

A Report on the National Stakeholder Summit:

Setting a Quality Improvement Research Agenda to Leverage HIT/HIM in Rural America

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Executive Summary

Unprecedented US federal support aims to push the healthcare sector into the digital age. These national investments have been envisioned to improve the quality of healthcare, reduce health disparities, and achieve cost efficiencies, among other goals. In rural America, a key obstacle to realizing this vision is the relative dearth of evidence to inform the adoption and use of health information management (HIM), health information technology (HIT), and telehealth. To fill these gaps, this report calls for an increase in research that generates knowledge about using HIM, HIT, and telehealth to optimize rural healthcare and thereby improve patient safety and the health of rural underserved populations. The research agenda in this report has three applications.

- The research recommendations will guide investigators in planning high-value studies; moreover, investigators can refer to the research agenda to substantiate the need for a particular inquiry.
- The multi-disciplinary nature of the research questions in this agenda will serve as a springboard for new research collaborations.
- The research agenda will help funding agencies understand the considerable need to support and expand rural-specific research.

Goals and Objectives

To identify critical knowledge gaps and spur new research, the American Health Information Management Association (AHIMA) Foundation, with support from the Agency for Healthcare Research and Quality (AHRQ), the Institute for Improvement of Minority Health and Health Disparities in the Delta Region, Verizon, and other partners, convened rural healthcare experts, providers, public health practitioners, consumers, and other national and local health industry stakeholders. The goal of the AHIMA Foundation's two-day summit was to develop a quality improvement research agenda to advance knowledge in research, practice, and policy about how to best leverage HIM, HIT, and telehealth to strengthen rural healthcare and, ultimately, improve the health of rural low-income and underserved populations. Specific objectives were fourfold.

- Review the economic, strategic, and tactical (practical) impact of HIM, HIT, and telehealth on quality improvement efforts in rural settings; specific agenda items

- included healthcare disparities, access, workforce shortages, patient safety, consumer acceptance, and economic and other performance incentives.
- Discuss the current state of quality improvement research in relation to current policy and practice challenges in deploying HIM, HIT, and telehealth in rural settings to strengthen patient-provider partnerships and support the delivery of high quality, safe care.
 - Create a quality improvement research agenda for rural settings to address gaps in current research, policy, and practice.
 - Set the stage for multi-stakeholder research collaborations.

Stakeholders

Eighty-three rural healthcare stakeholders participated in the summit. They were researchers, rural healthcare providers, public health practitioners, consumers, payers, policymakers, accreditation organizations, industry, and other experts. A wide array of disciplines was present: health sciences, healthcare administration, economics, public health, HIM, health law, communications, information technology, and more.

Research Agenda

The summit produced a research agenda designed to inform healthcare policy and practice by examining how the adoption and use of HIM, HIT, and telehealth may support quality improvement in rural healthcare and among underserved populations. As illustrated in Figure 1, via summit presentations and discussions, three priorities for research emerged.

- Adoption and Use:** integrating HIM, HIT, and telehealth into quality improvement systems to enhance access and optimize healthcare in rural settings
- Underserved Populations:** using HIM, HIT, and telehealth to reduce disparities in healthcare treatment and outcomes, especially in rural low-income and underserved populations
- Economic Value:** using HIM, HIT, and telehealth to enhance clinical performance and thereby support the economic viability of rural healthcare

Figure 1. Conceptual Framework for a Quality Improvement Research Agenda to Leverage HIM/HIT Implementation in Rural America

RESEARCH AGENDA Inform healthcare policy and practice by examining the adoption and use of HIM, HIT, and telehealth to support quality improvement in rural settings.		
Research Areas for HIM, HIT, and Telehealth in Rural America <i>Focal Points</i>		
<p>A) Adoption & Use for Quality Improvement</p> <p><i>Improve access and optimize care by deploying HIM, HIT, and telehealth in rural healthcare</i></p>	<p>B) Underserved Populations</p> <p><i>Reduce disparities in rural healthcare treatment and outcomes by using HIM, HIT, and telehealth</i></p>	<p>C) Economic Value</p> <p><i>Enhance viability of HIM, HIT and telehealth for rural providers through improved clinical performance</i></p>
Develop and test both new taxonomies and methods for studying rural healthcare.		
<p>A1. Develop theoretical models of HIM, HIT, and telehealth deployment to support quality improvement.</p> <p>A2. Assess facilitators of and barriers to HIM/HIT deployment.</p> <p>A3. Identify critical HIM, HIT, and telehealth elements that improve access to quality care.</p> <p>A4. Determine effective strategies for deploying HIM/HIT.</p> <p>A5. Evaluate the effectiveness of external support for HIM, HIT, and telehealth deployment.</p> <p>A6. Conduct clinical research on telehealth interventions.</p> <p>A7. Assess HIM/HIT impact on access to quality care.</p> <p>A8. Examine ways to integrate medical and dental data.</p>	<p>B1. Conduct analyses using electronic health information to assess, monitor, and understand rural communities' health needs.</p> <p>B2. Examine how HIM, HIT, and telehealth can support effective healthcare partnerships between underserved populations and their providers.</p> <p>B3. Test consumer-focused health technologies with underserved groups and caregivers.</p> <p>B4. Evaluate the impact of HIM, HIT, and telehealth on underserved populations and disparities.</p> <p>B5. Test community-based models for improving healthcare quality, safety, and access.</p>	<p>C1. Assess value of HIM, HIT, and telehealth and impact on patient care, including patients' perceptions.</p> <p>C2. Examine the effect of financial and nonfinancial (reputational) incentives on HIM, HIT, and telehealth use, clinical performance, and economic viability.</p> <p>C3. Determine effective strategies for redesigning workflow and improving EHR usability.</p> <p>C4. Assess the return-on-investment of HIM, HIT, and telehealth in healthcare delivery.</p> <p>C5. Compare ways to maximize the economic value of HIM, HIT, and telehealth.</p> <p>C6. Examine how HIM, HIT, and telehealth affect workforce demand and supply.</p>

Findings and Research Recommendations

Rural communities have unique constellations of healthcare strengths, opportunities for improvement, and population health needs. However, much of the existing literature on healthcare quality improvement, HIM/HIT system implementation, the economics of HIM/HIT, and health equity pertains to urban and suburban settings.

Given the quick pace of US federal timelines for HIM/HIT deployment (2011 and beyond), summit participants found an urgent need for quality improvement research specific to rural areas. Some select examples from Figure 1 are:

- Develop new taxonomies that capture important differences in rural populations, providers, and settings; also, formulate additional research methods to address the challenges of small population sizes.
- Determine effective strategies for deploying HIM/HIT as part of a multi-component quality improvement system in rural settings.
- Evaluate the effectiveness of external technical, financial, and policy support for HIM/HIT deployment in rural communities.
- Examine how HIM, HIT, and telehealth can support effective healthcare partnerships between underserved populations and their providers.
- Evaluate the impact of HIM, HIT, and telehealth on underserved populations and on health disparities in rural communities.
- Assess the value of HIM, HIT, and telehealth and impact on patient care, including patients' perceptions.
- Determine effective strategies for redesigning workflow and improving electronic health record (EHR) usability for rural providers and patients.

As presented in Figure 2, specific steps are necessary to implement other parts of the research agenda. Some of the recommended research can be integrated into existing studies. Additional efforts are securing investigators' and research funding agencies' commitment to conducting quality improvement research in rural settings. Summit participants also urged initiatives to expand the pool of rural healthcare researchers and increase the use of multi-disciplinary research networks. With regard to the latter, as an outgrowth of the summit, new research collaborations are already underway to explore

integrating dental information into EHRs and test HIM/HIT innovations in chronic disease management.

