



MiHIN
Shared Services

ANNUAL REPORT

FISCAL YEAR 2017

"The MiHIN network, services and use cases expanded through 2017 to bring even greater interoperability, introduce consumer-focused use cases, leverage automation to reduce burdens on providers, and enable new levels of advanced care coordination. 2018 is shaping into a year of significant growth for the company, with expanded support for quality measure simplification, simple and effective tools to enable providers to access their patients' health information, and a broader support for electronic consent."

-TIM PLETCHER

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About MiHIN

Since 2010, the Michigan Health Information Network Shared Services (MiHIN) has worked closely with stakeholders to promote the secure exchange of health information in Michigan.

Each year MiHIN has made new strides forward, culminating in a tremendously successful fiscal 2017 that saw a deep focus on enhanced tools to help stakeholders onboard more quickly to participate in data-sharing opportunities, as well as new activities to support care coordination, learning health, and patient matching.



The MiHIN team celebrates a successful Connecting Michigan for Health 2017

Our Mission

MiHIN is dedicated to improving the healthcare experience, improving quality and decreasing cost for Michigan's people by supporting the statewide exchange of health information and making valuable data available at the point of care.

"With each health provider and organization that joins the Michigan network, patients win. Each new participating organization that signs agreements and shares data with MiHIN ultimately helps increase patient safety by improving communication between healthcare providers and other healthcare organizations."

Introduction from the **EXECUTIVE DIRECTOR**

2017 was a wonderful year for interoperability across Michigan. We are so very thankful for all the participation, engagement, and everyone's willingness to share data to improve the health of the people in Michigan.

Collaboration from stakeholders and the MiHIN Use Case Factory® have helped accelerate a new crop of data-sharing activities throughout our great state. Notably, the Active Care Relationship Service (ACRS) use case doubled from 10 million to over 22 million new linkages being tracked each month.

In the same year that CHIME canceled its million-dollar patient matching challenge, MiHIN in collaboration with our network partners, successfully went live with a statewide approach to simplify patient matching using the statewide Common Key Service (CKS).

Queries for immunization history and forecast information from the Michigan Care Improvement Registry experienced giant growth in 2017 to aid public health objectives. Similarly, in addition to continued data quality improvements to statewide Admission-Discharge-Transfer (ADT) Notifications, this very successful use case now includes alerts from two-thirds of long-term care facilities. Our factory is now mass-producing data sharing!

MiHIN also continues to energetically pursue solutions that will relieve burdens on healthcare professionals and improve patient care by getting health plans, government, and providers to standardize and reduce variation around quality measurement. With support from the Michigan State Medical Society and the promotion of the new Quality Measure Information use case by the State Innovation Models program, quality measure "report once" capability for the state's providers became a true reality. Our partnership with the Michigan Primary Care Consortium, launched last spring to address the tangled challenge of coordinating care coordinators, is proving equally successful in 2018.

Thank you again to our stakeholders across Michigan, including providers, the hardworking members of the MiHIN Board, the Health Information Technology Commission, the unique commitment from the state's health plans, and the State of Michigan Department of Health and Human Services - all of whom continue to be key to Michigan's and certainly MiHIN's success!



Dr. Timothy Pletcher
Executive Director at MiHIN

A YEAR IN PROGRESS

December 2016: Plans made to deploy and trial Knowledge Grid components that filter data flowing through MiHIN to look for certain patterns of prescribed medications. March 2017: leaders from around the state convened for Learning Health for Michigan meeting, and identified need for demonstration of opioid prescribing patterns in the context of medication reconciliation.

June 2017: Knowledge Grid and MiHIN teams show working prototype of capability to filter patient-specific discharge information packets and find those with active opiate prescriptions, and those with active opiate, antianxiety, and muscle relaxant prescriptions.

July 2017: Michigan Medicine signs Pilot Activity Exhibit to permit access to real-world data to trial Knowledge Grid at MiHIN - filtering actual patient data packets at emergency room and hospital discharge.

September 2017: Trial with real-world data kicks off

Knowledge Object	Medications are Checked	Advanced Clinical Decision Support
New Opioid	✓	(Alert Message)
Respiratory Depression	✓	
Knowledge Object	Medications are Checked	Advanced Clinical Decision Support
New Opioid	✓	
Respiratory Depression	✓	(Alert Message)

New SERVICE



ORGANIZING AND SHARING COMPUTABLE BIOMEDICAL KNOWLEDGE

The Knowledge Grid is an open source software platform that makes it easier to store, organize, and share computable biomedical knowledge. This knowledge infrastructure supports Learning Health Systems at a broad scale, specifically enhancing knowledge-to-performance translation by helping to decrease latency between knowledge generation and its widespread use in practice.

