

The State of Medical Imaging

Jeroen Medema
Philips Healthcare

Charles Kahn
University of Pennsylvania

With thanks to . . .

- **Our hosts and organizers**
- **Harry Solomon**

A time of change . . .

But it's *always* a time of change for healthcare

**1993 was also a time of change, reflected in,
and driven by, the (then new) DICOM Standard**

**DICOM continues to respond to the changing
needs of the medical imaging community**

Old modalities – new protocols for characterization of anatomy and disease

- **CT multi-energy material decomposition**
- **MR functional, diffusion, quantitative**
- **NM/PET radiopharmaceutical tracers**
- **US elastography**

Dynamic imaging (4D)

Higher resolution everywhere

BUT...

Industry is rolling out new imaging capabilities faster than the necessary standards

- **And then slow to implement the standards when they are ready**

Need strong voices on professional side demanding standardization

- **“Can I view your wonderful <xyz> images on my <competitor> PACS? Will you adhere to the DICOM Standard for <xyz> images?”**
- **Get a date – in writing, from the product manager’s boss**

Changes for Imaging Professionals



“The technology revolution in image acquisition instrumentation now far outstrips the human observers’ ability to view and interpret medical images by using traditional methods, and a paradigm shift may be required.”

Andriole, et al. Optimizing analysis, visualization, and navigation of large image data sets: one 5000-section CT scan can ruin your whole day. *Radiology*, May 2011

Changes for Imaging Professionals

More data to be seen

- Helps radiologists see more

Visualization

- 3D / 4D
- Multi-modality

Assistive technology

- CAD
- Analytic results

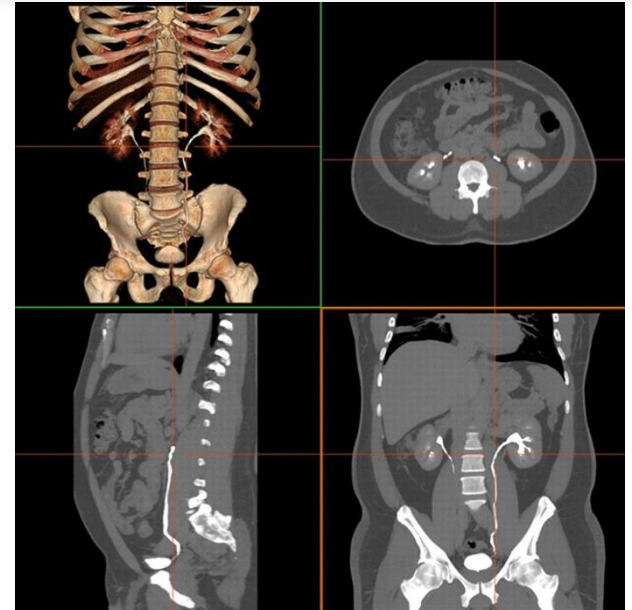


Integration of advanced visualization into PACS

Post-processing pipelines need intermediate results in standard formats

Evolving needs for advanced collaboration tools (multi-disciplinary teams)

Documentation of evidence and actionable findings



**That's all *internal* stuff within our
imaging domain**

But wait, there's more!

Patient-centered care requires:

- **Access to data from multiple institutions, anywhere**
- **Consistent access to all types of data, including images**

New players and systems

- **Non-imaging-specialist caregivers**
- **EMRs – in-patient, ambulatory, long term care**
- **PHRs and Portals**

Mobile technology changes access methods

- **Smart phones / tablets, not fixed workstations**
- **Web services for data distribution**

New software development environments and developers

- **Unfamiliar with imaging processes and systems**

Applications ecosystem breaks system models

- **Cloud based apps from multiple vendors**
- **Dynamic configuration**

Separation of app development, app deployment, financial models from classical radiology systems development

DICOM and DICOMweb

- Reach a wider audience
 - Leverage cross-industry web protocols and web developer training
- Maintain the investment in systems and image data
 - Enhance capability incrementally, not by wholesale replacement
- Keep aligned with other healthcare web services (HL7 FHIR)
- Deal with the entire imaging domain in the enterprise
 - Including *unscheduled* images (e.g. dermatology)

- It *is* a time of change
- Challenges for DICOM to keep up with changes in technology, and changes in the expanding environment of new stakeholders
- Challenges for old line and new line developers
- Challenges for imaging professionals to keep up with the data

- You are invited to join the DICOM efforts!