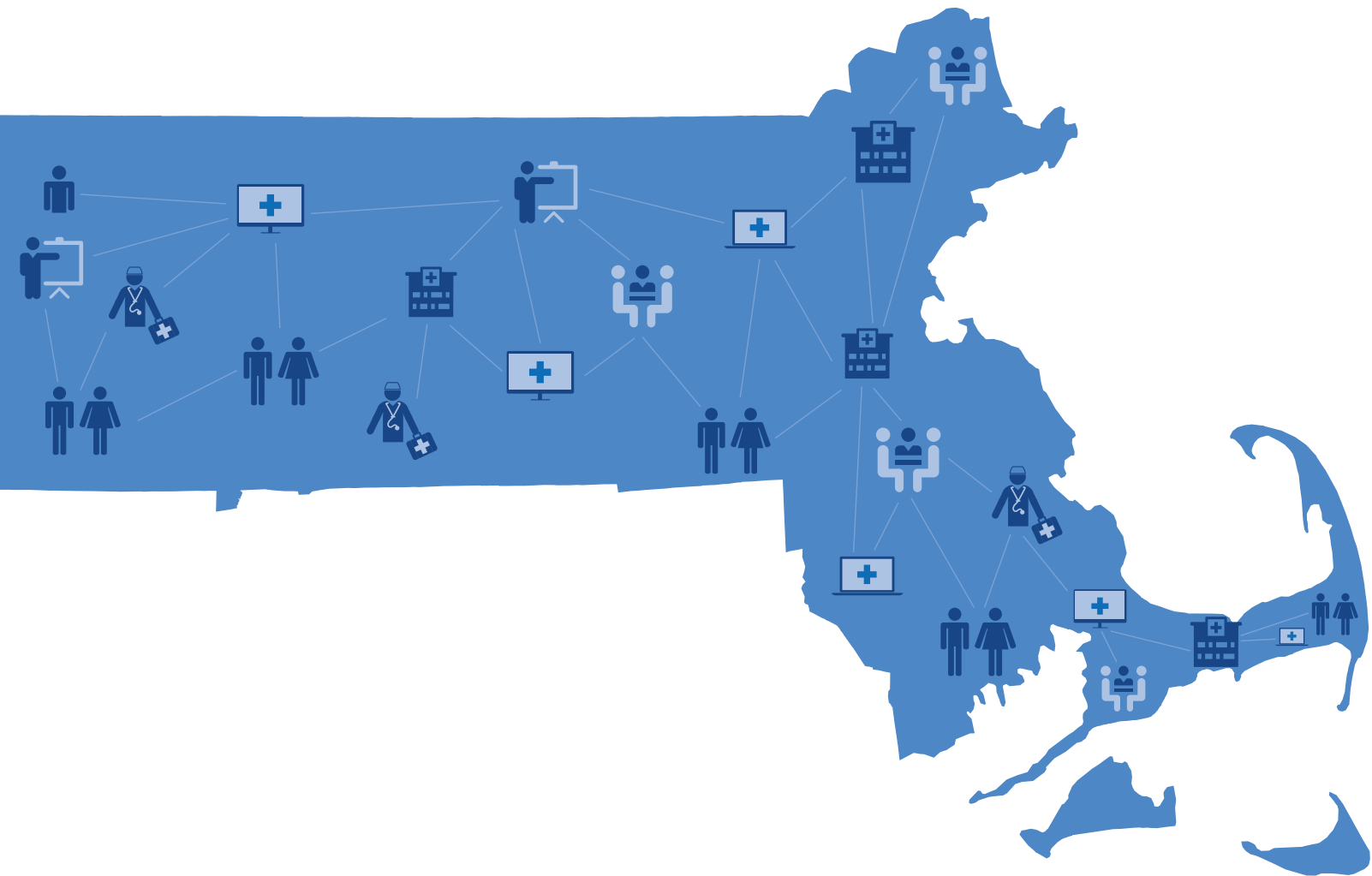**2014**

MeHI Provider and Consumer Health IT Research Study

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Introduction

The Massachusetts eHealth Institute (MeHI) at the Massachusetts Technology Collaborative is proud to present the *2014 MeHI Provider and Consumer Health IT Research Study*. Sponsored by MeHI and conducted by the respected health industry research firm Market Decisions LLC, this study is designed to provide a snapshot of the ways that eHealth and health information technologies (health IT) are used, and currently perceived, by consumers and healthcare providers in various care settings across the Commonwealth.

Technology can help us achieve the "Triple Aim" goals of health reform: Improve Care Quality, Reduce Costs, and Improve Population Health, but in order to achieve these goals, technology must be applied effectively and used efficiently.

Better healthcare information management through technology – eHealth – provides a critical pathway to a healthcare delivery system that is more efficient, more accurate, more accessible, more secure and more effective. These are worthy goals in any community – but in a state whose healthcare reforms are national models and whose healthcare sector accounts for 20 percent of all in-state jobs, these objectives take on added urgency.

> "… a clear majority of consumers (78%) have a strongly positive view of EHRs and other eHealth technologies as appropriate tools to improve healthcare delivery and to control the growth of healthcare"

MeHI – a division of the Massachusetts Technology Collaborative – was established by the Legislature and the Patrick Administration to "advance the dissemination of health information technology across the Commonwealth, including the deployment of electronic health records (EHR) systems in all healthcare provider settings that are networked through a statewide health information exchange."

MeHI's mission is to engage the healthcare community and catalyze the development, adoption, and effective use of healthcare IT for the purposes of reducing healthcare costs, improving the health of the population, and generating economic growth for the Commonwealth.

Under Chapter 224 of the Acts of 2012, MeHI was directed to:

- Facilitate the implementation and use of electronic health records (EHRs) in all provider settings;

- Help providers connect these EHRs to the Commonwealth's health information exchange – the Mass HIway;

- Identify and promote emerging healthcare technologies that are expected to improve the quality and reduce the cost of healthcare; and

- Promote – to providers, patients, and the general public – widespread understanding of the benefits of interoperable eHealth technologies for care delivery, coordination, and improved quality.

As shown in this report, there has been real progress in integrating eHealth technologies into our healthcare system. However, there are variances between and among provider settings, with some types of organizations further behind in their rates of overall EHR adoption – including independent organizations, as well as the behavioral health (BH) and long-term and post-acute care (LTPAC) sectors. This is due to a variety of factors, including individual practice models and resource constraints.

This report finds that a clear majority of consumers (78%) have a strongly positive view of EHRs and other eHealth technologies as tools that help improve healthcare delivery and control the growth of healthcare costs. This is important as engaged patients are key to the overall success of health reform. The survey data also shows that educational attainment and income have a meaningful impact on consumer attitudes towards use and value of health IT; more positive attitudes were conveyed by those with higher educational attainment levels and higher income levels. Many consumers also expressed at least some concern about security and privacy issues surrounding access to their health information.

Interestingly, while most providers in the study (61%) indicated they have discussed eHealth with their patients, three quarters of consumer participants could not recall their healthcare provider discussing eHealth technology with them in a professional setting.

Key Findings

There are many take-aways from this data and we – and others – will continue to analyze the responses for quite some time. However, we would like to emphasize the following findings:

- Adoption of health IT among Massachusetts primary care and specialty care providers is progressing well, as these groups boast over a 90 percent EHR adoption rate;

- Health information exchange (HIE) is on the radar of a clear majority of providers, with 26 percent reporting they are participating in an HIE and 68 percent of those not connected are planning to connect, but additional clarity and support for these providers is required;

- Focus is needed on increasing EHR adoption in other sectors, particularly behavioral health and long-term and post-acute care organizations, which show a lower adoption rate of 55 percent; and

- Consumers are excited about healthcare technology and have an overwhelmingly positive attitude toward health IT adoption and use. Providers can harness the value of this by engaging patients and encouraging them to use this information to become more involved in their own care and make decisions that promote their health.

As consumers express comfort with, and enthusiasm for, access to their health data, providers also indicated the benefits they saw in accessing health information, including the Massachusetts All Payer Claims Database (MA APCD). Safe and secure access to health data can be transformative for individual patients as well as for the Commonwealth, leading to more informed decision-making by consumers, new technology innovations, advanced research and discoveries, and new public health insights.

The results of this research will inform MeHI's programs and guide our efforts over the coming years, and we will periodically repeat sections of this survey in order to help measure our progress. Two of MeHI's core initiatives are already aimed toward these targets:

- The **eHealth eQuality Program** – Focused on eHealth adoption in the behavioral health and the long-term and post-acute care sectors; and

- The **Connected Communities Program** – Focused on engaging various stakeholders in shared, coordinated approaches to support full and effective use of EHRs, HIEs and other technologies to enable broader eHealth services by providers in each of the fifteen healthcare service areas across the Commonwealth.

Data from this research will also help MeHI's efforts in targeting those providers who need assistance meeting the legislatively-mandated requirements of Chapter 224, which include the following key dates:

- January 1, 2015 – Demonstrated proficiency in health IT will be a requirement for renewal of a physician's license.

- January 1, 2017 – All providers are required to fully implement interoperable EHR systems that connect to the Mass HIway.

Additionally, MeHI will seek to engage with partners, including the Executive Office of Health and Human Services (EOHHS) and its agencies; the Health Policy Council (HPC); and the Center for Health Information and Analysis (CHIA) to build on this project and implement its findings. MeHI will also reach out to collaborate with consumer advocacy groups, providers, payers and purchasers to facilitate the broad application of eHealth in the Commonwealth and advance the Commonwealth's health reform goals.

This study shows that while the Commonwealth as a whole has made significant progress with EHR and HIE adoption, more work is ahead to realize technology's full potential to support Massachusetts health reform. For Massachusetts' healthcare providers, consumers, payers (including taxpayers) and regulators, that's a reality we cannot afford to ignore – and a reality that will drive the action agenda of MeHI for years to come.

—Laurance Stuntz
Director, Massachusetts eHealth Institute

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Executive Summary

Purpose and Scope

The Massachusetts eHealth Institute (MeHI), a division of the Massachusetts Technology Collaborative (MassTech), is leading the state's efforts to further eHealth innovation across the Commonwealth. Central to MeHI's mandate is to advance the dissemination of health information technology (health IT or eHealth) throughout Massachusetts, including the deployment of electronic health record (EHR) systems in all healthcare provider settings and networking of health records and data through the statewide health information exchange (Mass HIway).

To help fulfill that mission, MeHI commissioned a study to provide comprehensive information on use, needs and attitudes towards health IT among Massachusetts healthcare providers and consumers, and to identify key drivers for eHealth adoption. The research included the following objectives:

- Understand the eHealth needs of healthcare provider and consumer audiences, segmented by key sectors and demographics;

- Ascertain the percent and level of eHealth adoption by various types of Massachusetts providers;

- Determine the number of providers that are exchanging data on a health information exchange (HIE), including on the Commonwealth's health information exchange, the Mass HIway;

- Determine which segments of the healthcare community need help to successfully deploy and attain maximum value from eHealth applications over the next several years; and

- Assess the degree to which providers are engaging patients in eHealth, including use of personal health records (PHRs), EHRs, and HIE, and use this information to identify patient engagement opportunities.

To develop the data necessary to achieve these objectives, Market Decisions, LLC, under the guidance of MeHI, conducted a combination of telephone-based and digital surveys of three different target populations in the Massachusetts healthcare system:

- 507 practice managers, including managers of primary care practices, community health centers, specialty medical practices, dental practices, behavioral health practices, home healthcare providers, rehabilitation and therapy providers, skilled nursing facilities, and behavioral health hospitals;

- 308 healthcare providers who were drawn from the ranks of those practices that participated in the practice managers' survey; and

- 807 individual consumers (18 or older), in a random sample weighted to reflect actual distribution of Massachusetts consumers by gender, age, region of the state, race and ethnicity.
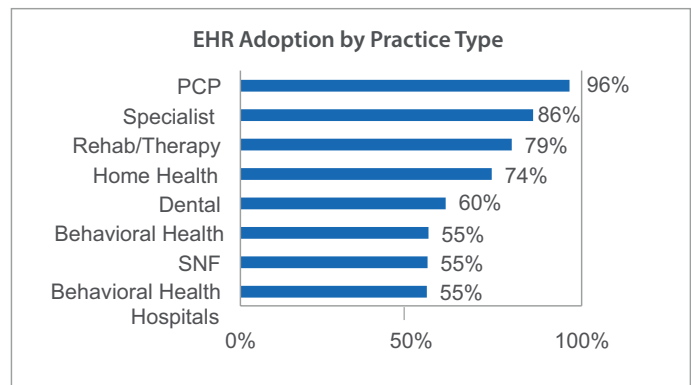
Highlights

Overview

Adoption of health IT has made significant inroads among healthcare providers across Massachusetts, but full implementation remains a work in progress. The need for the exchange of health information is clear and the benefits are significant.[1] Use of interoperable EHRs and HIEs help facilitate coordinated patient care, reduce duplicative treatments and avoid costly mistakes.

Nearly 80 percent of healthcare institutions and practices in Massachusetts report they are using EHRs – and 50 percent of consumers indicated they have used health IT to directly communicate with their healthcare provider, review test results, renew prescriptions or schedule appointments.

However, there are medical practice areas in which the benefits of eHealth are penetrating at a rate slower than the overall statewide total of 80 percent (Fig. 1).

**Figure 1: EHR Adoption Practice Breakdown
(% among all MA practices)**

EHR Adoption by Practice Type

Practice Type	Percent
PCP	96%
Specialist	86%
Rehab/Therapy	79%
Home Health	74%
Dental	60%
Behavioral Health	55%
SNF	55%
Behavioral Health Hospitals	55%

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[1] http://www.healthit.gov/providers-professionals/health-information-exchange/hie-benefits

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Results from the study show:

1. Hospitals, primary care providers (PCPs) and other medical practices are progressing well toward EHR adoption. Ninety-six percent of primary care practices and 86 percent of specialists surveyed reported using EHRs. Nevertheless, there is a clear need to encourage more rapid deployment within other segments of the practice spectrum, particularly behavioral health (BH) and long-term and post-acute care (LTPAC) practices.[2]

2. Consumers have a strongly positive view of the benefits of eHealth solutions: 78 percent of consumers surveyed believe that EHR use improves care compared to paper-based systems; and 85 percent are comfortable with electronic storage of health information at their provider's practice.

3. Half of all consumers report using electronic means to communicate with their providers. While 61 percent of providers report they have discussed health IT with their patients, only 24 percent report their providers have discussed health IT with them. This disconnect between what practices are saying about patient engagement and what patients are hearing suggests that clinical settings of all kinds have an opportunity ahead to increase focus on patient engagement and education efforts as they roll out eHealth solutions.

4. Currently only 26 percent of healthcare practices share information via health information exchanges (HIEs) or other electronic networks, with primary care practices having the highest participation rate at 30 percent. Moreover, those practices that do share information electronically are far more likely to do so within affiliated practitioners/networks than with outside organizations. To realize the care and cost advantages for eHealth technologies in Massachusetts, the healthcare sector needs to retrieve data out of individual practices (and affiliated networks) and get it onto the HIway where it can be securely accessed by a broader spectrum of healthcare delivery system participants for the benefit of patients and consumers.

