

# Annual 2017 Report



# AHRQ Health Information Technology Division's 2017 Annual Report

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## I. About the Health IT Division

The Agency for Healthcare Research and Quality (AHRQ) Health Information Technology (IT) Division's mission is to produce and disseminate evidence about how health IT can make healthcare safer, higher quality, more accessible, equitable, and affordable, and to work within the U.S. Department of Health and Human Services and with other partners to make sure that the evidence is understood and used. Beginning in 2004, AHRQ has worked to fulfill this mission by investing in more than 600 research grants and contracts awarded to over 285 distinct institutions in 48 States and the District of Columbia.

AHRQ's ongoing health IT activities aim to improve healthcare decision making, support patient-centered care, and improve the quality and safety of medication management. In recent years, AHRQ has expanded upon these initiatives to support health IT research on the use of technology by patients to improve the quality and effectiveness of care; safe and effective implementation of health technologies; dissemination and application of patient-centered outcomes research (PCOR) findings; and optimization of electronic health record (EHR) design to enhance usability and support clinical work flow.

In 2017, active projects focused on strengthening the understanding of healthcare providers' information needs and decision making processes; consumers' use of health IT to access and manage their health information; and strategies to effectively collect and use patient-reported outcomes data. See Section V for the full list of projects active during 2017.

Additionally, in 2017 AHRQ set forth several new funding opportunities that share the goal of improving the effectiveness of health IT systems. These new areas of research are directed at developing, scaling, and disseminating findings from new clinical decision support (CDS) tools as well as implementing, evaluating, and scaling ways to collect and utilize patient-reported outcome measures. In addition, a new FOA will support exploratory and developmental health IT projects that seek to apply data and evidence in innovative ways to facilitate population health management and patient-centered care delivery and coordination.

This report highlights the 151 projects funded by AHRQ's Health IT Division that were active at any time during 2017. These projects span various areas of interest, funding mechanisms, and geographic distribution. Individual project profiles for all active and closed projects, project-related news, and publications are available on the AHRQ Health IT website at:

[www.healthit.ahrq.gov](http://www.healthit.ahrq.gov).

## II. Health IT Division Projects

### A. Funding Opportunities

The Health IT Division uses a variety of funding mechanisms to achieve its research goals, including grants and contracts. Each mechanism specifies the content, format, and timeline for deliverables, including periodic reporting requirements for completion of milestones and budget updates. Collectively, these mechanisms provide funding for a wide variety of health services research and administrative activities that are described in more detail below.

#### **Grants**

Grants provide money, property, or other direct assistance for approved projects or activities to support a public purpose that does not directly benefit the government. Grant proposals are submitted to AHRQ in response to a funding opportunity announcement (FOA). One-time FOAs are known as a request for applications (RFAs), and recurring FOAs are known as program announcements (PAs).

There were 150 Health IT Division-funded grants active at any time during calendar year 2017, with lifetime AHRQ funding equaling \$153.2 million. Lifetime AHRQ funding refers to the total financial support that AHRQ obligates to a project during the entire project period.

Grants active during calendar year 2017 were awarded under the following programs.

**Health IT Funding Opportunities.** Active grants were supported by the following ongoing or closed Health IT Division funding opportunities.

***Exploratory and Developmental Grant to Improve Healthcare Quality Through Health IT (R21) (PAR-08-269, PA-14-001):*** Provides funding for health IT exploratory and developmental research projects that support the conduct of short-term preparatory, pilot, or feasibility studies. There were 61 projects active during 2017 funded under these R21 program announcements.

***Disseminating and Implementing Evidence from Patient-Centered Outcomes Research in Clinical Practice Using Mobile Health Technology (R21) (HS-14-010):*** This FOA provides funding to develop and evaluate the effectiveness of novel approaches that use mobile health (mHealth) tools to enable the timely incorporation and appropriate use of PCOR evidence in clinical practice. Ten projects have been funded through this initiative and all were active in 2017.

**Grant Highlight: [HopScore: An Electronic Outcomes-Based Emergency Triage System \(R21 HS024071\)](#)**

The “HopScore” tool aims to support objective triage decisions in the emergency department (ED) and improve patient differentiation based on outcomes data. HopScore uses easily obtained patient demographic and clinical information commonly collected at ED triage to predict patients’ risk for critical outcomes. The project, led by Dr. Scott Levin at Johns Hopkins University, is refining and piloting an outcomes-based ED triage tool to predict patients’ risk for time-sensitive critical health events.

**Grant Highlight: Health Information Technology-Supported Process for Preventing and Managing Venous Thromboembolism (#R01 HS022086)**

Dr. Pascale Carayon and a team of investigators at the University of Wisconsin-Madison are developing health IT design requirements using a sociotechnical systems approach for preventing and managing venous thromboembolism (VTE). Using observations, interviews, focus groups, and a survey in four hospitals of an integrated healthcare system, researchers are identifying the cognitive and team work involved in VTE prevention and management that are informing the development of design requirements.

***Understanding Clinical Information Needs and Healthcare Decision Making Processes in the Context of Health IT (R01) (PA-11-198):*** Funds research aimed at elucidating the nature of cognition, task distribution, and work flow in healthcare delivery settings. While this program announcement is now closed, during 2017 there were 14 active projects funded through this program announcement.

***Understanding User Needs and Context to Inform Consumer Health IT Design (R01) (PA-11-199):*** Funds projects that help build a knowledge base about consumers' personal health information management needs and practices and related design principles. This program announcement, now closed, funded 12 projects active in 2017.

***Active Aging: Supporting Individuals and Enhancing Community-Based Care Through Health IT (P50) RFA (HS-10-016):*** This FOA funded one research project with the objective of developing sustainable and reproducible strategies to translate research into practice effectively and efficiently. This RFA is now closed, and the project ended during 2017.

***Patient-Centered Outcomes Research Clinical Decision Support Learning Network (U18) RFA (HS-15-003):*** This funding supported the development of the Patient-Centered Clinical Decision Support Learning Network (PCCDS-LN). This 5-year effort (Grant #U18 HS024849), led by Dr. Barry Blumenfeld, brings together diverse stakeholders to promote a sustainable community around developing, disseminating, and applying evidence-enabled, patient-centered CDS. The goals of the PCCDS-LN are to: accelerate collaborative learning, identify barriers and facilitators to implementing PCOR findings into clinical practice with the assistance of CDS; recommend ways to implement PCOR findings as CDS; reinforce facilitators for effective CDS use; measure PCOR finding use in CDS; and evaluate its impact and plan for long-term sustainability. For more information on the PCCDS-LN, see: <https://pccds-ln.org/>.

***Electronic Data Methods (EDM) Forum: Second Phase (U18) (RFA-HS-13-004):*** This FOA supported one project to continue and expand the work of the [Electronic Data Methods Forum](#). This project ended in March 2017.

**Other Health IT-Funded Grants.** In addition to the grants described above, the Health IT Division funds grants with a health IT focus that are solicited through the following general Agency FOAs:

***Conference Grant Program Awards (R13) (PA-13-017):*** AHRQ supports conferences that help to further its mission to improve the quality, safety, efficiency, and effectiveness of healthcare for all Americans. Two health IT-focused conference grants were active during 2017.

**Career Awards (K01, K08):** AHRQ funds Career Development (K01, K08) grants designed to support the next generation of health IT-focused researchers, including:

- Mentored Clinical Scientist Research Career Development Award (K08) (PAR-09-085, PA-13-039). There were six K08 projects active in 2017.
- Mentored Research Scientist Research Career Development Award (K01) (PAR-09-087). There were two K01 projects active in 2017.

**Patient-Centered Outcomes Research Pathway to Independence Award (K99/R00) (RFA-HS-13-002):** The purpose of this funding is to increase and maintain a strong cohort of new and talented AHRQ-supported independent investigators trained in comparative effectiveness methods to conduct PCOR. One health IT-focused project was funded in 2013 and was ongoing at the end of 2017.

**Patient-Centered Outcomes Research Mentored Clinical Investigator Award (K08) (PA-13-180):** This funding provides support for an intensive, mentored research career development experience in comparative effectiveness research methods as applied to PCOR. One health IT-focused grant was funded in 2016 and was ongoing at the end of 2017.

