USE CASE SPECIFICATION

Version 1.0

Image Exchange

Version History

Version #	Date	Author(s)	Reason for Change
1.0	05/21/2020	Use Case Team - HealthTech	New
2.0	06/05/2020	Use Case Team - HealthTech	Added ROI study synopsis per BSCC request

Image Exchange for Healthcare Provider, Healthcare Organizations, and Payors

HIE Use Case Summary

Montana's healthcare community shares a collective and necessary need to exchange health information, including radiographic images, efficiently to better serve patients. While organizations may already be electronically exchanging radiology summary reports, many currently rely on physical media such as compact discs (CD) to exchange the imaging data. Patients are often asked to transport their own medical images to various appointments, or the images are shipped via traditional mail service. To mitigate this problem, Big Sky Care Connect (BSCC) is offering an Image Exchange functionality to allow healthcare teams to transmit, view, and store radiologic images along with the corresponding reports.

Image Exchange via BSCC's Health Information Exchange (HIE) enables participants to electronically exchange images and reports across organizations to offer providers near real-time access to patients' images, the ability to compare new and prior image studies from outside organizations, and the ability to collaborate and consult with other providers. This functionality offers BSCC participants improved Image Exchange efficiencies which reduces operational costs for facilities and imaging service providers, provides improved speed and quality of care delivery. It decreases patient exposure to radiation from unnecessary and/or duplicative imaging exams.

Having medical imaging data available via BSCC HIE offers participants an additional incentive to utilize the HIE as a singular source of secure and trustworthy information for the provision of longitudinal health records. In summary, the benefits of implementing an Image Exchange solution as a BSCC service offering is in alignment with the Institute of Healthcare Improvement (IHI) Triple Aim[1]:

- **Improve the patient experience of care**: Accelerate patient care by eliminating time spent locating and uploading images from physical media and efficiently make better informed treatment decisions based on access to comprehensive patient data

- **Improve the health of populations**: Reduce radiation exposure to patients and improve care coordination across specialties

- **Reduce the per capita cost of health care**: Reduce unnecessary and/or duplicative imaging due to a lack of access to prior imaging data and/or the loss, forgotten, or unreadable physical media upon which the images are saved

User Story

Clinic: Dr. Jones is a primary care physician at a family medicine practice. Ms. Morgan arrives for her yearly wellness exam. She does not suffer from any chronic illnesses but informs Dr. Jones

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[1] http://www.ihi.org/Engage/Initiatives/TripleAim/Pages/default.aspx

that three weeks ago she visited an urgent care clinic with complaints of cough, fever, and shortness of breath. To obtain more detailed information about the encounter, Dr. Jones accesses BSCC and learns that the urgent care physician had ordered a complete blood count (CBC) and chest x-ray which confirmed pneumonia. Ms. Morgan has completed antibiotics that were prescribed but admits she still has a cough and is fatigued. Dr. Jones understands that pneumonia takes weeks for a full recovery. He orders a follow-up CBC and chest x-ray to be completed within the next two weeks to determine whether she is actively fighting an infection and if her lungs are clear.

After obtaining the results of Ms. Morgan's follow-up tests, Dr. Jones accessed BSCC HIE to view the previous chest x-ray performed at the urgent care clinic. Dr. Jones is able to do a side-by-side comparison of Ms. Morgan's chest x-rays, along with the radiology reports, to visualize how her recovery has progressed. Immediate access to prior images and reports saves time and administrative effort that would have otherwise been spent acquiring and uploading prior images.

Patients may not recall the type of radiology exam they received and may or may not bring copies of their images or reports to their appointments. Accessing BSCC HIE will allow the patient's primary care team to review prior images and reports housed within BSCC HIE in advance of patient visits and/or during patient encounters. This capability can assist providers in decision making and planning at the point of care, thus improving patient experience and increasing coordination across the care team.

