Case Studies of Regional Extension Centers Serving Rural Practices: North Carolina

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In 2010 and 2011, the Office of the National Coordinator for Health Information Technology (ONC) awarded funds to 62 Regional Extension Centers (RECs) to assist eligible providers with adopting Electronic Health Records (EHR) and using them to improve patient care. Funding for the nationwide system of RECs was authorized by the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, which also authorized the establishment of Medicare and Medicaid incentive payment programs for providers who achieve "meaningful use" of EHRs.

The REC program assists providers who have had historically-low rates of EHR adoption, many of whom practice in rural areas. They include primary care physicians and mid-level providers in small group practices of 10 or fewer providers, clinics connected with public or Critical Access Hospitals, Community Health Centers, Rural Health Clinics, and other ambulatory settings that predominately serve uninsured, underinsured, and medically underserved populations.

This case study focuses specifically on the North Carolina REC and its experiences working with rural physician practices in the state. It is intended to serve as a companion to our recent article in *The Journal of Rural Health*, which examined the national impact of the REC program and the role of the RECs in helping rural physician practices achieve "meaningful use" of EHRs.[1] A second case study focuses on REACH, the REC serving Minnesota and North Dakota.[2]

The two RECs were selected for case studies based on their high rankings among the 62 RECs nationwide on the number of rural providers that had signed-up for REC services, implemented EHRs, and attained mean-
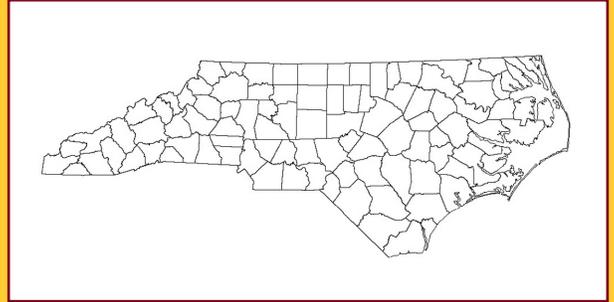
Meaningful Use of Certified EHRs

For purposes of qualifying for Medicare or Medicaid incentive payments, CMS has defined three stages of meaningful use of certified EHRs:

- **Stage 1** focused on electronically capturing health information in a structured format, using it to track key clinical conditions and communicating it for care-coordination purposes, implementing clinical decision support tools to facilitate disease and medication management, using EHRs to engage patients and families, and reporting clinical quality measures and public health information.

- **Stage 2** focuses on more rigorous health information exchange, including increased requirements for e-prescribing and incorporating laboratory results, and the expectation that providers will electronically transmit patient care summaries with each other and with the patient to support transitions in care.

- **Stage 3** criteria are likely to focus on promoting improvements in quality, safety, and efficiency leading to improved health outcomes; focusing on decision support for national high priority conditions; improving patient access to self-management tools; providing access to comprehensive patient data through robust, secure, patient-centered health information exchange; and improving population health.[3]

The timeline to reach these stages depends on when Stage 1 is achieved. Providers who achieved Stage 1 in 2011 have 3 years before advancing to Stage 2. Subsequently, all other providers will have 2 years meeting Stage 1 criteria before advancing to Stage 2 in their third year.[4]

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Background: North Carolina

North Carolina has a rural population of approximately 2.77 million.[5] As of 2009, 1,740 non-federal primary care physicians were practicing in the state's 60 rural counties.[6] The primary care infrastructure in the state includes 86 certified Rural Health Clinics and 31 Community Health Centers.[7] In addition, 56 local health departments provide primary care services.

ingful use as of May 2012. For the North Carolina case study, a two-person team conducted interviews in 2012 with key individuals at the North Carolina Area Health Education Center (AHEC), their partner organization (Community Care of North Carolina, or CCNC), and two rural primary care practices in the state that received assistance from the REC (a Community Health Center and a solo physician practice). Interview protocols were developed based on the literature and preliminary discussions with REC staff. The interviews with the RECs and their partner organizations addressed the state context and history of the REC, its organization and staffing; the process of working with rural practices and helping them to EHRs to improve quality of care, vendor selection, EHR funding, Health Information Exchange, and lessons learned. The interviews with rural practices covered practice characteristics, the process of implementing the EHR system, the role of the REC, usefulness of the EHR system, challenges, and lessons learned. Interviewees included the REC program director and clinical director; CEOs and program staff at partner organizations; and a physician, a CEO/RN, clinic managers, and staff at the rural practices.

