The Growth of Digital Imaging/PACS: How to Survive the Deluge

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Sources of PACS Data “Explosion”
Implications of Multislice CT and High Speed MR on Enterprise Image Distribution

- Huge data sets
- Confusing to clinicians
- Image overload for radiologists

Integrated PACS / 3D workstation
Imaging Outside of Radiology

PACS vs EMR
Why Use PACS Beyond Radiology?

- PACS is the best tool to manage medical images from ALL areas of the enterprise
  - Understands the concept of “like priors”
    - Head CT compared to Head CT
    - R hand skin lesion compared to the same prior lesion
  - The EMR manages clinical data
    - Not exam centric
The Ideal Vision

Potential Image Sources

- Ear / Nose / Throat, Otolaryngology
- Microscope Imaging, Pathology
- Respiratory Imaging, Bronchscopy
- Gastrointestinal Imaging, Endoscopy
- Intra-Operative Imaging, Laproscopy
- Orthopedic Imaging, Arthoscopy
- Imaging of the eye, Ophthalmology
Visible Light (DICOM VL)

- Enterprise image distribution will improve the speed and quality of patient care:
  - Review prior images and reports
  - Share images over the web for consultation, conferencing and teaching

- Any endoscope can be a digital modality
  - Intelligent Appliance
    - “Plug and play”, installs in seconds
    - Supports most models of all major scope vendors
  - DICOM
  - Clinical procedure specific UI

Otolaryngology

- Endoscopic imaging of the ear, nose and throat
  - Numerous types and styles of endoscopes
  - Patient is conscious and aware
  - Exams tend to be repeated at follow up
  - Video frame rates can reach 200fps
    - Standard 30fps, 10 sec = 300MB
    - 200fps = 2GB for 10sec
  - Requires synchronized audio
Pathology: Now

Microscope-based
- Subjective
- Local (glass slide)
- Labor-intensive

~ 1867

~ 1680
Pathology: Future

Digital (Virtual Microscopy)
- Objective
- Global (virtual slide)
- Assisted by automation

• Improved Analysis
  - Multiple fields & resolutions
  - Memory
  - Virtual slide(s)
  - Image Analysis
  - Annotation

• Archival & Retrieval

• Standardization
  - Quantification
  - Automation
Benefits of Single Image Archive and Display System

- Analogous to working in a system with multiple EMR’s
- Increased cost to maintain, train and support
- Multiple image “silos” compromise patient care

ENT / CT / PET Correlation
ENT / CT Correlation

Multi-institution and Multi-modality
Environmental Costs of Expanding PACS Storage Requirements

- All spinning costs
  - Purchase
  - Maintenance
  - Electricity
  - Cooling

- Benefits to integrated HSM (hierarchical storage management)
  - Tape (or other nearline media) uses little or no energy to sit in slot
  - Use of DICOM MWL to do intelligent prefetchs in event of disaster recovery
  - Alternative is restoring all data of which only a small percent will ever be used