Effective Use of HIE Tools for Managing the Care of Patients with Prediabetes, Diabetes, and Hypertension

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> *"Improving Ohio's Health" is an on-going series of articles and webinars that are developed to help providers in the care management of patients with hypertension and/or diabetes.*
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> *This article explores the use of the tools, solutions and clinical information available from Ohio's HIE, CliniSync, to support the care and treatment of patients with prediabetes, diabetes and hypertension.*

One critical element for managing the care of patients with conditions such as hypertension, prediabetes, diabetes is ensuring that the care team has all the available patient information medical events, such as a visit to the Emergency Department (ED). Care management can be challenging for clinicians and their support staff. In the past care management traditionally have relied on patients sharing information about care they've received elsewhere. Occasionally, other healthcare organizations sent the providers their patient lab tests, reports, discharge instructions and information on admissions, discharges and ED events. The advent and use of health information exchanges (HIE) can greatly reduce the time necessary to gather patient clinical information while providing additional tools that can greatly improve the health, wellness and outcomes of all patients, especially those with hypertension, prediabetes, diabetes.

An HIE is both a verb and a noun in that it is the transmission of data from one healthcare provider to another, and it's the underlying technology platform that stores, manages and transmits patient information.

The breadth of clinical data, tools and integration points has increased in recent years as HIEs mature and identify new use cases not previously considered. Some HIEs began with routing and delivering patient lab and radiology results from a hospital to providers in their extended community or another primary service deemed of high value by member organizations. HIEs then began to layer on additional services such as expanded document delivery, clinical data aggregation, event notification, web-based tools, Electronic Health Record (EHR) integration and other services as well as expanding to other sectors of the healthcare continuum.

The adoption of HIEs nationwide, and in Ohio, has increased dramatically in the past several years due to federal and state incentive programs such as Meaningful Use. This growth in HIE participation was met by the need for a greater range of patient clinical data because of the transition to value-based care. The most recent need for improved collaboration between healthcare entities and a focus on the total cost of care arose from Accountable Care Organizations (ACO), Chronic Care Management and other alternative payment models. This recent need continues to spur growth in healthcare sectors that have, in the past, been slow to participate with an HIE, as well as the development of HIE solutions to meet the growing needs of participating organizations.

Ohio is uniquely positioned to benefit from HIE use as it is one of the only states where a single HIE covers approximately 88% of the state and nearly every hospital within the state is a member and is contributing patient data. The recent addition of commercial insurers as HIE participants will be a major factor in driving continued adoption and mitigating gaps in clinical data created by healthcare organizations that do not contribute data to the HIE.

WHY USE AN HIE?

While HIE adoption has dramatically increased there is still value in asking — "Why should I use and share data with an HIE?" The exchange of patient clinical data between providers of care has tremendous potential to improve patient care and satisfaction. Numerous studies have been performed and literature published regarding the potential value of an HIE to healthcare and patients. The use of an HIE to send and receive patient clinical data enhances Clinical Decision Support (CDS) and other EHR functionality. These EHR functions in turn support care management tasks and can increase income by identifying the tests or procedures needed by patients. These various studies seem to all agree that the following statements are true with the use of an HIE:

- ✓ Improves quality of care, efficiency, and patient safety
- ✓ Facilitates communication among providers
- ✓ Facilitates quality of care measurements
- ✓ Improves public health surveillance
- ✓ Decreases health care costs

Healthier Patients
- Fewer medical errors
- Improved patient safety
- Improved continuity of care
- Better outcomes

More Efficient
- Automated sharing of info
- Less paperwork
- Reduced time to access clinical information at the point of care
- Fewer repeat tests and procedures