The Knowledge Grid represents a crucial step in adapting to a world where computable knowledge is mass-produced using big data.

Pilot Overview

Two separate Knowledge Objects (KOs) were used in the Knowledge Grid pilot. The first KO was used to “filter” for an opioid prescription. The second KO was used to “filter” for a Triple Threat (respiratory depression), which is a combination of opioid + benzodiazepine + muscle relaxant. Once a Medication Reconciliation message was received, the medication section was “filtered” through these two KOs to identify which message contained either an opioid “hit,” or a triple threat “hit.”

A Direct Secure Message containing the raw Continuity of Care Document and the enhanced message can then be created and sent. The enhancement of the message (examples to the left) displays the KO used to filter the message, whether medications were checked by the Knowledge Grid, and an alert that provides support if an opioid or triple threat were found. A link within the enhanced message directs the receiving healthcare provider back to the Knowledge Grid Library where more detailed information on specific KOs can be found.

Featured SERVICES

Many of MiHIN’s existing services enjoyed successful expansion in 2017 as well. Our growing shared services suite is being adopted in many different ways throughout Michigan.



COMMON KEY SERVICE MOVES INTO PRODUCTION

2017 saw Michigan’s Common Key Service move into full production, offering unique identifiers that stakeholder organizations throughout the state can use to help consistently and reliably match patients with their electronic health information across multiple organizations, applications, and services.

Working in tandem with the Active Care Relationship Service and Health Directory, the Common Key Service helps Michigan organizations ensure that the right patient information is being shared with the right healthcare providers, when they need it. Many thanks to the organizations that worked diligently to help pilot the service!



PHYSICIANS AND PAYERS ALIGN ON QUALITY MEASURES

Physicians and payers in Michigan used the last year to make tremendous progress aligning efforts on quality measure reporting through the Physician-Payer Quality Collaborative (PPQC) focused on the Quality Measure Information use case.

The group notably completed a full quality data loop to produce gaps in care reports for the first time in Michigan with aligned, standardized data formats supporting the “Report Once” approach to relieve burdens on physicians and payers.

Physician organizations sent standard, aligned all-payer supplemental quality data files to payers (health plans) which evaluated and processed the data, then produced and sent standard gaps in care reports back to provider organizations.

The Use Case Factory®

CATCHES FHIR®

The MiHIN Use Case Factory is Michigan's unique methodology for prioritizing data to share statewide and to streamline the legal, technical, and cybersecurity aspects of high-quality data sharing across the state.

By focusing on specific data-sharing scenarios, or “use cases,” for public health reporting, avoiding duplication of quality measurement, reducing readmissions, preventing overmedication, or healthcare coordination, Michigan has become a leading state in the nation for creating value from health information exchange.

2016 saw the expansion of the Use Case Factory version 2.0. Use Case Factory v2 sped up the process of onboarding for the healthcare community and simplified the statewide legal agreement structure.

In 2017, MiHIN enhanced the Use Case Factory to accelerate evaluation of how a use case, service, or new technology will impact stakeholder systems or networks, and in turn their patients.

Persona Library Grows to 50

Testing with real health data is, of course, very dangerous. There is a significant need for realistic patient data that does not pose any risks of disclosure and can be safely used for system testing, interoperability testing, and other purposes. MiHIN leverages fake but completely realistic “people” created at MiHIN to enable robust and thorough testing for population- and patient-specific scenarios.

“Personas” are thoroughly-populated data constructs that represent individual patients, providers and organizations, and that contain richly-detailed health information that can be used to test technology solutions at all stages of development. MiHIN's Persona Library now features more than 50 richly detailed patients, providers, and organizations.

Each persona has been created to support specific services or data-sharing scenarios. Using a standard set of personas to test services across the healthcare IT spectrum helps ensure that results are predictable and that software performs as expected. The personas represent a combination of both sanitized and simulated clinical test data along with detailed insights into patient consumer behaviors derived from studies conducted with real patients and doctors.



Billy Chen's Story

Billy Chen, the four-year-old son of Joan and William Chen, has been suffering from a number of health complications resulting from rubella he contracted before birth: cataracts, hearing loss, and a congenital heart defect. Billy and his parents' lives revolve around doctors' visits with Joan often taking Billy to specialists around Michigan and nationwide. Billy sees 13 different specialists and physicians, each of whom must stay up to date with Billy's condition to help coordinate his care.

