Quality Improvement in the Age of Electronic Health Records:
The North Carolina Improving Performance in Practice Program

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The Improving Performance in Practice program of the South East Area Health Education Center aims to assist primary care practices in using electronic health records to improve outcomes for patients with chronic diseases. This commentary describes the challenges and successes of practices that have participated in this program.

The Improving Performance in Practice (IPIP) program of the South East Area Health Education Center (SEAHEC) serves the North Carolina counties of New Hanover, Pender, Brunswick, Bladen, Onslow, and Columbus. This program began in early 2008 with 12 participating primary care practices, and the program expanded in 2010 when it began working in tandem with a Regional Extension Center (REC) grant.

Organized by the primary care certifying boards and physician specialty societies, the IPIP program was initially funded by the Robert Wood Johnson Foundation and receives direction and technical assistance from Group Health Research Institute's MacColl Institute for Health Care Innovation. IPIP is founded on principles outlined in the program's change package, which is a blueprint for improving care delivery. The IPIP change package entails high-leverage changes within a practice, including implementation of a registry to track and benchmark care, use of templates for planned care, use of protocols to guide decision making, and adoption of self-management support strategies to engage patients in managing their disease. These changes are not necessarily sequential, but they can be a natural progression towards improvement in a practice. The goal of the change package is to promote care that is evidence-based, standardized, consistent, and measurable across disease states. The first step is to implement an electronic database to readily identify and manage patients with chronic diseases.

Initially, most practices in the SEAHEC region used an external database with paper flow sheets to manage the care of patients with diabetes or asthma. Flow sheets printed from this external registry highlighted aspects of care that were due to take place, based on information about what type of care had already been provided during previous visits. SEAHEC's quality improvement coaches (QICs) encouraged the use of flow sheets for previsit planning as a regular part of the care routine. As a follow-up to the use of flow sheets, QICs met with practices and extracted trending data from their registry. Based on these data, coaches worked with practice teams to perform plan-do-study-act (PDSA) cycles that led to improvement across measures throughout a practice. For example, one multilocation practice emphasized their diabetes medication protocol during staff meetings by regularly discussing data related to statin therapy, combination therapy with angiotensin-converting enzyme inhibitors and angiotensin receptor blockers (ACE/ARB therapy), and aspirin usage. The medication protocol was discussed as a standardized treatment for diabetes across practice locations. Providers were often reminded of the agreed-upon protocol during data discussions, particularly when related measures seemed to be lagging. When the practice adopted and implemented an electronic health record (EHR) system, the providers and staff members were able to incorporate these protocols and their application process into order sets, electronic templates, and point-of-care reminders for diabetes care.

Although the flow sheets were useful, practices often reported that the time and effort required for staff members to maintain the registry were barriers to sustainability. For many practices, this limitation helped motivate them to adopt an EHR system. During quarterly IPIP meetings, collaborative participants presented how their EHR system would allow data to be collected for every patient during the visit itself, without duplication of effort in printing paper flow sheets or performing manual data entry after each visit.

Having experience with an electronic registry helped shape practitioners' expectations of clinical functionality as they chose and implemented their new EHR system. Staff members at practices that had consistently used paper-based tools such as asthma action plans, patient educa-

Electronically published April 16, 2013.

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N C Med J. 2013:74(2):151-154.
0029-2559/2013/74213

tion materials, and clinical protocols worked with IPIP/REC staff and EHR vendors to build these features into their EHR system, often before the system went into use. These tools were also shared with other practices during quarterly collaborative meetings involving all of the practices that were working with the SEAHEC IPIP/REC team. Some of these meetings were attended by more than 100 practitioners and staff members, with everyone sharing the pearls of wisdom they had gleaned while selecting and implementing their EHR systems. The peer-to-peer education that took place at these collaborative meetings provided valuable insights for practices regarding EHR implementation, meaningful use requirements, and patient-centered medical home activities. Hearing from colleagues about barriers as well as successes enhanced the credibility of the advice and developed providers' ability to advocate for improved systems of care. Also, these interactions accelerated progress by eliminating much of the trial and error that occurs when a practice works entirely in isolation.

