INTEGRATED DIAGNOSTICS: OPTIMIZING TEST ORDERING AND RESULTS REPORTING

Pathology Informatics Summit
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Defining Integrated Diagnostics

- ✓ Integrated diagnostics defined as *optimized* test order-entry and *merger/blending* of diagnostic information in reports
- ✓ Increasingly necessary for molecular/genomic reports; also relevant for radiology/surgical pathology reports
- ✓ Contrast this with norm today when pathology/radiology results usually published piecemeal, serially, & independently
- ✓ Makes most sense for diagnosticians themselves to "predigest" their data & provide actionable results to clinicians
- ✓ Easier said than done; in remainder of lecture will describe barriers that exist in pursuit of integrated diagnostics

Blog Note about Merging Pathology and Radiology; Lab Soft News on October 23, 2006

Reference to specialty merger

Reference to integrated reports

LAB SOFT NEWS

Presented by the Pathology Education Consortium

« PLoS ONE: An On-Line Open-Access Medical Journal | Main | Google Search Using a Disease Name »

Ten Reasons for Merging Pathology/Lab Medicine with Radiology

I have come to the conclusion that pathology/lab medicine and radiology should be merged into a unified medical specialty called diagnostic medicine. *CAP Today* published an article in its September issue entitled *Tapping the Potential Synergy of Radiology, Pathology* (link here) that covered some of this same territory. This same idea has been championed by Dr. Richard Friedberg since 1997, the year that he helped the VA Atlanta Healthcare Network create a single Diagnostic Medicine Service Line that combined radiology, nuclear medicine, and pathology across three states.

I will be presenting a lecture about this topic at the *Lab InfoTech Summit* on March 5-7, 2007, at the Venetian Hotel in Las Vegas (link here). In order to prepare for it, I have come up with ten reasons in favor of this idea, which are listed below. I would be interested in any comments from readers about this proposal.

1. *Substantial overlap between the mission of the two specialties -- diagnosis of disease through images and the analysis of biomarkers -- already exists.* A merger would serve to reinforce and provide greater impetus to a trend that is already occurring.
2. *Enhanced clinical and research value of the merged LIS, RIS, and PACS databases.* We have not yet begun to fully understand the value of querying image databases, particularly when correlated with complex genomic and proteomic results.
3. *The integrated reports of pathologists and radiologists working collaboratively would achieve higher levels of quality.* Although there is some knowledge currently shared between radiologists, pathologists, and lab scientists, it would not equal what could be accomplished through coordinated activities in the same department.
4. *The merger of medical imaging, molecular imaging, and molecular diagnostics is already taking place on a very active basis in multinational corporations.* See my previous notes about initiatives by Siemens (links here) and GE Medical (links here). Large companies such as these have already established their strategic goals and they involve placing large bets on the future of diagnostic medicine.
5. *The science and research agendas of molecular imaging and molecular diagnostics already demonstrate extensive overlap.* In previous notes I have discussed how many of the molecular imaging research goals are similar to those being pursued in molecular

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Why the Need for More Integration of Diagnostic Information?

- ✓ Diagnostic information increasingly complex; requires ongoing synthesis/rationalization by professionals
- ✓ Increasing pressure on clinicians to see more patients; integration enables them to operate more efficiently
- ✓ Integration saves resources, avoids redundant testing, and paves the way for value-based healthcare
- ✓ Excuse no longer tenable that it's *solely* the job of the clinicians to integrate all diagnostic information

Dual Process Required to Pursue Integrated Diagnostics

- ✓ First attainable goal is creation of integrated diagnostic reports combing AP/CP data + radiology narrative reports
- ✓ For majority (~80%) of patients, this goal can be achieved with software that generates holistic view of all results
- ✓ For more complex pts., MD collaboration (facetime or virtual) may be required to integrate results & generate action items
- ✓ Attention also required to input (i.e., order-entry) side with algorithms to reduce unnecessary orders when placed
- ✓ These algorithms need to reside in pathology & operate under direction of path/rad personnel; constantly evolving science

Value-Based Healthcare

- ✓ Now transitioning from fee-for-service to value-based care; when achieved, will have major effect on diagnostic orders
- ✓ Reimbursement will be disassociated from volume of testing; goal of program to restrain rising cost of care
- ✓ For all of diagnostics, more lab testing & imaging will not necessarily yield higher quality care for patients
- ✓ Need greater emphasis on safe, appropriate, and effective care with enduring results at reasonable cost
- ✓ Key question to ask in new environment: what is fastest & most efficient path to the correct diagnosis for patient?

