Body Fluid Testing—Complicated Specimen Types

Jonathan R. Genzen, MD, PhD, is the section chief of Clinical Chemistry at ARUP Laboratories and an associate professor in the Department of Pathology at the University of Utah School of Medicine. His clinical and research focus involves clinical chemistry, laboratory automation, and process improvement.

Here, he discusses the significance of body fluid testing in the clinical laboratory industry, noting that "body fluid validations can seem daunting, particularly when resources are very limited," but that shared work can aid everyone. "The entire community benefits when laboratories share the results of body fluid validations in the peer-reviewed literature."

Q: Why is body fluid testing such an important issue for clinical laboratories?

A: Clinical laboratories sometimes receive requests to test body fluids using assays not FDA-cleared or approved for a particular fluid type. Clinical laboratories are responsible for ensuring analytical validity and compliance with all applicable regulatory requirements, but should also be approachable for unique requests from licensed clinicians who assert that body fluid testing is necessary for a given patient. Balancing these requests from clinical services with the need for regulatory compliance can be challenging, particularly when results may influence treatment decisions.

Q: What are the most challenging factors to consider in performing body fluid validations?

A: The challenges lie in the uncertainties regarding experimental design, the feasibility of conducting robust experiments in clinical laboratory settings, and the regulatory implications of potential test modifications. Additionally, collecting an adequate number of residual specimens and identifying staff availability for validations can be difficult. Thankfully, recent publications have outlined commonsense approaches for exclusion of matrix interference, a concept that is now incorporated into CAP's checklist.

Q: How should reference ranges be addressed for body fluids?

A: The CAP checklist (COM.40620) emphasizes that reference ranges must be reported with body fluid results, unless the body fluid is tested and reported along with a corresponding blood specimen from that patient. CAP also permits the citation of published literature. The traditional concept of reference ranges for body fluids may be somewhat unclear, as some fluids may not even exist in non-pathologic conditions. In such scenarios, sensitivity, specificity, and clinical interpretive limits related to testing may also be helpful to clinicians. ARUP has developed a free resource (**www.aruplab.com/bodyfluid**) that can be used to further evaluate how body fluid results have been described in peer-reviewed literature, linking directly back to the original articles in PubMed.

Q: How should laboratories handle testing of unique specimens?

A: The CAP checklist also specifies how laboratories can handle clinically unique requests. When not tested locally, these specimens are sometimes directed to reference laboratories. For this reason, published body fluid validations are frequently initiated at reference laboratories and larger academic or regional laboratory settings. In some scenarios, local testing may have a better chance of providing results (e.g., synovial fluids may congeal or clot during transport). Regulations regarding body fluid testing should be practical enough to allow testing to be performed locally when there is reasonable assurance of analytical validity.

Q: How comprehensive is the scientific literature on body fluid testing?

A: The published literature is extensive, but often inadequate in consideration of analytical validity and methodology-specific information. Several recent studies have placed a much greater focus on the instrumentation used for analysis, which is incredibly valuable to the clinical laboratory community as CAP allows laboratories to reference published literature. Our group is committed to designing body fluid validation studies that are publishable, peer-reviewed, and publically available. This is in the best interest of patient care, regardless of where the testing is performed.