



Measuring Adoption and Use of Health Information Technology to Reduce Health Care Disparities and Improve Quality

A Progress Report: 2006–2013

INTRODUCTION

Many health policy analysts and lawmakers believe widespread adoption of electronic health record systems is a precursor to national efforts to reduce the cost and improve the quality of medical services in the United States. “This is really the infrastructure for health care reform,” says Ashish Jha, MD, MPH, associate professor of health policy and management, Harvard School of Public Health.

The systems—which include the software and hardware necessary to store patients’ health information digitally—have the potential to improve health care services in two important ways. First, digital files can be shared much more easily than paper ones. This “health information exchange” helps multiple medical providers coordinate care for a patient seamlessly, reducing redundant and expensive diagnostic tests and procedures. Second, the software gives providers valuable information to help them make good decisions about their patients’ medical care—ranging from a reminder to order a routine test to an alert if an electronic prescription contains an incorrect dose of a medication or conflicts with a drug a patient is already taking.

Both file sharing among providers—who could be located in the same building or across the country—and decision-support software are sophisticated ways to use health information technology. Hospitals and physicians usually start with the basics—such as entering and storing information about a patient’s medical history or lab results—and then add these advanced applications.

A National Emphasis on Adoption of Health Information Technology

Given the potential of electronic records, President George W. Bush made adoption of this technology a national priority. In 2004, he appointed David J. Brailer, MD, PhD, as the first national coordinator for health information technology.

President Barack Obama and Congress further institutionalized national efforts to push providers to adopt electronic health record systems by enacting the Health Information

Technology Economic and Clinical Health (HITECH) Act in 2009 as part of the American Recovery and Reinvestment Act. Under this act, physicians and hospitals earn incentive payments through Medicare and Medicaid if they meet specific criteria related to the installation and use of electronic health records. The program—which is being rolled out in three progressively more sophisticated phases—is referred to colloquially as “meaningful use” because of the emphasis on not only installing systems but on using them routinely to improve patient care.

Beginning in 2015, physicians and hospitals will be penalized through an adjustment in their Medicare payments if they do not meet the criteria for meaningful use. However, those physicians and hospitals that have a patient population made up of a significant proportion of Medicaid beneficiaries will not be penalized and can qualify for an incentive payment before they actually meet the meaningful use criteria.

Reporting on Adoption and Use of Electronic Health Record Systems

Through three grants totaling \$1,849,632¹ (January 2006 through June 2013), the Robert Wood Johnson Foundation (RWJF) has funded researchers at the Institute for Health Policy at Massachusetts General Hospital, Harvard School of Public Health, and Mathematica Policy Research to produce an objective and timely series of reports and journal articles chronicling the adoption and use of electronic health record systems among physicians and hospitals. Researchers are also evaluating differences in the rates of adoption among different types of providers, such as those who serve the poor or who are located in rural areas, and the impact of electronic health record systems on quality and efficiency.

See [Appendix 1](#) for a list of individuals interviewed for this report.

WHAT IS THE PROJECT ABOUT?

When the RWJF project began, policy-makers “had a goal of significantly increasing adoption [of electronic health record systems], but it was hard for them to know where they were and what resources needed to be applied without a reliable measure of the rate of adoption,” says John Lumpkin, MD, MPH, senior vice president and director of the health care group at RWJF.

That is why RWJF and the Office of the National Coordinator for Health Information Technology (ONC), located in the U.S. Department of Health and Human Services, funded two closely related projects: to define an electronic health record and then to track adoption and use of the technology over time.

¹ ID#s 51912, 63431, and 68754.

It was a tall order.

“So-called electronic health records are not a simple technology. They can vary enormously,” explains David Blumenthal, MD, MPP, a lead investigator on the RWJF grants until 2009.² “People could say they had an electronic health record if all they did was look up lab results, but there are dozens of other things you can do with electronic health records that could be used to characterize those records. Even if you have a record, the question is whether you are using it or whether it is sitting unused.”

Project leaders wanted “to be more specific,” Blumenthal says. “We wanted to know what it meant when people said they had an electronic health record. We also wanted to find what the basic elements were that you had to have in order for it to be called an electronic health record.”

