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Dirección y calidad

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USCAP & AACR HIGHLIGHTS 2012

[2065] The Impact of Immunohistochemistry on Turn-around-Times in Surgical Pathology Reporting

J A Bennett, H Mani. PSMSHMC, Hershey

- **Background:** Rapid turn-around-times (TAT) in surgical pathology are important for optimal patient management. The College of American Pathologists mandates a two-day TAT in over 80% of routine cases. However, immunohistochemistry (IHC) that is often required prior to rendering a diagnosis may potentially increase TAT. To our knowledge, there has not been any systematic analysis of the impact of IHC on TAT. We analyzed the effect of performing IHC on TAT in cases with a diagnosis of dysplasia or carcinoma.
- **Design:** We searched the pathology database of a tertiary care teaching hospital to identify all cases with a diagnosis of dysplasia or carcinoma in a one-year period. TATs were noted for each case and then cases were classified based on whether or not IHC had been performed. Cases were also analyzed by type of specimen (resection vs. biopsy) and by organ system/site. Data was tabulated and analyzed.
- **Results:** A total of 940 cases with a diagnosis of dysplasia or carcinoma were included for study. Most cases were from the genitourinary tract (GU) (308 cases), followed by lower gastrointestinal tract (GIT) (306 cases), lung (192 cases) and upper GIT (134 cases). IHC was performed in 249 (26%) cases. IHCs were performed more frequently in lung (87/192, 45.3%) and upper GIT (59/134, 44%) specimens than in lower GIT (70/306, 22.9%) and GU (33/308, 10.7%) specimens. The average TAT for all cases was 3.12 days, with TAT being significantly higher in cases with IHC (4.11 days) than in those without IHC (2.76 days). IHC increased TAT in both surgical resections (5.17 days with vs. 3.49 days without IHC) and in biopsy specimens (3.05 days with vs. 1.85 days without IHC). TATs with and without the use of IHC by organ system were GU 4.24/2.95, lung 4.25/2.87, lower GIT 4.34/2.56 and upper GIT 3.56/2.53. All the pairs analyzed showed statistically significant increases in TAT following use of IHC ($p<0.05$). When IHC was used, 80% of samples had a TAT of 3.15 days (2.29 days for biopsy specimens and 4.11 days for surgical resections).
- **Conclusions:** The use of IHC significantly increases TAT in both surgical resection and biopsy specimens with a diagnosis of dysplasia or carcinoma. Our data potentially provides a useful benchmark for additional time required for IHC. Since many specimens require IHC prior to issuing a surgical pathology report, similar studies from other institutions will help evolve TAT recommendations for specimens requiring IHC.

Category: Quality Assurance

[2073] Retrospective Blinded Review of Major Errors in Anatomic Pathology: Experience of a Tertiary Care Facility

Shweta Chaudhary, Leonard B Kahn, Tawfiqul Bhuiya. Hofstra-North Shore LIJ School of Medicine, Lake Success, NY

- **Background:** Quality control and quality assurance are integral to the practice of Anatomic Pathology, a discipline in which it is difficult to define criteria's for evaluating these parameters. This study is focused on pathologist's interpretational diagnostic errors. We present a unique model of quality assurance in which the pathologists in the department perform a blinded review of major discrepancies which served to heightened awareness of patient consequences and reduce the number of errors.
- **Design:** All types of errors including false positive/false negative and any error which was of clinical consequences were included in the study. The cases were blinded and given numeric designation. All pathologists were required to review the pertinent slides with the same information that was available to sign out pathologist. Based on the pathologist's consensus opinions, a final performance improvement report was generated. Impact on patient management was considered significant if error necessitated second surgery or an inappropriate surgery was performed because of incorrect diagnosis. Also, delayed treatment resulting from inappropriate diagnosis was considered as significant. If the diagnosis was corrected within short time frame and there was no change in management, the error was considered to be clinically insignificant.
- **Results:** There were a total of 303 cases over the past 18 years. The cases were divided into various subspecialties and source of error (frozen section or permanent section) was noted.

