LAP Audioconference

Checklist Updates
September 16, 2009

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Chair, LAP Checklist Committee
Learning Objectives

• List important topics from the Lab General, Hematology and Microbiology checklists
• Describe current and recent updates to the LAP inspection checklists including the rationale for the changes
• Use the checklists to improve laboratory quality
Periodic/Annual

• Deletion of word “periodic” where possible
  – Replaced by “at least annually” or other appropriate period
Administrative Requirements: “Terms of Accreditation”

GEN.26791  Phase II (new 2006, revised 2007)
Does the laboratory have a policy that addresses compliance with the CAP terms of accreditation?
Note: The CAP terms of accreditation are listed in the laboratory’s official notification of accreditation. The policy must include notification of CAP regarding the following:

1. Investigation of the laboratory by a government entity or adverse media attention related to laboratory performance; notification must occur no later than 2 working days after the laboratory learns of an investigation or adverse media attention
Administrative Requirements: “Terms of Accreditation”

Addition to item (1), GEN.26791, 2009:
This notification must include any complaint investigations conducted or warning letters issued by any oversight agency (i.e. CMS, State Department of Health, The Joint Commission, FDA, OSHA)
Administrative Requirements: “Terms of Accreditation”

GEN.26791 Phase II

Does the laboratory have a policy that addresses compliance with the CAP terms of accreditation?

Note: The CAP terms of accreditation are listed in the laboratory’s official notification of accreditation. The policy must include notification of CAP regarding the following:

2. Change in laboratory test menu; notification must occur prior to starting new patient testing
Administrative Requirements: “Terms of Accreditation”

GEN.26791 Phase II

Does the laboratory have a policy that addresses compliance with the CAP terms of accreditation?

Note: The CAP terms of accreditation are listed in the laboratory’s official notification of accreditation. The policy must include notification of CAP regarding the following:

3. Change in location, ownership or directorship of the laboratory; notification must occur at least 30 days prior to the change(s); or, in the case of unexpected changes, no later than 2 working days afterwards.
Review of Method Performance Specifications (Quantitative Tests)

- Accuracy
- Precision
- Analytic sensitivity (lower limit of detection)
- Analytic specificity (interferences)
- Reportable range (analytic measurement range (AMR))
- Reference range
# Review of Method Performance Specifications

<table>
<thead>
<tr>
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<th>FDA cleared/ approved tests</th>
<th>Other tests*</th>
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<tbody>
<tr>
<td>Accuracy</td>
<td>Verify</td>
<td>Establish</td>
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*Lab-developed tests, or FDA-approved tests modified by the laboratory.*
CLSI References on Test Validation

• Refer to CLSI Guidelines:
  – C28-A2 Determining Reference Intervals…
  – EP5 Evaluation of Precision…
  – EP15-A2 User verification of precision and trueness (to verify manufacturer claims)
  – EP9-A2 Method comparison and bias estimation…
New for 2009 Edition

In Introduction to MPS section in GEN:

1. Qualitative tests: Establish/verify only relevant elements—e.g., accuracy; analytic sensitivity (drug tests)
New for 2009 Edition

In introduction to MPS section in GEN:

2. Matrices other than blood (e.g., body fluids)
   • Common fluid types:
     – Verify/establish applicable elements—but may use data from blood IF matrix interferences can be defined
   • Uncommon fluids—disclaimer on report
     – “The reference range and other method performance specifications have not been determined for testing ---- in ---- fluid. Result should be integrated into clinical context for interpretation.”
New for 2009 Edition

In introduction to MPS section in GEN:

3. New phase I item: Summary statement by director, approving the MPS for each test

4. Intermittent tests (ex., in support of research protocols, or related to seasonal diseases such as influenza): the laboratory should have written procedures for putting test into production, including confirming method performance specifications, as appropriate.
Competency Assessment