Figure 2. Call to Action to Support the Research Agenda

Steps to Implement the Research Agenda
<ol style="list-style-type: none">1. Develop multi-disciplinary networks of health researchers and rural healthcare stakeholders. These networks should be deliberately developed to diversify the field of health researchers and add consumer perspectives.2. Secure research funding agencies' and investigators' commitment to expanding quality improvement research on the use of HIM, HIT, and telehealth in rural settings.3. Expand quality improvement research in rural settings based on the priorities in this research agenda. A beginning point is integrating relevant research priorities into existing federally and privately funded studies (e.g., annual provider and consumer surveys, program evaluations, public-private funding requests for proposals).4. Translate research findings for use by policymakers, healthcare providers, consumers, and technology companies.5. Broadly disseminate this research agenda and subsequent research findings through strategic national stakeholder collaborations.

Conclusions

This research agenda has the potential to improve stakeholders' understanding of HIM, HIT, and telehealth in rural settings, with the support of public and private funders. The resulting knowledge is greatly needed so that national investments in HIM/HIT will enable all rural Americans to access safe, timely, patient-centered care and to lead long lives.

In the main body of this report, readers will find additional background on the need for rural-specific research on using HIM, HIT, and telehealth to optimize care. The report explains each of the 20 research recommendations in Figure 1 and discusses implementation. Appendices provide additional information about the summit.

The Opportunity

Health reform stakes are high for rural communities, but little is known about how to deploy HIM, HIT, and telehealth in rural settings to support optimal patient care and safety. To remedy this situation, the American Health Information Management Association (AHIMA) Foundation—with support from the Agency for Healthcare Research and Quality (AHRQ), the Institute for Improvement of Minority Health and Health Disparities in the Delta Region, Verizon, and other partners—convened rural healthcare experts, practitioners, policymakers, researchers, and other stakeholders in a two-day summit. The purpose was to establish a quality improvement research agenda on leveraging health information management (HIM), health information technology (HIT), and telehealth to strengthen rural healthcare and reduce disparities in rural low-income and underserved populations. The resulting knowledge would inform policy and practice.

For rural providers and patients, health reform offers both promise and peril. HIM, HIT, and telehealth have the potential to advance the quality of care in rural communities. Careful use of these systems can support high quality, efficient, patient-centered medical care.¹⁻¹¹ At the same time, other research cautions that HIM, HIT, and telehealth can be expensive investments that yield minimal benefits if not carefully implemented.^{4, 11-16} Finally, expanding telehealth and consumer-focused technologies open new avenues for consumers and providers to be partners in managing health.

American Recovery and Reinvestment Act of 2009 committed new federal resources and policy support to prompt HIM/HIT uptake. Federal health reform in 2010 authorized demonstration projects that could have HIM, HIT, and telehealth components. Health reform and other policy changes implicitly institutionalize the use of HIM/HIT in the health system.¹⁸ In addition, the pay-for-performance movement provides additional incentives for providers to use HIM/HIT in managing their patients' health.

Much is unknown about how to realize the benefits of HIM/HIT in rural healthcare. As observed by Carolyn Clancy, MD, AHRQ director: “After almost a decade of public- and private-sector experimentation through demonstrations and grants, the path from health IT adoption to high-quality, high-value healthcare remains largely uncharted.”⁴

At the summit, rural healthcare experts and leaders worked together to set a quality improvement research agenda for rural settings. The focus of these presentations and discussions was: **What research is needed to better leverage HIM, HIT, and telehealth to support quality improvement in rural communities in order to improve clinical outcomes and reduce health disparities?**

After providing background on HIM, HIT, and telehealth as quality improvement tools, this paper summarizes project methods. It next presents the research agenda resulting from the summit, followed by a call to action to advance the recommended research. One critical step is the formation of multi-institutional collaborations to study research priorities identified in the summit.

Status of Rural Health and Healthcare

Rural healthcare has many strengths. Medicare data indicate that patients in rural and critical access hospitals are more likely than patients in other hospitals to receive some types of recommended hospital care.¹⁹ In rural areas, scarce resources can prompt providers to be innovative and can facilitate the development of partnerships to address local healthcare and community-based priorities. For example, small rural medical practices have improvised effective strategies to meet the needs of patients with limited English proficiency.²⁰ High performing health systems in rural areas have used HIM, HIT, and telehealth in multi-component efforts to improve quality of care, access, and efficiency. Results include higher productivity and patient satisfaction rates, shorter hospital stays, lower readmission rates, trimmed medical costs, and better control of chronic conditions.^{5, 21, 22}

Yet national data show rural populations—especially low-income, racial/ethnic minority groups, and adults age 65 and older—often are medically underserved, receive less recommended healthcare, and are less healthy than other urban and higher income groups. For example, compared to Americans in metropolitan areas, nonmetropolitan residents are less likely to receive recommended care for diabetes and heart attacks. People in nonmetropolitan regions also are more likely to have chronic conditions, problems accessing care, and fair/poor health. Healthcare access and quality challenges also are found in urban settings as well.^{19, 23-26}

Quality Improvement and Rural Healthcare

Quality improvement is a strategy for improving healthcare outcomes. As defined by Dr. Clancy, *healthcare quality* “is the right care, for the right patient, at the right time, every time.”²⁷ HIM, HIT, and telehealth, especially in combination with non-technology investments, can contribute to advances in healthcare quality and population health. Some ways that HIM, HIT, and telehealth support quality improvement are by identifying high risk patients that could benefit from additional support, tracking clinical performance overall, monitoring specific patient groups, providing clinical decision support, and enhancing access to timely care.^{3, 5, 28}

New medical technologies, changes in healthcare financing and delivery, and evolving population health needs are some of the forces reshaping healthcare. Now patients, caregivers, and providers are finding they have different responsibilities and roles in health management. The patient-physician relationship is also changing. In this context, rising healthcare models—especially the chronic care model, patient-centered medical home, and participatory medicine—emphasize collaborative patient-provider relationships as instrumental to high quality care.²⁹⁻³¹ These healthcare models also promote HIM, HIT, and telehealth as tools to support patient-provider partnerships. Specifically, health technologies and information management have the potential to enhance patient-provider communications, facilitate shared decisionmaking, provide patients with self-management support, and help the care team follow treatment plans.^{8, 32-35}

Low HIM/HIT Adoption in Rural Settings

Surveys have produced a wide range of health technology adoption rates (in part because sponsors used different measures). Results from an early 2008 survey indicate that less than 20 percent of providers have adopted basic HIM/HIT systems.³⁶⁻³⁸ Another survey in 2009 indicates 2 percent of hospitals could achieve federal meaning use criteria for incentive payments.³⁹ These and other surveys report that smaller, rural, and critical access hospitals lag behind urban and larger hospitals in HIM/HIT adoption.^{19, 36-39} Experts estimate few dentists have interoperable EHRs.⁴⁰ Many rural hospitals report having used one or more forms of telehealth, with use varying by service (e.g., cardiology or emergency care) and by function (e.g., clinical or educational).¹⁹

Nationally in 2009, only 8 percent of adults have used e-mail to communicate with a doctor, 7 percent have used a personal health record, and 2 percent have used a health-related application for a cell phone.⁴¹ About three in five Americans do go online for health information, with rural consumers at similar rates to urban and suburban adults.^{41, 42} However, rural Americans are more likely to lack wireless Internet access and home broadband services.^{43, 44}

Need for Rural-Specific Research

Rural healthcare merits specific attention in research on the adoption and use of HIM, HIT, and telehealth for quality improvement. Rural settings are not little urban settings. Rather, rural communities have unique constellations of strengths, opportunities for improvement, and population health needs. In making research recommendations, summit participants recognized *rural* encompasses a diverse array of settings and providers. Other key terms are defined in Figure 3.