**Small Research Grant Program (R03) (PA-15-147):** Supports different types of small research studies including: pilot and feasibility studies; secondary analysis of existing data; small, self-contained research projects; development of research methodology; and development of new research technology. Three health IT-focused research grants were funded through this PA; all were ongoing at the end of the year.

**AHRQ Health Services Research Demonstration and Dissemination Grants (R18, PA-09-071, PA-13-046, PA-14-290).** The AHRQ Health IT Division funds health IT demonstration and dissemination projects through an Agency-wide FOA. During 2017, there were a total of five active grants funded through these program announcements.

**AHRQ Health Services Research (R01):** AHRQ funds projects through an Agency-wide FOA (PA-09-070, PA-13-045, PA-14-291) for ongoing extramural grants for research, demonstration, dissemination, and evaluation projects to support improvements in health outcomes, strengthen quality measurement and improvement, and identify strategies to improve access to care. There were 27 active health IT-focused grants funded through these FOAs during 2017.

**Grant Highlight: [Improving Adherence and Outcomes by Artificial Intelligence-Adapted Text Messages \(R21 HS022336\)](#)**

There are many well-known challenges related to medication management. A team of researchers led by Dr. Karen Farris used Reinforcement Learning (RL), an artificial intelligence method, to develop a model medication adherence system that automatically adapts text message communication to improve individual medication taking. Findings indicated that self-reported medication adherence significantly improved at 3 months in the intervention group compared to the control group. The distribution of text message themes changed over time indicating that the RL agent was learning and adapting.



***Centers for Education and Research on Therapeutics (CERTs) (U19, HS-11-004):***

AHRQ was given responsibility for administering the CERTs demonstration program authorized by Congress as part of the Food and Drug Administration Modernization Act of 1997 (Public Law 105-115). CERTs conduct research and provide education to advance the optimal use of drugs, medical devices, and biological products; increase awareness of the benefits and risks of therapeutics; and improve quality while cutting the costs of care. There was one health IT-focused U19 grant active in 2017, which ended in August 2017.

***Research Centers in Primary Care Practice-Based Research and Learning (P30) RFA (HS-12-002):***

P30 grants support Centers of Excellence in Primary Care Practice-Based Research and Learning that promote clinical, behavioral, and translational research activities. This FOA is intended for consortiums of three or more regional practice-based research networks (PBRNs), or national PBRNs with at least 120-member practices. There were two health IT-focused PBRN grants funded through this initiative in 2012; both ended during 2017.

## **Contracts**

A contract is an agreement that is initiated by the government to acquire a product or service under specified terms. The AHRQ Health IT Division supported one research contract that was active in 2017, with lifetime funding totaling \$2.29 million.

- In 2016, AHRQ contracted with MITRE to generate a systematic and replicable process for transforming PCOR findings into shareable CDS standards and a publicly available CDS prototype (Contract #290-16-00001U, *Patient-Centered Outcomes Research Clinical Decision Support Prototype Development and Dissemination*). This project, called the “CDS Connect Project,” is focused on supporting the rapid translation of evidence-based PCOR into clinical practice through interoperable CDS “artifacts.” The term “artifacts” has been deliberately embraced by the CDS Connect project to provide the ability to support a variety of CDS that are not exclusively limited to the space of clinical alerts, including alerts, order sets, textual reports, citations, and so forth. CDS Connect is a web-based repository service that enables the CDS community to identify evidence-based standards of care, translate and codify information into an interoperable standard, and leverage tooling to promote a collaborative model of CDS development. For more information, please see <https://cds.ahrq.gov/cdsconnect>. Additional information on CDS Connect project activities in 2017 is included in Section III-A: Project Highlights.

## **New Grant Funding Opportunities for 2018**

In 2017, AHRQ announced several funding opportunities designed to fund basic health IT research and fill gaps in the field that will lead to improved design of health IT systems. Applicants are invited to submit proposals for research projects to be funded in 2018. They include:

***Developing New Clinical Decision Support to Disseminate and Implement Evidence-Based Research Findings (R18) (PA-17-261):*** The purposes of this FOA are to develop

new, reliable, valid, and usable CDS from evidence-based research findings and then demonstrate its effectiveness to improve care in clinical practice.

***Scaling Established Clinical Decision Support to Facilitate the Dissemination and Implementation of Evidence-Based Research Findings (R18) (PA-17-260):*** This FOA will support research projects to extend (“scale”) the implementation and evaluation of well-established and effective CDS beyond the initial clinical setting or institution in which the CDS was originally developed and implemented, thereby extending the impact on clinical practice.

***Implementation and Evaluation of New Health IT Strategies for Collecting and Using Patient-Reported Outcome (PRO) Measures (U18) (PA-17-247):*** This FOA will fund innovative collaborative investigations to understand how new health IT strategies can increase the utilization of PROs in ambulatory care settings and contribute to improved patient-centered health outcomes and quality of care.

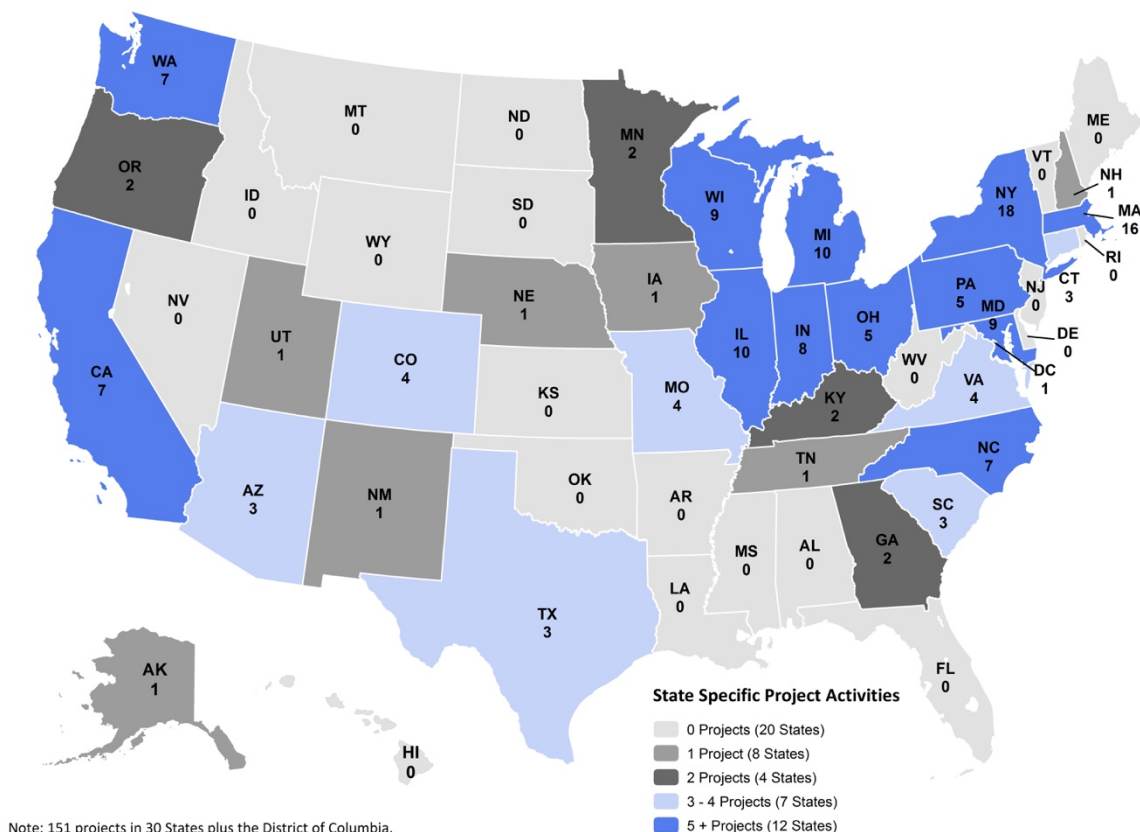
***Utilizing Health Information Technology to Scale and Spread Successful Practice Models Using Patient-reported Outcomes (R18) (PA-17-077):*** Projects funded through this FOA will support research that demonstrates how health IT can improve patient-centered health outcomes and quality of care in primary care and other ambulatory settings through the scale and spread of successful, health IT-enabled practice models that use PRO measures to achieve these objectives.