• GEN.55500 – Phase II
  • Direct observations of routine patient test performance, including, as applicable, patient identification and preparation; and specimen collection, handling, processing and testing
  • Monitoring the recording and reporting of test results, including, as applicable, reporting critical results
  • Review of intermediate test results or worksheets, quality control records, proficiency testing results, and preventive maintenance records
  • Direct observation of performance of instrument maintenance and function checks
  • Assessment of test performance through testing previously analyzed specimens, internal blind testing samples or external proficiency testing samples; and
  • Evaluation of problem-solving skills
Competency Assessment

• Elements are assessed as applicable
• Not all elements need to be assessed at each assessment event for every individual
• In first year, competency must be assessed no later than 6 months after individual starts testing, and then at one year
• Annual assessment after first year
• Added in 2007: specimen collection, and critical result reporting
Personnel

GEN.54750 - Phase II

For laboratories subject to U.S. federal regulations, do all testing personnel meet CLIA88 requirements?

NOTE: There must be evidence in The inspector should review a sample of personnel records to ensure that all testing personnel have been evaluated against meet CLIA-88 requirements. High complexity testing personnel must have an earned associate degree in a laboratory science or medical laboratory technology from an accredited institution, or equivalent laboratory training as delineated in 493.1489 or 493.1491. Moderate complexity testing personnel must have an earned high school diploma or equivalent, and that all individuals qualify documented training as delineated in 493.1423. For further details please refer to http://www.cms.hhs.gov/clia.
Personnel, cont.

- CMS emphasizing evaluation of records to ensure presence of documentation that personnel meet CLIA requirements
- Inspectors will review a sample of records
- CLIA reference in GEN.54750.
Critical Results

CLIA-88 (493CFR1291(g)):

• The laboratory must immediately alert the individual or entity requesting the test and, if applicable, the individual responsible for using the test results when any test result indicates an imminently life-threatening condition.…. 
  – Key word is “imminently”
“Critical Tests” per TJC

- Tests that require rapid communication of the results, even if the results are normal, e.g. cardiac markers collected from a patient in the emergency department
- Not the same as “critical results”
- No CAP requirements related to these
- Lab in JC-accredited institution should refer to JC requirements
- Refer to GEN.41320 (II)
Reference Labs

GEN.41350 - Phase II

• Does the laboratory have a documented process for evaluating and selecting reference laboratories?
  – Labs subject to US regulations: must refer only to lab that is CLIA certified or equivalent
  – Includes intermediate processing: histology, DNA sequencing in microbiology
  – Pts on research protocols: if test result used for patient care decision, lab must be CLIA-certified
  – Histology (not subject to CLIA): must be CAP accredited or accepted
  – Non-US labs: must refer to lab accredited by CAP or other recognized organization or gov’t agency
Identification

- **Patient:** no change from 2007 GEN.40490 –Phase II
  - 2 identifiers (not location) – both in- & out-pts.
  - If practical, verbal confirmation
- **Specimen:** new for 2009: 2 identifiers required for all *primary* containers (attached at time of collection) (GEN.40491 II)
  - 2 identifiers preferred but not required for submitted slides
  - Does not apply to outside protective container/bag
  - Does not apply to secondary containers / slides in laboratory (exception: slides for semen analysis require 2 ID’s: RLM.06600, HEM.35901; II)
Results Reporting & Interfaces

- GEN.41067 (II) – Director or designee with dir. qualifications must approve report content/format when new system implemented, at major change, & at least annually

- GEN.48500 (II) – Verify accuracy of results across interfaces (instrument-computer; computer-computer), prior to implementation of interface & “periodically” thereafter. Must include results, reference ranges, comments
Electronic and Paper Reports—
Required Information

GEN.41096 - Phase II

• Name and address of testing laboratory
• Patient name and identification number, or unique patient identifier
• Name of physician of record, or legally authorized person ordering test, as appropriate
• Date and time of specimen collection, when appropriate
• Date of release of report (if not on the report, this information should be readily accessible)
Electronic and Paper Reports—Required Information

