Clinical

Laboratory

Improvement

Advisory

Committee

Summary Report

September 20-21, 2006
Sheraton Midtown Atlanta Hotel at Colony Square
Atlanta, Georgia

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES

Clinical Laboratory Improvement Advisory Committee
September 20-21, 2006, Summary Report
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Record of Attendance

Committee Members Present

Dr. Lou Turner, Chair	Dr. Valerie Ng
Ms. Joeline Davidson	Dr. James Nichols
Dr. Nancy Elder	Dr. Gary Overturf
Ms. Paula Garrott	Dr. Barbara Robinson-Dunn
Dr. Carol Greene	Dr. Jared Schwartz
Dr. Gerri Hall	Dr. David Smalley
Dr. Lee Hilborne	Dr. Thomas Williams
Mr. Kevin Kandalaft	Dr. Jean Amos Wilson
Dr. Kevin Mills McNeill	
Dr. Dina Mody	

Ms. Luann Ochs, Roche Diagnostics Corporation (Liaison Representative – AdvaMed)

Committee Members Absent

Ms. Merilyn Frances

Committee Member(s) Resigned

Dr. Patrick Keenan

Executive Secretary

Dr. Thomas Hearn

Ex Officio Members

Dr. Devery Howerton, CDC

Ms. Judith Yost, CMS

Ms. Carol Benson, FDA

Record of Attendance, continued

Centers for Disease Control and Prevention

Ms. Nancy Anderson
Ms. Carol Bigelow
Dr. Joe Boone
Ms. Diane Bosse
Dr. Bin Chen
Ms. Stacey Cooke
Mr. David Cross
Ms. Joanne Eissler
Ms. Christine Ford
Ms. MariBeth Gagnon
Ms. Sharon Granade
Mr. James Handsfield
Dr. Lisa Kalman
Dr. John Krolak
Dr. Ira Lubin
Dr. Adam Manasterski
Ms. Leslie McDonald
Ms. Anne Pollock
Ms. Emily Reese
Ms. Andrea Scott
Dr. Shahram Shahangian
Mr. Darshan Singh
Dr. Susan Snyder
Dr. Julie Taylor
Mr. Howard Thompson
Ms. Pam Thompson
Ms. Glennis Westbrook

Department of Health and Human Services (Agencies other than CDC)

Mr. James Cometa (CMS)
Dr. Elliot Cowan (FDA)
Dr. Courtney Harper (FDA)
Ms. Daralyn Hassan (CMS)
Ms. Penny Mattingly (CMS)
Ms. Kathy Todd (CMS)
Ms. Harriet Walsh (CMS)
Ms. Cheryl Wiseman (CMS)
Mr. Gary Yamamoto (CMS)

In accordance with the provisions of Public Law 92-463, the meeting was open to the public. Approximately 30 public citizens attended one or both days of the meeting.

Clinical Laboratory Improvement Advisory Committee

The Secretary of Health and Human Services is authorized under Section 353 of the Public Health Service Act, as amended, to establish standards to assure consistent, accurate, and reliable test results by all clinical laboratories in the United States. The Secretary is authorized under Section 222 to establish advisory committees.

The Clinical Laboratory Improvement Advisory Committee (CLIAC) was chartered in February 1992 to provide scientific and technical advice and guidance to the Secretary and the Assistant Secretary for Health regarding the need for, and the nature of, revisions to the standards under which clinical laboratories are regulated; the impact on medical and laboratory practice of proposed revisions to the standards; and the modification of the standards to accommodate technological advances.

The Committee consists of 20 members, including the Chair. Members are selected by the Secretary from authorities knowledgeable in the fields of microbiology, immunology, chemistry, hematology, pathology, and representatives of medical technology, public health, clinical practice, and consumers. In addition, CLIAC includes three ex officio members, or designees: the Director, Centers for Disease Control and Prevention; the Commissioner, Food and Drug Administration; the Administrator, Centers for Medicare & Medicaid Services; and such additional officers of the U.S. Government that the Secretary deems are necessary for the Committee to effectively carry out its functions. CLIAC also includes a non-voting liaison representative who is a member of AdvaMed and such other non-voting liaison representatives that the Secretary deems are necessary for the Committee to effectively carry out its functions. Due to the diversity of its membership, CLIAC is at times divided in the guidance and advice it

offers to the Secretary. Even when all CLIAC members agree on a specific recommendation, the Secretary may not follow their advice due to other overriding concerns. Thus, while some of the actions recommended by CLIAC may eventually result in changes to the regulations, the reader should not infer that all of the Committee's recommendations will be automatically accepted and acted upon by the Secretary.

CALL TO ORDER – INTRODUCTIONS/FINANCIAL DISCLOSURES

Dr. Lou Turner, Chair, Clinical Laboratory Improvement Advisory Committee (CLIAC), welcomed the Committee members and called the meeting to order. All members then made self-introductions and financial disclosure statements relevant to the meeting topics.

