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Executive Summary

Introduction

The Minnesota e-Health Roadmap for Behavioral Health, Local Public Health, Long-Term and Post-Acute Care, and Social Services providers includes use cases, a person-centered view, recommendations, and actions to support and accelerate the adoption and use of e-health. These four settings, referred to as priority settings, are key for Minnesota's health care delivery and payment transformation work, moving from payment for services to payment for value and outcomes, and more coordinated and integrated care. Health transformation requires secure, accurate, and efficient sharing of information between providers and the individual. E-health, the adoption and use of electronic health record (EHR) systems, health information exchange (HIE), and other health information technology (HIT) supports not only sharing but collection and use of information to support communication and care coordination.

The Roadmap

The Roadmap process was structured with sequential steps that integrated the diverse issues of the priority settings. The steering team, with 19 individuals, and the workgroups, with over 50 subject matter experts from the priority settings, met over 40 times from January 2015 to June 2016. In addition, the Roadmap engaged more than 40 reviewers and a community of interest of over 900 people.

The steering team and workgroups identified over 70 use cases, each an individual's story that shows challenges in care coordination and collecting, using, and sharing information. Eight use cases were selected for deeper analysis and discussion. The priority use cases, summarized below, are the foundation of the Roadmap.

The priority use cases:

Anderson Family has members with confirmed and suspected tuberculosis.

David has privacy concerns that inhibit full disclosure of health history between the Veterans Health Administration and other providers.

Grace has uncontrolled juvenile onset diabetes with poor health due to lack of care coordination.

Jasmine, a micro-preemie infant, has respiratory needs that require home care and equipment.

Kari is a teenager who needs support from and coordination between multiple health, school, and social services during her pregnancy.

Maria, with significant assistance from her daughter, is transitioning to an assisted living facility.

Mike is struggling to control his diabetes and depression and to find stable housing, healthy food options, and employment opportunities.

Sally, who has autism and lives in a group home, has recurring emergency department visits.

The analysis and discussion of the priority use cases identified two key themes – 1) person-centered view of e-health, and 2) collecting, sharing, and using information. The connection of these two themes is shown in Figure 1. The person is encompassed by choices and social determinants of health, illustrating the many factors that influence health. These factors also impact how the person engages in e-health and the continuum of collect, use, and share. The continuum, supported by the functions of e-health, ensures the right information is available to the right person, at the right time, to make the right decision. Also important to the person, is that information is collected, used, and shared according to privacy, security, and consent laws – which ensures the person's privacy and preferences. Each use case can be illustrated using the figure, showing the opportunity for e-health to improve the outcomes of the individual.

FIGURE 1 PERSON-CENTERED VIEW OF E-HEALTH
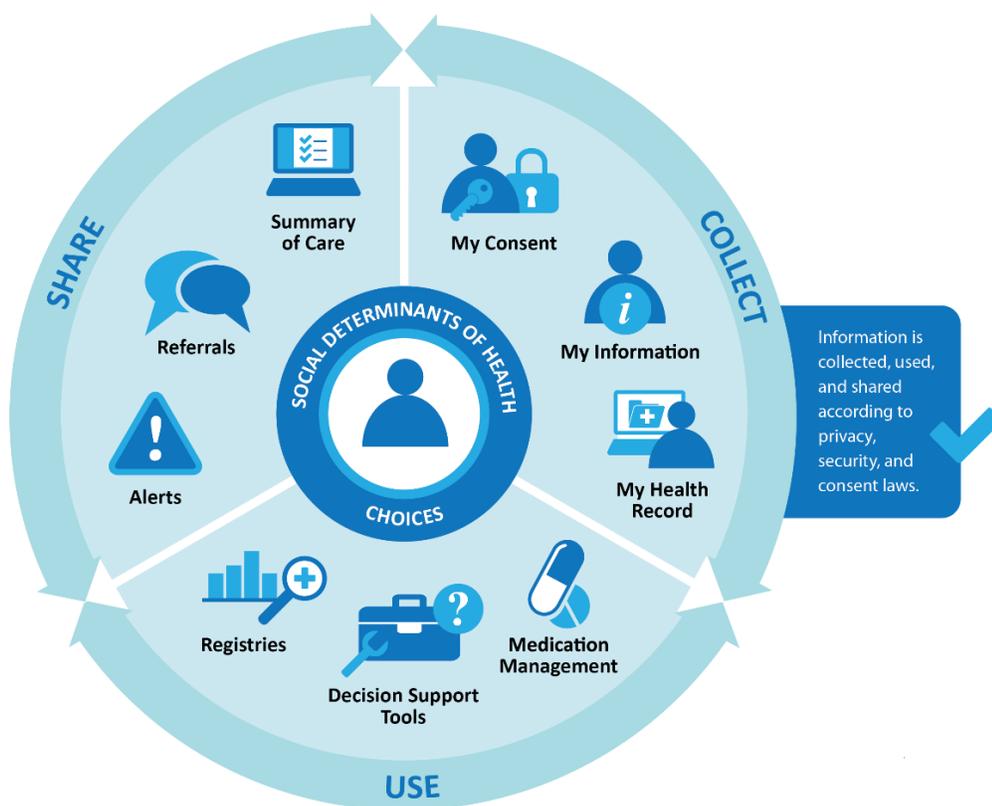
The priority use cases identified similar e-health related challenges for care coordination and collecting, using, and sharing information. These challenges were similar across the priority settings and confirmed that one roadmap would meet the needs of the priority settings. The e-health related challenges and the two key themes, led to the development of 10 recommendations for providers within the priority settings.

Recommendations

The 10 recommendations, summarized below, are for the priority settings and support the adoption and use of e-health to support healthier individuals and communities.

1. **Leadership commits to e-health** to provide guidance and ensure support and resources to adopt and use e-health.
2. **Assess readiness for e-health adoption and optimization** to determine the current e-health capabilities, future needs, and readiness to achieve your goals.
3. **Collect and integrate information needed for care** to identify the information needs of individuals, providers and other sources.
4. **Use information and automated tools** to enhance care and outcomes.
5. **Share information** to support care coordination and population health.
6. **Increase individuals' access to health information** to empower individuals and support decision-making.
7. **Comply with privacy, security and consent laws and other requirements** to protect privacy and keep information safe and secure.
8. **Develop staff e-health skills and knowledge** to effectively adopt and use e-health
9. **Use nationally recognized standards** to ensure information can be used and shared.
10. **Optimize workflow for effective use of e-health** to increase efficiency, effectiveness and quality of care.

The Roadmap also includes over 40 actions with resources and considerations that support the recommendations. There are additional actions for key partners such as professional organizations and state government. These actions are necessary for the adoption and use of e-health by the priority settings.

Next Steps

The Roadmap provides a starting point and a path forward for the priority settings. The next steps are to share and implement the Roadmap, which requires the effort, collaboration, and support from local, state, and national partners. Sharing the Roadmap will create awareness and support to develop resources for the priority settings. As the Roadmap is implemented, sharing stories and lessons learned will be vital to support and accelerate the adoption and use of e-health to achieve healthier individuals and communities.

Introduction

The Minnesota e-Health Roadmap for Behavioral Health, Local Public Health, Long-Term and Post-Acute Care, and Social Services providers includes use cases, a person-centered view, and recommendations, and actions to support and accelerate the adoption and use of e-health. These four settings, referred to as priority settings, are key for Minnesota's health care delivery and payment transformation work, moving from payment for services to payment for value and outcomes, and more coordinated and integrated care[1]. Health transformation requires secure, accurate, and efficient sharing of information between providers and the individual. E-health, the adoption and use of electronic health record (EHR) systems, health information exchange (HIE), and other health information technology (HIT) supports not only sharing but collection and use of information to support communication and care coordination.

Picture this scenario:

> *Mike is a 57 year-old with physical and mental health issues that he manages through medication. He relies on long-term disability for income and his father's home for stable housing. When his father passed away, the house was sold and Mike had nowhere to go. Without a support system, Mike had a hard time controlling his diabetes and depression. He struggled to find stable housing, healthy food options, and employment. Soon after, Mike was hospitalized for kidney and heart issues due to out-of-control diabetes. He was treated and released, but struggled to manage side effects from his new medications. He connected with the local social services agency for support, but continued to struggle, resulting in repeated emergency department visits. Despite Mike's requests for his providers to share his information, information did not move between the providers, resulting in continued poor health and well-being for Mike.*

The effective and efficient use of e-health provides the opportunity for Mike to regain control of his health and well-being by ensuring that all of his providers have the necessary information to support his needs. This is facilitated by information sharing – with Mike's permission – between his primary care doctor's office, his psychologist, social services, and the hospital emergency department. Mike also has the information he needs to take control of his disease management: using e-health to monitor his diabetes and heart conditions and develop skills for healthier living. Mike can only benefit from this opportunity when he and all of his providers across the care continuum leverage e-health to collect, use, and share information.

In addition to the recommendations and actions for the priority settings, the Roadmap focuses on additional actions for others that:

- Enhance care through improved communication among providers, including primary care and hospitals, individuals and their caregivers[2].

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[1] The priority settings were identified as important to health transformation and e-health by the Minnesota e-Health Initiative, the Minnesota Interoperable Electronic Health Record Mandate, the State Innovation Model, and the Minnesota Accountable Health Model.

[2] Caregivers are families and friends who provide direct care to an individual.

- Support individuals' access to their health information and engagement in their care and health.
- Identify key information and functionality needs for EHRs and HIE.
- Encourage policies and actions to support e-health across the care continuum for state and federal policymakers, agencies, and organizations.
- Identify evaluation and applied research opportunities to advance e-health.

Why e-health?

Across the nation, e-health is emerging as a powerful strategy to help transform the health system and improve the health of communities. For providers of care in Minnesota, e-health is becoming a necessary tool to communicate with each other. In addition, individuals are expecting to communicate with their providers and to access their health information electronically. E-health holds potential for advancing health equity through better collection, use, and sharing of information.

An EHR, a major part of e-health, is a patient health record with access to evidence-based decision support tools to aid providers in decision-making. The EHR can automate and streamline a provider's workflow, ensuring that all health-related information is collected and used. It can also prevent delays in response that result in gaps in care and poor, costly outcomes. The EHR can support the collection of information for uses other than care, such as billing, quality management, outcome reporting, and public health disease surveillance and reporting.

Interoperable EHRs have the ability to share and use shared information. They establish the foundation for e-health capabilities to improve coordination and efficiencies of care, and outcomes for the individuals and populations served. Sharing happens among providers and with the individuals served. Thus, implementing an interoperable EHR is key to successfully achieving the full benefits of e-health. To become "interoperable" and exchange health information, the EHR electronically shares information using nationally recognized standards. For HIE to be successful, providers and individuals must have confidence and trust that policies and procedures for privacy, security and consent are used to ensure information is protected.

Adopting and using EHRs and HIE requires major organizational changes. The experience of hospitals and clinics can inspire hope that the challenges are worthwhile for improving care for healthier individuals and communities. Hospitals and primary care clinics have built part of the road to e-health. Now is the time for providers of care in the priority settings to identify their own specific actions, considerations, and resources. The Roadmap is a tool to assist in this process.

The Roadmap

The Roadmap process was structured with sequential steps that integrated the diverse issues of the priority settings. The steering team, with 19 individuals, and the workgroups, with over 50 subject matter experts from the priority settings, met over 40 times from January 2015 to June 2016[3]. The subject matter experts represented the diversity of services provided within each priority setting and included providers from urban and rural areas, independent and health systems, and solo practitioners and large organizations. In addition, the Roadmap engaged more than 40 reviewers and a community of interest of over 900 people.

The steering team and workgroups identified over 70 use cases, each an individual's story that shows challenges in care coordination and collecting, using, and sharing information. Eight use cases were selected for deeper analysis and discussion. The priority use cases, summarized below and described in their entirety in Appendix B, are the foundation of the Roadmap.

The priority use cases:

Anderson Family[4] has members with confirmed and suspected tuberculosis.

David has privacy concerns that inhibit full disclosure of health history between the Veterans Health Administration and other providers.

Grace[4] has uncontrolled juvenile onset diabetes with poor health due to lack of care coordination.

Jasmine, a micro-preemie infant, has respiratory needs that require home care and equipment.

Kari is a teenager who needs support from and coordination between multiple health, school and social services during her pregnancy.

Maria, with significant assistance from her daughter, is transitioning to an assisted living facility.

Mike[4] is struggling to control his diabetes and depression and to find stable housing, healthy food options, and employment opportunities.

Sally[4], has autism and lives in a group home, has recurring emergency department visits.

