

Digital Slide Sharing and Consultative Strategies and Tactics

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Digital Slide-based Second Opinion Consult Service

- Subspecialty expert consultation sites is one of most important clinical applications envisioned for digital pathology/WSI
- Addressing workflow elements that differ in WSI-based consultation service vs. conventional consultation practice is required
- This session examines operational and administrative considerations unique to WSI-based subspecialty consultation

Digital Slide Consultative Strategies and Tactics – Outline

- Drivers/Benefits (real and anticipated)
- Barriers
- Operational considerations
 - Referring site issues
 - Consultant site issues
- Organizational strategy and tactics

Case Study – Cleveland Clinic

- Subspecialty-based surgical pathology service (>100K/yr)
- Exploring WSI applications in department-level context
- Experience with successes and barriers in WSI



Why Start a WSI-based Secondary Consultation Service?

- Provide access to subspecialty expertise where otherwise not available
- Supplement current consultation practices
- Extend organization's reach
- Support institutional distance medicine programs
- Develop international markets
- Develop *potential* revenue stream

Why Send Out Digital Slides Instead of Glass?

- Chance to leverage any investment in WSI by using for send out cases
- *Potential* for faster TAT – eliminate time and distance barriers with “sending out cases”
 - Already a built in delay expected for “send outs”
- *Potential* for less prep time and cost at referring site (packaging, mailing, etc.)
 - Unproven – some tasks replaced with others (scanning)
- *Potential* for real-time collaboration over a digital slides

Whole-Slide Imaging Digital Pathology as a Platform for Teleconsultation

A Pilot Study Using Paired Subspecialist Correlations

Wilbur DC et al. Arch Pathol Lab Med 2009; 133:1949-53
(Massachusetts General/Harvard)

- Feasibility study using 53 consultation-level cases from various organ systems
- 91% WSI concordance rate vs. glass slide dx
 - 93% for neoplastic
 - 88% for nonneoplastic
- Concluded that WSI interpretation for consultative material is feasible

The value proposition for digital pathology-based consult service hinges on realizing benefits that outweigh the costs associated with incremental work and investment.

Intangible benefits may be main drivers.



“We just got this cool scanner. Can I just send you some digital slides for a consult?”

“We wouldn’t have to pack up the slides and wait for you to get them.”

“We could get our answer right away.”

“It would be great for us.”

“Sure, we can do that.”

(later, internally): “How are we going to do that?”

Models for Individual-Use (or Ad Hoc) Digital Slide Sharing

- Desktop sharing applications
 - Viewing digital slides or video feeds from originator's desktop
 - Live conferencing, real time
- On-line digital slide sharing services
 - Low/no cost
 - Upload and sharing of digital slides
 - Informal communication and reporting
 - Live conferencing not required

Using Individual-Use Digital Slide Sharing Methods for Consults

- Maybe useful for individual, sporadic, and/or informal consult requests
- Informal reporting
- Concerns:
 - Scalability
 - Security
 - Patient and specimen identification
 - Organization of cases and workflow

**“We want to be on the cutting edge and have a digital pathology consult service”,
BUT...**

- How are we going to get the digital slides?
- How are we going to know the digital slides are available?
- What’s the clinical history or actual question?
- Who is going to look at the digital slides?
- Are we going to promise a faster turnaround time?
- How are we going to bill?

Taking it to the Next Level: What are Barriers to Digital Slide- based Consultation Service?

- Transition from ad hoc activity to department level program or service line
- Referring site issues
- Consultant site issues
- Suitability of WSI technology and software to meet service requirements
- *Cost* and value proposition

Transition to Department-level Digital Slide Consultation Program

- *Mindset* – see it as a service line
- Technology only part of what's needed
- Leadership support
- Objectives and scope definition
- Buy-in from participants and stakeholders

Transition to Department-level Digital Slide Consultation Program (cont'd.)

- Dedicated and responsible parties (not ad hoc or “hobby”)
- Policies
- Procedures (SOPs)
- Resources and budget
- Quality management

Workflow considerations are paramount in the successful implementation of digital pathology as a service

(that is, for anything more than occasional ad hoc, *informal* consults)

Sometimes you have to get “into the weeds...”



