Image Sharing: Value to an HIE

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This webinar is funded by a grant from:

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CME Series –
with CPE sought as appropriate

Health Information Technology for Clinicians:
How to Achieve Optimal Outcomes

Webinars and In-person events

Activity Director/Moderator: Thomas Agresta MD, MBI

Department of Family Medicine, Center for Quantitative Medicine

UConn Health

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Health Information Technology for Clinicians:
How to Achieve Optimal Outcomes

Sample Topics

- Medication Safety/ Reconciliation
- Health Data Analytics
- eCQMs (electronic clinical quality measures)
- Telehealth
- Image Sharing
- Precision Medicine
- Health Information Exchange
- Patient Consent models
- Public Health Informatics
- Patient-Generated Data

This series is funded by a grant from Connie, which did not influence the content of the program. Initial funding also from the Office of Health Strategy of CT

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Learning objectives

1

Discuss the benefits of medical image sharing for patients and providers

2

Discuss the additional value that medical image sharing can provide through an electronic exchange

3

Identify challenges and best practices to implement and apply medical image sharing to practice

4

Describe how a Health Information Exchange can facilitate medical image sharing in Connecticut

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Housekeeping

All participant lines will be muted during the panel discussion

The panelist will address you questions during the Q/A session from the Q/A chat feature

If we are not able to address your question today, we will follow up with you directly using your registered email.

This session will be recorded and available for download along with the slides used today.

Instructions on how to access will be sent after the session to your registered email along with instructions to earn CME and CPE credit.

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Presenters

Alan Kaye , MD

Independent Radiologist
Health IT Advisory Council Member, OHS
Former Chair of American College of Radiology

Ryan Bramble, MS

Executive Director
CRISP DC

Disclosures: All presenters have reported they have no conflicts to disclose

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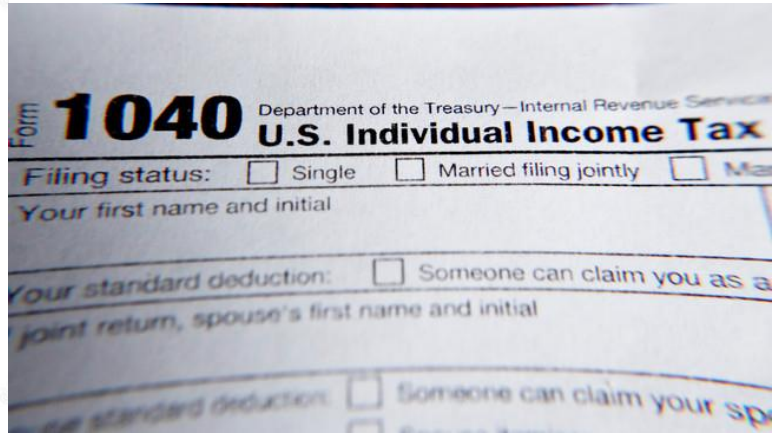
Why Are We Here?



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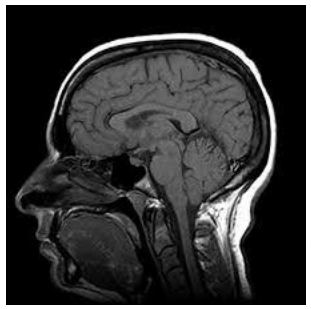