The analysis and discussion of the use cases identified two key themes – 1) person-centered view of e-health, and 2) collecting, sharing, and using information. The connection of two themes is shown in Figure 1. The person is encompassed by choices and social determinants of health, illustrating the many factors that influence health. These factors also impact how the person engages in e-health and the continuum of collect, use and share. The continuum, supported by

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[3]The steering team and workgroups participant lists are in Appendix A.

[4] Four use cases, Anderson Family, Grace, Mike and Sally were used for a legal analysis as part of another SIM funded project. Findings will be shared Minnesota Privacy and Security Resources (http://www.health.state.mn.us/e-health/privacy/index.html)

the functions of e-health, ensures the right information is available to the right person, at the right time, to make the right decision. Also important to the person, is that information is collected, used, and shared according to privacy, security, and consent laws – which ensures the person's privacy and preferences. Each use case can be illustrated using the figure, showing the opportunity for e-health to improve the outcomes of the individual[5].

FIGURE 1 PERSON-CENTERED VIEW OF E-HEALTH

The priority use cases identified similar e-health related challenges for care coordination and collecting, using, and sharing information. These challenges were similar across the priority settings and confirmed that one roadmap would meet the needs of the priority settings. The e-health related challenges and the two key themes, led to the development of 10 recommendations for providers within the priority settings.

Each recommendation includes actions to achieve the recommendation. Considerations and resources to support the actions are included with the recommendation. These recommendations and actions support the adoption and use of e-health but are not intended to be implementation guides or detailed directions for implementation of e-health.

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[5] The person-centered view of e-health led to the decision to avoid the use of terms such as client, patient, or resident. The terms individual and person are used whenever possible to emphasize the importance of person-centered.

Throughout the development of the Roadmap, the steering team and workgroups acknowledged small organizations and solo practitioners and their particular challenges in adopting and using e-health. Therefore the recommendations and actions were created for providers of all sizes. Some recommendations and actions may be easier for small organizations and solo practitioners and others for large organizations but all are important for the adoption and use of e-health.

The Roadmap recognizes that the priority setting recommendations require additional actions by other providers and partners such as professional and trade associations, policymakers, and state agencies. These actions are compiled into a Call for Action (Appendix C). The complete approach and methods is available as a supplemental document (http://www.health.state.mn.us/e-health/roadmaps.html).

Getting Started

Getting started is often the hardest part of the e-health journey. The 10 recommendations in the Roadmap focus your efforts by starting with leadership commitment and a readiness assessment. These two recommendations are critical to planning for e-health. After leadership commitment and a readiness assessment are the collect, use, and share recommendations. The remaining recommendations support the collect, use, and share recommendations and are focused on an individual's access to information; privacy, security, and consent; staff development; standards use; and workflow optimization.

Depending on leadership commitment and readiness assessment, you can follow the order of the Roadmap or start on a particular recommendation. The Roadmap is designed to be used regardless of the starting point. If you are not ready to implement an EHR, focus on the collect recommendation and use the additional recommendations to improve your collection of information. However, if you have an EHR and want to implement a registry, execute the use recommendation registry action and related considerations and resources. The e-health journey can be significant but with good planning, using a structured process, you will make progress towards adoption and use of e-health.

Recommendations

The 10 recommendations below support the adoption and use of e-health to support healthier individuals and communities. The collect, use, and share recommendations are emphasized at the top of Figure 2 to show their importance and connection to person-center view of e-health. The remaining seven recommendations are also important and contribute to a provider's ability to achieve collect, use, and share of information.

FIGURE 2 GRID OF RECOMMENDATIONS
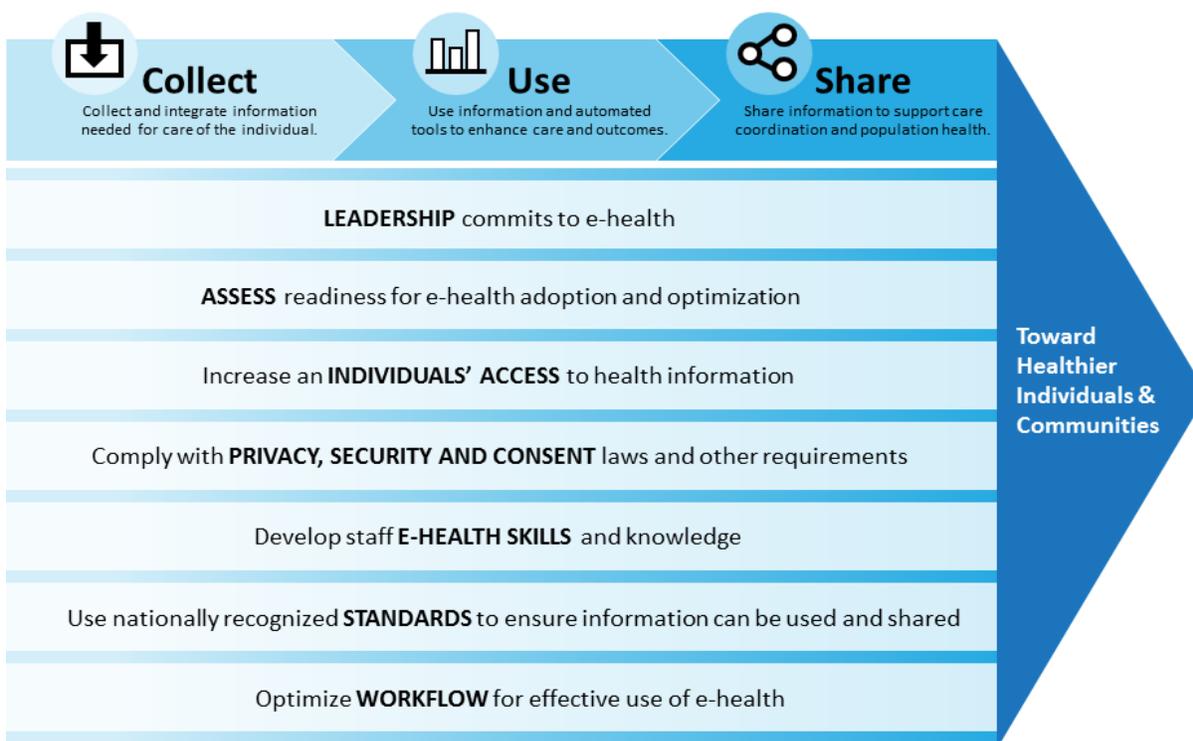
Leadership commits to e-health

Leadership provides commitment and strategic guidance. It ensures support and resources to adopt and use e-health. Implementing e-health always requires change, and leadership is a critical factor in the success or failure of implementing e-health. Many of the recommendations throughout the Roadmap require leadership's support.

Actions

Action 1: Learn about e-health and understand what is required under Minnesota law. Minnesota's Interoperable Electronic Health Record Mandate applies to hospital and health care providers across the state. Exempt from this mandate are individual health care providers in a solo, private practice, and those who do not accept reimbursement from a group purchaser.

Action 2: Use a structured process to create an action plan and prioritize for e-health through the development and implementation of an e-health vision and goals based on present and future needs. Be a champion for your vision and goals.

Action 3: Incorporate e-health into budgeting and financial planning. Develop a business case for adoption and use of e-health. Consider the financial gains from the efficiencies gained from better standardization and automation of workflow through implementing e-health. Common ways of funding e-health, such as e-health grants and other funding opportunities from state and federal government and foundations, are periodically available. Similar to evaluation costs (10-15% of budgets); e-health maintenance costs could be incorporated into program and grants budgets.

Action 4: Communicate effectively and frequently with staff by sharing a clear statement of the value of e-health and how to implement e-health vision and goals. Use a communication plan to ensure timely and useful dissemination of information regarding the project, role changes, timelines, and expectations.

Considerations & Resources

- The setting-specific Stratis Health's Health Information Technology (HIT) Toolkits (http://www.stratishealth.org/expertise/healthit/index.html) provide many resources that guide the implementation of an EHR from assessing your current needs through optimizing an EHR. There are specific toolkits for Behavioral Health, Local Public Health, Nursing Homes and Social Services. These toolkits have many tools, tips, and templates. Specific tools for leadership include:
    - Financial Assessment, Financing Resources, and Acquisition Models for EHR and HIE (assess section)
    - Communication Plan (plan section)
    - Visioning, Goal Setting, and Strategic Planning for EHR and HIE (plan section)
    - Total Cost of Ownership and Return on Investment for EHR and HIE (plan section)
    - IT Leadership (plan section)
- Funding Resources (http://www.health.state.mn.us/e-health/funding.html) for e-health includes state and national grants and additional resources.
- Understanding the Minnesota Interoperable Electronic Health Record Mandate (http://www.health.state.mn.us/e-health/hitimp/2015mandateguidance.pdf) provides guidance on the Interoperable EHR Mandate.
- During EHR implementation budget for an additional 10-15% contingency for unanticipated costs.
- For smaller settings, one or two providers may be the ones to ensure that the entire project is successful.

Assess readiness for e-health adoption and optimization

Implementing e-health requires significant organizational commitment and a well-designed plan. Before embarking on e-health adoption or optimization, assess your current e-health capabilities, future needs, and readiness to achieve your desired future state. Advance planning and assessment of your e-health needs will help ensure that you stay on the right path and use resources efficiently. As with building a road, you are going to want to ask yourself questions such as:

- Where are we trying to go?
- What do we want our path to look like?
- Who will be travelling on this road?
- Who do we need to have at the table?

Actions

Action 1: Utilize readiness assessment tools and the Minnesota e-Health Roadmap to identify where you are at and where you need to be focusing on technical, organizational, leadership, and operational factors.

Action 2: Measure leadership and staff e-health beliefs and identify strategies to build support for e-health.

Action 3: Evaluate the e-health needs and potential benefits for the individuals you serve using a person-centered view of e-health focusing on what information is needed, how it can be used, and who to share it with.

Action 4: Select the appropriate e-health system to achieve your goals using the Stratis Health HIT Toolkits (http://www.stratishealth.org/expertise/healthit/index.html) or other selection process tools.

Considerations & Resources

- Carefully assess what information is needed and what is not needed in your EHR. Determine who may have access to what information, and how information can be aggregated for reporting. The more you can anticipate your ultimate needs, the better your product selection will be.
- Ask potential vendors about the cost and ability to customize any forms or reports for your setting and what kinds of vendor-provided IT support will be available after implementation. The Minnesota Behavioral Health Community (http://www.mnbh-community.com/#!resource-tools/c15m2) has a large number of resources to help behavioral health providers with the selection and implementation of EHR systems.
- A Prescription for Meeting Minnesota's 2015 Interoperable Electronic Health Record Mandate: A Statewide Implementation Plan (http://www.health.state.mn.us/ehealth/ehealthdocs/ehrplan2008.pdf) is relevant to the four priority settings.
- Building an Informatics-Savvy Health Department (http://phii.org/infosavvy) assists public health organizations by both defining necessary informatics capabilities, and by enabling a self-assessment that aids in planning and priority setting.
- Office of the National Coordinator for Health Information Technology (ONC) How to Implement EHRs (https://www.healthit.gov/providers-professionals/ehr-implementation-steps).
- Public Health Informatics Profile Toolkit (http://phii.org/resources/view/150/public-health-informatics-profile-toolkit) serves as a guide that you can use to create a comprehensive summary of your agency´s current and projected information system needs and opportunities.
- SAMHSA Health Information Technology (HIT) (http://www.integration.samhsa.gov/operations-administration/hit) for mental health and substance abuse providers.

Collect and integrate information needed for care

E-health is a powerful tool to collect and integrate information necessary for an individual's care, and ensures your ability to effectively use and share information. Information sources and methods usually include:

- Individual and caregivers at point of care,
- Providers before, during, and after an event/episode, and
- Remote monitoring medical and health devices.

Actions

Action 1: Identify the information elements necessary for an individual's care. Appendix D contains a core set of information elements, including social determinants of health, for the priority settings based on the use cases, priority settings special needs, and health equity.

Action 2: Select and use an ONC certified EHR. A comprehensive list of certified EHRs is available at Comprehensive List of Certified Health Information Technology (https://chpl.healthit.gov/#/search) Note: not all settings have EHRs certified by the ONC therefore see Action 3.

Action 3: For providers or settings without appropriate EHRs certified by the ONC, select and use an EHR or other HIT that implements the Interoperability Standards Advisory (https://www.healthit.gov/standards-advisory) released by the ONC.

Action 4: Train your staff to utilize best practices and workflows to collect and integrate information into the correct fields in the EHR or other HIT. This integrated health information should include social determinants of health and information that is shared from other partners.