Dr. Thomas Hearn, Acting Director, Division of Laboratory Systems (DLS) [proposed], National Center for Preparedness, Detection and Control of Infectious Diseases (NCPDCID) [proposed], Centers for Disease Control and Prevention (CDC), welcomed the members and described recent organizational changes within CDC, including Dr. Robert Martin's new position as Acting Director, National Center for Public Health Informatics. Dr. Hearn stated that he has assumed the role of Designated Federal Officer and Executive Secretary for CLIAC previously held by Dr. Martin and explained he also continues to serve on the Clinical and Laboratory Standards Institute Executive Committee as the immediate Past President.

AGENCY UPDATES AND COMMITTEE DISCUSSION

Centers for Disease Control and Prevention (CDC) ***Addenda A & B***

Dr. D. Joe Boone

Associate Director for Science

Division of Laboratory Systems (proposed)

National Center for Preparedness, Detection, and Control of Infectious Diseases (proposed)

Centers for Disease Control and Prevention

Dr. Boone began his presentation with an overview of the Division's progress in genetics encompassing four areas: the Collaboration, Education, and Test Translation (CETT) program, the Genetic Testing Quality Control Materials (GTQC)* program, the Deriving Actionable Information from Testing project, and the status of genetic testing oversight in the United States (U.S.) and internationally. He referred the Committee members to the National Coalition for Health Professionals Education in Genetics' newsletter "Genetic Applications in practice: bridging the GAP from bench to bedside" (Addendum B) for additional information. Dr. Boone also announced plans for the September 2007 "Institute on Critical Issues in Health Laboratory Practice: Managing for Better Health," discussed work being conducted toward defining best practices in laboratory medicine, and shared plans for the November 2, 2006, CLIAC workgroup addressing the impact of rapid and molecular tests for infectious diseases on public health.

***Note:** This program has been renamed the Genetic Testing Reference Materials Program, GeT-RM.

Committee Discussion

- One member asked whether the need for quality control (QC) materials for newborn screening is being addressed. Dr. Lisa Kalman, GTQC Coordinator, responded that CDC's Newborn Screening Quality Assurance program provides proficiency testing and reference materials for biochemical newborn screening. She further explained that the GTQC program is in the process of collecting and confirming cell lines for reference use with DNA-based (molecular) tests, including confirmatory tests for newborn screening.

- Another member asked whether samples in the Coriell repository are designated for clinical versus research use. Dr. Kalman responded that because the primary focus of the National Institute of General Medical Sciences (NIGMS) repository at Coriell is research, samples purchased there are intended for research and not clinical use. The repository's institutional review board (IRB) reviews purchase requests to assure proper use of samples purchased from them.
- The same member went on to say access to international genetic testing services is an important component in the diagnosis and management of U.S. patients. This is a concern because non-U.S. laboratories are rarely CLIA-certified. In response to a question regarding prospects for global harmonization of quality standards to improve access to genetic tests for rare diseases done in international laboratories, Dr. Boone explained the CETT program provides the international community assurance that testing is done in a certified laboratory and that collaboration between researchers and clinical care providers is required. He stated that while it is unknown whether this approach can be universally applied, it serves to elevate standards for future work. Ms. Yost added that CMS will reconvene a workgroup later this year to evaluate options for the credentialing of international laboratories. She said while sending surveyors to foreign countries in unlikely, options might include use of existing accrediting organizations as well as the International Organization for Standardization certification process to ensure the integrity of international laboratory quality in terms of CLIA standards and to address foreign needs. Another member observed that CAP's Pathology Coding Caucus has addressed genetic testing quality issues. Therefore, ensuring synergy between groups working on the same issues would be helpful.

- A Committee member asked whether CDC's planned Institute would be U.S.-based or international. Dr. Boone replied this decision has not yet been resolved, but that choosing either option would make the meeting focus very different, and asked for opinions from CLIAC. Dr. Hearn said he could envision a meeting of national focus with participation from international experts. He mentioned the Division's work with the World Health Organization (WHO) in Lyon, France, and the possibility of WHO hosting a meeting on laboratory standards to include some focus on proficiency testing.
- Another member asked about the possibility of a *Morbidity and Mortality Weekly Report* (*MMWR*) article describing current government, private sector, and professional organizations' genetic testing activities. Dr. Boone replied he is currently assembling an outline of such an *MMWR* and would be willing to entertain content ideas.
- A member expressed hope that this Institute would address the issue of laboratories not being run by appropriate experts, citing that up to 80 percent of CLIA-approved clinical microbiology laboratories in the U.S. are not run by clinical microbiologists.
- Another member stated the same issue exists in genetic testing laboratories, and went on to describe the problem of how insurance requirements can impede the testing process by dictating where tests must be performed.
- In closing the discussion, Dr. Boone reiterated his request for help in identifying prospective members for the two workgroups being formed and solicited comments on the scope of these activities.

Food and Drug Administration (FDA) Update ***Addenda C & D***

Courtney Harper, Ph.D.

Associate Director for Toxicology

Division of Chemistry and Toxicology Devices

Office of In Vitro Diagnostic Device Evaluation and Safety (OIVD)

Center for Devices and Radiological Health (CDRH)

Food and Drug Administration

Dr. Harper presented a summary of FDA's Critical Path Initiatives and the Patient Safety Initiatives. In her update on CLIA-specific activities, she reported the final guidance document on the criteria and process for waiver is now in the clearance process. Dr. Harper also indicated FDA has observed rapid expansion of waived tests as a reflection of significant advances in technology, including the success of novel technology. She went on to discuss three recently released OIVD guidance documents addressing use of residual samples, analyte specific reagents (ASRs), and in vitro diagnostic multivariate index assays (IVDMIAs). Dr. Harper concluded with a current snapshot of OIVD's efforts to improve regulatory programs and develop and evolve regulations while maintaining a focus on good science.