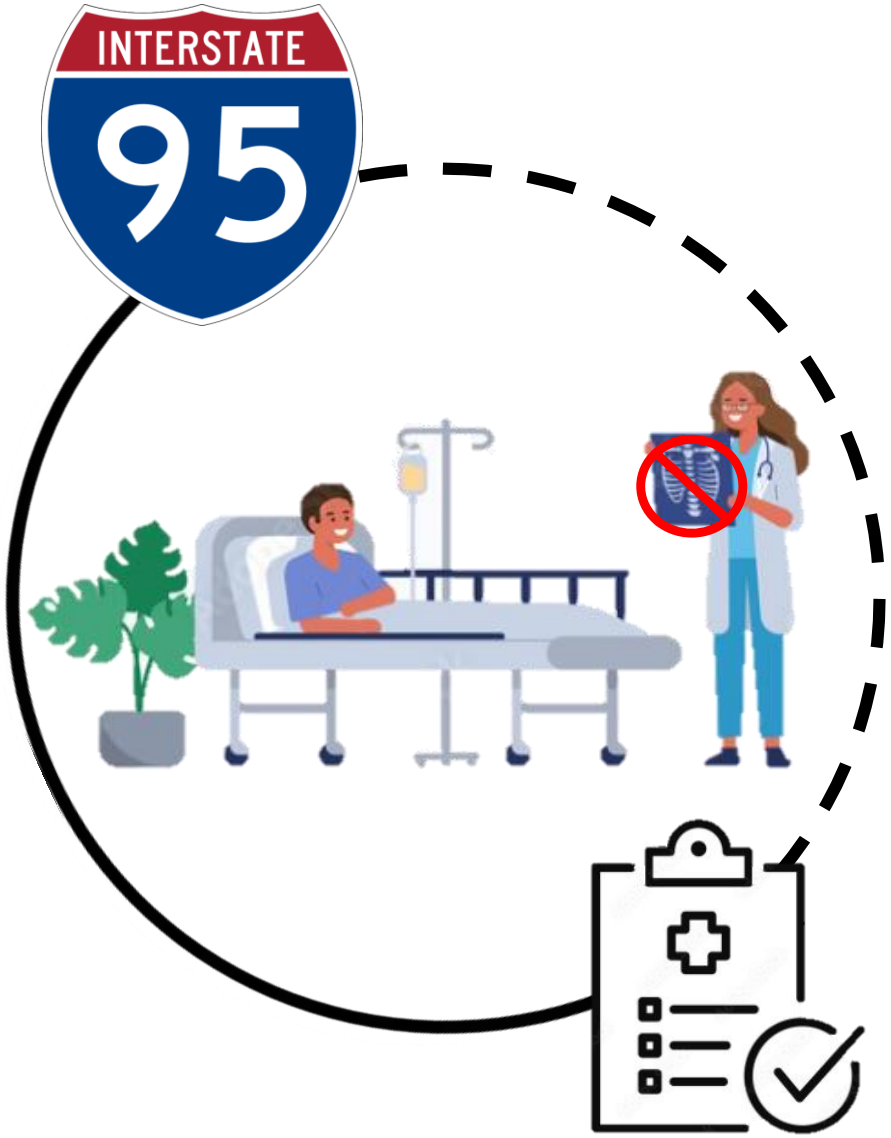

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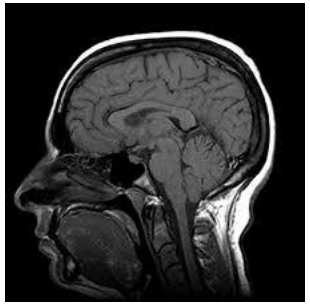

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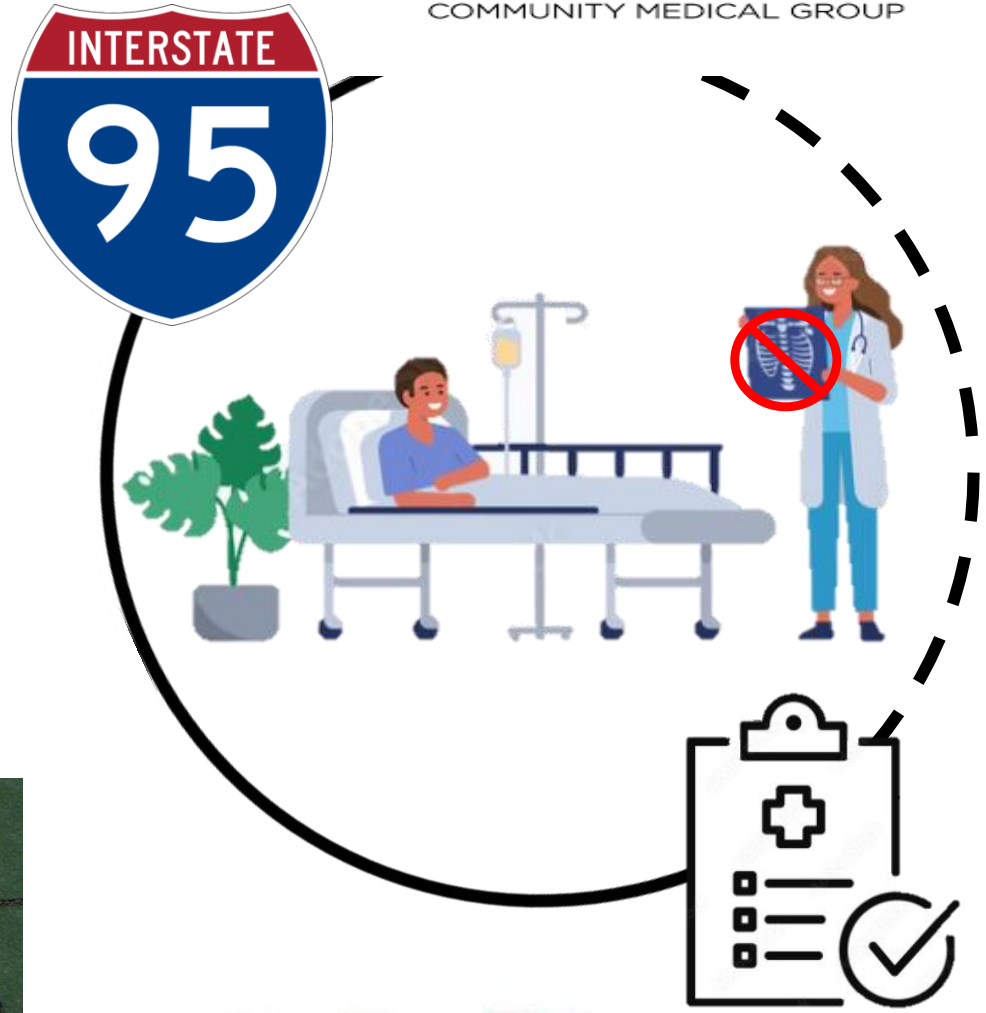

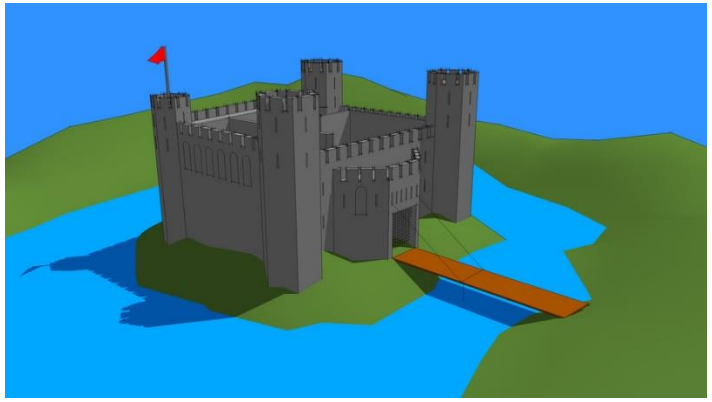

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Push for Electronic Data Aggregation (EHRs): 1990's-2000's

- NQF: safer, more affordable, and better coordinated care
- IOM - Improvement in medical IT infrastructure could play a central role in ameliorating (medical) errors and, in doing so, could pay for itself.
- Federal Initiatives
  - Amend Stark (antikickback) laws to permit hospitals to donate hardware and software for EHR
  - Subsidies for above
  - **Interoperability requirement - "capabilities" for seamless access to historical and current information**

Interoperability Essential! - Slow Adoption

- Adoption of new standards for ALL electronic health info
- HIE's
- Breaking down the Silos
  - Financial
    - Initial subsidies of HIE's
    - Sustainability of HIE
    - Corporate interests of providers
      - Cost – sunk and future
      - Revenue – "Leakage"
  - CT legislation 2014-2015
  - Federal Cures Act – "Information blocking"