Provider Specialist: Mrs. Jones presents to the Cancer Center for her six-month post chemotherapy and radiation treatment follow-up positron emission tomography/computerized tomography (PET/CT) scan appointment with her oncologist. The previous PET/CT scan Mrs. Jones had pre-chemotherapy and radiation took place at an offsite facility not affiliated with the Cancer Center. The radiologist onsite will need to compare prior PET/CT images and the associated report with today's exam to compare the quantification of tumor metabolism, assess for any new malignancies, and determine whether her treatment plan was effective. Lack of access to prior images and reports, or reports only, can hinder the radiologist's ability to determine the status of disease.

Both Cancer Center and the offsite facility are BSCC HIE participants. This enables the radiologist and the oncologist of the Cancer Center to access the HIE and obtain Mrs. Jones' prior PET/CT images and report. Therefore, the radiologist is able to confidently relay a precise assessment of the patient's current state to the oncologist. The oncologist will ultimately be better informed with trustworthy information to assess Mrs. Jones' progress during and after treatment, heavily affecting future care plans. Inaccurate or limited data regarding tumor growth or metastasis could result in improperly administered cancer care.

Provider without certified electronic health record technology (CEHRT): Mr. Wright suffered from persistent lower back pain for over a year after having lumbar spinal fusion surgery for degenerative disc disease. After consultation with his surgeon, it was decided that Mr. Wright's graft had healed well enough that he can safely tolerate mild chiropractic manipulation of the lumbar spine.

Mr. Wright makes an appointment with a local chiropractor. His chiropractor is able to view radiologic images taken onsite via his local picture archiving and communication system (PACS). However, without a CEHRT, the chiropractor had been previously unable to electronically exchange patient data with other providers. Recently, the chiropractic office began participating in BSCC HIE, thus granting the providers in the office the ability to logon to the provider portal and

query for patient data. In preparation for Mr. Wright's visit, the chiropractor was able to view all of his pre- and post-surgical progress notes, radiologic images, and reports.

Upon Mr. Wright's arrival to his appointment, the chiropractor reviewed pertinent medical history and risk factors to ensure a safe and beneficial patient encounter. Accessing prior images and reports from the BSCC provider portal assists the provider in providing safer care with confidence as to not exacerbate an existing injury.

Hospital: Dr. Smith is an emergency department (ED) physician at a critical access hospital in rural Montana. A patient arrives to the ED suffering from multiple injuries sustained from a fall during a hike. Dr. Smith suspects the patient may have fractured his femur and will likely need specialized orthopedic surgical care. To confirm the diagnosis, Dr. Smith orders x-rays of the patient's hip and femur, as well as an abdomen/pelvis CT scan to rule out additional internal injuries. The imaging results indicate that the patient will need a higher level of care and will need to be transferred to a facility that can care for his injuries.

Upon transfer, the x-ray and CT scan images will need to be sent to the destination facility in advance of the emergency patient arriving. If this does not occur, the receiving care team will not have all the patient's relevant information on hand and will need to repeat tests, hindering their ability to make fully informed decisions, plan care, and truly understand the urgency of the patient's condition. Lacking previous imaging information could result in the patient receiving duplicative exams, increased exposure to radiation, and increased costs due to payors not covering the expense of duplicate exams.

Participating in BSCC HIE, Dr. Smith will be able to electronically exchange vital health information with the new care team, allowing them to securely access and review all documentation from the ED visit including images with their corresponding report in minutes, saving valuable time. Additionally, accessing the images and reports will allow the radiologist at the receiving facility to compare the post-surgical/treatment images with Dr. Smith's initial images to better evaluate the repair process.

Care Management-Value Based Payment Models - Accountable Care Organizations (ACO), Rural Health Clinics (RHC) Federally Qualified Health Centers (FQHC), Patient Centered Medical Home Plus (PCMH+) and Clinically Integrated Networks (CIN): Susie is a Care Manager working for a CIN, that provides the provider network for a number of Medicare Advantage plans characterized by dual-sided risk (i.e. shared savings and shared losses). One responsibility Susie has is providing transitional care support to high- and rising-risk patients attributed to the CIN's participating providers. By ensuring that patients attributed to her CIN experience smooth transitions from the hospital setting Susie helps to: reduce inpatient readmissions, reduce post-procedural complications; increase patient compliance with treatment plans and pharmaceutical regimens; all of which contribute to the CIN's ability to meet its total cost of target.