***Health Information Technology to Improve Health Care Quality and Outcomes (R21) (PA-17-246):*** This FOA will support exploratory and developmental health IT projects that seek to apply data and evidence in innovative ways to facilitate population health management and patient-centered care delivery and coordination. These exploratory projects should be designed to develop health IT solutions that enable or facilitate population health management and patient-centered care delivery within healthcare organizations and health systems in a way that makes the solution shareable and configurable across different health domains and levels of scale.

## **B. Geographic Distribution of Projects**

During 2017, projects were led by organizations located in 30 States plus the District of Columbia (see Figure 1). New York, with 18 projects, was the State with the highest number of active health IT projects, followed by Massachusetts with 16, and Illinois and Michigan each with 10. Projects are classified by the State where the lead organization is located, but many projects include collaborators from more than one organization in different States. For example, the *Assess Risk of Wrong Patient Errors in an EMR That Allows Multiple Records Open* project (Grant R21 HS023704), led by a principal investigator at Columbia University in New York, is conducting studies at two sites: Brigham and Women’s Hospital in Boston, Massachusetts, and at Montefiore Medical Center in the Bronx, New York.

**Figure 1: Number of Projects Active in 2017 by State**



## C. Characteristics of Health IT Projects

AHRQ funds diverse projects that focus on a range of health IT technologies, interventions, populations, medical conditions, settings, and type of care. Once a project is awarded, projects are reviewed and categorized using a detailed taxonomy. Projects may include one or more of any of these taxonomy categories.<sup>1</sup>

### **Technologies**

Projects are categorized by the health IT application or intervention being studied (Table 1) and can be tagged using more than one technology. The most common health IT category was EHRs/electronic medical records (EMRs) (n=45), followed by CDS (n=35), and mobile devices (n=26).

The *Patient-Centered Virtual Multimedia Interactive Informed Consent* (Grant #R21 HS023987) project is one example of a project categorized by more than one technology: consumer health

<sup>1</sup> Project categories are up to date as of January 23, 2018. Projects categories may be updated when a project changes its approach and methodologies.

informatics and mobile devices. This project, led by Dr. Fuad Abujarad, is enhancing the traditional patient informed consent process by developing the Patient-Centered Virtual Multimedia Interactive Informed Consent tool (VIC). The VIC will be developed as a patient-centered, web-based application with the ability to run on mobile devices.

**Table 1: Technologies Studied**

Technologies	Total
Electronic Health Record/Electronic Medical Record	45
Clinical Decision Support System	35
Mobile Device	26
Consumer Health Informatics	18
Patient Portal	16
Mobile Phone	11
Dashboard	10
Patient-Generated Health Data	10
Machine Learning	9
Natural Language Processing System	9
Telemedicine System	7
Computerized Provider Order Entry System	6
Health Information Exchange	6
Virtual Reality	6
Personal Health Record	5
Text Messaging	5
Clinical Documentation	4
Remote Patient Monitoring	4
Bioinformatics and Genomics	3
Internet	3
Registry	3
Secure Messaging	3
Voice Recognition	3
Data Warehouse	2
Social Media	2
Architecture	1
Clinical Informatics	1
Clinical Messaging	1
Data	1
Electronic Prescribing	1
Geographic Information System	1
Informatics	1
Kiosk	1
Knowledge System	1
Public Health Reporting System	1
Radio Frequency Identification Device	1
Radiology Information System	1
<b>Total</b>	<b>263</b>

## Medical Conditions Studied

The AHRQ Health IT Division funds projects that study the use of technology to improve management and outcomes of a variety of medical and health conditions, including cardiovascular disease, cancer, and substance abuse. Many of the projects evaluated the impact of an intervention on multiple health conditions or examined patients with co-morbid conditions.

For example, in the *Treating Comorbid Depression During Care Transitions with Relational Agents* project (Grant #R21 HS022938), led by Dr. Suzanne Mitchell, the team at Boston Medical Center developed the Sophie CBT System, an internet-accessed relational agent (RA), to deliver cognitive behavioral therapy for depression to patients with chronic illness and comorbid depression.

The most common medical conditions studied were unspecified chronic conditions (n=14), followed by mental and behavioral health (n=10), and diabetes (n=9). See Table 2 below.

**Table 2: Medical Conditions Studied of Project Research**

Medical Conditions	Total
Chronic Conditions	14
Mental/Behavioral Health	10
Diabetes Mellitus	9
Cardiovascular Disease	7
Cancer - Unspecified	6
Hypertension	6
Asthma	5
Obesity	5
Infectious Disease*	5
Gastrointestinal Disease	4
Substance Abuse	4
Breast Cancer	3
Congestive Heart Failure (CHF)	3
Coronary Artery Disease (CAD)	3
Pregnancy	3
HIV/AIDS	2
Neurologic Disease	2
Respiratory (Lung) Disease	2
Stroke	2
Tobacco Use	2
Cerebral Palsy	1
Cervical Cancer	1
Colorectal Cancer	1
Hyperlipidemia (HL)	1
Prostate Cancer	1
Renal (Kidney) Disease	1
Sickle Cell Anemia	1
<b>Total</b>	<b>104</b>

\*Infectious Disease includes viral, bacterial, and respiratory infection.

### Care Setting and Type of Care

Projects are categorized by the care setting (Table 3) and type of care (Table 4) of their research. For care setting, 42 projects active in 2017 were conducted in ambulatory settings. Thirty-one projects focused on inpatient care in hospitals, and 31 studies focused on care in patient homes.

**Table 3: Care Setting of Project Research**

Care Setting	Total
Ambulatory Setting	42
Hospital*	31
Patient Home	31
Academic Medical Center	18
Emergency Department	16
Federally Qualified Health Center	6
Perioperative/Operative	6
Intensive Care Unit	5
Across the Healthcare System	4
Community Health Center	4
Outpatient	4
Long-Term Care Facility	3
Integrated Delivery Network	2
Ambulatory Surgical Center	1
Laboratory	1
Pharmacy	1
Rehabilitation Center	1
Veterans Affairs Medical Center	1
<b>Total</b>	<b>177</b>

*\*Note: Hospital includes projects tagged as inpatient.*

For type of care, 39 projects focused on primary care, followed by acute care (n=29), and specialty care (n=24). See Table 4.

The *Comparison of Asynchronous Telepsychiatry Alongside Synchronous Telepsychiatry in Skilled Nursing Facilities* project (Grant #R01 HS025395) is one example of a project categorized as both behavioral health and long-term care. This project, led by Dr. Glen Xiong, is evaluating the use of asynchronous telepsychiatry to provide mental health services to individuals living in skilled nursing facilities.

**Table 4: Type of Care in Project Research**

Type of Care	Total
Primary Care	39
Acute Care	29
Specialty Care	24
Self-Management	19
Pediatrics	14
Surgery	6

Type of Care	Total
Ambulatory Care	5
Long-Term Care	4
Preventive Care	4
Tertiary Care	4
Behavioral Health	3
Home Healthcare	3
Orthopedics	3
Family Medicine	2
Obstetrics and Gynecology	2
Multi-Specialty Care	1
Urology	1
<b>Total</b>	<b>163</b>

### Healthcare Theme

Projects are categorized by healthcare theme (Table 5). Thirty-two projects active in 2017 were focused on patient-centered care. Twenty-six projects studied interventions to increase patient safety, and 21 projects focused on technology usability research.

The *Sleep Promotion Toolkit for Hospitalized Patients* project (Grant #R21 HS024330), awarded to Dr. Lichuan Ye, is one example of a project in the patient-centered care category. The project is revising a patient-centered sleep promotion toolkit called SLEEPkit and integrating it into an existing web-based patient portal.

**Table 5: Healthcare Theme in Project Research**

Healthcare Theme	Total
Patient-Centered Care	32
Patient Safety	26
Technology Usability	21
Human Factors	20
Patient Engagement	20
Chronic Disease Management	19
Patient-Reported Outcomes	19
Mobile Health	18
Quality Improvement	17
Patient Education	13
Transitions in Care	13
Clinical Decisionmaking	11
Care Coordination	10
Preventive Medicine	10
Sociotechnical Aspects	10
Clinical Workflow	8
Access to Care	7
Medication Adherence	7
Medication Errors	7
Telehealth	7

Healthcare Theme	Total
Care Planning	6
Medication Safety	6
Medication Management*	5
Quality Measurement	5
Adverse Events	4
Interoperability	4
Medication Reconciliation	3
Personalized Medicine	3
Learning Health System	2
Meaningful Use	2
Smoking Cessation	2
Health Literacy	1
<b>Total</b>	<b>338</b>

\*Note: Includes projects tagged as medication or medication management.