Figure 3. Definitions of Key Terms as Used in this Report

Term	Definition
Electronic Health Record (EHR)	An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one healthcare organization. ⁴⁵
Health Informatics	The integration of technology, systematic application of information, and dissemination of knowledge for the express purposes of data collection, classification, storage, and analysis (manipulation) for problem solving, decision support, quality improvement, research, methods, health planning and policy, and service that will support public health initiatives, medical education and clinical decisionmaking to improve access to quality care, improve patient safety, reduce disparities, and control costs. ⁵⁶
Health Information Exchange (HIE)	The electronic movement of health-related information among organizations according to nationally recognized standards. ⁴⁵
Health Information Management (HIM)	The practice of maintenance, care, and appropriate use of health information in hospitals, medical practices, health departments, health insurance companies, and other facilities that provide healthcare or maintenance of health records. Health informatics and health information technology are utilized in information management. ^{17, 46}
Health Information Technology (HIT)	Certified EHRs and other technology and connectivity required to meaningfully use and exchange electronic health information. ⁴⁷
Meaningful Use	Use of certified EHR technology in a manner consistent with criteria being established by the Secretary of Health and Human Services through the rulemaking process, including, but not limited to, e-prescribing through an EHR and the electronic exchange of information for the purposes of quality improvement, such as care coordination. ⁴⁷
Telehealth	Telehealth, also referred to as telemedicine, is the delivery of health-related services and information via telecommunications technologies in the support of patient care, administrative activities, and health education. ⁴⁸
Underserved Populations	Populations that have limited access to and utilization of quality healthcare services or that persistently have more health risk factors and lower health status compared to other sociodemographic groups. ^{49, 50} Examples: rural poor, persons with disabilities, frail elderly, and some racial/ethnic minority groups

Summit Methods

Upon receiving notification of the award from AHRQ, the AHIMA Foundation first met with its AHRQ program officers. The purpose of this meeting was to review agenda and summit plans and solicit suggestions for additional speakers and topics. The program officers were also invited to participate in the summit planning steering committee.

Planning Process

AHIMA Foundation staff notified individuals who had initially agreed to participate on the summit planning steering committee at the time of the original application. The committee began planning during a kick-off conference call. The committee then held several subsequent planning meetings leading up to the summit. Planning tasks included determining the summit topics and speakers, signing off on meeting plans and logistics, contributing names to the invitation list for attendees, and participating in the conference itself, either as a speaker or panel moderator.

Based on commitments developed during the initial grant application, along with additional suggestions from AHRQ program officers and steering committee members, the AHIMA Foundation staff solicited speakers for the keynote and panel sessions. Invitation e-mails were sent out with proposed agenda times, and where required, agency protocol was followed to invite high-level government agency speakers to attend (e.g., David Blumenthal, MD, MPP, National Coordinator, Office of the National Coordinator for Health Information Technology). The confirmed speakers can be found in the summit agenda, Appendix A. As speakers confirmed their participation, AHIMA Foundation staff conducted half-hour conference calls with moderators and speakers for each session on the agenda so that session participants could discuss their overall perspective, specific topics, and research gaps and challenges.

Based on suggestions from steering committee members, AHRQ program officers, and AHIMA Foundation staff contacts, an invitation list was compiled for the summit, consisting of approximately 200 contacts from 140 organizations. Electronic invitations were sent out to those on the list, and responses were solicited through a form attached to the invitation. If unable to attend, invitees could suggest a designee to attend in their place, upon approval from the steering committee.

The AHIMA Foundation solicited additional support for this conference in order to convene a greater number of speakers and staff, supplement hotel expenses, and provide food and beverage for summit participants. The two organizations that provided supplemental funding were the Institute for Improvement of Minority Health and Health Disparities in the Delta Region and Verizon.

A total of 83 speakers and attendees participated in the meeting, necessitating a significant amount of logistics planning to conduct the event (see Appendix B for participant list). Under contract with the AHIMA Foundation, the Hilton Alexandria Old Town provided meeting space, food, and audiovisual equipment. AHIMA Foundation staff assisted with travel arrangements for speakers and moderators, and attending speakers received stipends and expense reimbursements. Staff also compiled meeting packets for each participant, with materials including the summit agenda (Appendix A), speaker and attendee biosketches (solicited from individual participants), and an evaluation form. Following the summit, a password-protected website was set up so that participants could access the speakers' presentations.

Summit Purpose and Objectives

The summit purpose was to develop a quality improvement research agenda to advance knowledge in research, practice, and policy about how to best leverage HIM/HIT to strengthen rural health systems and, ultimately, improve the health of rural Americans.

Specific objectives were fourfold.

- Review the economic, strategic, and tactical (practical) impact of HIM, HIT, and telehealth on quality improvement efforts in rural settings; specifically address healthcare disparities, access, workforce shortages, patient safety, consumer acceptance, and economic and other incentives.
- Discuss the current state of quality improvement research in relation to current policy and practice challenges in deploying HIM, HIT, and telehealth in rural settings to strengthen patient-provider partnerships and support the delivery of high-quality, safe care.

- Create a quality improvement research agenda for rural settings to address gaps in current research, policy, and practice.
- Set the stage for multi-stakeholder research collaborations.

Key members of the steering committee synthesized summit discussions to develop a conceptual framework and an initial draft report of the research agenda. The summit steering committee reviewed the first draft, and the authors used their feedback to develop a second draft. All summit participants and steering committee members were encouraged to comment on the second draft, which authors subsequently revised. The AHIMA Foundation submitted the final report to AHRQ for review and publication.

Challenging Context for HIM, HIT, and Telehealth in Rural Settings

Many summit participants expressed concerns that federal policy timelines for HIM/HIT use were out of sync with rural providers' ability to adopt HIM/HIT and qualify for meaningful use incentive payments from Medicare and Medicaid (beginning in 2011). According to participants, many rural providers view HIM/HIT and telehealth as high risk, expensive, and providing uncertain benefits. Reimbursement for telehealth clinical services is piecemeal. Rural providers that are interested in HIM/HIT can face major adoption hurdles, especially limited access to capital, expensive or inadequate telecommunication services, the challenge of re-engineering clinical processes without disrupting patient access and care, and a local workforce without the requisite competencies. Their patients may not consent to electronic exchange of their personal health information; other patients, especially the elderly (80+ years) may consent to EHRs but lack the ability to use consumer-focused health technologies.

Improving the health of rural underserved populations and eliminating disparities will take more than increased access to quality healthcare. Summit participants called for a strong commitment by providers, public health officials, researchers, funding agencies, and consumers to support research using electronic health information for both clinical and community health purposes.

With implementation of Health Information Technology for Economic and Clinical Health (HITECH) Act¹

¹ HITECH provisions in the Recovery Act of 2009 created new federal programs to advance HIT through funding, incentives, and technical assistance; in addition it bolstered the establishment of national and federal standards for secure and appropriate electronic health information exchange.⁵¹

and the Patient Protection and Affordable Care Act (PPACA) in open throttle, it is imperative that the recommended research in this agenda commences. The findings are needed so that HIM, HIT, and telehealth investments will contribute to improved rural health, especially among underserved populations.

Research Agenda

Three research priorities for leveraging HIM, HIT, and telehealth to improve rural healthcare emerged from the summit.

- A. **Adoption and Use:** integrating HIM, HIT, and telehealth into quality improvement systems to enhance access and optimize healthcare in rural settings
- B. **Underserved Populations:** using HIM, HIT, and telehealth to reduce disparities in healthcare treatment and outcomes, especially in rural low-income and underserved populations
- C. **Economic Value:** using HIM, HIT, and telehealth to enhance clinical performance and thereby support the economic viability of rural healthcare

Figure 4 presents a conceptual framework for the research agenda resulting from the summit. The purpose of this research agenda is to inform rural healthcare policy and practice by developing knowledge of how HIM, HIT, and telehealth can be used to support quality improvement, reduce health disparities, and enhance clinical performance.