Emphasis of Integrated Diagnostics on the Most Complex Patients

- ✓ For majority of patients, a simple “merge” of pathology/radiology reports provides sufficient integration
- ✓ However, complex pts. account for the largest share of all healthcare expenditures; pay attention here
- ✓ Greatest efficiency gains & cost savings can be achieved by “dx collaboration” for their care
- ✓ Consider cancer patients for example; cancer genomics & imaging critical to successful treatment
- ✓ Precision medicine will drive integrated diagnostics; pursue best treatment at right time for right patient

We Are in Golden Age of Diagnostics

- ✓ During care of complex patients, the diagnosis of disease most significant challenge; therapy then often obvious
- ✓ Pathologists & radiologists increasingly able to recommend specific therapy based on their diagnoses
- ✓ We are in golden age of diagnostics but limited in ability to exploit opportunities – *face* organizational & IT constraints
- ✓ Need to embrace integrated dx to enable diagnosticians to move beyond limitations placed on them by EHRs
- ✓ Lecture will focus on how to exploit opportunities to improve care; emphasis on IT & workflow in pathology/radiology

Organizational Constraints to the Pursuit of Integrated Diagnostics

- ✓ Pathologists and radiologists operate mainly in parallel professional tracks with relatively few points of intersection
- ✓ Increased levels of specialization results in far fewer generalists in specialties and increased “silo-ization”
- ✓ Paucity of generalists & lack of integration is increasing problem in hospitals; financial rewards for specialization
- ✓ Need some generalists with top level view to understand “whole” patients & triage them to appropriate specialist
- ✓ From organizational perspective & by habit, hospitals not always accommodating to more integrated view of care

How and Why Enterprise-Wide EHRs Inhibit Integrated Diagnostics

- ✓ Too expensive; absorb capital from other IT projects
- ✓ Designed mainly to generate bills & replicate paper record
- ✓ Insufficient attention to workflow of physicians
- ✓ Inhibit clinician productivity/efficiency with data input needs
- ✓ Unwieldy; not amenable to rapid software changes
- ✓ Not optimized to run rules/algorithms/heuristics
- ✓ Shift power to EHR vendors, central IT, & executive officers

Makes No Sense to Simply Dump Diagnostic Reports into EHRs

- ✓ Diagnosticians have accepted notion in recent years that we should just “dump” our test results into the EHRs
- ✓ Clinicians then forced to perform “hunt and seek” for the information that is most relevant for care of their patients
- ✓ If critical information goes unnoticed or not acted upon, clinicians often blamed for the these systemic errors
- ✓ EHRs designed primarily to bill patients; optimizing clinicians’ workflow only a secondary consideration; growth of scribes
- ✓ Problems exacerbated by fact that hospitals spends hundreds of millions of dollars on EHRs; pathology starved for capital

Current Relationship Between Pathology and Radiology

- ✓ Pursuit of integrated diagnostics requires tighter relationship between pathology & radiology; silos can make task daunting
- ✓ New science causing radiology to overlap with pathology; increasing dx specificity in radiology (e.g., molecular imaging)
- ✓ Actual merger/closer collaboration would result in greater political power for diagnosticians in hospitals
- ✓ Pathologists/radiologists often state that they are “too busy” to explore innovations to delivery of higher quality services
- ✓ Perhaps more realistic to consider creating a virtual dx. dept. based on close collaboration & production of “super” reports

CP/AP Integration First Essential Step in Pursuit of Integrated Diagnostics

- ✓ CP modules in LISs historically developed first for labs like chem. & hematol.; early interfaces from analyzers
- ✓ AP modules developed later; referred to later as AP-LISs; initially designed mainly as word processors
- ✓ Often LIS & AP-LIS systems operate independently; molecular path/cancer genomics “beg” for integration
- ✓ Hematopathology good example of pathology subdiscipline that has always been AP-CP integrated
- ✓ Need to take steps to more closely integrate CP/AP before serious efforts to integrate with radiology

What Are Major Barriers to AP/CP Integration in Future?