Digital Consult Workflow Steps at Referring Site

- *Scan slides* → **Correctly!**
- Prepare required case-related documentation – letter, preliminary report, billing information, etc. – *potentially another scanning step*
- Transmit case-related documentation
- Notify consultant site of case submission
- Provide additional material when requested – slides, blocks, additional scanned slides (e.g. IHC)

Case-related Documentation for Digital Consults

- Patient ID and demographic information
- Description of specimen/ # of glass slides submitted
- Clinical history
- Specific questions or requests for pathologist
- Pathology report (if referral case)
- Patient insurance/billing information

For digital pathology consultations, a mechanism is required for getting this information to the consultant site

Digital Consult Referring Site Issues

- Personnel and competence/expertise to scan slides
- Scanner acquisition and maintenance costs
- Scanner support and maintenance functions
- Troubleshooting of scanners
- Communication and procedures regarding need for glass slides or blocks for deferral or additional studies

Digital Consult Referring Site Issue – WSI scanner

- Sites with pre-existing scanners and image formats – compatibility issues
- Can consulting laboratory provide scanners to referring sites?
 - Cost
 - Compliance – inducement (?)
 - Support
- Smaller, lower cost, dedicated use scanners available?
- Price points and financial justification/hurdle

Digital Consult Workflow Steps at Consultant Site

- Accessioning and receipt of required documentation
- Verification of slide quality, case completeness
- Awareness that case has been received at case intake location
- Distribution of digital consult case to pathologist

Digital Consult Workflow Steps at Consultant Site (cont'd.)

- Notification to pathologist that case is available (slides don't "appear")
- Pathologist navigation to digital slides – only his/her cases
- Generation and distribution of report (formal vs. informal)
- Process for deferral and conversion of case to a conventional glass slide case – need glass
- Process for additional studies – need block, need stains, etc.
 - Will you accept scanned immunostains? Policy?

Addressing pathologist concerns is key to implementing digital pathology successfully.



Pathologist Factors in WSI for Second Opinion Consultation

Wilbur DC et al. Arch Pathol Lab Med 2009; 133:1949-53
(Massachusetts General/Harvard)

- “Negative comment from WSI reviewers related to virtual slide-viewing technical issues, such as fine resolution and ease and speed of navigation, especially at high magnifications.”
- “Comments also indicated initial unease or lack of confidence...when using this technology.”

Pathologist Concerns in Digital Consultation Service

- Service coverage and case assignment
- Training in use of WSI *and* digital consult service procedures
- Willingness/comfort in use of WSI
- Time required per case (vs. glass)
- TAT expectations – raised because of digital availability?
- Procedure for deferrals
- Procedure for block/slide requests
- Expectation for availability to provide real time consultations with referring sites over digital slide?

CAP Laboratory Accreditation Requirements Applicable to Digital Pathology

- Method to ensure correct patient and image identification and match
- Access to pertinent clinical information at the time of case review
- Policies for appropriate and intended use(s) of equipment
- Training procedures
- Inclusion of digital pathology in quality management plan
- Data confidentiality and security measures

Strategies for Overcoming Organizational Roadblocks for Digital Consult Service

(Cleveland Clinic Case Study)

- Leadership buy-in – departmental and institutional
- Establishment of organizational unit dedicated to digital pathology – “ePathology”
- Subspecialty-based surgical pathology service
- Use of internal reference laboratory resources

“ePathology” Organizational Unit

(Cleveland Clinic Case Study)

- Charge: to incorporate digital pathology into departmental operations
- Pathologist Medical Director
- Dedicated:
 - Personnel and procedures
 - Space
 - Budget
- Matrix relationship with pathology informatics group

Tactics for Digital Consult Service Workflow

(Cleveland Clinic Case Study)

- Development of SOPs specific to digital consult service
- Accessioning of digital consults in ePathology unit
- Acceptance of supporting documents by fax
- Alignment of digital consult procedures with conventional consult procedures as much as possible
- Expectation of case review (not necessarily final dx) within 24 hours of receipt
- Use of (empty) slide tray with paperwork as indicator of case assignment – analogy to conventional case distribution

Tactics for Addressing Pathologist Concerns in Digital Consult Service

(Cleveland Clinic Case Study)

- Aim of minimization of differences in workflow that pathologists experience for digital consults
- Adherence to existing rules and practices for handling routine consults – case assignment, holdover cases, coverage of absences, etc.
- Training and documentation
- Dual display monitor configuration with new 24-inch monitor
- Opportunity to build archives of consultation case images more easily

