

FINAL REPORT AND RECOMMENDATIONS OF THE HEALTH INFORMATION EXCHANGE USE CASE DESIGN GROUP

Contributors:

Stacy Beck
Pat Checko, DrPH
Kathy DeMatteo
Gerard Muro, MD
Mark Raymond
Jake Star
Lisa Stump, MS, RPh

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Prepared by:

Michael Matthews, Chief Strategy Officer

Carol Robinson, Chief Executive Officer

CedarBridge Group LLC
515 NW Saltzman Rd. #661
Portland, OR 97229
www.cedarbridgegroup.com



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GROUP

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Executive Summary

The *Final Report and Recommendations of the HIE Use Case Design Group* is the work of a multi-stakeholder planning effort, which was chartered by the Health Information Technology Advisory Council (Health IT Advisory Council) on June 15, 2017. The Health Information Exchange Use Case Design Group (HIE Use Case Design Group) was chartered to:

1. Develop HIE use cases that align with Health IT Advisory Council recommendations
2. Establish value propositions to prioritize / sequence the use cases
3. Research and validate high-level business and functional requirements for prioritized use cases

Over the course of 11 teleconference meetings from late June 2017 to October 2017, the HIE Use Case Design Group, with support and facilitation from CedarBridge Group, developed, validated, and reviewed a total of 31 HIE use cases. This review, and the effort to prioritize / sequence the use cases, was guided by one key principle: the use cases that were going to be recommended needed to create tangible value for the healthcare consumers, patients, and relevant stakeholders in Connecticut.

Following the prioritization / sequencing activities, which included a combination of objective and subjective measurement tools and extensive Design Group discussion, the group produced recommendations. These recommendations, listed below, were unanimously approved by the Health IT Advisory Council on October 19, 2017, and will be described in greater detail throughout this document.

1. Wave 1 use cases for implementation:
 - Electronic Clinical Quality Measure Reporting System (eCQM)
 - Immunization Information System (Submit / Query and Receive)
 - Longitudinal Health Records
 - Public Health Reporting
 - Clinical Encounter Alerts
 - Image Exchange
2. Wave 2 use cases for planning and implementation (following additional analysis and activities):
 - Medication Reconciliation
 - Medical Orders for Life-Sustaining Treatment (MOLST) and Advance Directives
 - Patient Portal
 - Population Health Analytics
3. Utilize the use case library to inform the future planning process
4. Prepare a comprehensive financial sustainability plan for HIE services

This report represents the conclusion of the HIE Use Case Design Group's work. However, the Design Group recommends continued refinement of business, technical, and functional requirements prior to initiating procurement for any of the services to support the recommended use cases. The work of this HIE Use Case Design Group is a positive step forward in achieving the goal of delivering high-value HIE services requirements that meets needs of Connecticut stakeholders.

Introduction and Background

Legislation Regarding Health Information Technology in Connecticut

The state's efforts related to health information technology (health IT) and health information exchange, is largely defined by Connecticut Public Act 16-77,¹ which replaced the previously-enacted Public Act 15-146. This law established the Health IT Advisory Council as a governing body to advise the Health Information Technology Officer (HITO) in establishing priorities and policy recommendations for advancing the state's health IT and HIE goals, including the development and implementation of the statewide health IT plan, statewide HIE, and appropriate governance, oversight, and accountability measures to ensure success. The position of the HITO was also established under this legislation and is charged with administrative responsibility over the planning, design, implementation, and oversight of HIE services in the state. The HITO is tasked with coordinating the state's health IT and HIE efforts to ensure consistent and collaborative cross-agency planning and implementation. The HITO is required to make recommendations for policy, regulatory, legislative changes, and other initiatives to promote the state's goals.

In addition, Public Act 16-77 includes provisions for:

- Requirements and expectations for a statewide HIE, including:
 - Real-time, secure access to complete medical records across all settings
 - Provide patients with secure electronic access to their health information
 - Allow voluntary participation by patients at no cost
 - Support care coordination through real-time alerts and timely access
 - Reduce costs
 - Promote interoperability
 - Meet privacy and security requirements
 - Support public health reporting, quality improvement, academic research, healthcare delivery, payment reform, and population health analytics
 - Utilize electronic data standards including security, privacy, data content, data structure and format, vocabulary, and transmission protocols.
 - Provide for broad local governance
- Requirements for the statewide health IT Plan, aimed at enhancing interoperability to support optimal health outcomes
- Promoting the reuse of enterprise health IT assets

Stakeholder Engagement

As part of the planning and design phase for statewide health IT infrastructure, the HITO undertook a four-month stakeholder engagement process and environmental scan to assess the current state and desired future state of the health IT environment in Connecticut.² One of the key objectives of this environmental scan process was to identify the health IT and HIE opportunities that represent the greatest value to stakeholders to help advance better health outcomes and healthcare delivery in Connecticut. Through this engagement process, a wide-range of stakeholders were interviewed and

¹ <https://www.cga.ct.gov/2016/ACT/pa/2016PA-00077-R005B-00289-PA.htm>

² <http://portal.ct.gov/Office-of-the-Lt-Governor/Health-IT-Advisory-Council/Health-IT-Reports-and-Recommendations>

many HIE use cases, HIE services, and shared infrastructure services were discussed as possible priorities. Areas of opportunity were identified and a set of nine recommendations were developed by CedarBridge Group, in consultation with the HIT PMO and SIM PMO, and approved by the Health IT Advisory Council. Building a library of use cases is a common approach for the design of complex software systems. At the kick-off meeting of the HIE Use Case Design Group it was noted that the following recommendations from the *Environmental Scan Final Report* were within scope for the HIE Use Case Design Group:

- Keep **patients and consumers as a primary focus** in all efforts to improve health IT or HIE
- **Leverage existing interoperability initiatives**, including existing or planned private investments, and relationships with state-based HIEs and the national initiatives
- **Implement core technology** that complements and interoperates with systems currently in use by private sector organizations
- **Support provider organizations** and networks that have already assumed accountability for quality and cost
- Ensure basic mechanisms are in place for all stakeholders to **securely communicate health information with others** involved in a patient's care and treatment
- **Implement workflow tools** that will improve the efficiency and effectiveness of healthcare delivery

HIE Use Case Design Group Charter

In light of the findings of the stakeholder engagement and environmental scan process, the Health IT Advisory Council supported the HITO by forming a time-limited, multi-stakeholder design group to investigate, discuss, and prioritize a library of HIE use cases and HIE services that would bring the most value to stakeholders in light of the expected planning activities around shared infrastructure services. The Health IT Advisory Council formally chartered³ the formation of the HIE Use Case Design Group on July 12, 2017 to:

1. **Develop use cases** that align with Health IT Advisory Council recommendations
2. **Establish value propositions** to prioritize / sequence the use cases
3. **Validate high-level business and functional requirements** for prioritized use cases

By building a library of use cases and prioritizing / sequencing the use cases to determine which will be addressed first through the implementation of core and shared services ensures that stakeholders are foundational to the identification of the goals and scope of Connecticut's statewide health IT and HIE infrastructure.

