DESIGN AND IMPLEMENTATION OF A DIGITAL PATHOLOGY NETWORK FOR AIR FORCE MEDICAL SERVICE (AFMS) PATHOLOGY PRACTICE

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US Air Force Medical Service (AFMS) is exploring ways to introduce digital pathology, utilizing whole slide imaging, into its pathology labs

UPMC is supporting AFMS pathology

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DIGITAL PATHOLOGY NETWORK: AFMS PATHOLOGY CENTERS

Develop a model digital pathology network composed of whole slide imaging scanners and supporting software.
Assessment / Design
- Contextual Inquiry
- WSI scanners / systems

Implementation
- Acquisition/ Installation/ Training
- Digital Pathology Adoption:
  - Selected Clinical Applications

Evaluation (measures)
- Digital pathology utilization
- Impact on pathologists, pathology organization, and clinical process
Assessment/Design

- Contextual Inquiry
- WSI Scanners /Systems
CONTEXTUAL INQUIRY

• A qualitative methodology for understanding and capturing in-detail aspects of work from the perspective of the user; may be used to support design of devices and systems within the hospital/medical environment.

• Use to document current workflows, needs and preferences of AFMS pathologists and pathology organization.

• Findings will identify clinical applications that may benefit the most from digital pathology implementation.
CONTEXTUAL INQUIRY

• Contextual inquiry study conducted at 3 regional pathology centers

• Main findings (reported at USCAP 2012):
  • AFMS pathology is a large globally distributed healthcare system
  • Unique histopathologist and pathologist staffing pipelines
  • Common IT infrastructure across AFMS pathology sites
  • Recommended clinical applications/workflows: Consultations, Quality Assurance, and Workload Distribution
WSI SCANNERS/ SYSTEMS REVIEW

- **Determine key criteria:**
  - High-speed, high-capacity WSI scanners
  - High-resolution digital slides
  - Current market presence in the US
  - Offers network connectivity

- **Assess viable scanners/systems**
  - Objective technical features including loading capacity, scanning features (speed, resolution, others), optics, others
  - Subjective features (Image quality, usability)
Assessment/ Design
• Contextual Inquiry
• WSI Scanners /Systems

Implementation
• Acquisition/ Installation/ Training
• Digital Pathology Adoption:
  • Selected Clinical Applications
IMPLEMENTATION

• **Selection/ acquisition**: a preferred scanner/system (as identified by AFMS pathologists for this research project)
  - Aperio: Scanners: 400-slide (regional centers)/ 5-slide (small centers)/ Spectrum Plus

• **Installation**: scanner/system at regional and smaller pathology centers (ongoing)

• **Training**: during installation followed by in-depth training conducted 1-2 months later (*provided by scanner vendor*)

• **Establish slide sharing capability** between sites
  - Pre AFMS intranet connectivity: share via the web using Aperio’s conferencing service
  - Post AFMS intranet connectivity: share via intranet
CLINICAL USE: EARLY ADOPTION* (PILOT STUDIES)

• Consultations
  • Subspecialty virtual conferences (connecting subspecialists located at multiple AFMS pathology centers)
    • Dermatopathology (ongoing)
      • Biweekly; cases selected by one subspecialist
    • Oral Pathology (planned)
  • Curbside consultations (ongoing)
• Digital slide vs glass slide concordance studies

* Early adoption= prior to AF intranet connectivity- use web-sharing services
CLINICAL USE: LATE ADOPTION* (PILOT STUDIES)

- Potential applications:
  - Consultations
    - Initiate formal second opinions provided by AFMS subspecialists utilizing digital slides
  - Quality assurance/ quality control
  - Workload distribution: Possible centralization of subsets of IHC stains

*Late adoption= following connectivity to AF intranet
Assessment/ Design
- Contextual Inquiry
- WSI Scanners /Systems

Implementation
- Acquisition/ Installation/ Training
- Digital Pathology Adoption:
  - Selected Clinical Applications

Evaluation (measures)
- Digital pathology utilization
- Impact on pathologists, pathology organization, and clinical process
SUMMARY

• Contextual inquiry suggested the greatest benefit for implementation of digital pathology for consultations, QA, and workload distribution

• WSI scanners/systems were assessed using selected criteria

• A single WSI system was selected (slide capacity varies based on site needs)

• To date, WSI systems were installed at 3 AFMS regional centers
  • Initial training provided at 3 sites- in depth training at 2 sites
  • Unique IT security challenges – barriers to slide sharing

• First clinical use - dermatopathology teleconferences

• Current efforts to evaluate clinical utility of digital pathology in AFMS
CONCLUSIONS

• Introduction of digital pathology into a large healthcare organization such as AFMS requires careful design and implementation to ensure successful adoption and utilization.

• The implementation of the model network and the lessons learned will provide a valuable framework to help guide the AFMS pathologists in preparing for an innovative and streamlined digital pathology practice.