Considerations & Resources

- Use the priority use cases (Appendix B) or create a diagram, starting with phone intake and ending with scheduling follow-up appointment, to identify the information that you use and that could be used by other providers.
- The Capturing Social and Behavioral Domains and Measures in Electronic Health Records: Phase 2
  (http://www.nationalacademies.org/hmd/Reports/2014/EHRdomains2.aspx) includes information on the collection and use of social determinants of health.
- Using Data to Identify Health Inequities: A Guide for Local Health Departments in Minnesota
  (http://www.health.state.mn.us/divs/chs/healthequity/guide/healthequitydataguide.pdf) is a pilot tool, which can provide more detail on social determinants of health.
- Individuals may share information collected through apps, wearables, or in-home sensors. These emerging forms of technology may help improve health and well-being and provide additional information. Providers should implement a process to evaluate technology and to understand use and opportunities.

Use information and automated tools to enhance care and outcomes

The real value from implementing an EHR system comes from optimizing it to support efficient workflows and effective clinical decisions, in support of high quality care and improved health outcomes. Effective use means that the EHR has tools such as computerized provider order entry (CPOE), clinical decision support (CDS), and electronic prescribing, and there are processes in place to use these tools for improving health and health care. Achieving effective use is complex and requires changes to user behavior, organizational processes and practices, and EHR functionality.

Actions

Action 1: Implement an EHR that has decision support tools that are relevant to the care provided and the individuals served. Automated decision support offers clinical/practice knowledge and health-related information that is intelligently filtered, and presented at appropriate times, to enhance care. One example of decision support is an EHR that reminds the provider to ask a person about the medications he or she is taking, as part of documentation for each visit. Decision support can also make recommendations for particular goals and strategies for common issues and recommend education materials.

Action 2: Implement an EHR that has computerized provider order entry (CPOE). This feature allows provider's orders for diagnostic and treatment services to be entered electronically instead of being recorded on order sheets. CPOE involves using menu items or pick-lists in the EHR for choosing recommended procedures or kinds of care. This is traditionally a clinical function, but can be applied to priority settings for referrals to internal and external programs and providers.

Action 3: Implement an EHR that has registry capabilities**.** A registry is a tool for tracking care and outcomes of a group of individuals for whom you are providing care. Use the EHR to manage registries of individuals based on their condition(s). This will allow for easy tracking, follow-up, and monitoring progress, and supports evidence-based care. Registries allow priority settings to identify and focus care on specific types of individuals, and to track populations with defined conditions or social determinants of health.

Action 4: Implement an EHR that captures or imports medication lists and use this information to conduct medication reconciliations. If necessary for care, also implement an EHR that reviews medications and alerts for medication interactions. Design workflows that include time to talk to people about their current medication intake and to record the responses into the EHR. Engage with community partners, including pharmacists who can provide medication therapy management, reviewing all current medications and offering suggested changes for the individual.

Action 5: Implement an EHR that produces reports about providers and cohorts. Use the reporting options available in your EHR to provide feedback and benchmarking to providers/staff. Establish a regular process and schedule for providing this feedback over time.

Action 6: Implement an EHR that includes reporting capabilities that are specific to your setting (e.g., state/federal agencies, boards, patient safety organization, etc.). This can lessen the burden of reporting and improve accuracy.

Considerations & Resources

- A Practical Guide of Effective Use of EHR Systems (http://www.health.state.mn.us/ehealth/summit/summit2009/g4effectiveuse2009.pdf) is intended to assist providers in maximizing the value of their investment and to achieve increased patient safety and improved quality of care.
- CDS encompasses a variety of tools to enhance decision-making in the clinical workflow. Clinical Decision Support (CDS) https://www.healthit.gov/policy-researchers-implementers/clinical-decision-support-cds
- The setting-specific Stratis Health's Health Information Technology (HIT) Toolkits (http://www.stratishealth.org/expertise/healthit/index.html) provide a variety of tools, recorded trainings, and reference documents for use of EHRs. The toolkits can be applied to e-health tools other than EHRs. Specific tools for use in the Optimize section include:
  - o Optimization Strategies for Clinical Decision Support
  - o Optimization for Strategies for Quality Improvement
  - o Optimization Strategies for Clinical Practice Guidelines
  - o Optimization Strategies for Registries (http://www.stratishealth.org/documents/HITToolkitclinic/2.Utilize/2.2Effective%20Use/2.2Optimization_Strategies_for_Registries.doc) in the Clinic Health Information Technology Toolkit is applicable to the priority settings.
- Establishing and agreeing upon CPOE order sets requires commitment to a quality improvement process that may require significant effort. Computerized Provider Order Entry https://healthit.ahrq.gov/key-topics/computerized-provider-order-entry
- Achieving measurable care quality improvement is a health care imperative. For guidance refer to HealthIT.gov's resources found here: eCQI: What It Is, and How It Can Help You. (https://www.healthit.gov/providers-professionals/planning-and-implementing-improved-care-processes)
- Medications at Transitions and Clinical Handoffs (MATCH) Toolkit for Medication Reconciliation (http://www.ahrq.gov/sites/default/files/publications/files/match.pdf) provides guidance on medication reconciliation.
- If your EHR does not have registry capabilities, the article Using a Simple Patient Registry to Improve Your Chronic Disease Care (http://www.aafp.org/fpm/2006/0400/p47.html) has strategies for using a spreadsheet or database software to make sure individuals get the care they need.
- Data analytics should be a consideration during the assessing, planning and selecting phases of an EHR or other health information technology. Ensure you have access to the data for your own analyses. Some resources for data analytics include the KHA REACH data analytic portal (https://www.khareach.org/portal/data-analytics) and the College of St. Scholastica MOOC courses (https://www.css.edu/graduate/non-degree/massive-open-online-courses.html).

- For advanced data analysis and reporting, consider using a repository. A repository includes a database and set of functionalities that consolidate data from clinical and/or other data sources and presents a unified view of a single person. This set of functionalities may be included in an EHR, but is often a separate database and requires resources to govern and manage. MDH is currently developing a framework to describe the components of an e-health repository that will be published in late 2016 on the [Minnesota e-Health website](http://www.health.state.mn.us/e-health/index.html) (http://www.health.state.mn.us/e-health/index.html).

Share information to support care coordination and population health

HIE is the secure electronic exchange of information between providers of care and services. The goal of HIE is to help make health information available when and where it is needed. Minnesota supports a market-based approach for HIE. Priority settings have choices to make based on what services are needed and what services are offered by state-certified HIE service providers in the Minnesota market.

Actions

Action 1: Evaluate your readiness with respect to organizational support and needs, workflow changes and training needs, privacy and security, technical infrastructure, and the estimated cost and benefits of using HIE.

Action 2: Understand the level of support provided by your EHR vendor, as they can help you assess your EHR system's technical capabilities as it relates to HIE. Consider the following questions:

- Does your EHR vendor have skilled staff and the capability and capacity to build, test and implement interfaces for HIE at a reasonable cost and in a timely manner?
- Does your EHR vendor have experience in working with intermediaries such as an HIE Service Provider?
- Can your EHR vendor map data stored in proprietary formats into standard formats for exchange?
- Does your EHR vendor have a clear business plan and timeline for upgrading and/or updating their software to meet evolving national certification requirements?
- Does your EHR support the current national standards for HIE?
- Does your EHR support transmitting relevant data to a patient portal or personal health record (PHR)?

Action 3: Implement an EHR with embedded HIE capabilities or a separate HIE service provider that supports Direct Secure Messaging. Direct Secure Messaging is a standards-based method of information exchange, which enables providers to securely send information to other trusted parties. Information shared (sent or received) will likely include:

- Summary of care documents that support a transition of care to another provider. This document may include a problem list, diagnoses, summary of care provided, and follow-

up recommendations. Such information helps a provider quickly ascertain any problems already addressed, the current approach, and future treatment recommendations.

- Alerts, or event notifications, include a broad range of messages sent to an individual's provider(s) informing them of recent health care encounters. For example, it is useful for a provider to receive an alert indicating that an individual was seen in the emergency department. The provider receiving the alert can than more quickly address any issues and help prevent future emergency care. These notifications and alerts help ensure that care is better coordinated and that potentially costly interventions are averted. Alerts are an especially effective tool because they provide essential information in a succinct message about an individual's health status to their providers. The Admit/Discharge/Transfer (ADT) message is a specific message that is used to communicate episode details. ADT messages carry patient demographic information and information about trigger events (such as patient admit, discharge, transfer, registration, etc.).
- Referrals provide information when an individual has been recommended to another provider for additional care. Often the referral providers are not aware that an individual was referred to them. As a result, people may "fall through the cracks" and not receive vital care. When referral messages are sent between providers, the receiving provider can follow up, and increase the likelihood that an individual receives recommended care. For example, a primary care provider treating a patient with depression may recognize a psychotherapy need. When the psychotherapist receives the referral message, they can follow up with the individual, making it more likely that they will come in for care.

There are multiple ways of securely exchanging health information. It is important that providers look for state-certified HIE providers to act as the secure bridge for sharing information. Depending on the capabilities of your EHR or embedded HIE, providers can start with simpler forms, such as Direct Secure Messaging, or consider other, more robust, methods of health information exchange.

Action 4: Understand what is required under Minnesota and federal law. The Minnesota Interoperable EHR Mandate applies to hospitals and health care providers across Minnesota. Please note that individual health care providers in a solo, private practice, and those who do not accept reimbursement from a group purchaser are exempt from this mandate.

The mandate requires that the EHR be connected to a State-Certified Health Information Organization (HIO) either directly or through a connection facilitated by a State-Certified Health Data Intermediary (HDI) as defined in Minnesota Statute §62J.498.

While there is no fine or state-administered penalty at this time for not complying with the mandate, the Minnesota e-Health Advisory Committee and MDH recommend that all providers of care demonstrate progress toward achieving the EHR and interoperability requirements. Potential benefits of compliance include:
- Increased efficiency and quality outcomes
- Improved ability to avoid adverse events
- Timely access to information regarding the individuals you serve.

Action 5: Offer or support access to a patient portal or other technology, such as a PHR, either directly from your EHR or another HIT vendor such as a State-Certified HIO. This type of HIT can provide secure access for individuals to view, download and share their health information.

Action 6: Implement an EHR that allows you to send and receive secure messages with the people you serve. People increasingly prefer using secure messaging to communicate with their providers.

Considerations & Resources

- Assessing your exchange partner capabilities prior to implementing HIE ensures that the HIE service selected is one that exchange partners are able to use. Direct Secure Messaging is more readily available in some communities, although many providers are also beginning to implement more robust, query-based mechanisms of HIE.
- A Practical Guide to Understanding HIE, Assessing Your Readiness and Selecting HIE Options in Minnesota
  (http://www.health.state.mn.us/divs/hpsc/ohit/hieguidance/guidancedocs/hieguide.pdf) is intended to provide an introduction to HIE and help providers understand their HIE choices in Minnesota.
- Developing the organizational support for implementing and using HIE as part of the regular workflow is critical. Organizations need to be able to articulate a clear picture of a single, integrated delivery system for the individual – a system that can provide all the information needed, when it is needed, for both the individual and the providers. One way to establish a shared vision for HIE is to conduct a visioning session with staff to avoid basing your HIE requirements solely on current needs and uses.
- The setting-specific Stratis Health's Health Information Technology (HIT) Toolkits (http://www.stratishealth.org/expertise/healthit/index.html) provide a variety of tools, recorded trainings, and reference documents for understanding and implementing. Specific tools include:
  - o HIE Technology Readiness Inventory (assess section)
  - o Exchange of Clinical Summaries via CCR, CCD, C-CDA (plan section)
  - o Participation, Data Sharing, Data Use, Business Associate Agreements for HIE and EHR (select section)
  - o Using Direct for HIE (implement section)
  - o EHR and HIE Policies and Procedures Checklist (implement section)
- Implementing HIE may give you the opportunity to add new or improve existing workflows. Before you develop your business requirements, make sure you understand your workflows and look for ways to improve them. Review the workflow recommendation later in the Roadmap for more information.
- The individuals you serve must trust you to protect their health information and to use it appropriately to improve care. Review the privacy, security and consent recommendation later in the Roadmap for more information.
- Part of understanding your practice's readiness for HIE involves assessing your technical capabilities, primarily through your EHR. Make sure your EHR can:

Act, and Psychotherapy notes. As additional Minnesota resources become available, they will be posted here.

- A Security Risk Analysis tool can be found in the Optimization section of the Stratis Health's Health Information Technology (HIT) Toolkits (http://www.stratishealth.org/expertise/healthit/index.html).

Develop staff e-health skills and knowledge

Staff skills and knowledge are required to effectively adopt and use e-health. Although the scope of staff capability will be dependent on the size and type of provider (e.g. solo provider, small organization, large organization), all of the recommendations can be applied to any size or type of provider organization.