³ <http://portal.ct.gov/Office-of-the-Lt-Governor/Health-IT-Advisory-Council/Health-IT-Advisory-Council---HIE-Use-Case-Design-Group-2017>

Definition: *A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. The use case is made up of a set of possible sequences of interactions between systems and users in a particular environment and related to a particular goal. A use case can be thought of as a collection of possible scenarios related to a particular goal, indeed, the use case and goal are sometimes considered to be synonymous.⁴*

Stakeholder Representation of HIE Use Case Design Group Members

The HIE Use Case Design Group was sponsored by the HITO, governed by the Health IT Advisory Council, and supported by CedarBridge Group. The list of HIE Use Case Design Group members, and the description of stakeholder representation, can be seen in Table 1 below. Members were tasked at the kickoff with applying a lens to their work that fully represented the concerns of larger stakeholder groups, not their own individual interests or solely the interests of their organization.

TABLE 1: HIE USE CASE DESIGN GROUP MEMBERS

Name	Role and Stakeholder Representation
Stacy Beck	Clinical Quality Program Director of Anthem; Represents perspectives of the payer community, both as data consumers and data providers.
Patricia Checko, DrPH	Co-chair of SIM Consumer Advisory Board and Health IT Advisory Council Member; Represents the views and needs of consumers and patients and as an advocate for public health.
Kathy DeMatteo	Chief Information Officer of Western Connecticut Health Network and Health IT Advisory Council Member; Represents the perspective of a multi-hospital network with an integrated network of affiliated physicians.
Gerard Muro, MD	Chief Medical Information Officer of Advanced Radiology Consultants and board member of Charter Radiology Network; Represents specialty physicians' perspective and will advise on opportunities related to informatics.
Mark Raymond	State Chief Information Officer and Health IT Advisory Council Member; Represents the perspective of the state, including information assets that can be leveraged in support of health IT and HIE.
Jake Star	Chief Information Officer of VNA Community Healthcare and Health IT Advisory Council Member; Represents the perspectives of non-hospital and non-physician stakeholders in the larger healthcare team, and will advise on needs and challenges of long-term post-acute care providers.
Lisa Stump, MS, RPh	Senior Vice President and Chief Information Officer of Yale New Haven and Health IT Advisory Council Member; Represents the perspective of a large health system and current Epic customer and advise on the needs of academic medical centers.

⁴ <http://searchsoftwarequality.techtarget.com/definition/use-case>

HIE Design Group Process and Activities

Timeline and Milestones

The HIE Use Case Design Group held 11 meetings from late June 2017 to October 2017. The kick-off meeting on June 27, 2017 set the stage for the group to spend the rest of the meetings reviewing, assessing, discussing and prioritizing use cases. Initially, the HIE Use Case Design Group was scheduled to conclude its work in nine sessions and provide its recommendations to the Health IT Advisory Council in September. However, early in the process a tenth meeting was added, and at its August 30th meeting the HIE Use Case Design Group decided an eleventh meeting was necessary in order to integrate more detailed information around technology needs and business, legal, policy, and financial considerations, and to gather additional stakeholder input. The Design Group presented their recommendations to the Health IT Advisory Council on October 19, 2017 and they were accepted unanimously. Table 2 outlines the timeline for the HIE Use Case Design Group.

TABLE 2: TIMELINE FOR HIE USE CASE DESIGN GROUP PROCESS

Milestones and Deliverables	Dates
Session 1: Kick-off meeting	6/27/17
Session 2: Review use cases (part 1)	7/12/17
Session 3: Review use cases (part 2)	7/19/17
Present update to Health IT Advisory Council	7/20/17
Session 4: Review use cases (part 3)	7/27/17
Session 5: Review use cases (part 4)	8/2/17
Session 6: Review use cases (part 5) and prioritization criteria for use cases	8/9/17
Session 7: Review use cases (part 6); Complete prioritization / sequencing activities	8/16/17
Present update to Health IT Advisory Council	8/17/17
Session 8: Review results of prioritization / sequencing activities; Select “top 10” (part 1)	8/23/17
Session 9: Select “top 10” use cases (part 2); Discuss need for additional meetings	8/30/17
CedarBridge to conduct analysis of HIE services and technology infrastructure necessary to support “top 10” use cases; Research financial, business, legal, and policy considerations and socialize / validate “top 10” use cases with targeted stakeholders	8/23/17 – 10/4/17
Present update to Health IT Advisory Council	9/21/17
Session 10: Review expanded use case documents for identified “top 10” and preliminary recommendations for use cases	10/4/17
Session 11: Finalize recommendations; develop plan for delivery of recommendations to the Health IT Advisory Council	10/11/17
Present Recommendations to Council	10/19/17
Delivery of Final Report and Recommendations to HITO	10/31/17

For each meeting, CedarBridge Group produced an agenda, presentation, and supporting materials, which were subsequently reviewed and affirmed by the HIE Use Case Design Group members. Following each meeting a detailed summary was distributed to Design Group members, which was approved

through a formal vote by membership. At each meeting, members were led through activities by CedarBridge Group, including the review and validation of use case summary documents, overview and review of prioritization / sequencing activities, and structured discussions to drive the group towards consensus around recommendations. Between meetings, HIE Use Case Design Group members had the opportunity to review materials, comment on past meeting summaries, and complete required activities while CedarBridge conducted use case research and analysis, engaged with the HIT PMO on overall approach, and interviewed other stakeholders to inform and validate use cases.

Use Case Inventory

The HIE Use Case Design Group approved a template for the content for each use case, based on industry standards for similar technology development projects.⁵ CedarBridge populated this template for each identified use case, based on industry experience and research. The Design Group then reviewed the library of HIE use cases that represented input from key stakeholders and areas for opportunity in Connecticut's healthcare ecosystem, based on findings from the environmental scan, and developed criteria to evaluate which use cases should be advanced to subsequent phases of prioritization. The Design Group reviewed 31 use cases in total, utilizing the template populated by CedarBridge. The use case template consisted of the following sections:

- Executive summary
- Function and purpose
- Value proposition(s)
- Persona – fictional narrative detailing real-world example of each use case
- Process diagram
- Identification of key actors

Once all use cases were reviewed and discussed by the HIE Design Group, there was some consolidation of uses cases (for example, MOLST and advance directives use cases were combined for consideration). For others, it was determined that some use cases were dependent upon the effective implementation and deployment of the infrastructure associated with a separate use case and would have been too challenging for immediate implementation as part of Wave 1 (for example, transitions of care are largely dependent on functional and optimized clinical encounter alerts). Additionally, members heavily considered a lack of mature implementation standards as a reason to delay consideration of some use cases until future years (for example, patient-generated data and genomics).