Key Findings: Providers and Practice Managers

This survey reveals that most Massachusetts providers are well on their way to making healthcare data digital. However, deployment of EHR systems has been somewhat slower among Behavioral Health and LTPAC providers such as skilled nursing facilities (SNFs). While 96 percent of primary care providers have adopted EHR technology and 30 percent ar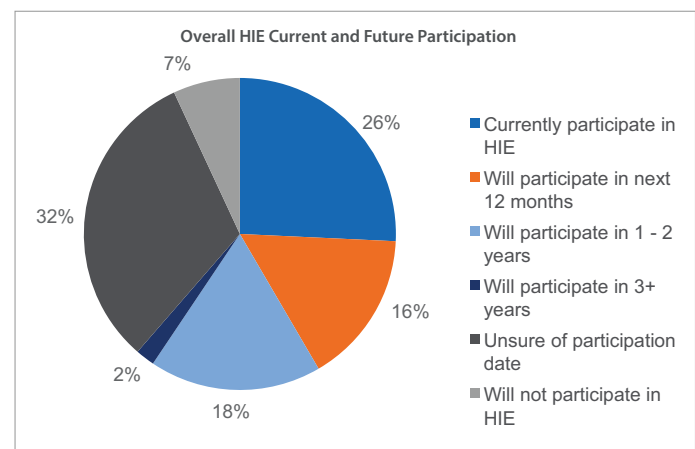e transmitting patient information electronically, only 55 percent of Behavioral Health and LTPAC organizations have adopted EHRs – and most of those are not transmitting patient information electronically.

A majority of providers report having discussed health IT with their patients, and more than half (53%) are using health IT to allow patients to communicate electronically.

As this study demonstrates, Massachusetts-based practices are making progress toward the interoperability of health IT but the extent of electronic communication between systems remains somewhat limited. Many providers who are using EHRs are not yet regularly sharing information digitally via HIEs on a practice-to-practice or practice-to-patient basis. Instead, providers reported most external digital information-sharing has been for electronic prescriptions and public health reporting.

The study also made clear that more needs to be done to ensure all providers fully implement interoperable EHR systems that connect to the Mass HIway: only 26 percent of healthcare practices in the Commonwealth report they currently participate in an HIE (Fig. 2).

Figure 2: HIE Participation (% among all MA Practices)

Overall HIE Current and Future Participation

- 26% Currently participate in HIE
- 16% Will participate in next 12 months
- 18% Will participate in 1 - 2 years
- 2% Will participate in 3+ years
- 32% Unsure of participation date
- 7% Will not participate in HIE

Key Findings: Consumers

As a whole, the survey data indicates that consumers are supportive of eHealth adoption, while showing some concern about keeping their medical records private and secure:

- 85 percent are comfortable with electronic storage of health information, with 50 percent very comfortable.

- When prompted, 69 percent expressed concern about the privacy and security of their information.

- 78 percent believe that, if all doctors use EHRs instead of paper records, it will improve care; with 48 percent believing it will greatly improve care.

Implications and Next Steps

A key purpose of this study was to provide data that would identify key drivers for eHealth adoption and to suggest better methods and polices for encouraging and promoting that adoption.

The findings contained in this report can assist policymakers and healthcare sector leaders seeking to extend and improve the use of EHRs, HIEs and other eHealth technologies.

Based on the results of this study, there is opportunity ahead to further advance the impact of health IT, including the following:

- The lag in eHealth adoption within some provider sectors is due to a number of factors. Assistance from the Commonwealth accelerating adoption of EHRs and HIE usage by Behavioral Health and LTPAC facilities could have a meaningful impact on adoption rates in these provider communities.

- Health information exchange deployment is underway, but providers report some barriers to achieving transfer of patient records. The development of state-level model organizational policies could support more rapid and efficient deployment of HIE.

- This study indicated that some providers do not feel they have access to the training and support needed

> Of those with an EHR, most practices are using their EHR for medication reconciliation (81%), quality reporting (81%), electronic prescribing or eRx (76%). A smaller percentage of practices are using their EHRs for clinical decision support rules (64%) and public health reporting (55%).

to successfully use health IT. Both additional education and technical assistance programs can help providers more effectively integrate EHRs and health information exchange, including through the Massachusetts HIway, into their practices.

- This report demonstrates that healthcare consumers support the use of health IT. However, it also illustrates what appears to be a 'disconnect' between what the providers' communicate about health IT and what consumers' understand. Creation of consumer engagement "best practices" will increase healthcare practices' and providers' level of engagement and education for their patients as well as help ensure both sectors understand the many benefits of using eHealth tools. This is particularly vital for outreach and support for consumers with lower incomes and/or less formal education.

ENDNOTE: In this report, terms have the following meanings:

Affiliated – In this report, classification of "independent" and "affiliated" practices is based on self-reported data from the practice manager survey. Respondents were asked: "Is this location an independent practice or organization that is not affiliated with a network or health care system – or are you affiliated with a network or health care system?"

eHealth – the adoption and effective use of EHR systems and other health IT to improve health care quality, increase patient safety, reduce health care costs, and enable individuals and communities to make the best possible health decisions. In this Report, the terms "health IT" and "eHealth" can be used interchangeably.

EHR – An electronic health record is an electronic record of health-related information on an individual that conforms to interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one healthcare organization.

HIE – Electronic health information exchange (verb) allows healthcare providers and patients to appropriately access and securely share a patient's vital medical information electronically.

A Health Information Exchange (noun) provides the capability to electronically move clinical information among disparate healthcare information systems while maintaining the meaning of the information being exchanged.

Mass HIway – The Massachusetts Health Information Highway is a secure statewide HIE that enables the electronic movement of encrypted and secured health related information among diverse organizations in the Commonwealth.

PHR – A personal health record is an electronic application used by patients to maintain and manage their own health information in a private, secure, and confidential environment.

See **Appendix 1** for a more extensive definitions section.

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Notes on Methodology

The report provides results about those providing healthcare services, based on surveys of (1) healthcare practices, (2) healthcare providers and (3) consumers.

Practice Survey: For the survey of healthcare practices, the practice manager or other member of the management team was asked to answer the survey about the practice, as a whole. Individual healthcare providers responded to the provider survey and were asked to respond about themselves only.

Data for this survey was collected via telephone from practice managers or equivalent positions for 507 unique locations.

Healthcare practices were stratified by type based on Standard Industrial Classification (SIC) codes appended to the sample list.

Behavioral health practices and skilled nursing facilities were identified as populations of particular interest and were included in the sample in a larger proportion than they exist in the overall population.

In cases where more than one type of care was provided at a location, a practice was counted in each applicable category when results are reported by practice type but only once for overall numbers. Due to this, when broken down by practice type, results often summed to more than 100 percent.

Provider Survey: During the practice survey, practice managers provided lists of providers practicing at their locations. Invitations to take a secure online survey were then sent to providers, via the US postal service and, when available, e-mail addresses. 308 providers were surveyed to obtain the provider data included in this study, with at least one provider completing the survey from 46 percent of the 507 practices.

Consumer Survey: The consumer data was obtained in surveys of 807 consumers conducted between November 26, 2013 and January 30, 2014. This random sample was stratified by the six Massachusetts Executive Office of Health and Human Services (EOHHS) regions to ensure that consumers from all areas of the Commonwealth were included.

The data for all three surveys has been weighted so the results accurately reflect the views of all practices, providers and consumers in the Commonwealth.

There are a number of questions where respondents could provide more than one answer or multiple responses. In such cases, adding the separate categories together sum to more than 100 percent. There may be slight differences in reported percentages in cases where two or more categories are added together. For example, when a summary of the percent that are very familiar and the percent that are somewhat familiar is reported simply as the percent that are familiar, this may differ slightly than if one were to add the categories. This is simply due to rounding of the percentages.

Acknowledgments

The Massachusetts eHealth Institute (MeHI) at the Massachusetts Technology Collaborative is the state's entity for healthcare innovation, technology, and competitiveness and is responsible for advancing the dissemination of health information technology throughout Massachusetts, including the deployment of electronic health records systems in all healthcare provider settings and connecting them through the statewide health information exchange. For more information, please visit mehi. masstech.org and follow @MassEHealth.

MeHI would like to thank the following people and organizations who were critical to the publication of this research:

The executives and staff at Market Decisions, including the authors of the research, Brian Robertson, PhD, and Curtis Mildner, MBA, as well as Dr. David Cochran, MD, of Lightship Health. We'd also like to thank Market Decisions' Nathaniel Mildner and Bethany Porter for the editing of the final research.

In addition, we'd like to thank the key stakeholders in the Massachusetts healthcare community who provided guidance on the goals of this project and provided their insight to Market Decisions. These thought leaders in the Massachusetts healthcare and health IT community, include the following:

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Co-Chair – Joint Committee on Health Care Financing
Massachusetts State Senate

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Executive Director
Massachusetts Council of Community Hospitals
Formerly – House Co-Chair, Health Care Financing Committee

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Executive Director
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Director - System Performance/Strategic Investment
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Executive Director
Center for Health Information and Analysis (CHIA)

Marilyn Schlein Kramer
Deputy Executive Director - Health Information
Center for Health Information & Analysis (CHIA)

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VP and Chief Medical Information Officer
Baystate Medical Center

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Executive VP & COO
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Leon Barzin
Director of HIT
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Patricia Kelleher
Executive Director
Home Care Alliance of Massachusetts

Bob Anders
Director of Integrations
HealthWyse

Vic DiGravio
President/CEO
Association for Behavioral Healthcare

Elissa Sherman
President
Massachusetts LeadingAge

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Research Director
Deborah Wachenheim
Health Quality Manager
Health Care for All

Eric Linzer SVP, Public Affairs and Operations
Mass. Association of Health Plans

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Overview

Widespread adoption and meaningful use of health information technology (health IT) will contribute to optimizing health system performance by enriching the patient experience of care, including quality and satisfaction; improving the health of populations; and reducing the per capita cost of healthcare – the "Triple Aim" of federal and state health reform efforts. Currently, adoption of electronic health record (EHR) systems is beyond its tipping point in Massachusetts, with 79 percent of overall healthcare providers using an EHR, and most of the remaining practices report planning to do so within the next two years. However, as will be shown in this survey, adoption and use varies by practice type. For example, 96 percent of primary care providers have adopted an EHR and 30 percent are transmitting patient information electronically, but only 55 percent of other care settings, such as behavioral health and skilled nursing facilities (SNF) have adopted an EHR, and most of those are not transmitting patient information electronically.

This report reveals the results of an extensive survey of Massachusetts healthcare providers' and consumers' health IT adoption rates and usage by various healthcare specialties. Providers and consumers also shared the barriers and enablers they are facing.

Providers/Practice Managers

While health IT adoption in Massachusetts, specifically the adoption of EHRs, is widespread, particularly among primary and specialty care providers, it is significantly less prevalent in other care settings, such as dental and behavioral health practices, long-term and post-acute care (LTPAC) facilities and behavioral health hospitals. Nevertheless, of those surveyed, most practices that have not yet adopted EHRs stated they are planning to do so within the next two years. Practices currently using an EHR report they are mainly using them for such functions as ordering tests and prescriptions, and public health reporting.

While most providers (61%) report that they have discussed health IT with their patients, only 24 percent of patients reported recalling a conversation with their healthcare provider about health IT. However, among those providers who have discussed health IT with patients, only a few report that their patients are concerned about the confidentiality and security of their information. There is, however, a lack of knowledge on key aspects of EHR information use such as consent requirements. When providers were asked about their perception of patients' familiarity with the opt-in process for patient consent on the Massachusetts health information exchange (Mass HIway), 95 percent reported that their patients were either very or somewhat unfamiliar with the process.

With that in mind, electronic communication is becoming a more important method for providers and patients to communicate. Most practices are now providing a method for patients to electronically access their health information or communicate with their provider. We found that a large majority of patients with such access are now using this mode of communication.

Although Massachusetts is making progress toward the interoperability of health IT, the extent of electronic communication between systems remains somewhat limited. Even though this survey confirmed that use of HIE is limited (44 percent of practices not currently participating indicated they are planning on implementing HIE within the next two years), of those currently using an HIE, the most common uses, as reported by practice managers, are 1) improvements in process efficiency, 2) public health reporting, 3) requests for referral and 4) ePrescribing (eRx). The survey established that healthcare providers believe electronic exchange of health information can and will improve healthcare quality through better coordination of care and improved patient safety.

As many providers are required to meet Meaningful Use objectives, we found that one in five practices reported interest in receiving training and technical assistance in meeting these objectives. Specifically, practice managers, as well as individual providers, expressed interest in receiving training for 1) optimization or adoption of an EHR, 2) electronic exchange of health information, 3) meeting meaningful use standards, and 4) meeting Board of Registration in Medicine (BORIM) licensing requirements.

Consumers

The results of this survey indicate an overwhelmingly positive attitude toward health IT adoption and use among the general public. Overall, fifty percent of Massachusetts healthcare consumers indicate they have used health IT to directly communicate with their healthcare provider, review test results, renew prescriptions or schedule appointments. Among consumers who reported that their provider has the capability of communicating electronically use is even higher, with 78 percent now using this capability. Among those using electronic communication, consumers indicate this type of communication has 1) made it easier to correspond with their provider; 2) helped them become more involved with their care and more knowledgeable about their health; and 3) led them to ask more questions they might not have asked in a one-on-one conversation, making them feel more connected to their doctor.

Consumers' attitudes are driven in part by perceptions of the benefits of technology, with more than three quarters (78 percent) believing that if all doctors used electronic health records instead of paper records it would improve care. Furthermore, 85 percent are comfortable with electronic storage of health information at their provider's practice, indicating that they are readily accepting the change from paper to electronic storage.

Nevertheless, concerns about confidentiality and security of information are a reported barrier to adoption for some non-users; but these consumers also indicated that if the proper privacy and security safeguards were in place and explained, this concern would be alleviated.

Consumers also expressed support for health information exchange. When first informed of the HIway, 53 percent of consumers had a positive impression. When consumers were informed that information could only be sent to another provider with their consent, 87 percent indicated they were very or somewhat supportive of the HIway.

Highlights

Currently, adoption of electronic health record (EHR) systems is beyond its tipping point in Massachusetts, with 79 percent of overall healthcare practices currently using an EHR and most of the remaining practices planning to do so within the next two years.

However, adoption and use varies by practice type. For example, while 96 percent of primary care practices report they have adopted an EHR, only 55 percent of behavioral health practices and skilled nursing facilities (SNF) have done so.

Furthermore, participation in an HIE[2] is much lower, with most practices not transmitting patient information electronically. Currently, 26 percent of overall practices share information electronically, with primary care practices having the highest participation rate at 30 percent. In addition, practices participating in HIE are generally more likely to share information within their affiliated networks and organizations than with outside organizations.

Rates of participation in an HIE are even lower among other practice types, with dental practices (7%) and skilled nursing facilities (SNFs) (8%) lagging behind significantly. This report will delve into the health IT adoption rate and usage of various healthcare specialties, and the barriers they are facing.

Data Collection Methodology

Information for this analysis was collected using three separate data collection efforts: Practice Managers, Providers (MDs, NPs and other clinical practitioners), and Consumers.

First, a healthcare practice survey was designed to collect information on health IT adoption and use at the practice level. Data for this survey was collected via telephone from practice managers or equivalent positions for 507 unique locations. These practices were originally stratified by type based on Standard Industrial Classification (SIC) codes appended to the sample list. Behavioral health practices and skilled nursing facilities were identified as populations of particular interest and were included in the sample in a larger proportion than they exist in the overall population. This is called an "over-sample" and allows us to examine these groups in greater detail than would be otherwise possible.