Actions

Action 1: Consider the broad range of skills and knowledge necessary for the adoption and use of e-health, and the collection, use and sharing of information. This includes, but is not limited to, e-health understanding, computer literacy, IT expertise, e-health standards, informatics, and data analytics.

Action 2: Assess e-health skills and knowledge needs. This assessment should be based on the planned use of e-health.

Action 3: Implement a training plan, with a focus on role-based training, and budget that ensures staff receive initial and ongoing training.

Action 4: Develop and update staff roles and position descriptions that incorporate new e-health activities and responsibilities.

Considerations & Resources

- Solo providers and small organizations can collaborate for certain skills and knowledge, contract with a vendor for a shared resource, or build a network for peer support and learning.
- Identify current staff who have an interest, aptitude or skills in e-health to be super-users.
- Project management is a necessary skill for adoption and use of e-health.
- Some education institutions have opportunities for their students to work with provider organizations on projects to meet their degree or certificate requirements. This can be a way to get some additional help, as well as a way to find a potential employee.
- Building an Informatics-Savvy Health Department tool (http://www.phii.org/infosavvy) assists public health organizations by both defining necessary informatics capabilities, and by enabling a self-assessment that aids in planning and priority setting.
- EHR Implementation: Training pays dividends (http://medicaleconomics.modernmedicine.com/medical-economics/content/tags/accelerating-roi-your-ehr-purchase/ehr-implementation-training-pays-d) a list of 14 actions to ensure high-quality training.
- Stratis Health's Health Information Technology (HIT) Toolkits (http://www.stratishealth.org/expertise/healthit/index.html). A training plan tool

is in the Implement section. Provides a variety of assessment and inventory tools for staff capacity in the Assess sections.
- Workforce Position Classifications and Descriptions (http://phii.org/resources/view/6423/workforce-position-classifications-and-descriptions) has e-health position descriptions and classifications for local public health.

Use nationally recognized standards to ensure information can be used and shared

Standards are necessary to ensure that information is universally understood, is in the appropriate format, moves from point A to point B, and is securely accessed and moved.

Actions

Action 1: Learn about standards and participate in the development, identification, and adoption of standards necessary for priority settings to enable sharing of information.

Action 2: Select and use an EHR that is certified by the ONC. A comprehensive list of currently certified EHRs is available at Comprehensive List of Certified Health Information Technology. (https://chpl.healthit.gov/#/search) Note: not all settings have EHRs certified by the ONC; therefore, see Action 3.

Action 3: For providers or settings without appropriate EHRs certified by the ONC, select and use an EHR or other HIT that implements the Interoperability Standards Advisory (https://www.healthit.gov/standards-advisory) released by the ONC.

Action 4: Select and use an American Nursing Association recognized terminology within the EHR or health information technology.

Considerations & Resources

- Each priority setting should select a nursing terminology standard appropriate for their setting and utilize mapping to SNOMED-CT and LOINC when exchanging between different terminology standards.
- Interoperability Standards Advisory (https://www.healthit.gov/standards-advisory) represents the Office of the National Coordinator (ONC) for Health Information Technology's current thinking on the best available standards and implementation specifications, and is updated annually. To ensure incorporation of your priority setting, engage in the annual review and update.
- Standards and Interoperability (S&I) Framework (http://www.siframework.org/) empowers stakeholders to establish standards, specifications and other implementation guidance that facilitate effective health care information exchange. The S&I Framework creates a forum – enabled by integrated functions, processes, and tools – where stakeholders can focus on solving real-world interoperability challenges.
- Engaging in the standards activities of the Minnesota e-Health Initiative (http://www.health.state.mn.us/e-health/abouthome.html) can provide your priority setting perspective and help advance the development of more robust, inclusive standards.

- [Standards Recommended to Achieve Interoperability in Minnesota (Updated 2011)](http://www.health.state.mn.us/e-health/standards/standardsdocs/g2standards2011.pdf) (http://www.health.state.mn.us/e-health/standards/standardsdocs/g2standards2011.pdf) provides practical support to those having to meet the Minnesota Interoperable EHR Mandate, as wells as to achieve the Minnesota e-Health Initiative's goals of improving care and supporting healthier communities.
- [Recommendations Regarding the Use of Standards Nursing Terminology in Minnesota](http://www.health.state.mn.us/e-health/standards/standardsdocs/nursingterminology082114.pdf) (http://www.health.state.mn.us/e-health/standards/standardsdocs/nursingterminology082114.pdf) was developed by the Minnesota e-Health Standards & Interoperability Workgroup to fill a gap in national recommendations on nursing terminology.

Optimize workflow for effective use of e-health

Workflow is the sequence of physical and mental tasks performed by various people within and between work environments. It can occur at several levels (one individual, between people, across organizations) and can occur sequentially or simultaneously. Providers need to review and incorporate e-health into workflow to increase efficiency, effectiveness and quality of care.

Actions

Action 1: Plan for e-health implementation by assessing current workflow by utilizing tools, techniques, and mapping to identify obstacles in information capture, environment, policies and procedures, staffing and training.

Action 2: Address changes to new or updated workflows by developing a process to confront concerns or issues with communication, commitment, human resource issues (roles), motivation, and resources. Show staff how the change will benefit them.

Action 3: Design and implement new workflows to streamline processes, increase efficiency and improve quality.

Considerations & Resources

- Providers all experience time pressures. While the use of secure electronic exchange of information may at first appear to be an added burden, workflow can be designed for more efficient and effective use. For example, if a provider offers a patient portal, individuals might be encouraged to complete intake forms and assessment measures prior to their initial appointment, making the provider's time with the individual more goal directed, efficient, and more satisfying to the individual receiving care.
- Agency for Healthcare Research and Quality [Workflow Assessment for Health IT Toolkit](https://healthit.ahrq.gov/health-it-tools-and-resources/workflow-assessment-health-it-toolkit/workflow). (https://healthit.ahrq.gov/health-it-tools-and-resources/workflow-assessment-health-it-toolkit/workflow) has an FAQ on workflow.
- Plan-do-check-act (PDCA) is a four-step cycle that allows you to implement change, solve problems, and continuously improve processes. Its cyclical nature allows it to be utilized in a continuous manner for ongoing improvement. The [Agency for Healthcare Research and Quality Plan-do-check-act (PDSA)](https://healthit.ahrq.gov/health-it-tools-) (https://healthit.ahrq.gov/health-it-tools-

and-resources/workflow-assessment-health-it-toolkit/all-workflow-tools/plan-do-check-act-cycle) has additional tools and information.

- Health Resources and Services Administration's [Health IT Adoption Toolkit](http://www.hrsa.gov/healthit/toolbox/HealthITAdoptiontoolbox/) (http://www.hrsa.gov/healthit/toolbox/HealthITAdoptiontoolbox/) includes tools for workflow.
- ONC [Quality Improvement](https://www.healthit.gov/providers-professionals/implementation-resources/quality-improvement-pdsa) (https://www.healthit.gov/providers-professionals/implementation-resources/quality-improvement-pdsa) resource can assist you in redesigning your system and improving your outcomes.
- Public Health Informatics Institute resource [Analyzing Clinical Data and Workflow](http://www.phii.org/ehrtoolkit/analyzing-clinical-data-and-workflows). (http://www.phii.org/ehrtoolkit/analyzing-clinical-data-and-workflows) focuses on the entire workflow from information origin to use.
- SAMHSA-HRSA Center for Integrated Solutions has resources for [Workflow](http://www.integration.samhsa.gov/operations-administration/workflow) (http://www.integration.samhsa.gov/operations-administration/workflow).
- A Workflow and Process Improvement Tool is in the Implement section of the [Stratis Health's Health Information Technology (HIT) Toolkits](http://www.stratishealth.org/expertise/healthit/index.html) (http://www.stratishealth.org/expertise/healthit/index.html).

Next Steps

The Roadmap provides a starting point and a path forward for the priority settings. The next steps are to share and implement the Roadmap, which requires the effort, collaboration, and support from local, state, and national partners. Sharing the Roadmap will create awareness and support to develop additional resources for the priority settings. This next step is primarily dependent on the Roadmap participants, the professional and trade associations, and the Minnesota Department of Health.

Implementing the Roadmap requires the individual effort of providers within the priority settings to execute the recommendations and actions. This effort needs to be supported by the partner organizations and their ability to achieve the call to action. As the Roadmap is implemented, sharing stories and lessons learned will be vital to support and accelerate the adoption and use of e-health to achieve healthier individuals and communities. These resources, once available, will be available at [Minnesota e-Health Roadmap](http://www.health.state.mn.us/e-health/roadmaps.html) (http://www.health.state.mn.us/e-health/roadmaps.html).

Appendix A: Participant List

Steering Team Members

Co-Chair: Randy Farrow, Mankato Clinic
Co-Chair: Cally Vinz, Institute for Clinical Systems Improvement
Co-Chair (past): Carol Berg, UCare

Members:
Wendy Bauman, Dakota County Public Health
Todd Bergstrom, Care Providers of Minnesota
Jennifer Blanchard, Minnesota Department of Human Services
Kris Dudziak, HealthPartners
Dan Edelstein, Allina Health and HealthPartners
Cathy Gagne, St. Paul Ramsey County Public Health
Tim Gothmann, Jewish Family Service of St. Paul
Cindy Grolla, Northfield Hospital
George Klauser, Lutheran Social Service
Kevin Larsen, Office of the National Coordinator of Health IT
Martin LaVenture, Minnesota Department of Health
Jennifer Lundblad, Stratis Health
Deanna Mills, Community University Health Care Center
Krista O'Connor, Minnesota Department of Human Services
Peter Schuna, Pathway Health
Annie Schwain, Voda Counseling
Darrell Shreve, LeadingAge Minnesota (past)
Trisha Stark, Minnesota Psychological Association
Catherine VonRueden, Essentia

Behavioral Health Workgroup

Co-Chair: Annie Schwain, Voda Counseling
Co-Chair: Trisha Stark, Minnesota Psychological Association

Members:
Matthew Chiodo, Fraser Institute
Gregory Clancy, Allina Health/Health Catalyst
Alisa Cohen, Therapeutic Services Agency, Inc.
James Dungan-Seaver, Hamm Clinic
Ann Eiden, Nystrom & Associates
Scott Gerdes, Zumbro Valley Health Center
Mark Alan Gustafson
Nancy Houlton, UCare
Eric Larsson, Lovaas Institute Midwest
Ellen Luepker

Gwen Pekuri, South Central Human Relations Center
Shauna Reitmeier, Northwestern Mental Health Center
Mark Schneiderhan, University of Minnesota, College of Pharmacy
Lisa Squire
Grace Tangjerd Schmitt, Guild Incorporated
Khaonou Vang, RESOURCE, Inc.
Steven Vincent, Minnesota Psychological Assn.
Linda Vukelich, Minnesota Psychiatric Society
Claire Wilson, Minnesota Association of Community Mental Health Programs

Local Public Health Workgroup

Co-Chair: Wendy Bauman, Dakota County Public Health
Co-Chair: Cathy Gagne, St. Paul Ramsey County Public Health

Members:
Sue Ellen Bell, Minnesota State University- Mankato
Bill Brand, Public Health Institute
Phyllis Brashler, Minnesota Department of Health
Melanie Countryman, Dakota County Public Health
Sue Grafstrom, LifeCare Medical Center
Daniel Jensen, Olmstead County Public Health Services
Susan Strohschein, Retired
Jessica Tarnowski, Minnesota Department of Health
Diane Thorson, Otter Tail County Public Health

Long-Term and Post-Acute Care Workgroup

Co-Chair: Todd Bergstrom, Care Providers of Minnesota
Co-Chair: Kris Dudziak, HealthPartners
Co-Chair (past): Darrell Shreve, LeadingAge Minnesota

Members:
Mary Chapa, Ebenezer, a part of Fairview Health System
Lisa Fowler, Bayada Pediatrics
Abdi Galgalo Gonjobe, Metro Health Care Services, LLC
Jennie Harvell, US Department of Health and Human Services/ Office of the Assistant Secretary
for Planning and Education
Deborah Kaspar, Perham Living
Janel Peterson, Evangelical Lutheran Good Samaritan Society
Sarah Shaw, Minnesota Department of Health
Bonnie Westra, University of Minnesota

Social Services Workgroup
Co-Chair: Tim Gothmann, Jewish Family Service of St. Paul

Co-Chair: George Klauser, Lutheran Social Service

Members:
Stephanie Abel, Hennepin County Human Services and Public Health Department
Karen Crabtree, Essentia Health St. Mary's
Elizabeth Dodge, Chisago County Health and Human Services
Scott Fridley, Volunteers of America
Melinda Hanson, Minnesota Department of Health
Joel Kalle, Minnesota Cameroon Community
Jody Lien, Otter Tail County Human Services
Kate Onyeneho, Center for Africans Now in America
Eric Ratzmann, Minnesota Association of County Social Service Administration
Isaak Rooble, Somali Resources Aid Associates
Mary Jo Schifsky, Store to Door
Cheryl Shanks, Camilia Rose Care Center, LLC
Deb Taylor, Senior Community Services

Stratis Health and the Minnesota Department of Health, Office of Health Information
Technology, facilitated the development of the Minnesota e-Health Roadmap.