- ✓ Long history of surgical and clinical pathologists operating quite independently (and probably happily)
- ✓ Differences reinforced by training programs and job market with two streams outputting trained pathologists
- ✓ Job market, particularly in academic settings, that rewards super-specialization rather than generalists
- ✓ Subdisciplines like molecular pathology so complex that difficult to master science even in one's chosen domain
- ✓ Fee-for-service has rewarded individual productivity rather than optimizing pursuit of smaller body of results

Discordance Studies: Pathology vs. Radiology Reports

- ✓ Number of imaging-surgical pathology discordance studies have been published with expected results
- ✓ If you look for it, some degree of discordance usually discovered; related in part to different terms/vocabulary
- ✓ Definitional challengs: what constitutes clinically significant discordances from two specialty groups
- ✓ Complicated by fact that radiologists generate “impressions” -- pathologists usually “diagnoses”
- ✓ More robust literature on discordance will drive movement toward greater integrated diagnostics

Relationship of Integrated Diagnostics to Laboratory Management Teams

- Concept of laboratory management teams (LMTs) created by Dr. Mike Laposata at MGH and Vanderbilt
- Teams of lab professionals that consult with clinicians regarding test selection and results interpretation
- Notion of LMTs harmonizes with concept of integrated diagnostics; lab professionals can reduce dx errors
- Dr. Laposata has pursued goal for years of trying to gain support for LMTs & reimbursement for services
- Conference planned by him for next February in Galveston devoted to broader knowledge of LMT's

Where Have Variations of Integrated Diagnostics Been Deployed?

- ✓ Ideas in this lecture are mainly a theoretical construct; integrated diagnostics has not been widely deployed in hospitals
  - ✓ However, number of studies have revealed frequent discordance between pathology and radiology reports
- ✓ UCLA/RadPath: Coordination of pathology and radiology interpretations for unified diagnosis in one formatted report
- ✓ University of Pittsburgh: Comprehensive Theranostic Summary (CTS); integration of clinical and surgical pathology results
- ✓ Front page story on integrated diagnostics in Sept. 2015 *CAP Today* has stimulated broader consideration of this approach

Integrating AP and radiology, inch by inch

Kevin B. O'Reilly

September 2015—Two major specialties serve all of health care as the foundation for diagnosis. Now efforts to align pathology and radiology again appear to be picking up steam. As payment shifts to so-called value-based care and as medical record systems may challenge successful test interpretation, many experts seek a clear integration of these two specialties.

Moreover, an Institute of Medicine report on diagnostic errors due this fall is expected to add pressure on everyone within U.S. health care to redouble their efforts to improve diagnostic accuracy.

Richard C. Friedberg, MD, PhD, pathology chair at Baystate Health System, sees the need for integrated diagnostics extending beyond cancer or other life-threatening illnesses. U.S. health care's growing reliance on nurse practitioners and physician assistants to provide primary care, he believes, will increase the importance of the role of diagnostic specialists.

"We've seen this in Massachusetts over the last eight years, where we have long experience with 'Romneycare.' There are more people, who have less scientific background and less experience, taking care of more patients," says Dr. Friedberg, the CAP's president-elect. "We see ordering practices going bizarre because they don't have the history and tradition of how to work up this process or that process, or may not know the nuances of this test versus that test."

Bruce A. Friedman, MD, active emeritus professor of pathology at the University of Michigan Medical School, is a longtime advocate of the integrated approach to diagnostics, which he believes is essential for the specialties of pathology and radiology to assert their central place within health care organizations and dramatically improve diagnostic efficiency. He detailed his vision for diagnostic integration at a December 2014 Chicago meeting of the International Society for Strategic Studies in Radiology.