Elliot P. Cowan, Ph.D.

Chief, Product Review Branch

Division of Emerging and Transfusion Transmitted Diseases

Office of Blood Research and Review

Center for Biologics Evaluation and Research

Food and Drug Administration

Dr. Cowan summarized the FDA's March 10, 2006, Blood Products Advisory Committee's (BPAC) proposals for studies of HIV home-use test kits and the Committee's recommendations for informational material content. He also reviewed the next steps for home-use approval including identification of groups for clinical trials, evaluation of study proposals, and strategies for post-market surveillance.

Committee Discussion

- Dr. Harper was requested to clarify the term "adverse event." Is it being defined as a very limited event resulting from use of the test itself or is it an event resulting from an action taken based on the test result? Dr. Harper acknowledged that defining "adverse event" is a challenge due to the types of reports the FDA receives. She said, especially with severe adverse events where extensive investigation is likely, a laboratory or device user will link the adverse event to a pre- or post-analytical failure. She went on to indicate that the FDA recognizes this as an imperfect system and is actively seeking feedback on how to improve the system.
- Several members commended the FDA's LabNet initiative and suggested partners, such as ASM's Division C and ClinMicroNet and the BioRadQC program, to further communication of surveillance information. One member stressed the importance of linking LabNet with physician practice networks for waived testing information sharing, as the majority of waived testing is performed in physicians' offices.
- In responding to questions regarding the definition and regulation of IVDMIAs, Dr. Harper clarified that a test must meet three criteria to be considered an IVDMIA:

    - clinical data must be used to empirically identify an algorithm
    - the algorithm must be employed to integrate different data points in order to calculate patient-specific results
    - information supplied by the MIA test developer regarding the clinical performance and effectiveness of the test must be used for result interpretation.
- When asked why FDA developed the IVDMIA guidance document, Dr. Harper responded that some of the tests currently marketed have no third party review. FDA does not intend to practice enforcement discretion with IVDMIA's, unlike the ASR's. Thus, this guidance will assure physicians the tests advertised are actually producing the results as claimed.
- One member asked Dr. Harper to discuss FDA's position on vendor promotion of off-label use of HPV testing. Dr. Harper responded that complaints concerning inappropriate use of medical devices are investigated and the FDA encourages feedback from medical device users.
- A member voiced concern about the impact ASRs, as defined in the guidance document, would have on laboratories if manufacturers have to disassemble PCR master mixes. It was suggested FDA provide a grace period for multiplex ASR vendors to obtain IVD approval. Dr. Harper responded the FDA has flexible options for manufacturers of multiplex ASRs and will work with them to bring them into compliance.
- Because of the potential impact of the FDA guidance documents as well as the time needed for CLIAC review and discussion, requests were made to extend the comment period beyond the 90-day deadline and to allow for CLIAC discussion of the guidance document at the next CLIAC meeting. Dr. Harper indicated, to her knowledge, the 90-day comment period for federal documents is standard, but that comments received after the deadline would be

accepted by the FDA. She also encouraged comment on any FDA guidance and indicated she would advise FDA of the CLIAC request for extension of the comment period.

- One member suggested a 1-800 generalized resource information line to effectively address many of the post-analytical issues associated with HIV home-use tests. Dr. Cowan agreed that a simple, direct, easy-access counseling system could address many, though not all, identified post-analytical issues. He added that FDA guidance was intended to allow for manufacturer creativity in addressing post-analytic challenges as opposed to being prescriptive. He reassured CLIAC that the FDA would require manufacturer submission of appropriate validation and determine its effectiveness.
- Another member emphasized that the homeless, many of whom are health-illiterate, are not in the minority of those being HIV tested. Although a challenge, communicating with this population should not be overlooked.
- A member suggested FDA consider device labeling to prevent home-use tests being brought into the hospital setting.
- Ms. Carol Benson, Associate Director for Chemistry, OIVD, CDRH, FDA, apprised CLIAC that the recently waived lead test was the first device to be evaluated by the FDA using the Committee's recommended acceptance criteria. She thanked the members for their efforts, acknowledging the FDA has found the waiver criteria very workable.

Centers for Medicare & Medicaid Services (CMS) ***Addenda E & F***

Judy Yost, M.A., M.T.(ASCP)

Director, Division of Laboratory Services

Survey and Certification Group

Centers for Medicare & Medicaid Services

Ms. Yost presented CLIAC members with a CMS-produced CD containing six educational brochures designed to assist laboratories with interpretation and implementation of CLIA regulations (http://www.cms.hhs.gov/CLIA/05_CLIA_Brochures.asp#TopOfPage). She also encouraged CLIAC members to review *Partners in Laboratory Oversight,* CMS's recent guidance for coordination of CLIA activities among CMS Central Office, CMS Regional Offices, State Agencies (including states with licensure requirements,) accreditation organizations, and states with CMS approved state laboratory programs (http://www.cms.hhs.gov/CLIA/downloads/090606%20RevPartners%20Lab%20Oversight.pdf). She then presented a CMS update focusing on a summary of CMS's responses to the Government Accounting Office (GAO) May 2006 audit report of the CLIA program. She indicated the full GAO report and CMS response are available on the GAO website, http://www.gao.gov/new.items/d06416.pdf. Ms. Yost closed her formal presentation with a brief overview of CMS actions CLIA laboratories should anticipate as a result of the GAO report and recommendations. She then provided an update on the status of the proposed rule for genetic testing, noting the CMS decision against publishing a Notice of Proposed Rulemaking.

