Implementing a Multi-Jurisdictional Telepathology Solution: Pan-Canadian Proof of Concept

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Partner Organizations

Outline

- Why Telepathology ?
- Vision
- Local implementations
- MJT Implementation
- Patient Benefits

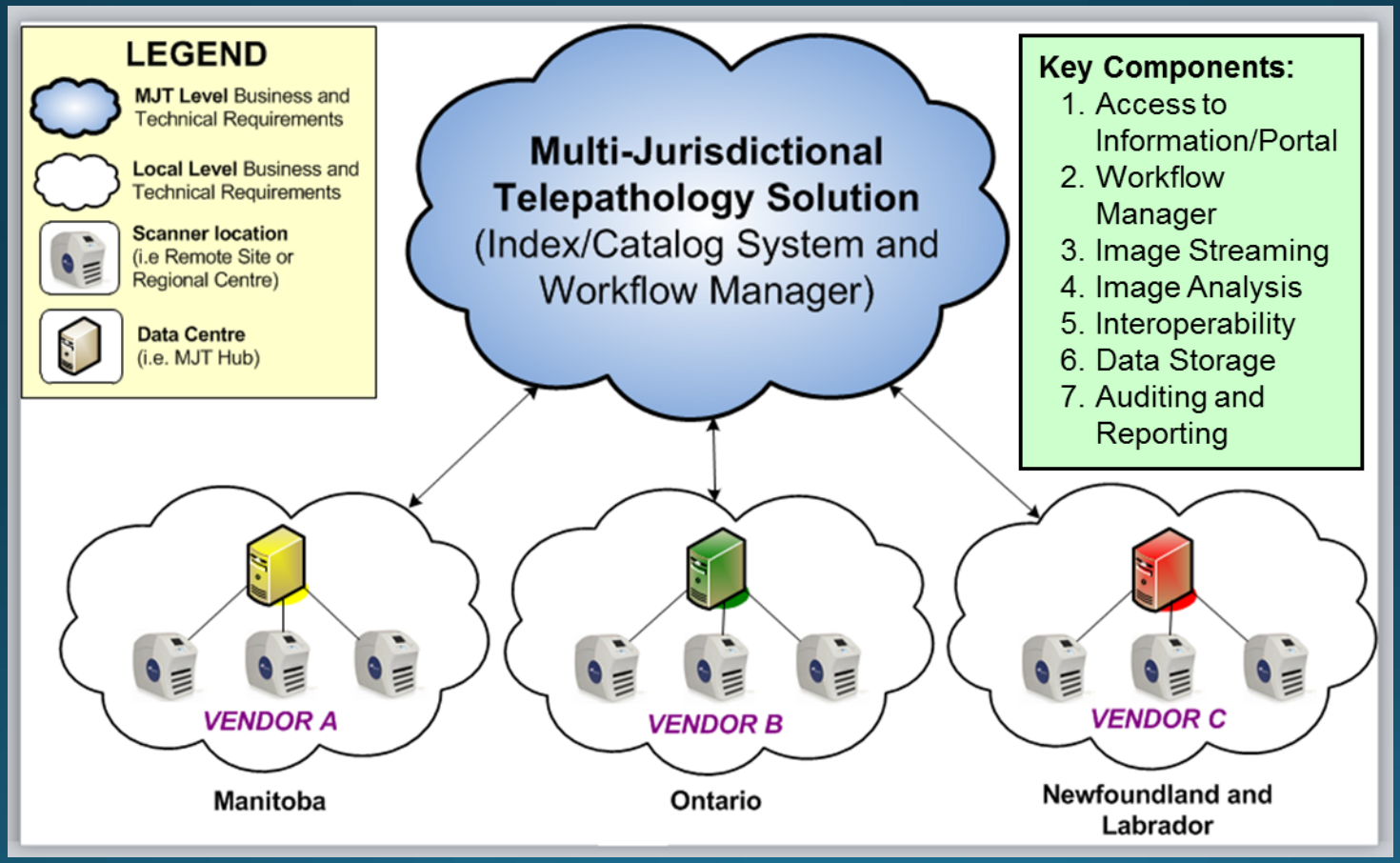
Why Telepathology?

- Create sub-specialist diagnostic capacity
- Minimize transportation for patients or specimens/slides
- Leverage larger pathology centres
- Meet increasing demand for services with limited human and financial resources.