GEN.41096 - Phase II

- Time of release of report, if applicable (if not on the report, this information should be readily accessible)
- Specimen source, when applicable
- Test result(s) (units of measurement, when applicable)
- Reference intervals, as applicable
- Conditions of specimen that may limit adequacy of testing
Electronic and Paper Reports—Required Information

• All data elements listed must be available
  – For electronic reports, all results need not be on one screen, but must be readily available by a link, etc.
  – Laboratory must retain reports for 2 years (GEN.20377-Phase II) unless longer period specifically required (e.g., surgical pathology and cytopathology reports, blood bank tests, etc.)
Electronic and Paper Reports—Required Information

• Reference ranges
  – Interpretive or lengthy reference range information (e.g., cut-offs for tests for drugs of abuse; cut-off for risk of DVT/PE for D-dimer) need not be attached to test result, but can be in memo to clinicians. Technically this is true for all reference ranges but is strongly discouraged.
Corrected Reports—Requirements

GEN.41310 - Phase II

1. Both original result and corrected result must be present and identified as such

2. In electronic systems, need not be both on same screen but must readily available by a link
   - For lengthy narrative results (e.g. surgical pathology reports), “replicating the entire original and corrected pathology reports may be cumbersome and render the revised report format difficult to interpret. In such cases, a comment in the corrected report summarizing the previous information and the reason for the correction may be more appropriate than repeating the entire original report.”
How Far Down the Interface Chain?

- Report requirements apply to LIS and information systems that are directly linked to LIS, or linked to LIS thru middleware or interface engine.

- Requirements do not apply to systems further downstream: ex., they apply to LIS and HIS interfaced to LIS, but not to clinic EMR’s linked to HIS; they apply to client systems linked to LIS directly or thru middleware or interface engine.
Computerized Reports—Calculations

• Calculations by LIS, middleware, AND analyzers (added in 2009 ed.)

GEN.43450 – Phase II [changed from phase I in 2009]

– Must by checked every 2 years or after system change(s) that could affect calculations

– Applies only to calculations modifiable by user
Direct to Consumer Tests (DTC)

New phase II checklist items 2009:

- Results must be reported only where lawful
- Lab must send result to patient’s practitioner if requested
- Lab must give patient contact info for a health care practitioner
- Results must include interpretation in lay terms
- IF critical result is defined, lab must report to consumer in timely manner
- Results must be retained for 10 yrs.
• Changes requested by CMS
  – Procedure manual contents must reflect CLIA, as applicable (493.1251):

  (1) Requirements for patient preparation; specimen collection, labeling, storage, preservation, transportation, processing, and referral; and criteria for specimen acceptability and rejection
  (2) Microscopic examination, including the detection of inadequately prepared slides. (3) Step-by-step performance of the procedure, including test calculations and interpretation of results.
• (4) Preparation of slides, solutions, calibrators, controls, reagents, stains, and other materials used in testing. (5) Calibration and calibration verification procedures. (6) The reportable range for test results for the test system. (7) Control procedures. (8) Corrective action to take when calibration or control results fail to meet the laboratory's criteria for acceptability. (9) Limitations in the test methodology, including interfering substances. (10) Reference intervals (normal values). (11) Imminently life-threatening (critical) test results. (12) Pertinent literature references.
• (13) The laboratory's system for entering results in the patient record and reporting patient results including, when appropriate, the protocol for reporting imminently life-threatening (critical) results. (14) Description of the course of action to take if a test system becomes inoperable.
Method comparisons

• Semiannual inter-method comparison
  – Includes qualitative* and quantitative methods
  – Agreement not required—*relationship* between methods must be defined
  – Details of comparison procedure is up to the laboratory director; historical QC data may be used for instruments of same type using same QC material
  – Additional wording in Note in MIC: *Two or more detectors connected to a single data collection, analysis and reporting computer might not be considered separate systems.*

*from CMS
If the laboratory uses more than one instrument/method to test for a given analyte, are the methods/instruments checked against each other at least twice a year for correlation of patient/client results?