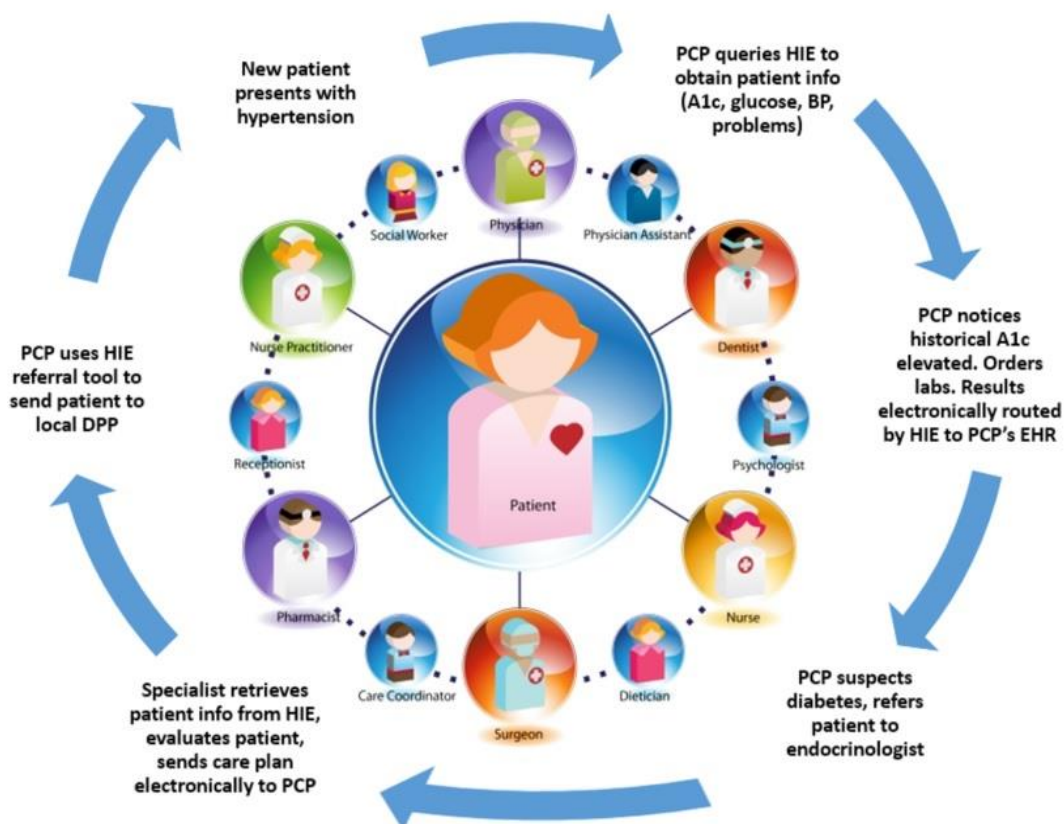**Informed Treatment Decisions**
- More complex and up-to-date patient medical record, including information from all care providers

Now, as several years have passed, the predictions made by those studies are beginning to be proven true as the advancements to patient outcomes are being seen. The sharing of patient data enables stakeholders, policy makers, public health professionals and healthcare providers to make informed decisions about population health and healthcare, from patient care to healthcare budgets. More recent studies on HIEs estimate that national implementation of fully interoperable systems could result in net savings of $77.8 billion annually[i].

An HIE supports improved efficiency of the care team when treating diabetic and hypertensive patients by ensuring they have access to a more complete clinical history and are aware of any

events related to the patient that may require additional treatment or care coordination. The patient information stored in the care team's EHR, which is supplemented by the clinical information available for the patient in the HIE, will improve the outcomes of hypertensive, prediabetic, and diabetic patients. Lipid panel lab results for hypertensive patients flow from the local hospital or private lab to the HIE that then routes this information to the primary care physician. A primary care provider caring for a diabetic patient who was recently discharged from an inpatient stay due to a diabetic event can access the discharge instructions and various lab tests performed while the patient was in the hospital. The care team can then use this information to perform a medication reconciliation, adjust the diabetic care plan and make other needed changes that may prevent future diabetic events.

Each of the HIE services or solutions support the care of hypertensive, prediabetic, and diabetic patients.

HIE SERVICES/SOLUTIONS

The following section provides a deep dive into each of the HIE services or solutions available in Ohio and common to most, if not all, HIEs across the country. Included in each solution are specific examples of how it supports patients with prediabetes, diabetes and hypertension.