Cheryl Wiseman, MPH, C.T.(ASCP)

Division of Laboratory Services

Survey and Certification Group

Centers for Medicare & Medicaid Services

Ms. Wiseman provided CLIAC with an update of the 2005 cytology proficiency testing (PT) results and with preliminary data from the 2006 cytology PT cycle. After reviewing the cytology PT data, she presented an overview of CMS survey and enforcement processes and concluded with a review of cytology laboratory survey findings from 1988 to the present.

Committee Discussion

- A member commented the improved cytology PT scores for 2006 probably reflect improvements in the field validation of test slides as well as an increased comfort level of test takers. Ms. Wiseman added CMS has determined that field validation must be more thoroughly defined for the cytology Notice of Proposed Rulemaking. To this end, CMS met with representatives from three PT programs to draw from their knowledge and expertise.
- The same member asked if CMS supported unannounced inspections by accrediting organizations. Ms. Yost responded the CLIA regulations allow either announced or unannounced inspections. In order to balance cost with effectiveness, CMS has chosen short (two-week) notice inspections. She informed CLIAC the accrediting organizations are monitoring reactions to unannounced inspections and collecting information to determine whether announced versus unannounced inspections affect outcome.
- Several Committee members asked Ms. Yost to comment on the tabling of the proposed genetic testing rule by CMS, voicing concern that past CLIAC recommendations as well as personnel standards should be addressed by regulation and if not by regulation then by some other mechanism. Ms. Yost reminded CLIAC the 2003 CLIA Quality Systems regulation, which included laboratory director board certification requirements, already addressed some,

though not all, of the genetic testing issues. She further stated that the rapidly changing technology associated with genetic testing may be better addressed with standards of practice guidelines developed through combined government agency and communities of practice processes [e.g. the CLSI or Clinical and Laboratory Standards Institute process.]

- A member was concerned that without a CLIA personnel requirement for a specialization in genetics, interpretation of genetic testing will be performed by personnel lacking the appropriate expertise.
- Several members requested further discussion on the tabling of the genetics rule at the next CLIAC meeting.

The Future of Health Laboratory Practice – Overview ***Addendum G****

Thomas L, Hearn, Ph.D.

Acting Director, Division of Laboratory Systems (proposed)

National Center for Preparedness, Detection, and Control of Infectious Disease (proposed)

Centers for Disease Control and Prevention

Dr. Hearn introduced the theme for the meeting by reviewing CLIAC's planned approach to consider future challenges for public health laboratories and for clinical laboratories performing nonwaived testing in traditional sites and those performing "simple" testing in diverse sites. The focus of this meeting was centered on "complex" nonwaived testing. After illustrating the position of laboratory medicine in the U.S. health system, he described the current status of laboratory practice and posed several questions regarding the laboratory's future role and functions to help frame the issues for the Committee's deliberations: What will laboratory

practice in the US look like in the future? How will laboratory practices and services adapt? What assumptions should we make about the future of laboratory medicine? What are the implications for public health? Dr. Hearn then introduced the speakers and their topics.

***Note:** The addendum was revised from material provided in the Committee's notebooks to reflect last minute updates by the presenter.

Committee Discussion

- When asked for a definition of a laboratory given the current variety in settings, testing types, and test performers, Dr. Hearn replied that he did not consider the physical surroundings of a laboratory, but rather the activity of testing a biological specimen to help guide health care decisions.
- A member commented on the difficulty of developing all-inclusive policies that will promote connection among different specialties and optimize patient care. Dr. Hearn acknowledged that gaps and problems in the system cannot be addressed quickly through the regulatory process and encouraged the Committee to envision ways to implement and communicate systems changes.

The Future of Health Laboratory Practice – Introduction ***Addendum H***

Jocelyn M.B. Hicks, PhD, FRCPath

Professor Emeritus, The George Washington University School of Medicine

President, International Federation of Clinical Chemistry

Dr. Hicks began her presentation with a brief historical overview of the earliest laboratory testing to present-day state of the art clinical laboratory science. She described new and future laboratory technologies and processes with their accompanying challenges: short staffing, increased point-of-care and home testing, non-invasive testing, increased use of tandem mass spectrometry, molecular testing, use of robotics, and telecommuting. Dr. Hicks emphasized information technology (IT) should provide the backbone of health care for the future to facilitate the move toward personalized and preventive medicine.