During data analysis, practices were re-categorized based on the actual type of care provided, as reported by the prac-

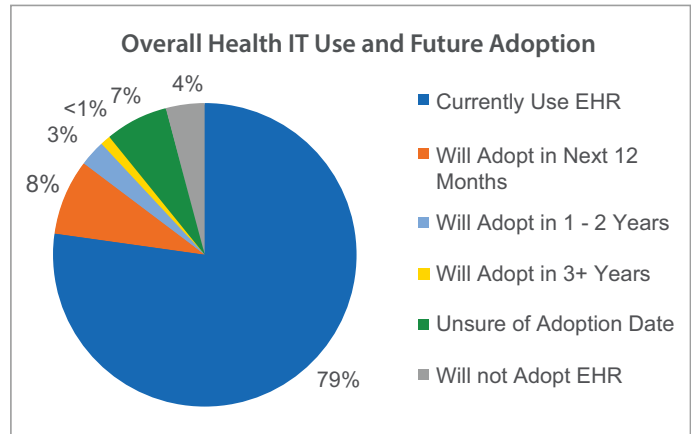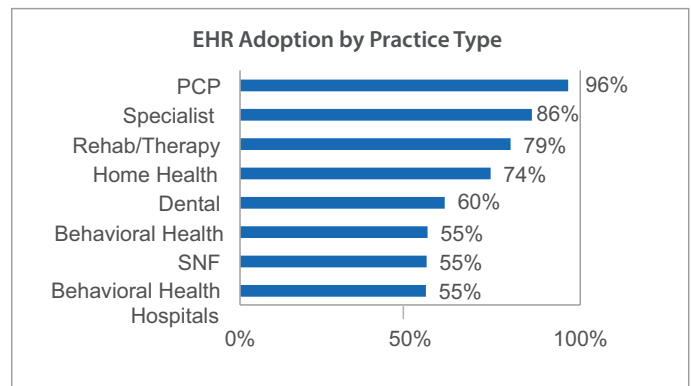**Figure 1: Overall Adoption (% among all MA practices)**

Overall Health IT Use and Future Adoption

- Currently Use EHR
- Will Adopt in Next 12 Months
- Will Adopt in 1 - 2 Years
- Will Adopt in 3+ Years
- Unsure of Adoption Date
- Will not Adopt EHR

Figure 2: EHR Adoption Practice Breakdown (% among all MA practices)

EHR Adoption by Practice Type

Practice Type	Adoption
PCP	96%
Specialist	86%
Rehab/Therapy	79%
Home Health	74%
Dental	60%
Behavioral Health	55%
SNF	55%
Behavioral Health Hospitals	55%

tice manager, as many of the original SIC code designations proved to be inaccurate. The distribution of practice types is shown in Figure 3. While the unit of sampling for the practice survey was physical practice locations, the results are presented by the type of care provided to patients at that location (PCP, Specialist, Dental, etc.). In cases where more than one type of care was provided at a location, a practice was 1) counted in each applicable category, when results were reported by practice type, but 2) only counted once for overall numbers. Due to this type of counting, when broken down by practice type, results will often sum to more than 100 percent. The practice survey found that thirty-seven percent of practice locations provided more than one type of healthcare service.

The second data collection effort was the provider survey, which was designed to assess provider attitudes toward health IT. During the practice survey, practice managers provided lists of providers practicing at their locations.

[2] In this report the term HIE is defined as a focus on the mobilization of healthcare information electronically across organizations within a region or community according to nationally recognized standards. An HIE provides the capability to electronically move clinical information among disparate healthcare information systems, while maintaining the meaning of the information being exchanged.

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**Figure 3: Practice Survey Respondents by Type of Health Care Provided
(% responding to the 2014 Practice Health IT Survey)**

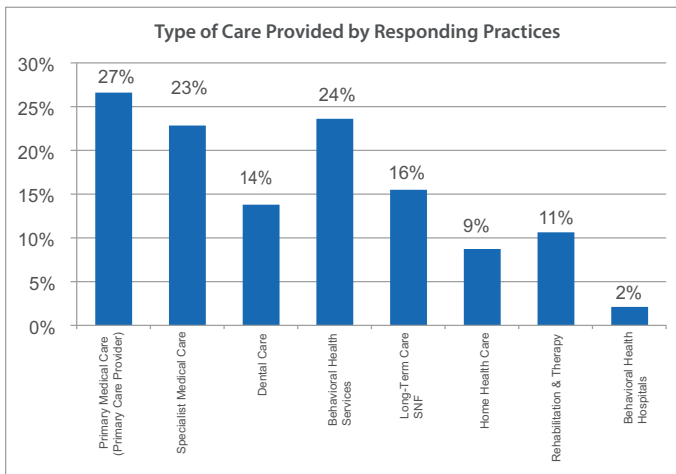Type of Care Provided by Responding Practices

**Table 1: Provider Survey Respondent Breakdown
(% responding to the 2014 Provider Health IT Survey)**

Type of Provider	%
Primary Care Provider	36%
Licensed Behavioral Health Provider	25%
NP or Physician's Assistant	11%
Dental Care	11%
Specialist Physician	9%
RN	7%
Home Health Care	4%
Long-Term Care Provider	4%
Other Care Staff	1%
LPN	<1%

Invitations to take a secure online survey were then sent to providers both via the US postal service and, when available, e-mail addresses.

For this component 308 providers were surveyed, with at least one provider completing the survey from 46 percent of the 507 practices, a high rate of response. A breakdown of provider types is provided in Table 1.

There are two main reasons why data collection from the practices and providers was split into two separate surveys. The first is the extreme difficulty of engaging providers in clinical practice in the survey process. To obtain their participation the survey needed to be brief and focused. Second, the surveys were targeted based on the information required; the provider survey focused on collecting attitudinal information that could only be obtained from a provider, while information such as EHR adoption and HIE participation could be obtained from practice managers independently.

The third data collection effort was the consumer survey, which was designed to gauge awareness and attitudes about health IT among the consumers. This survey was conducted via telephone with 807 randomly selected adult consumers. This random sample was stratified by the six Massachusetts Executive Office of Health and Human Services (EOHHS) regions to ensure that consumers from all parts of the Commonwealth were included.

The data for all three surveys has been weighted so the results accurately reflect the views of all practices, providers and consumers in the Commonwealth.

Reporting Results

In reporting survey results we use the term practice or practices when referring to results from the practice manager survey, providers when referring to results from the provider survey and consumers when referring to results from the consumer survey. Unless otherwise stated, the reported percentages are the percent among the entire population. For example when the results indicate that 79 percent of healthcare practices reported using an EHR, this means that 79 percent of all healthcare practices in the Commonwealth currently use electronic health records.

Healthcare Practices and Providers

EHR Adoption

Electronic Health Record (EHR) adoption is well beyond its tipping point in Massachusetts. While adoption rates vary by the type of practice, a majority of practices have adopted an EHR and the remainder state they plan to do so in the next two years. When asked, most practice managers did not cite a specific barrier to adoption.

- 96 percent of primary care practices and 86 percent of medical specialist practices report they have adopted EHRs. No recent, directly comparable data was available, although some studies have surveyed particular segments of the provider population. Nationally 78 percent of office-based physicians nationally reported using any EHR in 2013 (Hsiao & Hing, 2014).[3]

- The EHR adoption rate is lower among rehabilitation and therapy practices[4] (79%) and home healthcare providers (74%) and lowest among dental practices (60%), behavioral health practices (55%), skilled nursing facilities (55%), and behavioral health hospitals (55%).

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[3] This national study provides a summary for all office based physicians and not a breakdown by primary care and medical specialists.

[4] The Rehabilitation and Therapy segment includes practices offering short-term outpatient rehabilitation and therapy services.

- Among those practices not currently using EHR, 79 percent indicate they will adopt an EHR in the future, with 70 percent of these adopting in the next year and 96 percent within the next two years.

- Most practices that do not now use an EHR state no barriers to its use (54%) or do not know if there are any barriers (24%).

- Only 4 percent of all practices indicate they will never adopt an EHR.

> What are the top three ways that your use of EHR has improved or helped facilitate the quality of care provided to patients or the operation of this practice/ organization?
>
> (1) Legibility of notes has improved significantly.
>
> (2) Accessing patient info from 3 different offices, or from home on call, has dramatically improved quality of care.
>
> (3) I save thousands of staff hours per year now that we're not always hunting for paper charts, and the information is always available in the EHR (barring power/ computer outages).
>
> — *Specialist Physician*

EHR Uses and Benefits

While most providers believe the use of an EHR will improve care for patients, practice managers report they are currently using their EHR primarily for automation of routine processes, such as ordering tests and prescriptions, and public health reporting. Most practices are not yet using an EHR to improve patient involvement; they are neither providing a method for patients to access their health information nor a method for patients to communicate electronically with them.

- Providers agree that EHRs will improve facilitation of communication between members of the healthcare team (92%), improve the quality of patient care (82%), reduce medical errors (82%) and enable better decision-making (75%).

- Practice managers report using an EHR for medication reconciliation (81%), quality reporting (81%), e-prescribing (75%), clinical decision support rules (64%), and public health reporting (55%).

- Practice managers believe the most important improvement after implementing an EHR is ease of access to patient data (85%) followed by the ease of ordering electronic prescribing, tests or lab work (59%).

- Sixty-two percent of all practices do not provide a means for patients to electronically access their personal health information. Among those practices providing access to health information electronically, access includes lab and test results (84%), clinical summaries of office visits (79%), prescription renewals (75%), reminders for preventive care (74%), and email access to providers (72%).

- Among those providers using an EHR, 92 percent agree that EHRs facilitate communication of patient information among members of their healthcare team, 82 percent agree that EHRs improve the quality of patient care, 80 percent agree that EHRs reduce errors, 75 percent agree EHRs enable better decision-making, 70 percent agree that EHRs take into account the specific needs of their practice, and 70 percent have seen an improvement in operational efficiency.

Current and Future Participation in Health Information Exchange

The rate of participation in a Health Information Exchange (HIE) lags behind EHR adoption, but practice managers cited no specific barriers to joining, and many say they will join an HIE in the next two years.

Leveraging the use of health IT to improve care and reduce costs remains a challenge. Practice managers report they are using technology for sharing records, prescribing, ordering

Figure 4: HIE Participation (% among all MA Practices)

Overall HIE Current and Future Participation

- 26% Currently participate in HIE
- 16% Will participate in next 12 months
- 18% Will participate in 1 - 2 years
- 2% Will participate in 3+ years
- 32% Unsure of participation date
- 7% Will not participate in HIE

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tests and public health reporting. Providers believe in the promise that technology will improve care by facilitating communication of patient information among members of healthcare teams and by enabling better decision-making. Current participation by practices in HIE is limited, but many practices are planning on participating in an HIE in the next two years.

Overall 26 percent of Massachusetts healthcare practices report they participate in an HIE. Of these, 51 percent are participating in the Mass HIway with others participating in a number of private exchanges, including Wellport – Newbury-port HIE, Holyoke connect HIE – Holyoke, and ELINC – Winchester HIE. However, a number of practices that reported participating in HIE could not name the exchange in which they were participating.[5] This can be compared to a national study conducted in 2012 in which only 10 percent of ambulatory practices participated in HIE efforts (Mathematica Policy Research Institute, 2013).
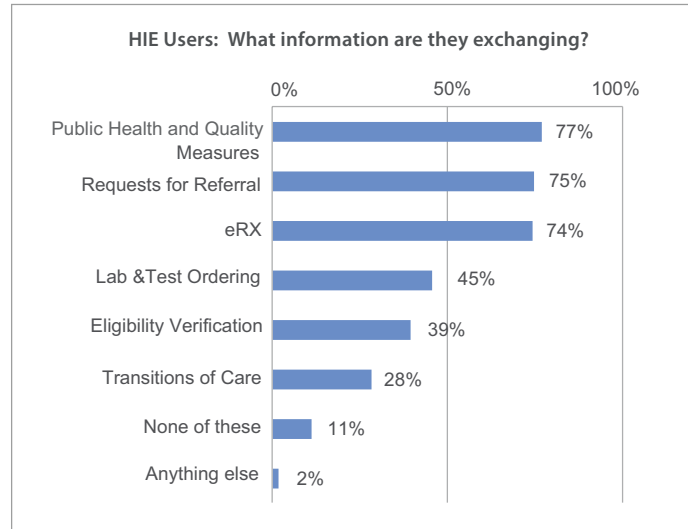
Those most likely to participate in HIE are primary care practices (30%), behavioral health practices (28%), and specialty medical practices (22%). The least likely to participate in HIE are home healthcare providers (17%), rehabilitation and therapy practices (11%), behavioral health hospitals (9%), skilled nursing facilities (8%) and dental practices (6%).

Overall, thirty-eight percent of practices reporting an affiliation with a network or healthcare system participate in HIE, compared to only 17 percent of independent practices.

Overall, 68 percent of Massachusetts healthcare providers who are not currently participating in a HIE indicate they will do so in the future. Among these, 21 percent intend to adopt in the next year, 44 percent within the next two years, one third have no timeline for participation, and 7 percent report they will never participate in HIE. Among those that will not participate in HIE, 50 percent are healthcare providers. 25 percent are dental providers, nearly all (93%) are independent practices, and 60 percent have only one licensed clinician. Most receive little or no payment through Medicare or Medicaid, with 72 percent receiving 10 percent or less of payments through Medicare and 68 percent receiving 10 percent or less of payments through Medicaid. Only 25 percent currently use EHR, and among those without an EHR, 79 percent do not intend to adopt an EHR.

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[5] This may indicate these exchanges are not well known or that there is a lack of understanding of the difference between transmitting over an HIE and a more general electronic exchange of health information.

Figure 5: HIE Use (% among MA practices participating in HIE)

HIE Users: What information are they exchanging?

Public Health and Quality Measures	77%
Requests for Referral	75%
eRX	74%
Lab &Test Ordering	45%
Eligibility Verification	39%
Transitions of Care	28%
None of these	11%
Anything else	2%

Provider Attitudes on Barriers to HIE Participation

What are the barriers to your adopting and using health information exchange (HIE)?

"Cost, being a solo provider. I'm quite frankly more interested in being able to speak with patients and have it be confidential. The cost includes buying a program and getting IT people to help you. I fall very conservatively in the arena of patient confidentiality. I would really need to know how protected or encrypted it is before I would confidently tell patients to use it." – Behavioral health provider

"I see HIE as a daunting task. Trying to tie together disparate EMR systems to get a meaningful flow of information to allow for the realization of the benefits listed above seems to me to be many years away. I guess I'll believe it when I see it."

Most practice managers (54%) cannot point to specific barriers to HIE participation or do not know (24%). However, when providers were asked about barriers to HIE participation, they mentioned cost of implementation (25%), the time required for implementation (20%), and issues with system incompatibility and interoperability (16%).

Health Information Highway Uses and Benefits

The most important uses of HIE, as reported by practice managers, are improvements in process efficiency, public data reporting, requests for referral and eRx. However, providers believe that HIE can improve healthcare quality by better coordination of care and improved patient safety.

- Most practices that have implemented HIE are currently reporting public health and quality measures (77%), providing requests for referral (75%), and using e-prescribing (74%). Less than half use electronic lab radiology or pathology ordering (45%), electronic eligibility verification (39%) or transitions of care (28%).

- Among those practices currently participating in an HIE, sharing data with state or local public health departments (71%) is the most common, followed by sharing with hospitals (65%). Sharing with other PCPs (18%) and specialists (12%) is much more limited.

- Overall, there is a belief among providers that HIE provides significant benefits in terms of better coordination of care (80%), reduction of medical errors (75%), elimination of duplicate tests or procedures (75%), improved patient safety (68%), more efficient public health reporting (63%), and ability to achieve meaningful use (60%).

Patient Consent

Overall, 61 percent of providers report discussing health IT with their patients, with primary care providers (72%) and specialty providers (66%) being more likely to have had this discussion, and behavioral health providers (59%), dentists (54%), rehabilitation and therapy providers (50%), behavioral health hospital providers (50%), skilled nursing facility providers (38%), and home healthcare providers (17%) being less likely. Interestingly, only 24 percent of consumers report their providers have discussed health IT with them, showing a disconnect between what the providers view as a health IT discussion and what patients are hearing. Of those that discussed health IT with their patients the following was reported:

- 21 percent of providers say their patients expressed concern about electronic exchange of health information. That concern is primarily around confidentiality and security (81%) followed by who has access to the EHR data (74%).

- Providers report that almost all patients (95%) are unfamiliar with the opt-in process for patient consent and authorization for sharing their health information through the HIway.

- Providers agree they are also unfamiliar (80%) with the opt-in process for patient consent.