The North Carolina REC

The North Carolina Regional Extension Center (REC) is based in the AHEC. The central office is located at the University of North Carolina in Chapel Hill; nine regional offices are spread throughout the state. The AHEC's mission is to train healthcare personnel, emphasizing primary care delivery sites in rural and other underserved areas. Established in 1972, the North Carolina AHEC is currently the largest in the country, employing more than 1,500 people. The AHEC is the principal provider of continuing medical education in North Carolina, with 21 residency programs in rural areas of the state. Reflecting a state environment that is supportive of primary care practice, the AHEC receives $47 million annually in state funding.

Over the past several years, the AHEC has worked in partnership with other agencies to build an infrastructure for improving care in primary care practices in North Carolina through hands-on quality improvement (QI) consulting and support. In 2005, North Carolina was chosen as a pilot state for the national Improving Performance in Practice (IPIP) Program, which was funded by the Robert Wood Johnson Foundation and operated by the American Board of Medical Specialties. IPIP was initially based at the North Carolina Academy of Family Practice, and then became part of the AHEC. Additional funding for IPIP came from the State Public Health Division, Medicaid, and Blue Cross Blue Shield of North Carolina (BCBS). The IPIP initiative helps practices improve asthma and diabetes care using patient registries, quality measurement and reporting, protocols, and QI coaches.

Because the AHEC already had QI staff working with primary care practices around the state and was a trusted entity in local communities, the Governor of North Carolina asked the AHEC to take a lead role on the REC initiative in 2009.

REC Partners

Community Care of North Carolina (CCNC) is a private, not-for-profit organization composed of 14 regional networks with 1,568 participating primary care practices covering all counties in the state. The CCNC central office staff in-

cludes a clinical team, which provides medical, nursing, pharmacy, and behavioral health expertise to the care managers and QI staff in the 14 regional networks, as well as staff for a claims data warehouse that provides data reports, care alerts, and medication information about patients. The CCNC and AHEC staffs have been working together for several years at the central office level and at the local level on multiple initiatives, including IPIP and an Agency for Health Care Research and Quality (AHRQ) Primary Care Transformation grant.

For the REC initiative, CCNC has promoted REC services in their visits with practices, worked with the AHEC to identify practices that are ready for EHRs, and coordinated provision of QI services to the practices. Regional leadership collaboratives link CCNC clinical directors and chief administrators with their counterparts in the regional AHEC offices.

The AHEC also partners with the North Carolina Quality Improvement Organization (QIO), the Carolinas Center for Medical Excellence, which has shared EHR training modules and on-line tools with the AHEC to use in their REC work.

REC Organization and Staffing
The REC uses a decentralized model, with staff in each of the nine regional AHEC offices. The executive director and the clinical director of the REC are based at the main AHEC office in Chapel

Hill. Both had extensive experience working with physician practices on QI prior to the establishment of the REC. The clinical director is a physician who has worked with the QI project for 6 years, full-time in Chapel Hill for 2 years.

In 2009, prior to implementation of the REC initiative, the AHEC had 10 QI positions, including the current executive director of the REC and QI coordinators in each of the 9 AHEC regional offices. As of 2012, this had increased to 52 staff, including QI coordinators, practice support staff, and technical support staff. The majority of QI coordinators are nurses and health care administrators with backgrounds in QI. All staff members, including technical support staff, have training in QI, medical outcomes, and primary care medical homes (PCMH). The AHEC did not find it difficult to recruit staff for the REC. They were able to hire a number of practice managers who had EHR experience and had played a key role in implementing an EHR in a physician practice.

AHEC Funding
The AHEC has a diversified portfolio of funding to work with primary care practices. In addition to the $13.5 million federal REC grant received from ONC in 2010, additional funding sources include state AHEC and Medicaid funds, federal grants (the AHRQ Primary Care Transformation grant and a Community Transformation grant from the Centers for Disease Con-

trol and Prevention), BCBS, and private foundation funds from the Duke Endowment. The North Carolina Division of Public Health assigned Community Transformation grant funds to the AHEC to work on EHRs and QI on vascular disease, partnering with local public health departments. The BCBS funds are targeted to helping practices obtain PCMH recognition. The AHEC is also starting to charge fees to specialists (outside the scope of their REC grant award) for their services including EHR implementation, meaningful use, QI, and practice redesign.

