Leveraging the Benefits of Health Information Technology to Support Healthcare Delivery Model Redesign

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ABSTRACT

Uninsured and low-income underinsured patients create substantial challenges for local healthcare systems, yet their providers are not always included in community-wide implementations of health information technology. To address this deficit, prototypes of the recently proposed National Health Information Network must include providers who care for underserved populations. In 2003, a consortium of providers founded the Waterbury Health Access Program (WHAP) to implement an electronic medical record (EMR) system that would first address the needs of the region’s vulnerable underserved patients. It was anticipated that lessons learned would be applicable to other patient populations as well.

The WHAP consortium of competing hospitals and outpatient clinics developed a broad-based community-wide initiative to include implementing a common EMR system to share clinical information across all locations. The design includes 11 outpatient clinic locations linked to a common data-sharing tool that is accessible by each clinic, emergency department and community practitioner participating in a local, coordinated charity care program. The collaboration required to support community-wide implementations of health information technology also can be leveraged to facilitate additional quality improvement initiatives.

KEYWORDS

■ Electronic medical records (EMR) ■ RHIO ■ Quality of care ■ Underinsured
■ Uninsured ■ Outpatient records

In 2004, 45.8 million people were uninsured, an increase of 8.5 percent since 2000. One of the most common reasons cited for the rising number of uninsured persons is the high cost of insurance. Two-thirds of the uninsured are from low-income working families, with incomes below 200 percent of the federal poverty level. Furthermore, minority populations are disproportionately affected by inadequacies of healthcare coverage, with 19.7 percent of African Americans and 32.7 percent of Hispanics being uninsured. While the low income underinsured population has sources of health insurance coverage such as Medicare or state programs, they remain exposed to gaps in coverage, such as prescription drugs.

The increasing number of uninsured and low-income underinsured persons in the United States has placed a significant burden on the current healthcare system because these populations are less likely to have a permanent medical home, often have a more advanced disease.
when diagnosed, are less compliant with treatment regimens because of cost and are more prone to receiving fragmented healthcare. These factors increase the likelihood that patients will require additional treatments, further increasing the cost of care. Additionally, they contribute to poorer national health statistics.

These challenges, along with others, have contributed to the United States healthcare system being ranked 37th among the 191 member countries of the World Health Organization, even though the U.S. system is the most expensive system, both in terms of per capita expenditures and as a percentage of gross domestic product. The ranking is based on a comprehensive group of indicators, including the level of population health, responsiveness to the expectations of the population, and fairness of financial contribution.

Among many critiques of the system, some blame inadequate healthcare coverage for contributing to poor access to adequate healthcare services. Conversely, the number of people without any form of healthcare coverage in the United States continues to rise. While many industrialized countries have adopted a universal healthcare system, they also have adopted information technology as an integral part of their healthcare delivery system model.

Recognition of the burden of uninsured and low-income underinsured patients on the national healthcare system can be found in one of the overall goals of the Healthy People 2010 initiative, which seeks to “eliminate health disparities among different segments of the population.” A potentially complementary federal initiative involving the promotion of interoperable health information technology systems nationally led to the formation of the Office of the National Coordinator for Health Information Technology by executive order in 2004. ONC has championed the concept of developing Regional Health Information Organizations (RHIOs) that subsequently link to a National Health Information Network (NHIN). Communities throughout the United States currently face the challenge of integrating these two initiatives.

As the total number of uninsured patients continued to rise in recent years, federal programs such as Medicaid and Medicare guarantee coverage for eligible patients who enroll, but patients may still experience gaps in their coverage, such as poor prescription drug benefits and poor access to specialty services. In the absence of a universal healthcare system, safety-net providers in local communities attempt to care for vulnerable patient populations.

Although many private community office providers offer services to uninsured and low-income underinsured patients, other institutions often are involved at the community level. These institutions include federally qualified health centers, emergency departments, charitable clinics, public health departments, and public hospitals. These entities often provide healthcare regardless of patients’ insurance status or ability to pay.