With funding from the Office of the National Coordinator for Health Information Technology, the researchers put together an expert consensus panel to help them create both definitions of an electronic health record system as well as survey instruments to measure adoption among physicians and hospitals. The five panel members, along with 15 others who were part of technical working groups, included national experts in areas such as survey design and interpretation, statistics, development and use of electronic health records, health care disparities, health care quality, and other relevant fields. The panel held three meetings, supplemented by meetings of the four technical working groups. See [Appendix 2](#) for a list of members of the expert consensus panel and the working groups.

Surveying the Field

Researchers analyzed 36 published surveys that addressed definitions fielded between 1997 and 2005 (most since 2000). “There were lots of studies and they were all over the map. They used different definitions and different methods, and often the definitions were loose and the methods were not rigorous,” Blumenthal says.

² In 2009, Blumenthal replaced David J. Brailer, MD, PhD, as the national coordinator for health information technology. Ashish Jha, MD, MPH, associate professor of health policy and management at the Harvard School of Public Health, and Catherine M. DesRoches, PhD, senior scientist at Mathematica Policy Research, took over as co-lead investigators. Both had been involved in the project since the beginning. Sara Rosenbaum, JD, professor of health law and policy at George Washington University School of Public Health and Health Services, was the lead investigator on the grants from the Office of the National Coordinator of Health Information Technology; those contracts ended in 2009, and then continued her work under a subcontract from the Harvard School of Public Health. All four researchers—as well as others—worked on both projects as a team.

At the time of the interview for this report on April 2, 2012, Blumenthal was chief health innovation and information officer at Partners HealthCare and professor of medicine and health care policy at Harvard Medical School.

Catherine M. DesRoches, PhD, DrPH, MSC, senior scientist at Mathematica Policy Research, also notes that “it was important to establish a uniform way of measuring adoption since everyone did it differently and it was impossible to know what the numbers meant.” For example, estimates of the rate of electronic health record system adoption for physician offices ranged from 15 percent to 46 percent.

The investigators also found that there was a dearth of surveys measuring hospitals’ adoption of electronic health record systems. Many of the surveys that did exist focused on software that allows physicians to place orders for prescriptions and tests electronically—what is known as computerized physician order entry. Using this software functionality as a proxy for an electronic health record system, the researchers estimated hospital adoption rates ranging from 5 percent to 21 percent.

Standardizing Definitions

After analyzing the existing surveys, the researchers developed definitions for two levels of electronic health record system: basic and comprehensive. For each level, they created separate definitions for physician practices and hospitals.

For physician practices, a basic electronic health records system includes the ability to:

- Enter and store information about patients’ demographics, medical history, and medications, as well as clinicians’ notes
- Order prescriptions
- View lab and radiology (X-ray, MRI, etc.) results

The primary difference between a basic and a comprehensive system is the addition of decision-support capabilities—such as warnings for unsafe interactions between medications and electronic reminders to order standard screenings—and the ability to send orders for tests and prescriptions electronically.

For hospitals, a basic system provides the following:

- The ability, in at least one clinical unit, to capture basic information about a patient’s hospital stay, including demographic information, nursing assessments, physicians’ notes, medication lists, and discharge summaries
- Computerized entry for medications
- Reports on test results

The comprehensive system also allows the care provider to order a wide range of tests and medications and to access decision-support applications. To meet the comprehensive definition, hospitals also had to have all functions installed in all major clinical units.

Tracking Adoption

In order to address the adoption of the technology, DesRoches says, “The strategy of our expert consensus panel was to focus on functionality, asking questions like: Do you have a computerized system for patient demographics? Do you have a computerized system for the patient’s medical problem? Is it everywhere in your hospital or just one critical unit? For physicians: Do you have it and do you use it?”

The goal, emphasizes Blumenthal, “was to document the level of adoption of electronic health records in a valid, reliable, and replicable way.”

With support from ONC, researchers fielded a survey of physicians’ use of electronic health record systems in late 2007 and early 2008. ONC contracted with the National Center for Health Statistics to field the survey in subsequent years as part of the center’s annual survey of physicians’ offices (the National Ambulatory Medical Care Survey). “We thought it was a good way to institutionalize the survey,” Blumenthal says.

ONC also contracted with the American Hospital Association (AHA) to field a survey on adoption of electronic medical records among hospitals.³ The association added the survey—the Information Technology Supplement—to its long-standing annual survey of hospitals. “These are data that AHA has always believed to be important and it is something that logically we wanted to be involved with,” says Peter Kralovec, senior director of AHA’s Health Care Data Center. The association has completed four surveys on electronic medical records since 2008 and plans to complete one more under its current contract with ONC.

