Health IT Standards Committee

A Public Advisory Body on Health Information Technology to the National Coordinator for Health IT

Clinical Operations Workgroup: Image Sharing Recommendations

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John Halamka, Co-Chair

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Clinical Operations Members

Workgroup Members

- **Jaime Ferguson, Kaiser Permanente**
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- Don Bechtel, Siemens
- Martin Harris, Cleveland Clinic
- Stanley Huff, Intermountain Healthcare
- Kevin Hutchinson, My-Villages Inc
- Elizabeth Johnson, Tenet Health
- John Kimek, NCPDP
- Rebecca Kush, CDISC
- Nancy Orvis, Department of Defense
- Marjorie Rallins, American Medical Association
- Wes Rishel, Gartner
- Christopher Ross, Mayo Clinic
- Joyce Sensmeier, HIMMS
- Karen Trudel, HHS/CMS
- Dan Vreeman, Regenstrief Institute

Ex Officio Members

- Jay Crowley, FDA/HHS
- Marjorie Greenburg, HHS/CDC
- Clem McDonald, National Library of Medicine
- Terrie Reed, FDA/HHS

Charge

- How full image sets or designated key images are shared between different facilities and specialists: the high level architecture e.g. role PACS, Archives, and EMRs
- How this is deployed with central and distributed reading facilities
- What methods and technical standards are used to push, pull, or view images in one place that originated or were interpreted in another place
- Issues encountered sharing reports and interpretations, or auditing, with or alongside the images themselves
- Inclusion of time series data in scope in addition to radiological images

Stakeholder Discussions

- Radiological Society of North America, Christopher Carr
- LifeIMAGE, Hamid Tabatabaie
- NHS Scotland, Andy Robertson
- National Institute of Biomedical Imaging and Bioengineering, Hamid Tabatabaie
- Care-Delivery Organizations

Recommendations for Image Sharing

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	TIER 1 Exchange of Text-Based Reports	TIER 2 Exchange of Non-Radiology/Cardiology Images	TIER 3 Exchange of Radiology/Cardiology Images - Full Study	TIER 4 Exchange of Radiology/Cardiology Images- Key Images
CONTENT	Plain text +/- structured headings, scanned/rendered document	"Clinical Capture" images with or without metadata	Complete set of images of diagnostic quality	IHE Key Image Note (KIN) and images referenced therein
ENCODING	PDF, HL7 2.x OBX segment content, CDA L1, or CDA L2 + CCDA DIR template	Without metadata: JPEG, PNG, DNG, PDF, H.264; with metadata: DICOM	DICOM (object appropriate to modality)	
VOCABULARY	LOINC to describe study/procedure, LOINC for structured headings	LOINC to describe study/procedure (in DICOM header/XDS metadata)	LOINC to describe study/procedure	LOINC to describe study/procedure, DICOM DCID 7010 for titles
PUSH	HL7 V2 ORU/MDM MLLP over VPN/TLS, DIRECT SMTP or XDR preferred	DIRECT SMTP or XDR, DICOM DIMSE/ULP or STOW over VPN/TLS, IHE XDR-I	DICOM DIMSE/ULP or STOW over VPN/TLS, IHE XDR-I	DICOM DIMSE/ULP or STOW over VPN/TLS, IHE XDR-I
PULL	IHE XDS	IHE XDS-I, DICOM WADO-URI or WADO-RS over VPN/TLS	IHE XDS-I, DICOM WADO-URI or WADO-RS over VPN/TLS	IHE XDS-I, DICOM WADO-URI or WADO-RS over VPN/TLS
VIEW			IHE IID, else pull (WADO-URI+/-XDS-I for rendered JPEGs when sufficient)	IHE IID, else pull (WADO-URI+/-XDS-I for rendered JPEGs when sufficient

Abbreviations/Terminology

- **Metadata:** in this context, patient identifiers, dates, acquisition technique
- **KIN:** IHE Key Image Note
- **KOS**: DICOM Key Object Selection
- **DIMSE**: DICOM Message Service Element (traditional DICOM PS 3.7)
- **ULP**: Upper Layer Protocol (traditional DICOM PS 3.8 TCP/IP protocol)
- **MLLP**: HL7 V2 Minimal Lower Layer Protocol (used by all IHE HL7 V2 stuff)
- **IID:** IHE Invoke Image Display
- **STOW:** DICOM Store Over the Web by RESTful Services (STOW-RS)

Questions/Discussion

Questions?