The HP 2010 Initiative

The two overarching goals of the HP 2010 initiative are to help individuals of all ages increase life expectancy and improve their quality of life and to eliminate health disparities among different segments of the population.

The HP 2010 Consortium, a group of more than 400 health-related organizations, was informed through a series of national meetings, regional meetings and public feedback. The HP 2010 Consortium developed a comprehensive set of two overarching goals, 28 focus areas and 467 objectives aimed at improving the quality of health for all Americans. Objectives are defined as specific indicators of success within a particular focus area. For example, the first focus area, improving access to quality health services, has 16 objectives. Objective 1-1 includes a challenge to increase the proportion of persons with health insurance nationally from the baseline of 83 percent in 1997 (age-adjusted to year 2000) to 100 percent by 2010.

The HP 2010 consortium has challenged all healthcare providers, from local community office providers to federal agencies, to collaborate on achieving the detailed objectives. There is no limit of who within the healthcare system should help achieve these objectives. According to the HP 2010 initiative, “By selecting from among the national objectives, individuals and organizations can build an agenda for community health improvement and can monitor results over time.”

The uniform set of objectives encourages measurement and comparison of health indicators at multiple levels, ranging from single organizations to the entire state or nation. Fundamental to the measurement and comparison of objectives is a coordinated, effective data collection methodology. Large community-wide databases of clinical information provide promise as one means of effectively assessing attainment of HP 2010 objectives in a timely manner.

ONC and RHIOs

Although more studies are needed, arguments for the current healthcare system to embrace coordinated information technology to enable effective and efficient delivery of
healthcare is documented elsewhere. This has resulted in increased pressure on communities to implement coordinated health information systems that facilitate the sharing of clinical information across competing entities.

To advance the implementation of health information technology, ONC was chartered by presidential order in February 2004. ONC has proposed the development of regional health information organizations (RHIOs) as an integral step toward creating a national health information network, or NHIN. With the overall goal of improving the delivery of cost-effective quality healthcare, ONC hopes the NHIN also will facilitate public health reporting and surveillance.

Although RHIOs are poorly defined, many see them as programs that facilitate the sharing of clinical information across a community using health information technology. ONC recently released a request for proposals to develop prototypes for solutions to real-world healthcare environments in three or more distinct healthcare markets to include two or more competing providers; at least four types of provider organizations; both inpatient and outpatient settings; two or more end-user healthcare applications that will exchange information across sites of care; and at least one system or application that provides data for population health purposes. Whether this definition is ultimately integrated into the definition of a RHIO is in question.

A recent study projects that the cost of implementing RHIOs, which would ultimately link to the NHIN, would total $275 billion over a 10-year implementation phase. Despite the high cost of implementation, others have estimated that the annual national savings from a functional NHIN would total $112 billion. More than 70 percent of the estimated savings are attributed to interoperability of EMRs. Given the likelihood that the federal government will be a major sponsor of health information technology implementations nationally, the needs of underserved patients should be integrated into projects nationally.

Those advocating RHIOs hope they will provide the healthcare industry with compelling techniques for system redesign through strategic involvement of key players and effective use of healthcare data, thereby improving quality, cost effectiveness and efficiency. In particular, some proposed benefits of RHIOs include:

- Enhancing regional collaborations by involving multiple stakeholders.
- Encouraging cross-industry involvement for intellectual, financial and technological commitment.
- Providing prompt access to accurate clinical and demographic information.
- Preventing human errors for automated processes.
- Facilitating more rapid implementation of new evidence-based medicine recommendations and guidelines.
- Streamlining data collection and reporting processes for individual providers and communities.

RHIOs may help deliver high-quality healthcare, improve cost-effectiveness and efficiency. More importantly, RHIOs may help address healthcare needs and issues of special populations.