Comparison of key features between two time periods		
	1993-2001	2002-2010
Total errors	230/ 189515 (0.12%)	73/221112 (<0.01%)
Frozen interpretative errors	129	48
Errors on non frozen section cases	101	25
Significant patient consequences	31	15

Distribution of cases divided as per subspecialities		
Subspeciality	cases no (%) [1993-2001]	cases no (%) [2002-2010]
Bone and Soft tissue	33 (14.4)	8 (10.9)
Neuropathology	19 (8.3)	4 (5.5)
Breast	36 (15.6)	14 (19.2)
GI	19 (8.3)	10 (13.7)
GU	20 (8.7)	5 (6.8)
GYN	38 (16.5)	11 (15.1)
Head & Neck	50 (21.7)	10 (13.7)
Thoracic and Pulm	15 (6.5)	11 (15.1)
Total	230	73

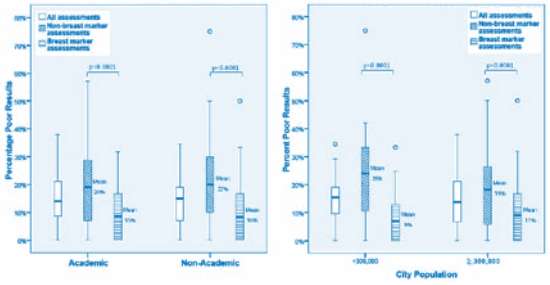
- **Conclusions:** This study highlights the positive impact of systematic review in reducing pathologist's interpretational error and in identifying potential sources of error. Anonymous review process encourages active participation. To conclude, besides the routine quality control and assurance parameters, these cases can be used as an objective tool for monitoring professional competency and provides objective criteria for performance improvement for pathologists.

  Category: Quality Assurance

[2074] Academic and Non-Academic Laboratories Perform Equally on CIQC Immunohistochemistry External Quality Assessment

Z Will Chen, Heather Neufeld, Maria A Copete, John Garratt, Blake C Gilks, Emina E Torlakovic. University Health Network, University of Toronto, Toronto, Canada; University of Saskatchewan, Saskatoon, Canada; Lions Gate Hospital, Vancouver, Canada; University of British Columbia, Vancouver, Canada

- **Background:** Expertise in medicine tends to concentrate in academic institutions in larger cities. Quality of laboratory testing may be expected to follow this trend. We hypothesize that academic centers (AC) are more successful than non-academic centers (NAC) in immunohistochemistry (IHC) external quality assessment (EQA) challenges in the Canadian IHC Quality Control (CIQC) program, an EQA program supported by the Canadian Partnership Against Cancer.
- **Design:** Results of 9 CIQC challenges for ER, PR, Her2, CD45, CD20, CD3, cyclin D1, Bcl-2, Bcl-6, Ki-67, pankeratin, LMWK, HMWK, CK7, CK20 and CK5 were examined. Performance on breast marker tests (BT) was assessed based on concordance to reference values. Performance on other tests was assigned a 3 or 4-tier score ranging from optimal to poor by expert assessors based on preestablished criteria for each test. For this study, these results were converted to a binary result (poor/good) as follows: for BT, <90% concordance=poor, ≥90%=good; for non-BT, lowest tier score=poor, all other scores=good. AC were compared to NAC, and labs located in a small city (pop. <300,000) were compared to those located in a large city (pop. ≥300,000).
- **Results:** A total of 66 Canadian and 8 foreign labs, of which 33 (45%) were AC and 48 (65%) in large cities, participated in at least one CIQC test. The number of participants in each test ranged from 17 to 53. There was no difference in performance on any test compared to AC/NAC nature or city size. However, overall performance on BT was significantly better ($p<0.0001$, Student's t-test) than on non-BT regardless of AC/NAC nature or city size, with the mean value of poor results on non-BT being approximately twice that of BT.



- **Conclusions:** AC and NAC irrespective of city size were equally successful in CIQC EQA challenges, suggesting that expertise in IHC can be achieved in many types of labs. However, performance on BT was significantly higher than on non-BT in every category, suggesting that emphasis on breast hormone IHC quality assurance in recent years has led to improved results.
  Category: Quality Assurance

[2076] Implementation of Lean Methods To Improve Histotechnology Productivity

Heather S Currens, Stephen S Raab. Eastern Health Authority, St. John's, NL, Canada; University of Washington, Seattle, WA