## Populations Studied

The AHRQ Health IT Division funds projects that study various populations, some of which also overlap with AHRQ's priority populations. AHRQ identifies "priority populations" as specified by Congress in the Healthcare Research and Quality Act of 1999 (Public Law 106-129), consisting of groups with unique healthcare needs or issues that require special focus, such as racial and ethnic minorities, low-income populations, and people with special healthcare needs.

Tables 6 through 10 outline the frequencies of projects categorized by each target population; projects can be tagged with more than one category. For example, in the *School-Based Tele-Physiatry Assistance for Rehabilitative and Therapeutic Services for Children with Special Health Care Needs Living in Rural and Underserved Communities* project (Grant #R01 HS025714), Dr. James Marcin and his team are studying the use of pediatric physiatrist medical direction using telemedicine with the goal to improve care for children with special healthcare needs who live in rural and medically underserved areas.

## Age

The most common age category was adults (n=36), followed by children (n=23), and adolescents and young adults (n=15).

**Table 6: Age Studied**

Age Studied	Total
Adult	36
Children	23
Adolescent and Young Adult	15
Elderly	12
Infant	3
<b>Total</b>	<b>89</b>



### Coverage Population

Four projects focused on those who were covered by Medicaid, while three other projects focused on individuals with private insurance, were Veterans, or who were uninsured (Table 7).

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**Table 7: Coverage Population Studied**

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Coverage Population Studied	Total
Medicaid	4
Private Insurance	1
Uninsured	1
Veterans	1
<b>Total</b>	<b>7</b>

### OMB Race and Ethnicity Populations

Eleven projects focused on specific Office of Management and Budget (OMB) race and ethnicity populations (Table 8).

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**Table 8: OMB Race and Ethnicity Studied**

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OMB Race and Ethnicity Studied	Total
Black or African American	4
Hispanic or Latino	3
American Indian or Alaska Native	2
White	2
<b>Total</b>	<b>11</b>

### Vulnerable Populations

The most frequent vulnerable populations studied in the projects were individuals with chronic care needs (n=17), followed by minority populations (n=12), medically underserved (n=10), and low-income populations (n=10).

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**Table 9: Vulnerable Population Studied**

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Vulnerable Population Studied	Total
Individuals with Chronic Care Needs	17
Minority Populations	12
Low Income Populations	10
Medically Underserved Populations	10
Inner City Populations	6
Rural Populations	6
Individuals with Disabilities	2
Individuals with Low Literacy	1
Individuals with Special Healthcare Needs	1
<b>Total</b>	<b>65</b>

## Roles

The projects were also reviewed on the role of the population studied. The most common population roles were physicians (n=50), caregivers (n=21), and clinical staff (n=20).

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**Table 10: Role Studied**

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Role Studied	Total
Physician	50
Caregiver	21
Clinical Staff	20
Nurse	16
Researcher	5
Surgeon	4
Decision Maker	3
IT Staff	3
Physician Assistant	3
Stakeholder	3
Vendor	3
Implementer	2
Nurse Practitioner	2
Payer	2
Pharmacist	2
Administrator	1
C-Suite Officer	1
Public Health Worker	1
<b>Total</b>	<b>142</b>

## III. Project Highlights

### A. AHRQ Project Highlights from 2017

In 2017, there were many projects that helped develop and disseminate information to add to the health IT knowledge base that reflected the Health IT Division's current priorities. A sample of projects is featured below.

#### ***Use of Health IT to Improve Patient Safety***

AHRQ funds projects to study how health IT can improve patient safety and how health IT itself can be safely used and implemented.

***Individualized Drug Interaction Alerts (Grant #R21 HS023826):*** While most electronic CDS systems include alerts for drug-drug interactions (DDIs), the majority relies on simple drug combination rules and ignores drug attributes and patient-specific information available in the EHR. These attributes and patient-specific information include factors that influence the risk of an adverse drug reaction, such as the dose, route of administration, duration of therapy, and concomitant therapies. To address this issue, Dr. Daniel Malone and a team of investigators at the University of Arizona developed and pilot tested a DDI drug knowledgebase (KB) and algorithms to determine whether warnings about DDIs are relevant to a given patient. The team identified patient-specific and drug-specific attributes that can be used to determine if a DDI alert is provided to a prescriber or pharmacist. They also examined DDI alerts that are commonly ignored or overridden by healthcare providers and whether clinical algorithms could reduce these alerts. The team found that for many of the drug combinations, implementing the clinical algorithms would lead to a substantial reduction in the number of warnings without causing harm to patients.

#### ***Focus on Consumer Health IT***

Increasingly, innovative computer and information systems are being developed to help people manage health concerns, monitor important indicators of their health, and communicate with their caregivers. AHRQ supports research to determine how these patient-facing technologies can best improve the quality and effectiveness of care.

***Bringing Communities and Technology Together for Healthy Aging (Grant #P50 HS019917):*** Dr. David Gustafson and a team of investigators at the University of Wisconsin-Madison developed Elder Tree, a community-based integrated information and communication technology (ICT) system that supports older adults. The web-based system connects seniors with each other, family, friends, and community resources. It serves as a source for information about local events, and offers tools for users to track their personal health and wellness. The researchers found a positive effect for older adults using the system. Analyses indicated that the system reduced the risk of falls and depression, and improved quality of life and social support for users. Older adults with multiple chronic conditions related to metabolic syndrome, including diabetes and depression, especially benefited from reductions in symptom distress and used

fewer primary care services. Elder Tree has been successfully disseminated to 57 counties in Wisconsin and continues to expand.

### ***Improving Health IT Usability***

AHRQ's usability research focuses on how to design and implement EHRs so that they are more intuitive to use and more readily support clinical workflow.

***Discovery and Visualization of New Information from Clinical Reports in the Electronic Health Record (Grant #R01 HS022085):*** Reviewing clinical notes, a necessary part of making diagnostic and therapeutic decisions, is hindered by many factors, including the sheer volume of electronic clinical data in the EHR, suboptimal text user interface design, and limited time to interact with patients. Dr. Genevieve Melton-Meaux at the University of Minnesota is refining computational methods to identify new information in clinical notes and then assessing a new tool to help clinicians better visualize the new information, thereby aiming to improve clinicians' efficiency, decision making, and satisfaction with documentation mechanisms in the EHR. As part of this work, the team conducted a study in which participants reviewed the notes section in a prototype EHR and had to review the case, provide a verbal summary of the case, and fill out a workload instrument. In addition, the participants were assessed for their note-reading patterns. The team found that the assessment and plan section of the note were most often read first and rated as the most valuable section in the note, followed by the past medical history and then the chief complaint. They also found that participants had negative impressions of auto-populated data and that this information was often ignored.

### ***Advancing the Use of Clinical Decision Support***

CDS makes new and targeted evidence available to clinicians at the point of care, improving their ability to act more readily on that information. When inappropriately implemented, the use of CDS can lead to alert fatigue, high override rates, and physician frustration. When effectively developed and implemented, CDS provides the right information to the right audience in the right way and at the right time. AHRQ has a long history of investing in research about how to make CDS more effective and usable and continues to explore how CDS can accelerate the movement of evidence into practice so that it become more shareable, standards-based, and publicly available.

***Patient-Centered Outcomes Research Clinical Decision Support Prototype Development and Dissemination (Contract #290-16-00001U):*** As noted in the funding opportunities section, in 2016 AHRQ funded the creation of a CDS repository called "[CDS Connect](#)," which is the first national public platform for sharing CDS, including its interoperable, standards-based building blocks. Those developing, implementing, and testing CDS can use CDS Connect to share their CDS tools and to learn from each other's experiences. Initial work is grounded in the domain of cholesterol management and designed to promote the transformation of findings into actionable, relevant, and interoperable clinical capabilities. More information on the CDS Connect successes is described in the following first year final [report](#).