Providing an Independent Perspective

RWJF funded the research team to produce reports and peer-reviewed journal articles based on ONC-supported survey work, as well as to undertake additional analyses initiated by the team.

“It was important to have this report come from an independent source and be outside the Department of Health and Human Services for a couple of reasons: for the political independence, but also the sense that if it stayed in the government, it would have to go through many layers of approval.”—which would delay release of the information, says Michael Painter, JD, MD, senior program officer at RWJF.

DesRoches says this watchdog role was particularly important after the federal government enacted the HITECH Act. “If you have an office that is spending billions to increase adoption, that office should not be the only group that is evaluating progress because there is a lot at stake for it,” she points out.

³ The American Hospital Association uses this term instead of electronic health records.

In addition, notes Karen Donelan, ScD, senior scientist in health policy at the Mongan Institute for Health Policy at Massachusetts General Hospital, “Policy measurement from the federal government takes some time. A foundation can move more quickly to get data out that are important for policy and important for research.”

The research team has produced five reports⁴ and plans to produce one more under the current grant. The reports provide updated estimates of the rate of electronic health record adoption by physician practices and hospitals (by size, patient demographic composition, and other characteristics). Individual reports also address a variety of related topics, for example: adoption of electronic health records and health care disparities, privacy issues in health information technology, health information exchange (the process of sharing data among organizations), and the role of health information technology in the success of accountable care organizations.⁵

The researchers also have published eight articles in peer-reviewed journals, such as *Health Affairs* and the *New England Journal of Medicine*. See the [Bibliography](#) for details.

WHAT HAS BEEN FOUND SO FAR?

Little Use at the Starting Point

“The most important finding was the baseline numbers for where we were when we started,” DesRoches says. “We put together measures that have really stood the test of time and are still in use,” adds Donelan.

The initial survey was fielded between September 2007 and March 2008 and found the following:

⁴ The five reports published as of 2012 are:

Health Information Technology in the United States: The Information Base for Progress. Princeton, NJ: Robert Wood Johnson Foundation, 2006. Available [online](#).

Health Information Technology in the United States: Where We Stand, 2008. Princeton, NJ: Robert Wood Johnson Foundation, 2008. Available [online](#).

Health Information Technology in the United States: On the Cusp of Change, 2009. Princeton, NJ: Robert Wood Johnson Foundation, 2009. Available [online](#).

Health Information Technology in the United States: Moving Toward Meaningful Use, 2010. Princeton, NJ: Robert Wood Johnson Foundation. Available [online](#).

Health Information Technology in the United States: Driving Toward Delivery System Change, 2012. Princeton, NJ: Robert Wood Johnson Foundation, 2012. Available [online](#).

⁵ According to the [Centers for Medicare & Medicaid Services](#), “Accountable Care Organizations (ACOs) are groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high quality care to their Medicare patients.”

- Some 17 percent of physicians had an electronic health records system: only 4 percent of physicians had a comprehensive electronic health records system; 13 percent had just a basic system.⁶
- Some 9.1 percent of hospitals had an electronic health records system: only 1.5 percent of hospitals had a comprehensive electronic health records system and 7.6 percent had just a basic system.⁷

“It became clear to us pretty quickly and pretty early that we had a long way to go—that most doctors and hospitals were not using electronic health records,” Jha says.

Steady Growth in Electronic Health Record Use by Physician Practices

Among physician practices, the percentage with at least a basic electronic health record grew steadily from the 17 percent in late 2007/early 2008 to 35 percent in 2011.⁸ “On the physician office side,” says Donelan, “I think a lot of physicians have started to see the value of electronic health records.”

But there also were differences in adoption rates—with a widening gap over time—based on the characteristics of the physician practice. For example, in 2011:

- *The type of practice mattered:* Some 40.2 percent of primary care physicians had a basic system, compared with 30.9 percent of specialists.
- *Physician age mattered:* 40.0 percent of physicians 45 years old or younger had adopted a basic system in 2011, compared with 35.5 percent of those between 46 and 55, and 30.8 percent of those older than 55.
- *The size of the practice mattered:* Some 60 percent of practices with 10 or more physicians had a basic system, compared with 37.1 percent of practices with three to nine physicians, and 24.2 percent of practices with one or two physicians.