Committee Discussion

- Discussions began with gaps in IT systems and electronic order entry. Policy makers should include the more unusual and metabolic diseases in the development of IT systems. If the rare and unusual tests are not in the ordering system, a resident might simply choose from what is available electronically and the opportunity to order less common tests is lost.
- A Committee member shifted to the issue of workforce shortages and the concept of hiring non-laboratorians in the future. Another member described the approach of hiring persons with science backgrounds, rather than traditionally trained technologists, to perform molecular testing. In response, Dr. Hicks expressed the need for flexibility in considering areas of testing where an education in other fields may be more suitable and in hiring bright people with different backgrounds, providing more on-site training, and making laboratory medicine more interesting.
- A member agreed and said more education is needed pre- and post-high school regarding the

availability of clinical science programs. The resources needed to shift to this new hiring pool must be developed.

- One member identified underutilization of the knowledge, skills, and abilities of graduates of traditional baccalaureate clinical laboratory science programs as the cause of poor workforce retention despite steadily increasing enrollment. Another Committee member added that while consolidation of test platforms is a cost-saving mechanism for the laboratory, it might contribute to making the technical part of the job less interesting.
- Another member pointed out that personnel shortage might be an unintended consequence of licensure requirements, which can reduce the numbers of available testing personnel.
- The comment was made that the amount of required documentation can be so burdensome laboratories lack time to train, orient, or educate people on the job.
- The Committee discussed the issue of test over-utilization and incorrect ordering. New technologies can offer multiple test panels that may not translate from research to ordering medically necessary tests in clinical practice. The challenge is to have clinicians recognize laboratory professionals as a valuable resource for correct test ordering. Educating clinicians to include laboratorians as part of the health care team could improve utilization of laboratory personnel and reduce errors.
- A member stated that inconsistency in specimen collection and handling requirements among laboratories, particularly for contracted reference laboratories and outpatient testing, is a critical issue that needs to be addressed.
- The suggestion was made that stakeholders need to be proactive in reinventing the profession of laboratory medicine to demonstrate value, particularly in light of the technologic innovations mentioned in the presentation, and to address the void in appropriate use of

testing strategies and interpretation.

"The Future of Medical Laboratory Practice" A Manufacturer's Perspective on Regulations, Standards, and Guidelines in Advanced Diagnostics Microarray Product Development ***Addendum I****

Cynthia K. French, Ph.D., MBA

Vice President, Affymetrix Clinical Laboratory

Affymetrix, Inc.

Dr. French provided an overview of microarray platform technology manufacturing processes from research to validation of performance. She described the standardization, good practice policies, and quality systems used in the production process. Dr. French discussed the role CLIA laboratories play in advancing emerging technologies into clinical practice by using laboratory assays developed in-house to provide significant data collection for validating quality and diagnostic applications.

***Note:** The addendum was revised from material provided in the Committee's notebooks to reflect last minute updates by the presenter.

Committee Discussion

- A member asked if the clinical laboratory scientists (CLS) currently performing microarray platform testing understand the test principles. Dr. French replied the first CLS hired by Affymetrix performs

gene expression protocols and understands the principles. She acknowledged this person went through a very good training program and the company provides weekly in-house training for their technologists as part of its internal certificate program. Another member noted the National Accrediting Agency for Clinical Laboratory Sciences now requires molecular diagnostics as part of the baccalaureate program.

- A member introduced the issue of dealing with requests from physicians for gene chip assays that have not been clinically evaluated. Another member suggested that because of the type of quality systems presented by Dr. French, future standards of care would include expression analysis.

High Throughput Mass Spectrometry – Derived Base Compositions for the Detection and Strain Typing of Bacterial and Viral Pathogens ***Addendum J***

Steven A. Hofstadler, Ph.D.

Vice President of Research

Ibis Division of ISIS Pharmaceuticals

Dr. Hofstadler presented an overview of mass spectrometry and how it is used for clinical and epidemiologic identification and strain typing of bacterial and viral pathogens. He gave examples of the use of genotyping applications in microbial forensics, outbreaks, nosocomial strain tracking, and food pathogen monitoring. The advantages of mass spectrometry are reduced time for test performance, high testing capacity, multiple applications using the same platform, direct testing of environmental and clinical samples, and robustness to mixtures in samples.

Committee Discussion

- A member asked for clarification on the throat swab studies regarding the identification of normal flora and fungi. Dr. Hofstadler explained the primers used were designed to avoid targeting human, mammalian, or fungal sequences.
- Another member asked how it is assured that what is amplified in a sample is in relative proportion to the quantity in the original sample. Dr. Hofstadler explained the company has performed many studies of small numbers of genome mismatches.
- A Committee member inquired whether this technology had been applied to HPV identification because some developing countries are considering eliminating the Pap test in favor of HPV testing for populations. Dr. Hofstadler replied HPV has been considered, but it is a complicated issue.
- A member acknowledged both the advantages of mass spectrometry and the need to maintain workforce capability to perform culture for validation.

Reporting Standardization in Pathology ***Addendum K****

Elizabeth L. Hammond, M.D., F.C.A.P

Pathologist, LDS Hospital

Medical Director, Office of Research

Intermountain Healthcare

Professor of Pathology and Adjunct Professor of Internal Medicine

University of Utah School of Medicine

Dr. Hammond gave an overview of why standardization of reporting is important and the elements of a good report. She presented the rationale for and experiences with moving her institution to a synoptic format for requisitioning and reporting laboratory tests and described how use of a synoptic checklist reduced errors, improved quality, accelerated workflow, and increased satisfaction among clinicians and laboratorians. She also covered checklist reporting elements and helpful rules to ensure complete and appropriate information is gathered from and returned to clinicians, and noted ancillary benefits to other systems and to regulators.