- **Background:** Lean methods have been increasingly incorporated into healthcare institutional strategies to maximize efficiencies, improve financials, and reduce error. We examined the effectiveness of these methods in improving the productivity of histotechnology services.
- **Design:** We evaluated the turn-around times (TAT) for the processing of surgical tissue blocks over a 5 month period. To affect a reduction in the backlog of uncut blocks and to achieve a 24 hour processing TAT, we employed Lean methods, including creating a visual workplace; 5S of the laboratory; introduction to Toyota work principles; workspace redesign and standardization; employee engagement in work redesign; and assessment of task staffing requirements. Lean Implementation specialists performed root cause analysis to investigate methods of reducing TAT. Pathology residents instituted quality improvement studies to identify areas of over-blocking of surgical specimens.
- **Results:** Initially, we found a backlog of 1989 surgical specimen blocks. Productivity of technologists ranged from 30 slides per day to 150 slides per day with a staff of 14 FTEs. Within the first month, the 5S of the lab created four additional cutting stations that produced a more conducive work area. Employee education encouraged participation from the frontline staff in the evaluation of factors contributing to the backlog of work and in workspace standardization. Reassessment of task staffing requirements removed technologists from 2 assignments that were transferred to laboratory assistants thereby freeing up additional time to cut blocks. Improvement specialists created a visual workplace with daily productivity numbers for the cutters as well as graphs indicating the number of blocks received, in arrears, and cut for the week. Unscheduled absences, as well as the revocation of overtime, were addressed with personnel in an attempt to change the culture of non-attachment to job responsibilities. Pathology residents' quality improvement studies identified areas of over-blocking for placentas, fibroids, and submission of specimens deemed unnecessary for pathologic review. Within the five month period the entire backlog was erased and a 24 hour TAT maintained. Productivity of technologists increased to 80 - 165 slides per day.
- **Conclusions:** We showed that the application of Lean methods resulted in increased productivity. The involvement of front line staff in work redesign created a culture of process ownership. The performance of quality improvement studies and root cause analysis resulted in increased efficiency.

Category: Quality Assurance

[2083] Whole Slide Imaging Validation Using Cervical Biopsies Yields Significant Interobserver Variability for Low Grade Dysplasias

Susan L Haley, Michael J Thrall. The Methodist Hospital, Houston, TX; Weill Cornell Medical College of Cornell University, New York, NY

- **Background:** Whole slide imaging (WSI) involves scanning glass slides to produce digital images, which may be viewed remotely. Validation requirements have not been adequately addressed, and there are no standard guidelines for validating WSI for diagnostic use in the laboratory. Furthermore, few studies address the utility of WSI in challenging specimens such as cervical biopsies for dysplasia, when high resolution is particularly critical for accurate diagnosis.
- **Design:** Fifty (50) cases with cervical biopsies (103 total specimens) were imaged at 20x magnification using BioImagene iScan Coreo Au scanners. Two examiners then blindly and independently evaluated the WSI using image-viewing software (Virtuoso). The examiners were aware of prior Pap test results for all cases. The histologic diagnoses were then compared to the original glass slide diagnoses. All diagnoses were stratified as: Negative, HPV/CIN 1, CIN 2, and CIN 3.
- **Results:** One hundred and three (103) scanned specimens were collected. Of these, 1 slide had not been scanned and 3 were lacking coverslips or were overstained. Of 200 WSI diagnoses made, no specimen originally diagnosed as high grade dysplasia was called negative. There were 33 minor discrepancies and 14 major (calling a positive finding "negative" or two categorical differences). Seven cases (6.8%) could have had different clinical treatment based on WSI interpretation: 5 cases of HPV/CIN 1 were upgraded to CIN 2/3 and 2 cases of CIN 2/3 were downgraded to HPV/CIN 1 by at least one observer. The overall diagnostic accuracy was 83.5%, using the original glass-slide diagnosis as the gold standard.

Original Diagnosis	Reviewer 1			Reviewer 2			
	Negative	HPV/CIN 1	CIN 2/3	Negative	HPV/CIN 1	CIN 2/3	N/A
Negative	36	9		32	12		1
HPV/CIN 1	3	42	2	10	31	5	1
CIN 2/3		1	7		2	6	

- **Conclusions:** Although whole slide imaging offers a promising new tool for pathologists, validation can be challenging. Here we have shown that for cervical biopsies, where interobserver variability is known to be substantial using glass slides, it is difficult to disentangle the effect of WSI image quality from interobserver variability. We consider our results sufficient to validate WSI as being equivalent to glass slides, but an objective threshold for "acceptable" variability in WSI validation has not been established. Additional studies on intraobserver validation are needed to determine if this is a superior approach.