Recent Growth in Hospital Use of Electronic Health Record Systems

The percentage of hospitals with at least a basic electronic health record system increased slowly from late 2007/early 2008 (9.1 percent) through 2010 (15.1 percent). But that

⁶ DesRoches CM, Campbell EG, Rao SR, Donelan K, Ferris TG, Jha A, Kaushal R, Levy DE, Rosenbaum S, Shields AE and Blumenthal D. “Electronic Health Records in Ambulatory Care—A National Survey of Physicians.” *New England Journal of Medicine*, 359(1): 50–60, 2008. Abstract available [online](#).

⁷ Jha AK, DesRoches CM, Campbell EG, Donelan K, Rao SR, Ferris TG, Shields A, Rosenbaum S and Blumenthal D. “Use of Electronic Health Records in U.S. Hospitals.” *New England Journal of Medicine*, 360(16): 1628–1638, 2009. Available [online](#).

⁸ By 2011, the National Center for Health Statistics was fielding the survey for the Office of the National Coordinator as part of its annual Ambulatory Medical Care Survey.

percentage grew much faster between 2010 and 2011 (to 26.6 percent).⁹ “Adoption has really picked up in a meaningful way through the incentive program,” Jha says. “I think there is enough in the pipeline so that I expect another 10- to 15-point jump next year.”

The researchers also used the survey research as a base to study differences in adoption rates among different types of hospitals. The work focused on whether an electronic health record system was associated with other variables but not why they were related.

- “The quality of care at disproportionate-share hospitals (which are hospitals that care for a large number of poor patients) was lower than in the other hospitals, but if they had an electronic health record, that difference in quality disappeared,” DesRoches says. However, the researchers did not find a significant difference in overall adoption rates between disproportionate-share hospitals and other hospitals.¹⁰
- The rate of adoption of an electronic health records system varied, depending on the size, location, and teaching mandate of a given hospital. “The increase in adoption among teaching hospitals and large hospitals is much higher than it is among smaller hospitals, rural hospitals, and those without a teaching mandate,” says Chantal Worzala, PhD, director of policy at the American Hospital Association.
- Relationships between adoption of electronic health records and quality and efficiency of care for several conditions (congestive heart failure, myocardial infarction, and pneumonia) and the prevention of surgical complications were “modest at best and generally lacked statistical or clinical significance,” researchers found. However, they did find an association between clinical decision support tools (clinical reminders and practice guidelines) and slightly better performance on publically reported quality measures.¹¹

Limited Health Information Exchange

Health information exchange—the process of sharing data among organizations—is in its infancy, the researchers found. “The main finding is there is not a lot of infrastructure, and established health information exchange is not going on right now,” says DesRoches.

DesRoches identifies several significant hurdles to widespread exchange of health information:

⁹ DesRoches CM, Worzala C, Joshi MS, Kralovec PD and Jha AK. “Small, Nonteaching, and Rural Hospitals Continue to be Slow in Adopting Electronic Health Records Systems.” *Health Affairs*, 31(5): 1092–1099, 2012. Abstract available [online](#).

¹⁰ Jha AC, DesRoches CM, Shields AE, Miralles PD, Zheng J, Rosenbaum S and Campbell EG. “Evidence of an Emerging Digital Divide Among Hospitals That Care for the Poor.” *Health Affairs*, 28(6): w1160–w1170, 2009. Abstract available [online](#).

¹¹ DesRoches CM, Campbell EG, Vogeli C, et al. “Electronic Health Records’ Limited Successes Suggest More Targeted Uses.” *Health Affairs*, 29(4): 639–646, 2010. Abstract available [online](#).

- There is no business case for sharing health information. “While in an ideal world provider organizations would share data, no organization wants to make it easy for their patients to go somewhere else.”
- The software used by different organizations is not always compatible. If not compatible, an algorithm that converts data from one system to another is required for different organizations to exchange data.
- With data stored in “the cloud” there are problems with patient identification: making sure that “When physicians are looking for John Smith, they are getting the right John Smith.”
- A “these are my patients” culture limits physician acknowledgement of the benefit of having ready access to data and “not having to start from scratch when a patient shows up in their office.”