In 2017, the study team published the findings of the CDS Connect pilot of a newly developed CDS artifact, Statin Use for the Primary Prevention of Cardiovascular Disease in Adults. In both design and execution, the pilot focused on collaboration with the project's clinical partner to

ensure a balance of development rigor and real-world considerations. The [report](#) describes the process used for the development and refinements of the piloted CDS, technical integration with the pilot site EHR, evaluation of the CDS's performance, and lessons learned through evaluation of the pilot testing experience, including direct clinical user feedback. The artifact described in this report is free and openly available on the CDS Connect Repository, and can be accessed at <https://cds.ahrq.gov/>.

A second area of focus for the CDS artifacts is pain management, needed to bolster the Federal response to the opioid crisis. This effort will provide standards-based, shareable CDS resources that are free and publicly available to providers to assist in the mitigation of opioid misuse and related deaths. The team conducted an environmental scan of current management of chronic non-cancer pain to identify standards of care, evidence-based recommendations, and tools that could contribute to the development of new patient-centered artifacts. The scan identified several findings that will inform efforts in 2018, including: 1) a limited availability of opioid CDS artifacts; 2) most current clinical practice guidelines, pain assessments, and opioid risk assessments hold copyrights that restrict their use; 3) a lack of standard terminologies to represent care concepts in the addiction domain, such as psychosocial treatments, and the structured capture of these concepts; and 4) a lack of publicly available electronic clinical quality measures and only one published opioid CDS specification.

More information on these and other projects may be found on the AHRQ Health IT Projects' [website](#), where success stories, videos, and podcasts highlighting many of the projects are available.

## **B. Publicizing Grantee and Contractor Outputs**

The Health IT grantees and contractors publicize their research findings in many ways, such as participating in AHRQ's [2017 Patient-Centered Clinical Decision Support Learning Network Conference](#), publishing work in peer-reviewed journals, presenting their work during AHRQ web conferences, and making presentations to stakeholder groups and at other health- and IT-based conferences. AHRQ has developed an [AHRQ Health IT Projects Publication Database](#) to further disseminate work of the funded projects. This Publication Database is updated on a quarterly basis via literature search of projects active within the past 3 years and by notification from funded grantees and contractors of published work.

During 2017, a total of 148 peer-reviewed publications were identified through the literature search and the notification system.

### ***Publications***

Highlights from the Health IT funded projects' publications include the following:

[\*\*\*Safety Huddles to Proactively Identify and Address Electronic Health Record Safety\*\*\*](#). Dr. Hardeep Singh and a team of investigators explored the use of safety huddles for identifying and learning about EHR-related safety concerns (Grant #R01 HS022087). Safety huddles—short, routine debriefings designed to engage frontline clinical and administrative staff in discussions about existing or emerging safety and performance issues—have been found to be useful in

creating a sense of collective situational awareness that increases an organization's capacity to respond to safety concerns. Dr. Singh and his team retrospectively analyzed daily safety huddle briefing notes recorded at a tertiary-care hospital over 249 days. They identified 245 EHR-related safety concerns. Over 40 percent of concerns involved “*EHR technology working incorrectly*,” followed by 25 percent involving “*EHR technology not working at all*.” Concerns related to “*EHR technology missing or absent*” accounted for 16 percent, whereas 15 percent were linked to “*user errors*.” Based on these results, they recommended that healthcare organizations consider huddles as a strategy to promote understanding and improvement of EHR safety.

### **Adolescents' Perspectives on Personalized E-Feedback in the Context of Health Risk Behavior**

**Screening for Primary Care.** Dr. Carolyn McCarty and a team of researchers at the University of Washington and the Seattle Children's Research Institute conducted a qualitative study to evaluate the “Check Yourself” tool (Grant #R01 HS023383). The tool is a tablet-based screening instrument that queries youth about eating, nutrition, exercise, screen time, sleep, safety behaviors, drug and alcohol use, sexual behavior, and emotional health, and then provides personalized feedback based on screening responses. The evaluation explored youth perceptions of and preferences for receiving personalized feedback for multiple health risk behaviors and reinforcement for health promoting behaviors. This publication summarized the semi-structured interviews conducted with adolescents to understand their perspectives of the Check Yourself tool, reactions to the personalized feedback, and desired expansions of the tool. Overall, the tool was well-received by participants who perceived it as a way to enhance—but not replace—their interactions with providers. They appreciated receiving nonjudgmental feedback from the tool and responded positively to information regarding the consequences of behaviors, comparisons with peer norms and health guidelines, tips for behavior change, and reinforcement of healthy choices. Some participants dismissed the peer norms as not real or relevant and national guidelines as not valid or reasonable. When prompted for possible adaptations to the tool, adolescents expressed interest in receiving followup information, setting health-related goals, tracking their behaviors over time, and communicating with providers electronically between appointments.

**InfoSAGE: Use of Online Technologies for Communication and Elder Care.** A team of researchers led by Dr. Charles Safran is conducting a longitudinal study to evaluate the usage and impact of InfoSAGE (<http://www.infosagehealth.org/>), a web- and mobile-based technology platform developed for the care collaboration and coordination of aging elders within a private, online, family network (Grant #R01 HS021495). InfoSAGE can be used to manage medications, post and comment on a family message board, assign tasks or appointments to individual members, curate searches, and provide tiered access to shared information. As part of the study, participants are surveyed at baseline and every 6 months thereafter for the duration of the study. This publication summarizes some initial findings from the surveys, including that elders use the site as often as their caregivers. Most elders in this study were able to use advanced technologies to create an online network, add medications, and exchange messages. Families have formed networks that include spouses, children, grandchildren, and caregivers, and the platform has successfully connected caregivers who are geographically dispersed.

## AHRQ Web Conferences

In 2017, the AHRQ Health IT Division hosted four national web conferences highlighting work funded by the Health IT Division. These web conferences spanned a range of topics and were attended by a variety of participants, including providers, researchers, and health IT professionals. The 1.5-hour sessions were comprised of informative presentations and interactive discussions. Post-presentation materials for all web conferences are available on the AHRQ Health IT web site under [Events](#). Summaries of web conferences in 2017 are as follows:

- During the [National Web Conference on Improving Health IT Safety through the Use of Natural Language Processing to Improve Accuracy of EHR Documentation](#) (February 7, 2017), Drs. Thomas Payne (Grant #HS 023631, which closed in 2016) and Li Zhou (Grant #HS 024264 and #HS 022728) discussed their AHRQ-funded work on the development of tools and methods designed to advance the use of technology safety through improved EHR documentation. They presented evaluation strategies and findings for a voice-generated enhanced electronic note system called VGEENS (Dr. Payne) and concepts related to the use of natural language processing (NLP) technologies for improving accuracy and timeliness of EHR embedded notes and documents (Dr. Zhou).
- Drs. Courtney Lyles (K99/R00 HS022408), Jessica Ancker (Grant #K01 HS 021531), and Ruth Masterson Creber (Grant #R01 HS021816, PI: David Vawdrey) presented AHRQ-funded work during the [National Web Conference on Effective Design and Use of Patient Portals and their Impact on Patient-Centered Care](#) (March 23, 2017). This included the design and use of patient portals among varied populations and settings, and their impact on patient engagement, diabetes self-management, and healthcare quality.
- The [National Web Conference on Optimizing the Presentation and Visualization of Health Data for Patients and Providers](#) (May 30, 2017), focused on methods for optimizing the meaningful presentation of health data for both providers and patients. Drs. Brian J. Zikmund-Fisher (Grant #R01 HS021681) and Genevieve Melton-Meaux (Grant #R01 HS022085) discussed findings from their AHRQ-funded studies on developing methods for presenting meaningful displays of medical test result data to patients for improved understanding and clinical note organization to improve the efficiency of provider documentation.
- During the [National Web Conference on Use of Health IT for Aging Adults](#) (July 17, 2017), Drs. David H. Gustafson (Grant #P50 HS019917), Charles Safran (Grant #R01 HS021495), and Kevin Ponto (Grant #R01 HS022548) highlighted their AHRQ-funded

Information on Dr. Payne's work on VGEENS, [Improving Accuracy of Electronic Notes Using a Faster, Simpler Approach](#), Grant #R21 HS023631, is available in this [video](#). The team developed, implemented, and evaluated a voice-generated enhanced electronic note system that was designed to address the problems of electronic progress notes. VGEENS integrates voice recognition and transcription with NLP to create inpatient progress notes. The system was designed to match the workflow of physicians when doing inpatient rounds. During a [randomized control trial](#), they found that physicians rated it as generally very reliable and secure. This approach provides an alternative to use of keyboard and templates to create progress notes and may appeal to physicians who prefer voice to typing.



work on the development of innovative technologies to improve care planning and communication with aging adults. Dr. Gustafson described the development of Elder Tree, a web-based information and communication technology system aimed at connecting aging adults with family members, caregivers, other aging adults, and community resources on elder independence and quality of life. Dr. Safran presented information on InfoSage, a family-centered web-based platform to improve communication, coordination, and collaboration related to healthcare decision making and care transitions for aging adults and their families. Lastly, Dr. Ponto presented on the vizHOME project, describing the benefits of integrating a full-scale three-dimensional model of a home with EHR data for aiding in care planning for aging adults.