Category: Quality Assurance

[2084] Immunohistochemistry Validation Procedures and Practices: A College of American Pathologists Survey of 727 Laboratories

Lindsay B Hardy, Patrick Fitzgibbons, Jeffrey Goldsmith, Richard Eisen, Marybeth Beasley, Rhona Souers, Raouf Nakhleh. Beth Israel Deaconess Medical Center, Boston, MA; St. Jude Medical Center, Fullerton, CA; Greenwich Hospital, Greenwich, CT; The Mount Sinai Medical Center, New York, NY; The College of American Pathologists, Northfield, IL; The Mayo Clinic, Jacksonville, FL

- **Background:** The immunohistochemistry (IHC) lab represents a dynamic area of surgical pathology with limited practice guidelines. Studies have shown significant interlaboratory variability in results. The purpose of this study was to establish baseline parameters for IHC validation procedures and practice, and to assess their feasibility of implementation.
- **Design:** In September 2010, a questionnaire was distributed by the College of American Pathologists (CAP). It was composed of 32 questions relating to non-predictive assays as well as non-FDA approved, predictive IHC assays other than human epidermal growth factor 2 (HER2).
- **Results:** Qualitative aspects of the procedures are shown in table 1. 86% of labs validated the most recently introduced non-predictive antibody. 75% used 21 or fewer total cases for the validation, and 40% used weakly or focally positive cases. 75% of labs validated the most recently introduced predictive antibody other than HER2. Less than half used 25 or more cases for the validation, and 47% used weakly or focally positive cases.
- **Conclusions:** Some laboratories have written validation procedures that appear to build upon HER2 testing guidelines. Some labs also manage to validate new antibodies according to those standards, however many do not. While guidelines for HER2, estrogen receptor, and progesterone receptor help give laboratories some guidance for those IHC procedures, there appears to be a need for further validation guideline development for non-predictive and non-FDA approved predictive antibody assays.

Table 1. Validation Procedures for Immunohistochemistry

Percent of laboratories that include in their written procedure:	Non-predictive	Predictive
Validation of new antibodies	68	46
Specific number of cases required	54	65
Revalidation for introduction of a new lot of antibody	66	64
Revalidation for introduction or change of antigen retrieval	71	80
Revalidation for a change in detection system	74	81
Revalidation for a change in instrumentation	74	78
Revalidation for a change in fixative	65	74
Revalidation for a change in tissue processor instrumentation	49	55
Any specifications for use with cytologic material?	37	42

Category: Quality Assurance

[2094] Clinician Compliance with Laboratory Regulations Requiring Submission of Appropriate Clinical Data: A One Year Retrospective Analysis

Lester J Layfield, Rachel E Factor, Elke A Jarboe. University of Utah, Salt Lake City, UT; ARUU Laboratories, Salt Lake City, UT

- **Background:** The evaluation of tissue samples submitted to Surgical Pathology is a consultation composed of evaluation of pertinent patient history, clinical findings and morphologic analysis. The College of American Pathologists (CAP) recognizes the need for clinical data in the interpretation of specimens submitted for histopathologic evaluation. The CAP regulation (CAP GEN.40100 Specimen Collection Manual Elements) includes instructions for a number of elements which include the need for appropriate clinical data, when indicated. In a note they state, “Because of the importance of clinical information in the practice of Surgical Pathology and Cytopathology, requisitions for such specimens should include pertinent clinical data, as well as preoperative and postoperative diagnosis.” Anecdotal evidence indicates that clinician compliance with such requests is variable and at times poor.
- **Design:** ARUP Laboratories and the Department of Pathology at the University of Utah have recognized inclusion of clinical history on Surgical Pathology request forms as a clinical indicator for quality assurance. The quality assurance data from August 1, 2010 to September 31, 2011 were searched for all cases flagged as containing no clinical history. Additionally, four consecutive weeks of Surgical Pathology request forms were reviewed to determine the presence or absence of clinical history, correlation was made with specimen type and clinical service requesting the pathology consultation. QA data was also reviewed to determine if the clinical history was accurate.