Figure 4. Conceptual Framework for a Quality Improvement Research Agenda to Leverage HIM/HIT Implementation in Rural America

RESEARCH AGENDA Inform healthcare policy and practice by examining the adoption and use of HIM, HIT, and telehealth to support quality improvement in rural settings.		
Research Areas for HIM, HIT, and Telehealth in Rural America <i>Focal Points</i>		
<p>A) Adoption & Use for Quality Improvement</p> <p><i>Improve access and optimize care by deploying HIM, HIT, and telehealth in rural healthcare</i></p>	<p>B) Underserved Populations</p> <p><i>Reduce disparities in rural healthcare treatment and outcomes by using HIM, HIT, and telehealth</i></p>	<p>C) Economic Value</p> <p><i>Enhance viability of HIM, HIT and telehealth for rural providers through improved clinical performance</i></p>
Develop and test both new taxonomies and methods for studying rural healthcare.		
<p>A1. Develop theoretical models of HIM, HIT, and telehealth deployment to support quality improvement.</p> <p>A2. Assess facilitators of and barriers to HIM/HIT deployment.</p> <p>A3. Identify critical HIM, HIT, and telehealth elements that improve access to quality care.</p> <p>A4. Determine effective strategies for deploying HIM/HIT.</p> <p>A5. Evaluate the effectiveness of external support for HIM, HIT, and telehealth deployment.</p> <p>A6. Conduct clinical research on telehealth interventions.</p> <p>A7. Assess HIM/HIT impact on access to quality care.</p> <p>A8. Examine ways to integrate medical and dental data.</p>	<p>B1. Conduct analyses using electronic health information to assess, monitor, and understand rural communities' health needs.</p> <p>B2. Examine how HIM, HIT, and telehealth can support effective healthcare partnerships between underserved populations and their providers.</p> <p>B3. Test consumer-focused health technologies with underserved groups and caregivers.</p> <p>B4. Evaluate the impact of HIM, HIT, and telehealth on underserved populations and disparities.</p> <p>B5. Test community-based models for improving healthcare quality, safety, and access.</p>	<p>C1. Assess value of HIM, HIT, and telehealth and impact on patient care, including patients' perceptions.</p> <p>C2. Examine the effect of financial and nonfinancial (reputational) incentives on HIM, HIT, and telehealth use, clinical performance, and economic viability.</p> <p>C3. Determine effective strategies for redesigning workflow and improving EHR usability.</p> <p>C4. Assess the return-on-investment of HIM, HIT, and telehealth in healthcare delivery.</p> <p>C5. Compare ways to maximize the economic value of HIM, HIT, and telehealth.</p> <p>C6. Examine how HIM, HIT, and telehealth affect workforce demand and supply.</p>

Findings and Research Recommendations

Although Figure 4 presents these priorities as separate, many recommendations would generate knowledge relevant to two or more priorities. The vision is for research in each priority to begin as soon as possible so studies in one area can be informed by evidence generated in other areas. Some recommendations have a particular focus on HIM/HIT because of the pressure on rural providers to deploy these systems in the next few years. The first research recommendation is relevant to all priority areas. Findings from the proposed research, while to be generated from rural settings, may be useful in other settings, particularly inner cities and communities with underserved populations.

Crosscutting Priority: Develop and test new taxonomies and methods for studying rural healthcare.

Summit participants urged the development of new taxonomies of rural communities, healthcare providers, and populations. Current taxonomies are too broad and mask important differences about rural provider characteristics, populations (under)served, and the context in which rural healthcare is delivered. Both qualitative and quantitative methods exist—and should be better utilized—to obtain adequate sample sizes and enhance data collection and analysis.²⁵ Nonetheless, additional sampling methods should be developed to deal with the challenges of small population sizes in rural settings.

A. Adoption and Use for Quality Improvement

HITECH sets ambitious goals for HIM/HIT adoption in healthcare, but relatively little is known about the challenges facing rural providers in integrating HIM/HIT into clinical care. As a result, summit participants recommended a set of urgently needed, high priority studies to generate knowledge about how to best:

- Support rural providers in deploying HIM, HIT, and telehealth.

Adoption and Use for Quality Improvement

Integrating HIM, HIT, and telehealth into quality improvement systems to enhance access and optimize healthcare in rural settings

- Use these systems to improve patient access to high quality, safe healthcare in rural areas.

Findings from these recommended studies would be useful to rural and small providers and should guide future HITECH implementation and federal policy.

A1. Develop theoretical models of HIM, HIT, and telehealth deployment to support quality improvement in rural healthcare.

Theoretical models specific to rural healthcare are needed to describe stages of adopting and implementing HIM, HIT, and telehealth for quality improvement. These models would represent the incremental nature of deploying HIM, HIT, and telehealth and capture interrelated efforts, such as redesigning clinical processes and training staff. One line of inquiry should test existing models of HIT implementation (e.g., the one used by Healthcare Information and Management Systems Society⁵²) with rural providers. A new set of theoretical models should have a community-wide lens, and additional models should seek to describe consumer adoption.

As theoretical models are developed, investigators should devise new quantitative and rigorous qualitative methods to:

- Measure rural providers' utilization of HIM, HIT, and telehealth capabilities, such as frequency and nature of use.
- Isolate the contributions of HIM, HIT, and telehealth to quality improvement.

Once validated, these theoretical models and new methods should support subsequent research examining, for example, HIM, HIT, and telehealth barriers and facilitators, costs, benefits, and impacts on quality of care.

A2. Assess and quantify the impact of situational facilitators of and barriers to HIM, HIT, and telehealth adoption and use in rural settings.

Research is needed to yield a better understanding of the full range of factors influencing HIM, HIT, and telehealth adoption and use in rural settings. Summit participants recommended three interrelated branches of study: providers, consumers,

and community. Knowledge from these studies should inform the design of interventions to bolster HIM, HIT, and telehealth uptake in rural communities, especially among providers caring for underserved populations.

Providers

Given HITECH timelines, three urgent inquiries are needed. The findings should be disaggregated by context, populations served, and provider characteristics.

- Comparisons of HIM, HIT, and telehealth adoption among rural providers serving racial/ethnic minorities and other underserved populations to adoption by other providers.
- Mixed-methods studies to assess clinical acceptance of and level of readiness to adopt HIM, HIT, and telehealth among rural providers.
- Initial examinations of the foremost:
 - Challenges that rural and small providers (both medical and dental health) face in adopting HIM/HIT systems.
 - Facilitators of effective HIM/HIT deployment in rural and small provider settings.

The existing literature has identified some factors influencing HIM, HIT, and telehealth uptake. Summit participants recommended investigators collect additional rural-specific data.

- Assess rural providers' internal context for deploying HIM, HIT, and telehealth to optimize care, including, but not limited to, clinical acceptance, business model, current financial situation, governance, provider size and type, existing workforce capabilities, and staff perceptions about the privacy and security of electronic health information.
- Quantify established external barriers to HIM/HIT adoption and assess potential solutions. Rural and small providers have reported three common difficulties: access to capital, technology suitability, and skilled workforce shortages. For telehealth, established barriers include limited reimbursement and unresolved legal issues (e.g., licensing, credentialing, liability, and scope of practice).

Some of these investigations should apply behavioral economics to examine factors related to rural providers' use—and nonuse—of HIM, HIT, and telehealth and to identify opportunities to influence uptake. (Behavioral economics is a growing field that draws on both economics and psychology to study the behavior of individuals and populations. A core premise is that individuals and institutions sometimes may act contrary to their economic self-interests (i.e., act *irrationally*) because emotions, risk perceptions, social pressure, and other non-economic factors also influence individuals' choices.⁵³)

Findings about factors related to providers' HIM/HIT uptake should lead to consequent studies that identify drivers of effective HIM/HIT deployment and test the replicability of these success factors.

