HOSPITAL IMAGE EXCHANGE

Exploring Opportunities for a Statewide Image Repository through the State-Designated Health Information Exchange

An Environmental Scan

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Introduction

Overview

Electronic exchange of diagnostic images (e.g., radiology, cardiology, pulmonology, gastroenterology, etc.) holds great promise for increasing efficiencies and improving patient outcomes.[1] Access to images at the time of care supports providers in care delivery and in assessing a patient's progress against their treatment plan. While imaging often takes place at the onset of an ailment to determine a diagnosis, additional imaging can be done to assist with treatment planning, monitoring, and documentation (e.g., if a tumor changes in size). This can create information silos when patients go to different health care facilities for different purposes or change providers.[2] Sharing images traditionally requires placing images on transportable media (e.g., compact discs) with the patient providing courier services. If a provider is unable to view the images[3], another test is typically ordered increasing utilization cost and a patient's exposure to radiation.

Imaging constitutes a large portion of health care expenditures. Medicare spends about $10B annually on imaging services with repeat imaging being a substantial contributor to this cost.[4] New reimbursement models encourage hospitals to reduce duplicative imaging as a cost containment measure. The ability to view images from disparate systems at the point of care can help decrease unnecessary imaging. In the era of health care reform, greater care coordination promises to transform care delivery from an acute (episodic) approach to one that focuses on chronic care management, including long-term and palliative care. Image exchange is incentivized under meaningful use, which requires increased electronic sharing of medical records, including images.[5]

Background

Hospitals have been exchanging images for the past 30 years.[6] Teleradiology was one of the first use cases for exchanging images between systems, enabling radiologists to review and interpret images

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[1] Greater Houston Healthconnect, *Image Enabling Health Information Exchange*. Available at: ghhconnect.org/ebook_image_enabling_health_information_exchange.pdf.

[2] Health IT & CIO Review, *The big picture: Interoperable medical image exchange*, October 2015. Available at: www.beckershospitalreview.com/healthcare-information-technology/the-big-picture-interoperable-medical-image-exchange.html.

[3] Use of media can contribute to inefficiencies due to lack of vendor compliance with standards and variability in vendor implementation. Images placed on media are sometimes encoded in proprietary formats instead of the Digital Imaging and Communications in Medicine (DICOM) standard. Other problems are with the design of the embedded image viewer, which can be cumbersome to use, slow, or completely inoperable. RadioGraphics, *Medical Image and Data Sharing: Are We There Yet?* Available at: pubs.rsna.org/doi/pdf/10.1148/rg.295095151.

[4] Healthcare Informatics, *Study: Use of Health Information Exchange Reduces Repeat Imaging Costs*, January 2016. Available at: www.healthcare-informatics.com/news-item/study-use-health-information-exchange-reduces-repeat-imaging-costs.

[5] The Centers for Medicare & Medicaid Services requires imaging results consisting of the image itself and any explanation or other accompanying information to be accessible using certified electronic health record technology for hospitals participating in the EHR Incentive Programs. For more information, visit: www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/Stage2_HospitalMenu_3_ImagingResults.pdf.

[6] DICOM became the internationally accepted standard in 1993 for health care organizations to store and transmit medical images to a Picture Archiving communication System (PACS).

remotely.[7] Hospital departments traditionally store, transmit, and view images using a Picture Archiving Communication System (PACS). Over the past decade, Vendor Neutral Archives (VNAs) have become more mainstream. VNAs are enterprise-wide solutions that consolidate images from multiple departments, or PACS, enabling images to be shared and retrieved more easily; many PACS vendors have begun to offer VNA-like products.[8, 9, 10] In 2012, about a third of hospitals nationally had adopted VNAs with the primary reason to achieve economies of scale.[11]

In the spring of 2015, the State-Designated Health Information Exchange (HIE), the Chesapeake Regional Information System for our Patients (CRISP), in consultation with the Maryland Health Care Commission (MHCC), launched an image exchange pilot with a few hospitals in the State. The pilot enabled images to be made available as part of a patient's medical record accessible through the CRISP Query Portal. A focus of the pilot was to use image exchange to support stroke care. Preliminary findings suggest that user difficulties were minimal and the availability of images through CRISP enhanced care delivery.