Appendix B: Priority Use Cases

Tuberculosis (Anderson Family)

Summary

Problem Statement: inefficient processes for timely surveillance and treatment of a communicable disease.

Primary Demographics: urban family with suspected Tuberculosis (TB) involving more than one state. Payer – private insurance.

Settings: Hospital, laboratory, local public health (LPH), Minnesota Department of Health, primary care clinic, college, Wisconsin Department of Health.

Actors: Anderson family, hospital discharge planner, hospital Infection Control Practitioner (ICP), lab staff, local public health nurse (PHN), Minnesota Department of Health (MDH) staff, primary care provider (PCP), Wisconsin Department of Health Staff.

Story

Mr. Anderson is admitted to a local hospital with a medical history and symptoms of suspected Tuberculosis (TB). A chest x-ray is performed and a sputum specimen is collected. The chest x-ray findings are consistent with pulmonary TB and the sputum specimen is smear-positive.

His results are reported by the hospital to the Minnesota Department of Health (MDH) via phone call within 24 hours. MDH begins working immediately and directly with the hospital's infection control practitioner (ICP) to monitor Mr. Anderson's care and treatment and coordinate discharge planning. Mr. Anderson is started on TB medications at the hospital due to the positive smear test, and a Nucleic Acid Amplification Tests (NAAT) was ordered and awaiting results.

When Mr. Anderson's sputum comes back NAAT positive, MDH enters the rest of the information on the TB Case Report Form into MEDSS. A notification is then emailed to the public health nurse (PHN) that MDH has officially counted Mr. Anderson as a TB case. MDH fills out the TB Case Report Form and faxes a copy to the local public health (LPH) agency designated PHN.

The hospital discharge planner follows the MDH Tuberculosis Hospital Discharge Planning Checklist and begins planning for Mr. Anderson's return to home. During this time, the PHN asked the hospital ICP to send the history and physical, labs, chest x-ray reports, and medication list via fax.

While at the hospital, Mr. Anderson is tolerating his medication and is given education on TB treatment, follow-up and implications. The hospital discharge planner coordinates follow-up care for Mr. Anderson, MDH and LPH to ensure that treatment continues and infection control precautions are followed in the community. He will undergo six – 12 months of direct observation therapy (DOT). He agrees to the recommended treatment terms and is discharged. While Mr. Anderson was inpatient, the LPH PHN began the contact investigation. The PHN identified that there were three other individuals living in the home: his wife, a child under the age of five and a child who goes to college in Wisconsin. The PHN requests consent for LPH to contact his family about his TB diagnosis and their potential exposure. MDH provides LPH with

medication orders and medication that LPH will review with Mr. Anderson. He has a follow-up appointment established with the ICP.

The PHN visits the family at their home to conduct symptom reviews and obtains medical histories; those reviews are negative. A tuberculin skin test (TST) is administered to the wife and the four-year-old child. The PHN arranges with Mrs. Anderson to return to the home in two days to have the TSTs read.

The PHN completes a MDH case management report and faxes it to MDH. Direct Observation Therapy (DOT) for Mr. Anderson has begun for TB medications. Patient medical assessment and education on TB was conducted and documented in the LPH EHR.

Four year-old Marcus' first TST test was negative. The follow-up or second TST also indicated a negative result. Due to Marcus's age, a chest x-ray is needed so the PHN calls the family's medical clinic to help schedule that appointment. The chest x-ray results were negative. Because Marcus is under five years of age, window-period prophylaxis is ordered. Direct Observation Therapy (DOT) for Marcus has begun for TB medications. Extensive teaching was provided to the family regarding why this is recommended. The prophylactic treatments commenced for Marcus at the same time as Mr. Anderson's DOT. All assessments and observed therapies are documented in the LPH EHR, and then the PHN fills out paperwork to fax back to MDH.

The family includes a college age child, Audrey, who stays at her Wisconsin college during the week, but commutes home on the weekends. The PHN notifies MDH and completes an 'Inter-jurisdictional Transfer' form with Audrey's contact information. This form is faxed to MDH, who then faxes it to the Wisconsin Department of Health, so that they can contact Audrey and make arrangements for screening. The Wisconsin PHN visited Audrey in her dorm and conducted two TST screenings nine weeks apart. Both the first and second test results were negative.

After six weeks and multiple phone calls, the PHN received confirmation from the lab that Mr. Anderson's form of TB was active. The PHN made a copy of the lab report and provided it to Mr. Anderson. The PHN notifies the clinic and hospital of the need for post exposure testing.

Following three negative sputum tests, and multiple phone calls, the PHN received verbal confirmation from the lab that Mr. Anderson is no longer deemed infectious. The PHN administers another TST to Mrs. Anderson and Marcus. Two days later, both TSTs are read as negative and Marcus's window-period prophylaxis medication is discontinued. The PHN receives a report from the WI Department of Health to indicate that Audrey's second TST is negative, as well. No further screening is necessary. Home isolation and home visits are discontinued.

Future State

1. The patient's results are reported by the hospital to the Minnesota Department of Health (MDH) via EHR in real time.
2. The hospital's EHR has a CDS module to direct the infection control practitioner (ICP) regarding the care and treatment and coordinate discharge planning for TB case management.
3. The lab reports the NAAT positive test directly to MDH and alerts the MD of the results.

4. A notification is electronically generated to the appropriate Local Public Health Department that MDH has officially counted Mr. Anderson as a TB case.
5. Medication dosses are documented and medications are automatically sent to the appropriate person for dispensing.
6. The hospital discharge planner enters a plan of care into the EHR describing roles and responsibilities of each party for treatment continuation and infection control precautions are followed in the community.
7. LPH assesses contact investigations with the patient that is documented in the EHR and shared with all parties. When a contact address is out of jurisdiction for the practitioner, an alert is generated to MDH for them to contact the appropriate jurisdiction for follow-up.
8. Complete direct observation therapy via telemedicine and document encounter in the EHR.
9. The LPH EHR also has a decision support module for contact assessment and protocols for age, weight and medical history regarding TB.
10. All follow-up testing is entered automatically into the electronic systems of the agencies involved with coordinated clinical decision support mechanisms.

Veteran with Privacy Concerns (David)

Summary

Problem Statement: Privacy concerns inhibit full disclosure of health history

Primary Demographics: 50 year-old African American male veteran with complex co-morbidities of PTSD, social integration, alcohol and drug addiction history and acute medical conditions. Payers – VA, private pay, private insurance.

Settings: Alcohol/substance abuse clinic, emergency department, hospital, psychiatry clinic, veteran's administration primary care and specialty clinics.

Actors: David, hospital discharge planner, outpatient substance abuse/alcohol treatment provider, primary care provider (PCP), psychiatrist, orthopedist.

Story

David is a 50-year-old veteran who receives routine medical care from the Veterans Health Administration (VA). The VA clinic is about an hour away from his home. He is also under care with a non-VA psychiatrist for post-traumatic stress disorder (PTSD) and issues with social integration. David is compliant with the antidepressant medication prescribed by this psychiatrist. He also attends psychotherapy sessions every other week. In the past, David was diagnosed with alcohol dependence and abuse of opioids. He attended 12-step programs and reported he is now sober. David believes that release of information about any psychiatric treatment or prior substance use would result in loss of employment. He specifically declined to sign consent forms to release information to other providers. He paid for psychiatric treatment out-of-pocket. Providers at the VA are unaware of his psychiatric treatment and substance abuse history.

David visited the VA clinic due to chronic pain in his right shoulder blade that radiated down his right arm. This pain led to an inability to sleep comfortably. His primary care provider (PCP) suspected a herniation of a cervical disc and David was referred to an orthopedist for diagnosis and treatment. The PCP sent a referral consultation request to the orthopedist (within the VA) electronically. The orthopedist saw David and x-rays confirmed the cervical disc herniation. The orthopedist prescribed high-dose steroids, an opioid for temporary relief of chronic pain and an exercise program. The orthopedist sent an electronic consultation summary report to David's PCP. The PCP received the report which confirmed the diagnosis and course of treatment. Neither the PCP nor the orthopedist knew of David's prior drug and alcohol history. David did not inform the psychiatrist of the opioid prescription, nor did he make his physicians aware that he had relapsed and was drinking again.

David subsequently presented at the local hospital emergency department (ED) complaining of acute abdominal pain, nausea and fever. The ED physician is unable to access his health information from the VA or the psychiatrist. Although the initial diagnosis was acute appendicitis, lab tests showed pancreatitis. Lab tests also showed presence of alcohol and opioids. David was admitted for treatment of pancreatitis and was detoxed from alcohol as part of the acute care. During the course of hospital treatment, David revealed the name of his psychiatrist and that he had a prescription for an antidepressant. Although his opioid prescription

was suspended during inpatient treatment, David did not acknowledged his past opioid dependence.

In planning for discharge, the hospital team recommended that David receive continuing care in an outpatient program for alcohol dependence. The hospital discharge planner consulted with David to identify characteristics of outpatient alcohol/substance use disorder providers that were important to him. The hospital discharge planner used an electronic resource management tool to generate a list of outpatient alcohol/substance use disorder providers that met his criteria. The discharge planner called his chosen treatment provider to make an appointment. David signed a granular release for his hospital medical records and discharge plan to be shared with the treatment provider before his appointment.

David was discharged home from the hospital with an appointment scheduled for the treatment provider. A summary of care (discharge) document including medication list (prescribed before and during the hospital stay), ordered outpatient services, and suggested providers was given to David upon discharge to share with his other providers.

Future State

Through the course of David's treatment from varied providers, he recognized the health implications of withholding information and authorizes to release and share information across all providers. He receives coordinated care across all providers leading to the opportunity for improved outcomes such as early identification of reoccurrence of alcohol/substance abuse. Ongoing education surrounding information sharing and consent, lead to increased confidence in privacy and consent of information.

1. David sees psychiatrist and signs consent to release information allowing for the sharing of his medication and care plan. With encouragement from his psychiatrist, David shares information about his past history with substance use.
2. David sees PCP for shoulder pain. PCP is aware of antidepressant and his past history of substance use.
3. PCP electronically schedules referral to orthopedist.
4. David visits orthopedist. Medications are prescribed that compliment his antidepressant drug regime and take into consideration David's past history of substance use. Psychiatrist informed of opioid prescription through direct secure messaging. David's health record is updated, as is his care plan.
5. David starts drinking again and does not inform PCP or psychiatrist of his drinking relapse.
6. David presents at hospital with pain. Hospital reviews medication list from PCP (VA system) and care plan, notes opioids medication. Psychiatric care summary also available through HIE. Initial diagnosis is pancreatitis. Lab test is performed confirming pancreatitis and high levels of alcohol. Pancreatitis is treated. David is detoxed from alcohol. Medications are reviewed in light of new circumstances. David's medications are updated. Information is shared with PCP and psychiatrist through admission and discharge alerts. Hospital modifies care plan based upon the actions they have taken.
7. Hospital knows about psychiatrist and prior opioid use based upon medical record.
8. The hospital discharge planner consulted with David to identify characteristics of outpatient alcohol/substance use disorder providers that were important to him. The hospital discharge planner used an electronic resource management tool to generate a list

of outpatient alcohol/substance use disorder providers that met his criteria. The discharge planner showed David how he could access information about his medical care through his PHR where a discharge summary and recommendations for continued service and providers is listed.

9. David was discharged home from the hospital with a summary of care (discharge) document including medication list (prescribed before and during the hospital stay), ordered outpatient services, and suggested providers. The discharge summary was electronically shared with his other providers through direct secure messaging. Providers can also view information in the updated EHR.

10. David shares his alcohol abuse with his providers and attends treatment for this. His care plan is updated to reflect his alcohol treatment plan. David is educated about privacy rights and concerns related to his substance abuse treatment. He decides to sign consents to share selected information with his other providers.

Uncontrolled Juvenile Onset Diabetes (Grace)

Summary

Problem Statement: High-risk diabetic with lack of care coordination in a rural area with a provider shortage.

Primary Demographics: Adolescent with diabetes and mental health concerns in rural setting with private payer insurance.

Settings: behavioral health, local public health, hospital, primary care, school, crisis center.

Actors: Grace, Grace's parents, school nurse, school social worker, primary care provider (PCP), diabetes educator, emergency department (ED) staff, public health nurse (PHN), psychiatrist, psychotherapist, crisis team, residential treatment center.