Dr. Friedman

We are living in a "golden age of diagnostics," he said, but health care systems are unable to fully exploit testing advancements because EHRs are not optimized to run testing rules, algorithms, and heuristics that can make the testing process faster and less costly.

"EHRs are built on a core of antiquated software," Dr. Friedman tells CAP TODAY. "They're not designed to increase clinical efficiency, but primarily designed to drop a bill and, secondly, to replicate paper rec-ords. And they're so complex that if you touch it, you break it. Laboratory and radiology information systems tend to be more nimble but don't have the reach that EHRs have."

What is needed, Dr. Friedman argues, is what he calls an "integrated diagnostics server." The idea is a server

Reimbursement for Clinical Pathology Consultations (CPT codes 80500 & 80502)

- ✓ Service rendered by the pathologists in response to a request for test interpretation
- ✓ The pathologist's medical interpretive judgment must be documented in a written report
- ✓ The pathologist may review the results of several tests at different intervals during the course of the time
- ✓ Requires review of the clinical record; relatively easy with advent of broadly accessible EHRs
- ✓ EHR review can be automated with software that can extract key data elements & present in an LIS window

Integrated Dx, Integrated Dx Servers (IDSs), & Integrated Dx Reports

- Important to keep triad in mind: integrated dx is process, integrated server is tool, integrated dx report is product
- What are major barriers to pursuit of this goal?
  - Inertia, lack of interest by diagnosticians; comfort with the *status quo*
  - Pathology/radiology losing control over their traditional IT resources
  - Scarcity of capital for IT investment at level of Pathology
  - No tradition of reimbursement for data integration
  - Limited proof thus far of advantages of integrated dx

Details about Heuristics/Algorithms/Business Rules Deployed on IDSs

- ✓ Software tools for calculation, data processing, automated reasoning, and organizing hierarchical lists
- ✓ Enable processes on IDSs by which test results are analyzed and “next steps” are determined
- ✓ This software development based on deep knowledge, iterative steps, validation, and continuous testing
- ✓ No endpoint in IDS development; constantly under development because science/technology ever-changing
- ✓ Need pathologist/radiologist review of all reports as quality check & to ensure continuing refinement of IDSs

Political Consequences of Pursuit of Integrated Diagnostics

- ✓ Politics involves competition for hospital resources; diagnostics often undervalued by the C-suite
- ✓ Pathology/radiology also rapidly losing control over its IT; appeal of EHRs to C-suite & federal government subsidies
- ✓ Need to seize the IT & programmatic initiative with integrated diagnostics; critical for value-based care
- ✓ EHR vendors need to help educate user community about additional value-add of enabling clinicians to work smarter
- ✓ Algorithms will be critical intellectual property but will need to be revised on continuing basis; science rapidly changing

Local Discordance Studies: Good Starting Point for Integrate Diagnostics Program

- ✓ Many people view idea of integrated diagnostics as appealing but wonder about how to launch program
- ✓ We have spent decades & millions of dollars in CP on Lean/Six Sigma in pursuit of elimination of errors
- ✓ We tolerate significant error rates of ~3-4% in surgical pathology/radiology reports due to discordance
- ✓ When presented with such data, many dept. personnel will claim that their local experience is different
- ✓ One solution is to mount “local” departmental discordance studies of most complex patients to assess error rate

Take-Home Points from Lecture

- ✓ Pathology informatics has a rich history of deploying IT to enhance mission of the specialty
- ✓ Need to turn attention to integration in pathology & with the other key diagnostic medical specialty, radiology
- ✓ This new strategy will enhance the diagnostic franchise in hospitals; help prepare for value-based medicine
- ✓ Development of integrated dx, servers under control of path/radiology will ultimately provide automated sol'n
- ✓ Most agree that integrated diagnostics has merit; key is motivating colleagues to adopt broader approach to job