As more practices are going live with their EHRs, and the focus shifts to helping practices meet meaningful use Stage 2 requirements, the REC staff is beginning a transition from EHR adoption to focus more on QI. In 2014, ONC funding for RECs decreases and the AHEC may have to reduce REC staff. It is working on alternative sources of funding, including a contract with a large payer.

Working with Primary Care Practices on EHR Adoption and Meaningful Use
The AHEC offers a range of practice consulting services to primary care practices, including assistance with establishing PCMHs, practice redesign, team-based care, same-day scheduling, performance measurement and improvement, and implementing EHRs. Through the REC, the AHEC provides technical support to primary care practices on about 115 different EHRs. It does not rec-

ommend specific EHR vendors to practices; it provides options, and describes the advantages and disadvantages of each vendor. In selecting a vendor, practices have considered whether the EHR is being used by the local hospital or by a large health care system, if the practice is part of one.

The AHEC is working with ambulatory clinics that are associated with Critical Access Hospitals and other rural hospitals, but is not working directly with the hospitals on EHR implementation. It did not apply for the ONC supplemental funds that were available for RECs to work with Critical Access and other small rural hospitals, because it felt that its expertise was in working with physician practices, and that the supplemental funds would not be sufficient to hire expertise in hospital systems. At the beginning of the REC initiative, the clinical director went to medical society meetings and hospital staff meetings to talk to physicians and encourage them to sign up for REC services. In the most rural eastern part of the state, AHEC staff called and scheduled appointments to visit the practices and tell them about the services they could provide. Forty to 50 percent of primary care practices in North Carolina had some type of EHR prior to the REC initiative. There has been very little attrition among the practices working with the REC, and the AHEC expects that about 90 percent of providers will ultimately achieve meaningful use.

Table 1 shows the EHR status of rural and urban providers in North Carolina who received REC services as of November 2013. These providers include physicians (Family Practice, Internal Medicine, OB/GYN, and Pediatrics) and other health care professionals (Nurse Practitioner, Physician Assistant, Nurse Midwife) with prescribing privileges practicing in small group practices of 10 or fewer providers or other priority settings for REC services. A total of 1,274 rural providers had signed up with the REC; 1,037 of these rural providers had "gone live" on an EHR system; and 603 had achieved meaningful use.

The AHEC has found that the message of using EHRs to improve clinical quality has resonated with primary care physicians. The Medicare and Medicaid EHR incentives have also been a motivating force for practices. North Carolina was one of the first states to establish a Medicaid EHR Incentive Program, disbursing the first incentive payments in March 2011. The AHEC believes that a practice must be committed to successfully implement an EHR

system. It has been more difficult to get the last 20 percent of practices to participate. Some in this group hesitate to commit to an EHR system because they suspect something better might come along. Other physicians are nearing retirement and may not wish to overhaul their existing records systems at a late stage in their careers. The median age of rural primary care physicians in North Carolina is 55; nationally, physicians over 55 are less likely to have adopted EHRs.[8]

The situation is mixed in terms of organizational structure. In general, smaller practices are less likely to have EHRs due to a comparative lack of financial and human resources. This is not always the case, however. In North Carolina, some solo and two-physician practices have made the decision to push ahead and implement EHR technology, while the bureaucracy in some larger practices (such as University clinics) has slowed the implementation process. Local health departments that provide primary care are a challenge. Part of the problem is that county commissioners have to approve EHR

Table 1. Status of North Carolina providers who received REC services as of November 2013 by rural/urban location

Status	Small Rural	Large Rural (Micropolitan)	Urban (Metropolitan)	Total
Signed up with the REC	392	882	2,832	4,106
Live on EHR system	334	703	2,475	3,512
Achieved Meaningful Use	172	431	1,299	7,618

Data Source: ONC, Regional Extension Center Program Key Performance Indicator Summary Table, updated 11/7/2013, available at http://dashboard.healthit.gov/data/.

purchases, since they control local health department budgets. In addition, local health departments can't take out loans for EHRs like small practices can.

