Information Technology as a Driver for New Modes of Practice in Pathology and Lab Medicine: A System Integration Perspective

Bruce A. Friedman, M.D.
Active Emeritus Professor of Pathology
University of Michigan Medical School
Ann Arbor, MI  48109
President, Pathology Education Consortium
My email: friedman@labinfotech.com
My blog: www.labsoftnews.com
Twitter: @labinfotech

The Interplay Between Information Technology and System Integration

- Key goal today is to provide a strategic perspective about how information technology will affect field of cytopathology
- In pursuit of this goal, will discuss various types of system integration that are accelerating with IT as a key driver
- Will be using broad definition for "systems," including hospitals, hospital departments, and medical specialty practices
- This approach will both set the stage for following lecture and alert you to evolving macro trends in healthcare
- Obviously, and if case is well made for reality of these trends, consider shifts in your career for better alignment

Integration (e.g., IT, System, Organization, Specialty): One of My Favorite Topics

- No problem for me to lecture on topic of integration; have spent most of my career trying to understand this term
- Reason why important is that many "systems" develop initially as separate entities until value/merit is proven
- Subsequently, some may need to be integrated with related processes to enhance coordination & efficiency
- Such integration often technically difficult; as they evolve, systems may acquire their own goals, rules, budgets
- Also politically difficult: each system, as it is developed, has its own personnel roster who may resist change & reform

Setting the Stage for Integration Discussion in Pathology & Lab Medicine

- Period of unrest about healthcare delivery: expectation of high-quality services but less interest in paying for them
- Particularly in the U.S., interest in healthcare reform but difficult to define & achieve; vested interests lobby heavily
- Will focus here on two key elements in healthcare: (1) clinical lab/pathology services, (2) information technology
- Per title of lecture, will pay special attention to integration as a means to achieve more efficient and effective care
- Recurrent theme will be growing criticality of diagnostics in healthcare delivery, now entering golden era of this field

Examples of Integration Pathology & IT Integration Under Discussion

- (1) Integration of Clinical Pathology with Anatomic Pathology integration of genomics diagnostics with downstream therapeutics
- (2) Workflow integration of digital pathology with LIS, RIS and PACS, introduction of the pathologist dashboard/console
- (3) Integration of Pathology, Lab Medicine, & Radiology to form new specialty of Diagnostic Medicine, emergence of "Diagnostic Centers"
- (4) Development of lab networks (hospital LIS + esoteric reference LIS); pursuit of integrates clinical lab database for patient care
- (5) Downstream integration of the expanding LIS with hospital EMRs, consideration of the technical & political challenges involved
Criticality of Diagnostics in Emerging Healthcare Delivery Model

- Emergence of healthcare model with more emphasis on diagnostics, highly significant for labs, pathology, radiology.
- Result of better technology & science; prominence of the field will be enhanced by pursuit of integrated diagnostics (see later).
- Also opportunity to reshape relationship of labs to consumers; lab medicine begin to develop ongoing relationship with them.
- Relationship to consumers will require greater familiarity with Web 2.0; source of both information & links to consumers.
- Limitations/barriers will not be erected by marketplace; determined by ambitions/vision/skill set of lab professionals.

Wellness vs. Overt Disease; Emergence of Pre-Disease as Significant Category

- In previous diagram, major separation between wellness and overt disease, most MDs trained to diagnose latter.
- Sophisticated diagnostic techniques uncovering genetic predisposition to disease & pre-diseases in earliest forms.
- Because MDs & hospitals focus on overt disease, consumers titling to complementary/alternative medicine.
- In U.S., CAM accounts for 1/3 of out-of-pocket spending on prescription drugs & 1/6 of spending on healthcare visits.
- Lab professionals should place more emphasis on predictive/preventive medicine; capture more of this market.

Further Discussion about the Deloitte Healthcare Reform Pyramid

- Critical element in most healthcare reform proposals in U.S. is more support for IT; current emphasis on EMRs.
- Much discussion in healthcare reform dialogue focuses on comparative effectiveness of treatment; related to EBM.
- Reimbursement for episodes-of-care as alternative to fee-for-service; lab testing will be key metric for assessing value.
- Coordination of care poses challenge in U.S.; burden falls on primary care practitioners who are in short supply.
- Consumerism & PHRs at top of pyramid; opportunity to engage consumers in their care if maintain PHR platform.

(1) Integration of Clinical Pathology & Clinical Pathology; Diagnostics with Therapeutics

- Clinical pathology has long been diverging from surgical/cytology pathology, now some early signs of convergence of them.
- Surgical/cytology pathology moving beyond morphology and subjective to more scientific & quantitative approach.
- Major stimulus from new emphasis on quantitative & qualitative biomarkers; biomarkers & algorithms (see next).
- This integration, as well as increased adoption of digital pathology, a necessary precursor to integrated diagnostics.
- With integrated diagnostics, diagnostician uses various lab tests & imaging modalities to arrive at the correct diagnosis.
Algorithm-Driven Diagnostics as Precursor to “Blended” CP and AP