Since the introduction of the REC grant in 2010, additional practices have been recruited to join the SEAHEC IPIP program. These practices approached the IPIP/REC team with an initial goal of selecting an EHR system, implementing it, and working toward meeting the meaningful use requirements of the EHR incentive programs of the Centers for Medicare & Medicaid Services. However, as these practices began the implementation process, received education on how to use the EHR system to manage patient care, and heard about the successes of their peers, many of them also began monitoring and improving their care of patients with chronic diseases. Practices in the collaborative that have already implemented an EHR system and are using quality data continue to provide motivation for those practices that have not yet reached the stage of routinely pulling data from their EHR system. For example, a pediatric practice presented their asthma data and screenshots of their asthma template, and they described the process of developing the custom template to eventually pull data. This presentation reminded other practices that there are exciting payoffs to be gained after a practice struggles through the difficult EHR implementation phase. It also reinforced the possibility of using the EHR system to demonstrate improvement. As these data are automatically produced over a period of time, they can be placed into annotated run charts. Such charts not only show trending data over time but also contain short notes to indicate PDSA cycles that were implemented during particular time frames, so that a practice can see if the implementation of a particular quality initiative resulted in data improvement. These charts add excitement to improvement work, as each PDSA cycle is correlated with tangible advances in care.

In addition to attending collaborative meetings, QICs also perform on-site practice visits, during which they provide feedback regarding EHR support, technical issues, and functionality. A great strength of the IPIP program is that IPIP/REC staff members are able to gather pertinent information from multiple sources, including area providers, multiple partner agencies, and REC staff members across the state with whom they attend meetings and webinars. In many cases, QICs are able to obtain advice not just from this network of connections but also from local practices that are willing to network and provide in-person assistance to other collaborative participants in their region or in more distant areas of the state. This sharing among staff members and practitioners can range from receiving advice over the telephone to shadowing in a practice to see an EHR system in use.

IPIP/REC staff members also observe aspects of work flow in order to help practices prepare for EHR implementation. For example, in one practice that utilized paper charts, telephone prescription refill requests were automatically transferred to the nurses' line. Nurses would pull the paper chart, message the provider via sticky note, and then either call in the refill request or ask the front office staff to make an appointment for the patient to return to the clinic. As the practice was preparing to implement an EHR system, the QICs explained to the practice's staff members that many practices in the region train front office staff members to gather key data and message the provider electronically, thus executing refill requests more efficiently. The QICs worked with the practitioners, nurses, and front office staff members to create a telephone template—a series of questions to ask the patient when gathering refill information. By eliminating the sticky note and extra intermediary work by the nurses, staff members streamlined the process, and nurses were able to dedicate additional time to clinical rather than clerical work. As a result of such efforts, 46 practitioners reported on surveys administered following collaborative meetings that IPIP/REC support had been worthwhile in their efforts to use their EHRs for patient management.

The second step in the IPIP change package is to implement clinical decision support tools to guide patient visits. In practices that want to improve rates of participation in smoking cessation therapy or to improve management of diabetes, asthma, hypertension, or hyperlipidemia, practitioners work with QICs to choose evidence-based guidelines that suit the needs of their practices. A common issue is how to track whether patients have received preventive care consistently and in a timely manner. Setting up clinical decision support rules within the EHR system helps practitioners to prioritize challenging aspects of care, to develop a protocol that can serve as a benchmark, to identify staff members who are responsible for care activities, and to use the EHR system to alert staff members when care is due for a particular patient.

In one practice, practitioners wished to know when influenza vaccination was due for patients with asthma. IPIP/REC staff members worked with the practice and their vendor to create a rule that would flag the practice when vaccination was due. The flag would initially alert the front office staff members upon patient check-in. Patients who wished

to receive the vaccine were given information about their chronic disease and an explanation of why vaccination is important. A standing order protocol was created during practice staff meetings that empowered the nurse or medical assistant to administer the vaccine if the flag signaled that the patient was overdue to receive it. Soon after documenting the patient's vital signs and social history, nurses in the practice would administer the vaccine, before the provider entered the exam room. This change resulted in a significant improvement in influenza vaccination rates and more efficient use of provider time for other aspects of care. Similar results were obtained for practices working on providing foot exams, smoking cessation interventions, instructions in patient self-management, and asthma action plans.