Much Yet to Accomplish

RWJF’s Painter says it not yet clear whether the federal government’s provision of financial incentives to encourage hospitals and doctors to purchase electronic health record systems will turn out to be a good investment. To date, the surveys primarily measure adoption rates and not whether doctors and hospitals are using the systems in a meaningful way to improve patient care, he notes.

When looking at the major findings as a whole, Jha says, “What we have done is to paint the picture of how hard this is. We can celebrate what I think have been real successes but also pay attention to all the challenges, so we don’t get comfortable and think that we have solved this issue.”

WHAT IS THE SIGNIFICANCE OF THE WORK FOR THE FIELD?

This work “arguably contributed to the HITECH Act,” in Painter’s view. “It showed that without a huge federal investment you couldn’t get the private sector to move quickly to adopt the technology. The federal leadership had an opportunity to bring a lot of investment to bear on pushing quick adoption of the technology.”

The early reports, published in 2006 and 2008, “documented how small adoption rates were and helped support the provision of the HITECH Act that provided both monetary and technical support to physicians and hospitals,” Blumenthal says.

Jha believes the team’s analysis of the association between an electronic health record system and performance on standardized quality measures at disproportionate-share hospitals provided some of the intellectual underpinning for the decision to develop modified meaningful use rules for hospitals that serve the poor. “I think that is a big part

of the reason that HITECH got structured the way it did—to give additional support to the high Medicaid providers,” says Jha.

Now, says DesRoches, “there is a uniform way to measure adoption. Asking the questions our panel posed has become the standard way to measure adoption in survey research.”

WHAT CHALLENGES HAS THE PROJECT FACED?

Working cooperatively with the federal government on the project has not always gone smoothly.

When the project began in 2006, RWJF and the ONC inked a formal memorandum of understanding, detailing each organization’s role. The same researchers worked on both pieces of the project, helping to cement a close relationship. “They were very motivated to collaborate with us,” Painter says.

In 2006 and 2008, RWJF and ONC released reports on adoption of electronic health records systems with high-profile media events at the National Press Club. “Everybody showed up. The secretary came. It worked really well,” Painter recalls.

The relationship evolved after Blumenthal replaced Brailer as national coordinator.

“I had absolutely nothing to do with the project once I got there as a matter of ethical recusal,” Blumenthal says, explaining the situation he found himself in. “They continued to work with my old institutions, Harvard and Massachusetts General Hospital. I delegated decisions about it to people in my office. They did not check with me and I did not check with them.”

Without a top-level champion within ONC, however, the staff “didn’t understand the history of the RWJF project and it didn’t have any relevance to them,” Painter says.

There was another reason the relationship changed: The contract between the Office of the National Coordinator and the researchers ended in 2009. “We had fulfilled the goal to get the measures and embed them in the ongoing surveys,” DesRoches said. “The Office of the National Coordinator decided it would fund the American Hospital Association and the National Center for Health Statistics. We were no longer part of that.”

Without direct ties to ONC, the RWJF reports lost their public prominence. “For a couple of years after the Obama administration began, we didn’t have high-profile releases, we didn’t have the National Press Club event, and we didn’t have any federal officials in attendance,” Painter adds.

That is why RWJF program staff and the researchers redoubled their efforts to make a presentation at an event at the National Press Club on April 25, 2012. There, in

collaboration with editors at *Health Affairs*, they outlined the major findings from the most recent RWJF-funded report as well as related articles in *Health Affairs* and the *Journal of the American Medical Association*. A representative from the Office of the National Coordinator attended, as did researchers from the American Hospital Association and the National Center for Health Statistics. “The room was filled to capacity,” Painter says.

WHAT DOES THE FUTURE HOLD?

The researchers will complete one more report under the current grant, but then the question will be: Should the Foundation renew the grant for this project?

“I think it is time for us to reassess our engagement with this and what is needed in the field to encourage the continued adoption,” says Lumpkin. “I do not think we have reached a conclusion.”

There are at least two key issues for RWJF to consider:

- First, is the report still necessary as a means to prod hospitals and doctors to adopt electronic health records? “The environment today in regards to the importance of electronic health records is different than it was in 2005 when we started. For example, there are major incentives that were put in the HITECH Act,” Lumpkin says, adding that most hospital executives and physicians have been sold on the merits of electronic health record systems.
- Second, is there still a role for an independent report? Blumenthal believes there is. “Keeping a third party involved, like Harvard, which has been working continuously on this over time, is very helpful to policy-makers,” he says, “because neither the American Hospital Association nor the federal government have the final word on what is happening.”