The Design Group reviewed the use cases with the ultimate goal of creating a prioritization / sequence for the implementation of use cases in the first year of HIE services (Wave 1), and identifying candidates for implementation during the second year (Wave 2) following additional analysis of business and functional requirements and/or the implementation or utilization of core services that are necessary for enablement. All 31 of the original use cases were deemed important and are considered critical to ongoing planning and implementation efforts of statewide HIE services and will remain in consideration

⁵ Armour F. and Granville M. *Advanced Use Case Modeling: Software Systems*. Upper Saddle River: Addison-Wesley. 2001.

by the HITO and Health IT Advisory Council, even if they were not prioritized / sequenced as part of this Design Group’s recommendations.

Following the initial review of all use cases, Design Group members engaged in two activities to prioritize / sequence the use cases, with a goal of identifying a “Top 10” list for further analysis and validation (additional details on the prioritization activities is provided in a subsequent section). Once the “Top 10” list of use cases was identified and validated by the Design Group, CedarBridge, in collaboration with targeted stakeholders, conducted a high-level technology assessment and expanded the applicable use case templates with legal, policy, business, and financial considerations to further assess the use cases for sequencing. The staging of use cases into implementation waves represents the dynamic and collaborative nature of the Design Group’s discussions and active participation to arrive at the most critical use cases for the first two years of HIE services and infrastructure implementation. The final list of use cases, reflecting consolidations and recommended implementation staging, can be found in Appendix 1.

The HIE Use Case Design Group’s current staging is not a fixed representation of priorities. The Year 1 implementation of HIE infrastructure and use case services should be accompanied by planning and re-evaluation of the highest priority use cases for Year 2 under an appropriate governance structure, as seen in Figure 7. While 10 use cases were nominated for implementation in the first two years of statewide HIE services, the remaining use case library forms a solid foundation for rapid, future planning efforts.

Use Case Evaluation Criterion

The HIE Use Case Design Group used the criterion listed in Table 3 as the foundation for their evaluation of the use cases in consideration of prioritization / sequencing. In alignment with the language of Public Act 16-77, the findings of the environmental scan, and stated priorities of the Health IT Advisory Council, particular focus and attention was given to the first two criteria elements when assessing use cases. The ability for use cases to produce value for patients, consumers, and other stakeholders in Connecticut was paramount to the evaluation and prioritization process.

TABLE 3: CRITERION USED TO EVALUATE USE CASES

Prioritization Criteria	
1. Value for Patients and Consumers	<ul style="list-style-type: none"> ● Patient-centeredness ● Allows for patient preference, choice, and convenience ● Improves care coordination across continuum (primary care, ancillary and support services, emergency and inpatient care, behavioral health, etc.) ● Enable entire care team to participate in a patient’s care ● Enable population health improvements ● Improves patient safety

<p>2. Value for Other Stakeholders (providers, community orgs, payers, employers, etc.)</p> <ul style="list-style-type: none"> • Define return on investment, financial return, and value proposition for each stakeholder • Alignment with organization goals and business requirements for stakeholders <ul style="list-style-type: none"> ○ Enable participation in value-based payment models ○ Enable clinical decision-making and care coordination through information access • Enable community organization and providers of social services
<p>3. Workflow Impact</p> <ul style="list-style-type: none"> • Enables access to healthcare records by individual providers • Defined impact to clinical staff’s workflows (positive or negative) • Defined impact to administrative staff’s workflows (positive or negative) • Accessibility and level of effort
<p>4. Ease of Implementation</p> <ul style="list-style-type: none"> • Implementation readiness and use case maturity • Procurement process • Speed of implementation (quick win) • Complexity of business processes • Training requirements • Timeline for realizing value proposition
<p>5. Integration, Maintenance, and Technical Assistance</p> <ul style="list-style-type: none"> • Define resource requirements necessary to support implementation and integration(s), including technical assistance and maintenance • Alignment with business and functional requirements of other prioritized projects
<p>6. Prerequisite Services</p> <ul style="list-style-type: none"> • Define services and infrastructure that is necessary to support use cases (basic care map, type of payload, type of transport, trust agreements, technical / security standards, etc.) • Assessment of prerequisite services for an HIE entity • Assessment of prerequisite services for partner organizations (HISP, ability to produce / send admit, discharge, transfer messages (ADTs), etc.)
<p>7. Scalability</p> <ul style="list-style-type: none"> • Stand-alone use case vs. cluster (e.g. care coordination and longitudinal health record) • Leverage HIE service as core component / infrastructure to support multiple use cases • Consider HIE Services that will support multiple use cases when implemented (economy of scale)
<p>8. Existing Infrastructure and Resources</p> <ul style="list-style-type: none"> • Consider if existing infrastructure meets the needs of stakeholders • Governance of existing infrastructure / resources • Scalability of existing infrastructure / resources

Prioritization / Sequencing Activities

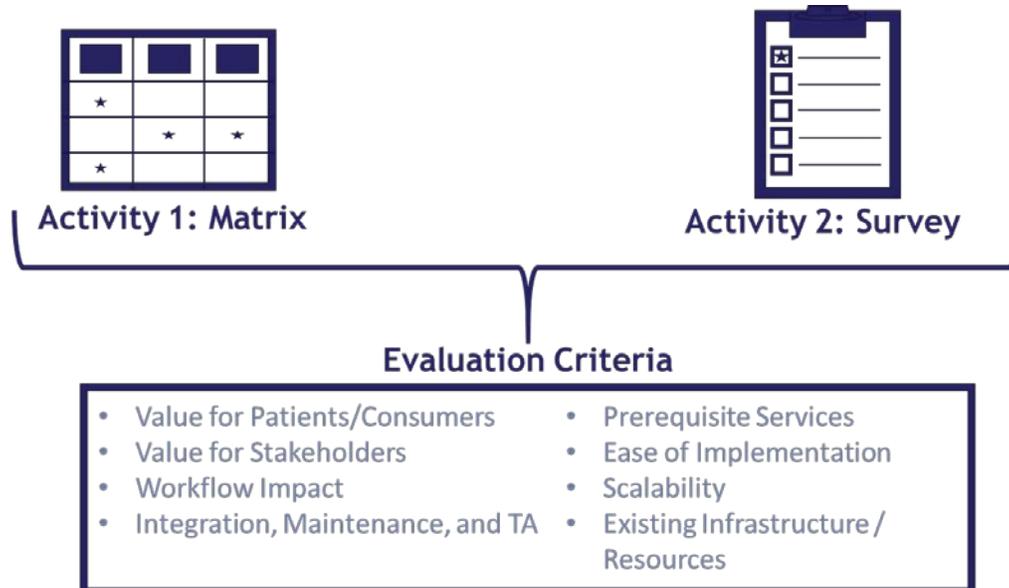
Following the initial review of use cases, Design Group members were asked to complete two separate prioritization / sequencing activities in order to develop rankings of the use cases. These scores and rankings that resulted from these activities did not translate directly into the recommendations for implementation. The purpose of these activities was to facilitate careful consideration of the use cases across the prioritization criteria in order to enable an informed and targeted discussion.