Project Initiation

- Partnership with Canada Health Infoway, NL Centre for Health Information, Diagnostic Services Manitoba, and University Health Network.
- Phase I (Local & MJT): Define the requirements and estimated costs to connect pathology services within and among the provinces (NL, MB, UHN).
- Phase II: Implement provincial networks (NL, MB, UHN) and Connect to the Multi-jurisdictional Network

Vision


LEGEND
MJT Level Business and Technical Requirements
Local Level Business and Technical Requirements
Scanner location (i.e Remote Site or Regional Centre)
Data Centre (i.e. MJT Hub)
Multi-Jurisdictional Telepathology Solution (Index/Catalog System and Workflow Manager)
Key Components:
1. Access to Information/Portal
2. Workflow Manager
3. Image Streaming
4. Image Analysis
5. Interoperability
6. Data Storage
7. Auditing and Reporting
VENDOR A
VENDOR B
VENDOR C
Manitoba
Ontario
Newfoundland and Labrador

Current Challenges in Delivery of Pathology Services

- Underserved rural, remote areas
- Access to sub-specialty pathologists
- Logistics with moving glass slides
- Longer turn-around time increases patient anxiety

Local Solutions

Manitoba

- 5 sites
- 40 pathologists
- GE Omnyx
- Application
  - Consultations
  - Tumour Board
  - QA Conferences
  - Education