Story

Grace is a 14 year-old girl in eighth grade who was recently diagnosed with type 1 juvenile onset diabetes by her primary care provider (PCP) she sees in a small town in southwest Minnesota. Her A1C was 13 when she was tested and diagnosed. This clinic is a satellite office to a big health system in Sioux Falls, South Dakota, but has not had the technology upgrades and system connections to talk seamlessly to the health system. However, the clinic did provide the after visit summary and is in process of meeting meaningful use requirements.

Grace was referred to the diabetes nurse educator in the clinic for initial Diabetic teaching. The PCP also faxed the Local Public Health Department for in home follow up care from their Home Health Nursing staff.[6]

The Public Health Nurse (PHN) met with Grace and her parents at home to reinforce the teaching around diabetes management including testing blood sugar, how to store insulin, how to keep track of how much insulin she used. Grace also met with the part time school nurse where she was taught how to manager her diabetes while at school. Both the PHN and the school nurse were documenting their notes in paper charts. Medication education and documentation was provided, but due to the lack of a shared care plan, the education effort was not coordinated.

Over time, adjustments were needed in the amount of insulin Grace needed. Per her primary care provider's faxed orders, the school nurse assisted Grace with these adjustments while at school. At the same time, the public health nurse worked with Grace and her parents to help her when changes were needed to her insulin level at home. The PHN, family, and school nurse had some challenges in communicating because of perceived FERPA (Family Educational Rights and Privacy Act) laws. This kept the providers from directly connecting with one another as frequently as was needed to provide Grace with adequate care coordination. The PHN also had some challenges in coordinating with the PCP because Public Health records were paper and the PCP's while electronic, were not accessible.

Initially, Grace had several bouts of hypoglycemia where she collapsed in gym class. The kids in her class made fun of her, which caused her to become sad and ashamed of her medical issue.

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[6] A few counties in Rural Minnesota provide home health care services along with Public Health Services. Within most counties in Minnesota this service would be provided by a separate home care agency.

She also had issues with hyperglycemia, which made her angry and snap at people. This caused peers to shy away from Grace and stop being friends with her. Her parents brought her to a psychotherapist at the county mental health center. The mental health center has an EHR, but it is not interoperable with other EHR systems. The psychotherapist did note that Grace was taking insulin and was having issues getting her diabetes under control. The psychotherapist shared with Grace's parents' concerns that her moods seemed to be unstable.

Over the next several months, Grace was not able to get her diabetes under control and continued her follow up care with her primary care doctor who continued to order adjustments to Grace's insulin. He was not aware of all the work that was done by the PHN and school nurse or that Grace's parents took her to the emergency department (ED) for uncontrolled blood sugars in another town multiple times. The ED also changed her insulin and did not document the change where it could be viewed by other providers involved in Grace's care nor were alerts sent to her PCP about her ED admissions. Because of this Grace's parents started requesting paper records so they could carry them to each health care provider.

After several months, her PCP, suggested that Grace have a pump inserted to help her control her blood sugars. Grace and her parents reluctantly consented to an external insulin pump. For the next several months, Grace struggled with control of her blood sugars and started to become clinically depressed. Her psychotherapist recommended that Grace see a psychiatrist for a medication evaluation. Paper charts were used. Grace was prescribed an anti-depressant. Grace nor her parents shared with the school or her PCP that Grace was seeing a psychiatrist, and had been prescribed medication, due to shame and concerns that her peers would find out.

Kids at school continued to make fun of her because she wore a pump on her side. Even with support of the psychotherapist, psychiatrist, school nurse, PHN[7], and her parents, Grace continued to struggle in school. At one point Grace became so despondent that she shared with a friend that she thought about suicide. Her friend shared that information with the school social worker, who called her parents. Grace's parents did not know how best to help Grace, and the school social worker suggested that the family call the county crisis team to have Grace assessed to see if she needed additional mental health treatment. The crisis team had trouble connecting with the PHN and PCP but did touch base with her psychiatrist by phone after obtaining signed consents. They subsequently recommended that Grace's parents consider entering her into a day treatment program. There were not such services available at her school and the nearest hospital with a day treatment program for children was several hours' drive away. As her grades fell, her friends became fewer, and over time her blood sugars levels would stabilize then destabilize. Graces struggle with her diabetes and associated depression continued.

Future State

Grace's health records are viewable by all providers via HIE. The PCP, behavioral health specialists, home care provider and school supports can coordinate care and document changes. Her plan of care would be designed with Grace and her family and shared with all providers. Grace is treated for her medical and mental health in an integrated fashion. Additional diabetic education is provided for Grace and her family by a dietician and online interactive educational program that was part of diabetes services support group. Care coordination is involved in all

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[7] A few counties in Rural Minnesota provide home health care services along with Public Health Services. Within most counties in Minnesota this service would be provided by a separate home care agency.

steps of Grace's care to ensure that there is no undo trauma/stress as her treatment and diagnoses change. Grace and her family feel 'taken care of' by her providers with a common Care Plan.

1. Grace is diagnosed with diabetes by her PCP. Personal health data is updated in an EHR that is integrated with the health system. PCP sends electronic referral to Public Health Nurse.

2. Grace meets with the PHN. A care coordinator is assigned for Grace by her payer. The PHN and the care coordinator exchange electronic secure messages through the regional HIE to develop a care plan for Grace which is shared through direct secure messaging with the PCP. Grace is chosen to participate in an online diabetes program sponsored by the health system that focuses on diabetes education and monitoring. FERPA privacy and consent policies are followed allowing for appropriate information to be shared electronically between school, PHN, behavioral health providers, and the PCP. Grace's care plan is consistently updated.

3. Grace and family monitor her blood sugar levels, recording the information in an online application, part of the patient portal. The data entered into the patient portal is viewable and accessible by all of Grace's providers. The blood sugar levels are electronically transferred into the PCP's EHR. This data is accessible by the PHN, PCP and school nurse. The school nurse assists Grace in making adjustments to her insulin. These adjustments are also recorded in the EHR.

4. Grace meets with a psychotherapist at the local mental health center and is diagnosed with adjustment disorder. Appropriate consents and releases are completed. Pertinent information is shared with PCP and PHN via EHR behavioral health CCD document sent through the regional HIE. Data privacy and consent is discussed with the family, reducing anxiety and concerns. Care coordinator is consulted and informed through electronic messaging that Grace is receiving psychotherapy. Grace uses the patient portal to record her moods, and these are tracked in conjunction with blood sugar changes by her providers.

5. After meeting with Grace, PCP adjusts insulin dosage. EHR is updated. Care coordinator notes changes and electronically communicates with all parties using Direct Secure Messaging. An alternative treatment method is discussed (insulin pump) and readily agreed to when PCP shares information obtained through clinical decision support tools as part of the family's education.

6. Grace visits the ED for uncontrolled blood sugar. Upon reviewing the EHR, the ED recommends accelerating the timetable for the installation of the insulin pump. Grace's parents start documentation of Grace's care using a PHR linked to her EHR (which is accessible by Grace also).Alerts about the ED admission and recommendations regarding the insulin pump are sent to all providers.

7. All parties review the information in the EHR and Grace has the pump implanted. Education about the pump is provided by a diabetes educator through a telehealth linkage with the Sioux Falls diabetes specialty center. Support for Grace is enhanced by her participation in the diabetes program as it includes practical information about how she can talk to peers about her condition.

8. Grace meets with a psychiatrist to discuss the issues with being a diabetic. Psychiatrist has access to Grace's EHR data through a patient portal to the PCP's health care system. Any medications prescribed are incorporated into the psychiatrist's EHR records and Grace's care plan is updated when the psychiatrist sends a direct message to the PCP and

PHN through the shared HIE so that accurate medication lists are available for medication reconciliation... Grace feels confident that only necessary information about her behavioral health is shared with her other providers, as her behavioral health CCD is tagged with metadata that allows for parsing information based on different confidentiality levels.

9. Grace manages her blood sugar levels using the application, which is incorporated with the EHR. The PCP monitors this information for any readings out of tolerance. The PCP, Public Health, and school nurse are sent alert messages automatically from the EHR when Grace's blood sugar is at a problematic level. The insulin pump is adjusted over time to minimize blood sugar level swings. Grace's care plan is updated with any changes. Grace's blood sugars and moods stabilize over time.

Home Support for Premature Baby (Jasmine)

Summary

Problem Statement: Home care services and equipment needs change over time.

Primary Demographics: Micro-preemie infant female with respiratory needs in urban area. Payer – private insurance.

Settings: home care agency, hospital, specialty care, habilitation therapy.

Actors: Jasmine, parents, home health providers, hospital discharge planner, hospital physicians, primary care provider (PCP), hospital case manager, durable medical equipment (DME) provider, nutritionist, respiratory therapist, payer.

Story

Jasmine was born at 24 weeks at 600 grams. As a micro-preemie, she encountered a number of physical issues including an underdeveloped respiratory system and feeding difficulties due to early and prolonged intubation. After four months in the neonatal intensive care unit (NICU) and pediatric intensive care unit (PICU), Jasmine was deemed ready for discharge in six weeks. Her hospital discharge planner determined all post-acute/home health needs and worked to coordinate with providers to ensure that appropriate services[8] were arranged for Jasmine. Consent forms to share information with the home health providers were obtained from Jasmine's parents. The discharge planner communicated the plans for the post-acute/home health needs with the case manager as a transition step for Jasmine.

- Respiratory: A portable ventilator, an oximeter, and associated supplies was required to keep Jasmine breathing and to constantly monitor her oxygen level.
- Nutrition: Jasmine required a feeding pump, appropriate formula, and associated supplies to get the calories that she needs.
- Home Health: Jasmine initially required 24 x7 nursing in the home due to her complex care plan, her fragile condition, and the complex technology required to sustain her life. A referral to Public Health was completed for education and support for the family.

The case manager printed orders for Jasmine's respiratory, nutrition, and home health needs then tracked down the infant's physicians for each particular care need to get their signatures on the orders. The case manager called various home health and equipment providers to understand who could provide each service. She faxed orders to each provider and fielded multiple phone calls for additional information on the patient. This continued for about two weeks as each provider obtained authorizations from payers for their portion of the service.

The case manager coordinated with providers to arrange visits with Jasmine and her family in the hospital and provide education on equipment and nutritional care. She also coordinated with each provider to arrange home visits to ensure that Jasmine's home environment was appropriate for the care and necessary equipment. All home health and equipment providers working on Jasmine's case contacted each clinician working with her to ensure they were familiar with the care plan and how to operate the equipment provided. At this point, Jasmine was discharged to home with home health services in place for her ongoing care.

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[8] Respiratory services were provided by a separate provider.

Future State

The parents are involved with the decision-making for future services with the case manager. They select providers for Jasmine's services based on their ability to provide what is necessary to develop a Jasmine-specific electronic longitudinal care record at a reimbursable cost within the payers' guidelines. The case manager sends a referral via Direct (secure email) to each provider/service with access to the post-acute care plan and discharge date.

1. Discharge notice entered into hospital Electronic Health Record (EHR). Support (educational/emotional) needs identified in EHR Care plan updated to reflect discharge via EHR. PCP has access to EHR for review purposes.
2. Discharge orders sent to via direct to case manager.
3. Case manager electronically receives orders for nutrition therapy, home health, and respiratory therapy. Reviews alternatives with parents. Provider(s) chosen and PCP notified.
4. Orders submitted electronically to other providers.
5. Other providers receive approval to provide services. Approval noted in care plan by providers. Parents create PHR with the other provider information.
6. Visits coordinated with parents to learn about EMD and associated monitoring devices/applications. Educational material accessible via the internet that can be incorporated into the PHR.
7. Using longitudinal care plan home visits for the other providers are coordinated by case manager, with parents having accessibility to the visit schedule.
8. Other providers coordinate services through longitudinal care plan which case manager oversees. Parents and PCP have access to the care plan to review and coordinate activities. Periodic meetings of all providers established by case manager with parents attending.
9. All medical data is incorporated into the Jasmine electronic Longitudinal PHR along with analytics providing trends, alerts, and other information including telehealth monitoring capability required to provide the highest level of care and a focus on the prevention of incidents and future hospital stays.
10. Jasmine discharged and sent home with her parents. Common care plan updated. ADT sent to all providers.
11. Jasmine transported home via services ordered by the discharge nurse. PCP orders follow up visits with all providers after consulting with specialist. Orders sent via direct email protocol to all providers.
12. Referral to public health and school team for early intervention services once Jasmine is medically stable and home care is ready to discharge.
13. The care coordination team monitors the Jasmine Electronic longitudinal PHR led by the case manager.