Today Susie has been notified through the HIE, that one of her CIN's attributed patients has recently been discharged from an out-of-network hospital for which she does not have access to the hospital's EHR. The patient's name is Mrs. Smith. Mrs. Smith is a 76-year-old Medicare Advantage beneficiary with a history of well controlled hypertension and diabetes who was admitted to inpatient after sustaining a fall at home. Knowing that she has limited time with each of her assigned patients, Susie wants to prepare to have an efficient and clinically impactful call with Mrs. Smith.

Prior to becoming a member of BSCC, preparing for this call would have been a challenge for Susie as she would not have had real time access to the out-of-network hospital's EHR and Susie's access to claims related to the patient's hospital visit would lag at least 30 days. Since Susie's CIN joined BSCC, she now has access to medical records related to clinical encounters occurring in any facility that also participates in BSCC (regardless of whether that facility is a CIN participant).

Upon reviewing Mrs. Smith's relevant discharge summary housed within the HIE, Susie is able to view radiological images performed at the inpatient facility. Susie is better prepared to engage Mrs. Smith in an efficient and clinically impactful conversation with insights about her inpatient encounter and ongoing treatment plan. With this insight Susie is prepared to: discuss Mrs. Smith's recent clinical history and inpatient treatment; ensure Mrs. Smith understands her ongoing treatment plan and any changes to her medication regimen, support timely clinical follow-up; provide guidance pertaining to self-management; and identify any other obstacles Mrs. Smith may encounter on her road to a full recovery.

Payor: Payors may also appreciate the benefits of BSCC HIE Image Exchange capability. The availability of electronic information, including radiologic images and reports, can positively impact patient care by improving provider performance. From a payor business case perspective, improved provider performance can have additional cost-saving implications for health plans. For instance, providers who query the HIE can avoid ordering expensive, unnecessary, and/or duplicate exams, such as MRIs and CT scans. BSCC's Image Exchange functionality has the potential to decrease repeat imaging, which is a substantial cost contributor to payors.

Key Actors

Those who will be using the application or system; can be human or technology. Key actors include but are not limited to:

- Healthcare providers serving at hospitals, clinics, long-term health facilities, post-acute care providers and radiologists, patient centered medical homes, emergency medical services (EMS), home care, hospice, as well as payors/health plans including Medicaid and Medicare.

- Platforms that support the transmission, retrieval, and storage of radiologic images

Stakeholder

Those who have an interest in the success of the use case. Stakeholders include but are not limited to:

- Key actors listed above.

- BSCC, Montana Medical Association (MMA), Department of Public Health and Human Services (DPHHS), Montana Board of Nursing, Montana Hospital Association (MHA), as well as compliance teams representing providers, and legal teams representing providers.

- Patients.

Function/Purpose

Image Exchange functionality on BSCC's platform will facilitate exchange of images between disparate hospitals and healthcare systems within the state of Montana and beyond. The exchange will happen in near real-time to improve care decisions, coordination, and healthcare outcomes.

This functionality will enable all authorized users of the BSCC HIE network to share diagnostic images such as magnetic resonance imaging (MRI), CT scans, ultrasounds, mammograms, and x-rays regardless of the originating healthcare facility, electronic health record, or PACS; expanding the access to and interoperability of radiology information which has long been siloed.

This functionality can reduce the time it takes for clinicians to access and view medical images and reports by eliminating the need to transport physical media, locate, and upload imaging data. BSCC participants can utilize the HIE as a singular access point to retrieve all pertinent patient health information, including radiologic images and reports.

The Image Exchange functionality offered by BSCC will aid in the expansion of interoperability to include the ability to view medical imaging data across disparate health systems.