NOTE: This question applies to quantitative tests performed on the same or different instrument makes/models or by different methods. This comparison must include all nonwaived instruments/methods. The laboratory director must establish a protocol for this check.

- Quality control data may be used for this comparison for tests performed on the same instrument platform, with control materials of the same manufacturer and lot number.

- Otherwise, the use of fresh human samples (whole blood, serum, plasma, urine, etc.), rather than stabilized commercial controls, is important referred to directly address the issue of whether a patient/client sample yields the same results across all of the laboratory’s methods. Statistical agreement of commercial control materials across methods does not guarantee comparability of patient/client specimen results because of avoid potential matrix effects. In cases when availability or pre-analytical stability of patient/client specimens is a limiting factor, alternative protocols based on QC or reference materials may be necessary but the materials used should be validated (when applicable) to have the same response as fresh human samples for the instruments/methods involved.

This checklist requirement applies only to instruments/methods accredited under a single CAP number.
Concentration Methods

New element from CMS:
CHM.24350  Phase I

Are concentration methods for quantitative tests verified?

NOTE: Methods used to concentrate specimens for analysis must be verified at specified, periodic intervals (not to exceed one year or manufacturer's recommendations).

[Applies to procedures used to bring analyte concentrations into AMR]
Waived Tests: QC Requirement Change

• POC.07037 (II): *Are control results documented for quantitative and qualitative tests, as applicable?*
  
  – Multiple devices: acceptable internal controls documented once/day of pt. testing *for each device* [new for 2009; before, could be documented once/day for all devices of one type at director’s discretion]
  
  • Exception: if device has lock-out feature, acceptable controls need not be documented
  
  • Unacceptable controls must always be documented
Other QC Requirements for Waived Tests

• Document corrective action for unacceptable results (POC.07124, II)
• Verify acceptable QC before reporting results (POC.07211, II)
• Follow manufacturer instructions (POC.07037, II)
Other Waived Requirements

• Calibration & reagent handling – follow manufactures’ instructions

• Method performance specifications: not applicable except for reference range (verify, or use literature)

• Requirements are same as nonwaived in areas of PT, instrumentation, Procedure manual, Specimen handling, Reporting, QM, Safety, Competency Assessment
CHM Checklist

• Control requirements for GC and HPLC (CHM.16650 & 17300, Phase II)

  – Previous—3 controls required for quantitative assays:
    • “Negative or sub-therapeutic” and
    • 2 positive controls at “therapeutic or toxic level”
    • This applied to drugs but not necessarily to other assays
CHM—GC & HPLC

CHM: Control requirements for HPLC (CHM.17300, Phase II)

– Revision—requirement with more general application—2 controls for quantitative assays

• 1 negative, sub-therapeutic or non-disease
• 1 positive, therapeutic or disease

• “For drug tests, an additional control may be useful to confirm performance near LOD or cut-off, or at a high/toxic level that tests the AMR.”
CHM—GC & HPLC

CHM: Control requirements for HPLC (CHM.17300, Phase II)

- Revised note indicates that controls must include as much of the pre-analytic process as feasible (purification, extraction)
  - E.g., for Hgb A1c: whole blood controls, while ideal, are unstable, so hemolysate controls must be used.
HEM - Changes for 2009: Manual Cell Counts

• In HEM, manual cell counts (per CMS):
  – Controls must be run on body fluids (previously, just required on blood)
  – Liquid controls must be run in duplicate
    • Applies to hemocytometers for which manual pipetting/dilution required (incl. disposable units). Does not apply to devices with automatic dilution. [subject to revision in future]
  – Procedural controls are acceptable (e.g. comparison to stained slide; different analysts count the 2 sides of hemocytometer). Duplicates not required [subject to revision in future]
HEM.35340

**NEW** 06/15/2009
HEM.35340 Phase I
Is at least one cell count control specimen analyzed, or a procedural control used, for each 8 hours of patient testing?

