

SIIM 2007 Hot Topic 7
DICOM Update

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Overview

- New objects & services (*David Clunie*)
- Network Configuration (*Rob Horn*)
- Application Hosting (*Lawrence Tarbox*)

DICOM Update

- More enhanced & new technology image objects
- Additional dose encoding objects
- More SR-based results & CAD objects
- More 3D work on registration & segmentation
- Structured display
- Communication of display parameters
- Document encapsulation
- Specimen identification
- Substance administration query/verify
- Unified worklist
- Frame level retrieval

Enhanced Image Objects

- Initially MR, then CT, then XRA/RF
- Sup 43 (WIP) - 3D Ultrasound
- Sup 110 (LB) - Ophthalmic Tomography
- Sup 116 (FT 2007/01) - 3D X-Ray
 - Cone beam CT & tomosynthesis
 - General purpose & dentistry
- Sup 117 (DLB) - Enhanced PET
 - Harmonize cardiac/respiratory gating with CT/MR
- Sup 125 (PC) - Breast Tomosynthesis

Enhanced Image Objects

- “Old” objects
 - Single frame
 - Not up to date with technology changes (MDCT)
 - Too much optional, ambiguous, or proprietary
- “New” (enhanced) objects
 - Multi-frame (faster performance, better compression)
 - Better organized (volumes, dynamic contrast)
 - Encode advanced acquisition technique
 - Mandatory rather than optional terms & attributes

Dose Encoding

- Increasing international public and regulatory scrutiny of radiation dose from imaging
- Existing encoding in images & PPS inadequate
- Need persistent object related to irradiation events
- SR-based encoding
- Sup 94 (FT 2005/11) - Radiation Dose Report
- Sup 127 (PC) - CT Radiation Dose Report
- CP 687 - Dose Reporting for Mammography

CT Radiation Dose Reporting

- Significant concern about radiation dose of screening MDCT exams
- Difficult to estimate/monitor from images alone
- Acquire, store and analyze information about “irradiation events” separately from images
- IEC defines metrics
- DICOM defines encoding in Sup 127 (as SR objects)
- ACR and FDA “encourage” adoption
- NEMA (vendors) commit to timely implementation

Results SR and CAD

- CAD
 - Sup 126 (WIP) - Colonoscopy CAD
- Results reporting
 - Sup 128 (PC) - Cardiac stress testing
 - Sup 129 (WIP) - Electrophysiology
 - Sup 130 (WIP) - Ophthalmic refraction

3D-related Objects

- Registration
 - Sup 73 (FT 2004/01) - Rigid & Fiducials
 - Sup 112 (FT 2006/08) - Deformable
- Segmentation
 - Sup 111 (FT 2006/08) - Raster
 - Sup 132 (WIP) - Surface
 - *Sup 131 (WIP) - Implant Description*

Display & Presentation

- Sup 123 (WIP) - Structured Display
 - How to layout specific images
 - As opposed to hanging protocols, which are rules for a class of images
 - Dentistry initiative, general mechanism
- Sup 124 (WIP) - Communication of Display Parameters
 - For managing display device calibration
 - Centralized storage of QC results

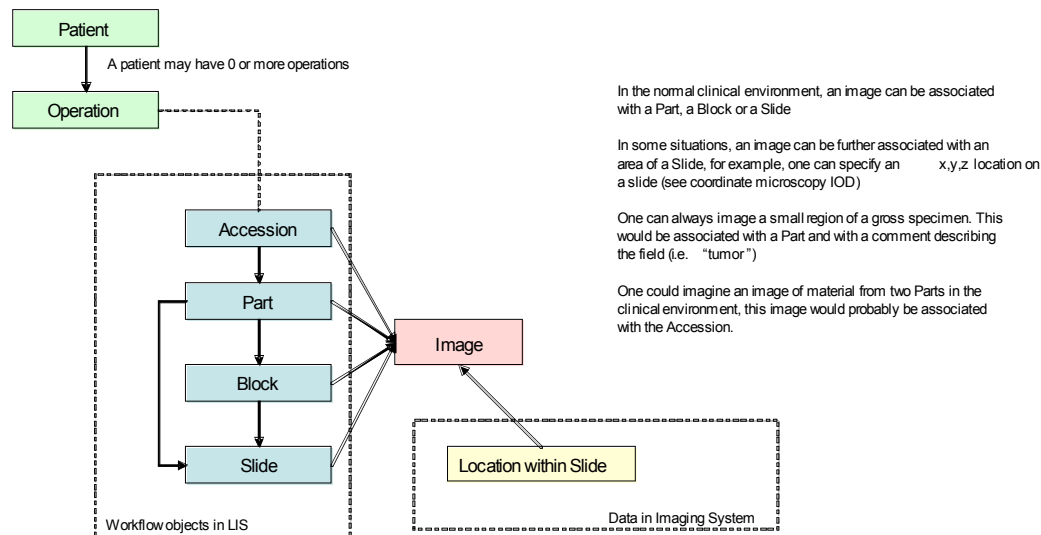
Document Encapsulation

- For storing and distributing “external” documents within PACS
 - Digitized paper
 - Page oriented results
 - Other structured document formats
- Sup 104 (FT 2005/03) - PDF
- Sup 114 (FT 2007/01) - CDA (HL7)

Specimen Identification

- Sup 122 (WIP) - Specimen Identification
- Renewed interest by pathology group
- Original attempt was too simplistic

Integration of Images and LIS in Anatomic Pathology



Other work ...

- Substance administration query/verify
 - E.g., for modality to check contrast sensitivity
- Unified worklist
 - Re-visit use cases for General Purpose Worklist
 - 1:1 scheduled:performed steps
 - Push (notify) & pull (query) models for tasks
- Frame level retrieval
 - For large (enhanced) multi-frame images
 - E.g., to view an SR reference to a subset of frames

Conclusion

- DICOM continues to track modality technology advances
- Revisiting outmoded objects
- Increasing diversity of SR for results
- Greater 3D emphasis as registration, segmentation and fusion become routine
- Other innovative work in new areas ...