Teen Pregnancy (Kari)

Summary

Problem Statement: Support needed from multiple health and social services.

Primary Demographics: Adolescent female in urban area. Payers – primary commercial insurance, secondary Medicaid.

Settings: Hospital, local public health, primary care, school, school-based clinic, school teachers, social services, WIC staff.

Actors: Kari, Kari's parents, county financial worker, primary care provider (PCP), public health nurse (PHN), school nurse.

Story

Kari is a 15 year-old smoker who went to a school-based clinic for a pregnancy test after missing two periods. Her pregnancy test was positive and she chose to have the baby. Kari admitted to the nurse many stressors and authorized referrals to the local public health department for Women, Infants, and Children's (WIC) assistance and for the Family Home Visiting (FHV) program, as well as to her primary care provider (PCP) and the county Human Services division to apply for Medicaid. Kari signs consents for her medical care related to pregnancy. Her parent(s) need to sign consents for non-pregnancy medical care/information and FERPA. The referrals are made by a phone call or a fax form. Kari currently lives at home with her parents although they are not involved in her pregnancy care.

The public health nurse (PHN) made a home visit. Kari completed a health history intake paper form and developed a plan of care with the nurse. The plan included Kari meeting with the PHN and participating in the FHV program, which incorporates teaching, counseling and guidance related to a healthy pregnancy, preparation for childbirth, and parenting along with case management activities focused on how to access pregnancy and parenting resources, insurance and cash benefits. Kari gave consent for the PHN to share her health information summary and coordinate the plan of care with the community-based teen parent case management team, her PCP, and the school nurse.

With the PHN's encouragement, Kari signs up to use her primary care clinic's PHR and establishes personal health goals. During the visits, the PHN collected data and the consent to share the data to with the Minnesota Department of Health (MDH) Family Home Visiting program. The nurse traveled back to the county public health office to type the information from the paper forms into the Electronic Health Record and completed the interactive HTML forms for DH FHV who then entered into its data collection system.

Not long after Kari's 32-week visit, the PCP recommended additional home visits and notified the PHN by phone that Kari was having premature contractions and was put on bed rest. The PHN provided more frequent visits for support related to preterm labor prevention and recognition, preparation for childbirth, and parenting. PCP/PHN faxes health plans notice of change in health status. The PCP notified the school by fax of the bed rest so homebound services were arranged quickly, allowing Kari to stay current with her schooling.

At 40 weeks gestation, Kari delivers a baby girl and texts the PHN with the update. The PHN coordinates a home visit the day after they get out of the hospital to ensure breastfeeding is going well and answer any questions. At the visit, the PHN helps Kari call WIC to make an appointment and call her financial worker to report the baby's birth and begin the process of obtaining medical assistance for the baby and Minnesota Family Investment Program (MFIP) benefits for the family. The PHN and Kari work on future goals that include schooling, child health care needs, daycare, social service needs, and pregnancy prevention options.

Future State

The PHN, PCP, school, Kari, other supports have the right information at the right time to make the right decisions. Multiple consents and releases are streamlined and better understood. Kari is supported throughout her pregnancy and set up with support services needed after the birth of her daughter. She was able to quit smoking after using an app on her phone and receiving education on the implications of smoking during pregnancy. She is encouraged to continue her education and with proper support graduates from high school. She continues to engage with local public health services for both her and her daughter.

1. Kari visits clinic to confirm pregnancy and is referred to support services electronically, including apps to track smoking cessation and pregnancy goals

2. Kari registers for a PHR with her PCP.

3. Kari, along with her PCP and PHN, create a common Care Plan for the remainder of her pregnancy that is viewable by all her providers and care supports

4. Kari and her school determine education goals

5. The PHN completes records and assessments that are electronically shared with the state to meet all requirements

6. Kari is able to communicate with the PHN via text to update and check in

7. OPPORTUNITY to involve family or assess support system

8. Kari, PHN, PCP, the community-based teen parent case management team, and school devise goals (and share via a common care plan electronically) for Kari (and her family) before and after she gives birth. Because of the involvement of primary care, education and support services before birth, Kari and her daughter have a plan of action, PHR, etc. in place before birth.

9. Consent requirements and process are more understood, streamlined and consistently implemented in all CHB's

Seamless Coordination (Maria)

Summary

Problem Statement: Care coordination relies on family leadership and paper records.

Primary Demographics: Elderly Hispanic widowed female; English is her second language; she lives alone in metro suburb and has early stage dementia; has significant help from daughter with activities of daily living; Payers – Medicare Part A fee for service with a private pay supplement.

Settings: Area Agency on Aging (AAA), assisted living facility, home delivered meals, home health agency, hospital, primary care provider (PCP), Senior LinkAge Line, skilled nursing facility.

Actors: Maria, Anna, assisted living staff, home care staff, Meals on Wheels, nursing home staff, Area Agency on Aging.

Story

Maria is an 87 year-old Hispanic widow who lives alone. English is her second language. Her daughter, Anna lives nearby and visits her every few days to do shopping and housework for her. Maria has developed early-stage dementia, and has chronic rheumatoid arthritis. She no longer drives. Maria receives meals on wheels once a day, but Anna increasingly has assumed the responsibility for bringing meals to her mother. Anna is Maria's health care agent but the health care directive is outdated and inaccessible by all health and care providers. Maria was found by neighbors twice late at night walking outside her house in January dressed only in a bathrobe. They brought her inside and called Anna. Maria's Primary Care Provider (PCP) recommends contacting the Senior LinkAge Line to explore options.

Anna discusses this latest development with Maria, and Maria agrees that Anna should contact The Area Agency on Aging (AAA), via the Senior LinkAge Line, for a long-term care consultation of her health care options. Over the phone the staff reviews Maria's reasons for considering assisted living. They also discuss Maria's personal goals, immediate and projected long-term care needs, including the need to update her advance directive, and identifies alternative community services that might meet her needs. Anna accepts the offer of an in-person meeting to continue Maria's assessment and planning. The meeting is arranged via phone calls. Transitional consulting services are provided to determine Maria's needs and the provider best suited to meet her needs. During this process an authorization code for assisted living services is received.

Before the meeting with the AAA can occur, Maria falls on the icy sidewalk and breaks her hip. Maria is hospitalized and receives a hip replacement. After several days, and with assistance of the hospital discharge planner Maria is transferred to the skilled nursing facility (SNF) chosen by Anna. Maria had a 12 day stay covered by Medicare where she received physical rehabilitation

Prior to Maria's departure from the hospital, the AAA staff join Maria and Anna, to discuss assisted living options. Maria decides to move into an assisted living location that offers rehabilitative therapies as well as services for people with dementia. Anna uses the internet to locate several assisted living options that fit Maria's preferences and needs. Maria makes her

selection and authorizes the assisted living to gather her medical records from her physician, the hospital, and the SNF. Following discharge from the SNF, the home care representative meets with SNF to review the SNF discharge summary and create a care plan for use while at assisted living.

Anna takes time off work to coordinate Maria's change in address and services. Maria moves into assisted living, and continues her physical therapy. She utilizes home care services to support her activities of daily living to maintain the recovery she has accomplished to date.

Future State

Maria's coordinated care is achieved through more clinical technology and communication, with less burden on Anna. A high quality of care and quality of life for Maria is ensured by keeping the PCP involved as she relies on other settings and services to support her health care which will enable a more streamlined care coordination.

Maria is transitioned from the hospital to the SNF. Prior to being admitted to the SNF, the SNF receives from the hospital Maria's person centric electronic post-surgery care plan. Upon admittance to the SNF, Maria undergoes an electronic assessment where it is determined that she has dementia. A Maria centric longitudinal care plan is developed by incorporating the hospital post op hip care plan and taking into consideration her dementia and other chronic care complications. Maria receives physical rehabilitation and a chronic care plan.

Prior to Maria's transition of care from the SNF, the AAA and SNF staff join Maria and Anna, to discuss assisted living options. Maria decides to move into an assisted living location that offers rehabilitative therapies as well as services for people with dementia. Anna uses the Internet to locate several assisted living options that fit Maria's preferences. Maria makes her selection and authorizes the assisted living facility to electronically transition the SNF's longitudinal EMR and care plan for Maria that now has input from the hospital, SNF, and PCP. This document is electronically transmitted using approved and secured processes. Prior to discharge from the SNF, the assisted living representative meets with the SNF to review the SNF transitions of care and updates the longitudinal care plan. Maria's longitudinal care plan is integrated into the assisted living EMR for use while at the assisted living facilities.

1. Anna and Maria discuss moving Maria to an assisted living facility.
2. Anna speaks with Senior LinkAge Line (SLL).
3. AAA sets up meeting with Maria and Anna.
4. Maria admitted to hospital following a fall. EHR record is updated. ADT is sent to notify her PCP of admission to the hospital. Hospital is able to access her medical records from her PCP. Immunizations validated via MIIC. Advance care directive available for hospital staff to review. PCP receives/reviews the information in the hospital EHR.
5. AAA, discharge planner, Maria and Anna discuss next steps with Maria's care. Maria's care plan is updated and shared with her PCP. Maria's advance care directive is updated.
6. Maria is discharged to a SNF. ADT sent to all caregivers. Discharge plan and care plan transmitted to SNF. PCP has access to discharge plan.
7. Maria receives rehabilitation, home health and other services. Services are facilitated through a care plan which is exchanged with providers via email. Anna and PCP have visibility into services being provided via a patient portal.

8. Maria and Anna pick an assisted living facility with PCP involvement.
9. Maria moves into assisted living. Intake process involves review of care plan, available medical records, and advance directive. These documents are updated to reflect change in living arrangements. All care givers notified of changes.

Mental Health Issues Hinder Ability for Self-Care (Mike)

Summary

Problem Statement: Mental health issues give rise to long-term unemployment, isolation, and unmanaged health issues.

Primary Demographics: Middle-aged male in urban area on long-term disability, with diabetes and depression. Payer – MinnesotaCare.

Settings: County social services, employer, employment program, hospital, social service agency.

Actors: Mike, adult protection services staff, county social services staff, emergency department (ED) providers, employer, employment program staff, food shelf staff, hospital providers, hospital social worker, and social service agency staff.

Story

Mike is 57 years old and has been receiving long-term disability for emotional issues and has significant physical issues that he deals with daily. When living with his father, Mike was able to take care of his own diabetes, and control his mental health issues with medication. When his father passed away, the house had to be sold and Mike had nowhere to go. Without a support system, Mike had a hard time controlling his diabetes and depression.

For three months, Mike was in an abusive living arrangement where he was bullied and forced to sign over his disability check. He left the place and contacted a local social service agency. The social service agency contacted adult protection and the police. The case review found him not to meet the vulnerable adult criteria and therefore did not require an assigned guardian.

The social service agency connected Mike with a local food shelf. The food shelf provided Mike enough food for the month. Much of that food was not diabetes friendly. Due to frequent lightheadedness, Mike does not feel safe while working. The social service agency assisted in enrolling Mike in an employment program and found part-time work. He found temporary living arrangements. Mike's financial situation (barely above poverty level) disqualifies him from many programs.

Mike was hospitalized due to out of control diabetes. The hospital enrolls Mike in MinnesotaCare. He was given medications and discharged. He was often dizzy and fell, but assumed that was due to the new medications. A couple weeks later, he fell in the street due to a medical event. During the second hospital stay, the hospital social worker connected with Mike's case worker at the social service agency. He was treated and released to his apartment with little follow up. He was placed on the waiting list for case management and the Community Alternatives for Disabled Individuals (CADI) waiver, which would qualify him for additional CADI services. The social service agency helped Mike move to a less isolated apartment and regularly accompanied him to the food shelf but he continued to battle depression, diabetes and medical issues related to his fall. Despite his ongoing involvement with the social service agency, Mike had five visits to the emergency department in the last three years, two of which resulted in hospitalizations.

Future State

Mike has the opportunity to achieve a higher quality of life and more independence due to Mike and all of his health and care providers having the correct information and education. This is facilitated by the connection between coordinated care with social service and behavioral health organizations and coordination of clinical care (PCP, hospital).