What About Image Sharing? The Technology Has Evolved

- 1980: Digital images of single film, scanned and transmitted over phone lines (modems)
  - Slow and low quality
  - Might have to pick out one image for transmission
  - Unsuitable for regular use – limited to emergency situations
- 1990's: Digitally-acquired images -> routine viewing of exams on computer monitors
  - Great for on-site radiologists
  - "Sneakernet"(films): inconvenient, inconsistent, delays, additional cost
- 2000's: Increased bandwidth, widely available and lower cost -> distributed PACS
  - Subspecialty interpretations
  - Teleradiology expansion
  - Still "sneakernet" (film ->disk")
- 2010's: Patient and Referring MD portals (+"sneakernet")
- **Interoperability???**

REAL (and common) clinical situations

- A patient with several chronic medical conditions and multiple prior imaging examinations moves to a new location and develops an acute medical condition
- A patient seeks a second opinion about their lung cancer and all the images are available to the surgeon, oncologist, radiologist and pulmonologist at the second location
- A patient presents to hospital ER with acute abdominal pain, worsened since visit to crosstown ER earlier in the day. ER doc requested CT. **Fortuitous** availability of CT from first hospital made ultrasound more appropriate exam, where an acutely inflamed gallbladder was diagnosed and patient went to immediate surgery.

Data (examples)

- Rochester RHIO: HIE drives 25% reduction in repeat medical images
- Yale “Ditch the Disk”

Ditch the Disk” (YNHH)

- Patients are still forced to navigate mounds of release forms and paperwork only to receive their images on a physical CD.”
- “It’s important … to recognize that for healthcare organization[s] to realize significant cost savings, increased speed of image exchange, and improved patient satisfaction and outcomes, health groups must adopt a secure health information exchange for diagnostic imaging studies.”
- Institutional workflow modification, patient and physician education
- Results
- 2019 YNHHS burned142,000 imaging studies to CDs or DVDs at an average cost of $3.95 each with aggregate cost approx. $550,000 without factoring in labor costs, including retrieving studies, shipping and delivery expenses.
- 2020, Yale sent 165,000 exams electronically and saved $650,000 without factoring in reprieve from packaging, shipping and labor expenses.
- With estimates expecting the healthcare giant to transfer some 350,000 studies in 2021, savings are forecasted to exceed $1 million.

Value to Patient

More rapid diagnosis

More targeted treatment

Better Outcomes?

Less exposure to radiation

Less repeat testing

Lower overall cost

Reduced waiting time

Value to Healthcare providers
Variable depending on role / situation

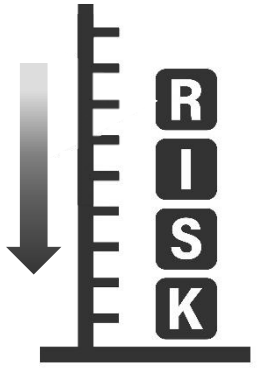
More rapid diagnosis

Less waiting for studies

Can compare studies

Reduced Burnout

Improves quality metrics



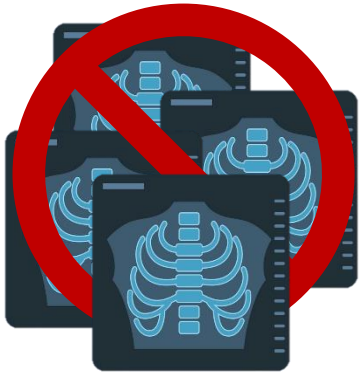
Reduced liability

Increased ability to collaborate

Capacity to share images

Value to Insurers / Employers

Reduced cost

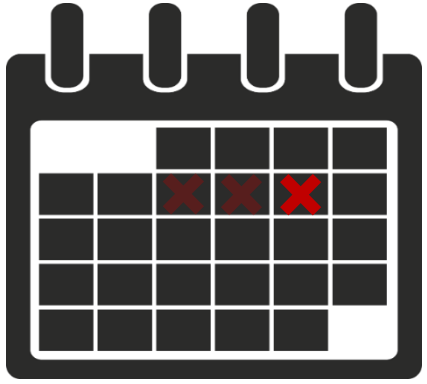


Reduction in duplicate testing

Improved Outcomes

More rapid second opinions

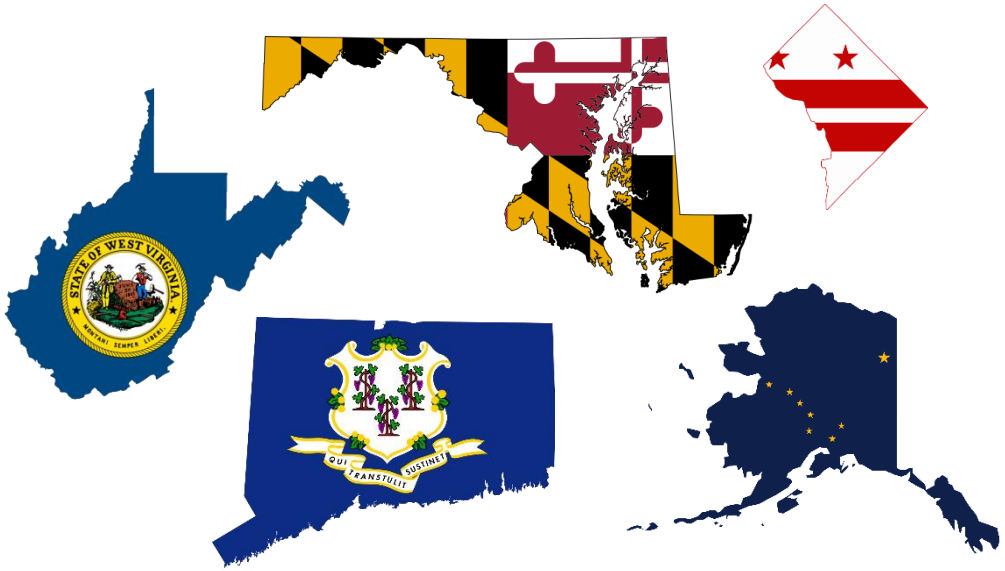
Improves quality scores?