Consumers

In a set of counterpart studies, researchers should delve into factors affecting rural consumers' participation in HIM, HIT, and telehealth. What factors (including utility to consumer, ease of use, and literacy appropriateness) appear to facilitate adoption? To what extent are rural consumers consenting to telehealth services or electronic exchange of their personal health information? What factors, including privacy and security concerns, are associated with non-consent?

In conducting some of these studies, investigators should apply behavioral economics concepts and principles. For example, investigators should test motivators for older people (e.g., social connections, personal responsibility, and desire to have active lives) that can be used to engage them in using health technologies for self-care.

To the extent possible, all studies should disaggregate results by population characteristics and contexts. The findings should be used to refine technologies or develop interventions that will enhance consumer participation.

Communities

The third branch of studies should identify the factors that differentiate rural communities with high penetration of HIM/HIT and effective use from those with minimal or unsuccessful HIM/HIT deployment. The HITECH Beacon Community Program is one source of promising rural communities to study. Specific factors to assess are:

- Community perceptions about privacy and security risks in HIM/HIT systems and health information exchanges.
- The legal and technical infrastructure for secure, appropriate health information exchange among providers, individual patients and caregivers, public health agencies, and other users.
- Providers' and consumers' access to technical and financial support for HIM, HIT, and telehealth use.
- The impact of social dynamics—especially social networks and local culture—on HIM/HIT adoption by rural providers.
- Local cultural factors influencing the delivery of healthcare by both HIM/HIT users and nonusers.
- Rural healthcare workforce characteristics that facilitate or hinder HIM/HIT adoption and use.

Summit participants also called for an analysis of the suitability of federal meaningful use standards and timelines for rural providers. Specifically, what definition of *meaningful use* best fits policy objectives and the reality of delivering high quality, safe care in various rural settings?

A3. Identify HIM, HIT, and telehealth elements that are critical to improving access to quality care.

Gaps in the knowledge base about using HIM/HIT in rural areas for quality improvement may slow the use of these tools to produce desired outcomes. Summit participants recommended research to design and evaluate quality improvement strategies using HIM, HIT, and telehealth that are tailored to rural settings. These interventions should identify which system elements—both individually and in combination—are essential to effectively supporting high quality care, timely access, and quality improvement.

A4. Determine effective strategies for rural providers to deploy HIM/HIT as part of a multi-component quality improvement system.

Findings from the above recommended studies should be applied to evaluate the effectiveness of strategies for surmounting challenges to adopting and using HIM/HIT. At the provider level, investigators should examine decisions about HIM/HIT systems

and their use, change management, training, and use of external support. How did current HIM/HIT users in rural settings overcome adoption barriers? What types of strategies enabled current HIM/HIT adopters to actually use their systems for quality improvement? To what extent are these strategies replicable? What can be learned from HIM/HIT adoption efforts that stalled or failed? These assessments of deployment strategies should take into account not only the situational context but also internal organizational factors including clinical workflow and culture, project management, and leadership.

Once this knowledge is used to develop best practices, researchers should test interventions and tools to encourage rural providers to apply these strategies.

Summit participants called for a specific line of research on effective provider-level strategies for protecting the privacy and security of electronic health information. Investigators should examine existing HIT/HIE consent processes in rural communities and assess the impact of these practices on patient participation.

A5. Evaluate the effectiveness of external technical, financial, and policy support for HIM, HIT, and telehealth deployment in rural communities.

A variety of programs already exist to support HIT adoption, but little is known about what works to increase HIM/HIT deployment among rural providers. In the near future, quick-response evaluations should estimate the impact of a range of supports, including technical assistance, state laws and policies, incentives and penalties, loans or other financial assistance, and vendor services. What levels and combinations of support appear to make the most difference in rural HIM/HIT uptake? How would altering one or more of the supports affect HIM/HIT adoption? What obstacles do rural providers with HIM/HIT still face in using their systems for quality improvement?

To further help policymakers and technical assistance providers consider how to apply existing resources to support rural HIM/HIT deployment, studies are needed to assess the extent to which providers that primarily serve racial/ethnic minorities and other underserved populations are accessing HITECH technical assistance, loans, and meaningful use incentives (in 2011 and beyond) as compared to other providers. If the

former are accessing these supports at lower rates, consequent research should quickly test strategies to level the playing field, such as by targeting resources.

Summit participants called for studies of different incentive designs to determine which ones advance rural providers' use of HIM/HIT for quality improvement. The studies should be structured to account for the multiple performance payment and reporting systems that many rural providers juggle.

A complementary set of studies should assess strategies to expand evidence-based telehealth in rural communities. Diffusion is slow even for the small set of clinical telehealth services that payers currently reimburse. Promising approaches, such as Ontario Telemedicine Network's marketing strategy, exist and should be evaluated for costs and effectiveness.

An immediate and high priority study should determine the most cost-effective ways to verify a user's identity and authority to access electronic health information. To assure an adequate level of policy support, analysts should:

- Assess the potential liability exposure of HIE participants, such as when a security breach occurs.
- Perform legal analyses to understand which laws apply when electronic health information is exchanged across state boundaries.
- Examine whether providers have a duty to consult EHRs prior to diagnosis and treatment.

A6. Conduct clinical research on telehealth applications, including mobile technologies.

In telehealth research, one major gap is the near absence of large-scale clinical research on services that show promise in rural settings but have not been sufficiently investigated. To the extent possible, these clinical studies also should examine costs, risks, and benefits, including improved access to timely care, patient perceptions of value, and reduced provider isolation. Research also should explore the extent to which telehealth can replace face-to-face care while maintaining or even improving quality.

In response to market interest, a growing number of handheld devices and mobile applications are available to providers and consumers. Empirical data about their risks, benefits, costs, and effectiveness is greatly needed.

A7. Assess impact, including unintended consequences, of HIM/HIT adoption and implementation on access to quality care.

Summit participants recommended examining how current HIM, HIT, and telehealth applications currently interface with each other to support, or impede, optimal care. The assessments should review not just data interfaces, but also impact on intra-provider, inter-provider, and patient-provider coordination. Consequent studies should explore how this interface could evolve in the future so as to advance health equity, access to high quality care, and other policy goals.

Health services researchers have begun to examine unintended consequences of HIM, HIT, and telehealth (e.g., changes in physician communications with other clinical staff and patients, new sources of potential medical errors, cyber-security problems, and increased workload). These efforts must be expanded to quantify these and other unintended consequences in rural settings as well as explore the contribution of underlying factors, especially human error, technological limitations, and poor implementation. Concurrent research should test practices to prevent adverse effects in various rural settings. So future risks can be minimized, researchers and practitioners should develop systems for continuous monitoring of unintended consequences with feedback loops to providers, payers, and policymakers.

A8. Examine ways to integrate medical and dental data in communities.

In the near-term, investigators should assess promising strategies, tools, and incentives to address dentists' limited uptake of interoperable EHRs. A related recommendation is evaluating community-based approaches to enable the electronic exchange of medical *and* dental health information among local providers, patients, and public health agencies. These studies should examine how providers are using the combined data to improve patient care.

Also in the near future, researchers and rural healthcare stakeholders should create a blueprint for integrating dental healthcare into the national health information infrastructure. Current efforts to build a national health information infrastructure have predominantly focused on the medical care, yet oral health affects systemic health. The proposed blueprint should use the existing evidence base and expert guidance to outline steps, including research and development, to achieve integration. Demonstration projects should test the feasibility of the blueprint approach and estimate potential costs and benefits.

