office of Research and Development (ORD) is announcing several important new funding opportunities for training programs. First is the ORD program announcement for Clinical Research Centers of Excellence. These Centers will help to advance VA's clinical research capacity for integrating state-of-the-art science with clinical practice, thus improving health care for veterans and the nation. These Centers will initially focus on the development of a national network of research facilities that support training for the next generation of leaders in clinical research.

Secondly are three mentored research training programs aimed at building diversity into the ORD community of researchers in order to better meet the needs of the diverse veteran population VA serves.

More information about these new ORD program announcements can be found on the VA R&D Web site at www.va.gov/resdev.

In addition, ORD's Health Services Research and Development Service has released a new solicitation that will fund up to three new Centers of Excellence that can assist in attaining the new vision articulated for the VA research program: *Today's VA Research Leading Tomorrow's Health Care.* Arriving at this vision will depend on VA's ability to build the scientific foundation needed to become a learning organization that systematically and continuously takes up important research findings into practice to improve the health and care of veterans. The three areas of focus encouraged for these new Centers include: enhancing organization, management, and leadership; integration of evidence-based practices into routine clinical and administrative operations; and/or the development, implementation, and evaluation of processes and structures designed to improve patient and provider decisions.

More information about this solicitation can be found on the HSR&D Web site at www.hsrd.research.va.gov

system, we need to carefully consider what we ask of our providers. We should make a concerted effort, then, to quantify additional work burdens on providers from use of new IT and seek to minimize any unnecessary work burdens. This will allow clinicians to accomplish the highest-priority clinical tasks and maximize their time with patients.

These issues can be explored best by applying both qualitative tools, such as ethnographic interviews and human factors observation, and quantitative methods, such as linking survey and database data to better measure health care processes. Providers and managers alike need to be involved in these efforts.

Examples of potential solutions to very real IT challenges that clinicians face every day include the following:

- Track those computerized reminders Dr. Parrino refers to that are frequently "turned off" and either remove them from the clinicians' work list, or modify them to make them more useful.

- Improve workflow by benchmarking the care process using industrial design methods. For example, some providers view patient data electronically before an encounter, evaluate the patient, and then return to the computer to complete the order session.

By determining what information is viewed before seeing the patient, custom screens or even paper-based reports for delivery of that information to the provider can be developed to streamline the process.

Effective modification and implementation of IT offers tremendous opportunities to improve the effectiveness and safety of primary care in VA, as well as access to that care. Working closely together, VA managers, clinicians, and informaticians can meet the challenges of incorporating new technologies. Health services researchers are ideal leaders to establish interdisciplinary collaborations to help IT reach its maximum potential within VA. ■

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The MH QUERI is advancing this goal by using information technology tools to improve the treatment of primary care patients with depression. We have evaluated the utility of existing data elements in the electronic medical record as quality-of-care measures for depression treatment, and we have participated in the development of clinical reminders to support the clinical practice guideline for depression. In the future, we hope to assess the impact of clinical reminders on the care provided to depressed patients, and to use clinical reminder findings to evaluate the impact of other efforts to improve the depression treatment delivery system. ■

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