- **Results:** Between August 1, 2010 and July 31, 2011, 21,700 surgical pathology cases were accessioned. Within this group, 1,293 (5.9%) requisitions contained no clinical history. The four week review found that 140 of 1,698 (8.2%) of requisitions contained no clinical history or only a specimen site of origin. This analysis also revealed that 4 cases contained substantially incorrect or incomplete clinical history (0.2%).
- **Conclusions:** Our review indicates a significant number (5.9%) of requisitions contain no clinical history on the request form. A more in depth review reveals that approximately 8% contain either no clinical history or simply a body site in the clinical history request area and in 0.2% of cases, the clinical history was factually incorrect. Compliance with requirements for clinical history is poor and reveals the need to educate clinicians to provide this information.

  Category: Quality Assurance

[2096] Communicating Diagnostic Uncertainty in Surgical Pathology Reports: Disparities between Sender and Receiver

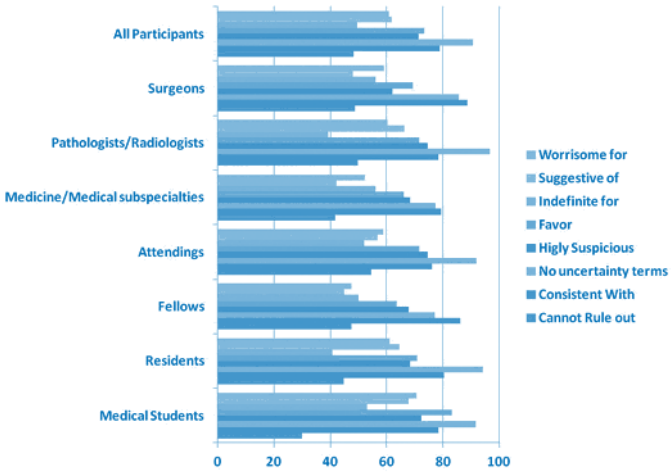
Sarah W Lindley, Lewis A Hassell, Elizabeth M Gillies. University of Oklahoma, Health Sciences Center, Oklahoma City, OK

- **Background:** Conveying diagnostic uncertainty in surgical pathology is a daily practice however there is no standardized wording for communication of uncertainty to clinicians.
- **Design:** Attendees at multi-disciplinary tumor boards completed an anonymous survey that asked them to estimate the degree of certainty associated with eight diagnoses. One diagnosis contained no expression of uncertainty while the other seven contained the following phrases: cannot rule out; consistent with; highly suspicious; favor; indefinite for; suggestive of; and worrisome for. A total of 57 responses were received.
- **Results:** For analysis the respondents were divided into the following groups: medical students, residents, fellows, attendings, medicine/medical subspecialties, pathologists/radiologists, and surgeons. The variations in the level of perceived certainty is quantified by the standard deviations from the means (table 1) and shown graphically (Figure 1).

Table 1: Standard deviations for the degree of certainty associated with phrases.

	Medical Students	Residents	Fellows	Attendings	Medicine	Pathologists/ Radiologists	Surgeons
Cannot rule out	18	25	25	27	31	21	30
Consistent with	16	21	8.9	24	16	25	13
No uncertainty terms	8.3	8.1	30	15	30	6	13
Highly suspicious	27	23	27	18	26	19	27
Favor	10	23	23	24	24	25	23
Indefinite for	29	19	25	28	21	24	31
Suggestive of	22	26	23	25	26	23	29
Worrisome for	22	24	19	23	22	23	22

Figure 1: Interpretation of degree of certainty associated with phrases



- **Conclusions:** We found that all groups show marked variability between respondents in the degree of certainty they associated with the phrases. The high standard deviations for all phrases indicate that there is substantial ambiguity in these terms, even amongst pathologists who routinely use these phrases in their own reports. These preliminary findings highlight the need for more explicit communication of uncertainty between pathologists and clinicians. Clearly, we are not adequately communicating our intended level of diagnostic uncertainty with the phrases studied here. This communication gap opens the door for medical errors. While a more extensive study is necessary, we see the need to foster dialogue and actions to insure more accurate communication.