At the time that the HIE Use Case Design Group was chartered, the electronic clinical quality measurement (eCQM) reporting system and immunization information system (submit and query / retrieve) use cases had already been identified and approved by the Health IT Advisory Council as priorities for implementation, and been explored and validated by separate, use case-specific Design Groups. It was decided to include them in these prioritization activities as an extra level of validation.^{6,7}

Activity 1 - Prioritization Matrix: HIE Use Case Design Group members received an Excel spreadsheet containing a matrix of all uses cases (first column) and prioritization elements (top row). Design Group members were asked to assess each use case against the prioritization criteria listed in Table 3. In assessing the use cases, they determined if the use case impacted the criterion element positively, negatively, or neutrally. A positive score received one point, a negative score received negative one points, and a neutral score receive zero points. A cumulative score was calculated for each use case based on the responses received by all Design Group members. Each use case could earn a total possible score of 8 points from each Design Group member, or 56 points cumulatively from all members.

Activity 2 – Survey: HIE Use Case Design Group members received a link to a SurveyMonkey questionnaire where they were asked to assemble a subjective top 10 ranking of the use cases. Responses were scored inversely, with the top ranked use case earning ten points, the second most important earned nine points, and so on. A cumulative score was calculated for each use case based on the responses received by all Design Group members. Each use case could earn a total possible score of 10 points from each Design Group member, or 70 points cumulatively from all members.

FIGURE 1. ACTIVITIES TO PRIORITIZE / SEQUENCE USE CASES



In order to create equal weight between the cumulative scores from the two activities, the scores from the Matrix activity were increased by a factor of 1.25. Once the cumulative scores were weighted

⁶ <http://portal.ct.gov/Office-of-the-Lt-Governor/Health-IT-Advisory-Council/Health-IT-Advisory-Council---Immunization-Design-Group-2017>

⁷ <http://portal.ct.gov/Office-of-the-Lt-Governor/Health-IT-Advisory-Council/Health-IT-Advisory-Council---eCQM-Design-Group-2017>

equally, a composite score was developed to capture the results from both activities into a single ranking, as illustrated by Figure 2 and Figure 3.

Figure 2. Combined Ranking and Composite Scores

Combined Ranking & Composite Scores

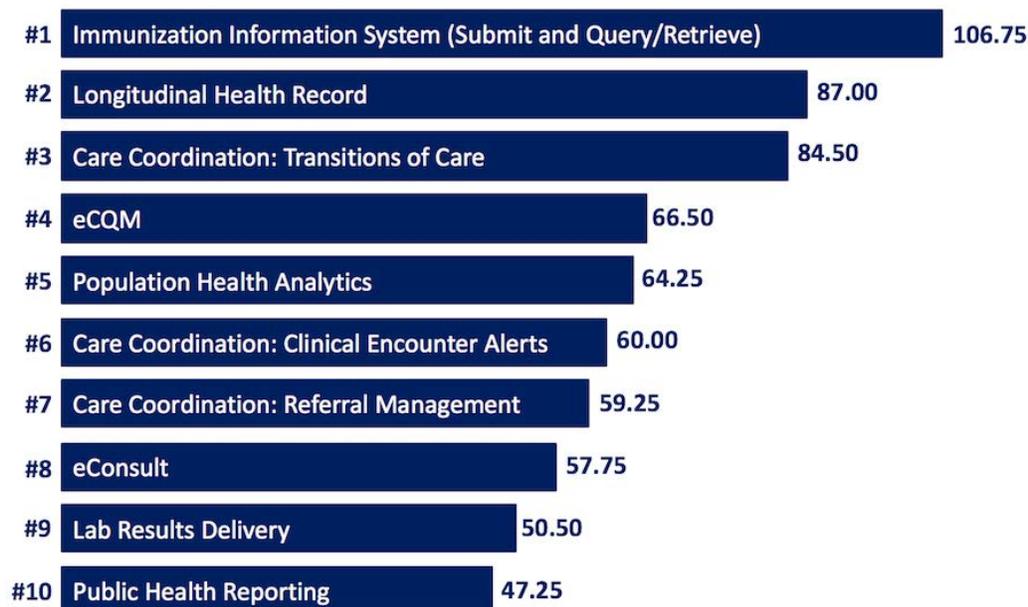


FIGURE 3. COMBINED “TOP 10” AND “IN THE MIDDLE” USE CASES

Use Case Inventory: Combined “Top 10”

Use Case	Matrix Score	Survey Score	Combined Score
Immunization Information System	58.75	48.00	106.75
Longitudinal Health Record	40.00	47.00	87.00
Care Coordination: Transitions of Care	47.50	37.00	84.50
eCQM	27.50	39.00	66.50
Population Health Analytics	31.25	33.00	64.25
Care Coordination: Encounter Alerts	45.00	19.00	60.00
Care Coordination: Referral Management	34.50	13.00	59.25
eConsult	46.25	15.00	57.75
Lab Results Delivery	38.75	19.00	50.50
Public Health Reporting	32.50	18.00	47.25

Use Case Inventory: Use Cases “In The Middle”

The following table contains the use cases that did not make the combined “Top 10” list, but were listed among the top 10 use cases for one of the two activities.

Use Case	Matrix Score	Survey Score	Combined Score
ED Super Utilizers	31.25	16.00	47.25
Medication Reconciliation	33.75	13.00	46.75
Advance Directives	36.25	9.00	45.25
POLST / MOLST	33.75	0.00	33.75

The “Top 10” ranking and composite scores were created to help guide the Design Group’s discussion to identify a viable list of high-value use cases that could be implemented in Connecticut as part of the first year of HIE services. The in-depth discussion around the composite “Top 10” list lasted for several meetings, and included in-depth analysis of business, financial, legal, and policy considerations. Through this discussion, the Design Group was able to recognize and discuss potential issues with the composite “Top 10,” such as why patient-centered use cases like advance directives, MOLST, and patient portal were not included. This discussion also led the Design Group to recognize use cases that required significant contingencies for implementation, or those that were not adequately mature for utilization and optimization.