Training needs

A majority of practices and providers are interested in receiving training for optimization or adoption of EHR, optimization of HIE, in meeting Office of the National Coordinator for

Health Information Technology (ONC) Certification standards or in meeting the licensing requirements of the Board of Registration in Medicine (BORIM):

- 31 percent of healthcare practices are interested in technical assistance or training for the optimization of their current EHR system.

- 4 percent of healthcare practices are interested in technical assistance or training for the adoption and implementation of an EHR.

- 7 percent of healthcare practices and 23 percent of providers are interested in technical assistance or training to optimize or to participate in HIE.

- 23 percent of healthcare practices and 53 percent of providers not participating in HIE are interested in technical assistance or training for the implementation of HIE.

Provider Attitudes on Electronic Communication

What do you think providers can do to encourage patients to communicate electronically with their healthcare provider(s)?

"I don't think that they will need to be encouraged. They will see it as a free and convenient way to get medical care. No co-payment, no waiting to have access to the (un-reimbursed) practitioner. In this era of ever-increasing costs and rising co-payments, patients have already been cancelling follow-up visits and increasing the volume of telephone calls to offices. Good patient portal systems can make electronic communication more efficient. We struggle with how to give patients access to lab reports, etc. as this information in unfiltered form can generate confusion, anxiety, and more phone calls to physician offices." — *Specialist Physician*

"I have texted and used mobile phone with private practice clients, but prefer it only for appointment changes. It is too easy for them to slip into seeking medication management or crisis advice, which is not appropriate use from my perspective. I do not want to have requests flying at me from all directions, particularly at the clinic setting, where my time is fully booked, and further requests would eat up what should be lunch and break times, or going home at the end of the day." — *Behavioral Health Provider*

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Table 2: Use vs. Encouragement of Electronic Communication

(% among all MA consumers whose provider is capable of electronic communication)

Use of Electronic Communication	Does your doctor or health care provider, or his or her practice, encourage you to communicate either online or by email?			
	Yes	No	DK-REF*	Total
Currently Use	67%	31%	2%	100%
Interested	21%	72%	7%	100%
Not Interested	18%	76%	6%	100%

- 20 percent of healthcare practices are interested in technical assistance or training in meeting Meaningful Use objectives.

- 19 percent of healthcare practices and 11 percent of providers are interested in technical assistance or training so their physicians can meet the state's new BORIM licensing requirement.

Provider–Patient Electronic Communication

Provider to patient electronic communication is becoming more common, with over half the providers reporting they allow patients to communicate with them via electronic means and 32 percent of consumers indicating their provider has encouraged them to communicate in such a manner. However, it appears that increases in provider to patient electronic communication are largely driven from the patient side. Seventy-two percent of patients whose provider has the capability and are interested in using electronic communication say their provider neither encourages nor discourages them to do so.

Also, in open-ended comments, some providers appear hesitant to communicate electronically, mentioning concerns over limitations of providing medical advice electronically, additional workload, and liability and privacy issues. This study also found that younger, high income, tech savvy consumers are more likely to communicate electronically.

- Overall, 50 percent of consumers report they currently communicate with their provider electronically. However, this number drops to 39 percent among those over age 65, 32 percent for those with a high school education or less, and 35 percent for those with a household income of $25,000 or less. Lower income consumers are also more likely to report that their provider does not possess the capability to communicate electronically.

- Among patients currently communicating electronically with their providers, 74 percent have household incomes of over $50,000 and 41 percent have household incomes over $100,000, 68 percent have access to the internet through an iPhone or other smart phone and 49 percent through an iPad or tablet.

Consumers

Consumers served by Massachusetts healthcare providers are overwhelmingly positive about increased use of health information technology.

Those who are currently using electronic means to communicate with their provider cite a variety of benefits, from greater involvement in their own care to taking specific actions to improve their own health.

Health IT is also strengthening the patient-provider relationship. Many users say they feel more connected to their doctor, and others say electronic communication has led them to ask a question that they might not have otherwise asked.

Concern about confidentiality and the security of their information is a barrier to some current non-users, but consumers indicated this could be overcome with better communication about authorization and privacy safeguards.

Consumer Attitudes on Electronic Communication

What do you think doctors can do to encourage patients to communicate with them online or by email?

"Everybody nowadays is on social networks, but what can they do to encourage? Not much. Once the patients know it is available, then they will be communicating with their doctors. If my doctor would let me know that she's available on email or online for chatting I'm sure I would use it."

—*Female, Age 52, Southeast MA*

Data Collection Methodology

Information for the consumer research component was obtained via telephone surveys conducted among a random selection of 807 Massachusetts healthcare consumers between November 26, 2013 and January 30, 2014.

Awareness of Health Information Technology

Healthcare consumers are aware that information technology is changing healthcare. Eighty-three percent of consumers have heard about electronic health records (EHR), 71 percent about electronic health information exchange, and 76 percent about personal health records (PHR).

Approximately one quarter (24%) reported their physician or provider discussed health IT with them in the past year.

Attitudes towards Health IT

Healthcare consumers also have overwhelmingly positive attitudes toward health IT. This is driven in part by perceptions of the benefits of technology, as nearly 80 percent believe that if all doctors used electronic health records instead of paper records it would improve care. Furthermore, 85 percent are comfortable with electronic storage of health information at their provider's practice, indicating they are readily accepting the change from paper to electronic storage.

Use of Health IT

Awareness of health IT is bolstered by the many consumers who already have actual experience using health IT. Fifty percent of Commonwealth consumers overall have communicated with their provider electronically. Among consumers whose provider has the capability to communicate electronically (64 percent of all providers), 78 percent are now using electronic communication.

Consumers are using electronic communication to look at test results (53%), renew prescriptions (38%), and to schedule appointments (34%).

Providers play an important role in encouraging this electronic communication: 67 percent of those communicating electronically with healthcare providers indicated their provider encouraged them to do so. Conversely, among those that are interested in but not yet using electronic communication, 72 percent said their provider has not encouraged them to do so even though their provider has the capability.

Benefits of Personal Heath Records[6]

Nineteen percent of consumers reported using a Personal Health Record (PHR). Most of these agreed that it made them feel 1) like they know more about their health (84%); 2) more involved in their own healthcare (83%); 3) more connected to their doctor (76%); 4) like they know more about the care their doctor gives them (82%); and 5) led them to do something to improve their health (66%). More than half (56%) agreed the use of PHR has led them to ask a question they might not have otherwise asked. Of those using a PHR, 76 percent expressed no concerns about doing so, but 20 percent did express concerns about confidentiality and security.

Nearly half the consumers surveyed (46%) are interested in using a PHR in the future. Among those not currently using but expressing an interest in PHR, most are 1) interested in seeing their doctor's instructions online; 2) receiving e-mail or online reminders for tests; 3) receiving information from their doctor online or via e-mail, without having to go to the office, 4) renewing prescriptions online or via e-mail; 5) requesting appointments online or via e-mail; and 6) looking at lab results online or receiving them by e-mail.

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[6] An electronic medical record (EHR) and your personal health record (PHR) are not the same thing. The EHR contains information about your health compiled and maintained by each of your healthcare providers. A PHR is information about your health compiled and maintained by you. The difference is in how you use your PHR to improve the quality of your healthcare. http://www.myphr.com/StartaPHR/what_is_a_phr.aspx #sthash.jcxCoqNy.dpuf

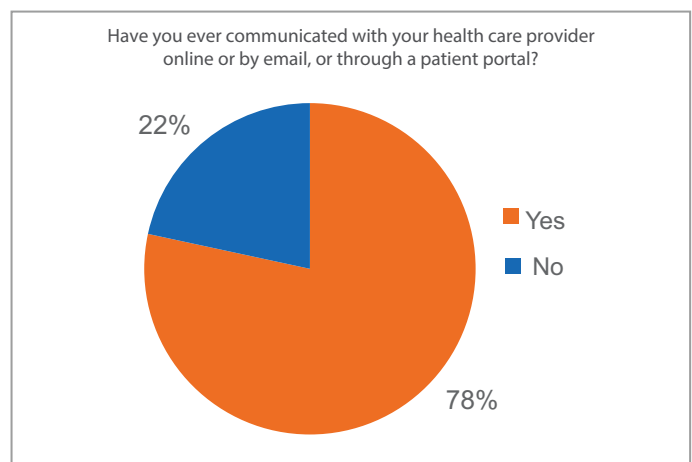**Figure 6: Electronic Patient to Provider Communication (% among those whose provider has the capability)**

Have you ever communicated with your health care provider online or by email, or through a patient portal?

- 22% No
- 78% Yes

Table 3: Consumer Attitudes on PHR Use

	(% agreement among PHR users)
Made you feel like you know more about your health?	84%
Made you feel more involved in your own health care and that you were working together with your doctor?	83%
Made you feel like you know more about the care your doctor gives you?	82%
Made you feel more connected to your doctor?	76%
Led you to ask your doctor a question you may not have asked before?	56%
Led you to do something to improve your health?	66%
Led you to find missing or incorrect information about your health?	53%
Made you feel less likely to switch doctors?	40%
Made it easier to talk to family about your health?	43%

Barriers to PHR

Among those who have not used a PHR, the primary barrier is concern about the security and privacy of their health information (69%).

Attitudes towards Health Information Exchange

Almost all consumers believe conceptually in the benefit of health information exchange (HIE): 80 percent think sharing information electronically between providers will improve the quality of care. However, only 53 percent of consumers have positive impressions about Massachusetts developing its own system for HIE. This is in part due to their lack of familiarity, as 80 percent have not heard of the HIway. However, security and privacy are also of concern among residents in regards to the HIway, with 65 percent concerned about the security and privacy of their health information being shared electronically between providers.

Patients' views of the HIway become much more positive after they are made aware of security safeguards and their role in providing consent to control access to their health information. Eighty-seven percent support the HIway knowing information could be shared only with patient consent, and 84 percent support the exchange knowing information would be sent through secure connections, with users (providers) being responsible for security of the information.

Discussion

Practice Manager and Provider Survey Discussion

Methodology

The MeHI Practice Manager Survey is based on surveys conducted between November 4, 2013 and February 28, 2014 with 507 healthcare practices throughout the Commonwealth. Included in the sample were primary care practices, community health centers, specialty medical practices, dental practices, behavioral health practices, home healthcare providers, rehabilitation and therapy providers, skilled nursing facilities, and behavioral health hospitals. The sample was obtained from Dunn & Bradstreet and included all businesses and organizations in the Commonwealth with a two digit SIC Code of 80 (Health Services). Prior to data collection, all non-direct-care and non-health-care practices were removed from the sample.

All Practice surveys were completed by telephone. The response rate for the practice manager survey is 9 percent, calculated using the American Association for Public Opinion Research RR3 formula. The data for the practice manager survey has been weighted to reflect the actual distribution of healthcare practices in the Commonwealth by the type of practice, as well as their geographic distribution.

The MeHI Provider Survey is based on surveys conducted between November 4, 2013 and March 3rd, 2014 with 308 healthcare providers throughout the Commonwealth. The sample of providers was obtained from the practices completing the MeHI practice manager survey. Providers surveyed included medical doctors, physician's assistants, nurse practitioners, registered nurses, behavioral health providers and licensed social workers. Once the practice manager completed the survey, they were asked to provide a list of all direct care providers. This was supplemented by reviewing the list of providers on the practice's web page when available. Each provider was sent a letter invitation to participate in the survey and where possible an email invitation was sent. Non-responders were sent an additional two mailings and if an email was available, three email reminders to participate in the survey. These initial surveys were completed by the providers online using a web survey. A total of 202 providers completed the survey online.

From February, 20th to March 3rd, 2014, reminder calls were made to providers focusing primarily on skilled nursing facilities, behavioral health, dental and home healthcare providers. If the provider was available and willing to participate, the survey was administered over the phone. In all, 106 providers completed the survey by telephone.

The response rate for the provider survey is 22 percent. Surveys were completed by providers from 46 percent of the practices included in the practice manager survey, a high rate of response among medical practices. The data for the practice manager survey has been weighted to reflect the actual distribution of healthcare providers in the Commonwealth by the type of practice.

Current Technology Infrastructure

Nearly all practices have access to the Internet (99%) and high-speed broadband access (92%), although broadband adoption rates are less than 90 percent for rehabilitation and therapy practices (72%), home health agencies (88%), behavioral health practices (89%) and medical specialists (89%). Most providers are using computers to access patient medical, behavioral health, and dental information, and many are using mobile computing technology in their practices.

A majority of practices (60%) have computer workstations installed in areas where patients receive care, although the rates vary by type of practice, as follows:

- Behavioral health hospitals (91%) and dental offices (77%) are most likely to have computer workstations installed in patient care areas.

- More than two-thirds of rehabilitation and therapy providers (69%) and skilled nursing facilities (68%) have computer workstations in patient areas, while 63 percent of primary care providers and 57 percent of medical specialist have them there.

- Among behavioral health providers, 60 percent have a computer workstation in areas where patients receive care.

- Overall, 63 percent of providers state they always use a computer to look up patient information in a typical day, while 19 percent frequently use a computer.

- A majority of primary care providers (77%), medical specialists (64%), dentists (63%), and home healthcare providers (63%) indicate they always use a computer to look up patient information.

- Less than half the behavioral health providers (38%), rehabilitation providers (35%), long-term care providers (30%) and providers at behavioral health hospitals (35%) indicate they always used computers to access information.

- 71 percent of practices use portable computing devices. The highest rates of use are among primary care practices (81%), home healthcare providers (77%), and rehabilita-

tion and therapy practices (73%). The lowest rate of use is among dental practices (42%).

- Providers are also using a range of information technologies, which includes hardware, such as laptops, tablets, smartphones, and other mobile computing technology; and software and services, such as telehealth, patient portals, billing, and digital services, such as radiography and digital photography.

- 28 percent of providers are using mobile technology, such as smart phones or tablets in their practice, 34 percent are using more traditional computers or lap-tops.

- The use of smart phones and tablets is most prevalent among home healthcare providers (55%) and dentists (35%).

- Nine in ten (87%) practices have an electronic practice management system, with 95 percent using systems integrated with their EHR.

- A large majority of dental practices (93%) and primary care practices (92%), medical specialists (86%), rehabilitation and therapy practices (84%) and home healthcare providers (73%) currently use electronic practice management systems.

- The lowest rates of use are among skilled nursing facilities (61%), behavioral health practices (64%) and behavioral health hospitals (64%).

The use of computerized provider order entry (CPOE[7]) is well established among primary medical care and specialist medical care practices in the Commonwealth but is less common among practices providing other healthcare services. Across all practices, 40 percent are using CPOE for all referrals, 39 percent for all medication orders, and 39 percent for lab and diagnostic tests. The rates of referral and lab and diagnostic tests are comparable across independent and affiliated practices, while affiliated practices are more likely to use CPOE for medication orders than independent practices, with 65 percent using CPOE for all of their medication orders compared to only 30 percent of independent practices. The relatively high percentage using CPOE for referrals, medication orders, and lab and diagnostic tests is driven primarily by the medical care practice (primary and specialty), among which a majority of primary care practices use CPOE for all referrals and medication orders, and nearly half for all lab and

diagnostic tests. A majority of specialty medical practices use CPOE for all medication orders. The use of CPOE is much less prevalent among all other types of healthcare practices. Outside primary and specialist medical care settings, most practices are not using CPOE at all for referrals, medication orders, or lab and diagnostic tests.

Current Use of Electronic Health Records

Most practices in Massachusetts have already adopted EHR technology and are using a number of EHR functions. The current adoption rate of EHRs among all healthcare practices in Massachusetts is 79 percent.

- The rate is highest among primary care practices with nearly all (96%) having implemented an EHR, and medical specialist practices with an 86 percent adoption rate. The next highest rates are among rehabilitation and therapy practices (79%) and home healthcare providers (74%).