  Category: Quality Assurance

[2106] On-Site Adequacy Assessments of Fine Needle Aspiration Biopsies

Cady E Pocrnich, Michele M Weir. London Health Sciences Centre and University of Western Ontario, London, ON, Canada

- **Background:** On-site assessment of fine needle aspiration biopsies provides valuable feedback on specimen adequacy and allows for further sampling and ancillary studies. This study sought to 1) determine the accuracy of on-site adequacy assessments (OSAA) provided by our laboratory's cytotechnologists; and 2) identify reasons for differences between OSAA and final sign-out adequacy assessment (FAA).
- **Design:** OSAA from Oct 09- June 11 were compared to FAA. Re-review of cases with differences between OSAA and FAA was performed by comparing OSAA and FAA slides.
- **Results:** Among 1060 cases, OSAA and FAA comparison yielded 1017 (96%) concordances and 43 (4%) differences. Six (0.5%) cases adequate at OSAA were unsatisfactory at FAA, and 37 (3.5%) cases unsatisfactory at OSAA were adequate at FAA. Reasons for differences in adequacy included: diagnostic material present only on fixed smears, ThinPrep and/or cell block (54%); amount of diagnostic material on rapid assessment smears borderline for adequacy, i.e. at "threshold" (22%); contributory clinical information (10%); and diagnostic pitfalls (10%). Slides were not available for review in 4% of cases. Diagnostic pitfalls were interpretation of lung parenchyma as neoplastic and salivary gland acinar cells as lymphocytes; and missed granulomas.
- **Conclusions:** The accuracy of OSAA provided by our cytotechnologists is high (96%). Differences between OSAA and FAA occurred in a minority of cases with only rare cases resulting in an unsatisfactory overall outcome. Reasons for differences were most commonly due to diagnostic material on additional slides not reviewed at OSAA. An interpretative issue was identified in a small percentage of cases.

Category: Quality Assurance

[2125] Large Specimen Surgical Pathology Reporting Facilitated by Lean Workflow and Rapid-Cycle Microwave Processor

Richard J Zarbo, Ruan C Varney, Michael J Dib, Beverly Mahar. Henry Ford Hospital, Detroit, MI

- **Background:** Timeliness of pathology reporting is one of the most common challenges in Surgical Pathology, particularly for large and complex specimens resections requiring more intensive workup for diagnosis. This even more challenging for teaching institutions that integrate residents and education into a large specimen dissection service and can be compounded by Core Histology Laboratory operations that serve as central processing units for numerous remote hospitals.
- **Design:** Pathology workflow in the Henry Ford Hospital Surgical Pathology and Histology Core Laboratory was optimized for continuous flow from work processes of accessioning through gross dissection, histology tissue processing, slide cutting and delivery to pathologists. In this work system, we tested integration of a rapid-cycle microwave processor (Logos, Milestone Medical, Kalamazoo, MI) into continuous flow work for large specimens. The isntrument was initially validated for processing times according to submitted specimen thicknesses from 1-3mm. All specimens were dissected fresh with occurrence of both fixation and processing on the instrument for total processor times ranging from 1.25-3 hours. We then compared surgical pathology report TAT from our previous July 2011 condition of overnight processing of large specimens to the new August 2011 condition of continuous flow processing of larger/complex specimens corresponding to CPT codes 88307 and 88309. Specimen dissection was performed by pathologists' assistants and residents.
- **Results:** 37 large specimen cases (33 coded as 88307 and 4 coded 88309) were dissected fresh at 3mm thickness with formalin fixation and processing in continuous flow on the rapid-cycle processor. TAT from time of accession to case signout was 3.2 days. This is a reduction of 36% from the previously attained TAT of 5 days for both large specimen classes of 88307 and 88309. No histology processing or slide stain quality defects were observed.
- **Conclusions:** Efficient work system designs in surgical pathology and histology can be enhanced with integration of rapid-cycle processors that promote the proven Lean efficiency concept of continuous flow. In teaching institutions, quality and consistency of the work product requires a gross dissection discipline by pathology residents and a different approach that shrinks the non-value added time waste associated with historical overnight or late afternoon batch mode gross dissection.

Category: Quality Assurance

[2071] Genetic Markers of Cancer – A Molecular Oncology Laboratory Adjusts to Changing Demands of Integrated Hospitals, Medical Centers and Outreach Services

Milena Cankovic, Lisa Whiteley, Joanne Beher, Dhananjay A Chitale. Henry Ford Hospital, Detroit, MI