Patient Generator for Load Testing Expands Support for FHIR

For testing involving large populations, MiHIN created the Patient Generator, or PatientGen - a FHIR-compatible test data generator that produces large numbers of “fake people” who have realistic patient histories with clinically relevant patient encounters.

PatientGen can create thousands or millions of SimPatients for organizations to use for load testing. These SimPatients are highly configurable, including such detailed data points as name, address, gender, race, religion, primary care physician, practice, specialist, and much more. The service can also break down different risk factors from diet, exercise, alcohol, smoking, drug use and promiscuity, and apply preferred risk factors to any population it generates to produce the most realistic bulk population data for load testing.

Introducing the FHIR®-PIT

Accelerating Interoperability improves health, reduces provider burdens, and saves precious resources that can be redeployed to help even more people.

Fast Healthcare Interoperability Resources (FHIR®, pronounced “Fire”) is an interoperability standard for the electronic exchange of healthcare information. It was developed by Health Level Seven International (HL7). FHIR is designed to enable health IT developers to more quickly and easily build applications for electronic health record (EHR) systems and to exchange and retrieve data faster from applications.

In 2017, MiHIN began introducing the Michigan healthcare community to a Pilot Interoperability Testbed (PIT) for FHIR training and testing – the FHIR®-PIT. The FHIR-PIT is a cloud-based utility that healthcare information organizations (such as health plans and health systems) can safely use to learn, experiment, design, test, scale, and move from pilot to production in a safe “sandbox” environment.

The FHIR-PIT initially introduces users to basic FHIR concepts and capabilities, then progressive modules provide users with instructions on using FHIR for quality measure reporting, transitions of care, and other common health information exchange activities.



MiHIN INTERNS



Our company culture values interns as the most important people at MiHIN because they represent our future. Interns at MiHIN (commonly called MiHINterns) provide a fresh perspective on healthcare issues and create innovative solutions that are helping MiHIN transform the healthcare industry. Each intern is paired with a full-time team member who acts as an internship mentor, creating opportunities for students to develop skills and contribute ideas to rewarding projects.

MiHIN seeks self-motivated, professional intern candidates who can work independently and aren't afraid to ask questions. We are proud of our growing internship program, and of the 20 (and growing!) bright-minded MiHINterns who are helping us strive for better healthcare. Sixteen former interns, including DeVera Henderson from this page's quote, accepted employment offers with MiHIN after their internships ended. We are thankful for the wide variety of talented team members who continue to work together to build a healthier future for the state of Michigan.

"There are two aspects from MiHIN I will always greatly appreciate. One is the expectation that we are capable of and will produce positive results, the second being the empowerment we receive as interns to make a difference."

-- DeVera Henderson, Security Analyst MiHINtern

A MiHINtern Success Story

At MiHIN, many of the use cases and services we generate begin with inspiration from our interns. In May 2014, Bo Borgnakke started his career in improving reporting for quality measure information as a MiHINtern.