FOCUS: Ambulatory Care Systems

The First Connecticut RHIO

The state of Connecticut has the highest per capita income in the country. However, communities with large uninsured and low income underinsured patients with poor access to healthcare are common, like the rest of the country. Waterbury, in south central Connecticut, is one city with a particularly large uninsured patient population.

Since the end of World War II, many residents of Waterbury have been faced with significant levels of unemployment and poverty, disproportionately higher than the other areas of the state. According to the 2004 census, 16 percent of Waterbury residents live below the federal poverty level, compared to 7.9 percent in the state and 12.4 percent nationally. Waterbury also has a higher percentage of Hispanics and African Americans (21.8 percent and 16.3 percent, respectively) than Connecticut as a whole (9.4 percent and 9.1 percent), and the U.S. (12.5 percent and 12.3 percent).

Results from the household survey of the Connecticut Office of Health Care Access 2004 found that as many as 16 percent of Waterbury residents are uninsured. Medicaid populations also encounter significant problems, as
reimbursement rates have fallen so low in Connecticut that many providers can no longer afford to accept Medicaid patients. This has forced patients to endure long waits, and it has overburdened those providers who are willing to treat these patients at a loss. In 2003, the Waterbury Health Access Program (WHAP) was created to improve the quality of care for all residents of the Waterbury area, regardless of ability to pay. Waterbury, like many communities throughout the country, has experienced both the positive and negative aspects of competition in the healthcare marketplace. Two competing hospitals serve approximately 350,000 residents in the region, with 107,000 of them residing within the city itself. Although the presence of the hospitals benefits insurance companies by stimulating competition, the resulting impact on pricing historically has challenged facility administrators' ability to ensure the fiscal viability of the two hospitals. To meet the needs of the uninsured and low-income underinsured, each hospital has maintained an outpatient clinic managed by core staff and residents in training programs. Additionally, each of the hospitals maintains an affiliated outpatient network of physician practices that primarily target those who have insurance. In 2003, a local federally qualified health center maintained three outpatient locations and a school-based clinic. Since then, it has received additional funding to open two locations to provide healthcare to the homeless. As in many communities nationally, Waterbury providers noted that the uninsured and underinsured patients often move between the various clinics and hospitals, leading to inefficiencies and redundancy in care. For example, patients at one hospital-sponsored charity clinic could easily seek care at the competing hospital’s emergency department. Patients move between outpatient clinics for various reasons, including financial, geographic convenience because of housing relocation, and patient dissatisfaction with providers. Each time patients access care at a new entity, valuable clinical information is not available to the new providers. For the city’s core population, this is especially challenging because 30 percent of the residents speak a language other than English. Language barriers increase the likelihood of obtaining an inadequate health history. These problems highlight some of the issues that led to the development of WHAP. In addition to developing one of the first RHIOs in the country involving truly competing entities, WHAP embarked on three additional activities. First, it sought to develop a multi-institutional case management program to improve access to pharmaceuticals and enroll eligible patients into state or federal health insurance plans. Then, it specifically targeted certain diseases for quality improvement through implementation of disease management clinics or other means. Finally, it aims to implement a coordinated charity care program using the American Project Access Network model. WHAP leverages the benefits of healthcare information technology to address disparities in health and healthcare, including issues of affordability, access to care, continuity of care and quality of care.