Practices still struggle with financing EHRs. The North Carolina Program to Advance Technology for Health (NC PATH), a program funded by BCBS, is covering about 85 percent of initial costs and upgrades for five years for a specific EHR product for practices that agree to pursue PCMH recognition. About 90 providers have signed up; about 160 more licenses are available, and BCBS may expand the program. The AHEC had expected a federal loan program to be established for physician practices for EHR costs. It set up a revolving fund loan program using state tobacco funds, and thought that the program could also be used to distribute federal dollars; however, the federal loan program was not established. The state program was not able to offer better rates than established lenders, and the AHEC did not find a big demand for the loan funds.

Sharing EHR data across providers has presented another challenge. The state Health Information Exchange was initially slow to develop, and the major integrated delivery systems have been reluctant to share data. The CCNC claims data warehouse is getting information to practices about Medicaid patients; however, some practices are having difficulty getting information when their non-Medicaid patients are hospitalized, even within the same health care system.

Lessons Learned
The REC clinical director shared three lessons learned about working with rural physician practices on EHR adoption and meaningful use. First, "be mindful of the practice's concerns, and honestly tell them up front what you can and can't do to help them." Second, "keep your eye on the prize - better care and better outcomes for patients." Third, "measure and measure again. Practices always think they're doing better than they are. When you show them the data the first time, they say it must be a mistake; the second time, they say we must fix this."

The REC executive director stressed the importance of working at the speed and capacity of the practices: "It's better to have an open practice using paper medical records than a closed one with an EHR," she stated. She also noted that the REC has trained their staff to be aware of the value of the time they are asking a practice to spend on EHR and meaningful use activities. "It is important to ensure that the services provided to the practice are worth what the practice could have billed for in terms of the provider's time," she emphasized. "A small practice may not be financially able to spare the time that a larger practice can."

Rural Primary Care Practices in North Carolina
To obtain the perspectives of rural primary care practices on EHR adoption and meaningful use, we interviewed administrative and clinical staff at a Community Health Center (Caswell Family Medical Center), and a solo physician practice (owned by Dr. Karen Smith). Both practices received REC services from the AHEC to help them achieve meaningful use.

Community Health Center
Caswell Family Medical Center, a Community Health Center (CHC) established over 30 years ago, served 4,873 patients in 2011. Its patient population by payer source is about 25 percent Medicare, 27 percent Medicaid, 15 percent uninsured/self-pay, and 33 percent other insurance. About 30 percent of Caswell's operations are covered by federal grant funds. The facility is accredited by the Joint Commission and certified by the Joint Commission as a PCMH.[9] Two physicians, 3 nurse practitioners, and 1 physician assistant care for patients; there is no hospital in the community.

EHR Adoption and Achievement of Meaningful Use
The CEO of Caswell Family Medical Center ("the Center") is a registered nurse who had experience using an EHR in a hospital and thought it was important that the Center adopt an EHR. It was very labor-intensive to deal with paper charts and the clinic was running out of space to store them. The Center began planning for the EHR in 2007, purchased it in 2008, and went live in 2009.

The initial purchase of hardware and software cost $153,647; annual maintenance costs since then have ranged from $21,061 to $36,780. The Duke Endowment contributed funds for the initial EHR purchase and a grant from the North Carolina Office of Rural Health was used to digitize the paper charts. The Center is charged on an ongoing, per-provider, per-month basis for each EHR component. Charges are the same for part-time and full-time providers.

The Center wanted a vendor that had experience working with CHCs and was familiar with the Uniform Data System clinical and financial measures that CHCs are required to submit to the federal Bureau of Primary Health Care (BPHC), a division of the Health Resources and Services Administration (HRSA). The vendor provided on-site training for a full week when the EHR went live and for a few days a couple of months later to address follow-up issues. Since then, training has been mostly web-based, which is convenient and less costly. All the clinicians use the EHR.

Two physicians and 2 nurse practitioners received Medicaid Stage 1 meaningful use incentives in 2012. The AHEC regional office provided phone and on-site assistance to the Center on the meaningful use requirements. The Center reports that the AHEC was very supportive and that they could not have achieved meaningful use status when they did without the AH-EC's help.