- The lowest rates of EHR adoption are among dental practices (60%), behavioral health practices (55%), skilled nursing facilities (55%) and behavioral health hospitals (55%).

- Providers see the positive impacts of EHRs in facilitating the communication of patient information, improving the quality of patient care and in reducing errors.

- Among those reporting to be affiliated with a healthcare network or system, 95 percent report they are currently using an EHR. This is compared to only 75 percent of those reporting they are independent practices.

- The lowest rates of EHR adoption are among independent skilled nursing facilities (only 35 percent currently use EHR), independent behavioral health practices (50%), and behavioral health hospitals (50%).

Of those with an EHR, most practices are using their EHR for medication reconciliation (81%), quality reporting (81%) and electronic prescribing or eRx (76%), with the smallest percentage using their EHRs for clinical decision support rules (64%), and public health reporting (55%).

Medical practices in general and primary care practices in particular, are most likely to use their EHR for medication reconciliation, quality reporting, eRx, as well as clinical decision support rules.

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[7] CPOE entails the provider's use of computer assistance to directly enter, for example, medication orders from a computer or mobile device. These orders are communicated over a network to the medical staff or to the departments (pharmacy, laboratory, or radiology) responsible for fulfilling the order.

Table 4: What percentage of the following provider orders are completed using Computerized Provider Order Entry (CPOE) for... (among all MA practices)

	Referrals		Medication Orders		Lab & Diagnostic Tests	
	All Orders	None	All Orders	None	All Orders	None
Overall	40%	37%	39%	29%	39%	38%
Primary Care Providers	63%	13%	60%	1%	49%	18%
Specialist	45%	32%	55%	15%	43%	28%
Dental	20%	58%	22%	61%	24%	68%
Behavioral Health	27%	63%	27%	52%	24%	59%
Skilled Nursing Facility	14%	66%	22%	54%	10%	66%
Home Health	13%	72%	16%	72%	12%	79%
Rehab/Therapy	1%	95%	8%	86%	3%	97%
Behavioral Health Hospitals	0%	55%	9%	36%	0%	73%

Table 5: Current Status of Electronic Health Records Adoption (% among all MA practices)
Classification of Independent and Affiliated practices is based on self-reported data from the practice manager survey.

	Overall	Primary Care Provider	Specialist	Dental	Behavioral Health	Skilled Nursing Facility	Home Health	Rehab/ Therapy	Behavioral Health Hospitals
Currently Use	79%	96%	86%	60%	55%	55%	74%	79%	55%
Will Adopt in Future	16%	3%	12%	36%	29%	39%	16%	18%	36%
Will Not Adopt	4%	1%	2%	4%	16%	6%	10%	2%	9%
Independent									
Currently Use	75%	95%	83%	59%	50%	35%	77%	76%	50%
Will Adopt in Future	20%	4%	14%	36%	33%	63%	12%	21%	40%
Will Not Adopt	5%	1%	3%	4%	17%	2%	12%	3%	10%
Affiliated									
Currently Use	95%	100%	91%	100%	100%	82%	50%	96%	100%
Will Adopt in Future	4%		9%			6%	50%	4%	
Will Not Adopt	1%					12%			

Among practices currently using EHR, 69 percent report the EHR system is the same as their practice management system. Another 22 percent report the systems are different but that the two systems are integrated. Only 7 percent of those using EHR rely on a system that is not integrated with their practice management system.

Among behavioral health practices, rehabilitation and therapy practices, and behavioral health hospitals, more than 20 percent of those using an EHR do not have a system that integrates with their practice management system.

Impact of EHR Use on Providers

Among those using EHR, the key ways providers reported the use of an EHR has improved or helped facilitate the quality of care provided to their patients are 1) ease of use and access to patient data (85%); 2) ease of use for specific functions, such as e-prescribing or viewing lab or test results (59%); and 3) standardization of procedures (16%).

Thirty-seven percent of providers using EHR reported technological problems, such as system incompatibility and interoperability of EHR systems with other technology. Of those reporting that the use of an EHR has hindered patient care, 35 percent say it is because it takes more time to use, hence they see fewer patient, and 11 percent say it is because of the time spent to implement the EHR, including training staff in its use and maintenance.

Among specific providers using an EHR the following was reported:

- 50 percent of dentists report that EHR use has hindered the care they can provide to patients, due to technological problems with the EHR operating with other technology.

- 54 percent of medical specialists feel the use of an EHR has reduced the time they can spend with their patients or that they see fewer patients with its use.

Table 6: Positive Impact of EHR use among Providers (% among providers using EHR)

	Strongly Agreed	Somewhat Agreed	% Strongly and Somewhat Agree
The use of EHR facilitates communication of patient information among members of our health care team	63%	29%	92%
The use of EHR improves the quality of patient care	44%	38%	82%
The use of EHR reduces errors	23%	57%	80%
Information from EHR enables better decision-making in patient care	39%	36%	75%
The EHR system takes into account the specific needs of my scope of practice	27%	42%	70%
Since adopting EHR, our practice has seen improvement in operational efficiency	35%	35%	70%

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Need for Technical Assistance or Training Among Those Currently Using EHR

31% of Massachusetts healthcare practices are interested in technical assistance or training for the optimization of their current EHR system with an interest in the following:

- Patient Engagement (61%);
- Project Management and Workflow Redesign (50%);
- Meeting Meaningful Use Measures (47%);
- Privacy and Security Risk Analysis (46%);
- Public Health Reporting (27%);
- Vendor or System Selection and Data Migration (15%).

Among those interested in technical assistance or training, the largest percentage are primary care practices (39% of all those interested), specialty medical care practices (19%), behavioral health practices (15%), and dental practices (10%). Less than one-tenth each are skilled nursing facilities (8%), home healthcare providers (6%), rehabilitation and therapy practices (2%), and behavioral health hospitals (1%).

- 39% are located in western MA, 29% in northeast MA, and 11% in central Massachusetts;
- 52% have 11 or more providers in clinical practice, while 38% have five or fewer;
- 87% are independent practices;
- On average, 20% of the practice's payments are made through Medicare, while 28% are made through Medicaid;
- 64% currently meet 2014 ONC standards and 29% meet 2011 ONC certification standards;
- Among those who plan to adopt HIE in the future, 61% are interested in training or technical assistance in adopting HIE;
- 50% are also interested in training or technical assistance relating to meaningful use;
- 52% are also interested in training or technical assistance relating to the BORIM licensing requirement (among those that are licensed through BORIM).

Need for Training and Technical Assistance Among Future EHR Adopters

- Massachusetts healthcare practices which are interested in technical assistance or training for the adoption and implementation of EHR indicated an interest in the following:
- Privacy and Security Risk Analysis (86%);
- Project Management and Workflow Redesign (75%);
- Meeting Meaningful Use Measures (71%);
- Patient Engagement (64%);
- Public Health Reporting (61%);
- Vendor, System Selection and Data Migration (56%);
- Language services, translation (5%);

Among those interested in technical assistance or training, the largest groups are behavioral health practices (33%) and skilled nursing facilities (30%). However, less than one-tenth in each of the following fields are interested: dental practices (8%), behavioral health hospitals (8%), primary care practices (7%), home healthcare providers (7%), specialty medical care practices 5%), and rehabilitation and therapy practices (1%).

- 39% are located in the Metro West region, 23% in central Massachusetts, and 14% in western Massachusetts;
- 85% have three or fewer providers in clinical practice;
- 100% are independent practices;
- On average, 20% of the practice's payments are made through Medicare, while 15% are made through Medicaid;
- 53% intend to adopt EHR within the next 12 months;
- 8% indicate practice will not attempt to meet meaningful use standards while 92% are unsure;
- 45% are also interested in training or technical assistance in adopting HIE (among those who plan to adopt HIE in the future);
- 61% are also interested in training or technical assistance relating to meaningful use.

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- 24 percent of rehabilitation and therapy providers indicate that the time it takes to implement an EHR and time necessary for training staff and maintaining the EHR system are all hindrances to patient care.

Ninety-two percent of those providers using an EHR agree that EHRs facilitate communication of patient information among members of their healthcare team; 82 percent agree that EHRs improve the quality of patient care; 80 percent agree that EHRs reduce errors; 75 percent agree EHRs enable better decision-making; 70 percent agree that EHRs take into account the specific needs of their practice; and 70 percent have seen an improvement in operational efficiency.

Medical specialty providers were the most likely to disagree when asked if EHRs take into account the specific needs of their practice. Forty-seven percent somewhat or strongly disagree, and 40 percent disagree that EHRs have led to an increase in operational efficiency.

Future Use of Electronic Health Records

Among those that are not currently using an EHR, 79 percent report they will adopt its use in the future. Only 4 percent of all practices indicate they will never adopt an EHR. Those least likely to ever adopt EHRs are behavioral health practices (16%), followed by home healthcare providers (10%).

Among the practices planning to adopt and implement an EHR system, 70 percent state they will do so within the next 12 months, and 96 percent within the next two years. Dental practices have the longest time horizon, with only 53 percent planning to adopt and implement within the next 12 months, although 100 percent plan to do so within 2 years. Seventy-five percent of rehabilitation and therapy practices have no plans on adopting EHRs for at least three years.

Overall, 62 percent of those practices planning to adopt in the future indicate no barriers to adopting and implementing an EHR. However, only 34 percent of primary care practices

Table 7: Through your practice or organization's e-communication system, patient portal or PHR... (% among practices using)

	% Yes
Do you provide lab and test results to patients?	84%
Do you provide clinical summaries of office visits?	79%
Do patients request prescription renewals?	75%
Do you routinely identify and remind patients due for preventive care?	74%
Do patients email primary care providers, specialists and other staff?	72%
Do providers send medication lists to patients?	59%
Do you email patients?	55%
Do patients review education materials for their diagnoses or conditions?	52%
Do patients schedule appointments including dates and times?	37%
Do patients complete patient registration or update patient information?	34%

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reported no barriers, with 56 percent citing converting current systems and changing current workflows, as possible barriers to adoption. An additional 14 percent indicated the time to adopt and implement an EHR acts as a barrier, and 13 percent see expense as a barrier.

Patient Access to Health Information through a Patient Portal or PHR

Overall, 38 percent of practices report providing a means for patients to electronically access their personal health information through a patient portal or personal health record (PHR). Affiliated practices were more likely to provide patient access than independent practices (53 percent compared to only 30 percent).

Providing electronic access to patient information through an online portal varies widely by the type of services provided within the practice. Those most likely to provide a patient portal or PHR are primary care practices (56%) and medical specialty practices (41%). This compares to only 16 percent of behavioral health practices, 13 percent of dental practices, 10 percent of rehabilitation and therapy practices, 3 percent of skilled nursing facilities, and 3 percent of home healthcare practices. None of the behavioral health hospitals provide such patient access.

The most common features offered through patient portals or other electronic communication systems are lab and test results (84%), clinical summaries of office visits (79%), prescription renewals (75%), reminders for preventive care (74%), and email access to providers (72%). Specialty medical practices were the most likely to offer prescription renewals (92%), while behavioral health practices were the most likely to email their patients (73%).

Provider Communication with Patients Regarding Health IT

A majority of providers report having discussed health IT with their patients, and more than half (53%) are using health IT to allow patients to communicate electronically. Providers report that communicating with their patients via email or the internet has also made them feel more connected to their patients.

Health IT

A total of 61 percent of providers report having discussed health IT with their patients. Primary care providers (72%) and medical specialty providers (66%) are the most likely to have the discussion, while only a slight majority of behavioral health providers (59%) and dentists (54%) have done so. The types of practices that are least likely to have discussed

health IT with their patients are rehabilitation and therapy providers (50%), behavioral health hospital providers (50%), skilled nursing facility providers (38%), and home healthcare providers (17%).

Electronic Exchange of Patient Information

Just over half the providers (52%) report having specifically discussed the electronic exchange of health information with their patients. Dentists are the most likely group of providers, with 73 percent followed by primary care providers (51%), specialty medical care providers (49%), behavioral health providers (40%), and rehabilitation and therapy providers (40%). Those least likely to have discussed the electronic exchange of health information with their patients are providers at skilled nursing facilities (38%), behavioral health hospitals (33%), and home healthcare providers (26%).

Of the providers who reported having this discussion, only a small percentage (21%) indicate their patients expressed concern about the electronic exchange of their information. Among those, 81 percent indicate their patients are concerned about security of their information when exchanged between providers, while 74 percent express concerns about the privacy of their information, in terms of who has access. More than one-quarter of these patients (27%) have concerns about maintaining the accuracy of their health information as it is exchanged between providers.

Electronic Communication

Currently, 53 percent of providers allow patients to communicate electronically with them via email or through the internet. Those most likely to allow such electronic communications are dentists (70%), rehabilitation and therapy providers (66%), home healthcare providers (57%), and behavioral health providers (51%). The providers least likely to allow their patients to communicate electronically are primary care providers (45%), specialty medical providers (48%), and skilled nursing facility providers (49%). Seventy-three percent of those who do communicate electronically with their patients indicate it has made them feel more connected to their patients.

Over half of all providers (56%) are interested in communicating with their patients electronically, with 26 percent being very interested. Those expressing the greatest interest are rehabilitation and therapy providers and home healthcare providers with 68 percent expressing interest, while 67 percent of behavioral health hospital providers and 63 percent of dentists also express interest. Less than half the skilled nursing facility providers (48%) and behavioral health providers (47%) are interested in communicating with patients electronically.

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Table 8: Current Status of Electronic Health Information Exchange
(% among all MA practices)

	Overall	Primary Care Provider	Specialist	Dental	Behavioral Health	Skilled Nursing Facility	Home Health	Rehab/ Therapy	Behavioral Health Hospitals
Currently Joined	26%	30%	22%	6%	28%	8%	17%	11%	9%
Will Join in Future	68%	68%	76%	86%	53%	84%	65%	86%	82%
Will Not Join	7%	2%	3%	8%	20%	8%	19%	2%	9%
Independent									
Currently Joined	17%	21%	13%	7%	22%	11%	19%	13%	10%
Will Join in Future	76%	78%	84%	85%	57%	83%	60%	85%	80%
Will Not Join	8%	1%	4%	8%	21%	7%	21%	3%	10%
Affiliated									
Currently Joined	38%	53%	30%		24%	5%		5%	
Will Join in Future	58%	36%	70%	100%	47%	86%	100%	95%	100%
Will Not Join	4%	11%			29%	9%			

When asked what providers can do to encourage patients to communicate electronically with their healthcare providers, 40 percent indicate they already encourage their patients to communicate electronically, and 24 percent indicate they do not encourage patients to communicate electronically or that electronic communication is not allowed. Dentists are the most likely to indicate they already encourage electronic communication (68%), while home healthcare providers (47%) and skilled nursing facility providers (38%) are most likely to indicate they do not encourage electronic communication or that it is not allowed. Overall, 36 percent of the providers surveyed indicate that all providers should encourage patients to use patient portals as a communications channel but to frame their use with realistic expectations. Another 27 percent indicate that there is a need to simply provide patient portals to facilitate electronic communication between patients and providers.

Current Participation in Health Information Exchange

While the percentage of practices in the Commonwealth currently participating in Health Information Exchange (HIE) is relatively low (26%), a large majority indicate they are planning on adopting HIE in the near future. Among those currently participating in HIE, information is being shared across a broad range of healthcare providers.

Twenty-six percent of Massachusetts healthcare practices participate in HIE; 51 percent of these practices indicate they are currently participating in HIE through the HIway.

- Thirty-eight percent of practices reporting they are affiliated with a network or healthcare system participate in HIE compared to only 17 percent of independent practices.

- Those most likely to participate in HIE are primary care practices (30%), behavioral health practices (28%), and specialty medical practices (22%).