HIT Improves Data Access

The objective of the first implementation phase of the Waterbury RHIO is to improve provider access to clinical information for outpatient locations providing services to uninsured and underinsured patient populations. The objective of the first implementation phase of the Waterbury RHIO is to improve provider access to clinical information for outpatient locations providing services to uninsured and underinsured patient populations. These populations were chosen because they were at higher risk of adverse outcomes unless quality improvement initiatives were quickly implemented. The Health Resources and Services Administration funded WHAP in 2003 to develop a centralized, community-wide EMR, which includes the implementation of a completely paperless EMR at 11 clinic locations that is interfaced into a data-sharing tool. The EMR has an integrated set of electronic quality-improvement tools. The clinics include two hospital-based charity clinics, six federally qualified clinic sites, and three locations of a large group practice. The vast majority of the uninsured and underinsured patients receive care at one of these locations. Although the initial implementation focuses on coordinating clinical information exchange for the area’s underserved patients, the EMR and centralized data-sharing tool are designed for all patients accessing care at participating clinics, including insured patients. Furthermore, the technology was chosen because of its potential for rapid expansion into community office sites. This data sharing laid the foundation for a RHIO that could exchange information exchange across multiple competing clinical entities. WHAP began coordinating the implementation of a RHIO in September 2003. However, three clinic sites included in the implementation migrated to a completely paperless EMR in 1999. The first hospital-sponsored charity clinic was added to that existing database in January 2004. A strategic decision was made to support additional clinics on a...
different hybrid Web EMR technology, provided by the same EMR vendor supplying services to the previously implemented clinic sites. This decision required additional preparation and development. The fifth clinic site, the competing hospital-sponsored charity clinic, did not complete implementation until August 2005. EMR implementation at the remaining six federally qualified health center clinics was expected to be in October 2005.

The interfaces necessary for the data-sharing tool have passed vendor testing, and WHAP consortium clinic site testing has begun. After it is fully implemented, the data-sharing tool will appear to the end-user clinician within the local clinic EMR. However, emergency department and other external physicians will be able to access the tool remotely via the Internet. Figure 1 details the flow of clinical information through the WHAP RHIO.

Step 1: Providers document clinical information on the completely paperless EMR. Patients are scheduled in the system and then assigned to physicians upon arrival. Physicians document the full encounter note using evidence-based medicine templates. Providers also can opt to type or dictate certain portions of the note. Prescriptions are entered into the EMR and can be faxed automatically to more than 100 participating local pharmacies. Physicians enter diagnoses and procedure codes for the visit. This information then is passed to the entity’s billing system through a custom interface.

Step 2: The updated clinical information is transmitted from the clinic to a centralized EMR data center via the Internet. Each of the clinic entities maintains a separate HIPAA-compliant database in the EMR data center. The hospital and national labs are interfaced directly to these EMR databases, which contain all the clinical information for each patient.

Step 3: Key portions of patients’ charts—including demographic information, medication changes, diagnoses, allergy lists and laboratory results—are updated in the data-sharing tool databases by the physician after the encounter note is completed in the EMR.

Step 4: Providers gain access to the data-sharing tool via the Internet. For providers using the EMR, the data-sharing tool is also accessible from within the EMR, automatically linking to the patient’s shared clinical information. Emergency department and community office physicians access the data-sharing tool via the Internet. The updated active clinical information from each of the entities is combined into a single clinical view. The value of clinical information is enhanced by the tool’s ability to provide an active medication list across locations.

Additionally, three practice management system interfaces and three laboratory result interfaces are in various stages of implementation, some of which are currently
functioning for provision of clinical care.

A WHAP advisory board, chaired by the WHAP program director, has been developed to oversee the implementation of the project.

Of residents seeking healthcare, nearly half of all patients and virtually all of the uninsured and underinsured patients in the area receive care at the participating sites. Nine additional private practices are strongly considering implementing the common EMR system and subsequently linking their patients through the data-sharing tool. Outreach is ongoing to the remaining clinical sites in the area. Because of joint purchasing power and additional EMR vendor discounts, the cost of participation is relatively low. The cost per FTE provider for startup cost for WHAP is $15,500, compared to an average of $34,787 to implement an EMR system.34

WHAP’s implementation of the EMR creates a 100 percent paperless chart for each patient at participating locations. After a visit, or when the record is subsequently updated by a provider, clinical information is interfaced into the data-sharing tool. The patient has the choice to share information across entities through the data-sharing tool. If patients opt out of this data-sharing tool, their demographic and clinical information is not available for providers attempting to access that patient’s chart at other clinical sites.