Pathologist Training – WSI Viewer and Digital Consult Process



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Rev

Image Viewer Training Checklist

| | |
|-----------------------|-----|
| NAME: | |
| EMP. # | |
| TRAINER: | |
| TRAINING DATE: | / / |

| CHECK | DESCRIPTION | REFERENCED IN: |
|--------------------------|--|----------------|
| <input type="checkbox"/> | Demonstrate image selection | Manual |
| <input type="checkbox"/> | Demonstrate image movement methods | Manual |
| <input type="checkbox"/> | Demonstrate magnification | Manual |
| <input type="checkbox"/> | Demonstrate image capture | Manual |
| <input type="checkbox"/> | Review case access method | Manual |
| <input type="checkbox"/> | Review Preliminary diagnosis sheet | Manual |
| CHECK | DESCRIPTION | REFERENCED IN: |
| <input type="checkbox"/> | Review applicability of HIPAA guidelines and Clinic policies | |

All of the preceding topics have been demonstrated/explained to my satisfaction.

| | | | |
|-----------------|--|--------------|-----|
| Trainee: | | Date: | / / |
| Trainer: | | Date: | / / |



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Revised:

Digital Pathology/WSI Training Checklist

| | |
|-----------------------|-----|
| NAME: | |
| EMP. # | |
| TRAINER: | |
| TRAINING DATE: | / / |

| CHECK | DESCRIPTION | REFERENCED IN: |
|--------------------------|--|--|
| <input type="checkbox"/> | Review workflow of e-path digital consult cases | Accessioning e-path trial study . |
| <input type="checkbox"/> | Review specimen/patient identification responsibilities | Accessioning e-path trial study . |
| <input type="checkbox"/> | Review case assembly, folder contents | Accessioning e-path trial study . |
| <input type="checkbox"/> | Review notification | Accessioning e-path trial study /SecondSlide procedure |
| <input type="checkbox"/> | Review case access method | SecondSlide Procedure |
| <input type="checkbox"/> | Review Preliminary diagnosis sheet | SecondSlide Procedure |
| <input type="checkbox"/> | Review workflow associated with the glass slides | Accessioning e-path trial study . |
| CHECK | DESCRIPTION | REFERENCED IN: |
| <input type="checkbox"/> | Review applicability of HIPAA guidelines and Clinic policies | SecondSlide Procedure |

All of the preceding topics have been demonstrated/explained to my satisfaction.

| | | | |
|-----------------|--|--------------|-----|
| Trainee: | | Date: | / / |
| Trainer: | | Date: | / / |

Software Functions to Support Digital Consult Service

- Digital slide “depot” software ideal functions:
 - Upload of slides
 - Upload of supporting documentation
 - Support of multiple WSI image formats
 - Alert to consultant site of case receipt
 - Messaging between referring and consultant sites
 - Ability to add digital slides or documents to original submission

Software Functions to Support Digital Consult Service (cont'd.)

- Case routing at consulting site between:
 - Case intake area and pathologist
 - Pathologists – case transfer, service coverage
 - Residents/fellows and attendings at academic centers
- Organized digital case list specific to assigned individual pathologist
- Integration with AP LIS
- Capture of billing information
- HIPAA compliance
- Option to save digital slides or image captures locally

- Enables upload of whole slide images for subspecialty-based digital consult service
- All major whole slide image formats accepted
- Stated benefits to senders:
 - Saving on overnight shipping charges
 - Receipt of results much quicker than traditional overnight mail

Service Points Addressed

- 24 hr TAT “under most circumstances”
- STAT processing not available
- Communication via e-mail for request of additional material – slides, blocks, images
- Billing information – insurance and institution billing available
- Hematopathology cases not accepted

Evolution of Digital Pathology

WSI as “cool technology” or “toy”



- Individuals with specific interests or needs
- Ad hoc use
- No standard operating procedures (SOPs)
- Training, if any, based on individual use and interests
- Stand-alone WSI systems

WSI as tool to meet operational needs

- Department-wide use
- Incorporated into departmental operations and workflow
- SOPs required
- Standard, role-based training required
- WSI systems integrated with AP LIS and other systems

Digital Slide-based Consult Service Summary

- Implementing a digital pathology-based consultation service requires attention to how new workflows will be incorporated into departmental operations.
- Potential operational barriers include issues at referring site and consultant site.
- Software capabilities for digital slide consultation must address departmental-level workflow requirements.