Need for Training and Technical Assistance Among Those Currently Participating in HIE

7% of Massachusetts healthcare practices and 23% of providers are interested in technical assistance or training for the optimization of their participating in health information exchange with an interest in:

Table 9: Interested in training or technical assistance (% among those interested in training)

	Practices	Providers
General HIE Education	97%	55%
Clinical or Practice Workflows	55%	52%
Sending, Receiving Care Summaries	31%	39%
Sending, Receiving Discharge Summaries	31%	38%
Sending, Receiving Referrals	31%	36%
Patient Consent & Opt-in	12%	52%
Privacy and Security Policies & Controls	24%	38%
Sending Lab Orders, Receiving Lab Results	17%	39%
Public Health Reporting	20%	28%
HIE Use Cases Development	24%	21%
Change Management	23%	13%
Return on Investment	4%	27%

- The least likely to participate in an HIE are home health-care providers (17%), rehabilitation and therapy practices (11%), behavioral health hospitals (9%), skilled nursing facilities (8%) and dental practices (6%).

Among those participating in HIE, 72 percent state they are exchanging information with medical specialists, 68 percent with affiliated primary care providers and 52 percent with hospitals within their own or with affiliated organizations. A minority are exchanging information with affiliated behavioral health providers (26%), pharmacies (20%), and lab or testing facilities (19%). There are key differences by the type of practice in exchanging information with affiliated organizations:

- Primary care practices (68%) and the small number of skilled nursing facilities (75%) participating in HIE are the most likely to exchange information with affiliated hospitals.

- 82 percent of rehabilitation and therapy practices exchange information with affiliated primary care providers.

- 56 percent of participating behavioral health practices exchange information with affiliated behavioral health providers.

Among practices, the largest percentage are behavioral health practices (33% of those interested) and primary care (33%), while 11% are home healthcare providers.

- Less than one-tenth each are skilled nursing facilities (9%), medical specialist practices (7%), dental practices (5%), and behavioral health hospitals (3%);

- 59% are located in northeast MA and 13% in southeast Massachusetts;

- 50% have 21 or more providers in clinical practice;

- 69% are independent practices and 31% are affiliated;

- On average 35% of the practice's payments are made through Medicare while 23% are made through Medicaid;

- 52% Meet 2014 ONC certification standards and 1% meets 2011 meaningful use standards, 34% do not Meet meaningful use standards;

- 44% are also interested in technical assistance or training in the optimization of their current EHR;

- 44% are also interested in technical assistance or training related to BORIM licensing;

- Among providers, 31% are general practitioners, 28% specialty medical providers, 16% behavioral health providers, and 13% nurse practitioner or physician assistants;

- 43% have been practicing for 20 or more years and 30% for 10 or fewer years.

Among those participating in HIE, nearly two-thirds (65%) are exchanging information with non-affiliated hospitals. However, only small percentages are exchanging information with non-affiliated primary care providers (18%), medical specialists (13%), and behavioral health providers (12%). There are also differences in the exchange of health information with non-affiliated organizations by type of practice.

- 82 percent of rehabilitation and therapy practices exchange information with non-affiliated primary care providers and medical specialists

- 51 percent of participating skilled nursing facilities also exchange information with non-affiliated primary care providers.

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Need for Training and Technical Assistance Among Those Who Will Participate in HIE

23% of MA healthcare practices and 53% of providers are interested in technical assistance or training for participating in health information exchange with an interest in:

Table 10: Desired training topics for practices and providers (% among those interested in training)

	Practices	Providers
General HIE or Mass HIway Education	91%	68%
Privacy and Security Policies & Controls	64%	38%
Patient Consent & Opt-in	50%	43%
Clinical or Practice Workflows	54%	34%
Sending, Receiving Discharge Summaries	50%	37%
Sending, Receiving Care Summaries	48%	39%
Sending, Receiving Referrals	37%	43%
Sending Lab Orders, Receiving Lab Results	32%	44%
Public Health Reporting	47%	23%
Return on Investment	30%	40%
HIE Use Cases Development	30%	15%
Change Management	17%	18%

- 76 percent of behavioral health practices exchange information with non-affiliated hospitals.

- 71 percent are currently exchanging information with local or public health departments.

A majority of those practices participating in HIE are currently reporting public health and quality measures (77%), providing requests for referral (75%), and using eRx (74%), while less than half use electronic lab, radiology or pathology ordering (45%), electronic eligibility verification (39%), or transitions of care (28%).

- Primary care practices are most likely to report public health and quality measures (90%), provide requests for referrals (87%) and electronic lab, radiology or pathology test ordering (64%).

- Medical specialty practices are most likely to have implemented eRx (84 percent of those using HIE).

- Among the 8 percent of skilled nursing facilities participating in HIE, 76 percent are using HIE for transition of care.

Among practices interested in technical assistance or training, the largest percentage are primary care practices (32%), specialist medical practices (15%), behavioral health practices (15%), skilled nursing facilities (14%), and dental practices (11%). Less than one-tenth each are home healthcare providers (5%), rehabilitation and therapy practices (4%), and behavioral health hospitals (2%).

- 45% are located in western MA, 16% in northeast Massachusetts, 13% in central MA, 12% in southeast MA, and 11% in the Metro West Region;

- 63% have 11 or more providers in clinical practice and 21% have 5 or fewer;

- 95% are independent practices;

- On average 29% of the practice's payments are made through Medicare while 29% are made through Medicaid;

- 89% currently use EHR;

- % of those who indicate they meet ONC Certification standards are also interested in technical assistance or training that would be useful to their practice or organization in moving forward with meeting Meaningful Use criteria;

- 45% are also interested in technical assistance or training related to BORIM licensing. 0

Among Providers:

- 25% are general practitioners, 21% specialty medical providers, and 15% behavioral health providers while 30% are other care staff;

- 66% have been practicing for 20 or more years;

- 47% are male and 53% female;

- 27% intend to join an HIE within the next 12 months and 83% within the next two years;

- 26% cite the time to implement as a barrier, 25% the expense and 13% indicate the lack of knowledge about uses and functions of HIE as a barrier to participation;

- 83% are also interested in technical assistance or training in the optimization of their current EHR;

- 44% of those who indicate they meet meaningful use standards are also interested in technical assistance or training that would be useful to their practice or organization in moving forward with meeting Meaningful Use criteria;

- 45% are also interested in technical assistance or training related to BORIM licensing.

Among providers interested in technical assistance or training, 25% are general practitioners, 21% specialty medical providers, and 15% behavioral health providers while 30% are other care staff.

- 66% have been practicing for 20 or more years;

- 47% are male and 53% female.

Table 11: Next, I would like to know with which groups you are currently exchanging Health Information. Are you exchanging information with…
(% among practices participating in HIE)

	Affiliated Organizations	Non-Affiliated Organizations
Medical Specialists	72%	13%
PCP or Family Practice Physicians	68%	18%
Hospitals	52%	65%
Behavioral Health Providers	26%	12%
Pharmacies	20%	9%
Imaging, Laboratory, or other Testing Organization, Facility	19%	8%
Home Health Providers	8%	4%
Long-Term Care Facilities	6%	3%
Human Services Providers such as Substance Abuse	6%	4%
Dental Service Providers	4%	3%
ER or Emergency Room		7%
State or Local Public Health Departments		71%
School Health Clinics		14%
Correctional Facilities		4%

Future Participation in Health Information Exchange

A large group of healthcare practices expect to adopt and implement HIE over the next few years. While many are unsure of their timeframe for participation, most do not foresee any barriers. Overall, 68 percent of Massachusetts healthcare practices not currently participating in HIE will participate in the future. Of this number, 76 percent are independent practices and 58 percent report being affiliated with a network or healthcare system. Seven percent of all providers indicate they will not participate HIE in the future; 8 percent are independent practices and 4 percent affiliated practices. The groups least likely to join in the future are behavioral health providers, with 20 percent indicating they will not join an HIE, and home healthcare providers, with 19 percent indicating they will not join an HIE.

Nearly half the practices that expect to participate in HIE in the future are unsure of their timeline, but 21 percent intend to do so within the next 12 months, and 44 percent within the next two years. Behavioral health hospitals (50%) and primary care practices (39%) are the most likely to state they will adopt within the next 12 months.

More than half the practices that will adopt in the future indicate no barriers to adopting and implementing HIE. Thirteen percent indicate the expense and 11 percent indicate the time to adopt and implement as barriers.

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Among providers that do identify barriers, 25 percent cite the cost; 20 percent identify time required for participation and implementation; 16 percent indicate technological problems, such as system incompatibility; and 12 percent view security risks and ensuring the confidentiality of information.

- Cost concerns are greatest among home healthcare providers (38%).

- Time constraints are of greatest concern to dentists (29%).

- Security and confidentiality of any information exchanged by 23% of behavioral health providers.

Patient Opt-In Process for the Massachusetts Health Information HIway

There is a broad unfamiliarity among all types of providers with the opt-in process for patient consent and authorization aspects of the HIway. Providers also perceive that nearly all patients are unfamiliar with the opt-in process too.

Among providers familiar with the opt-in process, only 1 percent are very familiar; another 19 percent somewhat familiar; 28 percent are not very familiar; and more than half (52%) are not at all familiar with the process.

The highest level of awareness is among skilled nursing facility providers (29 percent reported being somewhat or very familiar) and dentists (with 27 percent being somewhat or very familiar).

The lowest levels of familiarity are among the behavioral health providers (63 percent not at all familiar) and behavioral health hospital providers (60 percent not at all familiar).

The perception among providers is that nearly all their patients are also unfamiliar with the opt-in process for the HIway. Among all providers, only 1 percent indicated their patients are very familiar; another 4 percent believe their patients are somewhat familiar; and 95 percent believe their patients are very or somewhat unfamiliar. Compared to the patient consent process, 28 percent of providers indicate their patients are not very familiar and two-thirds (67%) indicate their patients are not at all familiar with the patient consent process.

Benefits of Health Information Exchange

A majority of providers see benefits to the use of health information exchange, though current users are more positive about its benefits than those not currently participating in HIE. The most significant benefits providers see are better coordination of care, the reduction of medical errors, and the elimination of duplicate tests or procedures.

Providers Views of HIE

While most providers think HIE will have considerable benefits, some think it will have minor or no benefit. Some providers may be implementing HIE but not believing in its value. Lackluster support may be an obstacle to fully using this technology.

Table 12: Provider HIE
(% among all providers indicating minor or no benefit)

Potential benefits of using HIE	Minor Benefit	No Benefit	Minor or no Benefit
Reduce Medical Errors	19%	6%	25%
Reduce Duplication of Tests	20%	7%	26%
Improve Patient Safety	29%	3%	32%
Improve Public Health Reporting	28%	9%	37%
Improve Meaningful Use	34%	6%	40%
Support Value Based Payment Models	38%	18%	46%

Significant benefits seen among providers currently participating in HIE include better coordinated care (80%), reduction of medical errors (75%), and elimination of duplicate tests or procedures (74%). More than two-thirds (68%) indicate that improved patient safety is a significant benefit, while 63 percent mention public health reporting, and 60 percent achieving meaningful. Almost half (48%) view supporting a value-based payment model as a significant benefit. In general, behavioral health providers, skilled nursing facility providers, and home healthcare providers are most likely to indicate using HIE as providing these potential benefits.

Of those not currently using HIE, 71 percent indicate that better coordinated care is a significant benefit, 60 percent cite eliminating duplicate tests, 54 percent say reducing medical errors, and 52 percent suggest improved patient safety. However, less than half see participation in HIE as providing significant benefits in the areas of improved public health reporting (42%), achieving meaningful use (38%), or supporting vale-based payment models (34%). Among those that are

Table 13: Please rate the following potential benefits of using or to your adoption of a health information exchange (HIE) as a significant benefit, a minor benefit, or not a benefit. (% indicating significant benefit among all providers)

	Currently Using HIE	Not Currently Using HIE
Better coordinated care	80%	71%
Reduce medical errors	75%	54%
Reduce duplication of tests or procedures	74%	60%
Improve patient safety	68%	52%
Improve public health reporting	63%	42%
Achieve meaningful use	60%	38%
Support emerging value-based payment models	48%	34%

not participating in HIE, skilled nursing facility providers and rehabilitation and therapy providers are most likely to see potential benefits in the participation in and implementation of HIE.

Certification and EHR Incentive Program Participation

The 2009 HITECH Act provides for Medicare and Medicaid incentive payments for the meaningful use of "certified EHR technology" by eligible professionals and hospitals. The HITECH Act also created the Office of the National Coordinator for Health Information Technology (ONC) which developed a Certification Program to ensure that EHR technologies meet the standards and criteria necessary to help eligible providers and hospitals achieve meaningful use objectives and measures for the Incentive Program, as established by the Centers for Medicare and Medicaid Services (CMS).

To qualify for Incentive Payments in 2014, all eligible providers' systems are required to meet the 2014 ONC certification standards – an upgrade from the 2011 Standards.[8] Practices are required to use systems that meet the ONC Certifications standards only if the practice's providers are participating in the Medicare or Medicaid EHR Incentive Payment Programs.

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[8] CMS recently indicated it would amend its rules to grant flexibility to providers who are experiencing difficulties fully implementing 2014 Edition CEHRT to attest this year.

Need for Training and Technical Assistance in Meeting meaningful use objectives:

20% of MA healthcare practices are interested in technical assistance or training in meeting Meaningful Use objectives with interest an in:

- Meeting MU Clinical Quality Measures – CQMs (74%);
- Patient Engagement Strategies (73%);
- Understanding EHR Incentive Program Requirements (72%);
- Understanding MU Core and Menu Measures (59%);
- Meeting Public Health Measures (56%);
- Achieving Interoperability (2%).

Among those interested in technical assistance or training, the largest percentage - in order - are primary care practices (33%), behavioral health practices (21%), specialty medical care practices (14%), and skilled nursing facilities (13%). Less than one-tenth each are dental practices (7%), home healthcare providers (5%), rehabilitation and therapy practices (4%), and behavioral health hospitals 3%).

- 37% are located in northeast MA, 17% in western MA, 15% in central MA, 13% in the Metro West Region, and 12% in southeast MA;
- 46% have 5 or fewer providers in clinical practice and 43% have 11 or more;
- 85% are independent practices;
- On average 19% of the practices' payments are made through Medicare while 29% are made through Medicaid;
- 86% currently use EHR;
- 21% have joined an HIE;
- 59% have experience challenges in meeting MU objectives. Most commonly that MU objectives don't mesh with the operating procedures of the practice (44%), the unwillingness of staff to meet objectives (24%), that providers lack the technical skills to use health IT effectively (22%), and the lack of time (20%);
- 79% are also interested in technical assistance or training in the optimization of their current EHR;
- 58% are also interested in technical assistance or training in adopting and implementing HIE in the future.

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Need for Training and Technical Assistance in Meeting BORIM Licensing Requirement

19% of Massachusetts healthcare practices with a primary care or medical specialist physician and 24% of such providers are interested in technical assistance or training in meeting the new BORIM licensing requirement .

Among practices, 41% are located in northeast Massachusetts, 20% in central Massachusetts, 17% in western Massachusetts, and 11% in southeast Massachusetts.

- 47% have 11 or more providers in clinical practice and 40% have 5 or fewer;

- 83% are independent practices;

- On average 22% of the practice's payments are made through Medicare while 28% are made through Medicaid;

- 96% currently use EHR;

- 13% have joined an HIE and 87% intend to join in the future;

- 88% are also interested in technical assistance or training in the optimization of their current HIE (among those participating in HIE);

- 43% are also interested in technical assistance or training for adopting and implementing HIE (among those that will participate in HIE in the future).

Among providers, 56% are general practitioners and 44% specialty medical providers.

- 37% have been practicing for 10 or fewer years and 34% for 20 or more years;

- 64% are male and 32% female.