- **Background:** Molecular oncology testing is exponentially increasing to aid in diagnosis and targeted therapy. In complex, budget limited health systems molecular labs are under pressure to cut costs. To align with our system's goal of integration and consolidation we aimed to re-examine and streamline already existing work processes and pathways to reduce waste due to lack of understanding, miscommunication, missing information, and miss delivered specimens. The ultimate goal is to provide timely and seamless service to our customers with zero defects.
- **Design:** Following the specimen trail we focussed efforts on 1) Increasing clinician awareness of test availability and specimen requirements (lectures, consultation, information brochures, internet resources); 2) Educating nursing, laboratory, administrative personnel by a) clearly defined standard processes (value stream maps, written instructions, internet links); b) monitoring different sites for test requisition completeness and specimen acceptability; 3) Establishing contact with leadership at off site locations; 4) Expanding already existing processes to include remote locations (TAT monitoring; provision of special blood collection tubes); 5) Reinforcing lab's commitment to superior customer service and LEAN practices (refresher training).
- **Results:** Clinician awareness was shown by increased utilization of our test menu with appropriate test selection (e.g. vIII EGFR vs EGFR exon 19/21 mutation), and reduced phone call/E-mail questions. There was 80% decrease in missing information (ICD9 codes, clinical information). Process flow maps facilitated tissue selection (tumor in block, little/no necrosis) making >90% of specimens acceptable for testing. LEAN practices reduced delay in processing from 31% to 5% in the past 2.5 years even when specimens needed to arrive from different sites and through different pathways. Although volumes increased by about 20% per year our TATs remained constant at 2 to 3 business days (vs the industry standard of 7-14 days).
- **Conclusions:** Correct test ordering and timely specimen delivery often necessitate collaboration with individuals separated by geography, leadership structure, and educational levels. By taking initiative, our laboratory has ensured that latest developments in molecular oncologic testing quickly translate into benefits to cancer patients. By eliminating non-value added waste we have been able to maintain record short turn around times even with increasing testing volumes and new hospitals and medical centers being integrated into our health system.

Category: Quality Assurance

[2089] Effectiveness of Reporting Significant Diagnosis in Anatomic Pathology: Pathologists' Roles and Challenges

Katherine L Kenerson, Negar Rassaei, Vania Nose. University of Miami, Miami, FL

- **Background:** Communication of an anatomic pathology significant diagnosis has been controversial since the College of American Pathologists (CAP) and the Association of Directors of Anatomic and Surgical Pathology (ADASP) first implemented it in 2006. Since then, there has been an increasing demand for hospital administration to impose this responsibility onto the pathologist, as reporting a significant diagnosis is an essential component in patient care. Yet, the pathologist may spend time trying to communicate a significant diagnosis to a clinician, at times with no success. Thus, the current challenge is defining the pathologist's role in reporting a significant diagnosis and understanding the most effective means of communicating these results to the clinician.
- **Design:** An eleven-item survey was distributed to all medical specialties in our institution. The survey consisted of closed-ended questions relating to the role of the pathologist and effectiveness of significant diagnosis notification. In addition, our department developed a centralized system for communicating a significant diagnosis and this survey was used to analyze the effectiveness of this system.
- **Results:** A total of one hundred and twenty seven clinicians and eleven pathologists responded to the survey. Most pathologists (73%) consider our mechanism of reporting a significant diagnosis to be effective. 41% of clinicians reported that our mechanism of reporting a significant diagnosis is not well defined. The most effective method of reporting a significant diagnosis was reported as email (63% of clinicians and 73% of pathologists,) however both clinicians and pathologists agree that a flag is needed to attract the clinician's attention if the report is sent via email.
- **Conclusions:** In the continuously growing field of pathology, the pathologist has had increasing responsibilities in patient care. The perception of this clinical survey reveals that it is the pathologist's responsibility to monitor the clinician's response to a significant diagnosis notification. Subsequently, it is crucial for our clinicians to be well introduced to a centralized system of reporting a significant diagnosis in order to receive this information in a timely manner. Accordingly, although multiple modalities exist to report a significant diagnosis, standardization of reporting is crucial to most effectively improve the pathologist's communication with the clinician. As a result, this will optimize patient care. Ultimately, increasing responsibilities and demands from hospitals may continue to change future practice.