### ***2017 Patient-Centered Clinical Decision Support Learning Network Conference***

The Patient-Centered Clinical Decision Support Learning Network (PCCDS-LN), an AHRQ-supported effort (Grant #U18 HS024849, described previously), hosted a 1-day meeting on October 3, 2017, to bring together diverse stakeholders to learn about and discuss the key issues around developing, disseminating, and applying PCCDS. Sessions focused on PCCDS for patient engagement, PCCDS measurement and outcomes, and PCCDS user needs and technologies. More information on the PCCDS-LN conference is available at: <https://pccds-ln.org/annual-conference> and more information on the PCCDS initiative is available at: <https://pccds-ln.org/>.



## IV. Conclusion

Health IT research funded by AHRQ has played a critical role in identifying barriers and facilitators to successful adoption of new and existing healthcare technologies, improving implementation and use of health IT, and disseminating best practices and solutions for harnessing the potential of IT in the U.S. healthcare system. Many projects that were active during 2017 strengthened existing technologies or developed new technologies, assessed the feasibility of using health IT tools, and evaluated the impact of health IT on health services delivery or patient health outcomes. Furthermore, the Health IT Division's funding focused on expanding health IT access to healthcare consumers through patient-facing technologies designed to expand access to health services and health information, improve quality and effectiveness of care, and facilitate PCOR using patient-generated health data. The work funded by AHRQ has made important advancements in developing and disseminating the evidence-base for health IT and shaping future priorities for the field of health IT.

Findings and lessons learned are shared through the [AHRQ Health IT website](#). Readers are invited to visit the website to learn more about all of the AHRQ resources, initiatives, and funded projects.

## V. List of Projects Active in 2017

**Table 11: Health Information Technology PA Grants**

<b>Exploratory and Developmental Grant to Improve Health Care Quality Through Health IT (R21)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Abraham, Joanna	An Etiology for Medication Ordering Errors in Computerized Provider Order Entry Systems	PA-14-001
Adelman, Jason Stuart	Assess Risk of Wrong Patient Errors in an Electronic Medical Record that Allows Multiple Records Open	PA-14-001
Asan, Onur	Perception and Use of a Patient Care Window to Improve Care and Family Engagement	PA-14-001
Avidan, Michael	Anesthesiology Control Tower: Feedback Alerts to Supplement Treatment (ACTFAST)	PA-14-001
Bardach, Naomi S.	Novel Information Technology to Create Patient-Integrated Quality Improvement	PA-14-001
Bauer, Nerissa San Luis	Improving Anxiety Detection in Pediatrics Using Health Information Technology	PA-14-001
Cartmell, Kathleen Buford	Reducing Hospital Readmission Rates by Implementing an Inpatient Tobacco Cessation Service Driven by Interactive-Voice Recognition Technology	PA-14-001
Choi, Sung	Personalized Engagement Tool for Pediatric Blood and Marrow Transplantation Patients and Caregivers	PA-14-001
Cohen, Lindsey	Relieving Anxiety in Children Undergoing Radiation Therapy through Virtual Preparation	PAR-HS-08-269
Cutrona, Sarah Leleiko	Open & Act: Tracking Healthcare Team Response to Electronic Health Record Asynchronous Alerts	PA-14-001
Dalal, Anuj K.	Interactive Patient-Centered Discharge Toolkit to Promote Self-Management During Transitions	PA-14-001
Dexheimer, Judith W.	Optimal Methods for Notifying Clinicians About Epilepsy Surgery Patients	PA-14-001
Dixon, Brian	Exploring the Utilization of and Outcomes from Health Information Exchange in Emergency Settings	PA-14-001
Dorsch, Michael	A Geofencing-Based Adaptive Messaging System to Support Patient Self-Management of a Low-Sodium Diet in Hypertension	PA-14-001
Dowding, Dawn	Development of Dashboards to Provide Feedback to Home Care Nurses	PA-14-001
Farris, Karen	Improving Adherence and Outcomes by Artificial Intelligence-Adapted Text Messages	PAR-HS-08-269

<b>Exploratory and Developmental Grant to Improve Health Care Quality Through Health IT (R21)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Federman, Alex D.	Development of an Electronic Medical Record-Integrated Enhanced After Visit Summary	PA-14-001
Ferucci, Elizabeth D.	Evaluation of the Impact of Telemedicine on Management of Rheumatoid Arthritis	PA-14-001
Gance-Cleveland, Bonnie	StartSmart™: Health Information Technology to Improve Adherence to Prenatal Guidelines	PA-14-001
Goss, Foster R.	Natural Language Processing to Identify and Rank Clinically Relevant Information for EHRs in the Emergency Department	PA-14-001
Gray, Stacy W.	Empowering Cancer Patients Through Innovations in Information Technology-Based Reporting of Precision Medicine	PA-14-001
Hettinger, Aaron Zachary	Context is Critical: Understanding When and Why Electronic Health Record Related Safety Hazards Happen	PA-14-001
Holden, Richard	Power to the Patient: Design and Test of Closed-Loop Interactive Information Technology for Geriatric Heart Failure Self-Care	PA-14-001
Juckett, David	Phenotype Modeling and Outcome Mapping for Pain Management Decision Support	PAR-HS-08-269
Kazemi, Donna	mHealth Delivery of a Motivational Intervention to Address Heavy Drinking Among College Freshmen	PA-14-001
Kent, K Craig	Patient-Centered Postoperative Wound Surveillance Using Current Technology	PAR-HS-08-269
Kutney-Lee, Ann	Electronic Health Record Use, Work Environments, and Patient Outcomes	PA-14-001
Lacson, Ronilda	Automated Notification for Follow-Up Testing Recommendations Across Care Settings	PAR-HS-08-269
Lee, Joyce	Patient-Centered Data Visualizations for Diabetes	PA-14-001
Leroy, Gondy	Enabling Large-Scale Research on Autism Spectrum Disorders Through Automated Processing of Electronic Health Record Using Natural Language Understanding	PA-14-001
Leung, May May	Intervention INC: Interactive Nutrition Comics for Urban Minority Youth	PA-14-001
Levin, Scott Ryan	HopScore: An Electronic Outcomes-Based Emergency Triage System	PA-14-001
Lindquist, Lee A.	Improving Outpatient Safety of Older Adults through Electronic Patient Portals	PA-14-001
Liss, David T.	Using Location-Based Smartphone Alerts Within a System of Care Coordination	PA-14-001
Malone, Daniel C.	Individualized Drug Interaction Alerts	PA-14-001