The additional validation and discussion process of the Design Group resulted in the identification of the final recommendations for Wave 1 and Wave 2 use cases. Upon additional research and analysis, four use cases were considered a high-priority, but required additional analysis and validation, or were contingent upon other technical infrastructure. These use cases were designated as Wave 2 and included: advance directives and MOLST (combined), medication reconciliation, patient portal, and population health analytics. The Design Group was also able to identify and validate six use cases that could create significant value for stakeholders and enable scalable HIE services if implemented in the first year. These use cases were designated as Wave 1 and included: clinical encounter alerts, eCQM reporting system, immunization information system (submit and query / retrieve), image exchange, longitudinal health records, and public health reporting.

Other use cases were reviewed and assessed, but did not ultimately meet the criteria to be considered for Wave 1 or Wave 2 at this time. This **library of use cases remains relevant to many Connecticut stakeholders and will remain under active consideration** for implementation in Connecticut as infrastructure and services are established and optimized. The Design Group recommends ongoing analysis of business and functional requirements for all use cases, as well as periodic re-evaluation of sequencing as part of future planning activities.

TABLE 4. FUTURE USE CASES (THOSE NOT INCLUDED IN WAVE 1 OR WAVE 2)

Future Use Cases	
Bundle Management	Lab Results Delivery
Care Coordination: Care Plan Sharing	Life Insurance Underwriting
Care Coordination: Referral Management	Medical / Lab Orders
Care Coordination: Transitions of Care	Medical Orders / Order Management
CHA Dose Registry	Opioid Monitoring and Support Services
Disability Determination	Patient-generated Data
eConsult	Research and Clinical Trials
Emergency Department Super-utilizers	Social Determinants of Health
Emergency Medical Services (EMS)	Wounded Warriors
Genomics	

Final Selection of Use Cases

The following six use cases represent the recommended Wave 1 that are targeted for implementation in the first year of HIE services:

- **eCQM Reporting System** – *previously identified by the Health IT Advisory Council as a high priority use case and supported by the eCQM Design Group’s identification of business and functional requirements*
- **Immunization Information System (Submit and Query / Retrieve)** – *previously identified by the Health IT Advisory Council as a high priority use case and supported by the IIS Design Group’s recommendations; the highest ranked need among stakeholders and HIE Use Case Design Group members*
- **Longitudinal Health Record** – *identified and validated by the HIE Use Case Design Group and stakeholders as being foundational to support scalable statewide HIE services and other critical use cases*
- **Clinical Encounter Alerts** – *identified and validated by the HIE Use Case Design Group and other stakeholders as being foundational to support scalable statewide HIE services and other critical use cases*
- **Public Health Reporting** – *identified as a complementary and supportive use case to the prioritized implementation of the Immunization Information System*
- **Image Exchange** – *considered a high value use case that would support improvements to clinical efficiency and efficacy; this use case was not initially prioritized, based on the activities described above, but was added to Wave 1 through Design Group discussions and targeted stakeholder interviews*

The following four use cases represent the Wave 2 candidates for further analysis, planning, and validation during the first year of HIE operations, and potential implementation during the second year:

- **MOLST / Advance Directives** – *further planning for this use case will be done in partnership with the Connecticut MOLST Task Force and Advisory Committee*
- **Medication Reconciliation** – *viewed as critical for quality, safety and efficiency, but with a recognized need to address process issues prior to the deployment of supportive technology*
- **Population Health Analytics** – *reliant on technology architecture of other use cases; will be considered once the eCQM reporting system has been implemented, leveraging that technology for additional value creation*
- **Patient Portal** – *reliant on technology architecture of other use cases; will be considered once the longitudinal health record use case has been implemented, leveraging that technology to support additional value creation and align with the priority of keeping the patient as the “north star”*

Considerations for Implementation

Core Services Framework

The overall technology framework for supporting use cases provides a mechanism for data sharing organizations and national networks to exchange data in a secure, standard, and flexible environment. This technology framework is built upon identified core services that will be necessary to enable HIE use cases. The core services that have been recognized include a centralized health provider directory (HPD), a master person index (MPI), an attribution system, a consent management system, and a centralized hub that will broker transactions to and from the data sharing organizations, national networks, and use case services. These core services will support a centralized provider directory, better patient matching, a centralized model to link patients to their care team, and a system to enable the management of consumer consent preferences. Core services will facilitate integration, normalization, de-duplication and transformation of clinical data to ensure standards-based and semantic interoperability. Building core services that satisfy the needs of multiple use cases is an efficient approach to architecture design and takes a holistic approach to organizing the needs of stakeholders efficiently.

Business Model and Sustainability Considerations

HIE Use Case Design Group members entered into this planning process with a recognition that financial sustainability has been a challenge for many HIEs across the country. Yet, there was also recognition that HIE services, properly designed and operated, will yield significant benefits for the citizens of Connecticut. Building upon the previous and current work of SIM, value-based care initiatives around the state, and widespread efforts to achieve the Triple Aim, Connecticut is committed to the creation of a new paradigm and business model for HIE that ensures long-term sustainability and return on investment for participants.

There are a number of dimensions to the sustainability framework envisioned for the state. First and foremost is the creation of *demand* for interoperability and data sharing, as opposed to the *supply* side. Much has been accomplished across the country on the *supply* side of interoperability, meaning the technical capability to exchange clinical data. Much less focus has been placed on how demand will be expanded far beyond today's level of data sharing, to the point that data sharing becomes a true standard of care that is integrated seamlessly into a clinician's workflow. As Connecticut advances towards statewide interoperability implementations, the business case and value proposition of all investments must remain central to the planning process.

Developing a use case library as part of a system design process explicates the *demand* for interoperability. This design process should continue to clearly communicate how stakeholders will take advantage of HIE services and derive value from its functions; future iterations of the system design process should examine the responsibilities and anticipated work required on the part of healthcare providers and organizations and how to clearly communicate their return on investment. This includes:

- Ongoing costs to connect to HIE services, especially when federal funds have ended;
- Implementation costs, like anticipated staff time and vendor fees;
- Non-traditional use of HIE services that bring in additional partners and revenue streams; and
- Non-monetary investments and benefits.

Additional effort could be directed towards describing sample funding models associated with use cases and how use cases can be prioritized in the context of these models. Data capture and efficient reporting have multidimensional qualitative and quantitative returns on investment for stakeholders that can be further clarified, including financial outlays, improvements in patient safety and healthcare quality, and end-user satisfaction. Some of these cost considerations must also be placed in the context of achieving efficiencies of scale; some use cases are foundational to others and, once implemented, confer cost savings because key functions and infrastructure that already exists for use cases implemented in earlier waves. Opportunities exist for additional work to identify future governance structures and sustainability models for consideration by the HITO and Health IT Advisory Council.