The Center, which also reports quality measures to the BPHC for its federal grant and to the Joint Commission, expressed frustration with the meaningful use reporting requirements, describing them as an additional burden and an expense in terms of staff time that far outweighed the incentives received. They feel that it requires too much nursing time to chart for the meaningful use reports, taking time away from other activities such as patient education. The Center acknowledged that the meaningful use requirements might not be as much of an issue for non-accredited private practices, because they don't have to do all the chart auditing that it does.

Benefits to Using EHRs
Caswell Family Medical Center has found that using an EHR has helped improve patient care. Patient safety (medication safety in particular) has improved. When physicians are on-call, they can access patients' records from home and know exactly what has happened with the patient. They report that it is much easier to extract data and calculate measures for patients with specific conditions. Compared to paper records, there are fewer delays in accessing charts for walk-in patients, and patient requests are handled in a timelier manner because they are entered directly into charts to be addressed when the provider has time. The Center still has medical record staff to handle informa-tion that comes from other sources (e.g., faxes that have to be scanned into records), but was able to move one medical records clerk to handling referrals full-time. The new referral system has improved care and was praised for being an efficient process during a recent Joint Commission survey.

Lessons Learned
The Center offered several pieces of advice to small rural clinics about planning and implementing EHRs, stressing the importance of talking not only to the sales representatives but also to the vendor's information technology staff about what will be needed in terms of hardware and security. In particular, they emphasized that clinics should look for a vendor who has input from nurses who have worked in the field recently, to ensure, for example, that the EHR allows a nurse to document her name when a procedure is done before the physician or other provider signs the record at the end.

They recommend taking a multidisciplinary group that represents all key functions to visit clinics where the EHR is being used, to facilitate observation and communication. They note that "some vendors have clinical staff," but point out that "it's different to watch the product being used by a provider who doesn't have a financial role for the vendor." They also stress the importance of having memorandums of understanding with hospitals and specialists, so that the clinic receives discharge

summaries directly for patients it sends to the hospital or refers to a specialist.

Solo Physician Practice

The solo physician practice we interviewed is that of family physician Dr. Karen Smith. She and her support staff care for approximately 4,000 patients; 30 percent of whom are covered by Medicare, 30 percent by Medicaid, and the rest mostly by BCBS, with some uninsured patients receiving free care. The practice is certified by the National Committee on Quality Assurance as a Level 3 PCMH. Dr. Smith does not provide inpatient care; patients are admitted to hospitals in two neighboring communities that have hospitalists to provide inpatient care.

EHR Adoption and Achievement of Meaningful Use

From 1997 to 2003, Dr. Smith was part of a group practice that used an EHR system. In 2003, she started a solo practice and became motivated to implement an EHR system to improve efficiency. The EHR system includes secure email and allows her to access patient records at home and send faxes directly.

Dr. Smith decided to use the same vendor for the EHR as she had for her practice management system, so she would not have to deal with two different systems. The EHR system cost about $75,000 up front. Presently, the vendor gets 4 percent of collections annually, and also receives a portion of Dr.

Smith's meaningful use incentive payments. Dr. Smith and her staff are very satisfied with the system's performance, but would like to change the financial arrangements. The vendor charges separately for additional components, such as a patient portal that would allow patients to request appointments and look at lab results. The cost of this patient portal is not affordable for this practice.

The AHEC worked with Dr. Smith on the technical aspects of meaningful use, ensuring that the EHR system would meet the requirements. Dr. Smith received her first Medicaid meaningful use incentive payment in 2011.

Benefits to Using EHRs

Dr. Smith and her staff have found that having an EHR has improved quality of care, reduced overhead, and improved the efficiency of the practice. It improves preventive care through reminders when patients are due for preventive care such as flu shots, mammograms, and colonoscopies. The medication reconciliation function reduces errors. The EHR is particularly helpful for patients with chronic health conditions; for example, it alerts the physician about diabetic patients' hemoglobin A1c levels.

Lessons Learned

According to Dr. Smith, quality of care should be the focus of using an EHR. She and her staff feel that an EHR can keep the physician in the loop with other providers of care and help keep patients

involved in their care.

Conclusions

This case study of the North Carolina REC and our second case study on the REC serving Minnesota and North Dakota demonstrate the importance of the REC program in helping rural providers adopt EHRs and achieve meaningful use. Recent national data on the substantial growth in EHR adoption among rural physicians is further evidence of the importance of the REC program, as well as Medicare and Medicaid financial meaningful use incentives.[10]

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