Minnesota Clinics e-Health Report, 2016

ADOPTION AND USE OF ELECTRONIC HEALTH RECORD SYSTEMS AND HEALTH INFORMATION EXCHANGE
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Executive Summary

This report presents results from the 2016 Minnesota Health Information Technology (HIT) Ambulatory Clinics Survey, which is the annual survey of clinics in the state regarding implementation of e-health. E-health is adoption and effective use of electronic health record (EHR) systems and other HIT, including health information exchange (HIE), to improve health care quality, increase patient safety, reduce health care costs, and enable individuals and communities to make the best possible health decisions.

Adoption

Adoption refers to the clinics that have “gone live” with an EHR system, meaning that the system is implemented and in use in some or most areas of the clinic. Nearly all (98%) ambulatory clinics in Minnesota have adopted EHRs, representing 1,257 clinics in 2016. Epic is the dominant EHR vendor system and is in use by 51% of Minnesota’s clinics.

Effective Use of EHR Systems

Effective use of EHRs refers to the use of electronic clinical support tools, such as computerized provider or entry (CPOE) and clinical decision support (CDS) tools. Use of these tools indicates that clinics are optimizing the technology to enhance health care delivery.

- Ninety-nine percent of clinics with EHRs used CPOE for some or all provider orders.
- Ninety percent of clinics with EHRs used medication guides/alerts routinely. Utilization of CDS tools has increased over time.
- Eighty-eight percent of all Minnesota clinics electronically prescribed for most non-controlled substance prescriptions. Clinics continue to face technical obstacles for e-prescribing controlled substances.
- Most clinics with EHRs use strong privacy controls. Ninety-four percent limited the EHR user’s access to information based on staff function or other criteria, and 99% conducted or reviewed security risk analysis information and updates as necessary as part the their risk management processes.
- Ninety percent of clinics with EHRs provided patients with the option to view their patient health information online; 66% offered the option to download, and 46% offered the option to electronically transmit their patient health information.
Exchange of Health Information

HIE is the secure electronic exchange of clinical information between organizations using nationally recognized standards.

- Sixty-nine percent of clinics with EHRs electronically exchanged health information with unaffiliated hospitals or clinics. Primary care clinics exchanged health information (80%) at a higher rate than specialty care clinics (56%).
- Ninety-two percent clinics with EHRs were able to generate an electronic summary of care record, but most do not provide an electronic care record for patients who require transfer or referral.
- The most common mechanism for HIE is through capabilities built into the EHR (61%). Thirty-eight percent of clinics exchange health information using a state-certified HIE service provider, and 43% use of Direct Secure Messaging.
- Less than half of clinics with EHRs (45%) received automated alerts from hospitals when a patient is admitted, discharged, or transferred.

In Summary

Since Minnesota began measuring e-health implementation in 2010, the state’s clinics have made great strides toward implementation and effective use of EHRs. Effective use of EHRs has improved over time and fewer indicate barriers to using decision support and patient management tools in the EHR. Electronic exchange of health information has improved dramatically for clinics that have this capability built within their EHR. However, clinics that rely on other mechanisms struggle to exchange data with unaffiliated providers. Even among clinics that exchange information, most are not completely interoperable in that their EHR does not “consume” the exchanged information as discrete, standardized data. Progress to date can be attributed to state grant and loan programs to support e-health, federal “meaningful use” incentives to promote implementation of EHRs, as well as Minnesota law requiring all providers to utilize interoperable EHR systems. However, clinics still need resources to advance e-health, and the information in this report will support development of guidance and policies for all providers in the state.
Introduction

E-health is adoption and effective use of electronic health record (EHR) systems and other health information technology (HIT), including health information exchange, 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 2008, the Minnesota e-Health Initiative, a public-private collaborative to accelerate the adoption and use of health information technology, developed the Minnesota Model for Adopting Interoperable EHRs that is applied to all aspects of the Initiative’s work and policy development. The model has seven steps which are grouped into three major categories:

▪ Adopt: assessment of needs and readiness, planning, and selecting an EHR system.
▪ Utilize: implementing an EHR system to “go live” and learning how to use it effectively.
▪ Exchange: determining readiness to exchange information electronically with other partners, and implementing regular, ongoing exchange between interoperable EHR systems.

To help inform progress toward these goals and identify guidance needed by providers to meet this mandate, the Minnesota Department of Health (MDH) established a framework – the Minnesota e-Health Profile – for assessment and evaluation of EHR adoption and use across multiple health settings that is based on the Minnesota Model. The Minnesota e-Health Profile is a series of online surveys of health care settings designed to uniformly collect and share the progress of Minnesota’s providers in adopting and implementing EHR systems, and exchanging electronic health information.

The assessment information is used to:

▪ Measure Minnesota’s status on achieving state and national goals to accelerate adoption and use of EHRs and other HIT and to achieve interoperability of health information;
▪ Identify gaps and barriers to enable effective strategies and efficient use of resources;
▪ Help develop programs and inform decisions at the local, state and federal levels of government; and
▪ Support community collaborative efforts.