Challenges to Implementation

Even as the initiative moves forward, several challenges had to be surmounted.

**HIPAA and privacy protection.** Because all competing entities participating in the WHAP’s EMR access the centralized data-sharing tool, WHAP had to ensure procedures and guidelines were followed to protect privacy. There were extensive discussions about which data elements could be shared via the data-sharing tool. Representatives from each of the participating entities took part in these key decision-making summits, which included the EMR vendor. The implementation team found it critical to ensure that both clinical and administrative staff from each entity participate in the summits because of the general variability of rapid communication within institutions. Using existing standards, patient information—including patient demographics, medication lists, problem lists, allergies list, and laboratory results—were approved for sharing among consortium sites in a HIPAA-compliant manner.

**Multiple vendor collaboration.** The EMR vendor chosen for the program is Amicore, which subsequently engaged First Consulting Group to develop the data-sharing tool. Interfaces for SSIMed, Emdeon and Medisense had to be created to link those practice management systems to the EMR. Additionally, interfaces from Cerner, Misys, and Quest Diagnostics laboratory systems were required to facilitate electronic reporting of test results. Vendor contracts were executed for interface development. However, a high degree of cooperation from competing vendors and competing WHAP Consortium sites was required to complete necessary interface development strategies.

**Changing standards for interoperability.** WHAP relies on existing standards such as LOINC, HL-7 and XML scripts. To anticipate changes in standards for interoperability and adjust accordingly, WHAP closely monitors activities of the Certification Commission for Health Information Technology, a likely lead for standards management. Additionally, periodic review of standards used by other RHIOs may help anticipate future standards adoption.

**Master patient index and patient duplication.** As of October 2005, WHAP is implementing a master patient index to remove instances of duplicate patient records and enable more accurate reporting; it is part of the centralized data-sharing tool.

**Training barriers.** Because the implementation strategy requires each of the participating clinics to migrate to a completely paperless EMR, many users were overwhelmed by the EMR, its capabilities and its complexities. Extensive, active training lasting four to six weeks per site was not enough time for some users to become familiar with the new system. Some clinical staff also skipped training classes because they thought they could learn the system as they saw patients. To address this issue, intensive post-implementation training support was provided. The training also included “train-the-trainer” programs and “mock clinics” for better preparedness.

**Physician acceptance.** Two different orthopedic physician teams, which saw patients at the two competing hospital-sponsored charity clinic locations one half day per week, both asked to move their clinic to another location so they could continue to use paper records. One of these teams has recently re-evaluated this decision and initiated planning to migrate to the EMR because of the difficulty it is having in accessing clinical information on the clinic population.

Organizational and Functional Model

WHAP’s administrative board consists of representatives from all of the consortium member entities; all have voting rights. Each consortium member has contributed significant in-kind resources to ensure the success of the RHIO. Most of the resources committed were the result of strong support of the project from physician and clinic leadership. The consortium has created an affiliation agreement to ensure that members follow the guidelines for compliance, administration and operation of the RHIO.

The board meets monthly and is chaired by the WHAP program director. It has agreed on a process for using WHAP’s patient data for epidemiologic reporting and quality improvement outcomes research. Data elements from the EMR databases and the centralized data-sharing
tool will be available for such reporting. The WHAP advisory board must approve reports generated from the data-sharing tool. However, each of the clinic entities maintains ownership of and controls access to their individual clinic EMR database.

There is optimism the approach will reduce duplication of laboratory testing. Having access to information within the data-sharing tool at the point of care is expected to decrease lag time for access to historical patient information, increase efficiency, and hopefully improve the quality of care. Having access to timely information aggregated from multiple locations also may reduce overall healthcare delivery costs by avoiding duplication of tests.