Participation in Healthcare Quality Initiatives

Overall, 44 percent of Massachusetts healthcare practices report participating in a federal, state or insurance company healthcare quality initiative. Forty-three percent of practices report they are not participating in a healthcare quality initiative and 14 percent are unsure.

The groups with the highest percentage participating are primary care providers (56%) and skilled nursing facilities (50%).

Those least likely to participate are behavioral health hospitals (9%), and home healthcare providers (12%).

Sixteen percent of practices in a healthcare quality initiative participate in the Blue Cross Blue Shield (BCBS) alternative quality contract, 9 percent in the e-prescribing incentive program, 9 percent in NCQA, 8 percent in Medicare PQRS, 8 percent in Pioneer, 7 percent in MassHealth primary care payment reform, 6 percent in Medicaid managed care, and 5 percent in patient centered medical home, among others.

Meeting BORIM Licensing Requirements[9]

Among practices, with providers licensed through Board of Registration in Medicine (BORIM), most indicate their providers are at least somewhat familiar with the physician licensing requirement regarding proficiency in the use of

EHRs. Most providers licensed through BORIM also indicate familiarity with this physician licensing requirement.

Overall, 86 percent of primary care and specialty medical care practices have one or more doctors licensed through BORIM. This includes 88 percent of primary care practices and 79 percent of specialty medical care practices. Nearly one in five (19%) of these practices are very familiar with the physician licensing requirement regarding proficiency in the use of EHRs and another 54 percent are somewhat familiar, while 14 percent are not very and 13 percent are not at all familiar with these licensing requirements.

Nearly nine in ten (88%) of primary care or medical specialist providers, indicate they are licensed through BORIM. Among these providers, 22 percent are very familiar and another 42 percent are somewhat familiar with the licensing requirement, while 20 percent are not very and another 16 percent are not at all familiar.

Benefits of Data from All Payer Claims Database (MA APCD)

Most providers see significant benefit from access to the Commonwealth's All Payer Claims Database ("MA APCD") in terms of timely notifications of ER visits or inpatient admissions and the records of services provided to their patient outside of their practice.

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[9] In August 2012, the Massachusetts state legislature passed Chapter 224 of the Acts of 2012. The new legislation applies more specific measures of physician proficiency with health information technology, as a condition of licensure in Massachusetts.

The 2012 Massachusetts healthcare reform law calls for provider access to the MA APCD. Fifty-eight percent of providers indicate such access would provide a significant benefit in allowing access to a record of services provided to their patients outside of their practice. Just over half (51%) indicate a significant benefit would be timely notifications of ER visits and/or inpatient admissions. Less than half believe that access to the all payer claims database would offer significant benefits in terms of improved care coordination (47 percent see as a significant benefit), benchmarking costs (37%), benchmarking quality measures (36%), or reducing medical errors (33%). In general, the providers most likely to view access to the all payers claim database as having potential benefits are skilled nursing facility providers, rehabilitation and therapy providers, and behavioral health hospital providers.

Demographics

Practice Characteristics

The practice characteristics in this study are as follows: 27 percent offer primary care services, 24 percent offer behavioral health services, 23 percent offer specialty medical care services, 16 percent were skilled nursing facilities, 14 percent offer dental services, 11 percent offer rehabilitation and therapy services, 9 percent are home healthcare providers, and 2 percent are behavioral health hospitals. Thirty-seven percent of practices provide more than one type of healthcare service.[10] Fifty-six percent of practices had five or fewer providers in clinical practice, while 35 percent had 11 or more providers in clinical practice.

Eighty-one percent of practices were independent, 11 percent were affiliated with a network or healthcare system, and 8 percent were unsure about affiliations. Among those affiliated with a network of healthcare systems, a majority provided specialist medical care (73%) and primary medical care (57%), while less than half also provided dental care (33%), behavioral health services (26%), hospitalization (24%), lab or imaging services (21%), long-term care services (15%) or home healthcare services (8%).

On average, 19 percent of practice payments are made through Medicare, 20 percent through Medicaid, and 5 percent through the Health Safety Net.

Table 14: What training or assistance would be useful to your practice or organization in meeting this new BORIM licensing requirement? (% among those interested in training)

	Practices	Providers
Interfacing EHR System with HIE	70%	69%
Using Health IT to Improve Clinical Care	53%	58%
Workflow Redesign and Practice Transformation	48%	47%
Quality Indicator Reporting	43%	42%
Privacy, Security, HIPAA Policy Guidance	48%	31%
Preparation for Compliance with Meaningful Use Measures	21%	52%
General Training on MU Core, Menu and Quality Measures	34%	37%
Public Health Reporting	32%	27%
Project Management During EHR, HIE Implementation	9%	42%
Assistance with Vendor Selection	12%	35%
Assessment, Gap Analysis of Readiness for Meaningful Use	19%	24%

Table 15: Please rate the following potential benefits of having claims data on patients seen in your practice as: a significant benefit, a minor benefit, or not a benefit (% among all providers indicating significant benefit)

	% Significant Benefit
Improve Care Coordination	46%
Reduce Medical Errors	33%
Benchmarking practice in terms of costs	37%
Benchmarking practice in terms of quality measures	36%
Timely notification of ER visits and/or inpatient admissions	51%
Record of services provided to patients outside of your practice system	58%

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[10] In cases where a practice location provided more than one type of care, their responses were reported in each category of service.

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Provider Characteristics

The provider characteristics in this study are as follows: nearly half were physicians (26 percent general practitioners and 23 percent specialists), 16 percent behavioral health providers, 11 percent a nurse practitioner or physician's assistant, 5 percent registered nurse and 3 percent long-term care providers. Twenty-six percent are other types of healthcare providers. Fifty-percent have been practicing for 20 or more years, while 24 percent for 10 years or less. Forty-nine percent are male and 51 percent female.

Consumer Survey Discussion

The MeHI Consumer Survey is based on surveys of 807 Massachusetts healthcare consumers conducted between November 26, 2013 and January 30, 2014. The sample design relied on a stratified dual frame random digit dial (RDD) methodology. The sample included both land line telephones and cell phones. In addition, the sample was stratified by the six Massachusetts health service regions. All surveys were completed by telephone. The response rate for the consumer survey was 42 percent (AAPOR RR3). The data for the consumer survey has been weighted to reflect the actual distribution of consumers aged 18 and older by their gender, age, and region of the state, race and ethnicity.

Familiarity with Health Information Technology

Overall awareness of health IT is high, with 83 percent of consumers having heard about various types of health information technology. Awareness is bolstered by the many consumers who already have actual experience using health IT in its varied forms, including web portals, electronic communication and personal health records. More than two-thirds of the consumers surveyed already have first-hand experience with health information technology. Since the subject is most relevant to those who use it, they are more likely to be familiar with it. However, respondents with lower incomes ($25,000 or less each year) and less education (high school or less) report significantly fewer experiences with and awareness of health IT.

Health Information Technology

Health IT is a familiar topic for most consumers, particularly well-educated and upper income consumers. 84 percent have heard about health IT, with 45 percent having heard a lot. Those with a high school education or less (27%) are much less likely to have heard a lot than those with a bachelor's degree (46%) or a graduate degree (60%). Those with

incomes of less than $25,000 are also much less likely to have heard a lot (30%) than those with incomes of $75,000-$100,000 (52%) and those with incomes of $100,000 or more (53%).

Those with a high school education or less are significantly less likely to have looked at lab or test results online or by email (30%) than those with a bachelor's degree or a graduate degree (55%). Those with income of less than $25,000 are significantly less likely (16%) to have renewed a prescription online or by email than those with incomes of $75,000-$100,000 (37%) and those with incomes of $100,000 or more (41%).

Personal Health Record

Personal health records (PHR) are also a high profile topic, but not as much among lower income respondents. 77% are familiar with personal health records, with 42 percent having heard a lot. Consumers with a high school diploma or less are much less likely to have heard about (21%).

Electronic Health Information Exchange

The term electronic health information exchange is familiar to a smaller but still considerable number of consumers. 70 percent have heard about electronic health information exchange, with 30 percent having heard a lot. Familiarity declines as educational attainment levels decline; those with high school diplomas or less are much less likely to have heard a lot (18%). Only 19 percent of the consumers surveyed have heard specifically about the HIway, with 5 percent having heard a lot.

Patient-Provider Communication

Communication from physicians is not the most important source of information about health information technology, but a physician's advice is very influential. Twenty-four percent have heard about health IT from their physicians in the past year, but the number drops among those with a high school education or less (13%). Thirty-seven percent of consumers have had a discussion about their EHR with their physician, and 61 percent of those that use a personal health record say their doctor or healthcare provider was important in their decision to use a PHR, while 35 percent say their providers were not important in their decision.

Attitudes towards Health Information

Consumers have overwhelmingly positive attitudes toward health information technology. This is driven in part by

perceptions of the benefits of technology; more than three quarters believe that this switch from paper to electronic records will improve care.

85 percent are comfortable with electronic storage of health information, with 50 percent very comfortable. Only 5 percent are not at all comfortable.

78 percent believe that if all doctors used electronic health records instead of paper records it will improve care; with 48 percent believing it will greatly improve care.

Use of Health Information Technology

Penetration of health IT among healthcare providers and use of this technology by consumers and providers alike is now widespread. More than two thirds say their provider maintains an electronic health record for them. About half have communicated electronically with their provider, either via e-mail or thorough a web portal. More than one third indicates their provider offers a web portal and one in five uses a personal health record.

Patients are taking the first steps toward adopting health information technology, with about half having looked at lab or test results electronically and more than a third renewed a prescription or scheduled an appointment.

Providers appear to have an important role in encouraging the use of health information technology. For example, among those using electronic communication with their provider, two-thirds say their provider encouraged them to do so. Conversely, among those interested but not yet using electronic communication, almost three-quarters say their provider has not encouraged them to do so.

Unfortunately, availability and use of technology is not universal. Those with lower incomes, less than $25,000 a year and those with a high school education or less, are more likely to say their provider does not offer health information technology and are less likely to use health information technology when it is offered.

Electronic Health Records

EHRs are the most widely used of the technologies researched. Sixty-nine percent say their healthcare provider maintains an electronic health record for them. However, there are differences by education: 85 percent of those with a graduate degree say their physician has an EHR, while just 55 percent of those with a high school degree or less indicate such.

Electronic Communication

Electronic communication with providers is used by half the consumers surveyed. Fifty percent currently communicate with their provider electronically either via e-mail or through a web portal. However, fewer of those with incomes of less than $25,000 per year (35%), with a high school education or less (32%), and those 65 years of age and older (39%) communicate electronically. Forty-four percent of those with incomes of $25,000 or less and 42 percent of those with a high school education or less say their provider does not have this capacity.

Fifty-six percent of consumers say their provider encourages them to communicate electronically. However, of those who actually use electronic communication, 67 percent say their provider encouraged them to do so. Of those not using electronic communication but are interested in doing so, 72 percent say their provider has not encouraged them to do so.

Patient Portals

Thirty-eight percent of consumers report their provider offers a patient portal that allows them to access personal health information. However, respondents with incomes of $25,000 or less are less likely to use one with only 25 percent reporting they currently use a patient portal or personal health record.

Use of patient web portals by patients is limited both in terms of those who have access to one and the scope of features it offers. Among those with access to a web portal 53 percent looked at lab or test results, 38 percent renewed a prescription, and 34 percent scheduled an appointment.

Personal Health Records

Personal Health Records (PHR) are used by the smallest number of consumers with only 19 percent saying they or someone in their family uses one.

Perceived Benefits of Health Information Technology

Benefits to health information technology are clearly recognized by users. The most important benefits are tangible, such as allowing "easier" communication with their physician and intangible or "feeling more involved in their care". About half agreed that health information technology has led them to take personal responsibility for their health, "doing something to improve their health."

Electronic Communications

Of those with access to a web portal or electronic communication with their physician the following was discerned:

- 76 percent agree that electronic communication has made it easier to communicate with their physician, with 48 percent strongly agreeing.

- 65 percent agree they feel more involved in their care, with 37 percent strongly agreeing.

- 59 percent agree that electronic communication has made them feel they know more about their health, with 34 percent strongly agreeing.

- 54 percent agree that electronic communication has made them feel like they know more about the care their doctor gives them, with 32 percent strongly agreeing.

- 46 percent agree it has led them to ask a question they might have otherwise asked, with 19 percent strongly agreeing.

- 47 percent agree that electronic communication with their provider has led them to do something to improve their health, with 22 percent strongly agreeing.

- Personal Health Record

- Of those who use a personal health record, the following was discerned:

- 90 percent find it useful, with 56 percent finding it very useful.

- 84 percent agree it made them feel like they know more about their health, with 56 percent strongly agreeing.

- 83 percent agree it has made them feel more involved in their own healthcare, with 56 percent strongly agreeing.

- 76 percent agree it made them feel more connected to their doctor, with 45 percent strongly agreeing.

- 82 percent agree it made them feel like they know more about the care their doctor gives them, with 53 percent strongly agreeing.

- 56 percent agree it lead them to ask a question they might not have asked before, with 34 percent strongly agreeing.

- 66 percent agree it lead them to do something to improve their health, with 33 percent strongly agreeing.

- 53 percent agree it lead them to finding missing or incorrect information about their health, with 31 percent strongly agreeing.

- 44 percent agree it made it easier to talk to their family about their health, with 21 percent strongly.

- 40 percent agree it made them less likely to switch doctors, with 29 percent strongly agreeing and 35 percent disagreeing.

Health Information Technology Adoption by Non-Users

When directly asking non-users about the use of electronic communication with their healthcare providers, many (59%) say they are not interested in doing so. However, two-thirds of non-users become interested when enticed with specific benefits. This is a familiar pattern to those who study the processes of innovation diffusion. Innovators and early adopters readily accept promising new ideas, often without prompting. The majority of any market will lag behind, adopting only when an innovation becomes mainstream and perceived risks have been confronted and overcome by others. To encourage those that wait to adopt innovations, it is necessary to continually communicate the benefits of adoption. Using credible sources to communicate those benefits is the best way to address perceived risk.

Of those who do not currently communicate electronically online or via e-mail with their doctors, 40 percent are interested in doing so, and 59 percent are not.

- 71 percent are interested in seeing their doctor's instructions online, with 32 percent reporting they would be very interested.

- 69 percent are interested in e-mail or online reminders for tests, with 47 percent being very interested in such reminders.

- 67 percent are interested in receiving information from their doctor online or via e-mail without having to go in the office, with 32 percent being very interested.

- 65 percent are interested in renewing prescriptions online or via e-mail, with 47 percent being very interested.

- 63 percent are interested in requesting appointments online or via e-mail, with 39 percent being very interested.

- 65 percent are interested in looking at lab results online or receiving them by e-mail, with 41 percent being very interested.

- 32 percent are interested in e-mail or online reminders to take prescriptions, with half those being very interested.

Interest and Barriers to Personal Health Records Use among Non-Users

Current non-users of personal health records indicate they are ready to adopt this innovation; more than three out of four are interested in doing so and most of them are very interested. The most significant perceptual barrier to adoption is concern about privacy and security of their personal information. However, for most (51%) a simple discussion with their provider would alleviate concerns. For some consumers, particularly those age 65 and older, availability of internet service and computers and comfort with the use of technology is a very real barrier.

Of those who do not use a personal health record, the following was discerned:

- 77 percent are interested in having their own copy of their personal health record, with 55 percent being very interested.

- 58 percent are interested in using a website where they can review or update their personal health information, with 26 percent being very interested.

- 55 percent are interested in managing their family's health information online, with 23 percent being very interested.

- Of those who do not use a personal health record, the following was discerned:

- 69 percent are worried about the privacy and security of information. This concern is even higher in Western Massachusetts, where 83 percent agree privacy concerns are a barrier to their adoption.

- 51 percent agree that a doctor's or healthcare provider's assurance that their health information is safe would encourage them to start using a personal health record. Fewer of those 65 and older (36%) would find this sufficient.