Value Proposition

Most of the major imaging centers already have the patients' results in an electronic format. Images can be exchanged and accessed electronically by healthcare providers from various locations through the HIE. Duplicating and distributing results to the primary care providers adds expense. Reducing duplications and transmitting results electronically yields savings to both the sender and the receiver of the information. Electronic Image Exchange enables the following:

- Enables effective collaboration
- Reduces operational costs
- Relieves the burden associated with manual information exchange
- Reduces duplication of services

Return on Investment

According to a study conducted by HEALTHeLINK in New York[2] as an internal quality improvement project, an analysis on the effects of accessing patient medical information via an HIE on the number of radiology exams and lab tests performed demonstrated a reduction in radiology and lab examinations. Two emergency departments (ED) were selected, each having a control group and study group. Both EDs had access to HIE services via the web portal. Researchers, who were present during patient visits for both EDs, collected and de-identified HIE log files for each patient in both groups dating back one year prior to the ED admission date until discharge. The researchers analyzed the current ED data with that from the file logs.

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[2] Yaraghi, Niam: *Center for Technology Innovation at Brookings;* The benefits of health information exchange platforms: Measuring the returns on a half a billion dollar investment. 2016.06. https://www.brookings.edu/wp-content/uploads/2016/06/hie_returns.pdf

Results

The researchers evaluated the effect querying the HIE for lab results and radiology results would have on the number of lab and radiology examinations. For the first ED, the expected log count of laboratory test orders decreased by 0.7248 units or 25 percent in patients whose records were queried in the HIE. The expected log count of radiology examination orders decreased by 0.2735 units or 26 percent in those patients whose records were queried in the HIE. For the second ED, the expected log count of radiology examination orders decreased by 0.6411 units or 47 percent in those patients whose records were queried in the HIE.

Conclusion

According to the analysis from the study conducted, querying the HIE database was associated with a significant reduction in utilization in ED settings. This localized study demonstrated an estimated 25-47 percent reduction in radiology examinations associated with obtaining patient data through the HIE. The results of this study provided evidence for other ED settings to evaluate the benefits of increasing their HIE querying rate against its potential costs[3].

BSCC HIE has the potential to radically improve the efficiency of healthcare delivery services.

Financial and Business Considerations

Financial and Business Considerations for Image Exchange

- Speeds access to images, improving patient care and reducing the overhead of image access for providers
- Decreases repeated patient visits due to incomplete records
- Reduces staff time spent faxing or mailing patient records or waiting to receive records
- Supports care transitions
- Supports reducing readmission efforts
- Supports care management efforts
- Reduces duplication of radiologic examinations and improves patient safety by limiting unnecessary radiation exposure

The federal Medicare program alone spends $10 billion annually on medical imaging, and repeat imaging is a substantial contributor to imaging costs[4].

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[3] Yaraghi, Niam: *Center for Technology Innovation at Brookings;* The benefits of health information exchange platforms: Measuring the returns on a half a billion dollar investment. 2016.06.
https://www.brookings.edu/wp-content/uploads/2016/06/hie_returns.pdf
[4] Journal American College of Radiology Dec 2015; 12:1364-1370. Copyright 2015 *American College of Radiology*

Funding sources:

- Health information technology for economic and clinical health (HITECH) 90/10 funding could be used as appropriate up to September 30, 2021

- Medicaid Management Information System (MMIS) 90/10 funding (for implementation) can be explored after September 30, 2021 if qualifications can be met at that time

- MMIS 75/25 funding (match for operations) is also an option to explore

- At this time, there is no specific funding sources for Image Exchange through CMS identified.

The MMIS 75/25 funding is more specific to the Medicaid population and is focused on ongoing operations.

End-user fees:

In the case of the Image Exchange being part of the core HIE services, the end user-fees would be the participation fee.