Reduced leave time

Increased satisfaction

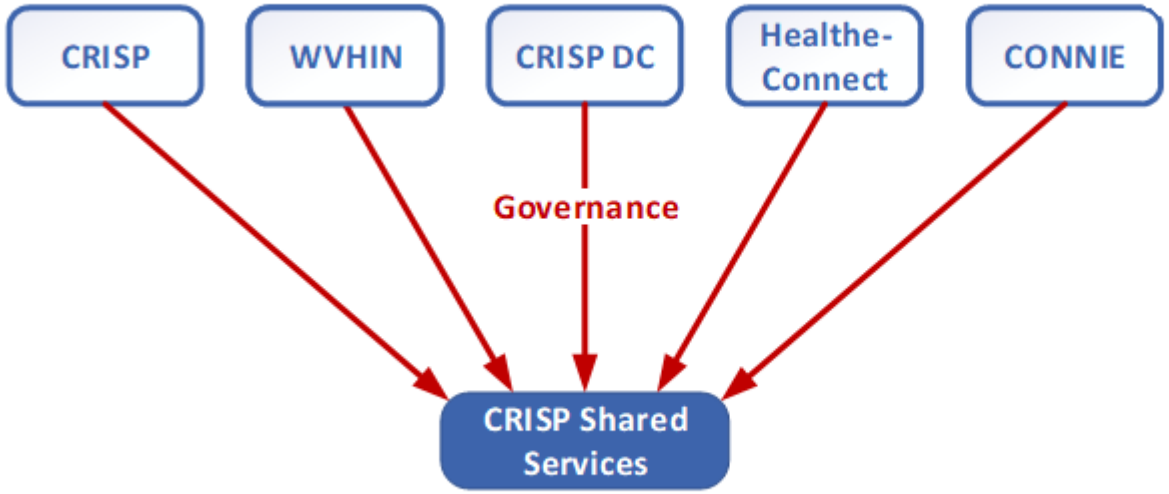
Better, Faster, Cheaper: Choose 2?
THREE?



CRISP's Affiliation Model

Structure

- *The mission of CRISP's shared services is to:* ***assist affiliate organizations in achieving economies of scale, pooling innovation efforts, and implementing best practices.***



CRISP Shared Services is a non-profit support organization, with each HIE participating in the governance.

Affiliation Principles

1. **Preserve the independence of the HIEs in each jurisdiction**, such that all regions can prioritize and fund their own initiatives, leveraging the shared infrastructure.

2. **Improve HIE technologies** available to serve all patients, providers, public health officials, and other stakeholders.

3. Take advantage of the favorable economics of sharing HIE infrastructure technologies, to **reduce costs for all regions**