- Great progress in development of “companion algorithms” for automated scoring of digitized IHC & FISH tumor slides
- Theoretically, this approach can minimize inter-observer variation and subjectivity in interpretation of special stains
- Special billing code has been assigned to automated IHC interpretation, allowing improved ROI for capital investment
- As noted previously, molecular dx & IVDMIAs moving toward possible that CP and AP will coalesce around basic concept of computerized algorithms that convert data to diagnoses

Broader Adoption of Digital Pathology: Precursor for Integrated Dx

- Conversion to digital pathology will take longer than digital radiology; won’t result in higher margins/new procedures
- Technology has also taken longer to mature; challenge of whole slide imaging and huge file storage requirements
- Digital pathology will be prerequisite for deployment of integrated diagnostics; given that radiology 100% converted
- One “killer app” for digital pathology will be “image search”, compare areas of interest against reference databases
- Another important enabling technology is the pathology cockpit or dashboard; whole slide images + all clinical data

(2) Workflow Integration of Digital Pathology PACS With LIS and RIS

- With analog surgical/cyto pathology, no need for workflow integration; managed by AP-LIS separately from CP
- Now surgical pathologists need to be aware of serum & tissue biomarkers; also need to review radiology findings
- This integration component is being addressed by new product offerings: front-end pathology dashboard/console
- LIS & RIS have 30-40 year history; optimal workflow, assumptions pre-baked into systems, no need to invent
- Digital pathology systems less mature; most effort focused on scanners, user interface, & interp. algorithms

Defining and Understanding the Value of the Integrated Diagnostic Center (IDC)

- An IDC is a clinic with the mission of diagnosing patients with lesions using multidisciplinary team
- MDTs consist of clinicians, pathologists, & radiologists who collaborate to quickly diagnose referred patients
- MDTs have many advantages: intra-team communication, referrals, & hand-offs are facilitated
- In the UK, Patients with breast masses are referred to IDCs which are called “one-stop” breast clinics
- No reason why IDCs cannot also be used to dx diseases other than breast such as lung, GU, & GI

Integrated Diagnostic Centers (IDCs): Tangible Proof of Value of Integrated Dx

- Radiologists have developed Breast Centers over years with focus on screening mammography & dx of masses
- Opportunity now for such centers to provide integrated reports (radiology + pathology) & more dx coordination
- Centers will spawn new software: merged LIS+RIS+ PACS; also integrated pathologist/radiologist dashboard
- Opportunity for workflow software that will manage & facilitate hand-offs from pathology/labs to radiology
- IDCs offer hospital pathology opportunity to compete with national reference labs; can’t offer similar dx services
Some of the Consequences of Emerging Diagnostic Networks

- Concept of a diagnostic network pioneered by NightHawk Radiology: off-hours interpretation of images in the U.S.
- Concept now morphing into "dayhawk": services being offered during day/night hours; local radiology groups losing contracts
- New companies like Telerays offer competitive bidding by hospitals for radiologist services; network opens market
- Hospital labs have had LIS interfaces to esoteric reference labs for many years; more efficient lab test ordering/reporting
- Lab networks can cut two ways; empowerment of small hospital labs or remote support for surgical pathology work

Basis for Claim that IDCs are Faster, Better, and Less Expensive

- Faster: result of MDT: enabling integrated & efficient communication, & scheduling of work processes
- Better (i.e., higher quality): mistakes in healthcare can result from errors in communication & hand-offs
- Less expensive: result of integrated administrative processes within IDCs such as reporting/scheduling
- Faster, better, & less expensive together will be perceived by patients as superior in marketplace
- In terms of patient satisfaction, compare a final dx for a lesion in days compared to current performance

(5) Integration of LIS with Hospital EMRs: Technical & Political Challenges

- One aspect of integration demanded of LISs is that they replicate test results to the hospital EMR for MD efficiency
- Politically inexpedient to describe this as difficult after hospital CEOs have spent millions of $$ on their EMRs
- Only acceptable strategy is to replicate only top-level processes within IDCs such as reporting/scheduling
- Goes far beyond mere interfaces goes far beyond mere interfaces
- Concept of lab network goes far beyond mere interfaces between LISs; task-sharing with front-end specimen prep
- Door for competitive bidding across reference labs for work
- Hospital labs opt for closer "upstream" integration with lab network than "downstream" integration with hospital EMRs

Reference Lab Data to Form Lab Network

(4) Integration of Hospital Lab Data With Reference Lab Data to Form Lab Network

- Many small to medium size hospital labs will be challenged by need to offer wide array of genomic/proteomic testing
- Easy solution that has been partly attempted in past: tighter operational/software integration with esoteric labs
- Concept of lab network goes far beyond mere interfaces between LISs; task-sharing with front-end specimen prep
- With national (or international) lab network in place, opening door for competitive bidding across reference labs for work
- Hospital labs opt for closer "upstream" integration with lab network than "downstream" integration with hospital EMRs

Summary: Weaving All of These Views into View of Future

- Need for quality/efficiency gains & new technology driving new integration agenda for pathology & lab medicine
- Common theme throughout this discussion has been need for more automation in healthcare delivery process
- Diagnostics growing more sophisticated: opportunity for companion therapeutics with automated ox selection
- Information technology represents a common enabling theme throughout all of these integration scenarios
- Need to embrace integration opportunities when can result in faster, better, less expensive dx services in healthcare

Lecture wrap-up

Different examples integration