Clinical Results Delivery	• Receive discrete results and reports in real time
Community Health Record	• View a patient's information from hospitals and practices
Notify	• Receive alerts when a patient is admitted or discharged from a hospital or Emergency Department
Contribute	• Provides opportunity for you to contribute Continuity of Care Documents (care summaries) to the Community Health Record
Referrals	• Send and receive referrals and track referral progress in real time

1. Results Delivery

Results delivery is the electronic delivery of a patient's lab results (general chemistry, microbiology, blood bank and pathology), radiology reports and transcribed reports including care summaries, history and physicals and progress notes, directly into an EHR. The HIE receives the results from a hospital or organization that processes the lab or performs the radiology study in real time upon completion. Then the HIE evaluates the information received to identify the ordering providers and other copied providers then routes the results to the appropriate recipient(s). This information is received by the EHR through an interface with the HIE and is stored electronically, lab results are stored as discrete data elements for the various tests performed and the reports are stored as electronic documents.

The electronic receipt of results improves efficiencies lost with other methods of delivering results (fax, VPN login, snail mail). In addition, receiving results electronically improves functionality with the EHR intended to enhance the care of patients. These electronic results can trigger Clinical Decision Support (CDS) rules and improve the accuracy and scores of quality reports and related initiatives.

Electronic results delivery enhances the ability of the care team to manage patients with diabetes and hypertension. For example, assume that a provider maintains a registry of diabetic patients that are overdue for their regular A1c testing. One of the patients on this registry is seen by the provider who then orders an A1c for the patient. The patient then goes to a local hospital to have blood drawn and the test results indicate that the A1c level is well above 9, which is high. In real time, upon completion of the lab, the result is sent to the HIE that then forwards the result directly into the order provider's EHR. The EHR removes this patient from the registry showing diabetic patients who are overdue for their A1c. If the EHR has a CDS rule enabled to monitor A1c results, the provider and care team could be immediately alerted to the high A1c results. The care team

could then reach out to the patient to make needed changes to the care plan which may prevent a trip to an ED and improve the patient's health.

2. **Longitudinal Health Record**
   Most HIEs provide a longitudinal health record that captures a patient's history from various visits, hospitalizations, tests and procedures, medications, problem lists and other information. This provides physicians and other authorized clinical personnel with a complete picture of a patient's health at the right time, in the right place. The provider queries a patient with some identifiable information, such as name or date of birth, and is then presented with a consolidated tabular view of the patient's demographic information, treatment history, hospital encounters, problem list, allergies, discharge instructions, lab results, radiology and other transcribed reports exchanged through the HIE.
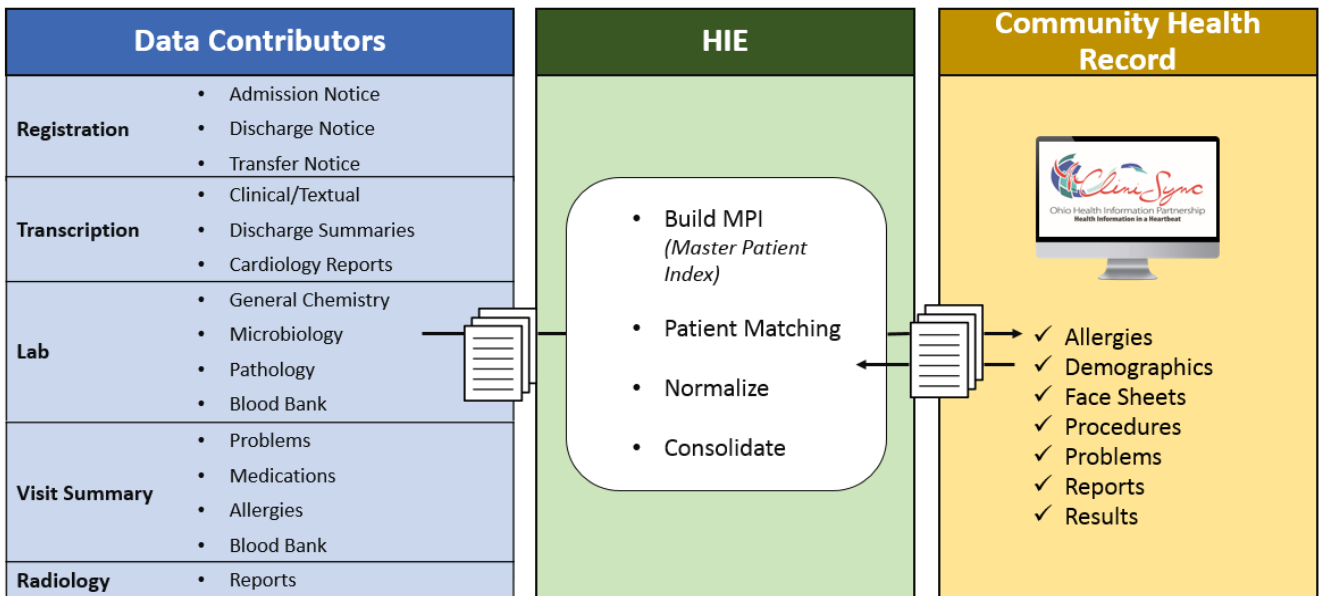