Data presented in this report are from the HIT Ambulatory Clinic Survey (clinic survey) conducted by the MDH Office of Health Information Technology. The clinic survey has been conducted annually since 2010. The 2016 survey includes responses from 1,285 of 1,423 clinics that have registered with the Statewide Quality Reporting and Measurement System (SQRMS), for a response rate of 90%. Complete methodology information is presented in Appendix A.
EHR Adoption

This section presents information on EHR adoption status, the systems used, and barriers to implementation among clinics that have not yet adopted. Adoption of EHR systems involves a process of assessment, planning, and selection, followed by a series of steps leading to a “go live” date. As such, this assessment recognizes that clinics may be in part of that process toward going live.

Most Clinics Have Implemented EHR Systems

Ninety-eight percent of ambulatory clinics in Minnesota have implemented EHRs, representing 1,257 clinics in 2016. Just 28 clinics did not have an EHR. Among clinics with EHRs, 74% indicated they were entirely paperless and 25% maintained paper charts but relied on the EHR for the most accurate information. Exhibit 1 shows that EHR adoption rates among Minnesota’s clinics have increased over time, from 67% when the annual clinic survey began in 2010 to 98% in 2016. Earlier data on EHR adoption is limited, with a 2005 survey among a subset of adult primary care clinics estimating the EHR adoption rate at 17% (data not shown).

Exhibit 1: EHR Adoption among Minnesota Clinics, 2010-2016

* The number of clinics is based on registrations for the Statewide Quality Reporting and Measurement System, and varies by year based on outreach efforts for clinics to register, and business changes to the clinic such as mergers, closings, and openings.
Exhibit 2 presents adoption rates by type of practice and geography. There is a difference in rates of adoption between practice type, with 99% of primary care and 96% of specialty care clinics having implemented EHR systems. There is no difference in adoption rates between urban (98%) and rural clinics (99%).

Exhibit 2: EHR Adoption by Practice Type and Geography, 2016
Few EHR Vendors Share the Market

Minnesota’s EHR market is dominated by the Epic system, which was used by 51% of clinics (Exhibit 3), an increase from 49% in 2015 and from 40% in 2014. Other systems with strong market penetration include eClinicalWorks (9%), Allscripts (5%), NextGen (5%), Cerner (4%), and Greenway (4%). Epic’s market share was higher among primary care clinics (58%) compared to specialty care clinics (43%), and also among urban clinics (52%) compared to rural clinics (47%). Most of the clinics (97%) were using an EHR system that is certified by the Office of the National Coordinator.¹

### Exhibit 3: EHR Systems Used by Adopting Clinics, 2016

<table>
<thead>
<tr>
<th>EHR Vendor</th>
<th>Percent</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epic</td>
<td>51%</td>
<td>641</td>
</tr>
<tr>
<td>eClinicalWorks</td>
<td>9%</td>
<td>112</td>
</tr>
<tr>
<td>Allscripts</td>
<td>5%</td>
<td>69</td>
</tr>
<tr>
<td>NextGen</td>
<td>5%</td>
<td>64</td>
</tr>
<tr>
<td>Cerner</td>
<td>4%</td>
<td>53</td>
</tr>
<tr>
<td>Greenway</td>
<td>4%</td>
<td>48</td>
</tr>
<tr>
<td>Centricity</td>
<td>3%</td>
<td>38</td>
</tr>
<tr>
<td>Meditech</td>
<td>2%</td>
<td>23</td>
</tr>
<tr>
<td>Other</td>
<td>17%</td>
<td>209</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,257</td>
</tr>
</tbody>
</table>

Of the 28 clinics that have not yet implemented or begun installing their EHR system, 13 planned to implement within five years. Non-adopting clinics indicated several barriers to adopting an EHR system. The greatest barriers were finding an EHR system to meet their needs (62%), lost productivity during the transition (54%), reaching consensus within the practice to select an EHR (46%), ability to secure financing for an EHR system (46%), and annual cost of maintaining an EHR system (42%).

¹ A complete list of certified HIT products is available at: [http://oncchpl.force.com/ehrcert](http://oncchpl.force.com/ehrcert).
Utilization of EHR Systems

The real value from investing in and implementing an EHR system comes from using it to support efficient workflows and effective clinical decisions. Effective use means that the EHR has tools such as computerized provider order entry (CPOE), clinical decision support (CDS) tools, and electronic prescribing, and that there are processes in place to use these tools for improving health care. This section presents utilization of EHRs for CPOE, CDS, electronic prescribing, and quality measure reporting. See Appendix B for definitions of these tools.

Use of Computerized Provider Order Entry

Use of CPOE has achieved near universal application among Minnesota clinics that have adopted EHRs. Exhibit 4 shows that 99% percent of clinics with EHRs used CPOE for some or all provider orders. The remaining 1% have the functionality but it’s not in use. CPOE utilization increased from 74% of clinics with EHRs in 2010 to 99% in 2016.

Looking at volume of orders, 95% of clinics using CPOE do so for most orders (80-100% of orders). Ninety-nine percent of primary care clinics used CPOE for most orders, which is higher than specialty care clinics (91%). There is no difference in use of CPOE by urban/rural geography.

Exhibit 4: Use of Computerized Provider Order Entry (CPOE), 2016

Responding clinics did not indicate many barriers to using CPOE. Most common challenges included required time to build orders into the EHR system (31%), required redesign of workflow processes (28%), limited time during patient encounters (24%), required system maintenance (22%), and lack of staff training (21%).
Use of Clinical Decision Support Tools

The clinic survey measured several CDS tools and functionalities. Exhibit 5 shows that 90% of primary care and 77% of specialty care clinics with EHRs used medication guides/alerts. All seven of the measured CDS tools were routinely used by more of primary clinics than specialty care clinics. Compared to urban clinics, rural clinics more routinely use chronic disease care plans, patient-specific reminder, and preventive care services due.