The third step in the IPIP change package is to standardize care throughout the practice. SEAHEC's IPIP program, in collaboration with Community Care of the Lower Cape Fear (CCLCF), is participating in the Agency for Healthcare Research and Quality's Infrastructure for Maintaining Primary Care Transformation (IMPaCT) project. As part of this initiative, both organizations' quality improvement teams are working with practices on previsit planning. Practices receive joint coaching and tools from SEAHEC/CCLCF to assist in the development of a previsit planning curriculum. This includes instructions on how to develop a standing order set for various chronic diseases, education about how huddles can improve team-based care, and assistance in improving practice-wide communication and staff satisfaction. Prior to participating in this initiative, practices are given a staff satisfaction survey that measures communication, culture, and teamwork within the practice. Once the results have been reviewed with the practice, staff members work together to decide which previsit planning tools would assist them in improving. The study is ongoing; however, staff satisfaction at these practices will be surveyed again in 12 months to see whether the interventions have improved staff satisfaction, increased standardization, and improved clinical outcomes. One participating practice has already begun to use huddles and previsit planning protocols, and preliminary data show improvement on various process measures such as documentation of glycosylated hemoglobin levels, smoking cessation counseling, and foot exam rates.

The last step in the IPIP change package is frequent data monitoring. Practices are assigned a QIC, a practice support coordinator, and a technical assistance specialist who work as a team to provide vendor-neutral guidance to practices throughout their improvement journeys. The team is trained to use a PDSA approach to guide improvement during regular on-site visits. Data are pulled from the EHR system and used to determine high-priority areas for improvement work. Practices not only see their own trending data but also receive comparative graphs benchmarked to state averages, regional averages, and national goals. Goals and small tests of change are set each month. By involving practice teams that span the breadth of office operations, practices can examine work flow from the waiting room to the exam room in working toward solutions.

Some practices also work with IPIP/REC staff as part of their goal to become recognized by the National Committee for Quality Assurance as a patient-centered medical home (PCMH) [1]. Primary care practices have long been called upon to provide care for a multitude of patient issues during the practice visit and to coordinate care across multiple care settings. Practices need processes for following patients across the continuum of health care. Without an EHR, providers must fax patient records from one health care facility to another in order to coordinate care. In contrast, practices that are part of a health information exchange (HIE) can have patients identify their primary care team, and the HIE can then inform these individuals when the patient receives care from other providers. Processes for coordination of care can be measured and standardized as practices work toward PCMH recognition. IPIP/REC staff members assist practices in the development of tools that improve the coordination of care such as referral logs, practice policies, and forms that allow specialists to more easily report results to the primary care provider.

Ultimately, to achieve full coordination and the best possible care and cost outcomes, medical home practices will need to be able to seamlessly exchange medical information with hospitals and with specialty practices. In response to this need, SEAHEC became a founding member of Coastal Connect Health Information Exchange (CCHIE) [2]. The organization has selected an electronic platform to serve as an EHR translator, which can be used to securely exchange important clinical information across various settings of care. As part of the ongoing improvement work in the IPIP/REC collaborative, practices are being educated about CCHIE. IPIP/REC staff members have also coordinated on-site demonstrations for interested practices that show the exchange of clinical information between the practice and area specialty practices and hospitals. In addition, CCHIE staff members have given presentations at several collaborative meetings. Grant funds from The Duke Endowment have supported practices in the Community Care of North Carolina network in connecting to CCHIE by covering connection costs and subscription fees.

In recent months, CCHIE has made significant progress in connecting practices to area hospitals and specialist practices, resulting in a network that is already robust. To date, 5 area hospitals and 174 area primary care and specialty practices (551 providers) can exchange real-time data electronically. In addition, CCHIE has put a new portal in place that allows practitioners to receive notifications alerting them to a hospital admission. The eventual goal of this portal is to provide discharge summaries in real time for hospitalized patients. As part of this work, IPIP/REC staff members emphasize that the EHR system, in conjunction with CCHIE, can allow for seamless clinical exchanges across various

care settings. This connectivity will contribute to better care coordination and improved outcomes, as well as allowing primary care practices to function as full-fledged medical homes.

Practice-level and system changes that foster improved and efficient care continue to be a goal in the SEAHEC region. The trust earned and the relationships formed by IPIP/REC staff members foster improvement work even among busy practices with limited quality improvement resources. Given a changing reimbursement system that is heavily influenced by outcomes and data, the IPIP program is likely to continue to evolve and to assist practices into the foreseeable future. NCMJ

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Acknowledgment

The author thanks Sam Cykert, MD, for reviewing this manuscript and suggesting several improvements. The author also thanks Albert Meyer, MD, and Ashley Adams for assistance in editing this manuscript.

Potential conflicts of interest. S.B. has no relevant conflicts of interest.

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