Bennett, D., Walsh, J., (2017), HIMSS17, *Advancing Value-Based Models Through Collaboration*

This longitudinal record allows the care team to understand their patients better, facilitate more meaningful conversations, and make more informed decisions. It provides a single point of access for providers to quickly identify where and when their patients have sought care from other members of the HIE and to further coordinate care. The patient information from the longitudinal health record can be downloaded to the EHR. Many EHR vendors provide an interface that allows the longitudinal health record to be queried and pulled down from the HIE into the patient's medical record.

In Ohio, this tool is called the Community Health Record (CHR) where 150 hospitals and a growing number of outpatient and ambulatory providers are sending or contributing data. Also, in addition to presenting a wealth of clinical information for the patient the CHR also performs a query of Ohio's Automated Rx Reporting System (OARRS).

The longitudinal health record is an invaluable tool in the care of patients with diabetes and hypertension. If a diabetic patient arrives for an appointment following a hospital stay, the care team can query the longitudinal health record to review the discharge instructions and any tests that were performed during the inpatient stay. The provider could also review any medication changes made during that diabetic patient's inpatient stay then perform the necessary medication reconciliation. If a provider begins care for a new patient with hypertension, they can use the longitudinal health record to review their historic blood pressure readings and review the hypertension medications that have been prescribed to that patient. A provider reviewing a new patient's longitudinal health record may determine that the patient's blood pressure readings are high and determine that the patient is an undiagnosed hypertensive and can then begin treating the condition.

3. **Event Notification**

Providers are increasingly being held accountable for improved and timely post-discharge care coordination and reduced readmission rates. Event notification is a service that sends real-time notifications of hospital inpatient admissions and discharges or an emergency room encounter to a designated member of a care team. These notifications can be sent in real time in a variety of delivery methods or in a scheduled report showing all events that occurred since the last report was delivered. Providers receive notifications on patients who are included in a patient panel that was uploaded to the HIE. This tool allows providers to stay apprised of patients' healthcare across the continuum and to help better coordinate a patient's care.

Event notification can prevent readmissions by driving timely, targeted clinical engagement by the care team upon a patient's discharge. This allows the provider to know when a patient had an event that they may have otherwise not known until that patient came in later for a normal appointment. The care team now can proactively schedule that patient for a discharge follow-up visit and query the longitudinal health record or contact the hospital for a copy of notes, tests and discharge instructions.

Consider the following case where a provider submits two different patient panels to the event notification system, one listing all high-risk diabetic patients and another containing a list of all high-risk hypertensive patients. The notifications for these different lists could be sent to different care team members who work specifically with the diabetic or hypertensive high-risk patients. A patient whose glucose level is poorly managed and out of control is admitted to a hospital for weakness and confusion. The care team member would receive a notification shortly upon completion of registration at the local hospital for that patient. The provider could reach out to the hospital to share that the patient is known to poorly manage their A1c. The notification triggers the care team to reach out to the patient and schedule them for a visit after discharge to make needed modifications to their self-management plan and medications.