In the case of the Image Exchange being part of an add on service, the end-user fee would be determined at a future time based on a number of factors to include but not limited to:

- Number of participants interested in utilization of Image Exchange
- Vendor costs
- BSCC contribution
- Other factors not yet identified

Procurement of Image Exchange platform

- Development and implementation of this use case will need procurement
- Procurement, request for proposal (RFP), and vendor selection will be in Phase 2 of use case process
- Procurement process is anticipated to span across 4-6 months
- Vendors identified are:
    - Ambra
    - EHealth Technologies
    - Forecare – Acquired by Phillips
    - LifeImage
    - Medicom
    - Nuance Powershare

Estimated vendor cost range:

- Estimated implementation cost of $300,000 to $400,000 with two initial PAC systems, plus a range of $10,000 (very small) to $150,000 (very large) per additional system connected

- Estimated monthly support costs to be approximately two (2) percent of implementation fees per year

Interface and access technology:

BSCC (HealthTech Solutions) and InterSystems should be prepared to quickly set up the interfaces needed for Image Exchange as it is a quick win with providers.

Staffing requirements:

BSCC (HealthTech Solutions) has initial staff assigned to negotiate and coordinate the onboarding activities needed for this technology with the vendor for Image Exchange.

Participant facility staffing considerations/workflow redesign:

Because of the reduction of staff time spent faxing or mailing patient images/reports/records or waiting to receive images/reports/records, that staff may be utilized in other areas of business to further increase efficiency.

Upstream/Downstream Dependencies

Upstream Dependencies

Image and study acquisition will be needed, the ultimate goal of which is to keep the users in their home systems. However, some users will not have a home system that contains the full functionality of a PACS and some who do will not be able to achieve full integration in a timely manner, which means an online PACS will be needed. A list of vendors with appropriate solutions is listed in the "Financial and Business Considerations" section above. A single vendor could manage image acquisition, workflow, and routing using an online portal and back-end integration. Given the maturity of these products (especially managing workflow and integration), it is advisable to seek such an arrangement.

Integration with the HIE's enterprise master patient index (EMPI) will also be needed. The PACS can be treated like any other system external to the EMPI performing intake and then feeding the EMPI for matching. The PACS would retain its own internal identifier and not import the EMPI's identifier. This reduces bottlenecking on intake. However, given that the PACS is part of the same offering or "expectation context" of the user, it is recommended that the PACS process merges based on matches in the EMPI requiring feedback from the EMPI to the PACS.

Workflow can be accomplished two ways: First, there is the online portal which should completely support appropriate workflow(s). Access to the portal can be provided from EHRs and other components such as the main user portal of the HIE with single sign-on (SSO). This requires redirection of user's browsers with included information for processing the workflow such as patient, study, or image identifying information. The other way to accomplish workflow for users is to allow them to remain in their home system and use the PACS' integration features to serve images and studies to EHR systems.

Integration with existing imaging systems will also be needed. The PACS system should already work with these networks. However, there will be much work to be completed in establishing business relationships with these networks and meeting any legal challenges that may present themselves.

None.

Onboarding of imaging systems and users is a major dependency for success. Integration will be required with EHR systems and users will need to be onboarded and trained. Business relationships must be established, and agreements reached.

Technology System Components and Services Utilization

Image Exchange when integrated with an existing HIE, utilizing XDS-i.b. XDS-i.b extends XDS.b to medical imaging. Utilizing XDS-i.b standards we can exchange digital imaging and communication in medicine (DICOM) files, portable document format (PDF) reports, and clinical document architecture (CDA) documents related to imaging reports.