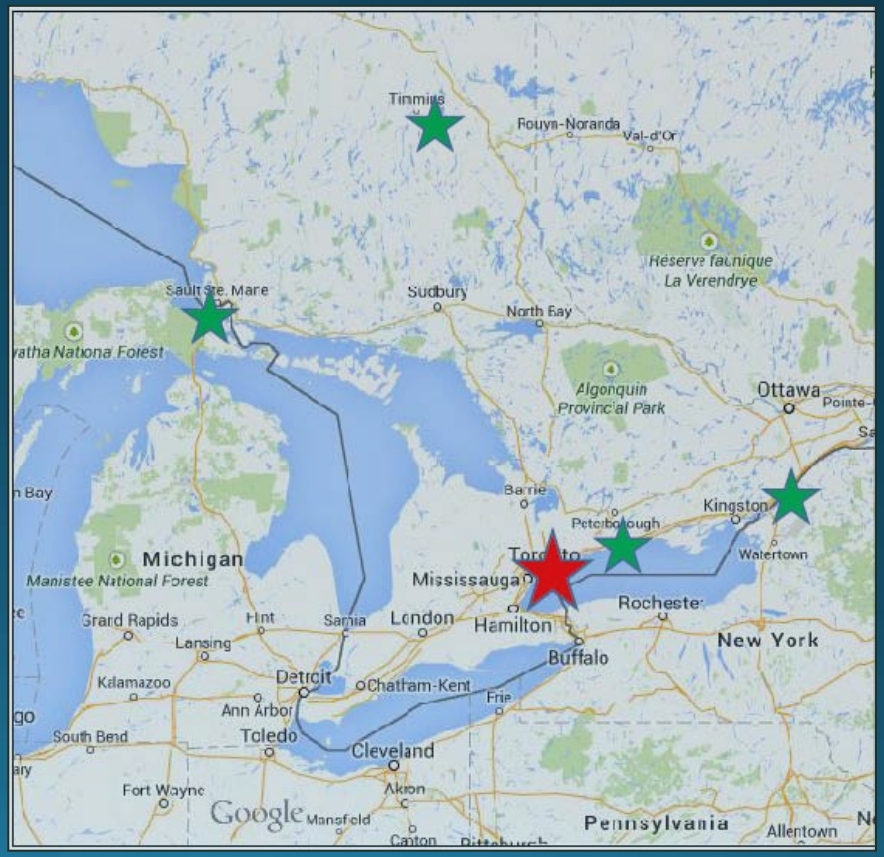
New

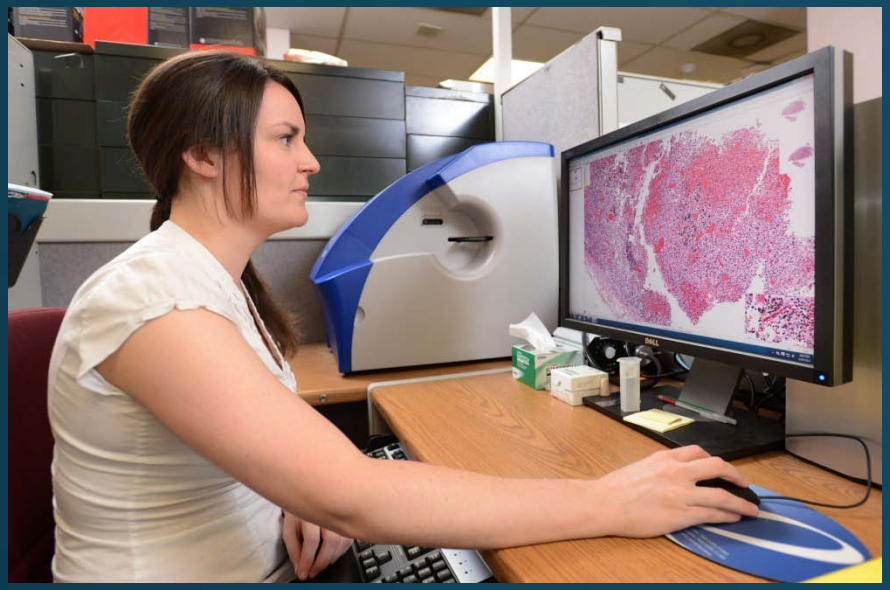
or

- 8 sites
  - 4 existin
  - 5 new sc
- 34 pathol
- Applicatic
  - Secor
  - Worki
    Assur
  - Educa

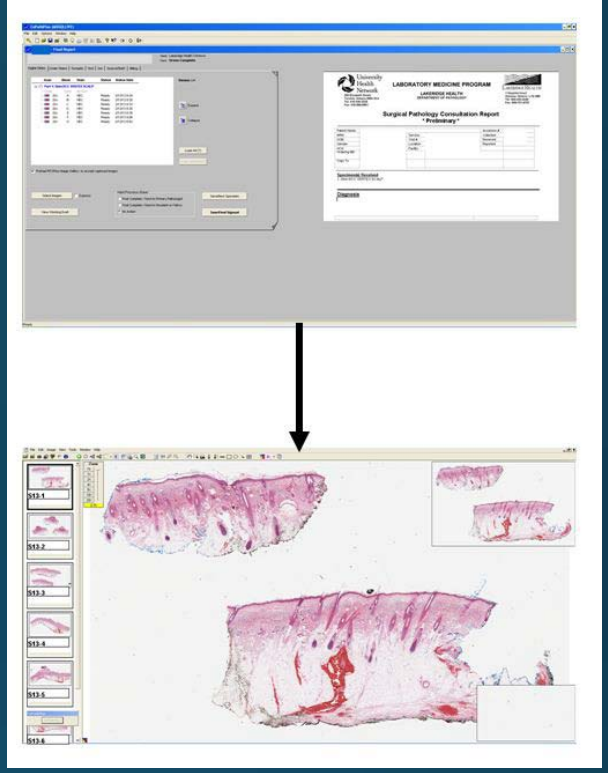
Ontario – University Health Network

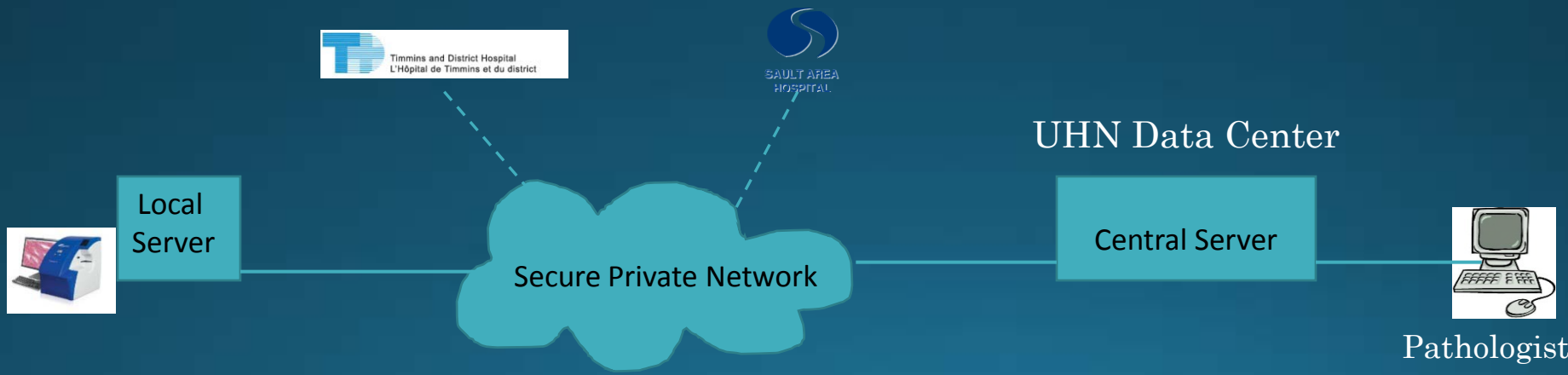
- 6 sites including 1 hub
- 65 pathologists
- Aperio/Leica
- Applications:
  - **Remote Frozen Section**
    - Toronto Western Hospital
    - Kingston General Hospital
    - Timmins and District Hospital
  - **Remote Primary Diagnosis**
    - Lakeridge Health Oshawa
  - **Consultation/ Teaching**