The EMR system includes a module for health maintenance reminders based on 120 performance measures from the Health Plan Employer Data and Information Set (HEDIS). By delivering evidence-based guidance to the point of care, the health maintenance reminders have the potential to improve clinical decision-making. This is crucial, because it has been reported that patients receive only 55 percent of recommended preventive and chronic disease care.\textsuperscript{35} WHAP hopes to increase this percentage locally.

Having a unified EMR linked to the data-sharing tool will enable standardized benchmark reporting across entities, so participating clinics will be able to compare quality indicators to guide quality improvement initiatives.\textsuperscript{36} The accuracy of reporting is expected to be significantly improved by the RHIO implementation.

**Emerging Role in Public Health**

EMRs contain detailed clinical information in a format that is accessible electronically, making them potentially very powerful for measuring healthcare statistics and facilitating public health surveillance. When EMRs are linked, these electronic networks of patient data have the potential to lend enormous support to public health activities.

In particular, key attributes of surveillance—sensitivity, timeliness, data quality and validity—should be improved and less costly using such linked electronic data because current surveillance systems often rely on manual reporting. WHAP is currently working with the public health department and the Connecticut Emerging Infections Program to develop a pilot electronic surveillance program for hepatitis, a reportable disease. The lessons learned will guide future public health department collaborations.

Additionally, leaders for the program are evaluating an ad hoc reporting tool that would enable more comprehensive reporting from the data-sharing tool's database.

During the development of WHAP, many believed that the mere implementation of a community-wide RHIO alone would not completely meet the existing needs of the uninsured and underinsured of the area. Many of the challenges faced by the patients would remain, including the lack of a primary care provider, inability to afford therapeutic regimens and the tendency to seek care only during times of emergency. To decrease these obstacles to care for patients, members of WHAP have developed several programs described below (See Figure 2). These programs are targeted to provide access to care and quality improvement.

Case management focuses on needs such as access to primary care, specialty care, health insurance, transportation, and pharmaceuticals. The goal of case management is to overcome these common obstacles faced by a breadth of patients with multiple medical disorders.\textsuperscript{37,38} Case management functions include screening eligible patients to enroll them into any of the WHAP programs; completing necessary paperwork to enroll patients into federal and state-funded health insurance programs and pharmacy assistance programs; assigning patients to a medical home for primary care; coordinating referrals to specialists; and conducting periodic surveys of case-management patients to further identify the needs of the population. Case managers working at multiple consortium member locations perform these functions.

The community-wide EMR facilitates case management functions by providing case managers with remote access to patient charts, including medication lists and diagnoses. The EMR also enables case managers to communicate with providers and schedule appointments for patients receiving case-management services.

The disease management component of the program serves patients with HIV/AIDS, hepatitis, depression, and certain types of cancer. Medical specialists in each of the targeted diseases are developing the different programs, which include activities ranging from enhanced screening activities to implementation of disease management clinics.
The EMR assists disease management programs through health maintenance reminders for all patients, and outcomes monitoring processes by using data from the EMR, data-sharing tool and specialized reporting. The EMR enables disease managers to include clinical information of patients into the EMR, which is then available to other providers, including the primary care physicians.

**Waterbury Project Access**

Waterbury Project Access is based on the American
WHAP initiatives relate to six focus areas. Table 1 gives specific examples of the focus areas and objectives addressed by WHAP. More importantly, the program hopes to have a stronger impact on the overall goals of HP 2010, improving the quality of health for all residents and reducing health disparities.

**Success Factors and Lessons Learned**

There are several key factors affecting the success of the WHAP program and numerous lessons learned so far.

**Commitment.** Gaining participant commitment to the program had to be cultivated through a series of larger meetings involving providers and administrators for each of the clinics. It seemed important to have both sets of individuals involved in larger summits while designing the program because both groups had to agree to overcome very different obstacles to successfully implement the program. Beyond the larger meetings, individual meetings with key administrative and clinical staff were required to develop the trust required to gain their commitment to the project.