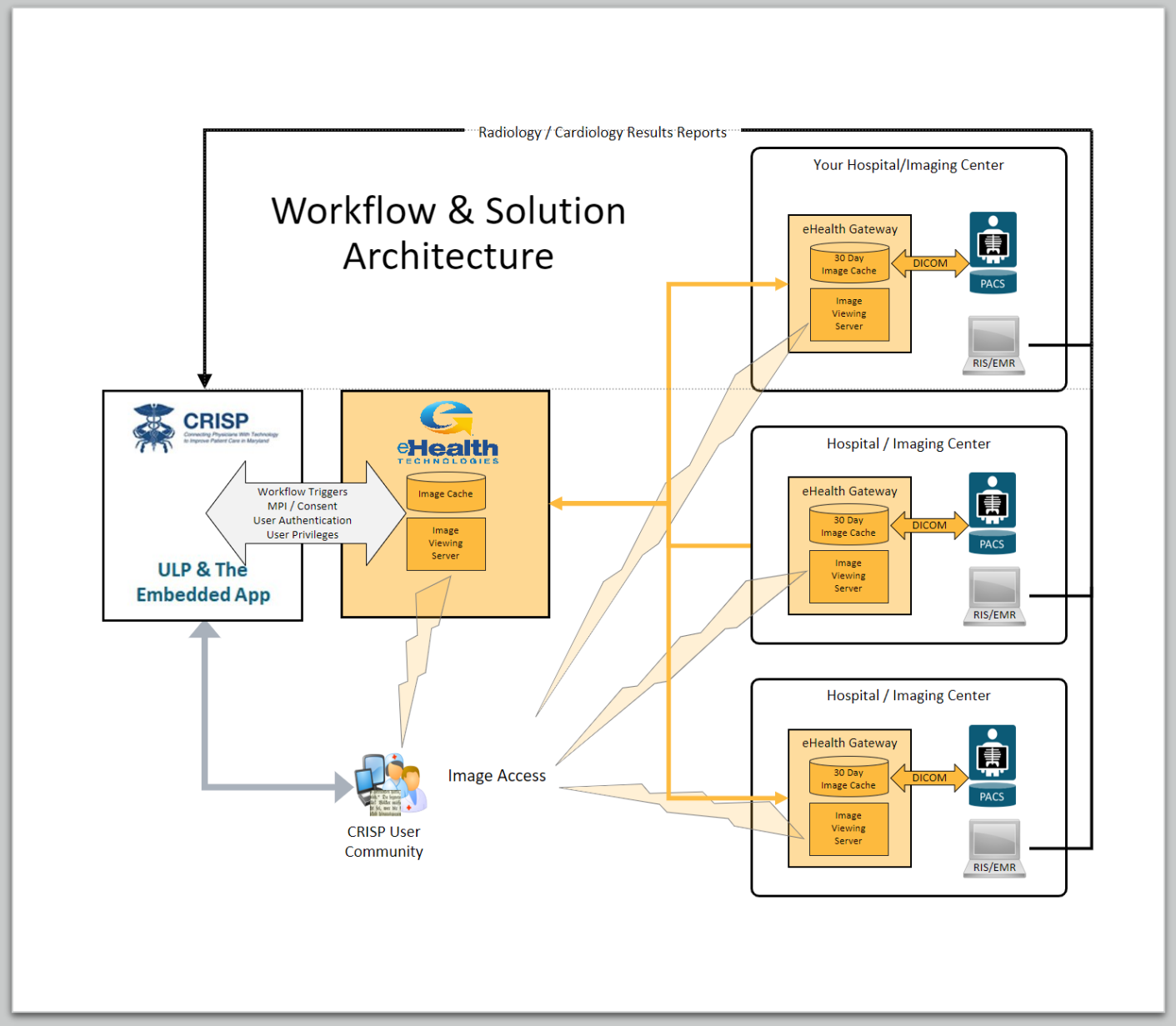
What Image types are available in CRISP

- Most Image types are available through CRISP
  - Radiography, CT, Ultrasound, MRI Imaging
  - Other types could be exchanged in other states

- Authorized HIE users can launch a study of interest from any connected imaging location on eHealthViewer ZF—a zero-footprint, web-based viewing platform—a fully diagnostic-quality FDA 510(k) Class II medical device.

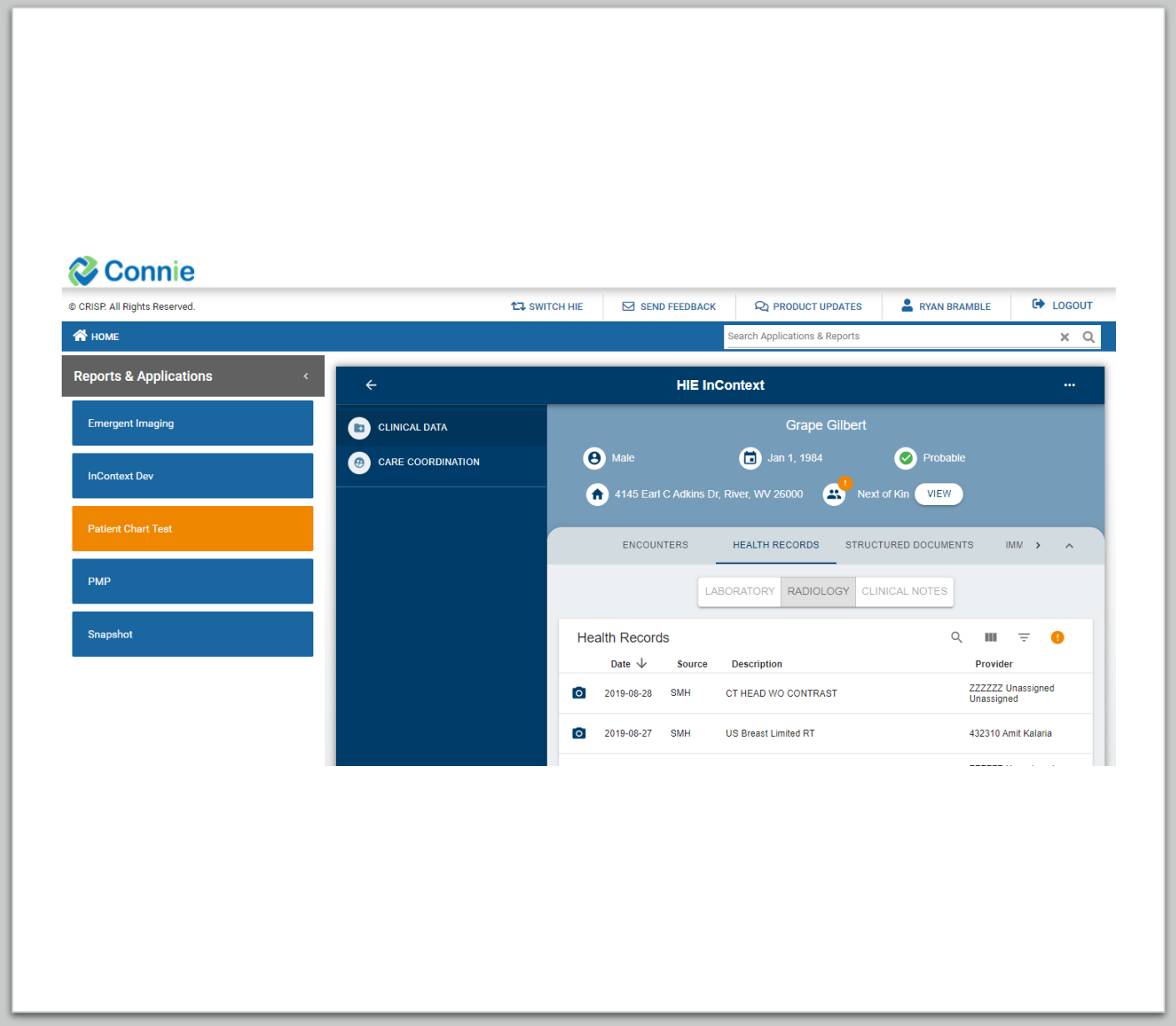
How Images are Currently Shared through CRISP

- Users of the CRISP Portal or SMART on FHIR App have access to Images
- They can be accessed alongside the text report or through an entire list of available images
- Images are retrieved from PACS systems using an intermediary hardware device