Routine scanning at 20x





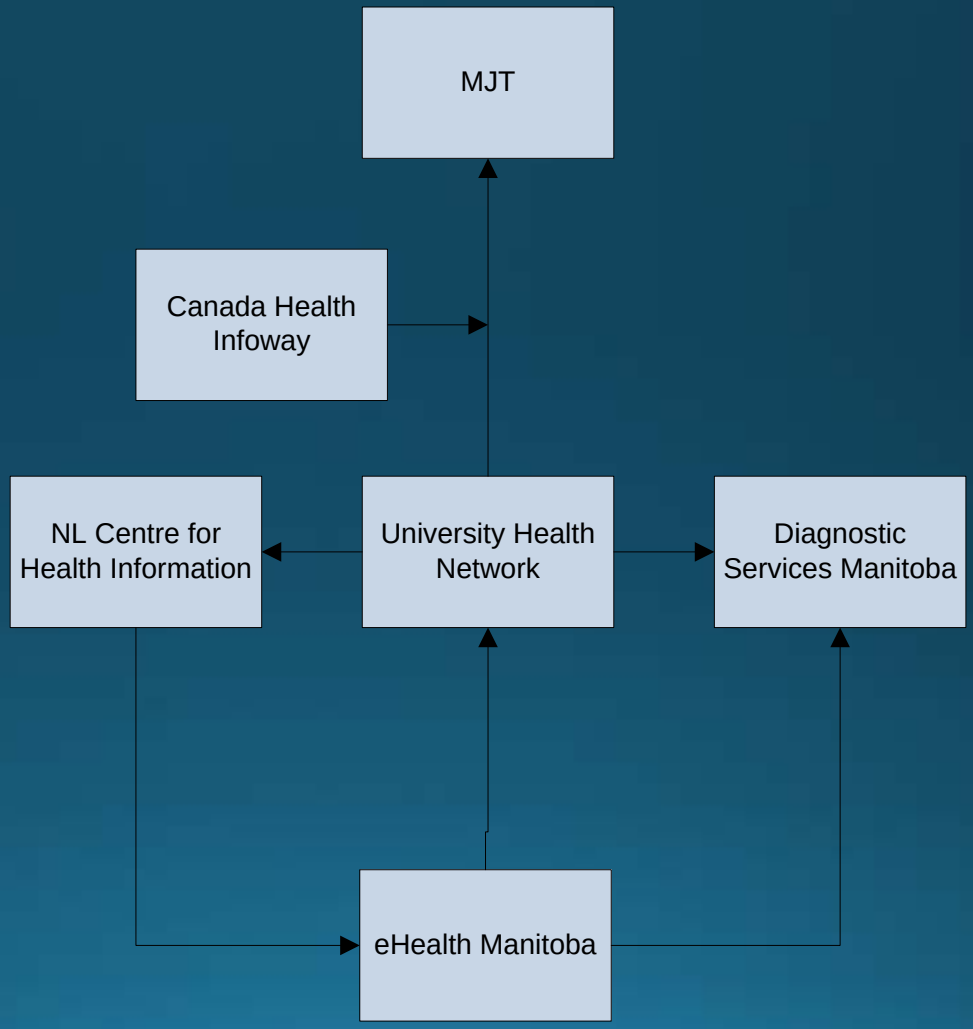
MJT Implementation

- Project Initiation in 2010

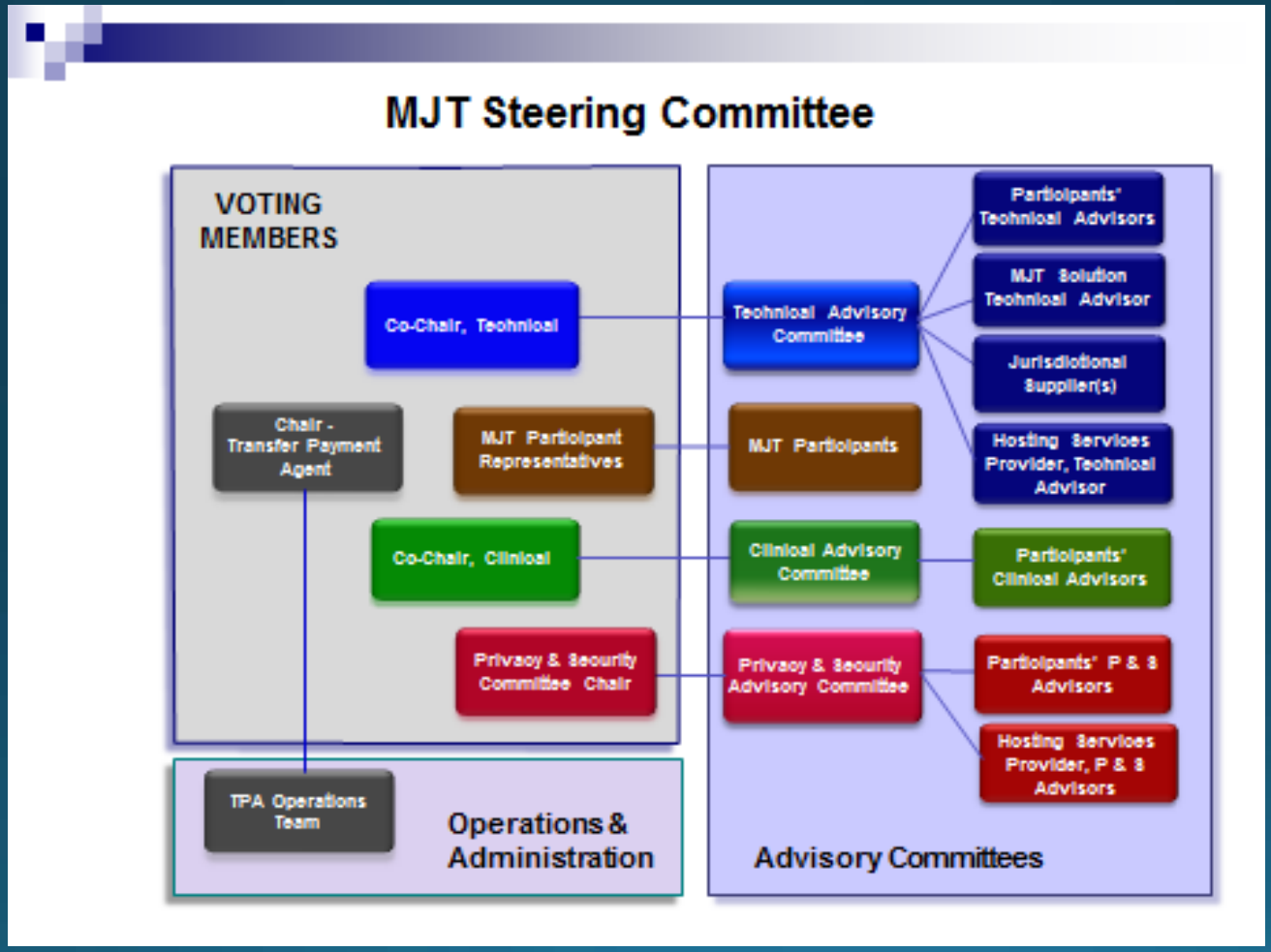
LOCAL & MJT	Project Milestones	2010	2011	2012	2013	2014	2015	2016	2017
	Project Initiation								
LOCAL	Local - Planning								
	Local - RFP								
	Local - Project Work								
	Local - Implementation								
	Local - Targets Achieved								
MJT	MJT - Planning								
	MJT - RFP								
	MJT - Project Work								
	MJT Implementation								
	MJT - Adoption Targets								