<b>Exploratory and Developmental Grant to Improve Health Care Quality Through Health IT (R21)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Mazur, Lukasz	Enhancing Providers Ability to Follow-up on Abnormal Test Results	PA-14-001
McAlearney, Ann Scheck	Portals in Inpatient Care (PIC): Evaluating the Usability, Use and Patient Experience Associated with Patient Portal Technology at the Bedside	PA-14-001
Meguid, Robert A.	Surgical Risk Preoperative Assessment System (SURPAS)	PA-14-001
Mitchell, Suzanne	Treating Comorbid Depression During Care Transitions with Relational Agents	PA-14-001
Molfenter, Todd David	Payer Readiness for Technology Implementation (P-RTI) Tool Application and Assessment	PA-14-001
Moore, Susan Louise	Engaging Disadvantaged Patients in Sharing Patient-Generated Health Data and Patient-Reported Outcomes through Health Information Technology	PA-14-001
Morrow, Daniel	Collaborative Patient Portals: Computer-Based Agents and Patients	PAR-HS-08-269
Munson, Sean	Sharing Patient Lifelog Data with the Primary Care Team for Two Patient Populations: Preventative Care and Chronic Disease Management	PA-14-001
Nahm, Eun-Shim	A Theory-Based Patient Portal eLearning Program for Older Adults with Chronic Illnesses	PA-14-001
Ornstein, Steven	Learning From Primary Care EHR Exemplars About Health IT Safety	PA-14-001
Overby, Casey Lynnette	Electronic Health Record-linked Decision Support for Communicating Genomic Data	PAR-HS-08-269
Patel, Minal R.	Feasibility of a Clinician Training Program to Improve Patient-Provider Communication in the Presence of Health Information Technology Systems in the Exam Room	PA-14-001
Phillips, Robert	Trial of Aggregate Data Extraction for Maintenance of Certification and Raising Quality	PAR-HS-08-269
Pratap, Jayant	Using the Electronic Health Record to Identify Children Likely to Suffer Last-Minute Surgery Cancellation	PA-14-001
Primack, Brian A.	Sponsored Health Information Technology and Evidence-Based Prescribing among Medical Residents	PAR-HS-08-269
Rangachari, Pavani	Using Social Knowledge Networking (SKN) Technology to Enable Meaningful Use of EHR Technology	PA-14-001
Rao, Goutham	Improving Diagnosis of Hypertension in Children (IDHC)	PA-14-001
Schnipper, Jeffrey Lawrence	Electronic Medication Adherence Reporting and Feedback During Care Transitions	PA-14-001

<b>Exploratory and Developmental Grant to Improve Health Care Quality Through Health IT (R21)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Sherwin, Robert	Enhancing an Electronic Medical Record-Based Real-Time Sepsis Alert System Performance Through Machine Learning	PA-14-001
Singh, Hardeep	Improving Direct Notification of Abnormal Test Results via Patient Portals	PA-14-001
Snyder, Margie E.	Enhancing Clinical Decision Support Applications for Community Pharmacist-Delivered Medication Therapy Management	PA-14-001
Valdez, Rupa	Accessibility and Beyond: Designing Consumer Health Information Technology for Disabled Individuals	PA-14-001
Wernz, Christian	Evidence-based Contingency Planning for Electronic Health Record Downtime	PA-14-001
Xie, Anping	Development of a Clinical Decision Support Tool for Facilitating Naturalistic Decision-Making and Improving Blood Culture Utilization	PA-14-001
Ye, Lichuan	A Sleep Promotion Toolkit for Hospitalized Patients	PA-14-001
Yen, Po-Yin	Development and Evaluation of Sociotechnical Metrics to Inform Health IT Adaptation	PA-14-001
<b>Disseminating and Implementing Evidence from Patient-Centered Outcomes Research in Clinical Practice Using Mobile Health Technology (R21)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Abujarad, Fuad	Patient Centered Virtual Multimedia Interactive Informed Consent (VIC)	RFA-HS-14-010
Bajaj, Jasmohan S.	Use of Patient Buddy Application to Disseminate Knowledge & Prevent Readmission	RFA-HS-14-010
Chrischilles, Elizabeth	Design and Testing of a Mobile Cardiovascular Risk Service with Patient Partners	RFA-HS-14-010
Connelly, Mark Andrew	Registry-Assisted Dissemination of Mobile Pain Management for Youth with Arthritis	RFA-HS-14-010
Oreskovic, Nicolas M	An Integrated Closed-Loop Feedback System for Pediatric Cardiometabolic Disease	RFA-HS-14-010
Rudin, Robert Samuel	Using mHealth and Patient-reported Outcomes to Deliver Evidence-Based Asthma Care	RFA-HS-14-010
Schnall, Rebecca	Use of mHealth Technology for Supporting Symptom Management in Underserved Persons Living with HIV	RFA-HS-14-010
Shah, Nirmish R.	Use of Mobile Technology to Improve Acute Care Utilization in Sickle Cell Disease	RFA-HS-14-010

<b>Disseminating and Implementing Evidence from Patient-Centered Outcomes Research in Clinical Practice Using Mobile Health Technology (R21)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Tubb, Matthew Robert	A Mobile App to Enhance Smoking Cessation Shared Decision Making in Primary Care	RFA-HS-14-010
Tulu, Bengisu	TJR Guru: A Mobile App for Shared Informed Decision Making in Total Joint Replacement Surgery	RFA-HS-14-010
<b>Understanding Clinical Information Needs and Health Care Decision Making Processes in the Context of Health IT (R01)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Carayon, Pascale	Health Information Technology-Supported Process for Preventing and Managing Venous Thromboembolism	PA-11-198
Cohen, Deborah Jill	Clinical Information Needs of Community Health Centers for Health Information Technology (CLINCH-IT)	PA-11-198
Fairbanks, Rollin	Cognitive Engineering for Complex Decision Making and Problem Solving in Acute Care	PA-11-198
Flum, David R.	Developing Design Principles to Integrate Patient-Reported Outcomes (PROs) into Clinical Practice through Health Information Technology: Data, User Experience, and Workflow Requirements for PRO Dashboards	PA-11-198
Franklin, Amy	Opportunistic Decision Making Information Needs and Workflow in Emergency Care	PA-11-198
Gold, Jeffrey Allen	Electronic Health Record Solutions for Accurate Reporting of Data on Interprofessional Intensive Care Unit Rounds	PA-11-198
Gurses, Ayse Pinar	Care Transitions and Teamwork in Pediatric Trauma: Implications for Health Information Technology Design	PA-11-198
Harle, Christopher Albert	Designing User-Centered Decision Support Tools for Chronic Pain in Primary Care	PA-11-198
Koopman, Richelle J.	Optimizing Display of Blood Pressure Data to Support Clinical Decision Making	PA-11-198
Manojlovich, Milisa	The Effect of Health Information Technology on Healthcare Provider Communication	PA-11-198
Melton-Meaux, Genevieve	Discovery and Visualization of New Information from Clinical Reports in the Electronic Health Record	PA-11-198
Singh, Hardeep	Decision Making and Clinical Work of Test Result Follow-up in Health Information Technology Settings	PA-11-198
Wetterneck, Tosha Beth	Understanding Primary Care Teamwork in Context: Implications for Health Information Technology Design	PA-11-198
Windle, John	Optimizing the Electronic Health Record for Cardiac Care	PA-11-198

<b>Understanding User Needs and Context to Inform Consumer Health IT Design (R01)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Bertoni, Alain	Maximizing the Impact of Electronic Personal Health Information Management (ePHIM) in Low-Income, Multiethnic Populations	PA-11-199
Jackson, Gretchen P.	Personal Health Information Needs and Practices for Maternal Fetal Care	PA-11-199
Matthews, Judith T.	Self-Management via Health Kiosk by Community-Residing Older Adults	PA-11-199
Ponto, Kevin	vizHOME: A Context-Based Health Information Needs Assessment Strategy	PA-11-199
Pratt, Wanda	Patients as Safeguards: Understanding the Information Needs of Hospitalized Patients	PA-11-199
Ralston, James	Patient Reminders and Notifications	PA-11-199
Ralston, James	Understanding and Honoring Patients with Multiple Chronic Conditions	PA-11-199
Safran, Charles	InfoSage: Information Sharing Across Generation and Environments	PA-11-199
Thompson, Haley S.	eHealth Activity among African American and White Cancer Survivors	PA-11-199
Turner, Anne M.	Addressing the Personal Health Information Management Needs of Older Adults	PA-11-199
Vawdrey, David Kent	Addressing Hospital Patient Information Needs Using a Personal Health Record Portal	PA-11-199
Zikmund-Fisher, Brian	Systematic Design of Meaningful Presentations of Medical Test Data for Patients	PA-11-199
<b>Active Aging: Supporting Individuals and Enhancing Community-based Care Through Health IT (P50)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Gustafson, David H.	Bringing Communities and Technology Together for Healthy Aging	RFA-HS-10-016
<b>Patient-Centered Outcomes Research Clinical Decision Support Learning Network (U18)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Blumenfeld, Barry H.	Patient-Centered Outcomes Research Clinical Decision Support Learning Network	HS-15-003