- 31 percent agree they do not need a personal health record to handle their health needs.

- 28 percent agree that taking too much time to update information is a barrier to use, with 42 percent of those 65 years of age and greater agreeing.

- 24 percent agree the cost of a personal health record is a barrier to use, with 40 percent of those with a high school degree or less agreeing, along with 37 percent of those with incomes less than $25,000 a year.

- 19 percent agree that taking too much time to learn is a barrier to use, with those 65 years of age (36%) and older, those in Western Massachusetts (32%), and those with a high school diploma or less (38%) agreeing.

- 18 percent agree their dislike of computers or the internet is a barrier to use, with those 65 years of age and older being much more likely to agree (40%), along with those with a high school education or less (35%). Those who indicated their health was "fair or poor" were also more likely to say agree (32%).

- 15 percent agree that not being familiar with computers and the internet is a barrier to use, with those 65 years of age and greater being much more likely to agree (42%).

- 14 percent agree that not having access to the internet was a barrier to use, with those 65 years of age and greater being much more likely to agree (33%).

Health Information Exchange and the Massachusetts Health Information Highway (HIway)

Almost all consumers agree with the conceptual benefit of health information exchange; 80 percent agree that sharing information electronically between providers will improve the quality of care. However, only a slight majority (53%) of consumers have positive impressions about Massachusetts developing its own system for HIE, the HIway. The gap between the recognized benefits of HIE in general and specific perceptions of the HIway is likely the result of a lack of familiarity. As mentioned in previous sections of this discussion, less than one in five consumers say they are familiar with the HIway, and among the general public, not much at all is known about this endeavor.

Not surprisingly, nearly two-thirds of the consumers surveyed are concerned about the security and privacy of information shared electronically between providers. This concern can be readily mitigated by communicating security safeguards and requiring patient consent before information is shared electronically. Eighty-seven percent supports the exchange via the HIway knowing information could be shared only with patient consent, and 84 percent support the exchange via the HIway knowing information would be sent through secure connections and that providers are responsible for security of the information.

- 80 percent say the ability to share healthcare information electronically between organizations where medical care is received will improve the quality of care.

- 64 percent are concerned about security and privacy of information if it is shared electronically between organizations, with 29 percent being very concerned.

- 53 percent have positive impressions of Massachusetts developing its own health information exchange called the

Health Information Highway, with 18 percent expressing negative impressions.

- 87 percent are supportive of the HIway knowing that information could only be shared with a patient's consent, with 57 percent being very supportive.

- 85 percent are supportive of the HIway knowing the exchange of healthcare information between providers will better coordinate care, increase patient safety and lower healthcare costs, with 60 percent being very supportive. Consumers in Western Massachusetts, however, are significantly less supportive (46%).

- 84 percent are supportive of the HIway knowing information would be sent through secure connections with providers being responsible for security of the information. Fifty-four percent are very supportive.

- 52 percent of responding consumers would not want some groups to have access to personal health information.

Similar Research

Limitations in Comparisons to MeHI Practice Manager and Provider Surveys

Very few state-specific health IT surveys were found, although two of these surveys were specific to Massachusetts (Fortin & Drazen, 2013; Massachusetts Medical Society, 2013). Consequently, national health IT coverage trends are more readily available than state-specific trends as surveys tend to focus on interviewing a national sample and then look at physicians and clinics by state. The National Ambulatory Medical Care Survey and Electronic Health Records Survey have tracked EHR adoption rates back to 2001. Response rates for the surveys that were found varied widely, ranging from a low of 3 percent to a high of 62 percent.

Many of these studies, including those conducted in Massachusetts, did not survey the full range of healthcare providers. The specific Massachusetts Studies (Massachusetts Medical Society, 2010 and Massachusetts Medical Society, 2013) included only physicians and dentists in their samples. Furthermore, dentists made up only a small percentage of participants. The study conducted by Blue Cross and Blue Shield of Massachusetts only surveyed ambulatory physicians (Fortin & Drazen, 2013). The National studies, such as the National Ambulatory Medical Care Survey and Electronic Health Records Survey, which includes in its sample only office based physicians, only focused primarily on medical providers.

These results do provide some insight into trends in health IT for the Commonwealth and the Nation, but specific groups surveyed must be considered when making comparisons to the MeHI surveys of practice manager and providers, which did include in their selection healthcare providers from all sectors of the field, sampled in relative proportion.

Study Findings

EHR Adoption

Adoption of EHR among practitioners in Massachusetts is generally better than the national average (Hsiao & Hing, 2014, Hsiao & Hing, 2012). In fact, on many measures, practitioners in Massachusetts have among the highest rates in the nation of adoption of specific EHR capabilities, including electronically ordering prescriptions (84%) and receiving notifications of potential conflicts concerning prescription medications (72%) (Fortin & Drazen, 2013). Rates for the nation as a whole and in the Commonwealth have been increasing, although the pace of increase is slower in the Commonwealth. However, this is due to the fact that Massachusetts is already above the national average in EHR adoption among its healthcare providers. Nationwide, 78 percent of office-based physicians reported using EHR in 2013; an increase from 72 percent in 2012 and 57 percent in 2011 (Hsiao & Hing, 2014).

Based on a 2008 study, roughly 28 percent of practices nationwide had basic EHR capabilities, compared to roughly 54 percent of practices in Massachusetts. Although adoption of basic EHR capabilities in Massachusetts at this time was above the national average – especially among office-based physicians – adoption of advanced EHR capabilities in Massachusetts was at or near the national average (Fortin & Drazen).

The percent of the Commonwealth's physicians and dentists using EHR increased to 73 percent in 2010; 76 percent of physicians and 16 percent of dentists (Massachusetts Medical Society, 2010). During this study, 11 percent of physicians and 32 percent of dentists also reported they would adopt the use of EHR in the future (Massachusetts Medical Society, 2010). Based on the survey conducted by the Massachusetts Medical Society during 2013, the current rate of adoption in the Commonwealth is 79 percent among active physicians (Massachusetts Medical Society, 2013).

Prior research has focused greatly on differences in EHR adoption based on the size of a practice. Generally, physicians in larger practices have higher levels of EHR adoption and are more likely to use these systems (Fortin & Drazen, 2013; Rao et al., 2011). Additionally, office-based physicians also tend to have higher levels of EHR adoption and use (Hsiao & Hing, 2012). These results are mirrored in the MeHI survey of practice managers, where we also observe that affiliated providers are more likely to have adopted an EHR than independent providers.

Based on the earlier 2008 survey, substantial gaps remained in abilities to keep various electronic notes and lists. As for advanced capabilities, disease management and health maintenance were areas still in need of improvement. The most adopted capabilities (on average 50 percent adoption rate or greater) included electronically ordering prescriptions and e-prescribing, performing drug interaction checks and receiving notifications of conflicting medicines, inserting transcribed dictation into an EHR, recording demographics, providing clinical summaries to patients, and accessing various lists. The least adopted capabilities (on average less than 50 percent adoption rate) included writing encounter notes, maintaining various lists (such as problem lists, allergy lists, patient lists), electronically viewing or being advised of compliance with quality measures, and accessing and using disease management and health maintenance plans.

Based on more recent studies, these gaps seemed to have been largely addressed as there is a greater use of functions within EHR systems at least among ambulatory care providers. Among those using an EHR, a majority now order medications, record demographics, e-prescribe, use clinical notes, view lab results, record smoking status, record vital signs, record medication/allergy lists, record drug warnings, record problems lists, view imaging results, record patient clinical summaries, provide the patient an e-copy of health information, and record guideline reminders (Hsaio C, Jha AK, King J, et al. 2013). However, less than half have the capacity to view

quality data (Hsaio C, Jha AK, King J, et al. 2013). The results of the MeHI practice manager survey suggest that rates of use of key functions, such as e-prescribing, quality reporting, public health reporting, and clinical decision support rules are at or above the rates observed nationally.

In Massachusetts, 34 percent report that the use of an EHR significantly slows down their practice and another 32 percent indicate it slows down their practice (Massachusetts Medical Society, 2013). While the MeHI provider survey did not directly measure provider's perceptions of this impact of the use of EHR, feedback provided by providers responding to the MeHI survey would support this. Many of their comments indicated that use of an EHR took time away from their patients.

Health Information Exchange

Nationwide, participation in health information exchanges has increased significantly over the past few years. In a 2012 survey, researchers found that 1,398 U.S. hospitals (30 percent of U.S. community hospitals) participate in HIE efforts, compared to 14 percent of hospitals doing so in 2010 (Mathematica Policy Research Institute, 2013). Similarly, in 2012, 23,341 ambulatory practices (10 percent of U.S. practices) participated in the 119 operational HIE efforts, a near tripling of the 3 percent in 2010 (Mathematica Policy Research Institute, 2013). This rate is lower than the 28 percent of practices reporting that they participate in HIE, as identified in our MeHI practice manager survey.

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Appendix: Definitions of Terms

ACA: The Affordable Care Act (ACA) is the comprehensive healthcare reform law enacted in March 2010. The law was enacted in two parts: The Patient Protection and Affordable Care Act (PPACA), signed into law on March 23, 2010, was amended by the Health Care and Education Reconciliation Act on March 30, 2010. The name "Affordable Care Act" is used to refer to the final, amended version of the law.

ACO: An Accountable Care Organization (ACO) is an organization of healthcare providers that agrees to be accountable for the quality, cost, and overall care of Medicare beneficiaries who are enrolled in the traditional fee-for-service program who are assigned to it.

Affiliated: In this study, classification of "independent" and "affiliated" practices is based on self-reported data from the practice manager survey. Respondents were asked "Is this location an independent practice or organization that is not affiliated with a network or health care system – or are you affiliated with a network or health care system?"

ARRA: The American Recovery and Reinvestment Act of 2009 (ARRA) was an economic package enacted in February 2009 to provide a stimulus to the U.S. economy. The HITECH provision, focused on health information technology adoption and funding, was included in the ARRA legislation.

BORIM: The Massachusetts Board of Registration in Medicine – The Board of Registration in Medicine's mission is to ensure that only qualified physicians are licensed to practice in the Commonwealth of Massachusetts and that those physicians and healthcare institutions in which they practice provide to their patients a high standard of care, and support an environment that maximizes the high quality of healthcare in Massachusetts.[11]

Care Coordination: Care coordination is the organization of healthcare treatment across several healthcare providers. Patient-Centered Medical Homes (PCMHs) and Accountable Care Organizations (ACOs) are two ways to coordinate care.

CMS: The Centers for Medicare and Medicaid Services (CMS) is an agency within the US Department of Health & Human Services (HHS) that responsible for administration of many key federal healthcare programs, including the EHR Incentive Programs.

CPOE: Computerized Provider Order Entry is the provider's use of computer assistance to directly enter medication orders from a computer or mobile device. The order is also documented or captured in a digital, structured, and computable format for use in improving safety and organization. CPOE is a process of electronic entry of medical practitioner instructions for the treatment of patients under his or her care. These orders are communicated over a computer network to the medical staff or to the departments (pharmacy, laboratory, or radiology) responsible for fulfilling the order.

eHealth: The adoption and effective use of EHR systems and other health IT to improve health care quality, increase patient safety, reduce health care costs, and enable individuals and communities to make the best possible health decisions. In this Report, the terms "health IT" and "eHealth" can be used interchangeably.

EHR: An Electronic Health Record (EHR) is an electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one healthcare organization. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. The ideal EHR

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[11] http://www.mass.gov/eohhs/gov/departments/borim/mission-statement.html

automates and streamlines the clinician's workflow while preventing duplication of labor. The EHR has the ability to generate a complete record of a clinical patient encounter as well as supporting other care-related activities directly or indirectly via interface. This includes evidence-based decision support, quality management, and outcomes reporting. EHRs are designed to reach beyond the health organization that originally collects and compiles the information. They are built to share information with other healthcare providers, such as laboratories and specialists, so they contain information from all the clinicians involved in the patient's care. The EHR represents the ability to easily share medical information among stakeholders and to have a patient's information 'follow' him or her through various care providers and facilities which that individual engages. EHRs are designed to be accessed by all people involved in the patients care - including the patients themselves.

EMR: An Electronic Medical Record (EMR) is an electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one healthcare organization. This term is often interchanged with EHR (see above).

ePrescribing (eRx): A prescriber's ability to electronically send an accurate, error-free and easily understood prescription directly to a pharmacy from the point-of-care.

HIE: electronic health information exchange allows healthcare professionals and patients to appropriately access and securely share a patient's vital medical information electronically. There are many healthcare delivery scenarios driving the technology behind the different forms of health information exchange available today.

When used as a noun, an HIE system facilitates the exchange of clinical information among varied healthcare information systems, while maintaining the meaning of the information being exchanged, regardless of provider affiliation, location or differences in technology.

Health IT: Health Information Technology is the use of computers and other technology by doctors and other care providers to store and retrieve health information and to allow providers to share health information with other providers as well as their patients. This includes technologies such as ePrescribing, EHR, HIE, patient portals and CPOE.

HIPAA: The Health Insurance Portability and Accountability Act (HIPAA) was enacted in 1996 and addresses the security and privacy of health data. Title II of HIPAA requires the establishment of national standards for electronic healthcare transactions and national identifiers for providers, health insurance plans, and employers. The standards are meant to improve the efficiency and effectiveness of the nation's healthcare system by encouraging the widespread use of electronic data interchange in the U.S. healthcare system.

HITECH Act: The Health Information Technology for Economic and Clinical Health (HITECH) Act refers to the portion of ARRA that is used to increase the use of EHRs by physicians and hospitals. This legislation provided funding for health information technology infrastructure, training, dissemination of best practices, telemedicine, inclusion of health information technology in clinical education, and State grants to promote health information technology.

Interoperability: Interoperability refers to the ability of two or more systems or components to exchange information and to use the information that has been exchanged.

MA APCD: The Massachusetts All Payer Claims Database.

Mass HIway: The Massachusetts Health Information Highway is a secure statewide HIE that enables the electronic movement of encrypted and secured health related information among diverse organizations, such as doctors' offices, hospitals, community health centers, laboratories, health plans and other healthcare providers.

MU: Meaningful Use is a term associated with ARRA that authorizes CMS to provide incentive payments for certain medical providers and hospitals that become compliant in the use of certified EHR technology: using certified EHR technology to improve quality, safety, efficiency, reduce health disparities, engage with patients and families, improve care coordination, population and public health as well as maintain privacy and security of patient health information.

ONC: The Office of the National Coordinator for Health Information Technology (ONC), located within the U.S. Department of Health and Human Services (HHS), coordinates nationwide efforts to support the adoption of health information technology and the promotion of health information exchange to improve healthcare. The ONC was mandated in the HITECH Act.

ONC Certification: The ONC Certification Program provides a defined process to ensure that EHR technologies meet the adopted standards and certification criteria to help providers and hospitals achieve MU objectives and measures established by the CMS under the Incentive Payment Programs.

Patient Portal: Online healthcare-related applications that allow patients to interact with their healthcare providers. These services provide the ability for patients to observe and document their medical information via the internet.

PHR: A Personal Health Record is an electronic record of information where health data related to your care is maintained by you or your family. This information could be lab test results, medicines, doctors' visits, or other information about your health and is available to you on your computer through a website.

PMS: Practice Management System (PMS) applications facilitate the day-to-day operations of a medical practice and enable users to capture patient demographics, schedule appointments, maintain lists of insurance payers, perform billing tasks, and generate reports. It handles the administrative and financial matters for a practice.

REC: Regional Extension Centers are federally designated organizations that offer a variety of programs and services designed to help clinical providers transition into a practice that meaningfully uses electronic health records.

SNF: A skilled nursing facility is an inpatient healthcare facility with the staff and equipment to provide skilled care, rehabilitation and other related health services to patients who need nursing care, but do not require hospitalization.

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