Project Governance

- Steering Committee
- Project team
- Working groups

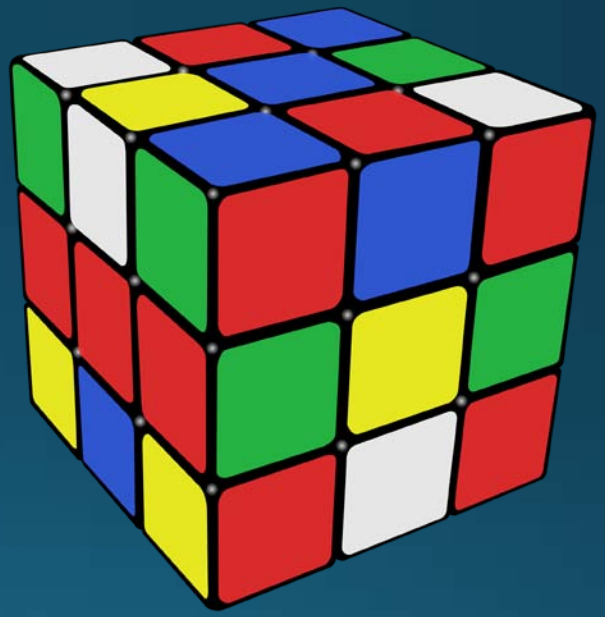


Operational Governance



Working Groups

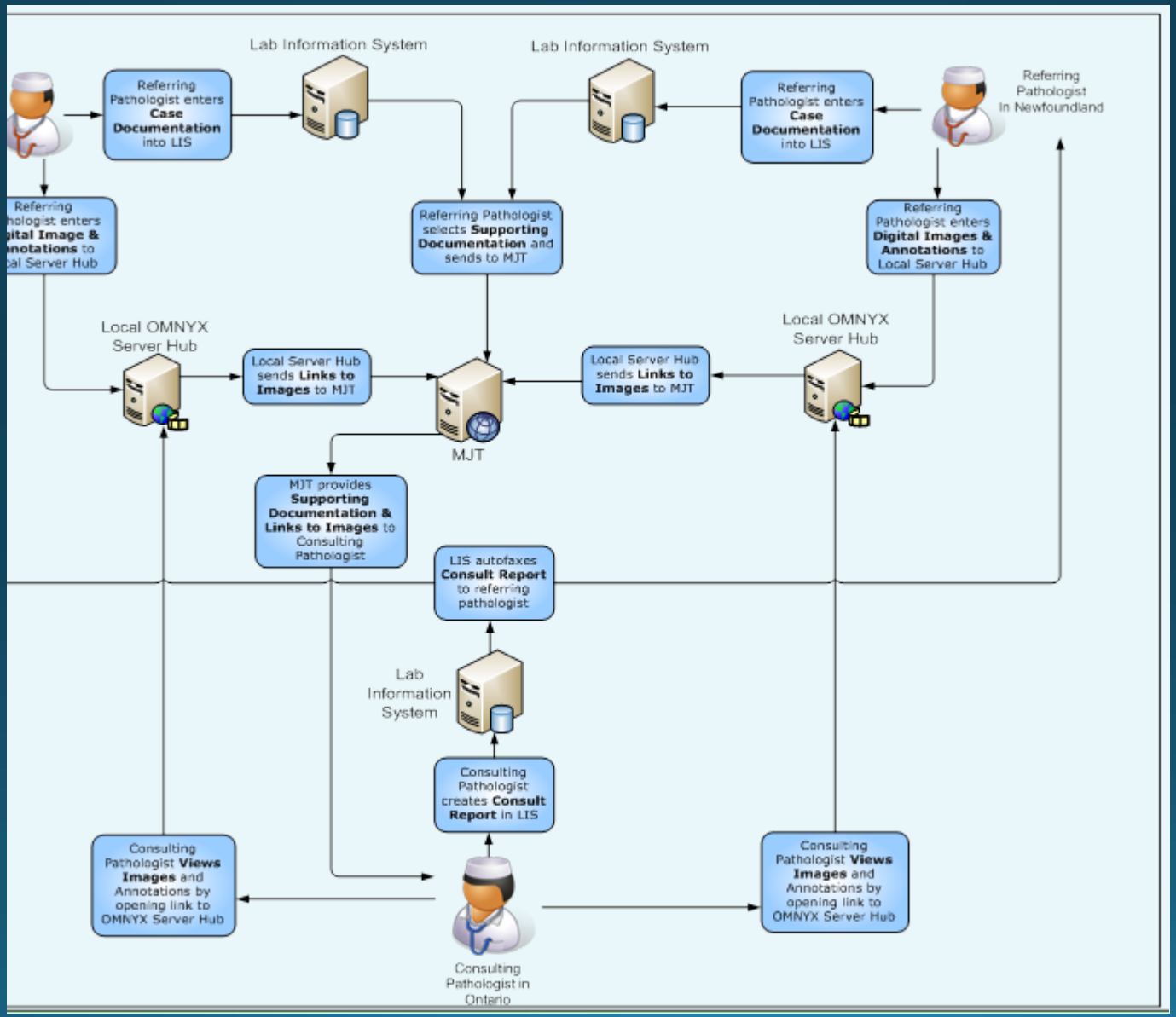
- Clinical WG
- Technical WG
- Privacy and Security WG
- Implementation WG
- Project Management WG



Clinical Working Group

- Stakeholders :Pathologists, Histologists, Administrator, Project Team members, Infoway
- Workflow
- Minimum Patient Identification

Clinical Workflow



Validation of WSI

Validation of whole slide imaging in the primary diagnosis of gynaecological pathology in a University Hospital

Jaume Ordi,[1,2,3] Paola Castillo,[1,3] Adela Saco,[1] Marta del Pino,[4] Oriol Ordi,[2] Leonardo Rodríguez-Carunchio,[1] Jose Ramírez[1,2]

ABSTRACT

Aims Experience in the use of whole slide imaging (WSI) for primary diagnosis in pathology is very limited. We aimed to determine the accuracy of interpretation of WSI compared with conventional light microscopy (CLM) in the diagnosis of routine gynaecological biopsies.

Methods All gynaecological specimens (n=452) received over a 2-month period at the Department of Pathology of the Hospital Clinic of Barcelona were analysed blindly by two gynaecological pathologists, one using CLM and the other WSI. All slides were digitised in a Ventana iScan HT (Roche diagnostics) at 200×. All discrepant diagnoses were reviewed, and a final consensus diagnosis was established. The results were evaluated by weighted κ statistics for two observers.