Current Landscape

Image exchange more often occurs between owned or affiliated hospitals and ambulatory providers independent of an HIE.[12] Use of transportable media by patients to share images with different providers is common. Since CRISP first launched, radiology reports have been accessible through the Query Portal; however, they do not include supporting images. Access to supporting images enables providers to have a more complete record of a patient's care overtime and gives context to text-based reports. Nationally, only a small portion of HIEs have incorporated image exchange as part of their data sharing abilities.[13] Use of HIEs to support image exchange has the potential to decrease cost, minimize patient exposure to radiation, and save storage space by reducing repeat imaging.[14]

About the Scan

In July 2016, MHCC and CRISP began exploring opportunities to broaden the image exchange pilot to increase access to images available through the CRISP Query Portal. The MHCC conducted an environmental scan to identify benefits and challenges with establishing a statewide image exchange repository accessible through the State-Designated HIE. The scan assessed hospital interest in image

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[7] Nearly 81 percent of acute care hospitals in Maryland exchange radiology images. Exchange with owned hospitals and ambulatory providers is more than two-fold as compared to non-owned organizations. See Appendix A.

[8] Healthcare IT News, *Is VNA the future of image delivery?*, April 2014. Available at: www.healthcareitnews.com/news/should-you-use-vna-whats-vna.

[9] Diagnostic Imaging, *What you Need to Know About PACS and VNA*, September 2014. Available at: www.diagnosticimaging.com/pacs-and-informatics/what-you-need-know-about-pacs-and-vna.

[10] See Appendix A for more information on the evolution of imaging sharing tools.

[11] Fierce Healthcare, *Survey finds a third of U.S. hospitals have adopted VNA solution*. December 2012. Available at: www.fiercehealthcare.com/it/survey-finds-a-third-u-s-hospitals-have-adopted-vna-solution.

[12] See Appendix B.

[13] Ibid., 1.

[14] Calgary Scientific, *Leveraging Statewide Health Information Exchanges to Provide Fast, Efficient Image Access*, November 2015. Available at: www.calgaryscientific.com/blog/leveraging-statewide-health-information-exchanges-to-provide-fast-efficient-image-access.

exchange capabilities available through CRISP and helped formulate the recommendations included herein.[15]

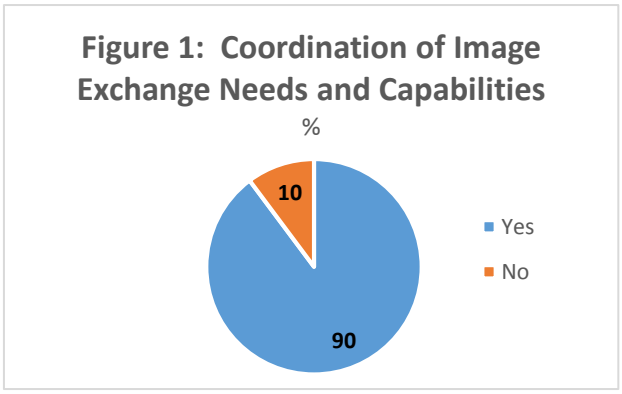
Limitations

Scan results are based on self-reported information provided by hospital Chief Information Officers (CIOs). Responses were not audited for accuracy and may have been influenced by CIOs' perception of the questions. A financial impact assessment associated with using the State-Designated HIE to support image exchange was not conducted.

Key Findings

Presented below in aggregate are key findings from the environmental scan. Note: All hospitals (N=48).