For hypertensive and diabetic patients, as with all patients, event notification provides actionable information to move from reactive to proactive care delivery. This allows for better management of transitions from the hospital to home, hospital to skilled nursing and after emergency department visits. Care teams that use event notification are equipped to follow-up with a patient to make needed changes to care within hours instead of days. This drives timely, targeted clinician engagement to prevent 30-day readmissions for high-cost, high-risk procedures and dramatically improves patient outcomes.

4. **Data Contribution**
The patient data available within the HIE and longitudinal health record comes from the contribution or publishing of patient data. This patient data is made available in a HIPAA-secure environment and accessible to all providers of care who utilize the HIE. Data contribution allows community providers to securely and seamlessly share their part of the overall patient's clinical story. This data can be contributed by a variety of submission methods including a Continuity of Care Document (CCDA) which contains a wealth of information, including diagnoses, results and reports, treatment plans, medications, demographic and insurance information.
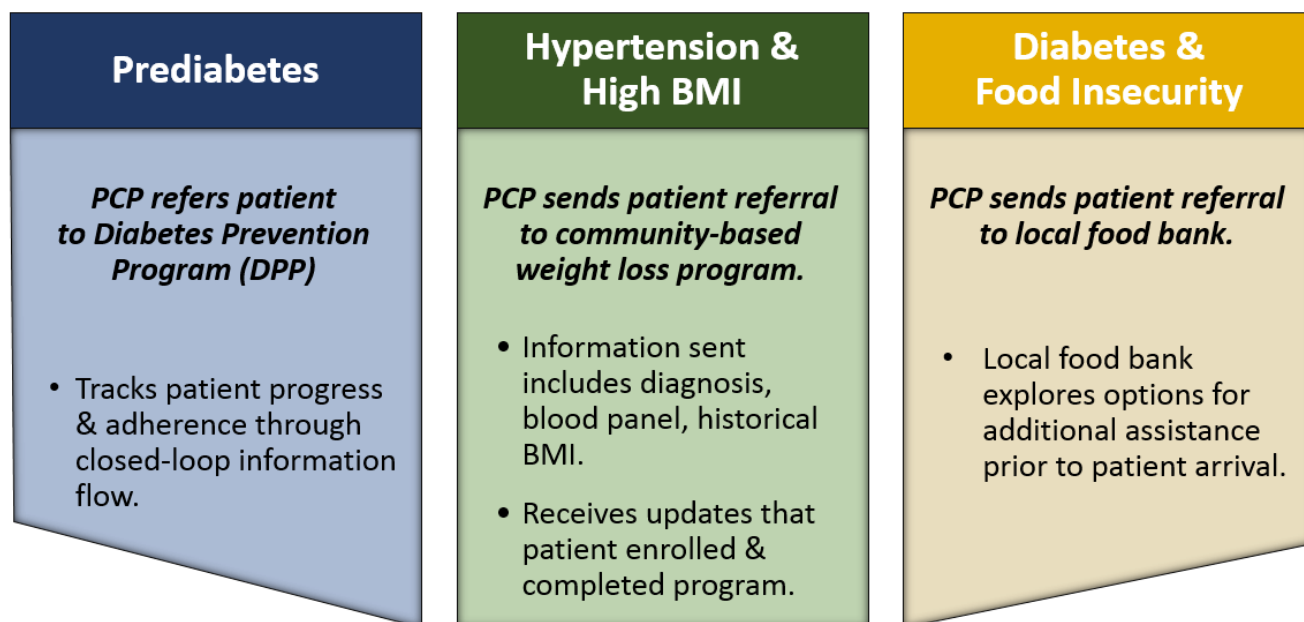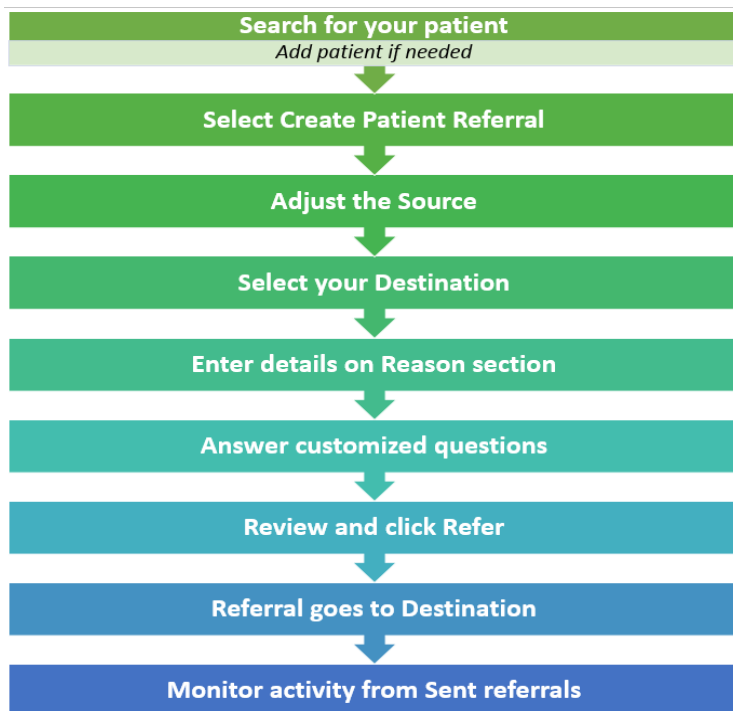
Contributing patient information to an HIE streamlines and reduces the cost of sharing data to providers of care across disparate systems. The longitudinal health record also becomes a more comprehensive and timely picture of a patient's health for safe, quality care. The availability of data makes transitions of care easier through real-time, electronic delivery of patient health information and lays the foundation for the analysis of population health for a managed group of patients, such as diabetics and hypertensives. The HIE, the healthcare organizations and providers connected to the HIE, and the contributed data help to create a true medical neighborhood or collaborative network. This network of care providers can include hospitals, practices, physicians, and other care providers, such as EMS personnel, pharmacists, home care specialists and social service agencies. There are numerous examples where data contribution can improve the care of a diabetic or hypertensive patient. Previously we discussed the example of a diabetic patient that does a poor job of managing their condition presenting to an ED with weakness and confusion. If the primary care provider were contributing clinical data to the HIE, then the care team in the ED would have access to the information through a query in the longitudinal health record. The care team at the ED would then have access to the patient's conditions, medications and A1c results and know that the patient is a diabetic and be better equipped to develop the appropriate treatment plan.