XDS-i.b introduces the concept of the "Imaging Document Source", a system that can produce DICOM file, such as a PACS within the radiology department.
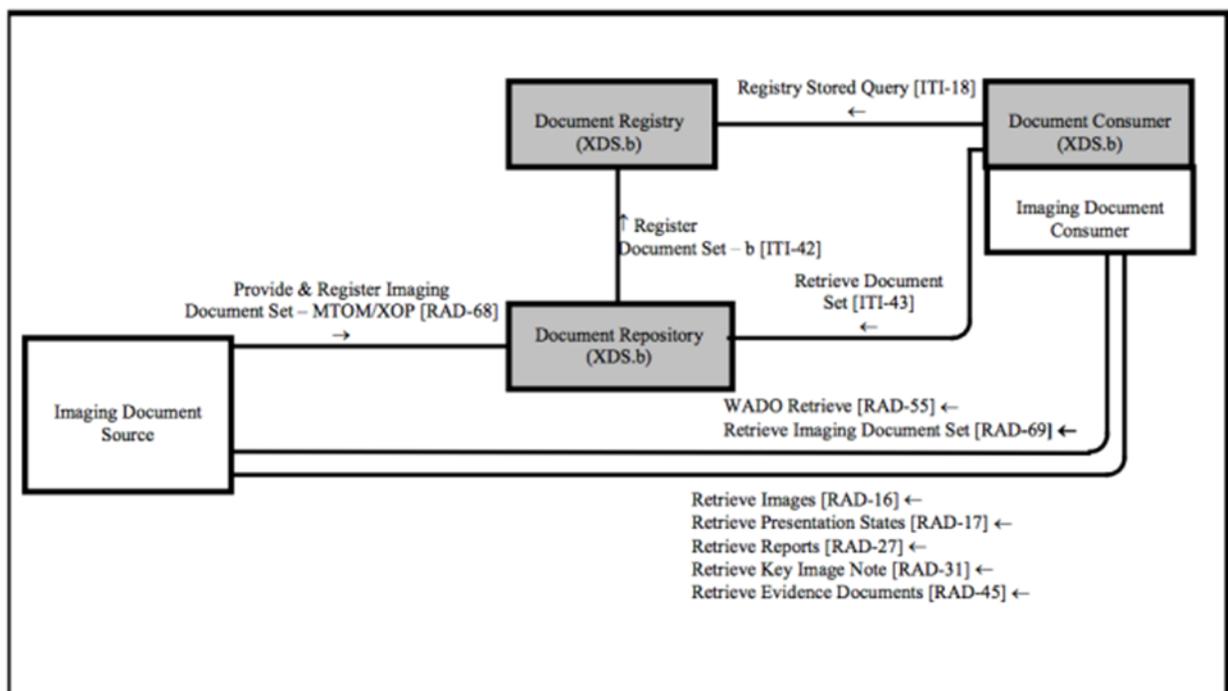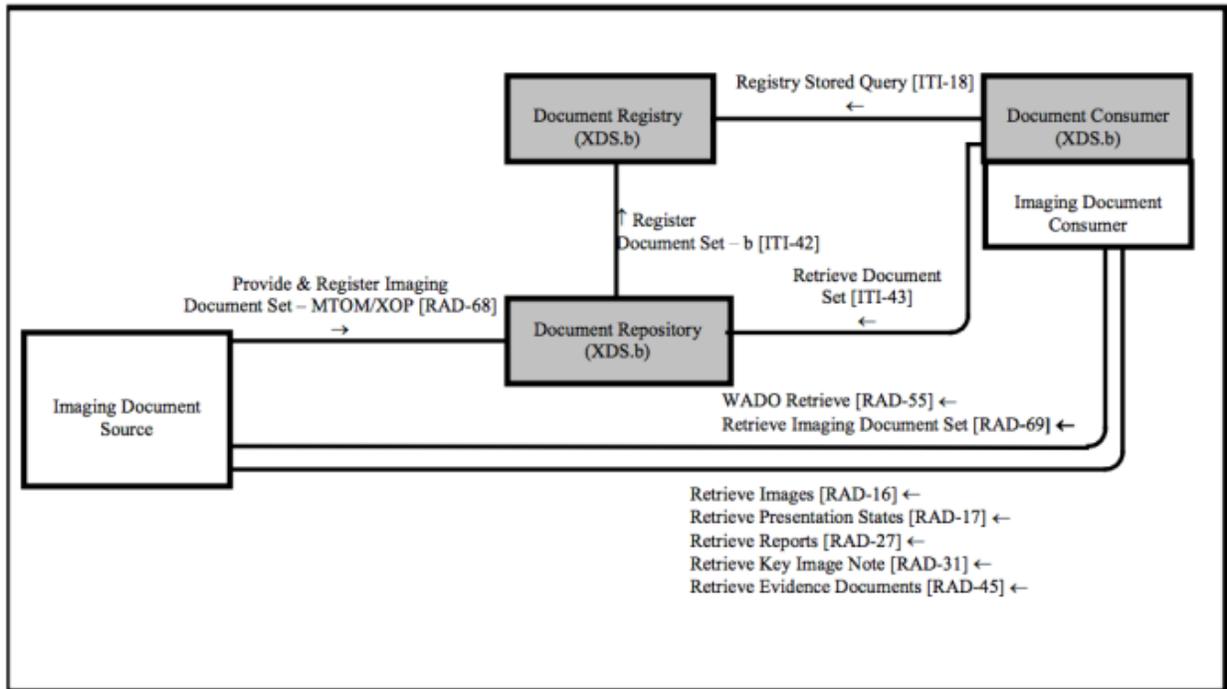