Several guiding principles should contextualize future activities around sustainability and the design of statewide health IT and HIE infrastructure:

1. **Focus on Demand:** Emphasize not just *supply* of interoperability capability, but *demand* for data sharing as a meaningful part of routine clinical workflows.
2. **Leverage Value-based Care Initiatives:** Support the data sharing needs of accountable care organizations, clinically integrated networks, Advanced Networks and other value-based care initiatives prevalent in Connecticut.
3. **Define and Support a “Healthcare Data Economy”:** Create opportunities to support exchange activities by capturing the value of data sharing and analytics
4. **Support Necessary Workflow Changes with Technical Assistance and Education:** Provide services needed to ensure all providers and caregivers have the capacity and know-how to participate in interoperability.
5. **Engage Payers:** Align health outcome improvement and financial incentives.
6. **Committed Stakeholders:** Ensure stakeholders who will derive value from HIE services are contributing to the identified sustainability model.
7. **Innovate:** Explore use cases with stakeholders who do not typically participate in HIE initiatives, such as clinical research and precision medicine.
8. **Allocate Expenses Judiciously:** Ensure cost allocations align with value creation.
9. **Include Funding for Development of a Long-term Financial Sustainability plan:** Provide a roadmap and business model for future success.
10. **Implement Rigorous Measures of Usage and Value:** Build measures of usage, value, and other dimensions into the deployment of any and all technologies.
11. **Ongoing Communication with all Stakeholders:** Ensure the benefits of HIE services accrue to all stakeholders and that benefits are communicated regularly and through multiple avenues.
12. **Privacy, Security, and Confidentiality:** Health data must be transmitted and stored using best practices that ensure privacy, security, and confidentiality in all systems and services.
13. **Thoughtful Design and Usability:** Systems must be designed for optimal ease of use; end-users must find the system intuitive and easy-to-use in their clinical and administrative workflows.

Recommendations

Following careful, collaborative deliberation and validation, the HIE Use Case Design Group identified the following recommendations to support the planning and implementation of statewide HIE services. These recommendations were presented to the Health IT Advisory Council on October 19, 2017 and were approved unanimously.

Recommendation #1: Implement Achievable, High-Value Use Cases as Wave 1

The HIE Use Case Design Group recommends that the identified Wave 1 use cases be implemented as part of the first year of HIE services. These Wave 1 use cases should inform the determination of necessary core services, establishment of a governance model, and should be incorporated into the development of the Implementation Advanced Planning Document update (IAPD-U) as part of the state’s federal funding request to support the planning and implementation of statewide HIE services.

TABLE 5. RECOMMENDATION #1: WAVE 1 USE CASES

Wave 1 Use Cases and Associated Tasks	
eCQM	<ul style="list-style-type: none"> • <i>Procurement and implementation</i>
IIS (Submit/Query)	<ul style="list-style-type: none"> • <i>Implementation and integration with Public Health Reporting; procurement</i>
Longitudinal Health Record	<ul style="list-style-type: none"> • <i>Leverage eHealth Exchange, CareQuality, and CommonWell</i> • <i>Implement core services (e.g. master person index and health provider directory)</i>
Public Health Reporting	<ul style="list-style-type: none"> • <i>Assess potential to leverage/expand AIMS</i> • <i>Implement expanded data elements, onboarding, and technical assistance</i>
Clinical Encounter Alerts	<ul style="list-style-type: none"> • <i>Finalize business and functional requirements</i> • <i>Procurement / contracting (including leverage existing assets)</i>
Image Exchange	<ul style="list-style-type: none"> • <i>Finalize business and functional requirements</i> • <i>Further discussions with NYeC and other image sharing networks</i>

Recommendation #2: Utilize Wave 2 Use Cases to Inform Near-term Planning Process

While the core services infrastructure, governance model, and Wave 1 use cases are being implemented, the HIE Use Case Design Group recommends that the state utilize the identified Wave 2 use cases and associated tasks to inform the immediate planning process for future use case implementation. The state should continue to analyze business, technical, and functional requirements, and should revalidate sequencing prior to the implementation of Wave 2 use cases.

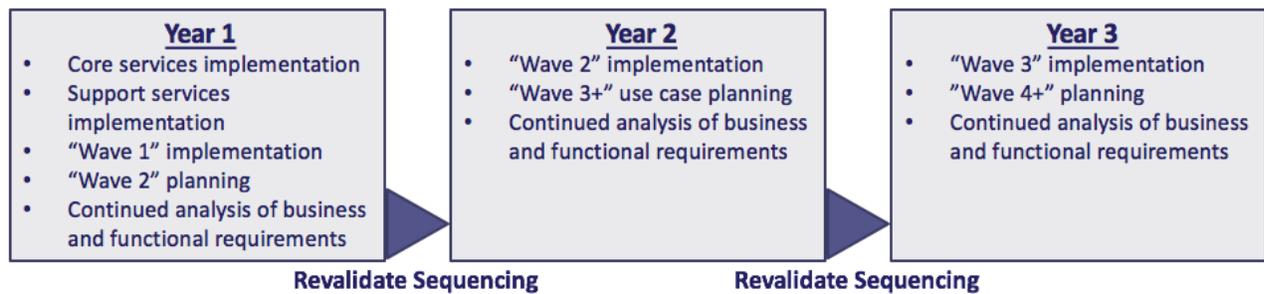
TABLE 6. RECOMMENDATION #2: WAVE 2 USE CASES AND ASSOCIATED TASKS

Wave 2 Use Cases and Associated Tasks	
Medical Reconciliation	<ul style="list-style-type: none"> • <i>Implement program for process re-design and supporting technology</i>
MOLST / Advance Directives	<ul style="list-style-type: none"> • <i>Partner with existing MOLST Task Force and Advisory Committee for assessment of technology value-add and the value of a complimentary AD Registry</i>
Patient Portal	<ul style="list-style-type: none"> • <i>Plan for rollout after implementation of longitudinal health record</i>
Population Health Analytics	<ul style="list-style-type: none"> • <i>Plan for rollout after eCQM reporting system and required technical architecture</i>

Recommendation #3: Utilize the Use Case Library to Inform Future Planning Process

Wave 1 and Wave 2 use cases represent the most viable and realistic implementation approach based on the current climate and needs of stakeholders in Connecticut. However, the full library of use cases brings tangible value to various stakeholder groups across the state and should remain under consideration for later implementation periods. The HIE Use Case Design Group recommends continued analysis of business and functional requirements as part of the future planning process, and a revalidation of sequencing on an ongoing basis to ensure the implementation sequence and rollout of use cases is closely aligned with the evolving environment and needs of health IT and HIE in Connecticut.