Results The level of interobserver agreement between WSI and CLM evaluations was almost perfect (κ value: 0.914; 95% CI 0.879 to 0.949) and increased during the study period: κ value 0.890; 95% CI 0.835 to 0.945 in the first period and 0.941; 95%; CI 0.899 to 0.983 in the second period. Major discrepancies (differences in clinical management or prognosis) were observed in 9 cases (2.0%). All discrepancies consisted of small lesions (8 high grade squamous intraepithelial lesions of the uterine cervix, one lymph node micrometastasis of an ovarian carcinoma) underdiagnosed or missed in the WSI or the CLM evaluation. Discrepancies with no or minor clinical relevance were identified in 3.8% of the biopsies. No discrepancy was related to the poor quality of the WSI image.

Conclusions Diagnosis of gynaecological specimens by WSI is accurate and may be introduced into routine diagnosis.

The rapid advances in this technology and i
many potential benefits will probably result in
progressive shift from conventional to virtu
microscopy in the routine diagnosis in patholog
Currently, several commercially available systen
are able to digitise glass slides containing tissue se
tions and produce virtual slides of excellent qualit

Validation of Multiple Whole Slide Imaging Scanners Based on the Guideline From the College of American Pathologists Pathology and Laboratory Quality Center

Michael J. Thrall, MD; Jana L. Wimmer, MD; Mary R. Schwartz, MD

• *Context.*—Whole slide imaging (WSI) produces a virtual image that can be transmitted electronically. This technology has clinical applications in situations in which glass slides are not readily available.

Objective.—To examine the results of a validation study performed using the draft version of the WSI clinical validation guideline recently released by the College of

cases as both glass slides and WSI, with at least a 3-week washout period between viewings.

Results.—Intraobserver agreement between glass slides and WSI was present for 786 (79%) of the 1000 cases. Major discrepancies occurred in 18 cases (1.8%). κ statistics compiled for the subset of cases (n = 504; 50%) with concern for neoplasia showed excellent agreement (κ = 0.8782). Individual scanners performed similarly to one
alysis of the results revealed an area of
all focal findings.
ns.—The results were felt to validate the use of
intended applications in our multiinstitutional
ystem, although scans at ×20 magnification
ufficient for cases hinging on small focal
h as microorganisms and inflammatory pro-

of Lab Med. 2015;139:656-664; doi: 10.5858/
073-OA)

Validation of a whole slide imaging system for primary diagnosis in surgical pathology: A community hospital experience

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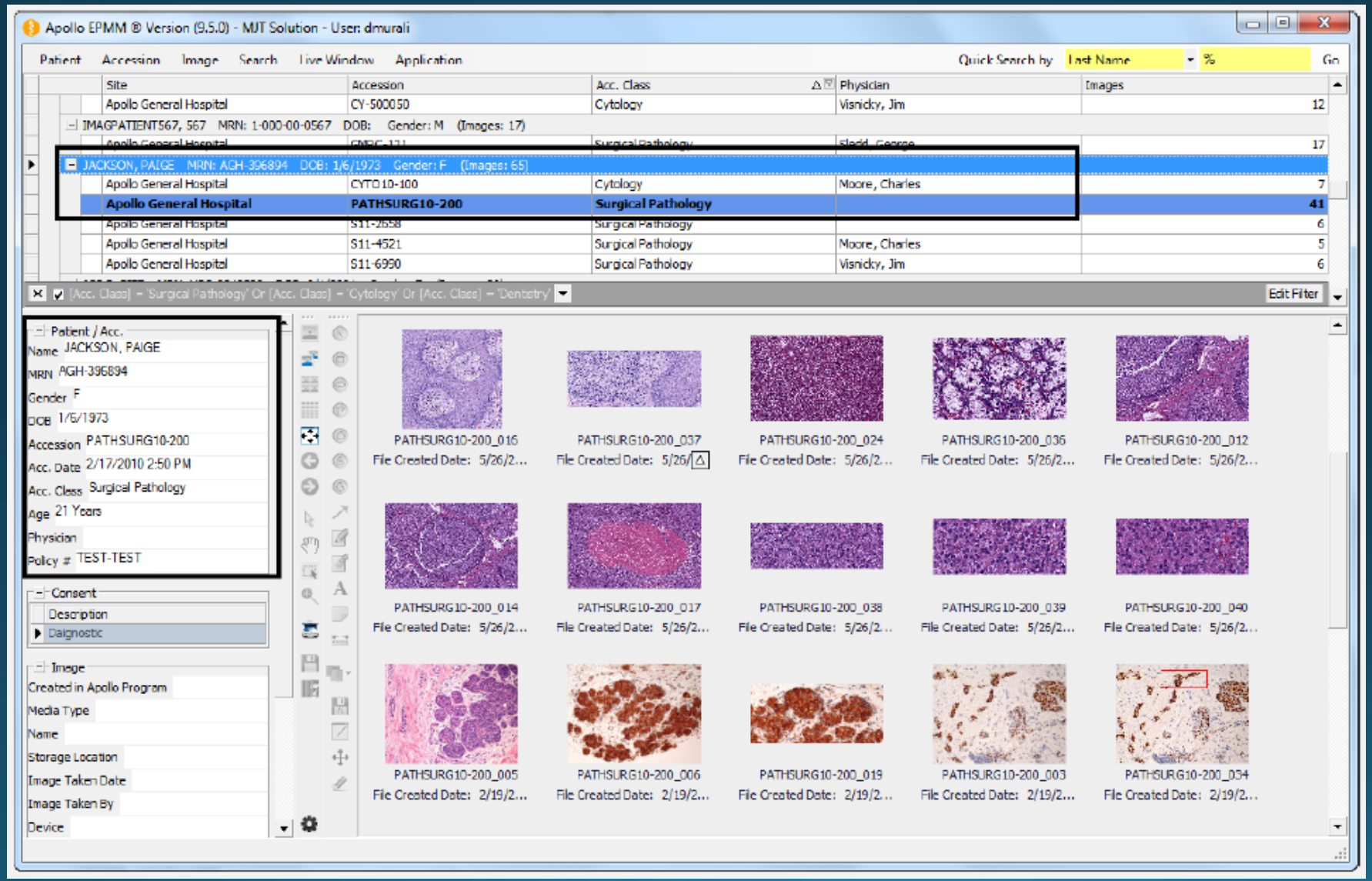
Available FREE in open access from: http://www.jpathinformatics.org/text.asp?2014/5/1/42/145721

