LUMEA | CASE STUDY

Improving Specimen Integrity with the BxBoard

The Challenge: A Critical Bottleneck in Precision Diagnostics

For modern healthcare to truly deliver on the promise of precision medicine, ancillary tests like genomic and molecular assays are essential. These tests provide clinicians with the information needed to make confident, timely treatment decisions. However, the integrity of the initial biopsy specimen is a significant and often overlooked bottleneck in the diagnostic workflow.

A significant percentage of biopsy specimens are compromised, leading to a "Quantity Not Sufficient" (QNS) diagnosis or degraded RNA. This can happen when there isn't enough cellular material for the lab to perform a test or when the nucleic acids are compromised. In an analysis of metastatic prostate cancer samples, one study found a QNS rate as high as 23%.[1]

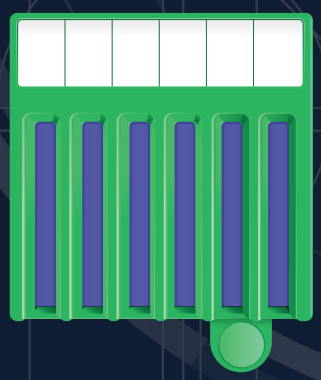
These specimen failures create a ripple effect of negative consequences:

- **For the patient:** Test cancellations lead to prolonged diagnostic uncertainty, heightened anxiety, and delayed initiation of critical treatment plans. In some cases, a repeat biopsy is needed, adding to the patient's out-of-pocket costs and physical burden.
- **For the healthcare system:** Failed specimens are linked to hospital readmissions and increased costs.[2]
- **For the laboratory:** The cancellation of a test triggers a cascade of inefficiencies, consuming valuable staff time and resources and requiring complex logistical coordination.

The integrity of the initial specimen is the first and most critical link in the diagnostic chain. When that link is broken, the entire value of precision medicine is lost.

The Solution: A New Standard for Specimen Management

- To address the pervasive issues of QNS and RNA degradation, a new approach to specimen management was needed. The **BxBoard** represents a fundamental shift in how tissue biopsies are handled, providing a more reliable and standardized method for specimen collection and preservation.
- The BxBoard's effectiveness comes from its innovative approach to tissue fixation: **sponge absorption**. Instead of traditional immersion fixation, where specimens float freely in a large volume of liquid formalin, the BxBoard uses a hydrophilic sponge saturated with a small, precise amount of fixative. This method provides several key advantages:



- **Accelerated Fixation:** The saturated sponge provides a sustained, high concentration of fixative at the tissue interface, accelerating penetration and ensuring rapid, even fixation of the sample. This prevents autolysis, the enzymatic degradation that can destroy cellular components and nucleic acids.
- **Minimization of Distortion:** The BxBoard's site-specific lanes hold the specimen securely, preventing it from curling or fragmenting. This preservation of morphology is crucial for ensuring a sufficient amount of linear tissue for analysis, directly addressing QNS issues.

The Before and After: BxBoard's Impact on QNS/RNA Rates

To quantify the BxBoard's impact, a comparative analysis was conducted by an ancillary testing company, pitting specimens collected in traditional formalin bottles against those collected on the BxBoard.*

Before: Traditional Formalin Bottles
When using traditional formalin bottles, the ancillary testing company faced a combined cancellation rate of **1.27%** due to QNS and RNA degradation issues. These failures resulted in a significant waste of time and resources, delayed diagnoses, and increased costs for both the lab and the patient.

After: The BxBoard Solution
After implementing the BxBoard, the same ancillary testing company saw a dramatic reduction in its cancellation rates down to .59%. Specimens collected using the BxBoard were **2.1 times less likely** to be cancelled due to QNS and RNA degradation issues compared to those collected in traditional bottles.

Method	Cancellation Rate (%) (Combined RNA & QNS)
Bottle	1.27%
BxBoard	0.59%

Risk Ratio: 2.1x less likely (95% CI: 1.4x-3.2x)

The Result: A New Standard of Diagnostic Confidence

The BxBoard is more than just a device for specimen collection; it's a foundational technology that enhances diagnostic precision and empowers the entire healthcare system. By ensuring the integrity and proper orientation of tissue specimens, the BxBoard:

- **Streamlines laboratory operations** by reducing re-processing and wasted resources.
- **Reduces costs** for the healthcare system and for patients.
- **Empowers clinicians** to provide more accurate and timely diagnostic reports.
- **Enables patients** to have confidence that their treatment decisions are based on the most reliable and complete information available.

The BxBoard has proven to be a powerful, data-driven solution, setting a new standard for specimen integrity and ensuring a clear, confident path to diagnosis and treatment for every patient.

Footnotes:
Minimizing the impact of quantity not sufficient (QNS) on next-generation sequencing (NGS) - Oncomine, accessed September 15, 2025, https://www.oncomine.com/hubfs/QNS-TechNote-Global-COL26886-102022-FWR.pdf
The Role of Laboratory Tests in Transitions of Care and Readmissions - Critical Values, accessed September 15, 2025, https://criticalvalues.org/news/all/2024/01/04/the-role-of-laboratory-tests-in-transitions-of-care-and-readmissions

*A genetic company's preliminary data shows a significant 53.54% reduction in Quality Not Sufficient (QNS) rates, dropping from 1.27% to 0.59% in labs using the BxBoard for fixation and the BxChip for tissue multiplexing. The BxBoard improves sample quality by optimizing tissue stability, which reduces issues like fragmentation and poor tissue quality, ensuring more of the initial specimen is usable for testing. The BxChip further enhances this by improving tissue yield and structural integrity through multiplexing needle cores, which is essential for downstream analysis. The combined use of both technologies appears to be the primary reason for the observed improvements, suggesting that a more comprehensive study is needed to validate these findings and support broader adoption.