Imaging Strategies



Nearly all hospitals have a strategy in place for coordinating image exchange initiatives across departments (Figure 1).[16] Hospitals benefit from having a centralized strategy since imaging has generally been considered one of the fastest growing segments of health care expenditures, accounting for nearly 15 percent of all costs.[17] Hospitals tend to default to imaging when patients present in the emergency room since imaging is considered to be one of the most effective ways to identify what's wrong with a patient quickly.[18, 19, 20] As new reimbursement models evolve, there is greater need to enhance care coordination within and across enterprises, which includes access to patient populations' imaging history at the point of care.[21] Multi-disciplinary care management helps ensure cost-effectiveness of care through an integrated team-based approach across different specialities.

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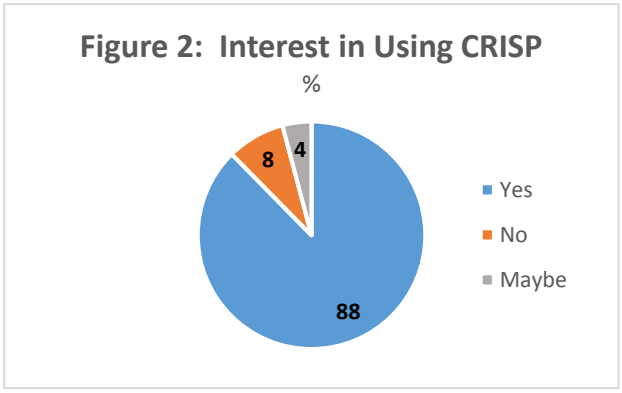
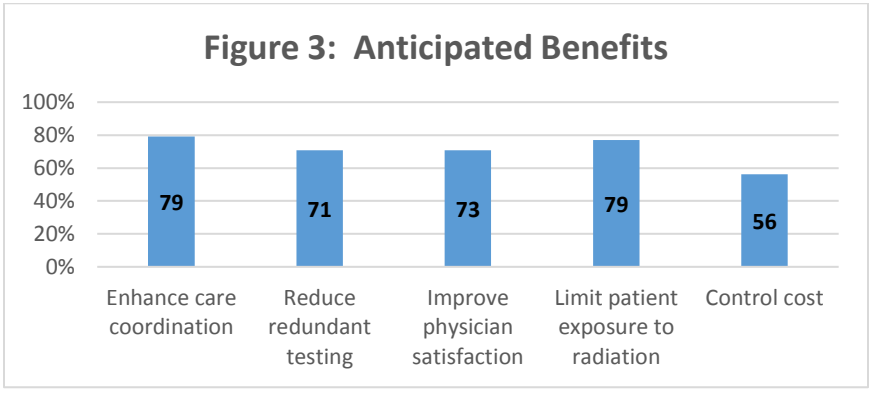
[15] See Appendix C for a listing of all survey questions.
[16] Hospital IT departments usually take lead in developing an imaging strategy given their objectivity among departments and ability to differentiate between clinical and technological needs (e.g., radiology has different priorities than cardiology, oncology, trauma, etc.)
[17] HealthLink, *Shrinking Health Care Costs*. Available at: www.healthlink.com/documents/Shrinking_Health_Care_Costs.pdf.
[18] Imaging has historically been the primary diagnostic tool in acute care settings.
[19] Diagnostic Imaging, *Imaging Utilization Trends and Reimbursement*, July 2014. Available at: www.diagnosticimaging.com/reimbursement/imaging-utilization-trends-and-reimbursement.
[20] Ibid., 2.
[21] LifeIMAGE, *Interoperable Image Exchange: Setting Standards for Federated Image Sharing*. Available at: www.interoperabilityshowcase.org/himss16/documents/lifeIMAGEInteroperabilityShowcaseWhitepaper.pdf.