B. Underserved Populations

Summit participants noted that rural and underserved populations with health disparities are often underrepresented in health services research. They called for an increased commitment by investigators and funding agencies to HIM, HIT, and telehealth research that focuses on underserved populations in rural communities. Building on existing evidence (including international research), this research priority calls for examining how to best utilize HIM, HIT, and telehealth to reduce disparities in healthcare treatment and outcomes for underserved populations.

Underserved Populations

Using HIM, HIT, and telehealth to reduce disparities in healthcare treatment and outcomes, especially in rural low-income and underserved populations

Increased use of multi-disciplinary teams would enhance research on improving health equity. Health disparities are multi-faceted, and by working across or integrating disciplines, teams can weave together rich bodies of evidence and formulate new questions.^{54 55} Teams can particularly benefit by having at least one member who is proficient in establishing effective research partnerships with communities so that consumers are involved in the assessments. Summit participants viewed community-based participatory research methods as essential to attuning queries to actual community challenges, strengths, and priorities.

B1. Conduct analyses using electronic health information to assess, monitor, and understand rural communities' health needs.

HIM/HIT can greatly expand opportunities for a variety of stakeholders to understand and track changes in the health of populations. Public health agencies, payers, consumers, health planners, and health services researchers are just a few of these stakeholders. Summit participants recommended convening stakeholders to grapple with a fundamental issue: Who should be asking questions—especially new inquiries—of electronic health information to produce new population health knowledge?

Within health systems, HIM/HIT can help providers and health plans develop population-based approaches for managing care for patients with similar needs. Summit participants called for research on how health systems and providers incorporate measures of population health into clinical practice and HIM/HIT systems. Findings from these studies should inform initiatives to optimize quality of care in ways that eliminate health disparities.

At the community or regional level, summit participants recommended finding ways to combine electronic clinical information with data on sociodemographic and environmental determinants of health. Sub-county spatial aggregations, or those using medically underserved areas as the unit of analysis, would deepen understanding of determinants of health disparities and potentially effective ways to attain health equity, whether through clinical care or public health interventions. A related area for exploration is developing strategies to access electronic data from other geographical areas to enable comparative population studies. Finally, researchers and planners should examine ways to use HIM/HIT systems to produce early warning signals about changes in population health.

B2. Examine how HIM, HIT, and telehealth can support effective healthcare partnerships between underserved population and their providers.

A ripe area for study is how HIM, HIT, and telehealth systems can help shift healthcare from an acute care to a model based on patient-provider partnerships. Summit participants hypothesized that many rural healthcare providers already deliver patient-centered care, but empirical evidence has not been developed. They recommended research comparing rural and urban providers in terms of the length of office visits,

patient-provider interactions, strategies used to support patient involvement in decisionmaking and treatment, overall primary care orientation, and other key quality measures for patients with chronic conditions.

A companion set of studies should examine patient-centeredness prior to and after HIM, HIT, and telehealth deployment. A specific inquiry is needed to determine if and how using these systems affects the patient-clinician relationship. With this knowledge base, researchers should study how HIM, HIT, and telehealth can further strengthen patient-centered care in rural communities.

Telehealth must be studied for how specific applications, such as telehome monitoring, can improve access to quality healthcare for hard-to-reach populations and persons with mobility restrictions. Provider-level studies should assess impact on clinical outcomes as well as patient and provider satisfaction with care management.

At both the provider and community levels, research is needed to identify design principles and operating rules that support effective chronic care and care transitions, examine challenges and strategies to overcome barriers, and quantify impact.

B3. Test consumer-focused health technologies with underserved groups and caregivers.

Consumers have an ever-widening array of technologies to manage their health and health care. Examples include interactive websites, mobile phones and applications, automated prescription reminders, and electronic biomarker monitors. A beginning point for this research is to examine adoption rates for consumer-focused technologies by various underserved groups and caregivers. Data are needed about what technologies are in use, by whom, and for what purposes.

Importantly, only limited clinical research has been conducted to evaluate the safety, utility, risks, usability, and effectiveness of consumer-focused technologies. Closing this knowledge gap must be a high priority. The testing should be conducted with underserved groups to identify features that facilitate adoption of effective consumer-focused technologies.

An additional set of inquiries should study how HIM, HIT, and telehealth affect communications among patients from underserved populations, caregivers, and providers. Investigators must strive to isolate features that appear to be effective in improving interactions. Summit participants called for studies that explore how various health technologies can support caregivers as members of care recipients' healthcare teams.

B4. Evaluate the impact of HIM, HIT, and telehealth on underserved populations and health disparities.

A specific focus should be evaluating quality improvement interventions for impact on health equity. Summit participants called for determining if and how HIM, HIT, and telehealth applications have a differential impact on underserved populations, rural seniors, low-income groups, and populations with chronic conditions.

B5. Test community-based models of using HIM, HIT, and telehealth to improve healthcare quality and access.

Achieving improvements in healthcare treatment and outcomes may require the development of community-based approaches. Summit participants recommended macro-level research of community models of integrated care delivery. This line of inquiry should explore how to define and measure *communitiness*, that is, the degree to which disparate healthcare providers and stakeholders in a geographic region work together to coordinate or improve patient care. What factors appear to facilitate communitiness?

As rural providers in a region deploy HIM, HIT, and telehealth, new opportunities will arise to experiment with virtual dental homes, accountable care organizations, and community-based health teams. Process and outcome evaluations of these demonstration projects would produce useful findings. Other inquiries should study how rural community-based interventions can use HIM, HIT, and telehealth together with quality management systems (e.g., Six Sigma, ISO 9000) to optimize care.

Finally, summit participants recommended studies that review how rural providers are involving patients and caregivers in establishing HIM, HIT, and telehealth systems. As

this body of evidence grows, analysts should identify effective practices that can be readily replicated.

C. Economic Value

Studies, primarily conducted in urban or suburban settings, have produced mixed results on the economic value of HIM, HIT, and telehealth applications. Research on the economic value of these systems in rural settings is a priority. Summit participants called not only for traditional return-on-investment and cost-benefit studies, but also research to quantify other important dimensions of value.

Economic Value

Using HIM, HIT, and telehealth to enhance clinical performance and thereby support the economic viability of rural healthcare

C1. Assess the value and impact of HIM, HIT, and telehealth on patient care in terms of changes in costs, clinical quality and outcomes, patient perceptions, and efficiencies.

Health economics research is needed to establish the value proposition of HIM, HIT, and telehealth in rural settings. Value should be quantified from multiple perspectives, including rural communities, providers, payers, and patients and their caregivers. Key questions include: When does the benefit materialize and to whom? How do HIM/HIT costs change over time? What is the cost-effectiveness of telehealth services in open, non-integrated healthcare systems?

Any new methods for monetizing implementation costs and benefits (e.g., effects on workflow and productivity) should be tested for validity and reliability.

Related studies should examine which variables appear to enhance the value that HIM, HIT, and telehealth generate. Summit participants urged researchers to explore how HIM/HIT value correlates with certain provider characteristics or patient populations.

C2. Examine the effect of financial and nonfinancial incentives on HIM, HIT, and telehealth use, clinical performance, and economic viability of rural healthcare.

Existing external incentives for providing high quality, patient-centered care include performance-based payment systems, federal meaningful use incentives, public reporting of quality or performance measures, accreditation, and other recognition programs.

Little is known about the overall effectiveness of pay-for-performance and other quality improvement incentives in rural communities. Which reward designs lead to improved clinical performance and reductions in healthcare disparities? How do quality incentives affect the economic viability of various rural providers? How could ARRA supports be modified to increase HIM, HIT, and telehealth deployment in rural settings?