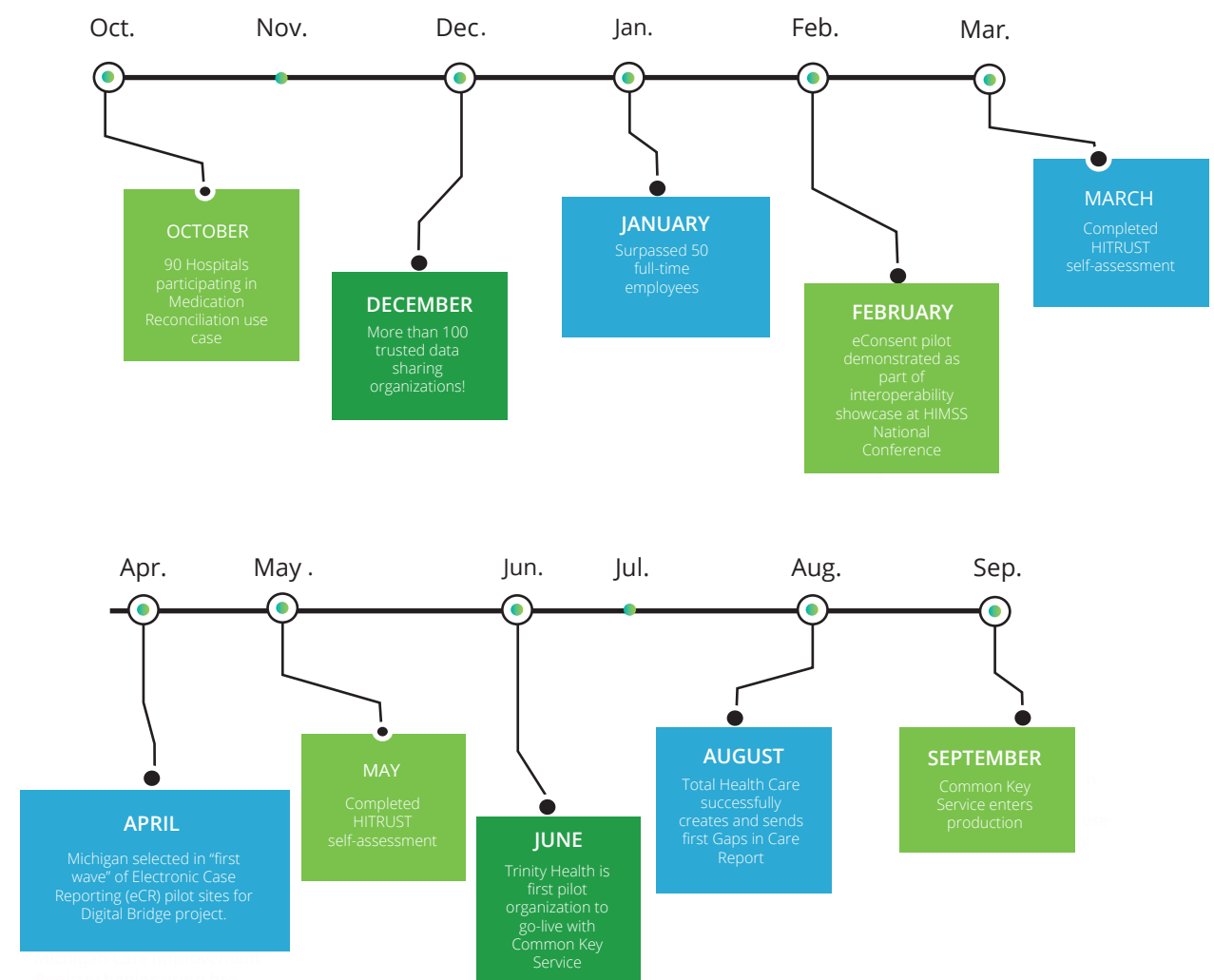
Bo's primary internship project involved researching, analyzing, and comparing hundreds of clinical quality measures across multiple reporting programs. He conducted an in-depth analysis to produce a comprehensive comparison spreadsheet and a diagram to help others visualize the overlaps between reporting programs. His Venn diagram quickly went viral and received national attention, because this kind of in-depth analysis had never been performed before.

Bo offers great advice for those MiHINterns seeking full-time opportunities with MiHIN: "Ask your mentor about the bigger picture and ultimate outcome for your assignments," he shares. In doing so, MiHINterns learn about new opportunities for improving healthcare, and how to take next steps toward these goals.

"MiHIN is in a unique position to greatly accelerate the deployment and successful utilization of health information exchange on a statewide and potentially national scale," Bo explains. Thanks in large part to his efforts, Michigan is considered a national leader on Clinical Quality Measures. Bo was recently promoted from Population Health Analyst to his new role as Senior Solution Analyst, and he has big plans for the future. In 2018, he aims to continue his work to reduce provider burdens by promoting MiHIN's Quality Measure Information (QMI) use case in support of value-based accountable care oriented around quality measurement.

Milestones IN 2017

Interoperability is more than technology. It happens in incremental steps comprised of legal agreements, messages routed, and with each organization onboarded successfully to a given use case all of which collectively add up to something big! Some milestones of which we're particularly proud in fiscal 2017 include:



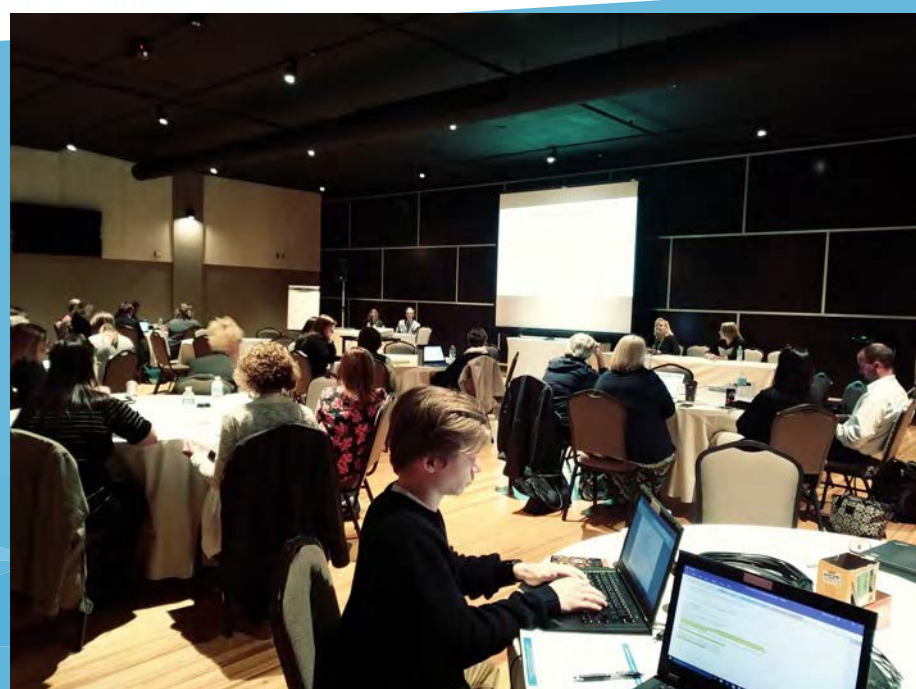
Working together on **CARE COORDINATION**

In May 2017, the Michigan Primary Care Consortium and MiHIN teamed up to lead a much-needed statewide conversation on care coordination in the state of Michigan. The ultimate aim of the Coordinating the Care Coordinators workshop series was to start the process of addressing care coordination barriers, developing options that in the end will improve healthcare for everyone through transparency, creating standard information and enabling streamlined workflow processes.

The workshops resulted in a white paper with definitions and recommendations that were formally presented to the HIT Commission on November 16, 2017. One of the major recommendations to the HIT Commission, was the use of the workshop series definition of coordination of care which is an unresolved definition used in Public Act 559 that amended the Michigan Mental Health Code to allow behavioral health information to be shared among clinical settings consistent with HIPAA. Unfortunately, absent this definition coordination of care between physical and behavioral health for care coordination remains a challenge.

The workshop series brought together a diverse community of over 150 stakeholders from around Michigan, including health plans, state government, community mental health agencies, skilled nursing facilities and many others.

Conversation and debates surrounding this task occurred over six months, including three workshops and five conference calls.



Today, care coordination guidelines are inconsistent and do not address many of the key elements that could optimize quality, efficiency, outcomes, and influence new payment directives. Adding to the lack of consistent care coordination guidelines is the absence of universal job descriptions that outlines a care coordinator's roles and responsibilities.

There are multiple silos, bureaucratic hurdles and barriers that impact care in Michigan. These obstacles can include anything from healthcare systems that do not communicate with each other because of technology constraints, to issues as simple as physicians and care teams not updating each other about their respective patients. This leads to duplicative outreach, poor communication, and misaligned financial that do not deliver valuable care from the patient's perspective.

Successes and Next Steps

While there are ongoing efforts to promote interprofessional collaboration, there is not a universally accepted definition for "coordination of care" in Michigan. Initial research revealed it is a broad term, an umbrella covering many different disciplines and needs. After many debates, the workshop attendees agreed upon the following definition.

Coordination of Care: 1. Monitoring a person's goals, needs, and preferences. 2. Acting as the communication link between two or more participants concerned with a person's health and wellness. 3. Organizing and facilitating care activities and promoting self-management by advocating for, empowering, and educating a person. 4. Ensuring safe, appropriate, non-duplicative, and effective integrated care.

There are five infrastructure elements that describe care coordination's status quo:

- Service Delivery
- Regulations
- Reimbursements
- Technology
- Workflow

Following MPCC and MiHIN's presentation of this recommendation to Michigan's HIT Commission, the commission adopted a resolution to include the multi-stakeholder definition in the broader review of coordination of care definitions to be completed by MDHHS. MDHHS plans to present its review in February 2018. Coordination of care needs to be defined to promote the sharing of mental health records under Public Act 559, effective April 10, 2017.