Common barriers to effective use of CDS tools included too many false alarms/too disruptive (46%), required redesign of workflow processes (44%), lack of resources to build/implement (40%), and lack of staff and/or provider training (26%).
Documentation of Advance Directives

An advance directive is a document by which a person makes provision for health care decisions in the event that, in the future, he/she becomes unable to make those decisions. These documents serve to convey a patient’s wishes for care to the care team; therefore, they should be available in the patient’s electronic medical record. As shown in Exhibit 6, over four in five clinics document the existence of a patient’s advance directive in their EHR, including 97% of primary care and 69% of specialty care clinics. Despite these capabilities of the EHR to document advance directives, just 11% of clinics have an advance directive for 50-100% of their patients age 65 and older, 44% have an advance directive for less than half of patients in this age group, and 30% document the advance directive but for an unknown percent of patients. Eighty-nine percent of clinics that document advance directives in the EHR have the directive electronically accessible in the EHR, and 5% incorporate it in the EHR but not in a consistent location. This is an increase from 2015.


- Documented for 50-100% of patients: 11%
- Documented for <50% of patients: 44%
- Documented for unknown percent of patients: 30%
- Does not document advance directives in EHR: 14%
- Does not know: 1%

(N = 1,257 Clinics)
Use of EHR Data for Disease Registries and Quality Measurement

Nearly all clinics (96%) are able to generate at least one report that lists patients by a specific condition. Exhibit 7 shows common disease reports generated from the EHR by primary care versus secondary care clinics. The most common disease reports generated by primary care clinics were depression (88%), diabetes (86%), asthma (86%), vascular disease (77%), hypertension (77%), and obesity (63%).

Most clinics utilized data from the EHR for internal quality improvement efforts. Ninety-four percent of clinics with EHRs shared data with providers, 87% used EHR data to set goals around clinical guidelines, 87% created benchmarks or develop priorities, and 69% supported professional development activities. Furthermore, 91% of clinics with EHRs used only their EHR (no paper) to collect and submit quality measures to outside organizations. All of these measures showed increases since 2015.
EHRs Impact on Clinical Practice

Exhibit 8 provides opinion measures related to the impact EHRs have had on clinical practice. There was strong agreement on the positive impact of EHRs, particularly on two important measures: 96% of clinics agreed that the EHRs have alerted their providers to potential medication errors, and 95% agreed that the EHR has enhanced patient care in their clinic.

Exhibit 8: Impact of EHRs on Clinical Practice – All Clinics with EHRs, 2016

- Be alerted to potential medication errors: 96% agree, 23% agree somewhat
- Be alerted to critical lab values: 90% agree, 19% agree somewhat
- Be reminded to provide preventive care: 81% agree, 22% agree somewhat
- Enhance patient care in your clinic: 95% agree, 38% agree somewhat
- Order more on-formulary drugs: 88% agree, 31% agree somewhat
- Provide care that meets clinical guidelines for patients with chronic disease: 85% agree, 29% agree somewhat
- Identify needed lab tests: 80% agree, 28% agree somewhat
- Order fewer tests due to better availability of other lab results: 75% agree, 40% agree somewhat

* Totals may not match sum of chart percentages due to rounding.
Primary care clinics indicated higher ratings for impact of the EHR on clinical practice. Exhibit 9 shows “Agree” responses for primary and specialty clinics. Primary care clinics expressed more value compared to specialty clinics for being alerted to critical lab values (86% and 53%, respectively), reminders to provide preventive care (72% and 44%, respectively), and identifying needed lab tests (63% and 39%, respectively). Sixty-four percent of primary care clinics agreed that EHRs have enhanced patient care in their clinic, compared to 48% of specialty care clinics.

**Exhibit 9: Impact of EHRs on Clinical Practice – Primary Care versus Specialty Care Clinics, 2016**

- **Be alerted to critical lab values**: 86% (Primary Care) vs. 53% (Specialty Care)
- **Be alerted to potential medication errors**: 73% (Primary Care) vs. 73% (Specialty Care)
- **Be reminded to provide preventive care**: 72% (Primary Care) vs. 44% (Specialty Care)
- **Enhance patient care in your clinic**: 64% (Primary Care) vs. 48% (Specialty Care)
- **Identify needed lab tests**: 63% (Primary Care) vs. 39% (Specialty Care)
- **Provide care that meets clinical guidelines for patients with chronic disease**: 61% (Primary Care) vs. 51% (Specialty Care)
- **Order more on-formulary drugs**: 54% (Primary Care) vs. 59% (Specialty Care)
- **Order fewer tests due to better availability of other lab results**: 38% (Primary Care) vs. 33% (Specialty Care)
Electronic Prescribing

Electronic prescribing, or “e-prescribing,” means secure bi-directional electronic information exchange between prescribing providers (prescribers), pharmacists and pharmacies, and payers or pharmacy benefit managers. E-prescribing improves the quality of patient care by enabling a prescriber to electronically send an accurate and understandable prescription directly from the point of care to a pharmacy. E-prescribing is a way to improve the quality, safety and cost-effectiveness, and efficiency of the entire prescribing and medication management process.