Prior research has helped refine clinical performance measurement. Now the growing availability of electronic health information creates new opportunities to assess providers' and health plans' performance in rural communities. A high priority area is studying how electronic patient data can be better utilized for performance measurement to augment or replace measures relying on claims data. Within this area, investigators and healthcare organizations should develop new metrics that address the quality of provider-patient decisionmaking, overutilization, appropriateness of services, and coordination of care among members of the care team. When testing new measures, researchers should examine appropriateness to rural settings as well as impact on underserved populations.

Another line of research should give priority to:

- Tailoring clinical performance metrics to different rural care settings and to various underserved patient populations.
- Exploring how performance measurement systems can be better leveraged to enhance patient-provider partnerships in rural settings.
- Investigating unintended consequences of measuring quality and performance, such as effects on services without quality improvement measures and changes in the gap between well-resourced and under-resourced providers.

C3. Determine effective strategies for redesigning clinical workflow and improving EHR usability for rural providers and their patients.

Because adopting health technologies alters workflow, summit participants called for studying the impact on clinical organization. A beginning point is assessing how HIM, HIT, and telehealth affect record management practices, personnel roles, clinical processes, and interactions with patients and caregivers. Comparative research should examine which strategies for re-engineering clinical workflow appear to be most effective and efficient. The literatures on technology diffusion in aviation and other industries could be important sources of insights.

Concurrent studies in the near-term should examine HIM, HIT, and telehealth design and technology adaptation for rural settings. This research should include efforts to compare the usability of EHRs for rural providers and consumers; knowledge generated about features that have low usability should inform future tool design. Other studies must explore the potential for alternative EHR formats and decision support to advance quality improvement, patient participation in care, and rural providers' business performance.

C4. Assess the return-on-investment of HIM, HIT, and telehealth in rural healthcare delivery.

To address a major evidence gap, summit participants recommended research to quantify costs, revenues, and, ultimately, the return on investment in rural healthcare delivery. Prospective analyses should incorporate future meaningful use incentives and penalties. These analyses should produce return-on-investment estimates in terms of clinical and business performance. Some of these recommended studies should monetize important intangible costs and benefits, including changes in provider isolation and patients' and caregivers' perceptions of quality.

Information is also needed on how HIM, HIT, and telehealth deployment impacts rural providers' business models. Researchers also must identify technological, social, provider, and external factors that correlate with financially sustainable HIM, HIT, and telehealth in rural settings.

C5. Compare strategies to maximize the economic value of HIM, HIT, and telehealth.

Using knowledge gathered in the above studies, researchers should study how to improve the value proposition of HIM, HIT, and telehealth for rural and small providers and for rural consumers. One line of inquiry should isolate HIM, HIT, and telehealth elements that give rural providers and consumers the greatest value for each dollar spent. Other investigations should examine alternative business models for rural healthcare providers that leverage HIM/HIT or telehealth as a key business asset.

C6. Examine how the integration of HIM, HIT, and telehealth into clinical care affects workforce demand and supply in rural areas.

Shortages of healthcare providers, including primary care physicians, are a common challenge in rural communities. Deploying HIM, HIT, and telehealth will require that existing rural healthcare professionals acquire new skills; moreover, additional steps to develop or virtually augment the local workforce may be necessary to secure HIM/HIT competencies. Researchers should evaluate strategies to enhance the supply of professionals with HIM/HIT skills in rural communities. In addition, studies should explore how to leverage HIM, HIT, and telehealth to:

- Recruit and retain a technologically skilled healthcare workforce in rural communities and examine different business models to recruit professionals and critical skills.
- Enable the expertise of existing healthcare providers and workers to better meet the health needs of the communities they serve.

Call to Action

The research agenda is ambitious and will require public-private partnerships to implement. The imperative is the paucity of information about how to use HIM, HIT, and telehealth in rural settings to improve access to quality care, reduce health disparities, and strengthen the viability and effectiveness of the rural healthcare system. Five steps, summarized in Figure 5, are necessary to move this research agenda from plan to action.

Figure 5. Call to Action to Support the Research Agenda

Steps to Implement the Research Agenda
<ol style="list-style-type: none">1. Develop multi-disciplinary networks of health researchers and rural healthcare stakeholders. These networks should be deliberately developed to diversify the field of health researchers and add consumer perspectives.2. Secure research funding agencies' and investigators' commitment to expanding quality improvement research on the use of HIM, HIT, and telehealth in rural settings.3. Expand quality improvement research in rural settings based on the priorities in this research agenda. A beginning point is integrating relevant research priorities into existing federally and privately funded studies (e.g., annual provider and consumer surveys, program evaluations, public-private funding requests for proposals).4. Translate research findings for use by policymakers, healthcare providers, consumers, and technology companies.5. Broadly disseminate this research agenda and subsequent research findings through strategic national stakeholder collaborations.

First, summit participants urged the use of multi-disciplinary research networks to attain a nuanced understanding of rural healthcare dynamics and the design of effective interventions. As a result of the summit, new research collaborations are underway to explore integrating oral health information into electronic health records that support medical care and test HIM/HIT innovations in chronic disease management. Other investigators can use this research agenda as a springboard for new research collaborations to conduct other recommended studies.

Deliberate efforts are necessary to diversify the pool of research investigators and institutions. Both formative and evaluative research should identify ways to effectively support rural community-based groups that want to conduct research but may not have the capacity to prepare a competitive proposal for research grants. Alternative processes for research grantmaking should be tested to learn how to level the playing field for research proposals in which small or rural groups would have a significant role. For example, how would increasing the quantity of awards by reducing grant amounts affect the mix of recipients? What would be the impact of a requirement to include new researchers, in-the-field rural professionals, or consumers as co-investigators?

Second, this research agenda necessitates a deepened commitment to supporting investigations focusing on the healthcare of rural Americans and underserved populations. Together with rural providers and patients, health services researchers should meet with funding agencies and seek their increased support for studies and evaluations that build knowledge about overcoming rural disparities. Funding agencies' commitment should go beyond research grants to also provide financial support for knowledge transfer (e.g., translation and dissemination, discussed below).

Third, many of the research recommendations address urgent needs for information to guide the process of deploying HIM/HIT systems in rural healthcare. To the extent possible, existing research investments should seek to integrate these priorities. In the near term, rural stakeholders, healthcare experts, and funding agencies can begin planning the next funding cycles using the priorities in this research agenda. These initial steps are valuable because they set the stage for developing research portfolios that systematically build the evidence base for sustained gains in the health of underserved populations.

Fourth, knowledge generated by quality improvement research on rural healthcare should transfer, as relevant, to various audiences. Potential target audiences include policymakers, providers, public health, patients and caregivers, and technology companies. The knowledge transfer process distills the essence of the findings for a specific audience, puts research results into a context that is accurate, presents the information in audience-friendly formats, and discusses implications.

Fifth, research produced from this agenda must be broadly disseminated to target audiences, tapping into trusted and frequently used information channels. Initial plans include submissions to *Health Affairs*, *Journal of Health Care for the Poor and Underserved*, trade publications, *Parade* magazine, and other consumer-oriented publications. Repeated or follow-on messaging can be beneficial given the congested media environment.

Conclusions

Health technologies will provide unprecedented quantities of health data that can be used to optimize care and improve access. Yet, rural providers' limited uptake of HIM, HIT, and telehealth suggests the need to develop effective research-informed strategies for supporting deployment in rural settings.

To close these evidence gaps, rural healthcare experts, providers, public health practitioners, consumers, and other national and local health industry stakeholders came together at a national summit to develop a research agenda and build research partnerships. The resulting research agenda seeks to inform rural policy and practice on how to effectively leverage HIM, HIT, and telehealth to strengthen healthcare and the health of rural and underserved populations.