***Note:** The addendum was revised from material provided in the Committee's notebooks to reflect last minute updates by the presenter.

Committee Discussion

- A Committee member opined CAP has already done a wonderful job of developing what really represents a national standard. The member suggested transferability of information among organizations is an important goal to achieve in the interest of patient safety. Dr. Hammond agreed and said establishing this nationally is valuable; pathologists at a recent CAP course requested CAP's assistance in the standardization of reports. CAP has a reporting initiative and is trying to standardize information on general elements, however, she concluded, developing synoptic reporting into a national standard is beyond what CAP can accomplish alone.
- A Committee member asked how difficult it was to get the clinicians outside of the integrated healthcare system to agree to work with synoptic reports and asked whether non-reported data was archived for future or legal reference needs. Dr. Hammond responded

report formats were developed with clinician cooperation, adding it was important to ask two questions to minimize confusion: (1) what report elements are needed to safely and effectively treat the patient, and (2) how should that information be presented? In answer to the member's second question, she said that all narrative reports were stored as narrative, but what goes into the warehouse to use for decision-making is a fragment of the total.

- A member suggested consulting tumor registry staff when setting up a reporting system since they focus on key words when coding laboratory reports. The member asked how patient chart information is quality checked against the clinical history provided on the requisition and how process redesign through process flow and cause-effect analysis is promoted and supported. Dr. Hammond responded that if information is collected rigorously, performing quality assurance is easier. She said both goals and report elements are chosen at the start of the year so appropriate data would be generated to assess goal achievement. She observed it was initially hard to persuade the administration that synoptic reporting was necessary, but they have benefited because everyone can now understand the entire process. Although the process was expensive, patients are safer.
- One member commented having both CAP and the American College of Surgeons (ACOS) cooperatively developing and updating the essential reporting elements lists expedites acceptance among all clinicians, but was concerned that vendors, smaller surgery centers, and doctor-owned hospitals do not appear to be fully onboard. The member noted these groups were also not being inspected by CAP, the Joint Commission on Accreditation of Healthcare Organizations, or ACOS. Dr. Hammond agreed, saying laboratory information system (LIS) vendors were also slow to adopt synoptic reporting. She described overcoming this by developing word processing macros that would work within most LIS report systems.

She added that synoptic reporting needed to be used across all disciplines, not just in oncology.

- A member cited examples to support Dr. Hammond, stating that while there was initial resistance to change by administration and LIS vendors, use of word processor macros worked; now almost all reports use synoptic format. This member noted the synoptic format lends itself to report monitoring via personal digital assistants, and spoke optimistically of the importance of a proactive laboratory community meeting and interacting with clinicians to help them.
- Another member emphasized that laboratory testing reports must include sufficient information to allow both the primary care provider and specialists to assess the report, relating the experience that intervening laboratories with different reporting formats might not pass on information necessary for the specialists.
- A member commented on a study from New York City that found the majority of genetic test results were communicated to patients by a secretary. For this reason, genetic reports must be succinct, understandable, and complete.
- A member asked Dr. Hammond if the synoptic report format had been extended to microbiology at her institution. Dr. Hammond said it had not, and all data still goes into the LIS; it is standardized but not interpreted. She noted the synoptic format would be especially helpful for samples requiring multiple tests such as a cerebral spinal fluid sent to the laboratory for chemistry, microbiology and cytology tests.

Patient-specific Narratives of Laboratory Test Evaluations ***Addendum L***

Michael Laposata, M.D., Ph.D.

Director of Clinical Laboratories, Massachusetts General Hospital

Professor, Harvard Medical School

Dr. Laposata presented a discussion of the basis for the incorrect assumption, often made by pathologists in charge of the clinical laboratories, that the ordering physician knows precisely how to proceed with an abnormal laboratory result. With the introduction of an enormous number of new tests, the clinician cannot be expected to know what every abnormal result means or what reflex testing would prove helpful in diagnosis. He discussed the reasons pathologists may be hesitant to address the situation, the effects of pathologists addressing only error issues arising from within the clinical laboratories, and errors resulting from lack of interpretation of complex laboratory results by knowledgeable pathologists. Dr. Laposata concluded his presentation with strategies for improving the problems of incorrect ordering of laboratory tests and misinterpretation of test results.

Committee Discussion

- The Committee strongly supported Dr. Laposata's proposal to include an interpretation, by a knowledgeable pathologist or other qualified person, with laboratory results. A member remarked it may be a mistake to assume clinicians understand even the simple laboratory tests and gave examples of incorrect interpretations of a blood urea nitrogen test and a routine urinalysis.
- A member commented that microbiologists would be glad to contribute to developing interpretive reports. Another member pointed out that constraints placed on outpatient and

reference laboratories often prevent the non-hospital laboratory from proceeding proactively in areas such as self-ordering and reflex testing.