Abstract

Guidelines for validating whole slide imaging (WSI) for primary diagnosis in surgical pathology have been recommended by an expert panel commissioned by the College of American Pathologists. The implementation of such a system using these validation guidelines has not been reported from the community hospital setting. The objective was to implement a WSI system, validate each pathologist using the system and run the system in parallel with routine glass slide interpretation. Six pathologists re-reviewed approximately 300 previously diagnosed specimens each, divided equally between glass slides and digital images (scanned at ×20). Baseline intraobserver discordance rates (glass to glass) were calculated and compared to discordance rates between the original glass slide interpretation and the reviewed digital slide interpretation. A minimum of 3 months was used as the washout period. After validation, a subset of daily cases was diagnosed in parallel using traditional microscopy (TM) and WSI over an 8-month period. The TM and WSI discordance rates ranged from 3.3% to 13.3% and 2.1% to 10.1%, respectively. There was no statistically significant difference among the pathologists. The parallel study yielded similar rates of discordances. In our laboratory, after appropriate implementation and training, there was no difference betwe- the WSI and TM methods.

MJT Solution



Technical WG

- Stakeholders: Jurisdictional Technical SMEs, Project Resources, Infoway SMEs, Vendor
- Architectural Solution
- Detailed Software Solution
  - Inter-operability and Interface of all 3 local systems with MJT solution
  - Distributing, Accessing, and Viewing consult cases
- Hosting at MB e-Health
- Upgrade of local solution, if needed

Privacy & Security WG

- Stakeholders: Jurisdictional Privacy & Security SMEs, Project Resources, Infoway SMEs, Vendor
- Common Understanding document
- Personal health information considerations
- Acceptable use policies
- Risk Framework
- Authentication
- Minimum security requirements

Implementation WG

- Stakeholders: Project Managers, Project Coordinators, Infoway, SMEs, Vendor
- Site installations
- Infrastructure integration
- MJT workflow
- Validation process
- Training
- Achieve adoption targets

Implementation Challenges

- Competing priorities, laboratory accreditation
- Development of cross-jurisdictional policies and procedures
- Human resources
- Integration with current workflow
- Developing and implementing a validation process
- Training requirements for workflow and adoption
- Ensuring success beyond adoption targets
- Multiple RFP Processes
- Understanding Health Canada requirements

Lessons Learned

- Do not underestimate the impact of:
  - New technology
  - Changing workflow
  - Cross-jurisdictional efforts
  - Interoperability of jurisdictional solutions
  - Consideration of scalability
- Early and ongoing stakeholder engagement

Benefits of an MJT Solution

- Enhancing collaboration for pathologists across Canada
- One point of access for pathologists across jurisdictions
- Keeping the glass slide at 'home'
- Providing patients with timely, sub-speciality diagnosis

Thank you!

Questions?

Partner Organizations