The research agenda has three priorities. A first set of urgently needed, high priority research focuses on effective ways to support rural providers in HIM/HIT adoption and how to best use HIM, HIT, and telehealth systems to improve access to high quality healthcare and patient-provider partnerships. A second line of investigations should examine how to best utilize HIM, HIT, and telehealth to reduce disparities in healthcare treatment and outcomes for underserved populations. The third recommended research area is to examine ways to enhance the economic viability of HIM, HIT, and telehealth for rural providers by improving clinical performance and outcomes. A crosscutting priority is the development of both new taxonomies and methods for studying rural healthcare.

Implementing this ambitious research agenda will require deliberate efforts to engage additional and sometimes untraditional stakeholders in community settings. Summit sponsors and participants encourage funding agencies to integrate these priorities into their research agendas. They also are establishing multi-disciplinary research collaborations and will transfer the resulting research findings for use in policy and practice. Ultimately, by improving stakeholders' understanding of HIM, HIT, and telehealth in rural settings, this research agenda will increase the odds that national investments in health technologies will enable all rural Americans to access safe, timely, patient-centered care and to lead long lives.

Appendices

Additional information about the Summit is provided in the attached appendices:

Appendix A: Summit Agenda

Appendix B: Summit Participants

Endnotes

1. Committee on the Future of Rural Health Care, Institute of Medicine. *Quality through Collaboration: The Future of Rural Health*. Washington, DC: National Academies Press; 2005.
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Setting a Quality Improvement Research Agenda to Leverage HIT/HIM in Rural America

A National Stakeholder Summit

Hilton Alexandria Old Town
Grand Ballroom
1767 King Street
Alexandria, Virginia 22314
April 22-23, 2010

Agenda

Day One – Thursday, April 22, 2010

10:30 – 10:45 Welcome

Alan F. Dowling, PhD, CEO, AHIMA

Mary Madison, MPA, Executive Director, AHIMA Foundation

10:45 – 11:15 Opening Remarks: AHRQ Priorities

P. Jon White, MD, Director of Health Information Technology, AHRQ

11:15 – 12:15 Disparities, HIM and Opportunities for Health Services Research

Moderator: Warren Jones, MD, Executive Director, Institute for Improvement of Minority Health and Health Disparities in the Delta Region

Arthur J. Davidson, MD, MSPH, Director, Public Health Informatics, Denver Public Health Department

Matthew Samore, MD, Professor, Division of Epidemiology, University of Utah

12:15 – 1:15 Networking Luncheon

1:15 – 2:00 National Health Information Network and Future Priorities

Introduction: Michael Millenson, President, Health Quality Advisors, LLC

David Blumenthal, MD, MPP, National Coordinator, Office of the National Coordinator for Health Information Technology, Department of Health and Human Services

Appendix A: Summit Agenda

Day One – Thursday, April 22, 2010 (cont'd)

2:00 – 3:15 Key Stakeholder Perspectives: HIT Adoption, Aligned Incentives and Research

Moderator: Patricia MacTaggart, MBA, MMA, Lead Research Scientist & Lecturer, Department of Health Policy, George Washington University

Gail Graham, RHIA, Deputy Chief Officer, Health Information Management, Veterans Health Administration Office of Health Information

MaryAnne K. Peifer, MD, Associate Director of Informatics, Lehigh Valley Physician Group, Lehigh Valley Health Network, Allentown, PA

Paul Glassman DDS, MA, MBA, Professor of Dental Practice, Director of Community Oral Health, University of the Pacific

3:15 – 3:30 Break

3:30 – 5:00 Quality Improvement Measures: Current and Future Links to HIT/HIM

Moderator: Michael Millenson, President, Health Quality Advisors, LLC

Floyd Eisenberg, MD, MPH, FACP, Senior Vice President for Health Information Resources, National Quality Forum

Steven A. Garfinkel, PhD, Managing Director – Research, American Institutes for Research

Carla Huber, ARNP, MS, Clinic Nurse Coordinator, CAT Clinic, Cedar Rapids Healthcare Alliance

Phil Renner, MBA, Senior Research Scientist, Research and Performance Measurement, National Committee for Quality Assurance

5:00 – 5:15 Day One Wrap Up

Warren Jones, MD, Executive Director, Institute for Improvement of Minority Health and Health Disparities in the Delta Region

**5:30 – 6:30 Networking Reception
*Sponsored by Verizon***

Appendix A: Summit Agenda

Day Two – Friday, April 23, 2010 – REVISED as of 4/20/2010

7:30 – 8:45 Continental Breakfast

**Welcome and Summary from Day One
Telehealth and Telemedicine**

Moderator: William J. Rudman, PhD, Independent Consultant and Program Director, Policy and Research, AHIMA Foundation

Ed Brown, MD, CEO, Ontario Telemedicine Network

Dena S. Puskin, ScD, Senior Advisor, Health Information Technology and Telehealth Policy, Health Resources and Services Administration

Maysa Namakian, MPH, Assistant Program Manager, Arthur A. Dugoni School of Dentistry, University of the Pacific

8:45 – 9:45 Economic Perspective: Hospital and Physician Performance Incentives

Moderator: Mary Madison, MPA, Executive Director, AHIMA Foundation

Bruce E. Landon, MD, MBA, Associate Professor, Department of Health Care Policy, Harvard Medical School

Shinyi Wu, PhD, Assistant Professor, Epstein Department of Industrial & Systems Engineering, University of Southern California

9:45 – 10:00 Break

10:00 – 11:15 Employer View Points on the Role of Quality Improvement in HIM/HIT and Future Research Opportunities for the Business Community

Moderator: John Orwat, PhD, Assistant Professor, School of Social Work, Loyola University Chicago and Senior Researcher, Blue Cross Blue Shield Association

Jim Levett, MD, FACS, Chief Medical Officer, Physicians' Clinic of Iowa

Cristie Travis, CEO, Memphis Business Group on Health

Leah Binder, MA, MGA, CEO, The Leapfrog Group

11:15 – 12:15 Roundtable: Government Health Agency Research Priorities

Moderator: Christopher Tompkins, PhD, Associate Professor, Brandeis University

Paul Moore, Senior Health Policy Advisor, Office of Rural Health Policy

David Dietz, Senior Policy Advisor, Office of Minority Health

Appendix A: Summit Agenda

Day Two – Friday, April 23, 2010 (cont'd)

12:15 - 1:15 Luncheon Speaker

Peter S. Tippet, MD, PhD, Vice President of Technology and Innovation, Chief Medical Officer, Verizon Business

1:15- 2:15 Experience from Providers in Rural Areas

Moderator: Maggie Elehwany, Vice President of Government Affairs, National Rural Health Association

Scott Groom, Vice President and CIO, Cabell Huntington Health System

Ira Moscovice, PhD, Director, University of Minnesota Rural Health Research Center

2:15 – 3:15 Meeting the Needs of Consumers and Their Families and Caregivers

Moderator: John Orwat, PhD, Assistant Professor, School of Social Work, Loyola University Chicago and Senior Researcher, Blue Cross Blue Shield Association

Brenda Dyson, RHIA, Community Outreach Coordinator, Mississippi

Charlotte Yeh, MD, Chief Medical Officer, AARP Services, Inc.

3:15 – 4:15 Legal Insights: Health Information Exchange and QI Research

Melissa E. Hargiss, JD, Independent Consultant and Former State of Tennessee HIT Coordinator and Director of the Office of eHealth Initiatives

Peter Enko, JD, Partner, Husch Blackwell Sanders

4:15– 4:30 Closing Remarks and Next Steps

Nadine Caputo, MS, Director, Research and Development, AHIMA Foundation

Robert Mayes, MS, RN, Senior Advisor on Health Information Technology, Center for Primary Care, Prevention, and Clinical Partnerships, AHRQ

Appendix B: Summit Participants

Setting a Quality Improvement Research Agenda to Leverage HIT/HIM in Rural America

Full Participant Roster

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