Potential Collaboration

Most hospitals expressed interest in using CRISP to support image exchange (Figure 2). However, hospital interest levels are best characterized as wanting more information to make an informed participation decision. This includes information on costs, features, ease of use, and versatility to assist hospitals in conducting a cost-benefit analysis of using a statewide solution through CRISP as compared to their existing imaging vendor. Interested hospitals anticipate the greatest value of using CRISP for image exchange would be to enhance care coordination and limit patient exposure to radiation (Figure 3). These benefits are promising as hospitals become increasingly pressured to improve quality of care, while increasing efficiency and reducing cost. A study that examined the relationship between use of an HIE and cost, found that providers with access to patient information through an HIE ordered fewer repeat x-rays, ultrasounds, and other imaging tests, resulting in cost savings.[22]





Integration Challenges & Considerations

Hospitals acknowledge that timing, resources, and budgets are influential in how they deploy their imaging strategies. The most significant factors impacting integration of imaging technology with CRISP are cost followed by competing priorities. Most hospitals indicate they have the technical resources to support integration and would like to learn more about a CRISP image exchange program. Some hospitals would like to see a demonstration of the entire workflow solution to better understand the integration process and associated workflow changes to assist them in determining the cost-benefit ratio of using CRISP for image exchange. Ideally, to optimize efforts for integration, some hospitals would like to enable a more standardized process and platform to access images along with the associated report using CRISP, while reducing the number of other image sharing methods across the State.

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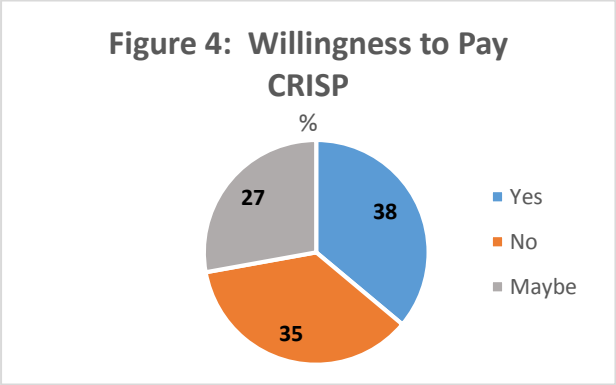
[22] Ibid., 4.

Pricing



Hospitals' willingness to pay CRISP for image exchange services is mixed (Figure 4). This is largely attributed to uncertainty about cost. A well-defined CRISP image exchange cost model can guide hospitals' participation decisions. Hospitals agree that in order to assess the reasonableness of cost, pricing needs to be reflective of opportunities to improve care and lower cost. In order to understand a like-for-like investment, roughly 71 percent of hospitals would prefer if the CRISP fee structure was similar to other vendors. This would provide a basis for doing a comparison for return on investment. Some hospitals expressed interest in alternative pricing models and would like to explore opportunities to have a one-time storage fee as compared to click fees.[23]

Recommendations

Hospitals are ambiguous about investing in CRISP for image exchange services primarily due to whether cost savings, if any, could be realized over their current investments. More information is needed in order for hospitals to assess the resources needed, both initial and long-term, for integrating their imaging solutions and clinical workflows with CRISP. CRISP should identify projected costs over a five-year period to help hospitals evaluate the feasibility of participating in a statewide solution. At this time, CRISP ought to defer broadening its image exchange pilot until concerns raised by hospitals have been addressed, including estimated costs and the value of image exchange using a statewide HIE.

Hospitals and ambulatory providers can benefit from eliminating use of transportable media as it's not uncommon for patients to act as the courier of their electronic images. Generally speaking, imaging networks (e.g., RadNet) have emerged as a way to reduce the need to use patients to transport images. As these networks become more diffused in the market, the benefit of investing in CRISP over other vendors becomes less clear. CRISP is encouraged to develop a value proposition for an image exchange service that articulates the advantages to care delivery and how it will decrease cost. CRISP is also encouraged to explore ambulatory practices willingness to support image exchange services.

