Q&A column

Editor: Frederick L. Kiechle, MD, PhD

Submit your pathology-related question for reply by appropriate medical consultants. CAP TODAY will make every effort to answer all relevant questions. However, those questions that are not of general interest may not receive a reply. For your question to be considered, you must include your name and address; this information will be omitted if your question is published in CAP TODAY.

Q. If an instrument is moved a short distance, is it necessary to conduct revalidation?

A. January 2021—The CAP checklist requirements do not specify how far an instrument must travel before it is considered a move. It is the laboratory's responsibility to ensure instruments function properly and performance is not affected by relocation. Some moves may require more extensive checks and verification processes than others. The relocation process could cause damage, regardless of distance. Furthermore, how an instrument performs in a new location could be affected by environmental conditions, such as temperature, humidity, or sunlight, or other factors, such as water source or types of personnel using it. Moves also may involve an extended downtime that could negatively affect an instrument.

Some instruments, such as handheld point-of-care testing analyzers, are intended to be portable. The requirements for checking performance and method performance specifications after a move would not apply to these instruments.

Laboratories should refer to the manufacturer's manual for critical requirements regarding setup, limitations, and environmental conditions. Instrument performance checks should include completing scheduled maintenance and instrument function checks, such as start-up and calibration processes, per the manufacturer's instructions. Method performance specifications, such as accuracy, precision, and reportable range, must be verified at the location where testing will be performed. The laboratory may also wish to contact the manufacturer for further recommendations.

After the move, the laboratory must perform verification studies using an appropriate number of samples, as determined by the laboratory based on the extent of the move, to show that performance parameters were not affected by the relocation process.

Clinical and Laboratory Standards Institute. *EP10-A3-AMD: Preliminary Evaluations of Quantitative Clinical Laboratory Measurement Procedures; Approved Guideline.* 3rd ed. CLSI; 2014.

Standard: Establishment and Verification of Performance Specifications. 42 CFR §493.1253. https://j.mp/e-CFR493.

Trudy R. Darden, MA, MT(ASCP)
Manager, Accreditation Services
CAP Accreditation Programs
College of American Pathologists
Northfield, Ill.

Q. At what level or time is aPTT considered incorrect? Is an aPTT of less than 22.0 seconds an acceptable result?

A. Interpretation of activated partial thromboplastin time (aPTT) depends on the reference range, which is established in every laboratory in accordance with guidelines from the Clinical and Laboratory Standards Institute.[1] The recommendation is for each laboratory to initially establish a reference range or verify the reference range of an FDA-approved test. This normal range should be verified with any change in reagent, lot number, instrument, or

collection system, or once per year.[2]

A falsely prolonged aPTT is one of the most common outcomes of a clinical laboratory aPTT result generated incorrectly. False elevation can be a consequence of specimen collection and handling issues such as failure to correct the anticoagulant volume in patients with a hematocrit greater than 55 percent, underfilling anticoagulant for a recommended collection volume of whole-blood-to-anticoagulant ratio of 9:1, and contamination with heparin. Another cause is increased sensitivity of aPTT reagents (greater than 50 percent). The recommended factor sensitivity for aPTT reagents is within 30 to 45 percent.[1]

Furthermore, prolonged aPTT can be a consequence of factor deficiency—most commonly factors VIII, IX, XI, and XII with less than 30 percent activity or less than 0.3 U/mL—or the presence of a nonspecific inhibitor, such as lupus anticoagulant, or a specific coagulation factor inhibitor.

With regard to the second question, reference ranges tend to vary by laboratory, as laboratories may use different manufacturers' aPTT reagents or kits. However, an aPTT of less than 22.0 seconds could be considered a shortened time if it is shorter than the lower reference interval of aPTT. The most efficient way to confirm a shortened aPTT is to collect another blood sample and repeat confirmation testing.[3]

Shortened aPTT can be attributed to preanalytical variables, disease conditions, and normal biological variability. Among the preanalytical variables are a suboptimal specimen due to a difficult or poor blood draw or a partially clotted sample, or inappropriate specimen collection and handling, such as overfilling a blood collection tube. A shortened aPTT can also be caused by a hypercoagulable state with increased predisposition to thrombosis, such as in post-operative patients or coagulation disorders such as factor V Leiden mutation and antithrombin deficiency. It is also common for patients with an acute or chronic condition—for example, myocardial infarction or malignancy—and inflammation. Finally, since a normal range is established by having approximately 2.5 percent of normal healthy people's results outside either side of the cutoffs, a shortened aPTT could simply reflect individual biologic variability within that 2.5 percent range.[4]

1. Clinical and Laboratory Standards Institute. *H47-A2: One-Stage Prothrombin Time (PT) Test and Activated Partial Thromboplastin Time (APTT) Test; Approved Guideline*. 2nd ed. CLSI; 2008.
2. Castellone DD. Establishing reference intervals in the coagulation laboratory. *Int J Lab Hematol*. 2017;39(Suppl 1):121–127.
3. Lippi G, Salvagno GL, Ippolito L, Franchini M, Favaloro EJ. Shortened activated partial thromboplastin time: causes and management. *Blood Coagul Fibrinolysis*. 2010;21(5):459–463.
4. Lippi G, Favaloro EJ. Activated partial thromboplastin time: new tricks for an old dogma. *Semin Thromb Hemost*. 2008;34(7):604–611.

Dong Chen, MD, PhD
Division of Hematopathology
Department of Laboratory
Medicine and Pathology
Mayo Clinic, Rochester, Minn.
Chair, CAP Hemostasis and Thrombosis Committee

Aishwarya Ravindran, MBBS
Division of Hematopathology

Department of Laboratory Medicine and Pathology
Mayo Clinic, Rochester, Minn.
Member, CAP Hemostasis and Thrombosis Committee