NOTE: This requirement can be met with assayed liquid control material, a previously assayed patient sample, or a procedural control. (An example of a procedural control is correlation of the cell count with the cellularity of a stained slide prepared by a standard, validated method.) Liquid controls performed by a hemocytometer should be run in duplicate.
For PT, is there documentation that the ISI is appropriate to the particular PT reagent and instrumentation used?

NOTE: The laboratory must demonstrate appropriateness of its ISI, a measurement of the sensitivity with which thromboplastin reagents detect decreased levels of vitamin K-dependent coagulation factors. The ISI used should be appropriate for the particular reagent-instrument combination. Acceptable documentation would include information from the instrument/reagent manufacturer, or use of an ISI calculated from laboratory specimens. The ISI for a particular reagent varies, depending on the instrument used for PT testing. This is especially true for photo-optical vs. electromechanical instruments, but may also vary among different instruments within the same classification.
HEM.23290  Phase II

Is the calculation of the INR appropriately adjusted for every new lot of PT reagent, changes in types of reagent, or change in instrumentation?

NOTE: The calculation of the INR must be appropriately adjusted for every new lot of PT reagent, changes in types of reagent, or changes in instrumentation. The ISI value usually changes with each new lot of PT reagent. The ISI affects the sensitivity with which the PT reagent will be able to detect decreased levels of the vitamin K-dependent coagulation factors. This change in sensitivity will affect the calculation of the INR value.
HEM.23290  Phase II

Is the calculation of the INR appropriately adjusted for every new lot of PT reagent, changes in types of reagent, or change in instrumentation?

NOTE (cont.): The laboratory should be able to provide documentation that the calculation of the INR is correct and appropriate for the new ISI value. These changes should be implemented wherever the INR is calculated, whether by the coagulation instrument, laboratory information system, or manually.

It is critical to calculate and report appropriate INR values. Reporting erroneous INR values may lead to use of excessive or insufficient oral anticoagulant medication, which may result in bleeding or thrombotic complications in patients.
HEM.23360 Phase II

Is the appropriate geometric mean of the PT reference interval used in the INR calculation?

NOTE: The appropriate geometric mean of the PT reference interval must be used in the INR calculation, given by the formula:

\[ \text{INR} = \left( \frac{\text{PT of patient}}{\text{PT of geometric mean normal population}} \right)^{\text{ISI}} \]

The mean normal population value may change when the specimen collection process, instrument, reagent lot, or reagent changes.
Is the appropriate geometric mean of the PT reference interval used in the INR calculation?

When the distribution of values is distributed normally, the GM, the arithmetic mean, the median and the mode of the population being studied are identical theoretically. These values diverge from each other, however, as the population distribution becomes more skewed. The geometric mean is a more appropriate estimate of the average value than the arithmetic mean when the population of interest is lognormally distributed because the geometric mean takes skewing into account.

Calculation of the geometric mean is indicated below; this calculation is available in many spreadsheet programs, such as Microsoft Excel.

\[ GM = \text{antilog} \left[ \frac{(\log(X_1) + \log(X_2) + \log(X_3) + \ldots + \log(X_n))/n}{1} \right]. \]
HEM.23430 Phase II

Are there checks of patient reports for correct INR calculations, patient values, and reference ranges under the following circumstances?