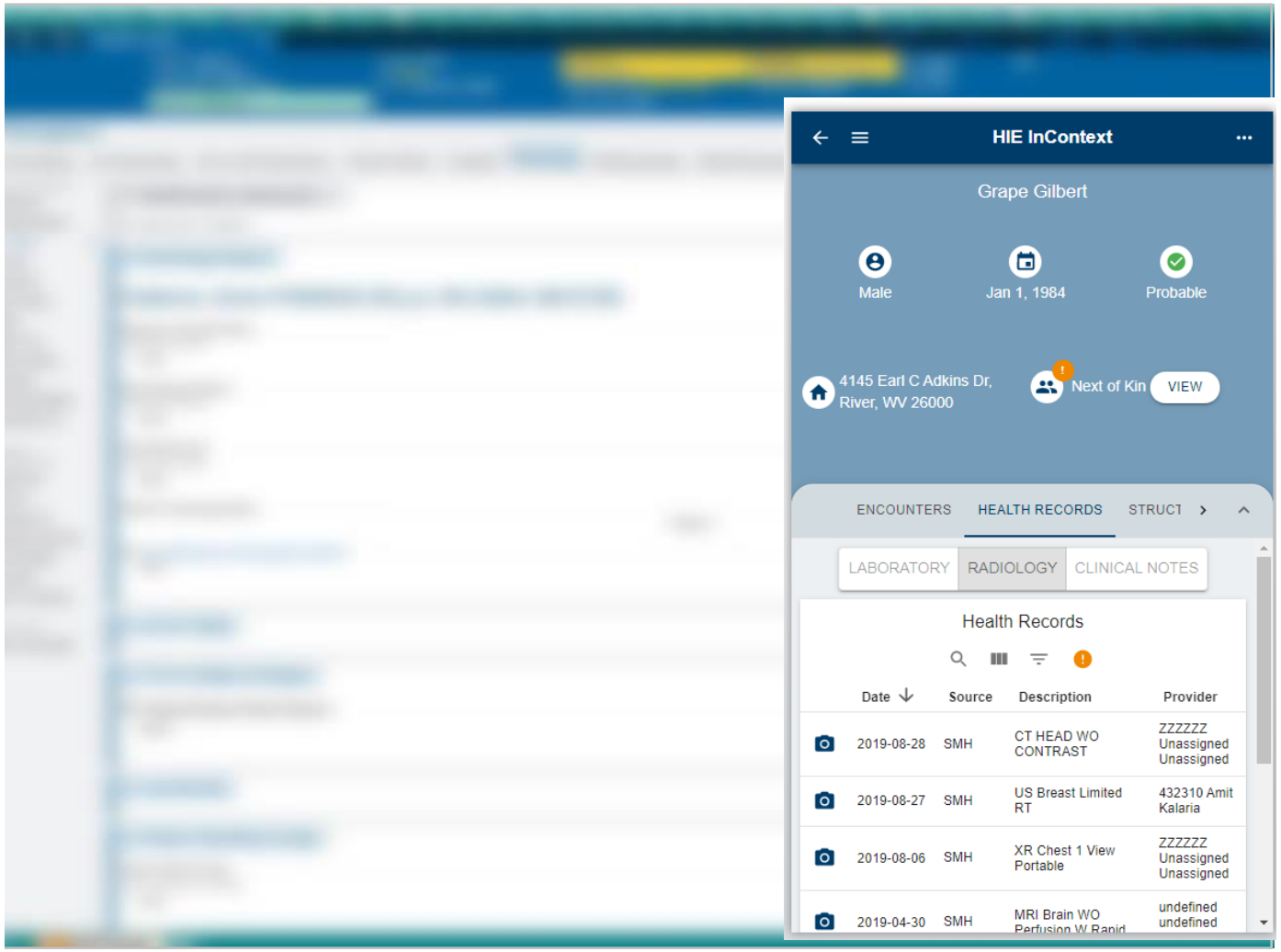
Web Based Portal

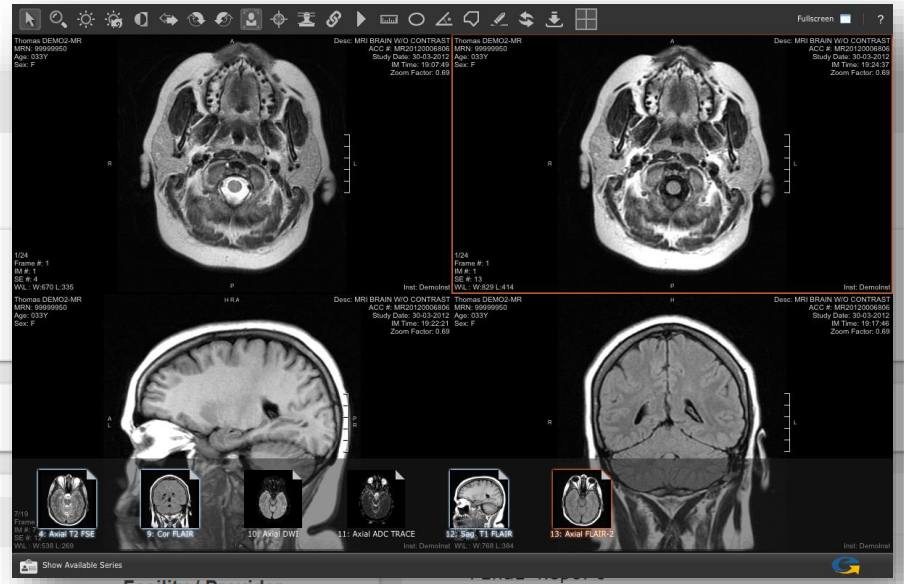
- Secure site for accessing health information
- Users have access to multiple applications
- Radiology section of the Patient Chart would contain link to images



SMART on FHIR App

- View of critical patient data, pulled from multiple repositories and embedded in the end user's EHR
- Interacts with EHRs FHIR endpoints to identify practitioner and patient
- Epic, Cerner, eCW, Athena





Testing, Gail

Female | **25 Nov 1965** (53 Y)

EID 30865028

Details

HEALTH RECORDS

Date Range : 1 Year

Print

Laboratory | Radiology

Search...