- Several members noted since the majority of healthcare in the U.S. is provided outside of academic centers, these interpretation practices would need to be adopted by private practitioners as well. One member suggested the push might need to come from clinicians, as well as pathologists. Healthcare providers demanding more than a laboratory form stating a test interpretation of positive or negative could give more impetus for change.
- A member expressed concern that as many of the genetic tests become easier to perform they migrate from the esoteric setting to the routine laboratory environments where often no expertise for interpretation exists. Because it is more economically feasible to keep them within the facility, the tests are being reported as positive or negative and using, at best, a canned comment.
- Noting much more testing is being done outside the central laboratory at the point of care, a member stated it becomes the laboratorian's role to both interpret the laboratory tests and to advise the ordering clinicians on next steps. The member mentioned an institution that is building practice pathways that incorporate decision-making algorithms.
- A member commented in their facility, pathology and laboratory services have been rated first in physician satisfaction for the past four years because the service provided is valued. This service includes easy access to clinical pathologists and PhDs for consultation and interpretation of laboratory tests.
- A member expressed concern over the few numbers of pathology residents trained and the decrease in doctoral programs in clinical laboratory science, particularly in light of the

growing expectations of clinicians for assistance in deciding what and how to diagnose and treat.

- Several members noted obtaining payment for interpretation of laboratory results is often difficult. Dr. Laposata responded his institution has developed algorithms for testing that have become medical policy; therefore, appropriate reflex testing is performed and is reimbursable. One member commented that if value is shown for interpretation, ultimately reimbursement will follow. Another member remarked that California personnel licensure makes obtaining reimbursement easier in that state.
- One Committee member pointed out the non-physician laboratory practitioner could play an essential role in laboratory result interpretation. This practitioner would fill part of the interpreter's role and allow the pathologist to focus on his or her part.

Challenges in Clinical Communication ***Addendum M***

James H. Harrison, Jr., MD, PhD
Associate Professor, Public Health Sciences and Pathology
University of Virginia School of Medicine

Dr. Harrison described problems encountered in integrating clinical and laboratory information systems (CIS and LIS) and some of the shortcomings of present systems that hinder efficient institutional operations. He illustrated the need for more informative and user-friendly data displays, and for a better, more robust XML-based LIS. Goals should include making the considerable amount of existing laboratory data more accessible to clinicians and the medical

community and moving laboratory data into a complete patient care context.

Committee Discussion

- A Committee member applauded efforts to improve the display of laboratory information and asked if this was influencing electronic medical record manufacturers in the development of their systems. Dr. Harrison said his group had attempted to work with an interested vendor but negotiations failed and his group had to write their own system. He said the group's goal was to define general principles in hopes that some would ultimately influence industry but with the expectation that it would take some time for these ideas to be realized.
- Another member was concerned that algorithms that combine laboratory and clinical data in a prescriptive order could lead to preconceived notions and thus bias the process of forming an independent differential medical diagnosis. Dr. Harrison responded that his work had not dealt much with algorithms, but he described his group's effort to segment laboratory data to most clearly represent the patient. He said it might be reasonable to segment information in terms of physiologic systems, diseases, or problems, and there is a need to remain aware of how these tools are used on the ward. He stressed a clear need for data aggregation and summarization so clinicians will be able to find needed information within what is often a very large amount of patient data.
- A member asked for comment on the difficulty of getting statistical datasets out of the hospital information system (HIS) or LIS, pointing out the need for clinicians and researchers to use middleware to successfully data mine the large amount of information in laboratory systems. Dr. Harrison observed that collecting research data was important, not just for clinical research, but also for quality assurance and practice improvement. He mentioned his

work included a survey of other institutions' methods for establishing clinical data repositories, where data is taken out of production laboratory systems, de-identified, and restructured into a database optimized for patient population queries. Dr. Harrison stated production LISs are not structured to provide population data, nor are laboratories usually staffed to support removal of such data for research or for clinical quality assurance efforts.

- Another member commented it might be better if laboratorians and clinicians were able to design the software. Dr. Harrison responded that a partnership is needed between laboratorians and software engineers. He added laboratorians could not design software for efficient query unless they were also software engineers familiar with research database design, which is different from the production design used in the LIS. He described the significant effort required of his institution to apply the PubMed data model to the clinical data repository to make data more accessible to clinicians and researchers. He said the hospital system and LIS simply cannot be made to work like an efficient population query database.
- A member observed that if the ways that people implicitly arrive at diagnoses can be explicitly determined, decision support systems could be even further developed. Dr. Harrison added there is opportunity for both diagnosis and for patient monitoring and decision making after the diagnosis. The data modeling issue is crucially important because data models inside these systems define the information that can be communicated through them and what they can be used for. He emphasized the need to correctly define the data models and develop multiple systems with different data models that translate information back and forth. This must be communicated to the vendor.

Future of the Laboratory Workforce: Advanced Clinical Practice ***Addendum N***

Kathy Doig, PhD, CLS(NCA), CLSp(H)

Director, Biomedical Laboratory Diagnostics Program

Michigan State University

Dr. Doig reviewed the status of the non-physician clinical laboratory work force and gave an overview of the proposed clinical doctorate degree in laboratory science. The annual need exceeds the supply of clinical laboratory workers by approximately 2:1. She discussed vacancy rates, reasons for the shortage, and future diverse workforce needs including the necessity for an advanced practice laboratory professional. Dr. Doig described the suggested curriculum for the Doctorate of Clinical Laboratory Science (DCLS), instructional modes, professional interest in the degree, and the advantages of advanced practice.