But eventually the imperative for knowing the percentage of adoption will be “way down,” in Painter’s view. “At some point the rate of adoption becomes less of a critical issue and it becomes more about how we are using it, which is the regulatory thrust through meaningful use.”

Prepared by: **Linda Wilson**

Reviewed by: Mary B. Geisz and Molly McKaughan

Program Officer: Michael Painter

Program Area: Quality/Equality

Grant ID # 51912, 63431, 68754

Project Directors: Ashish K. Jha (617) 589-4293; ajha@hsph.harvard.edu

Catherine M. DesRoches (617) 301-6973; cdesroches@mathematica-mpr.com

APPENDIX 1

Individuals Interviewed for This Report

David Blumenthal, MD, MPP

2011 to present:

Professor of Medicine and Health Care Policy
Harvard Medical School
Chief of Health Information and Innovation
Partners HealthCare
Boston, Mass.

From 2009 to 2011:

National Coordinator for Health Information
Technology
U.S. Department of Health and Human
Services
Washington, D.C.

At project start (2006):

Director, Institute for Health Policy
Massachusetts General Hospital/Partners
HealthCare
Boston, Mass.

Catherine M. DesRoches, PhD, DrPH, MSc

Senior Scientist
Mathematica Policy Research
Cambridge, Mass.

Karen Donelan, ScD

Senior Scientist
Mongan Institute for Health Policy
Massachusetts General Hospital
Boston, Mass.

Stephen Downs, SM

Chief Technology and Information Officer
Robert Wood Johnson Foundation
Princeton, N.J.

Ashish Jha, MD, MPH

Associate Professor of Health Policy and
Management
Harvard School of Public Health
Boston, Mass.

Peter Kralovec

Senior Director, Health Care Data Center
American Hospital Association Health Forum
Chicago, Ill.

John Lumpkin, MD, MPH

Senior Vice President and Director of the
Health Care Group
Robert Wood Johnson Foundation
Princeton, N.J.

Michael Painter, JD, MD

Senior Program Officer
Robert Wood Johnson Foundation
Princeton, N.J.

Sara Rosenbaum, JD

Professor of Health Law and Policy
School of Public Health and Health Services
George Washington University
Washington, D.C.

Chantal Worzala, PhD

Director of Policy
American Hospital Association
Washington D.C.

APPENDIX 2

Expert Consensus Panel and Working Group Members

Survey Content Working Group

*(Those with an * are also members of the Expert Consensus Panel.)*

***Carmella Bocchino, RN, MBA**

Senior Vice President, Medical Affairs
America's Health Insurance Plans
Washington, D.C.

***Sarah Hudson Scholle, MPH, DrPH**

Vice President, Research and Analysis
National Committee for Quality Assurance
Washington, D.C.

***Terry Hammons, MD, SM**

Senior Vice President, Research and
Information
Medical Group Management Association
Englewood, Calif.

***Paul Tang, M.D.**

Vice President
Chief Innovation and Technology Officer
Palo Alto Medical Foundation
Palo Alto, Calif.

***Mark Leavitt, M.D., Ph.D.**

Chair
Certification Commission for Health
Information Technology
Chicago, Ill.

Meta Analysis Working Group

Barry I. Graubard, PhD

Senior Investigator
Division of Cancer Epidemiology and Genetics
National Cancer Institute
Bethesda, Md.

Joseph Lau, MD

Director, Tufts Evidence-Based Practice
Center
Institute for Clinical Research and Health
Policy Studies
Tufts-New England Medical Center
Boston, Mass.

Thomas A. Louis, PhD

Professor, Department of Biostatistics
Bloomberg School of Public Health
Johns Hopkins University
Baltimore, Md.

Sally Morton, PhD

Vice President for Statistics and Epidemiology
RTI International
Research Triangle Park, N.C.

Christopher H. Schmid, PhD

Senior Statistician
Tufts Sackler School of Graduate Biomedical
Sciences
Tufts-New England Medical Center
Institute for Clinical Research and Health
Policy Studies
Boston, Mass.

Alan Zaslavsky, PhD

Professor of Health Care Policy
Harvard Medical School
Boston, Mass.

Disparities Working Group

Andrew Bindman, MD

Professor of Medicine, Health Policy,
Epidemiology & Biostatistics
University of California, San Francisco
San Francisco, Calif.