Imaging Viewer | Preview Image

Date	Descri	Facility / Provider
2019-02-14	CT Head or Brain w/o Contrast	Kaiser Permanente Mid-Atlantic States
2019-02-11	RAD4839 DIGITAL BRST TOMOSYN BIL W_CAD	MedStar Georgetown University Hospital 248468 SHAWNA WILLEY
2019-02-11	DIGITAL BRST TOMOSYN BIL W/CAD	MedStar Georgetown University Hospital 248468 SHAWNA WILLEY
2019-01-04	6207604 US ABD LIMITED	WVHIN - Wetzel County Hospital 936300 DAVID GHAPHERY

PROCEDURE: BI 4839 DIGITAL BRST TOMOSYN BIL W/CAD Acc: 9455739
DATE OF EXAM: Feb 11 2019 8:15AM

CLINICAL HISTORY: 64-year-old female, personal history of left-sided breast cancer status post lumpectomy, radiation, chemotherapy.

COMPARISON: January 22, 2018, January 11, 2017, January 11, 2016.

Statistics of CRISP Image Sharing

	October 2021	September 2021	August 2021	July 2021	October 2020	October 2019	October 2018
Images Viewed	18,898	17,747	18,836	17,880	10,985	6,189	1,510
Stroke Images viewed	236	234	179	292	216	110	110
Participants	51 Hospitals, 10 Outpatient Groups				51 Hospitals, 8 Outpatient Groups	45 Hospitals, 4 Outpatient Groups	34 Hospitals, 2 Outpatient Groups

Demo of CRISP Image Sharing

Provider and Patient Stories

I recently saw a 63 year old patient, who came to the ER with confusion noted at the nursing home. It appears that she had a fall 2 weeks ago, was seen at UMMC, and had been doing ok, when she suddenly started showing sign of confusion. It was not clear based on history whether she had a repeat fall.

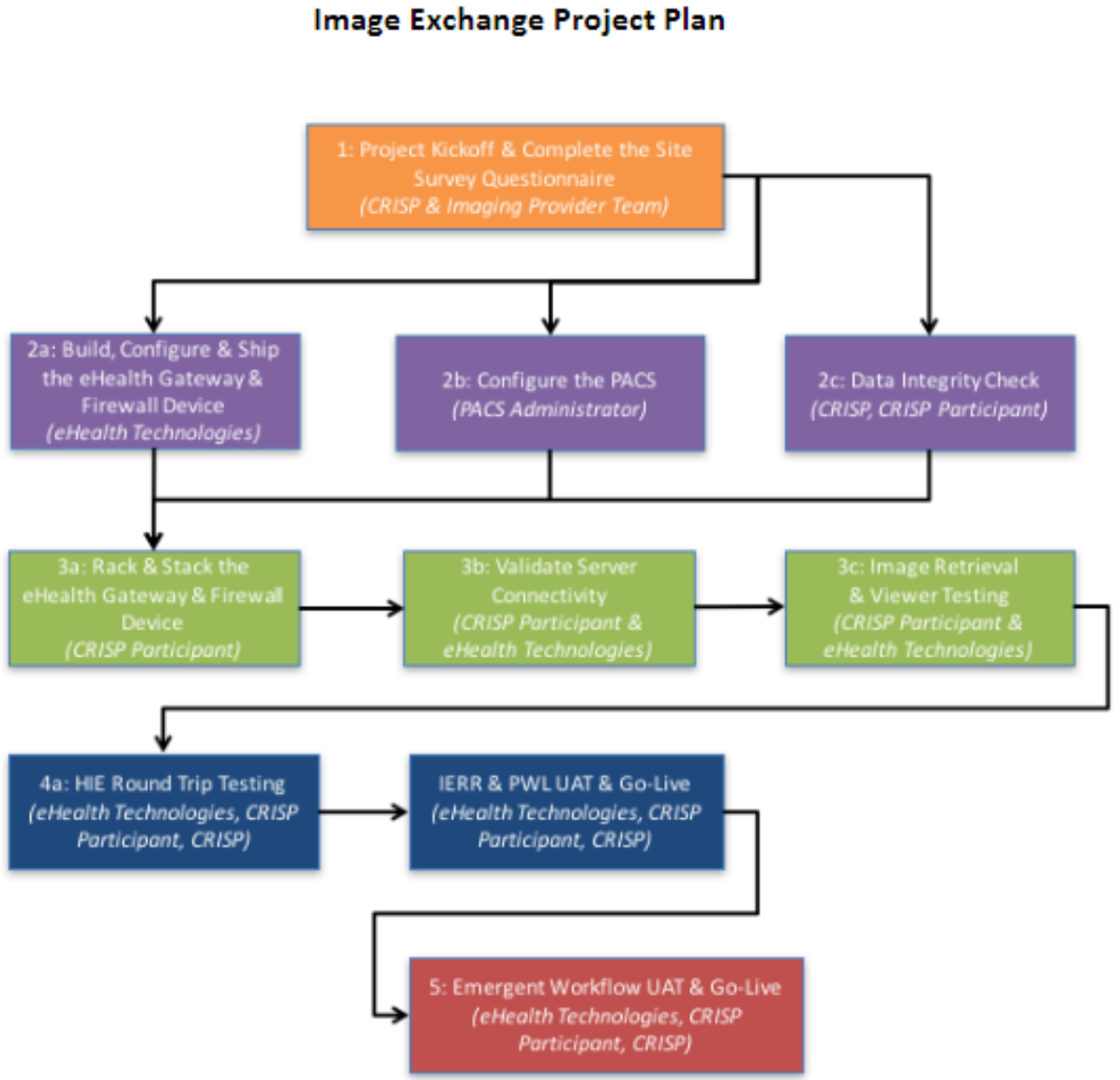
Once I saw this information, I thought to check CRISP and see if there was a prior study done at UMMC. I launched the CRISP InContext app, and looked at Radiology results within the Health records tab. There, I was able to see that she did indeed have a head CT done at UMMC during the encounter 2 weeks ago.

I viewed the results of the head CT within my native EMR. The report showed an acute on chronic right hemispheric subdural hematoma with mass effect. Within my EMR image viewer, I was able to see the edema, acute bleeding and compressed ventricles with the midline shift. I was also able to measure the size of the hematoma, which was about 14mm.