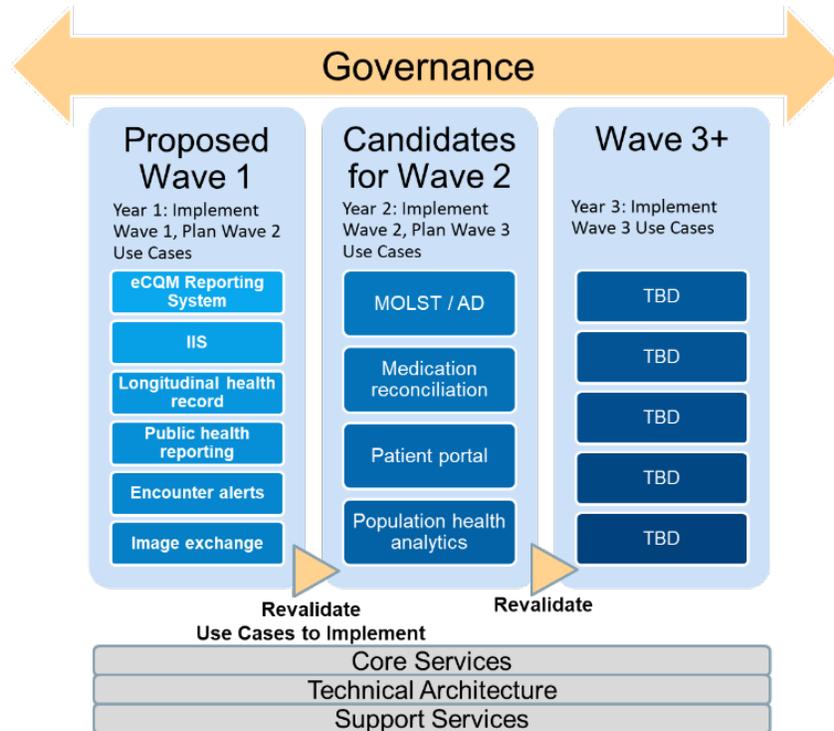
FIGURE 4. RECOMMENDATION #3: ROLLOUT AND CONTINUED ASSESSMENT



Recommendation #4: Prepare a Comprehensive Financial Sustainability Plan for HIE Services

The primary focus of the HIE Use Case Design Group was on value creation and technical requirements. The recommendations for initial use cases were driven by experience, common agreements around value among Design Group members, and best practices from successful HIEs in other states. The HITO should develop a sound, long-term financial sustainability plan, and rigorous measures of usage and reports on value creation should be included to ensure all services provided to stakeholders clearly define the value of their investments.

FIGURE 5. OVERALL RECOMMENDATION FOR USE CASE IMPLEMENTATION AND FUTURE PLANNING



Summary and Next Steps

The HIE Use Case Design Group is pleased to have been able to meet the charge, goals, and objectives of its charter in the timeframe allotted. Together, the work products and the accompanying recommendations build a strong foundation for the next steps toward implementing statewide HIE services that will meet the needs of Connecticut stakeholders. Statewide HIE services, supported by an infrastructure that is flexible, sustainable, and supportive of innovation, is essential for Connecticut’s healthcare transformation efforts.

Appendix 1: List of All HIE Use Cases

The HIE Use Case Design Group was sponsored by the HITO, governed by the Health IT Advisory Council, and supported by CedarBridge Group. Members decided on which use cases would proceed through from the first round of prioritization determinations (Future Use Cases) to an expanded set of use cases (Wave 2: Final) and finally the top, most important uses in the final stage (Wave 1: Final) that should be implemented first.

HIE Use Case	Description	Status
eCQM Reporting System	A statewide electronic system for clinical quality measurement will enable providers and encourage payers to more efficiently participate in value-based payment models. Measures that monitor care delivery and health outcomes must securely draw data from multiple data sources and organizations at multiple levels to best reflect an individual's entire experience of the healthcare system, risk factors and exposures, and impacts to individual health.	Wave 1
IIS (Submit and Query / Retrieve)	At the point of clinical care, an immunization information system (IIS) can provide consolidated immunization histories for use by a vaccination provider in determining appropriate client vaccinations. At the population level, an IIS provides aggregate data on vaccinations for use in surveillance and program operations, and in guiding public health action with the goal of improving vaccination rates and reducing vaccine-preventable disease.	Wave 1
Longitudinal Health Records	Timely and efficient access to longitudinal medical histories by healthcare professionals informs diagnosis and treatment decisions, reduces duplication of costly and potentially harmful tests / procedures, and saves patients and providers time and money by reducing the burden associated with collecting information, such as placing phone calls, waiting for faxes, and transcribing information. Longitudinal health records are a foundational element of effective HIE services and will enable scalable infrastructure.	Wave 1

HIE Use Case	Description	Status
Care Coordination: Clinical Encounter Alerts	Real-time notifications containing actionable information that are sent to members of a care team, such as primary care providers, long-term post-acute care providers, patient-centered medical homes, accountable care organizations, payers, managed care organizations, and research organizations when patients have a clinical event such as an admission or discharge to / from an inpatient facility, emergency department or outpatient care facility.	Wave 1
Public Health Reporting	Enable standardized, efficient, automatic, real-time transmission of information for public health reporting, such as electronic lab reports and syndromic surveillance, to prevent and contain outbreaks through targeted interventions, analyze population health trends, monitor and evaluate chronic disease epidemiology and incidents, and educate populations.	Wave 1
Image Exchange	Images can be exchanged and accessed electronically by healthcare providers from various locations to enable effective collaboration, reduce operational costs, and relieve the burden associated with manual information exchange.	Wave 1
Medication Reconciliation	Facilitate the improvement in medication reconciliation accuracy through increasing the exchange of medication information across all healthcare settings and providers to reduce medication morbidity and mortality and prevent future medication safety events, such as adverse reactions.	Wave 2
MOLST / Advance Directives	<p>MOSLT: Storing and exchanging MOLST forms electronically is critical to ensure a patient’s wishes are documented and available at the time and place of care, particularly for patients that experience many transitions of care.</p> <p>Advance Directives: It is crucial that patients’ preferences and values regarding their care are not only elicited and documented, but also actively shared and accessible at the time they are needed most. Patients, providers and health systems will, at a minimum, gain efficiency in a labor-intensive process of acquiring and storing advance directives.</p>	Wave 2

