

The Number Starts With a Definition

Five studies where storage, platform, matrix, calibration, and the measurand itself change what a laboratory number means.

Friday, September 25, 2026

Specimen stability | TBI biomarkers | Calcium | Proinsulin | Glycated albumin

FIVE SIGNALS WORTH YOUR BENCH TIME

01 / PREANALYTICS / CALPROTECTIN

Serum calprotectin was much more stable at -80 C than -20 C

Finding. A five-day study used two reagent systems on an Atellica analyzer. Estimated change accumulated far more slowly at -80 C than at -20 C, while the two methods also showed different instability slopes at -20 C.

Why it matters. A send-out or batched biomarker needs method-specific storage claims. Temperature, duration, freeze-thaw handling, and allowable change belong in validation and rejection criteria.

Limits. Only 40 leftover samples were divided among temperature-method groups, follow-up lasted five days, and allowable total-error limits were broad. Findings are not automatically portable to other platforms.

Evidence label: Peer-reviewed short-term stability study; full text may require subscription.

02 / TRAUMATIC BRAIN INJURY / PLATFORM COMPARABILITY

Handheld and core-lab TBI tests agreed on the binary decision

Finding. In 829 adults evaluated after blunt trauma, combined GFAP and UCH-L1 results showed 92.28% cross-platform agreement. Both tests detected all clinically significant intracranial lesions, with 100% sensitivity and negative predictive value; specificity was 29% and 25%.

Why it matters. The clinically relevant comparison is not correlation alone. Laboratories must separate numeric comparability from agreement at assay-specific cutoffs and define how discordant results are handled.

Limits. The cohort consisted of adults who received CT within 24 hours. Low specificity means many positive tests, and equivalent binary performance does not make concentrations interchangeable in every use.

Evidence label: Peer-reviewed paired-platform diagnostic study; full text may require subscription.

03 / MEANINGFUL UPDATE / CALCIUM

Corrected and total calcium missed hypocalcemia in ICU patients

Finding. Among 145 intensive-care patients, 119 (82.1%) had abnormal ionized calcium. Total, corrected, calculated-ionized, and nonionized measures underestimated hypocalcemia; pH-adjusted ionized calcium had 95.2% accuracy and correlated strongly with measured ionized calcium.

Why it matters. Edition 014 showed one interference-driven false high total calcium. This cohort broadens the lesson: indirect calcium estimates can misclassify physiology across a critically ill population.

Limits. This single-center cross-sectional study was small. Ionized calcium did not predict ICU stay or mortality, and pH adjustment does not eliminate the need for a well-controlled direct ionized measurement.

Evidence label: Peer-reviewed cross-sectional ICU study; full text may require subscription.

A distributable LC-MS/MS method separated proinsulin processing forms

Finding. A peptide-immunoaffinity LC-MS/MS assay quantified intact and partially processed proinsulin at routine flow rates. Between-batch imprecision was at most 16.4%, measuring intervals reached low-picomolar concentrations, and comparison exposed variable insulin cross-reactivity in two immunoassays.

Why it matters. Shared calibrators, antibodies, and an operating procedure make interlaboratory transfer testable. The two surrogate peptides also preserve information lost when all proinsulin forms collapse into one immunoreactive result.

Limits. Sample preparation is complex, and imprecision near clinical decision levels requires scrutiny. The study supports analytical adoption and research use, not improved diagnostic outcomes.

Evidence label: Peer-reviewed analytical method development and validation; subscriber access may apply.

Glycated-albumin standardization depends on choosing the right measurand

Finding. Across 129 donor sera and reference materials, a bottom-up proteomics method correlated strongly with enzymatic and JSCC methods ($r = 0.986$) but developed increasing negative bias at higher values because one site, Lys-525, represented total albumin glycation less well as glycation increased.

Why it matters. Standardization cannot repair a disagreement about what is being measured. Defining total glycated lysines versus one site comes before commutability, calibration transfer, and clinical cutoffs.

Limits. This method-comparison study proposes a preferred measurand; it does not establish outcome-based thresholds or multicenter reproducibility across routine systems.

Evidence label: Peer-reviewed method-comparison and standardization study; subscriber access may apply.

Verified source trail

1. Čičak, Šarčević, Saračević, et al. Stability of serum calprotectin as an emerging inflammatory biomarker: a five-day study at -20 °C and -80 °C using two analytical methods. Laboratory Medicine. 2026. DOI: 10.1093/labmed/lmag059.

2. Roberts, Gherasim, Li, et al. Comparability of GFAP and UCH-L1 Measurements Using Handheld and Core Laboratory TBI Plasma Tests and Their Diagnostic Performance for Traumatic Intracranial Lesions. The Journal of Applied Laboratory Medicine. 2026. DOI: 10.1093/jalm/jfag093.

3. Das and Baruah. Total Versus Ionized Calcium: Valid Index of Calcium Status in Critically Ill Patients. Archives of Pathology & Laboratory Medicine. 2026. DOI: 10.5858/arpa.2025-0488-oa.

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5. Zheng, Wu, Zhang, et al. Standardization Challenges in Glycated Albumin Measurement: Methodological Heterogeneity and Quantification Discrepancies. Clinical Chemistry. 2026. DOI: 10.1093/clinchem/hvag055.

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