1. Mike contacts social service agency for housing and financial services. Mike's information recorded in their respective applications. Social service agency serves as care coordinator. A care plan for Mike is developed.
2. Social services agency contacts adult protection. Also coordinates services with other providers on Mike's behalf. Mike begins using a PHR to document services provided
3. Vulnerable adult assessment completed. Part of the assessment included communication with PCP and behavioral health providers (if any).
4. Social services agency refers Mike to services providers including nutritional and diabetic educational providers via direct messaging. Social service agency requested a Behavioral Health Assessment, which upon completion was added to his records. Mike consents to having his information shared with other providers. Mike updates his PHR with corresponding documentation.
5. Mike utilizes other providers. Other providers notify social service agency of Mike's utilization of their services.
6. Mike enters hospital with a health issue. ADT sent to all providers communicating Mike's admittance to hospital. Social services agency acting as care coordinator requests case management.
7. Mike is discharged from hospital. EHR is updated. PCP has access to EHR. Discharge personnel arrange transportation. ADT sent to all providers. Discharge instructions shared with other services. Mike incorporates discharge plans into his PHR.
8. Case manager meets Mike following discharge and arranges community based waiver program. Hospital care plan and social services care plan integrated.
9. Mike's physical and emotional health improve, but he continues to return to the hospital for health issues. Case manager convenes all providers to try and identify causes for return hospital visits.

Recurring Medical Condition (Sally)

Summary

Problem Statement: Reoccurring ear infections, disruption to Sally's sense of safety and inappropriate use of the emergency department.

Primary Demographics: Female in urban area, morbidly obese with autism, recurring ear infections, Payer – Medicaid.

Settings: Ambulance, group home, hospital, primary care, social services.

Actors: Sally, guardian, ambulance personnel, county case manager, emergency department (ED) provider, group home staff, primary care provider (PCP).

Story

Sally is a resident of a group home and has a corporate guardian[9]. She has autism and is non-verbal and morbidly obese. She has great difficulty expressing herself without getting very frustrated. Sally has a long history of ear infections and over the last two years, and has had 11 emergency department visits. Her symptoms present as crying, pulling at her ear and increased agitation. When these symptoms present, group home staff call the after-hours on-call primary care provider (PCP). Each time they were directed to the emergency department. Every time Sally was transported by ambulance, and had to be sedated and accompanied by a four-person team from the group home. The on duty overnight group home staff had to call the manager to come in and supervise the other clients so the overnight team could accompany Sally to the hospital. Every visit to the emergency department Sally received an ear infection diagnosis. She was provided with a prescription for the ear infection. The ambulance team is contacted again to transport Sally home. While in the hospital waiting for her trip home, Sally remains sedated. Sally's average duration of stay in the hospital is in excess of 10 hours. The following day the county case manager is notified of the event and records it in Sally's records.

Future State

Sally has an established primary care home where a person-centered care plan in in place. This care plan includes how the guardian is engaged in decisions and protocols for common/reoccurring situations. They participate in a model of care offered through a Primary Care Provider (PCP) group that visits patients at their assisted living or group home setting.

1. Sally wakes up Saturday at 3 a.m. pulling at her ear and crying.
2. The group home staff contacts the on-call PCP. Group home staff receive PCP contact information from an EHR patient portal. They have view only access to the care plan.
3. PCP reviews Sally's medical history via an electronic health record (EHR).
4. PCP directs group home staff to review symptoms (including temperature).
5. Based on presenting systems and medical history, PCP diagnoses ear infection
6. PCP e-prescribes an antibiotic.
7. The county case manager is notified of the event when the PCP updates the EHR. The country case manager has view access to Sally's EHR data.

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[9] There are different types of guardians. The consent processes and protocols followed may vary based upon the type of guardianship.

8. Pharmacy delivers the antibiotic to the group within the hour so Sally can begin the medication.
9. PCP calls group home on Sunday to check in on Sally's symptoms and tolerance to the medication.
10. PCP visit Sally at the group home on Monday. The ear infection is confirmed.
11. The provider reviews Sally's care plan, medical and prescription history and frequency of ear infections to recommend a change in treatment options to help prevent reoccurrence.

Appendix C: Call to Action

The success of the adoption and use of e-health by priority setting providers is dependent on actions from other key partners. Below is a call to action for partner organizations in support of the Roadmap and its recommendations.

Academic/Educational Institutions

Action 1: Incorporate e-health and informatics skill sets and knowledge into education and training for professionals serving the priority settings.

Action 2: Reach out to priority setting organizations and students to identify practicums and other projects that students can work on in support of Roadmap implementation.

Action 3: Utilize the use cases or develop setting specific case examples that can be incorporated into the curriculum studies and assignments.

Action 4: Seek resources to develop and implement an evaluation and research agenda focused on the priority settings.

Health Care Plans and Purchasers

Action 1: Align payment incentives and policies that support e-health such as incentives for adoption and use of EHR and related systems and for exchange of information.

Action 2: Support incentives for collaborative efforts such as for requirements identifications and technical assistance, training, operations and assessment and evaluation.

Action 3: Ensure administrative, payment, and clinical data reporting requirements are consistent and able to be incorporated into the e-health tool/EHR reporting capability.

Health Information Exchange Service Providers

Action 1: Obtain Minnesota state-certification to offer HIE services.

Action 2: Engage the priority settings when identifying community needs and health information exchange capabilities.

Action 3: Reach out to priority settings to identify their needs and develop affordable options for providing services to meet their needs.

Action 4: Participate in local, state, and national activities to advance affordable and sustainable health information exchange.

EHR and Other Health Information Technology Vendors

Action 1: Incorporate the current data needs, functional requirements and information standards for the priority settings into software and services.

Action 2: Leverage the use cases to improve functionality and usability of health information technology for priority settings and individuals served.

Action 3: Support the exchange of information using Minnesota certified HIE providers.

Action 4: If offering HIE services, obtain <u>Minnesota state-certification</u> to provide HIE services.

Individuals and Caregivers

Action 1: Use the features of the patient portal such as scheduling, alerting, lab results, medications lists, provider notes, immunizations history, and appointments.

Action 2: Review your health information and provide comments to your provider. This can happen electronically (patient portal or PHR) or paper-based (visit summary).

Action 3: Share information collected from mobile or wearable technology with providers and/or with PHRs.

Action 4: Understand how health information is collected, used, and shared by providers.

Action 5: Participate as a consumer/caregiver in Minnesota e-Health Initiative workgroups and activities.

Minnesota e-Health Initiative

Action 1: Incorporate the priority setting needs into feedback to state and federal policymakers such as recommendations to the Commissioner of Health and the annual review of the Interoperability Standards Advisory of the Office of the National Coordinator.

Action 2: Develop resources to meet the needs of the priority settings including:

   a. Consent for emancipated minors and minor consent
   b. Health information exchange across state lines
   c. Real or perceived conflicts between HIPAA, MN statute 144.291-298, and public health reporting

Action 3: Implement strategies to address real and perceived public resistance to e-health.

Professional Organizations/Priority Setting Community At-Large

Actions 1: Promote the benefits and values of e-health at meeting, conferences, and within the profession.

Action 2: Request resources and support policies that provide funding and technical assistance for using e-health for priority settings including small organizations and solo practitioners.

Action 3: Work with other partners, including the MDH, to support user groups or communities of interest and to create a library of best practices, templates, policies, and procedures for adoption and use of e-health, optimization, position descriptions, consumer engagement, privacy, security, and consent, and others.

Action 4: Respond to state and national requests for information and participation on e-health including the Minnesota e-Health Initiative workgroups and activities, Interoperability Standards Advisory, Standards & Interoperability Framework, and other emerging national activities to encourage nationwide interoperability.

Action 5: Build upon the Stratis Health Information Technology Toolkits, filling in the gaps and continuing to develop additional setting specific tools.

Action 6: Work with national professional organizations to monitor and influence national and Minnesota policy development.

Action 7: Lead efforts to collaboratively define business requirements and unique information needs of priority settings.

Action 8: Work with the Minnesota Department of Health, Office of Health Information Technology to assess e-health adoption and use, identify gaps and barriers and inform local, state, and federal policy development.

Action 9: Promote the benefits and value of e-health in a broad variety of venues.

Action 10: Support the broad inclusion of providers covered by the 2015 EHR Mandate to ensure that the EHR mandate has an impact on improving the quality, continuity, and safety of care.

State Government

Action 1: Support partnerships, such as the Minnesota e-Health Initiative, that focus on e-health.

Action 2: Develop and use an aligned set of social determinants of health to lessen the collection burden on providers for this essential information.

Action 3: Fund regional public health informaticians to offer consultation, planning, coordination and technical assistance for the purpose of promoting and maintaining e-health with governmental public health and social services agencies.

Action 4: Support the broad inclusion of providers covered by the 2015 EHR Mandate to ensure that the EHR mandate has an impact on improving the quality, continuity, and safety of care.

Action 5: Support state and local government to meet requirements of the Interoperable EHR mandate by implementing a coordinated approach to secure HIE with MDH and other state government agencies and replacing numerous obsolete, siloed, non-standard systems.

Action 6: Accelerate workforce train in health informatics and Health IT by advancing coordinated curriculum in colleges and universities, health informatics job classifications, and governmental work force education and training.

Action 7: Support the adoption and use of EHR and HIE through targeted financial and technical assistance, and development of guidance and best practices to adopt and effectively using EHRs and HIE for all priority settings and in particular small organizations and solo practitioners.

Action 8: Work with other partners, including the professional associations, to support user groups or communities of interest and to create a library of best practices, templates, policies and procedures for adoption and use of e-health, optimization, position descriptions, consumer engagement, privacy, security, and consent, and others.

Appendix D: Core Information Elements

The Roadmap Core Information Elements were identified through a three-step process.

1. Evaluating the priority use cases' information needs using the Interoperability Standards Advisory released by the ONC, found at Interoperability Standards Advisory (ISA) (https://www.healthit.gov/standards-advisory)
2. Identifying the additional information needs of the priority settings and uses cases not in the ISA.
3. Incorporating significant social determinants of health and other factors influencing health and care not previously identified.

Basic Information

1. Name
2. Date of birth
3. Address including zip code and county
4. Telephone number
5. Care team member*
6. Guardianship
7. Caregiver
8. Payer

Care, Treatment, and Health Information

1. Alcohol use
2. Allergies
   a. Patient allergic reactions*
   b. Allergen: medications*
   c. Allergen: food*
   d. Allergen: environmental substances*
3. Assessment critical flag**
4. Behavioral health service/treatment type**
5. Confidentiality status**
6. Drug toxicology observation code**
7. Encounter Diagnosis (dental)*
8. Encounter Diagnosis (medical)*
9. Episode of care
10. Episode of care completion
11. Family health history*
12. Functioning and disability*
13. Imagining (diagnostics, interventions and procedures)*
14. Immunizations
    a. Historical*
    b. Administered*
15. Lab tests*

16. Medications*
17. Mental status exam**
18. Noncash benefit
19. Notes (progress, supervision, provider)
20. Numerical references and values*
21. Peer group type**
22. Physical activity
23. Problem list/condition list*
24. Procedures (dental)*
25. Procedures (medical)*
26. Professional service type**
27. Risk behavior
28. Route of administration for substance**
29. Stress
30. Substance abuse disorder code**
31. Substance of abuse
32. Therapeutic behavioral service type**
33. Tobacco use* or exposure
34. Treatment modality**
35. Treatment participation code**
36. Treatment service**
37. Unique device identification*
38. Vital signs*

Social Determinants of Health/Factors Influencing Health

1. Country of origin/U.S. born or non-U.S. born
2. Education
3. Education accommodation
4. Educational behavior
5. Employment status/ Industry and occupation*
6. Ethnicity*
7. Exposure to violence
8. Financial resource strain
   a. Food insecurity
   b. Housing insecurity/status
9. Gender identity*
10. History of incarceration/criminal justice system status
11. Income Source
12. Marital status
13. Military service
14. Neighborhood and community compositional characteristics
15. Preferred language* and proficiency
    a. Speak

          b.   Read

          c.   Hear

16. Race*
17. Religious affiliation
18. Sex*
19. Sexual orientation*
20. Social connections and social isolation
21. Transportation

Quality and Performance Measures Information

Practice-appropriate measures for quality, performance process, outcomes, and satisfaction, such as:

1. Health outcomes
2. Clinical/care processes
3. Patient safety
4. Efficient use of resources
5. Care coordination
6. Consumer engagement
7. Population and public health
8. Adherence to clinical/care guidelines

Forms, Documents, and Assessment/Screening tools

In addition to individual information elements, identifying forms, documents, and assessment and screening tools is an important step in understanding your information needs. Below are examples of forms, documents and tools to consider.

1. Advance directive
2. Minimum Data Set
3. Behavioral Health Assessment
4. Edinburgh Postnatal Depression Screen
5. PHQ-2 Depressing Screen
6. PHQ-9 Depression Screen
7. HARK-C
8. Skin/wounds monitoring
9. Intake (such as county defined intake questionnaires, admission, readmission)
10. Behaviors and interventions monitoring
11. Discharge Summary
12. Care plans
13. MDH-Family Home Visiting collection forms
14. WRAP plan**

*Identified in Interoperability Standards Advisory (https://www.healthit.gov/standards-advisory) with "best available" standards.

**behavioral health and substance abuse focus