Other recommendations to the HIT Commission from the workshop series included to:

- Encourage those engaged in coordination of care to regularly declare active care relationships
- Allows receipt of status updates through statewide health information network
- Aggressively promote use of ICD-10 codes related to social determinants of health across state systems (e.g. traditional healthcare, 2-1-1, etc.)
- Educate grant-funded coordinators on submitting \$0 claims
- Create a taskforce to develop quality measures for social determinants of health

The HIT Commission is considering these additional recommendations and expressed appreciation for the effort from the 2017 workshops as the first step in making Michigan the leader in care coordination. This project's next step is to use the multi-stakeholder definition to define registration, roles, and rules of engagement for care coordinators in Michigan.

Connecting Michigan FOR HEALTH

Each year, MiHIN convenes Connecting Michigan for Health, a conference focused on challenges, opportunities and advances in sharing health information. This year's event showcased important healthcare topics impacting the state, presented by leaders from around the state and across the U.S. From the opioid crisis to electronic consent, Connecting Michigan once again highlighted how electronic health information can be used to help Michigan, its healthcare community, and its citizens.

Healthcare and Government

Attendees at this year's conference heard from federal and state government officials, with perspectives on what's working and what needs to be fixed in the health information exchange sector.

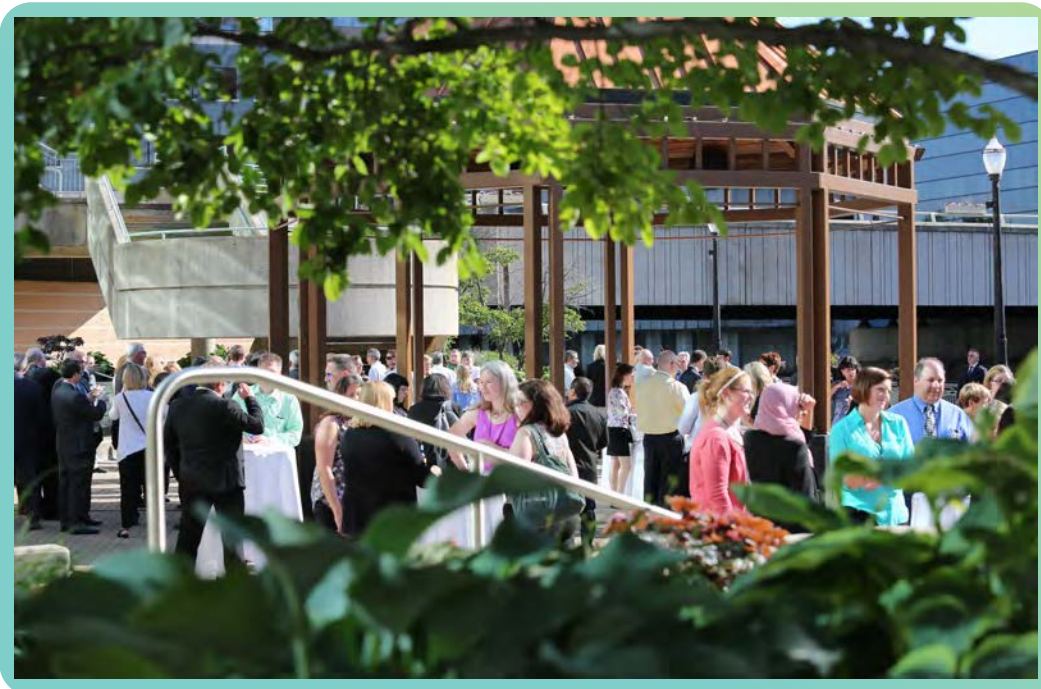
Keynote presenter Genevieve Morris, the Principal Deputy National Coordinator for Health Information Technology from the U.S. Department of Health and Human Services discussed the federal vision for exchanging health information and gave attendees a sneak preview of the department's updated roadmap for health information exchange.

Michigan's own Lt. Governor Brian Calley shared his personal experience with an autistic daughter, and the need for better support for autistic patients and their families.

Intersecting New Technology with Health Information Exchange

Our electronic devices follow us wherever we go, from laptops to phones and now wearable devices. Can these tools make a real difference in one's life? Aaron Seib (Executive Officer, National Association of Trusted Exchange) and Leslie Kelly Hall (Senior Vice President – Policy, Healthwise) discussed obstacles and opportunities to enhance patient engagement with wearable devices and personal health records.

Telehealth has quickly become an established option for personal healthcare. MiHIN's Jeff Livesay led a panel of healthcare experts on best practices around the legal, technology, and logistics hurdles surrounding telemedicine, including virtual office visits and remote patient monitoring.