1. Change in lot or type of PT reagent
2. Change in instrument
3. Establishment of new PT reference range
4. Change in INR calculation
5. At defined intervals, in the absence of the above changes

NOTE: It is suggested that the calculations be checked at the following INR values: 2.0 and 3.0. Patient reports should be checked at least once per year even in the absence of changes to the test system and calculations. This question applies whether the INR is calculated by the coagulation analyzer or by the laboratory information system.
PT / ISI / INR

- Inspectors emphasize documentation of correct ISI and correct calculation of INR
- Above requirements do not apply to systems for which analyst can not adjust ISI or calculation of INR
MIC Checklist

• **MIC.14538 - Phase II**
  For direct antigen tests on patient specimens that do include internal controls, is a positive and negative external control tested and documented with each new kit lot number or separate shipments of a given lot number?
MIC Checklist

- MIC.14538 - Phase II

In last edition, note required positive and negative external controls (organism or extract) for each new lot number and shipment, and required daily positive organism for high complexity tests and tests that include an extraction phase.
MIC Checklist

• MIC.14538 - Phase II

Revisions:

– Daily external positive control no longer required for tests with extraction phase (unless highly complex)

– Prior to relying on internal controls alone for daily QC, laboratory must do validation study
Molecular Micro.
Internal Controls

• MIC.63262 – daily controls may be limited to built-in controls if
  – System is FDA cleared & not modified
  – Validation study done
  – External controls for new lots/shipments & at frequency not less than mfg recommendation

NEW: daily controls may be limited to built-in controls for high complexity tests (ONLY in for molecular micro tests)
Streamlined Quality Control

MIC.21626 Phase I, rev. to Ph II in 2009

Is each new lot number and shipment of reagents used in bacterial identification systems tested with positive and negative organisms?
Streamlined Quality Control

MIC.21626 - Phase II

• Revision to Note: **Streamlined** QC is allowed as specified by manufacturer for commercial ID systems (=use of key indicator strains)
  – Manufacturer instructions must be followed w/o modification
  – Reference: CLSI M-50A
  – For user-developed ID systems, commercial systems that have not identified a streamlined QC process, or commercial systems for which laboratory alters manufacturer instructions, each biochemical test must be checked with positive and negative organism for each new lot/shipment
  – Changed to phase II
Molecular Microbiology, cont.

• More extensive, detailed Mol Micro section added to MIC checklist
  – Previously, MOL checklist required for non-FDA-approved/cleared tests
  – Now, all molecular microbiology testing inspected with MIC…MOL checklist is limited to inspection of genetic and oncology testing
Molecular Microbiology, cont.

• More extensive, detailed Mol Micro section added to MIC checklist

  – New section organization
    1. General – QM, QC, calibration, procedure manual, specimen handling, reporting, reagent handling, procedure and tests, instruments, safety, personnel
    2. FDA-cleared, non-amplified testing
    3. FDA-cleared, amplified
    4. Tests not FDA-cleared, and FDA-cleared tests modified by laboratory
       (More detailed validation requirements…)
Molecular Microbiology, cont.

• Molecular section of MIC checklist need not be used to inspect non-amplified tests run directly on positive cultures—can use other applicable section of MIC (ex., Mycobacteriology, Mycology)
New Checklist Format

Changes anticipated in 2010 edition
1. Question format changed to statements.
2. Additional fields—for example, compliance/examples of compliance, instructions to inspectors.
3. Changes in font and/or formatting

Future changes
1. New numbering system (invariant numbers)
2. “Single checklist” database, enabling checklists to be customized to fit the organization of each laboratory by linking common sections for PT, QC, instrument maintenance, etc., to the checklist items specifically applicable to each section of the laboratory
Checklists New Look, cont.

**URN.21250  PHASE II  Compliant  N/A  Yes  No**

When a procedure is discontinued, a paper or electronic copy must be maintained for at least 2 years, recording initial date of use, and retirement date.

**NOTE:** Current practice must match the policy and procedure documents.

**Instructions for Inspectors:**
Compliance to this checklist requirement must be demonstrated by:
- A written procedure for discontinued policies/procedures AND
- A file of discontinued policies/procedures including the retirement date

**Best Practice:**

**REFERENCE:**
Assistance

http://www.cap.org

Email: accred@cap.org

800-323-4040, ext. 6065
Questions?