5. Referral Tool

Many HIEs provide a means for a social service and community agencies or other healthcare providers to be able to receive referrals sent electronically by hospitals and physicians. This service utilizes a web-based referral tool that allows for clients, such as a social service agency, to set up their organization as a referral location or recipient. As part of the setup they add custom requirements and questions to be answered for a referral to be accepted. The individual or organization sending the referral can track the status of the referral to know if the referral was accepted, scheduled and completed. Often the referral tool includes the ability for the receiving provider or entity to send messages within the referral tool to obtain additional information or provide feedback.

For example, the diabetes prevention program at the YMCA, meals-on-wheels program, food bank and faith-based organizations could join the HIE as referral recipients. During their setup, they identify the services they provide and the patient information necessary to provide services to the patient. A social worker at the hospital with access to the HIE has a hypertensive patient that could easily control their condition with improvements in their diet. However, the patient shares that they have issues with food insecurity leading to poor nutrition and contributing to their hypertension. The social worker could access

| Search for your patient |
| Add patient if needed |
| Select Create Patient Referral |
| Adjust the Source |
| Select your Destination |
| Enter details on Reason section |
| Answer customized questions |
| Review and click Refer |
| Referral goes to Destination |
| Monitor activity from Sent referrals |

Prediabetes

PCP refers patient to Diabetes Prevention Program (DPP)

- Tracks patient progress & adherence through closed-loop information flow.