Exhibit 10 shows that 88% of all Minnesota clinics e-prescribed for most non-controlled substance prescriptions, either using their EHR or another electronic method. Primary care EHR clinics used e-prescribing at a higher rate (90%) than specialty care EHR clinics (86%). There was also a difference in e-prescribing between urban (86%) and rural (96%) clinics.

Exhibit 10: E-Prescribing by Practice Type and Geography, 2016*

<table>
<thead>
<tr>
<th>Type of Practice</th>
<th>Total (N=1,285)</th>
<th>Primary Care (N=677)</th>
<th>Specialty Care (N=608)</th>
<th>Urban (N=1,089)</th>
<th>Rural (N=196)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All Clinics (N=1,285)</td>
<td>88%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary Care (N=677)</td>
<td>90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specialty Care (N=608)</td>
<td>86%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urban (N=1,089)</td>
<td>86%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rural (N=196)</td>
<td>96%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Prescribing for non-controlled substance prescriptions.

E-prescribing rates for controlled substances were much lower, with just 4% of clinics e-prescribing. However, 83% of clinics created these prescriptions electronically and then faxed or otherwise manually delivered to the pharmacy or patient. Minnesota now allows electronic prescribing of controlled substances, but 45% of clinics indicated that their greatest challenge is that they don’t have the security and technology requirements to e-prescribe controlled substances.

Ninety-one percent of clinics were electronically alerted to potential drug interactions and/or drug-allergy interactions at the point of prescribing. Seventy-eight percent of clinics were alerted to patient-specific formulary information, 69% alerted to generic alternatives, and 41% were alerted to medication cost comparison (up from 25% in 2015).
Health Information Exchange

Health information exchange (HIE) is the secure electronic exchange of clinical information between organizations using nationally recognized standards (Minn. Stat. §62J.498 sub. 1(f)). The goal of health information exchange is to help make health information available, when and where it is needed, to improve the quality and safety of health and health care. In Minnesota, many efforts are underway to help achieve the secure electronic exchange of clinical information between organizations using nationally recognized standards. Other than electronic prescribing, most of the health information exchange happening in Minnesota is primarily between hospitals and clinics in the same system or with affiliated partners.

Health Information Exchange Activity

Minnesota’s clinics have not advanced from 2015 for HIE activity. In 2016, 69% of clinics with EHRs indicated that they exchanged with unaffiliated hospitals or clinics, compared to 73% in 2015 (but still up from 40% in 2014). Exhibit 11 shows that primary care clinics exchanged health information with unaffiliated hospitals and/or clinics at a higher rate (80%) than specialty care clinics (56%). There was no difference in exchange activity between urban (69%) and rural (68%) clinics.

Exhibit 11: Health Information Exchange with Unaffiliated Hospitals and/or Clinics, 2016

<table>
<thead>
<tr>
<th>Category</th>
<th>Total (N=1,257)</th>
<th>Primary Care (N=674)</th>
<th>Specialty Care (N=586)</th>
<th>Urban (N=1,062)</th>
<th>Rural (N=195)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Clinics with EHRs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Clinics</td>
<td>69%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Care</td>
<td>80%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialty Care</td>
<td>56%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>69%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>68%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exhibit 12 shows the types of partners with whom clinics may share patient information, comparing their need to share patient information against their ability to do so electronically. The difference between these is shown as a gap in electronic exchange. In general, there is high need among clinics to exchange with providers across the continuum of care. The greatest need for health information exchange was with unaffiliated clinics (92%) and unaffiliated hospitals (89%). Seventy-four percent need to share information with the Minnesota Department of Health, 71% with nursing homes, 66% with long-term care providers other than nursing homes, 65% with home health agencies, 64% with behavioral health providers, 63% with local public health, and 59% with social service agencies.

Despite the identified needs, actual electronic exchange with most of the unaffiliated partners lags the need by a large margin. About two-thirds of clinics actually exchanged with unaffiliated clinics (68%), and 58% exchanged electronically with unaffiliated hospitals. Similar large gaps between needed and actual electronic exchange exist for all types of providers except with MDH.

Exhibit 12: Clinics’ Needs to Share Patient Information and Electronic Health Information Exchange by Type of Organization, 2016
Exchange of Electronic Summary of Care Records

A summary of care record is a standardized data packet that includes patient information that is relevant to care providers, such as procedures, diagnoses, history, etc. Ninety-two percent of clinics with EHRs were able to generate an electronic summary of care record from their EHR for patients who require a referral to another provider, or transition from one setting of care to another. Forty-one percent of clinics provided an electronic summary care record to that facility for 50% or more of patients who transitioned (Exhibit 13), an increase from 33% in 2015.

Exhibit 13: Use of Electronic Summary of Care Records for Transitions or Referrals, 2016

EHR Interoperability of Data

An important component of interoperability is that the receiving EHR is able to incorporate standardized data without the need for manual entry. Most clinics do not incorporate electronic information from other providers into their EHRs as standardized data. Exhibit 14 shows how clinics typically integrate data from outside sources into their EHR. Most clinics incorporate a scanned or PDF file. Thirty-one percent of clinics integrated data in standardized format for immunizations, 25% for medication history, 19% for lab results, and just 12% for summary of care records. A small percent of clinics integrate these data in non-standardized format.
Exhibit 14: EHR Integration of Electronic Information from Outside Sources, 2016