Category: Quality Assurance

[2108] Evaluation of Communicating Frozen Section Diagnoses with Surgeons

Somak Roy, Anil V Parwani, Rajiv Dhir, Samuel A Yousem, Susan M Kelly, Liron Pantanowitz. University of Pittsburgh Medical Center, Pittsburgh, PA

- **Background:** Communicating the frozen section (FS) diagnosis to the surgeon is a critical component of the FS process. Unfortunately, this often involves reporting a diagnosis via telephone to operating room (OR) staffs other than the surgeon. This may lead to miscommunication and thereby affect patient care. The aim of this study was to evaluate the accuracy of communicating FS diagnoses during intra-operative consultations at our institution.
- **Design:** A total of 300 consecutive cases, where a FS was performed (9 month in 2009), were retrieved from the anatomic pathology laboratory information system (CoPath, Cerner). Cases were included if there was a corresponding OR note in the electronic medical record which described the surgeon's interpretation of the FS diagnosis. Pre-operative diagnosis, intra-operative question, specimen type, FS diagnosis (called to the OR), surgeon's interpretation, final pathologic diagnosis and patient outcome (per clinical notes) were recorded for all cases. Discrepancies between the FS diagnosis and surgeon's interpretation were recorded as a miscommunication and further classified as major (clinical impact) or minor (no clinical impact).
- **Results:** A variety of specimen types were received for FS requesting a diagnosis (59.3%), margin status (30.6%), both a diagnosis and margins (6.6%), or lymph node status for cancer (3.5%). There were 8 (2.6%) miscommunications, all of minor clinical impact, most (88%) of which had a FS diagnosis that was deferred to permanents. Miscommunications in these cases involved reporting "loaded" neutrophils in bone tissue, deferred grading for a sarcoma, interpretation of margins as "excellent" for urothelial dysplasia at ureteral margins, interpretation of a low grade spindle cell proliferation as an inflammatory lesion by the surgeon, and partial documentation in the OR note of two specimens that were submitted for FS diagnosis. In 6 other cases (2%) FS and final pathologic diagnoses were discrepant; however there was no miscommunication of these FS diagnoses to the OR.
- **Conclusions:** The rate of miscommunicated FS diagnoses to surgeons was low at our institution with no adverse patient outcome. Reporting of FS diagnoses using non-standard terminology and indeterminate diagnoses (ie. deferrals) were the most frequent cause for miscommunication. Miscommunications may be circumvented by maintaining a good working relationship with surgeons, requesting immediate acknowledgement following a verbal FS diagnosis and displaying the FS diagnosis in real-time on a monitor in the OR.

Category: Quality Assurance

[2118] The Specimen Handling of GI Mucosal Biopsy: A Simple and Effective Quality Improvement Initiative

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- **Background:** GI mucosal biopsy plays important roles in several clinical situations. Many specific diagnoses could be reached from the biopsy of patients present with GI symptoms with or without endoscopic abnormality. Diagnostic foci may be patchy or exclusively locate in certain areas of mucosa e.g. on surface of the mucus layer, tip of the villi or deep within the crypt epithelium. A perpendicular plane of tissue from surface to muscularis mucosae could increase diagnostic yield since they demonstrate the entire layer of mucosa as well as preserve its anatomic architecture. Starting in February 2010, Department of Pathology Faculty of Medicine Siriraj Hospital launched the 2 steps quality development program to improve the quality of GI mucosal biopsy slides.
- **Design:** First step at pathology laboratory, embedding technicians were trained to recognized GI mucosal biopsy and embed tissues in a perpendicular plane not to exceed 4 tissue pieces per block. After a month, second step at endoscopy unit was introduced. Endoscopic nurses were trained to spread the tissue on a mesh before fixing it in formalin. Then 3 sets of fifty slides were collected for evaluation from before, after step 1 and after step 2 period of quality development program. All slides were independently assessed by one pathology resident (TT) and one general pathologist (JT). Any conflict in reporting was resolved by consensus. Total number of tissues and number of tissues with perpendicular plane on each slide were recorded. Slides contain tissues with perpendicular plane over a half of the tissue pieces were considered as satisfactory. Diagnosis of each slide was also recorded. The study was approved by Siriraj Institution Review Board and supported by Siriraj Research Development Fund (Managed by Routine to Research: R2R)
- **Results:** Numbers of statisfactory slides are significantly increased from 46% to 60% and 74% (p value 0.017) and shown in Table 1.

Number of satisfactory slides among three sets.			
	Before (Feb 2010) n=50 (%)	After step 1 (Nov 2010) n=50 (%)	After step 2 (Dec 2010) n=50 (%)
Satisfactory slides	23 (46)	30 (60)	37 (74)
Unsatisfactory slides	27 (54)	20 (40)	13 (26)

- **Conclusions:** The quality of GI mucosal biopsy slides were significantly improved after a simple and feasible program. Educating and training medical personals involved in tissue procurement and tissue processing are crucial. Benefits from these high quality slides will be further investigated.

Category: Quality Assurance