Committee Discussion

- A Committee member commented that baccalaureate level technologists are already providing some consultation to physicians, emphasized the increasing necessity that technologists entering the workforce have the experience and knowledge to perform at higher levels, and stated the importance of using the technologists' skills.
- Another member related disappointment when their facility attempted to designate a medical technologist as consultant to clinicians saying the concept was so foreign that talented technologists were reluctant to try it.

- A member asked whether management was a separate track since the DCLS focuses on clinical responsibilities. Dr. Doig responded that laboratory management is a separate track. Students would have to understand certain areas of laboratory management but would be prepared primarily for the responsibility of interfacing between the laboratory and care providers.
- Noting it is almost impossible to keep up with the rapid changes occurring in the generalized field of laboratory medicine, a Committee member asked if the intent of the DCLS degree would be to focus on a specialized area or if it would be more generalized. Dr. Doig replied there could be two pathways to follow. In the first path, some students would begin as generalists but would become more specialized. In the second path, the student would become more of a general consultant, particularly for small hospitals and less specialized medical centers, and would refer clinicians to pathologists when necessary.
- A member suggested linking to persons who could be mentors in specific areas of laboratory medicine as key to success of the doctoral program. Dr. Doig responded her institution is linking with the medical school, residency programs, and the nursing school to accomplish this.
- Another member commented that highly technical educational programs have been developed, but if graduates are not challenged in the workplace, they move on to other areas where they can apply their skills. The DCLS may offer an opportunity for advancement and fill the gaps where there are not enough clinical pathologists.
- The industry liaison commented she agrees that industry can hire away the best and the brightest from the clinical laboratories because they can offer better pay and less hours. She noted many would have remained in the clinical laboratories if more opportunities existed

there. She stated even if educational programs existed, pilot programs would be necessary to prove the value of these positions to administrators.

Interdisciplinary Roles for Clinical Laboratory Scientists ***Addendum O****

Kathleen L. Hansen, CLS(NCA)

Interim President, Fairview Laboratory Services

Director, Laboratory Operations, University of Minnesota Medical Center (UMMC) – Fairview

Ms. Hansen provided an historical perspective of the evolution of laboratory roles at UMMC as a model for laboratory clinicians participating in hospital quality improvement efforts. She discussed laboratory participation in the hospital's interdisciplinary Process Improvement (PI) teams, which have addressed cost per case issues; supported the implementation of Computerized Physician Order Entry (CPOE), Verisafe patient ID, and a new process for blood product ordering systems; and attended rounds with physicians, nurses, and pharmacists. She concluded her presentation by observing that ongoing laboratory presence closer to patients and physicians leads to better communication and customer satisfaction as well as more opportunities for laboratorians.

***Note:** The addendum was revised from material provided in the Committee's notebooks to reflect last minute updates by the presenter.

Committee Discussion

- A member commented that while it is admirable for the laboratory to educate clinicians on laboratory testing, this issue should be addressed in medical school before students reach the residency level. The suggestion was made to work through the Advisory Committee on Graduate Medical Education (ACGME) and other bodies that determine educational requirements for various medical specialties. Several other members concurred and shared their personal experiences with this issue.
- A member suggested exploring models to combine the laboratory and the clinical specialty working in partnership.
- Another member suggested bringing clinicians into the laboratory rather than sending laboratory scientists on patient rounds so clinicians can observe laboratory workflow.

PUBLIC COMMENTS

- **Mr. Jason DuBois, American Clinical Laboratory Association (ACLA)** ***Addendum P***
- **ACLA Health Insurance Portability and Accountability Act of 1996 (HIPAA)/CLIA Issues** ***Addendum Q***
- **Ms. Janie Robertson, American Society for Cytotechnology** ***Addendum R***
- **P. Brock Williams, Ph.D.** ***Addendum S***

ADJOURN

Dr. Turner and Dr. Hearn acknowledged the staff that assembled the meeting program and thanked the CLIAC members and partner agencies for their support and participation. The

following reflects outcomes from this meeting:

- In response to the Committee's February 2006 request, a workgroup comprised of stakeholders including epidemiologists, clinical laboratories, public health laboratories, industry, and government will convene in Atlanta on November 2, 2006, to consider the impact of rapid and molecular tests for infectious disease agents on public health. Several CLIAC members will participate, including Dr. Barbara Robinson-Dunn (Workgroup Chair), Dr. Lou Turner, Dr. Nancy Elder, and Dr. Mills McNeill.
- The Chair acknowledged a member's request for the February 2007 agenda to include consideration of the tabling of the genetic proposed rule and encouraged everyone with a stake in the FDA ASR and the IVDMIA guidance documents to make public comment.

Dr. Turner announced the 2007 CLIAC meetings are scheduled for February 14-15 and September 5-6, and adjourned the Committee meeting.

I certify this summary report of the September 20-21, 2006, meeting of the Clinical Laboratory Improvement Advisory Committee is an accurate and correct representation of the meeting.

_____ Dated: 12/15/2006

Lou Flippin Turner, Dr.P.H., CLIAC Chair