Quality Measures and Best Practices for EHR-Based Information Sharing

Each Connecting Michigan includes two workshops, focused on timely subjects. This year's conference workshops focused on quality measures and EHR-based information sharing.

With guest speakers from the Michigan Department of Health and Human Services, the Centers for Medicare and Medicaid Services, and the Michigan State Medical Society, the "Understanding the New Quality Measure Landscape" workshop provided an overview of coming changes that will re-shape quality measure reporting.

Speakers from Michigan and around the country used the other workshop to discuss best practices for interoperability from electronic health record (EHR) systems, including "tricks of the trade" to move care summaries in and out of EHRs.

2017's event featured interactive exhibits to elicit attendee opinions on numerous subjects. Attendees were presented with a series of questions relating to their vision for healthcare. Exhibit questions and notable responses are presented below:



Why do you care about your work in health IT? Define the purpose or belief that inspires you.

- "Ensure that no one experiences the painful journey I had moving through our healthcare system."
- "Empowering every patient to be in charge of their own healthcare."
- "7,000 roughly die every year in Michigan from medical error."
- "Encouraging collaboration and partnership between providers, payers, and patients."
- "It is the enabler for the provider to have the information to serve the patients. What higher purpose is there?"



For the "Bright Ideas" exhibit, attendees were asked to write down ideas to improve health information exchange and attach those suggestions under light bulbs that illuminate with each new idea. Notable excerpts included:

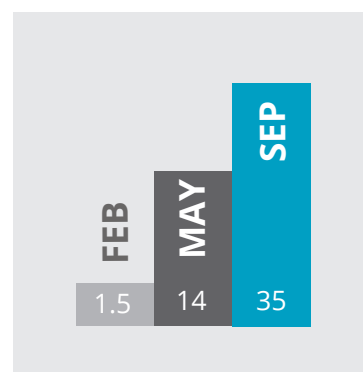
- Biometric patient identifiers – people don't have to "remember what their thumbprint is."
- An automatic system that allows a patient to see all notes and medications, test results, diagnosis and related health information on one platform – "One platform" – even if the providers are from different organizations/hospitals
- Developing a shared privacy framework across healthcare organizations that builds upon PA 129 and supports care coordination

MiHIN grows in MICHIGAN

2017 was a strong year of growth for sharing health information in Michigan, in all areas of operations. Whether in public health reporting, transitions of care, participating organizations, number of messages processing through the system, or number of employees at MiHIN – Michigan and MiHIN have experienced significant progress across the board.



Number of trusted data sharing organizations, up from 67



Number of Statewide Lab messages received in millions



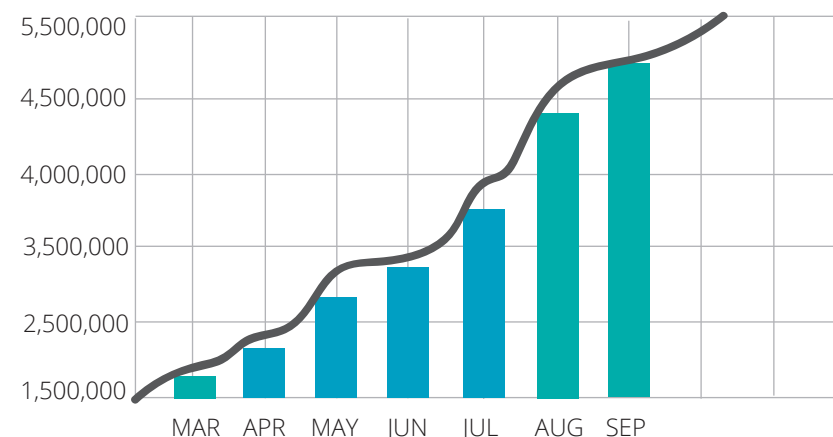
Increase in Medication Reconciliation messages