Electronic Data Methods Forum: Second Phase (U18)		
Principal Investigator	Project Title	Funding Opportunity Announcement
Edmunds, Margaret	AcademyHealth Electronic Data Methods Forum Second Phase	RFA-HS-13-004



**Table 12: Other Health IT Funded Grants**

<b>AHRQ Conference Grant Program (R13)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Fridsma, Douglas Brian	AMIA Health Policy Conference	PA-13-017
Gill, Erica L.	e3iVR: Conference on Ethics in Investigational and Interventional Uses of Immersive Virtual Reality	PA-13-017
<b>Career Development (K01, K08) Grants Focused on Health IT</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Ancker, Jessica	Improving Healthcare Quality with User-Centric Patient Portals	PAR-09-087
Blecker, Saul B.	Health Information Technology in Heart Failure Care	PA-13-039
Gephart, Sheila Maria	Clinical Decision Support Optimizing Necrotizing Enterocolitis Prevention Implementation in Neonatal Intensive Care Unit	PA-13-039
Melnick, Edward	Clinical Decision Support for Mild Traumatic Brain Injury	PAR-09-085
Nanji, Karen C.	Preventing Perioperative Medication Errors and Adverse Drug Events Through the Use of Clinical Decision Support	PA-13-039
Smith, Angela B.	Developing an Interactive, Patient-Centered mHealth Tool to Enhance Post-Cystectomy Care	PA-13-039
Wasson, Lauren	Improving Diagnosis of Cardiovascular Disease in the Emergency Department Using Cognitive Informatics Tools	PA-13-039
Wen, Kuang-Yi	MyHealthPortal: Using an Electronic Portal to Empower Patients with Breast Cancer	PAR-09-087
<b>Patient Centered Outcomes Research Pathway to Independence Award (K99/R00)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Lyles, Courtney	Engaging Diverse Patients in Using an Online Patient Portal	RFA-HS-13-002

<b>Patient Centered Outcomes Research Mentored Clinical Investigator Award (K08)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Sharifi, Mahnoos H.	Using Electronic Health Records to Support Decision-Making in Pediatric Obesity Care	PA-13-180
<b>Small Research Grant Program (R03)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Ellis, Charles	Speech Telerehabilitation After Stroke: Proof-of-Concept and Feasibility	PA-15-147
Mendonca, Eneida	Virtualized Homes: Tools for Better Discharge Planning	PA-15-147
Saleem, Jason J.	Ambulatory Clinic Exam Room Design with Respect to Computing Devices to Enhance Patient Centeredness	PA-15-147
<b>AHRQ Health Services Research Demonstration and Dissemination (R18)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Epstein, Jeff N.	Improving ADHD Behavioral Care Quality in Community-Based Pediatric Settings	PA-14-290
Jack, Brian	Implementation and Dissemination of 'Gabby,' a Health Information Technology System for Young Women, into Community-Based Clinical Sites	PA-14-290
Kroth, Philip	Minimizing Stress, Maximizing Success of Physician's Use of Health Information	PA-13-046
McTigue, Kathleen M.	Maintaining Activity and Nutrition through Technology-Assisted Innovation in Primary Care	PA-09-071
Solberg, Leif	Optimizing the Value of Patient-Reported Outcome Measures in Improving Care Delivery through Health Information Technology	PA-14-290
<b>AHRQ Health Services Research Projects (R01)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Adelman, Jason Stuart	Develop and Validate Health Information Technology Safety Measures to Capture Violations of the Five Rights of Medication Safety	PA-14-291
Adelman, Jason Stuart	Providing Evidence and Developing a Toolkit to Accelerate the Adoption of Patient Photographs in Electronic Health Records	PA-14-291
Aguilera, Adrian	Improving Diabetes and Depression Self-management Via Adaptive Mobile Messaging	PA-14-291

<b>AHRQ Health Services Research Projects (R01)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Alpern, Elizabeth	Improving the Quality of Pediatric Emergency Care Using an Electronic Medical Record Registry and Clinician Feedback	PA-09-070
Bates, David	Ensuring Safe Performance of Electronic Health Records	PA-13-045
Cummins, Mollie Rebecca	Electronic Exchange of Poisoning Information	PA-09-070
Dixon, Brian	Improving Population Health Through Enhanced Targeted Regional Decision Support	PA-09-070
Grannis, Shaun	Enhancing Patient Matching in Support of Operational Health Information Exchange	PA-14-291
Lambert, Bruce	Preventing Wrong-Drug and Wrong-Patient Errors with Indication Alerts in Computerized Provider Order Entry Systems	PA-14-291
Marcin, James	School-Based Tele-Physiatry Assistance for Rehabilitative and Therapeutic Services for Children with Special Health Care Needs Living in Rural and Underserved Communities	PA-14-291
McCarty, Carolyn A.	Improving Teen Care with Health Information Technology	PA-13-045
Patel, Vimla L.	Impact of Meaningful Use on Clinical Workflow in Emergency Departments	PA-13-045
Ratwani, Raj M.	Developing Evidence-based User Centered Design and Implementation Guidelines to Improve Health Information Technology Usability	PA-14-291
Schiff, Gordon David	Enhancing Medication Computerized Provider Order Entry Safety and Quality by Indications Based Prescribing	PA-13-045
Schnall, Rebecca	The Wise App Trial for Improving Health Outcomes in People Living With HIV (PLWH)	PA-14-291
Senathirajah, Yalini	Finding the Safer Way: Novel Interaction Design Approaches to Health Information Technology Safety	PA-14-291
Shapiro, Jason S.	Advancing Quality Measurement and Care Improvement with Health Information Exchange	PA-09-070
Siegel, Corey	Evaluating a Prediction Tool and Decision Aid for Patients with Crohn's Disease	PA-09-070
Sockolow, Paulina	Information Needs of Homecare Nurses During Admission and Care Planning	PA-14-291
Stockwell, Melissa	PRISM: Personalized Reminders for Immunizations using Short Messaging Systems	PA-13-045
Stockwell, Melissa	SINC: Synchronized Immunization Notifications	PA-14-291
Vest, Joshua Ryan	Use of Push and Pull Health Information Exchange Technologies by Ambulatory Care Practices and the Impact on Potentially Avoidable Health Care Utilization	PA-14-291

<b>AHRQ Health Services Research Projects (R01)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Weiner, Saul	Integrating Contextual Factors into Clinical Decision Support to Reduce Contextual Error and Improve Outcomes in Ambulatory Care	PA-14-291
Xiong, Glen	Comparison of Asynchronous Telepsychiatry Alongside Synchronous Telepsychiatry in Skilled Nursing Facilities	PA-14-291
Yellowlees, Peter M.	A Clinical Trial to Validate an Automated Online Language Interpreting Tool with Hispanic Patients Who Have Limited English Proficiency	PA-14-291
Zhou, Li	Natural Language Processing to Improve Accuracy and Quality of Dictated Medical Documents	PA-14-291
Zhou, Li	Encoding and Processing Patient Allergy Information in Electronic Health Records	PA-13-045
<b>Centers for Education and Research on Therapeutics (CERTs) (U19)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Lambert, Bruce	Tools for Optimizing Medication Safety (TOP-MEDS)	RFA-HS-11-004
<b>Research Centers in Primary Care Practice-Based Research and Learning (P30)</b>		
<b>Principal Investigator</b>	<b>Project Title</b>	<b>Funding Opportunity Announcement</b>
Fiks, Alexander	National Center for Pediatric Practice Based Research and Learning	RFA-HS-12-002
Ornstein, Steven	Research Centers in Primary Care Practice Based Research and Learning	RFA-HS-12-002

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**Table 13: Health IT Contracts**

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Health IT Contracts		
Organization	Project Title	Contract/IAA Number
The MITRE Corporation	Patient-Centered Outcomes Research Clinical Decision Support Prototype Development and Dissemination	290-16-00001U