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Standardized data</th>
<th>Non-standardized data</th>
<th>Fax/scan/PDF</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunizations (N = 1,109)</td>
<td>31%</td>
<td>1%</td>
<td>62%</td>
<td>6%</td>
</tr>
<tr>
<td>Medication history (N = 1,233)</td>
<td>25%</td>
<td>1%</td>
<td>69%</td>
<td>5%</td>
</tr>
<tr>
<td>Lab results (N = 1,240)</td>
<td>19%</td>
<td>2%</td>
<td>72%</td>
<td>5%</td>
</tr>
<tr>
<td>Summary of care record (N = 1,187)</td>
<td>12%</td>
<td>9%</td>
<td>72%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Percent of Clinics with EHRs that Use These Types of Data

Exchange Mechanisms Used

The most common mechanism for HIE is through capability built into the EHR, with 61% of clinics using this exchange mechanism (Exhibit 15). Thirty-eight percent of clinics are using a State-Certified HIE Service Provider\(^2\), 43% used Direct Secure Messaging (up from 28% in 2015), 20% used Interstate HIE and HealtheWay/eHealth Exchange\(^3\), 8% used peer-to-peer exchange, and 6% used Connect query-based exchange.

Exhibit 15: Exchange Mechanisms Used by Minnesota’s Clinics, 2016

Exchange capability built into your EHR
Exchange using a State-Certified HIE Service Provider
Direct secure messaging
Interstate HIE and HealtheWay/eHealth Exchange
Peer-to-peer exchange
Connect query-based exchange

Percent of Clinics with EHRs (N=1,257)

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\(^2\) A complete list of state-certified HIE service providers is at [http://www.health.state.mn.us/divs/hpsc/ohit/certified.html](http://www.health.state.mn.us/divs/hpsc/ohit/certified.html).

\(^3\) The eHealth Exchange is a group of federal agencies and non-federal organizations that came together under a common mission and purpose to promote interoperable health information exchange. Now rebranded as the Sequoia project; information is at [http://sequoiaproject.org/ehealth-exchange/](http://sequoiaproject.org/ehealth-exchange/).
Receipt of Automated Notifications from Hospitals

Automated electronic notifications can be used by hospitals to notify another provider when their patient has been admitted, discharged, and or transferred to another facility. These notifications are commonly referred to as “ADT” alerts, and are designed to improve the timely flow of information in situations where care coordination is a critical need.4

Less than half of Minnesota’s clinics received automated electronic alerts from hospitals (Exhibit 16). This is almost all from hospitals within the same health system as the clinic (40%), but includes 5% receiving from hospitals outside of their system.

Exhibit 16: Receipt of Automated Alerts from Hospitals, 2016

Challenges to HIE

As shown in Exhibit 17, the top challenges to secure HIE include managing consent to share information (50%), limited or no capacity among outside organizations to electronically exchange (50%), and/or capabilities of outside organizations to exchange were not known (41%). Other challenges included unclear value of return on investment (27%), inadequate set-up and/or subscription fees for exchange services (25%), and planning for and executing data use agreements (24%).

Exhibit 17: Challenges to Secure Health Information Exchange, 2016
Privacy & Security

An important component of HIE is that patients must have confidence in the integrity of the data being shared, and trust that providers using the data have procedures in place to keep their information safe and secure. Health care providers must implement standards for securing electronic health information to ensure that appropriate safeguards are in place to protect that data from unauthorized access.

Eighty-five percent of clinics with EHRs allowed patients to set privacy settings to authorize release of health information to another party (Exhibit 18). Three-fourths of clinics with EHRs allowed patients to define permissions for who should have access to their health record and under what circumstances (76%), and 74% allowed patients to set preferences regarding how and under what circumstances health information may be shared with others.

![Exhibit 18: Patients’ Control of Privacy Settings, 2016](image)

Most clinics with EHRs (94%) limited the EHR user’s access to information based on staff function or other criteria, and 99% conducted or reviewed security risk analysis information and updates as necessary as part the their risk management processes.

Clinics most often used a manual process to integrate patient consents into the EHR. Forty percent of clinics with EHRs tracked consents electronically, which is up from 35% in 2015. Sixty percent scanned signed paper consents into the EHR, and just 1% of these clinics were handling consents only by paper.
Consumer Access to Health Information

With the implementation of EHRs, health care providers have the opportunity to provide patients with their health information in an electronic format. These tools can help patients take responsibility for their own health and aid in keeping the health records updated with current information. The clinic survey assessed two aspects of consumer engagement: ability of patients to electronically view, download and/or transmit their personal health information, and use of patient portals.

Portability of Personal Health Information

Ninety percent of clinics provided patients with the option to view their patient health information online (Exhibit 19). Fewer clinics (66%) offered the option to download that information to a physical electronic media, and 46% offered the option to electronically transmit their patient health information. These results have increased in recent years, but continue to reflect interoperability challenges for patients to share data between providers. More primary care clinics offer view options (97%), download (76%), and transmit (53%) compared to specialty clinics (83%, 55%, and 38%, respectively). There is no difference in transmit options between primary and specialty clinics.

Clinics Offering Patient Portals

Patient portals are an internet application maintained by the clinic or provider organization that allow patients to access their electronic health records and permit two-way communication between patients and their health care providers. Ninety-three of clinics offered an online patient portal in 2016, including 97% of primary care and 89% of specialty clinics. There has been a steady increase in the offer of patient portals since 2011, when just 35% of clinics offered this service.
Among the 1,198 clinics with online patient portals, most offered several access options. Exhibit 20 shows that at least nine in ten of these clinics provided access to clinical visit summaries (96%), medication lists (94%), allergies list (92%), test results (91%), and/or diagnosis/problem list (90%). Nearly as many offer immunization records (83%). Just 58% of these clinics offered patients access to their care plans through their portal, and 32% offered providers’ progress notes.

