



cap

Digital Pathology: The Pathologist's Perspective

RICHARD C. FRIEDBERG, MD, PHD,
FCAP
CHAIRMAN, DEPARTMENT OF
PATHOLOGY
BAYSTATE HEALTH
SPRINGFIELD, MA

February 14, 2012



cap.org

v. 1

Digital Pathology: A Pathologist's Perspective

- What Digital Pathology *IS*?
- What are the Future Roles of a Digital Pathologists?
- Why is pathology changing now?
- Why Will Digital Pathology Take Off?

What Digital Pathology IS?

- Use of computer technology to convert analog microscopic images into digital images.
- Synonyms: digital imaging, virtual slides, or virtual microscopy

What Digital Pathology IS NOT?

- The elimination of glass slides
- The elimination of histology
- *In vivo* imaging
- Abandonment of 100+ years of morphology
- Replacement of established image analysis concepts
- Computer diagnosis

Where Does Digital Pathology Fit?

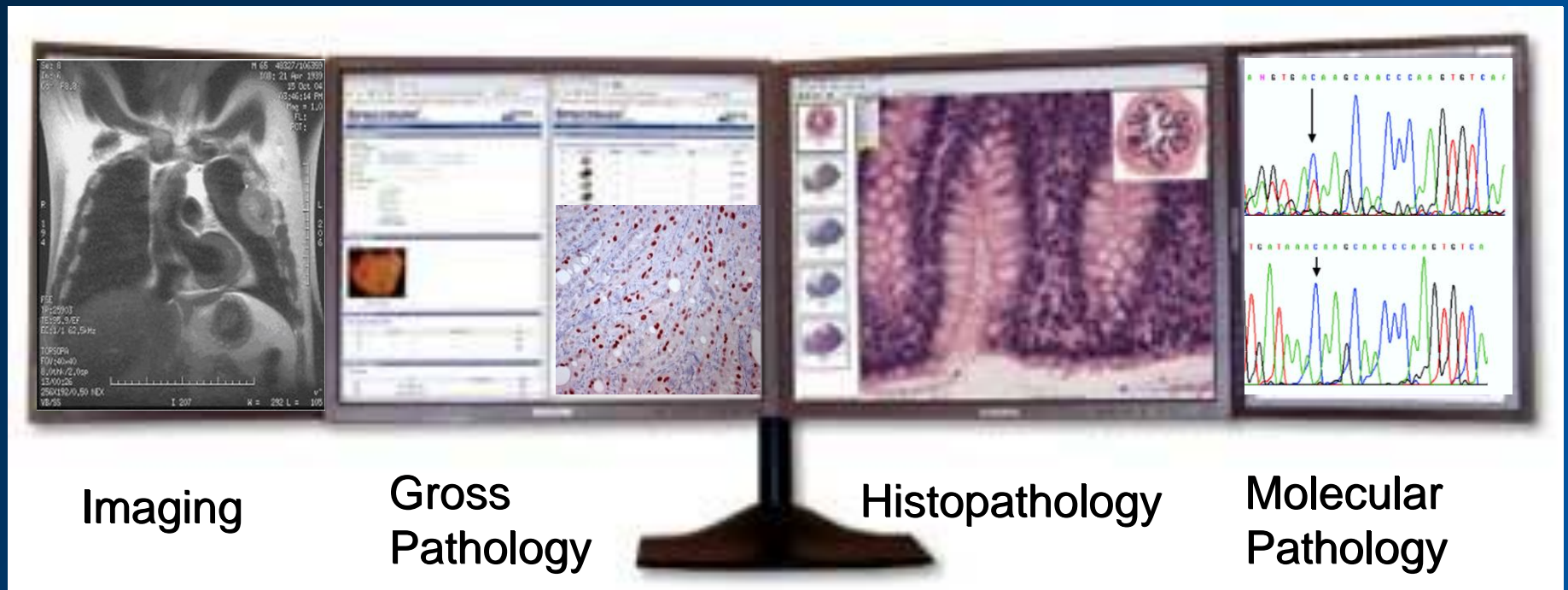
- Will affect everything between image acquisition to image analysis
 - Begins right after the slide is created
 - All the way up to the delivery of the final interpretation to the provider
- Will extend diagnostics
 - Complement a century of morphology knowledge with the emerging world of functional and structural molecular biomarkers, effectively redefining the diagnostic process

What are the Future Roles of a Digital Pathologist?



The New Paradigm

- Comprehensive integrated consultations with imaging, biochemical, histologic, molecular, cytogenetic and epigenetic data



- The Pathologist's Cockpit

Digital Pathology Will Lead to:

- Much improved reports
 - Off-time to near real-time
 - Single modality to multi-modality
 - Integrated within pathology (AP, CP, molecular, etc)
 - Integrated within diagnostic medicine - pathology, radiology, nuclear medicine, etc
- Access to the right pathologist at the right time
- Cost effectiveness to the healthcare system and laboratory

Why is Pathology Changing Now?

- Advances in digital technology
- Economics
- Fewer pathologists

What Do We Know About This Change?

- Radiology already made this change
 - The basic technology is here and it is being applied, delivered, and improved
- Differences between pathology and radiology will dictate different courses

What Agencies are Involved in Oversight?

- CMS
 - Enforces CLIA
 - Approves private accrediting organizations
- CAP
 - Functions as CMS-approved private accrediting organization
- Develops evidence based guidelines
 - Eg, "Validation on Whole Slide Imaging Systems for Diagnostic Use in Pathology"
- FDA
 - Ensures device safety and effectiveness

Impediments to Widespread Adoption of Digital Pathology

- Primary data acquisition – completely digital?
 - Nearly 100% optical acquisition today
- Glass slides and paraffin blocks?
 - Still need to fix/process/embed/cut tissue, create slides
- Where's the Beef ?? Value ??
 - Workflow, workflow, workflow
 - Grossing, processing, histology
 - Pathologist case-centric workflow will be critical



Why Will Digital Pathology Take Off?

- All-digital environment will allow easy integration of
 - Paper and electronic documents
 - Gross specimens & reports
 - Slide processing status
 - Whole slide images
 - Patient clinical background
 - Resident and peer collaboration
 - Prior cases, images, results
 - Radiology images
 - `omics, `ologies, `emias, `omas, & `itises
 - Reporting

Why Will Digital Pathology Take Off?

- Increased Efficiencies
 - Productivity increases due to workflow enhancements
 - Improved report TAT – days to hours
 - Archiving and retrieval of images allows comparisons
 - Easier tumor boards and conferences
 - Remote case review
 - Clinician viewing increases participation
 - Screening studies
 - Quantification
 - Improved slide availability, fewer handling errors

Why Will Digital Pathology Take Off?

- New Tools & Services
 - Quantitative comparison
 - Case sharing and collaboration
 - Computer aided image analysis
 - 3D tissue imaging, multiprotein colocalization, full dynamic quantitation
 - Remote frozen sections
 - Personalized medicine
 - Onshoring?
 - Immediate on-site contextual access to anatomy atlas, similar cases, expert opinion, other imaging modalities, etc.

Obstacles to Address

- Adoption
 - Technology: science and information
 - Practice integration
 - Market
- Quality requirements
 - Accuracy, sensitivity, specificity, reproducibility, validity
- Financial / Reimbursement
- Regulatory
- Medical ethics
- New mindsets are required





cap