HIE Use Case	Description	Status
Patient Portal	Patient portals, integrated with HIE services, can enable secure access to a longitudinal patient record. Providing a complete record of care, this single portal serves as an entryway to clinical data from various sources, linking data from different points of care, and ensuring patients have access to the same information as their care team.	Wave 2
Population Health Analytics	Collection, aggregation, visualization, and analysis of individual health information at the population level supports a variety of activities, such as: driving actionable insights to improve care, determining the effects of risk and protective factors on health outcomes, designing and evaluating health plan offerings and health interventions, comparing healthcare services to recommended guidelines or evidence-based literature, identifying patient safety events, supporting policy and workforce planning decisions, and solving complex social and health issues that disproportionately drive up care costs and impact communities. HIE services can be used to query existing clinical datasets, such as claims (all-payer claims databases), electronic health record (EHRs) systems, data systems of other community service providers, clinical data repositories, public data, and other data sources. By having access to various datasets, HIE services can offer machine-learning, automated analysis, geolocation, and predictive analytics.	Wave 2
Bundle Management	The Bundled Payments for Care Improvement initiative is comprised of four broadly defined models of care, which link payments for the multiple services beneficiaries receive during an episode of care. Under the initiative, organizations enter into payment arrangements that include financial and performance accountability for episodes of care. The goal is to create financial incentives that encourage providers to coordinate care across treatment settings, reduce unnecessary services, and expand initiatives that can help patients recover quickly	Future Use Case
Care Coordination: Care Plan Sharing	Care plan sharing empowers clinicians to better organize patient care activities and share information across the care continuum. Creating and sharing care plans through bi-directional HIE services enables efficient one-to-many exchange to support informed care delivery.	Future Use Case

HIE Use Case	Description	Status
Care Coordination: Transitions of Care	Poorly managed transitions can diminish health and increase costs. Enabling patient information to be exchanged electronically as patients move from one care setting to another can improve outcomes and efficiency. Efficient transitions of care can reduce the burden associated with manual information exchange and data hunting currently conducted by providers and administrative staff	Future Use Case
Care Coordination: Referral Management	The management of referrals between and among care providers is essential to care coordination, quality of care, patient safety, efficiency, and patient / provider satisfaction. This use case involves support for the process of requesting referrals and consults as well as sending results of such consults and notification of “close the loop” referral acceptance / rejection back to the referring physician.	Future Use Case
Disability Determination	Obtaining relevant clinical information on a specific patient is critical to the disability determination process. On average, the turnaround time for disability determinations have been reduced by over 35% ⁸ through the use of standards-based health information exchange. In a small but growing number of cases, determinations can be made in one to two business days with access to electronic health information. The reduction in turnaround time is of enormous benefit to patients and their families, and a source of revenue for organizations.	Future Use Case
Life Insurance Underwriting	The underwriting process for life insurance and long-term care insurance is labor-intensive, time-consuming and costly. Certain steps in the process could be partially or completely eliminated if clinical data from an HIE is of sufficient quality and quantity to support underwriting.	Future Use Case
Wounded Warriors	Often missing from the veteran’s medical record is information based on care provided by private sector healthcare systems. HIE services can enable VA physicians to have access to clinical data from private sector providers and private sector providers to have access to clinical data from the Department of Veterans’ Affairs (VA). This can increase patient safety, improve quality of care, and reduce diagnostic tests and patient inconvenience.	Future Use Case

⁸ http://www.medvirginia.net/sites/default/files/CaseStudy_SSA.pdf

HIE Use Case	Description	Status
Opioid Monitoring and Support Services	Integrated technologies, combined with policies and incentives, support healthcare workflows to enable appropriate prescribing, optimal consultation of Connecticut’s Prescription Drug Monitoring and Reporting System, and screening for substance misuse during clinical encounters. Advanced reporting and analysis aid state and local health districts’ assessment and development of interventions to mitigate risk factors associated with opiate-related events. An enhanced state-level opioid monitoring service would directly benefit local communities in their efforts to reduce opioid-related deaths, accidents, and overdoses through targeted interventions.	Future Use Case
Emergency Department Super-Utilizers	A small proportion of patients, called super-utilizers, who frequently visit the emergency department, generate a disproportionately high number of visits and cost associated with their care. Patients benefit from care teams informed by data and evidence care teams that are sufficiently resourced to provide care coordination that addresses the root causes driving a patient’s frequent emergency department use.	Future Use Case
Lab Results	Clinical lab results have an immense impact on diagnostic and treatment decisions. As the practice of evidence-based and value-based medicine expands, the importance of the availability of lab results is of growing in regard to clinical diagnosis, treatment, and monitoring. The value of a central results routing utility should be assessed against the current level of results routing already in place.	Future Use Case
Medical / Lab Orders	All services provided under the Medicare home health benefit and Connecticut Title 19 benefit must be ordered by a physician. Utilizing an HIE to transmit orders would allow treating physicians to see a chronological record of changes in the patient’s condition.	Future Use Case

HIE Use Case	Description	Status
Emergency Medical Services (EMS)	Emergency medical service (EMS) providers and professionals usually lack basic patient information when delivering care in the field, as well as the ability to transmit information to the emergency department, or receive outcome information following delivery of inpatient care. Through HIE services, certain clinical data to and from EMS providers may enhance decision-making and ability to measure clinical outcomes. HIEs can increase their value by expanding their network of clinical data contributors and consumers.	Future Use Case
Research / Clinical Trials	Identification and recruitment of participants for research and clinical trials is a time-intensive process that requires accurate knowledge of the target population. Data sharing across clinical and other data sources have been proven to contribute to greater efficiencies in predicting enrollment potential to plan research as well as in improving the efficiency of the recruitment process.	Future Use Case
Connecticut Hospital Association Dose Registry	Dose registries enable facilities to compare their radiation doses to those delivered in other facilities for the same exam, as well as historical radiation doses delivered to specific patients. Such comparisons over time could assist in optimizing patient radiation doses for medical imaging and benchmarking / monitoring radiation exposure goal in the context of broader health information exchange.	Future Use Case
eConsult	Communication of patient health information between providers and specialists is a key factor in correct diagnosis, treatment and positive patient outcomes. eConsults are an important part of the solution for transferring medical advice between medical specialists and primary care providers in an efficient and effective manner. Inadequate communication can result in duplicate testing, missing information, higher costs, and increased patient risk.	Future Use Case
Patient-generated Data	Patient generated health data is information created, recorded, and shared by patients related to health conditions and overall wellness. Patient-generated data can help healthcare providers detect adherence to care plans, enable more informed decision-making, and improve patient outcomes.	Future Use Case

HIE Use Case	Description	Status
Social Determinants of Health	Interest in community-level characteristics and non-medical determinants of health and their independent effects on healthcare outcomes has grown as providers have become increasingly responsible for patient-centered, value-based care. Central HIE services is an ideal mechanism to provide rich datasets that describe social and geographical environments and individual / community level risk factors.	Future Use Case
Genomics	Certain health systems and others have embraced genomics as another important component of diagnosis, treatment, clinical decision making, and research. The value of genomic data will only be realized when large data sets and populations are tested with accessible data that can be efficiently integrated with clinical data in an EHR.	Future Use Case