Exhibit 20: Online Services Offered Through Patient Portal, 2016

- Clinic visit summary: 96%
- Medication lists: 94%
- Allergies list: 92%
- Test results: 91%
- Diagnosis/problem list: 90%
- Immunization records: 83%
- Care plans: 58%
- Providers’ progress notes: 32%

Most clinics that offer patient portals provided additional electronic services through the portal or other methods. Exhibit 21 shows that administrative services offered included secure message or email (89%), online bill pay (79%), online appointment scheduling (76%), patient education materials (73%), electronic reminders for visits or follow-up care (64%), and electronic reminders for preventive/recommended care (60%). Less common functionalities included e-visits (38%), and blogs or online support groups (19%). Some other emerging functionalities mentioned by clinics include prescription refill requests, depression assessments, and requests for a patient’s personal health record.
Exhibit 21: Additional Electronic Functionalities Offered, 2016

- Secure messaging/email: 89%
- Online bill pay: 79%
- Online appointment request or scheduling: 76%
- Patient education materials: 73%
- Reminders for visits or follow-up care: 64%
- Reminders for preventive/recommended care: 60%
- E-visits: 38%
- Blogs or online support groups: 19%

Percent of Clinics with Patient Portals (N=1,198)
Use of Telemedicine Services

Telemedicine (also called telehealth) is the use of telecommunications technologies to provide health care services to a patient who is physically not with the provider. Telemedicine can include diagnosis, treatment, education and other health care activities.

Fifty-four percent of clinics in Minnesota used telemedicine services, an increase from 41% in 2015. Exhibit 22 shows that there was variation in use by geography and practice type, with 72% of rural clinics using telemedicine compared to 51% of urban clinics. Two in three primary care clinics (69%) used telemedicine compared to 39% of specialty care clinics.

Exhibit 22: Use of any Telemedicine Service by Practice Type and Geography, 2016

<table>
<thead>
<tr>
<th>Practice Type</th>
<th>All Clinics (N=1,285)</th>
<th>Primary Care (N=677)</th>
<th>Specialty Care (N=608)</th>
<th>Urban (N=1,089)</th>
<th>Rural (N=196)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>54%</td>
<td>69%</td>
<td>39%</td>
<td>51%</td>
<td>72%</td>
</tr>
</tbody>
</table>

The types of telemedicine activities used by Minnesota clinics are shown in Exhibit 23. The most common were being the originating or patient site (35%), real-time teleconsultations (33%), primary care and specialist referral services (30%), and remote patient monitoring (19%). Store-and-forward teleconsultations are used by just 9% of clinics. Among rural clinics, 61% were originating sites compared to 30% among urban clinics. Forty-nine percent of primary care clinics were originating sites compared to 20% of specialty care clinics.

Exhibit 23: Telemedicine Activities Conducted at Clinic, 2016

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percent of Clinics (N=1,285)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Originating or patient site</td>
<td>35%</td>
</tr>
<tr>
<td>Real-time teleconsultations</td>
<td>33%</td>
</tr>
<tr>
<td>Primary care and specialist referral services</td>
<td>30%</td>
</tr>
<tr>
<td>Remote patient monitoring</td>
<td>19%</td>
</tr>
<tr>
<td>Store-and-forward teleconsultations</td>
<td>9%</td>
</tr>
</tbody>
</table>
Exhibit 24 shows that, among the 699 clinics that use telemedicine services, the most common services used included chronic disease management (59%), consumer medical/health information (29%), after-hours pharmacy (27%), remote patient monitoring (26%), and provider and staff medical education (25%).

**Exhibit 24: Telemedicine Services Used, 2016**

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic disease management</td>
<td>59%</td>
</tr>
<tr>
<td>Consumer medical and health information</td>
<td>29%</td>
</tr>
<tr>
<td>Pharmacy, satellite/after hours</td>
<td>27%</td>
</tr>
<tr>
<td>Remote patient monitoring</td>
<td>26%</td>
</tr>
<tr>
<td>Provider and staff medical education</td>
<td>25%</td>
</tr>
<tr>
<td>ICU care using remote patient monitoring</td>
<td>21%</td>
</tr>
<tr>
<td>Radiology</td>
<td>19%</td>
</tr>
<tr>
<td>Correctional health - Triage</td>
<td>17%</td>
</tr>
<tr>
<td>Behavioral health</td>
<td>11%</td>
</tr>
<tr>
<td>Home health/hospice</td>
<td>10%</td>
</tr>
<tr>
<td>Nursing home care</td>
<td>9%</td>
</tr>
<tr>
<td>School health (K-12)</td>
<td>8%</td>
</tr>
</tbody>
</table>

Among all clinics, the most commonly identified barriers to using telemedicine included cost to provide the services (48%) cost of equipment (43%), and insufficient reimbursement (39%). Urban clinics noted additional barriers including lack of staff enterprise, lack of staff support, availability of providers, and lack of demand.
Resources Needed to Advance e-Health

Despite many e-health advances by Minnesota’s clinics, there are many needs to further optimize the systems, use of data, and exchange health information. All responding clinics were asked what resources they need; exhibit 25 shows that one-third of clinics need resources to integrate patient data from external resources into their EHR (33%), and/or develop infrastructure to support HIE (33%). Other commonly-indicated resource needs include managing workflow changes (27%), developing policies and procedures for managing data quality (23%), technical assistance to support HIE with MDH (22%), establishing HIE agreements with exchange partners (22%), and/or mitigating security risks (20%).