Hypertension & High BMI

PCP sends patient referral to community-based weight loss program.

- Information sent includes diagnosis, blood panel, historical BMI.
- Receives updates that patient enrolled & completed program.

Diabetes & Food Insecurity

PCP sends patient referral to local food bank.

- Local food bank explores options for additional assistance prior to patient arrival.

the referral tool in the HIE and search for local social service agencies, like a food bank, that could help the patient. The social worker would then select the appropriate social service agency, provide the necessary patient information and then the referral is submitted. The social worker will be notified when the social service agency receives the referral, when they contact the patient and finally when the referral is completed and closed. The referral tool streamlines the referral process to reduce phone calls and faxing while ensuring that actual follow-up has occurred.

OVERCOMING BARRIERS FOR HIE PARTICIPATION
While participating with a HIE benefits providers, healthcare organizations and patients, there are still barriers preventing adoption. Some providers are reluctant to share patient data due to an overly restrictive interpretation of the HIPAA regulations and fear that sharing patient data with an HIE could violate protection requirements. Some EHR vendors vary from accepted standards or implement interfaces in such a way that limits the ability to share or receive patient clinical data from an HIE. The EHR vendors sometimes charge a fee to implement needed interfaces between the EHR and HIE and these fees may vary between a low one-time fee to a high initial fee compounded by ongoing maintenance fees. The two greatest barriers are semantic interoperability and lack of HIE adoption across the healthcare spectrum.

Semantic interoperability is key to sharing clinical data in a useful way through resolving the various codes and terms used in healthcare. Semantic interoperability defines a common vocabulary and normalizes the ICD-9, ICD-10, CPT, CPT2, SNOMED HCPCS, RxNorm, LOINC and other codes along with the terms that describe a patient's problems, medications or procedures[ii]. Both HIEs and EHR vendors need to adopt a method of mapping the various coding when sending and receiving patient clinical data. The adoption of HIEs has risen dramatically by both hospitals and physicians, however, adoption lags well behind in the post-acute setting. Requirements for data exchange were placed on hospitals and physicians along with incentives to offset the costs of implementation as part of the Meaningful Use program. The Meaningful Use program excluded nursing homes, skilled nursing facilities and home health which then eliminated nearly one-third of the patient's health story.

While barriers do exist, they can be alleviated so that all organizations that provide care and services for patients can participate. CMS has contracted with a variety of organizations to provide technical assistance to hospitals, physicians and post-acute providers in the adoption of EHR and HIE technology. Federal, state and private grants can be utilized to offset interface fees and costs. Health IT organizations, such as Healthcare Information and Management Systems Society (HIMSS) serve as advocates to encourage the adoption of interoperability standards along with providing education and training opportunities to members so they can better understand and support EHRs and HIEs.

CONCLUSION
While the majority of patient care occurs within the patient's local community, the providers within the community may only have access to a subset of a patient's data necessary to provide the best care. When a patient is referred to a specialty provider outside their community the likelihood of access to tools to complete patient data drops dramatically. Broadly accessible patient information is a path to significant reductions in cost and improvements in quality. HIEs provide the HIPAA secure technical

platform that can supplement the development of medical neighborhoods. The HIE tools and data available today, especially here in Ohio, make it possible to manage and monitor the care of diabetic and hypertensive patients across numerous providers of care and a wide geography. While HIEs are far from perfect, the clinical information and variety of services or solutions that they provide can assist providers in improving the health and wellness of patients with diabetes, hypertension and a variety of other conditions.

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[i] Association of State and Territorial Health Officials (2016), Using Health Information Systems to Identify and Control Hypertension: Lessons from the ASTHO Million Hearts Learning Collaborative

[ii] B. Levy (2014, May). Health Care's Semantic Challenge. *For the Record.* Retrieved from http://www.fortherecordmag.com/archives/0514p26.shtml