**Regional collaborations.** WHAP has regular meetings to ensure everyone shares the same goals for an efficient RHIO. A formal agreement of affiliation between all entities has made the functioning of WHAP structured and transparent. The efforts of WHAP and others has stimulated the development of a Connecticut RHIO Working Group involving insurance companies, hospitals, outpatient providers and other healthcare entities. Congresswoman Nancy Johnson's office is heavily involved in coordinating the effort to leverage the benefits of health IT to benefit all patients throughout the state.

**Diverse funding.** WHAP receives funding from individual participating clinical entities for software maintenance; federal and foundation funding currently supports core operational staff. It is hoped that pay-for-performance programs from at least one insurance company will provide additional funding for current and future participating clinics that have larger insured patient populations.

**Trust.** Competing institutions involved in a community-wide program implementation such as WHAP must trust not only the program administration and each other. Key elements involved in the development of trust among key

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### Table 2. TRUST Model for rapid implementation of RHIO.

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<tr>
<th>Elements of TRUST</th>
<th>Description</th>
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<tr>
<td>Treaties</td>
<td>Selectively chose to resolve old conflict only if they will impede the current program’s success.</td>
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<tr>
<td>Regulatory Body</td>
<td>Development of an oversight committee or board in order to allow equal decision-making power.</td>
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<tr>
<td>Unbiased Leadership</td>
<td>Physician involvement along with “transparent management.”</td>
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<tr>
<td>Sustainability</td>
<td>Business proposals needed that include cost for long-term program success.</td>
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<tr>
<td>Teamwork</td>
<td>Scheduled events allowing feedback of targeted end users and management to participate in program development.</td>
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Project Access Network model. This innovative coordinated model of tracking and increasing charity care provided to uninsured patients was first implemented in Asheville, N.C., in 1996. The program became a cornerstone for access to specialty care for that city’s uninsured population.

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“Having access to information within the data-sharing tool at the point of care is expected to decrease lag time for access to historical patient information...”

Waterbury Project Access is coordinated by case managers and relies on physician-donated services, which are complemented by donated services from hospital laboratory and radiology departments. Case managers centrally coordinate pharmacy benefits. The goal of the program is to improve access to the full continuum of healthcare available in the community for uninsured, low-income patients.

Because Project Access increases the number of providers taking care of the same population, WHAP currently is working on getting discounted EMR licenses and maintenance fees to participating providers. This will enhance the effectiveness of the data-sharing tool; providers will be able to include all of their patients on the EMR.

Communities throughout the nation have implemented several innovative programs to help drive the country to meet HP 2010 objectives. The components of overall
stakeholders are listed in Table 2, giving a brief overview to the TRUST model for rapid implementation of RHIOs developed during the WHAP implementation.

Conclusion
The number of Americans who are uninsured or underinsured has continued to rise in recent years. In light of this increase and the special needs of these patients and their healthcare, it is critical to ensure that they are included in implementations of health information technology, in spite of the challenges.

As one example of the challenges faced when trying to include uninsured patients in RHIOs, some RHIOs link to insurance pharmacy claims databases to obtain lists of medications that patients have received. This does not work with uninsured patients, who pay individually for medications or receive them from drug company’s assistance programs; their prescription records will not be part of the claims data. This and many other challenges of linking uninsured and underinsured patients into national databases require innovative planning. For such patients, the most relevant point of data generation lies at the level of the physician-patient encounter, meaning that these patients need to be included in implementations of EMRs and EMR networks.

During the implementation of a community-wide linked EMR across a RHO in Waterbury, developers found that the relationships formed among a mixed group of providers, including hospital-based clinics, federally qualified clinics, group practices, and the health department could be leveraged to streamline development of programs to improve care for underserved patients. Ensuring that underserved patients are included in efforts to develop RHIOs from the initial stages is vital so they are not left behind in these initiatives. The ability to include such patients will portend the long-term impact that RHIOs will have on the quality of care provided to all patients, regardless of insurance status.

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