Looking at these resource needs by geography and type of practice, findings show that rural clinics had greater need than urban clinics for:

- Translating clinical needs to IT staff to optimize and/or customize the EHR, and/or
- Establishing HIE agreements with exchange partners.

Urban clinics had greater need than rural clinics for:

- Mitigating security risks to help prevent data breaches,
- Developing infrastructure to support HIE, and/or
- Technical assistance to support HIE with MDH.

Primary care clinics had great need than specialty care clinics for:

- Managing workflow changes,
- Developing policies and procedures for managing data quality, and/or
- Establishing HIE agreements with exchange partners.

Specialty clinics had greater need than primary care clinics for:

- Implementing an EHR system, managing EHR system updates, and/or transitioning to a new EHR system,
- Managing patient consent to share health information,
- Mitigating security risks to help prevent data breaches,
- Developing infrastructure to support HIE, and/or
- Integrating patient data from external sources into our EHR.
Conclusion

Minnesota began measuring EHR implementation among the state’s clinics in 2010. Since then these clinics have made great strides toward implementation and effective use of EHRs. This has been driven in part by federal incentive payments and in part by state policy actions. As of May 2016, organizations in Minnesota have received more than $727 million in federal incentive payments to implement EHRs.\(^5\) Prior to this funding, policymakers in Minnesota recognized that more effective use of health information technology was needed to improve the quality and safety of care and to help control costs, and enacted legislation that requires all health care providers in the state to implement an interoperable EHR system by January 1, 2015 (Minn. Stat. §62J.495). The Minnesota Department of Health provides guidance that describes Minnesota’s law, the types of providers impacted, what kind of information should be exchanged, privacy and security requirements, and how organizations can go about exchanging information.\(^6\)

Effective use of EHRs has improved over time, and Minnesota has had great success with e-prescribing following the state’s 2011 e-Prescribing Mandate (Minn. Stat. §62J.497). There is still room for improvement, however, as many clinics expressed a need for resources to advance their use of e-health and exchange health information. Further, there is variation among clinics based on their geography and/or type of practice. The Minnesota e-Health Initiative has opportunity with this information to target guidance for organizations and workforce training. Health care providers are increasingly embracing EHRs and related technologies to improve population health, but more work is needed to achieve interoperability. Results from this study demonstrate that clinics still face gaps between their need to share health information and their ability to do so electronically, and even more problems achieving interoperability.

Despite these successes with clinics, adoption of EHRs lags among providers not eligible for meaningful use incentives. As Minnesota embraces more coordinated models of health care delivery, it will be important to exchange health information with all relevant providers in their community so these providers have the right information at the right time, and that this information is available for all patients. Providers will benefit by continuing to work together to overcome technological barriers and advocate for the improvement of tools and systems and share best practices for effective use of health information technology.

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\(^5\) Centers for Medicare & Medicaid Services. EHR Incentive Programs, Data and Program Reports web page; http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/DataAndReports.html

\(^6\) This guide can be found at: http://www.health.state.mn.us/e-health/hitimp/2015mandateguidance.pdf
Appendix A: Methods

The data in this report contains information on the adoption and use of EHRs and other HIT and exchange of health information in Minnesota clinics as of March 2016. Clinic(s) for the purpose of this study means any location where primary or specialty care ambulatory services are provided for a fee by one or more physicians in Minnesota.

The primary source of the data is the 2016 Minnesota Health Information Technology (HIT) Clinic Survey (Clinic Survey), conducted annually by the Minnesota Department of Health. The 64-question Clinic Survey was administered as an online survey from February 15 to March 15, 2016. Invitations to participate were sent by e-mail to registered physician clinics; reminders to non-respondents were sent on February 29 and March 7. All physician clinics in Minnesota were required to register and complete the survey under the Minnesota Statewide Quality Reporting and Measurement System (Minnesota Rules, Chapter 4654). The response rate was 90% with 1,285 of 1,423 Minnesota clinics responding.

Comparative data provided in this report is from previous years of the Clinic Survey, which has been conducted annually since 2010.

**Analytic Definitions:**

**EHR Clinic:** A clinic that has implemented an EHR (count = 1,257 clinics in this study).

**Non-Adopting Clinic:** A clinic that has not implemented an EHR or has purchased/begun installation but not yet implemented (count = 27 clinics in this study).

**Geography:** Urban and rural designation is based on the Rural-Urban Commuting Area (RUCA) classifications, 2010 version. RUCA is a Census tract-based classification scheme that utilizes the standard Bureau of Census Urbanized Area and Urban Cluster definitions with work commuting information to characterize each census tract. The rural designation used in this report includes small town, small rural, rural, and isolated rural communities (codes 7-10).

**Practice Type:** Primary care clinics include all those reporting as family practice, geriatrics, internal medicine, and/or obstetrics/gynecology. Specialty clinics include any that do not report those primary practices.