https://wiki.ihe.net/index.php/Cross-enterprise_Document_Sharing_for_Imaging

Imaging document sources generate files and send them to a document repository. In this case HIE would host a document repository or a third-party vendor (e.g.: eHealth Technologies) can hold this image file. The repository registers its document set to one or more registries that holds metadata about the data within the repository.

Query and Retrieve of Images

https://wiki.ihe.net/index.php/Cross-enterprise_Document_Sharing_for_Imaging

The end user performs a query from the provider portal and the system would query its own registry or access a third-party vendor hosted registry (e.g.: eHealth Technologies) to get a set of metadata that can be used to find the repository hosting the data.

The Document Consumer reaches out to the Document Repository and pulls the needed document sets. These are passed to the "Imaging Document Consumer" which talks directly with the Imaging Document Source to retrieve the actual DICOM data.

Typically, when the images are not DICOM quality then the HIE can host them within its own repository.

Configuration/Interfaces Required

The interfaces given below assume utilizing a third-party vendor for this implementation. The HIE can connect to the Imaging solution using one of the below interfaces:

- XDS.i.b protocols

- SSO

- Custom API

External Dependencies

Onboarding of imaging systems and users is a major dependency for success. Integration will be required with EHR systems and users will need to be onboarded and trained. Business relationships must be established, and agreements reached. The existence of compatible systems and networks will likely not be a problem given that the standards have been in place for nearly 40 years now.

There is also a high probability that there will be issues with completeness and harmonization of the image meta-data. For example, DICOM is a widely adopted standard and every system claims compatibility. However, implementations can vary as to how much of that standard is supported, leaving the buyer to read each vendor's DICOM Compliance Statement to determine supported functionality. It is a standard format without a standard implementation.

Legal/Policy Considerations

Patient Protection and Affordable Care Act (ACA - 42 U.S.C § 18001 (2010))

- The Affordable Care Act (ACA) of 2010 establishes comprehensive health care insurance reforms that aim to increase access to health care, improve quality, lower health care costs, and provide new consumer protections. The ACA's reimbursement practices and cost containment measures discourage duplicative imaging which is detrimental to patients' health thereby making it essential to have a system where medical images can be securely shared among disparate organizations with different PACS systems. The Image Exchange capability on BSCC will also support the ACA's cost containment goal by providing a unified platform that accepts results from different PACS systems without requiring organizations to acquire new systems that will enable them to exchange image results with other organizations.

HIPAA (Pub.L.104–191, 110 Stat. 1936, enacted August 21, 1996, Title II)

- The HIPAA Privacy Rule describes what information is protected and how protected information can be used and disclosed. The HIPAA Security Rule describes who is covered by the HIPAA privacy protections and what safeguards must be in place to ensure appropriate protection of electronic protected health information. The Image Exchange on the BSCC platform will help ensure providers do not violate HIPAA rules because it provides a secure means of exchanging images without the risk of medical images being intercepted by unauthorized personnel.