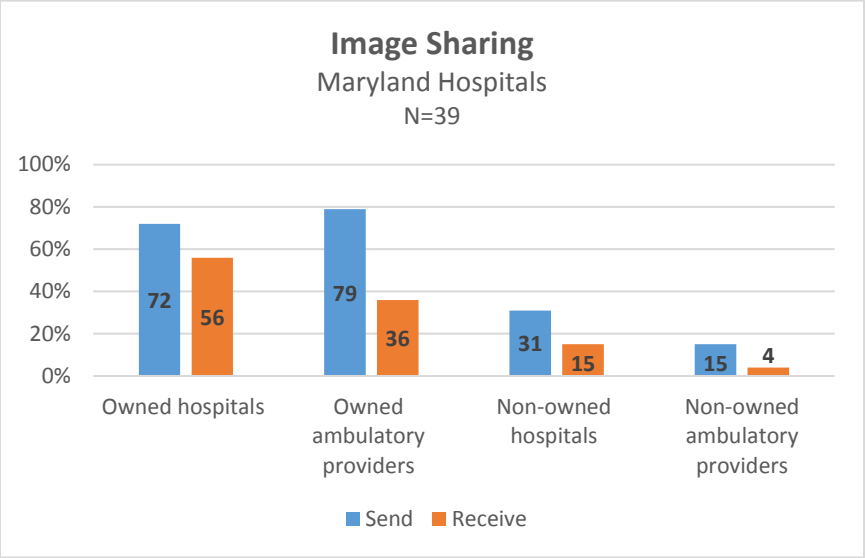
[23] Pricing structure can vary from cost per user, cost per view (or click), cost per maximum users, etc.

Appendix A

Source: Mach7 Technologies Ltd., *The Guide to VNA (Part 1)*, 2016. Available at: www.mach7t.com/resources/white-papers/guide-to-vna-part-1/.

Appendix B

About 81 percent of hospitals exchange radiology images; exchange with owned hospitals and ambulatory providers is more than two-fold as compared to non-owned organizations. Hospitals use a wide-range of image sharing solutions of which 79 percent are integrated with their EHR.



Source: MHCC, *Hospital Health Information Technology, An Assessment of Maryland Acute Care Hospitals*, December 2016.

Appendix C

Hospital Image Exchange Survey

Overview

The MHCC and CRISP are exploring opportunities to broaden the image exchange pilot to increase access to images through CRISP. We seek your input in answering the questions below. Your feedback will be used to formulate recommendations that inform future efforts regarding image exchange capabilities available through CRISP.

Questions

1. Does your hospital have a strategy for coordinating image exchange needs and capabilities across the enterprise?
    - Yes (Please provide general information about your hospital's strategy)
    - No (Please explain why)
2. Would your hospital find value in using CRISP to support diagnostic image exchange (e.g. radiology, cardiology, pathology, etc.) in Maryland?
    - Yes
    - No (Please explain why)
3. If your hospital already has an image exchange solution in place, what compelling reason would influence your hospital to switch from a local vendor to a statewide solution like CRISP?
4. How would an investment in CRISP to offer image exchange services impact your hospital? (select all that apply)
    - Improve care coordination
    - Reduce redundant testing
    - Improve physician satisfaction
    - Reduce patient exposure to radiation
    - Control cost
    - Other (Specify)
5. Assuming sufficient time to plan and allocate budgets appropriately, would your hospital be willing to pay CRISP for image exchange services through an increase in your annual CRISP fees?
    - Yes
    - No (Please explain why)
6. In order to understand a like-for-like investment, would your hospital prefer the CRISP fee structure for image exchange services be similar to other vendors?
    - Yes (Please explain why)
    - No (Please explain why)

7. List the top three challenges your hospital might encounter integrating with CRISP to send and retrieve images (rank challenges from 1 to 3 where 1 is most significant and 3 is least significant).
    - Lack of technical resources
    - Competing priorities
    - Cost
    - Other (specify)
8. Would your hospital be interested in learning more about the CRISP image exchange pilot?
    - Yes
    - No
9. Does your hospital currently participate in an image exchange repository through another third party?
    - Yes (Please specify)
    - No
10. Please tell us about anything else we should take into consideration as it relates to expanding the CRISP image exchange pilot.

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