19.9 Million

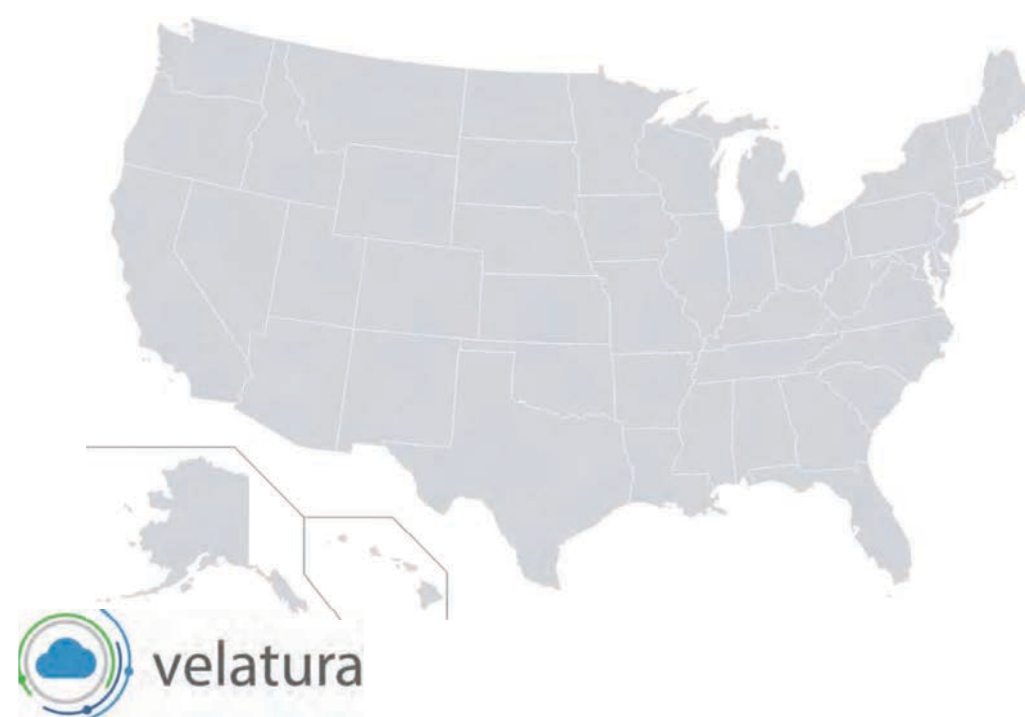
Active Care Relationships

137,998 unique providers in statewide Health Directory

TOTAL immunization history-forecast queries to MCIR since going live



MiHIN helps OTHER STATES



MiHIN's success in Michigan has led to continued interest by other states in using some of our services and adopting our unique approach. This interest has prompted numerous other states to reach out for advice and/or technical assistance in addressing their own challenges. As a mission based non-profit, MiHIN's facilitates information sharing in Michigan as its primary purpose. However, to both share and benefit from working with other states MiHIN formally created a separate legal entity to provide MiHIN services outside of Michigan's borders. The new subsidiary is called Velatura LLC.

Velatura, a newly-formed and wholly-owned subsidiary of MiHIN, leverages lessons learned from Michigan to help other states overcome challenges to achieve shared interoperability goals. In turn, these interstate opportunities will inform efforts in Michigan and will promote shared services that can help ensure efficient data-sharing between Michigan and other states.

The name velatura comes from an Italian painting technique commonly used to make clouds. This method allows the mixing of assorted colors to create an opaque or transparent background. We often refer to the need for technology to blend into the infrastructure and workflow in an equivalent manner to achieve the "velatura effect"!

What's next IN 2018

2018 is shaping up as a landmark year for MiHIN!

Many activities discussed in this report will come to fruition. The Coordinating the Care Coordinators project will continue to develop, our support for community resources (through the 2-1-1 use case and others) will expand, and the Knowledge Grid service will continue to support Michigan's Learning Health initiatives.

Also, 2018 will mark the 10th Anniversary of Connecting Michigan for Health (June 6-8), and we intend to make the anniversary event particularly memorable. The entire week will feature associated events, including MiHIN's first official Connectathon (June 4-5) and a legal workshop (June 5) examining hot topics impacting health information exchange.

Finally, MiHIN will once again grow in staff size. At the time of this writing, there are nearly 20 job postings available for full-time employees, bringing us to a staff of nearly 100 – a long way from the days of two people sharing a single office. And we will continue our ongoing search for the new voices in healthcare information via our internship program. So while we bid adieu to 2017, we look forward eagerly to see what will happen next. We hope you will join us!



WHAT WE HAVE IN STORE...

We have many exciting accomplishments planned for 2018:

Broader support for quality measure simplification

Connecting Michigan for Health

Coordinating the Care Coordinators next steps

Consumer portal features allowing stakeholders to offer tools for patients

Development of Inpatient Psychiatric Admission, Discharge,
Transfer Notifications

Electronic consent

Expansion of support for community services

Learning Health for Michigan (Knowledge Grid)

Medical Information Direct Gateway (MIDIGATE®) version 2.0

Real-time ADT Notifications for more hospitals

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