Assumptions

- Images are able to connect to the host's EHR so imaging can be integrated locally
- Regardless of the EHR system, the HIE can facilitate images between participants.
- During the development of the Imaging Exchange use case, all projections are for planning and estimate purposes only.
- During the development of the Imaging Exchange use case, all projections/estimates do not consider undefined business scoping elements that may be found throughout the project life cycle due to stakeholder requests, business and vendor requirements, vendor

negotiations, dependencies, durations, and any lag times which may result from the actual planning and implementation process.

- Most, if not all providers, will use SSO and/or Direct Query capabilities.
- Enterprises belong to one or more Cross-Enterprise Document Sharing (XDS) Affinity Domains. An XDS Affinity Domain is a group of healthcare enterprises that have agreed to work together using a common set of policies and share a common infrastructure.
- Document concept in XDS is not limited to textual information.
- XDS is document content neutral, any type of clinical information without regard to content and representation is supported.
- Vendor costs have not anticipated increased costs that may occur in the future.
- Costs do not include the outreach costs which are included in the outreach/onboarding contract.
- Use case work and management is continual throughout the project. These activities will transfer to BSCC permanent staff as they are hired and trained. These are part of the operational HIE process.
- HealthTech Solutions is on a time and materials contract which states that costs are not to exceed those which are identified in the contract.
- Constraints, inclusions, and exclusions are based on current knowledge as of May 18, 2020 and may change.
- Policy, legal, and regulatory as well as technical standards for interoperability changes may take place on both the state and federal level.
- Ongoing monthly interface fees are being negotiated as part of the initial HIE Statement of Work (SOW).
- Vendor costs identified do include monthly fees and are being negotiated in the initial HIE SOW.
- During an emergency situation, all BSCC HIE participants will have access to their computers or mobile devices allowing access to the HIE.
- Contribution of data into the BSCC HIE will be widely accepted.

Key Performance Indicator/Metrics of Use Case

The following are examples of metrics that can be used to analyze the outcomes of using the BSCC HIE for Image Exchange:

- Track radiologic images viewed within the HIE by users in an ED, inpatient or outpatient setting
- Track source organization utilization of image upload
- Compare average number of connections among sources versus user practice locations
- Track average number of radiology images and documents exchanged by data sources versus user access to radiology images and documents
- Identify top utilizers of radiology images from data source versus data consumer
- Track access to radiology images and documents by user job types (compare nurses versus physicians)

Alternative Paths

The first alternative path is to do nothing.

Challenges to improved collaboration between healthcare disciplines include the historical legacy of operating in different silos, the lack of existing opportunities for communication and operational, oppositional stances between different disciplines around scope of practice.

Strategies to improve interdisciplinary collaboration include aggressively seeking opportunities for dialogue and participation, including conversations peripheral to traditional means, the creation of partnerships with other organizations to provide combined services or at least exchange information, creating multi-agency partnerships to better align geographically with a hospital or health plans coverage area, and working with other community healthcare stakeholders to create a common vision for the full spectrum of community-based care.

MEDICAL DIRECTION AND OVERSIGHT

Challenges to strong medical direction and oversight and leadership include a still dysfunctional job market, the underutilization of technology system design and strategic planning, transforming educational needs for local healthcare disciplines only to new emphasis on Image Exchange and the benefits and efficiencies it can offer.

Another alternative path is to not implement an HIE-based PACS and simply index the existing systems. The HIE would receive demographics from imaging systems around the State and match them within the EMPI. Consuming systems could use the EMPI/record locator services (RLS) to find these records and fetch them via existing relationships. The images would remain where they are reducing network utilization. Basically, a federated network of networks with a central patient identity cross-reference (PIX). Workflow and integration would be the responsibility of the consuming organizations and the HIE would function as a PIX.

This might be helpful to large hospitals and provider networks who have these existing relationships. However, those who lack them would be left out. This situation could be improved by layering on the workflow and portal functionality within the HIE later.

This has some drawbacks. The HIE will likely end up hiring a vendor that already has both integration and portal functionality. It is a better plan to task this vendor with the entire PACS solution except for integration with the EMPI and SSO solutions.