I was able to view the image, which did showed that the patient had a hematoma at that time as well. Using the CRISP image viewer, I was able to measure the size of the hematoma, and observed that it was much smaller than it was currently, at about 6mm.

Based on the increased hematoma size and altered mental status, I concluded that she must have hit her head again or rebled into the older subdural hematoma, and consulted neurosurgery to further evaluate the patient. Without the CRISP InContext app, I would not have been able to compare the imaging, which might have resulted in a delayed clinical decision regarding this patient.

Onboarding to Image Exchange



National Efforts

- CareEquality and eHealthExchange are using standards to allow for the exchange of images between health information networks
- CareEquality is targeting two pilots live by the end of the year
- There have been a number of connect-a-thons to prove that the use case can work
- The exchange uses a “Patient Discovery” query and a “query for images” query

Poll 

- Would you consider using the Image sharing tools demonstrated within the CRISP environment if they are made available to to the Connecticut HIE Connie?

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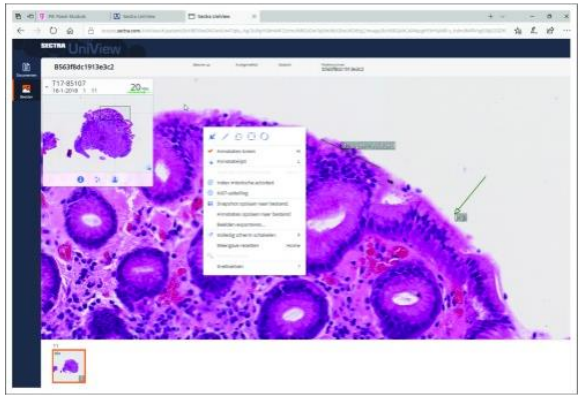
Image Sharing

Coming Soon in Early 2022

Possible additional Uses of HIE for Image Sharing

Could use similar infrastructure – Standards, Image server and sharing software

- Dermatologic Images
  - Cancer Screening – follow up for changes
  - Sharing PCP to Dermatologist
  - Second opinions
- Pathology Slides
  - Disease progression analysis
  - Second Opinions
  - Multidisciplinary Cancer Boards



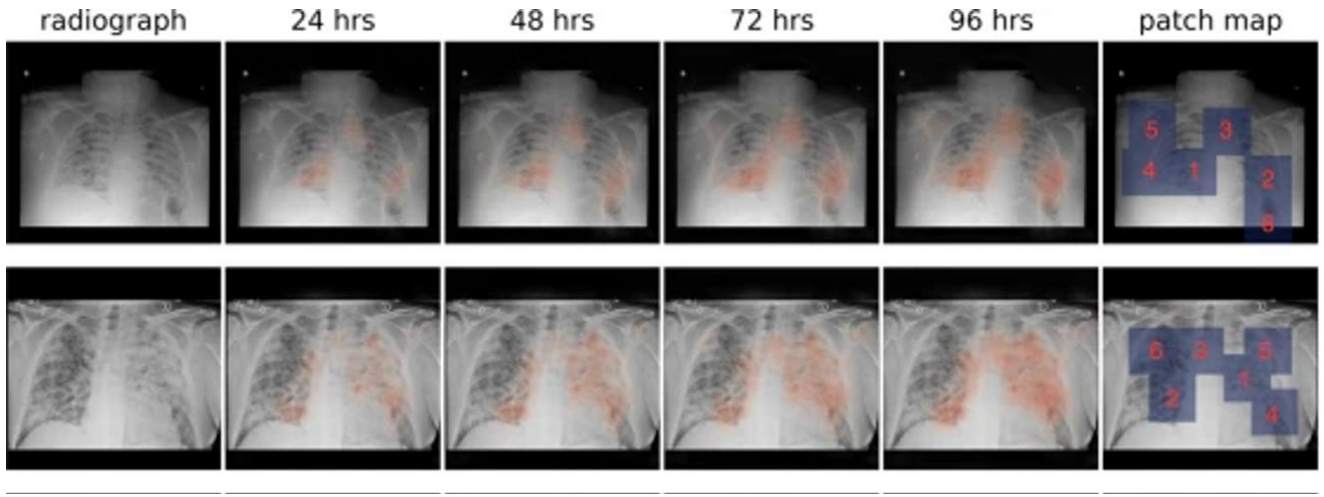
Caffery LJ, et al. Transforming Dermatologic Imaging for the Digital Era: Metadata and Standards. *J Digit Imaging*. 2018;31(4):. doi:10.1007/s10278-017-0045-8

Van Diest PJ, et al. Pathology Image Exchange: The Dutch Digital Pathology Platform for Exchange of Whole-Slide Images for Efficient Teleconsultation, Telerevision, and Virtual Expert Panels. JCO Clin Cancer Inform. 2019 Jun;3:1-7. doi: 10.1200/CCI.18.00146. PMID: 31194585

Potential - Diagnostic and Predictive AI

- Diabetic Retinopathy & Macular Degeneration
  - FDA approved tools for capture and AI diagnosis
  - Could be tracked over time for change /Prognosis
  - Improve accuracy of AI
  - Evaluate treatment (add clinical data analysis)

- AI for COVID-19 Prognosis
  - Who was going to be severely ill
  - High degree accuracy with clinical info
  - Developed rapidly but 3661 pts required
  - HIE could improve speed and accuracy



Verbraak, F et al. Accuracy of a Device for the Automated Detection of Diabetic Retinopathy in a Primary Care Setting Diabetes Care Apr 2019, 42 (4) 651-656; **DOI:** 10.2337/dc18-0148Diagnostic

Shamout, F.E. *et al.* An artificial intelligence system for predicting the deterioration of COVID-19 patients in the emergency department. *npj Digit. Med.* **4,** 80 (2021). https://doi.org/10.1038/s41746-021-00453-0

Questions

- Contact us for further information /
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