Terms used in the report are defined in the e-Health glossary found at: [http://www.health.state.mn.us/e-health/glossary.html](http://www.health.state.mn.us/e-health/glossary.html).

More information on e-health assessment and activities in Minnesota can be found at: [http://www.health.state.mn.us/e-health/assessment.html](http://www.health.state.mn.us/e-health/assessment.html).

Questions about this report and the data can be directed to Karen Soderberg, Research Scientist, [karen.soderberg@state.mn.us](mailto:karen.soderberg@state.mn.us) or 651-201-3576.
Appendix B: Glossary

**Clinical Decision Support (CDS) tools:** CDS tools provide clinicians or patients with clinical knowledge and patient-related information, intelligently filtered or presented at appropriate times, to enhance patient care. (Source: [http://www.himss.org/ASP/topics_clinicalDecision.asp](http://www.himss.org/ASP/topics_clinicalDecision.asp))

**Computerized Provider Order Entry (CPOE):** A computer application that allows a physician's orders for diagnostic and treatment services (such as medications, laboratory, and other tests) to be entered electronically instead of being recorded on order sheets or prescription pads. The computer compares the order against standards for dosing, checks for allergies or interactions with other medications, and warns the physician about potential problems. (Source: [http://healthit.hhs.gov/portal/server.pt?open=512&mode=2&cached=true&objID=1256](http://healthit.hhs.gov/portal/server.pt?open=512&mode=2&cached=true&objID=1256))

**Electronic Health Record (EHR) system:** An EHR is a real-time patient health record with access to evidence-based decision support tools that can be used to aid clinicians in decision-making. The EHR can also support the collection of data for uses other than clinical care, such as billing, quality management, outcome reporting, and public health disease surveillance and reporting. (Source: [http://healthit.hhs.gov/portal/server.pt?open=512&mode=2&cached=true&objID=1256](http://healthit.hhs.gov/portal/server.pt?open=512&mode=2&cached=true&objID=1256))

**E-Prescribing (eRx):** Sending prescriptions electronically from a provider's system to a pharmacy without an interim step from the hospital staff or patient. Prescriptions are for controlled or non-controlled substances; Minnesota now allows e-prescribing of controlled substances (Adapted from: [http://www.health.state.mn.us/e-health/e.html](http://www.health.state.mn.us/e-health/e.html))

**Health information exchange (HIE):** The electronic transmission of health related information between organizations according to nationally recognized standards. Health information exchange does not include paper, mail, phone, fax, or standard/regular email exchange of information. (Adapted from: [http://www.health.state.mn.us/e-health/h.html](http://www.health.state.mn.us/e-health/h.html))

**Patient portal:** An internet application that allows patients to access their electronic health records and permits two-way communication between patients and their healthcare providers. (Source: [www.healthit.gov/patients-families/faqs/what-patient-portal](http://www.healthit.gov/patients-families/faqs/what-patient-portal))

**Secure messaging:** Secure messaging is an approach to protect sensitive data using industry standards. It includes security features that go beyond typical email to (1) protect the confidentiality and integrity of sensitive data transmitted between systems or organizations and (2) provides proof of the origin of the data. Secure messages are encrypted bi-directionally and are stored on network or internet servers that are protected by login. Secure messaging functionality may be integrated with the EHR or maintained in a system separate and distinct from the EHR. (Source: [http://www.health.state.mn.us/e-health/s.html](http://www.health.state.mn.us/e-health/s.html))
Telemedicine/Telehealth: The use of telecommunications technologies (e.g., phones, e-mail, videos) to provide health care services to a patient who is physically not with the provider. Telehealth can include diagnosis, treatment, education and other health care activities. (Source: http://www.americantelemed.org/i4a/pages/index.cfm?pageid=3333)
Appendix B: Resources to Promote e-Health in Minnesota

There are many resources available to promote e-health in Minnesota as well as many actions that can be taken by health care professionals, their associations and consumers. This appendix offers suggestions and resources to help stakeholders participate in the process.

Health Care Professionals and Organizations

- Collaborate with organizations and other health care settings
- Participate in e-health training & education
- Use, adapt and share e-health tools
  - MN e-health EHR information: [http://www.health.state.mn.us/e-health/ehr.html](http://www.health.state.mn.us/e-health/ehr.html)
- Join/participate in the Minnesota e-Health Initiative [http://www.health.state.mn.us/e-health/abouthome.html](http://www.health.state.mn.us/e-health/abouthome.html)
- Subscribe to e-Health Updates at [www.health.state.mn.us/e-health/index.html](http://www.health.state.mn.us/e-health/index.html)
- Participate in Minnesota e-Health Initiative Workgroups: [http://www.health.state.mn.us/e-health/wgshome.html](http://www.health.state.mn.us/e-health/wgshome.html)

Associations

- Create a roadmap that includes components to:
  - Modernize electronic health records systems
  - Implement secure, standard-based electronic HIE
  - Ensure an informatics-savvy organization and workforce
- Draft model language for policies, contracts, use agreements, and best practices
- Create/support opportunities for collaboration statewide and regionally

Consumers

- Become engaged in managing your health and health care
  - Request a summary of your clinic visit
  - Ask for access to your personal health information electronically (e.g., patient portal)
- Use online tools to help manage your health and the health of your dependents or others you care for
- Learn about consumer engagement in health care from patients:
  - Office of the National Coordinator for HIT: [http://www.healthit.gov/patients-families](http://www.healthit.gov/patients-families)