Image Archiving for Digital Pathology

Which Way to Turn?

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Disclaimers

• User

• Apollo PathPACS

I have no financial interest with Apollo or any other commercial enterprise mentioned in this presentation.
Image Archiving for Digital Pathology

Which Way to Turn?
Hospital for Sick Children
Toronto, Ontario

Largest pediatric hospital in Canada

Provincial, national and international patients

Canada’s largest hospital-based child health research institute
Division of Pathology

Clinical, Research and Referral

• Surgical and autopsy pathology
  – Coroner’s pediatric autopsies
• Immunohistochemistry
• Electron microscopy
  – Provider arrangements
• Molecular pathology
Division of Pathology

Clinical, Research and Referral

- Surgical and autopsy pathology
  - Coroner’s pediatric cases
- Immunohistochemistry
- Electron microscopy
  - Provider arrangements
- Molecular pathology

Pathology Users

- 10 pathologists
- 2 fellows, up to 6 residents
- 3 research scientists
- 3 pathologists assistants
- 5 EM technologists
- 3 immunohistochemistry technologists
- 1 morphometry technologist
- 1 imaging consultant
Hard Copy Images
Hard Copy Image Archive

- Physical vulnerability of slides and prints
- Images lost, misfiled or “borrowed”
- No built in backup system
- Limited security options
- Outside of institution processing
Digital Image Archive

Limitations

- File format support
- Image acquisition
- Hospital IS interface
- Hospital IS support
- Application lifespan
Division of Pathology

Clinical, Research and Referral

- Surgical and autopsy pathology
  - Coroner’s pediatric cases
- Immunohistochemistry
- Electron microscopy
  - Provider arrangements
- Molecular pathology
Division of Pathology

Clinical, Research and Referral

- Macroscopic specimens
- Photomicroscopy
- Electronmicrographs
- Digital Faxitron images
- Document images
- Digitized whole slide images
Digital Image Archive Requirements

- Reliable
- Secure
- Useable
- Flexible
Digital Image Archive Requirements

- Reliable
- Secure
- Useable
- Flexible
- Obsolescence Resistant
Digital Image Archive Requirements

- Legislation
- Hospital
- Division
Legislative Requirements

• Provincial Legislation (Ontario)
  – Personal Health Information Protection Act
  – Freedom of Information and Protection of Privacy Act
  – Coroner’s Act

• Hospital Bylaws and Regulations
  – Photography and privacy policies
Hospital Requirements

- Mission

- Goals and objectives
  - Clinical, research and education

- Hospital IS interface

- Hospital IS hardware
Hospital Requirements

• Mission
• Affordable
Hospital Requirements

- Mission
- Affordable
- Reliable
Hospital Requirements

- Mission
- Affordable
- Reliable
  - Vendor

- Proven track record with installed user base
- Partnerships with other vendors
- Solid hardware and software background
- Financially sound
- Willing to collaborate
Hospital Requirements

- Mission
- Affordable
- Reliable
  - Vendor
  - Hospital IS

- Standard image file formats
- ODBC and other standards compliant
- IS infrastructure compatible
Division of Pathology Requirements

- **Reliable**
  - Clinical
    - Acquisition of images from all AP lab sections

- **Secure**
  - Pediatric forensic autopsy image security

- **Useable**
  - Research
  - Teaching
  - Administration

- **Flexible**
  - Users
Image Archive Security

Permissions

Audit Trails
Image Archive Security

Administrator

Permissions set on:
- Archive type
- User role
- Case type
- Specimen type
- Image class
- Image

Viewer
User Functions

- View
- Annotate
- Modify*
- Create
- Print
- Import
- Export
- Restrict
- Inactivate

- Functions individually allowed or prohibited
- Functions audited
<table>
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<th>Image Class</th>
<th>View</th>
<th>Modify</th>
<th>Create</th>
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<th>Copy</th>
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Audit Trails

Specimen S07-4029
Created By Apollo RESULTS Interface
Created Date 2007-09-21 13:53:34
Created By Program Apollo RESULTS Interface

Last Updated By Apollo RESULTS Interface
Last Updated Date 2007-11-09 13:11:23
Last Updated By Program Apollo RESULTS Interface
Division of Pathology Requirements

Reliable
- Clinical
  - Acquisition of images from all AP lab sections

Secure
- Pediatric forensic autopsy image security

Useable
- Research
- Teaching

Flexible
- Administration
- Users
Division of Pathology Requirements

- Reliable
- Secure
- Useable
- Flexible

- Division
- Department
- Hospital
- External clients
Useable and Flexible

Division Services

• Clinical
  – Case documentation
  – Case analysis (EM, morphometry)
  – Case presentation (clinical rounds)

• Academic
  – Research
  – Teaching
  – Conferences and Publications

• Administration
  – Quality assurance

Division Operations

Integration within laboratory work flow

adapting work flow to fit image archive

versus

customizing image archive to fit work flow
Useable and Flexible

Division Operations
Integration within laboratory work flow

- adapting work flow to fit image archive

versus

customizing image archive to fit work flow
Useable and Flexible

Simple Data Entry
- Simple metadata entry without redundancy
- Interface with Pathology LIS
  - Flexible entry options
  - “Down-time” contingencies
- Automatic security permissions
Useable and Flexible

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Useable and Flexible

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Useable and Flexible
Flexible

• Scalable
• Adaptable
Flexible

- Scalable
- Adaptable
Image Output

• **Within Division**
  – Viewing
  – Exporting
  – Printing

• **Outside Division**
  – Viewing
    • Other permissions
  – Clinical Rounds
  – Consultation

• Static images
• Audio-video streams
• Virtual microscopy
Division of Pathology

Pathology Digital Archive

Within Hospital

Clinical Services
Researchers
Teaching and Rounds
Pathologists
Flexible

- Scalable
- Adaptable
Flexible

- Scalable
- Adaptable

Obsolescence
Image Archiving for Digital Pathology

Which Way to Turn?
Pathology Digital Image Archive

- Reliable
- Secure
- Useable
- Flexible
Clinical Digital Image Archive

- Reliable
- Secure
- Useable
- Flexible

- Dermatology
- Gastroenterology
- Ophthalmology
- Plastic Surgery
- Pediatrics
Thanks To

*Sick Kids Implementation Team*

Daniela Crivianu-Gaita  *VP IS*
Michael Anderson  *Team Leader DPLM IS*
Lois Child  *Lab IS Resource Technologist*
Rita Pyle  *Project Manager IS*
Michael Starr  *Image Consultant*
Don Perrin  *PhD PA (ASCP)*
Jim Choi
Thanks To

Apollo PathPACS

Mark Newburger
Tom Campbell
Jeff Mabus
John Reichert