Stephen Downs, SM

Chief Technology and Information Officer
Robert Wood Johnson Foundation
Princeton, N.J.

Terry Hammons, MD, SM

Senior Vice President, Research and
Information
Medical Group Management Association
Englewood, Calif.

Michael Painter, JD, MD
Senior Program Officer
Robert Wood Johnson Foundation
Princeton, N.J.

Bruce Siegel, MD, MPH
Research Professor of Health Policy and of
Health Services Management
George Washington University School of
Public Health and Health Services
Washington, D.C.

Robin Weinick, PhD
Associate Director
Disparities Solutions Center, MGH/Harvard
Medical School
Boston, Mass.

***Survey Methodology Expert
Working Group***

Robert J. Blendon, ScD
Professor of Health Policy and Management

Harvard School of Public Health
Cambridge, Mass.

Martin R. Frankel, PhD
Professor of Statistics and Computer
Information Systems
Zicklin School of Business
Baruch College
New York, N.Y.

Craig Hill, PhD
Vice President, Survey Research Division
RTI International
Research Triangle Park, N.C.

Nancy Mathiowetz, PhD
Professor of Sociology
Chair, AAPOR Standards Committee
University of Wisconsin–Milwaukee
Milwaukee, Wis.

BIBLIOGRAPHY

(Current as of date of the report; as provided by the grantee organization; not verified by RWJF; items not available from RWJF.)

Articles

DesRoches CM, Campbell EG, Rao SR, Donelan K, Ferris TG, Jha A, Kaushal R, Levy DE, Rosenbaum S, Shields AE and Blumenthal D. “Electronic Health Records In Ambulatory Care—A National Survey of Physicians.” *New England Journal of Medicine*, 359(1): 50–60, 2008. Abstract available [online](#).

DesRoches CM, Campbell EG, Vogeli C, Zheng J, Rao SR, Shields AE, Donelan K, Rosenbaum S, Bristol SJ and Jha AK. “Electronic Health Records' Limited Successes Suggest More Targeted Uses.” *Health Affairs*, 29(4): 639–646, 2010. Abstract available [online](#).

DesRoches CM, Worzala C, Joshi MS, Kralovec PD and Jha AK. “Small, Nonteaching, and Rural Hospitals Continue to be Slow in Adopting Electronic Health Records Systems.” *Health Affairs*, 31(5): 1092–1099, 2012. Abstract available [online](#).

Jha AK, Ferris TG, Donelan K, DesRoches C, Shields A, Rosenbaum S and Blumenthal D. “How Common Are Electronic Health Records in the United States? A Summary of the Evidence.” *Health Affairs*, 496–507, 2006. Available [online](#).

Jha AK, DesRoches CM, Campbell EG, Donelan K, Rao SR, Ferris TG, Shields A, Rosenbaum S and Blumenthal D. “Use of Electronic Health Records in U.S. Hospitals.” *New England Journal of Medicine*, 360(16): 1628–3838, 2009. Available [online](#).

Jha AK, DesRoches CM, Shields AE, Miralles PD, Zheng J, Rosenbaum S and Campbell EG. “Evidence of an Emerging Digital Divide Among Hospitals That Care for the Poor.” *Health Affairs*, 28(6): 1160–1170, 2009. Abstract available [online](#).

Jha AK, DesRoches CM, Kralovec PD and Joshi MS. “A Progress Report for Electronic Health Records in U.S. Hospitals.” *Health Affairs*, 29(10): 1951–1957, 2010. Abstract available [online](#).

Reports

Health Information Technology in the United States: The Information Base for Progress. Princeton, NJ: Robert Wood Johnson Foundation, 2006. Available [online](#).

Health Information Technology in the United States: Where We Stand, 2008. Princeton, NJ: Robert Wood Johnson Foundation, 2008. Available [online](#).

Health Information Technology in the United States: On The Cusp Of Change, 2009. Princeton, NJ: Robert Wood Johnson Foundation, 2009. Available [online](#).

Health Information Technology in the United States: Moving Toward Meaningful Use, 2010. Princeton, NJ: Robert Wood Johnson Foundation. Available [online](#).

Health Information Technology in the United State: Driving Toward Delivery System Change, 2012. Princeton, NJ: Robert Wood Johnson Foundation, 2012. Available [online](#).