

Harmonizing Biomarker Data

Effectively managing today's explosive volume and diversity of data is critical to clinical trial success

A PRECISION BRIEF



Executive Summary

Key trial objectives often require specialty lab data generated from multiple vendors and diverse assays. Consider a key oncology trial that has 5 biomarker assays being run at 4 separate specialty labs—creating a volume and diversity of data that greatly expand the opportunities for discovery. Yet effective management of that data is foundational to success. Precision’s unique combination of cross-functional specialists and innovative informatics swiftly harmonizes biomarker data, setting the stage for data integration and analysis. Moreover, this innovative approach produces an order-of-magnitude reduction of time and cost for the Sponsor, while mitigating major risks for interim and final study deliverables.

Introduction

Precision medicine–guided drug development—and, in general, the reliance on specialty lab data to address key clinical trial objectives—has become the rule rather than the exception. Biomarkers are used to understand mechanism of action (MOA), evaluate pharmacokinetics/pharmacodynamics (PK/PD), explain differences in treatment response, and in many cases to select or stratify patients. A recent study of clinical development success rates from 2006 to 2015 showed the benefit of using biomarkers for patient selection results in a 3-fold increase in the likelihood of approval (LOA) from phase 1 (25.9% LOA with a biomarker vs 8.4% LOA without). Companies are also expanding efforts to transform discovery and development with translational research initiatives to develop companion or complementary diagnostics, identify new drug targets, reposition existing assets, and uncover novel insights on the MOA or biology of disease.

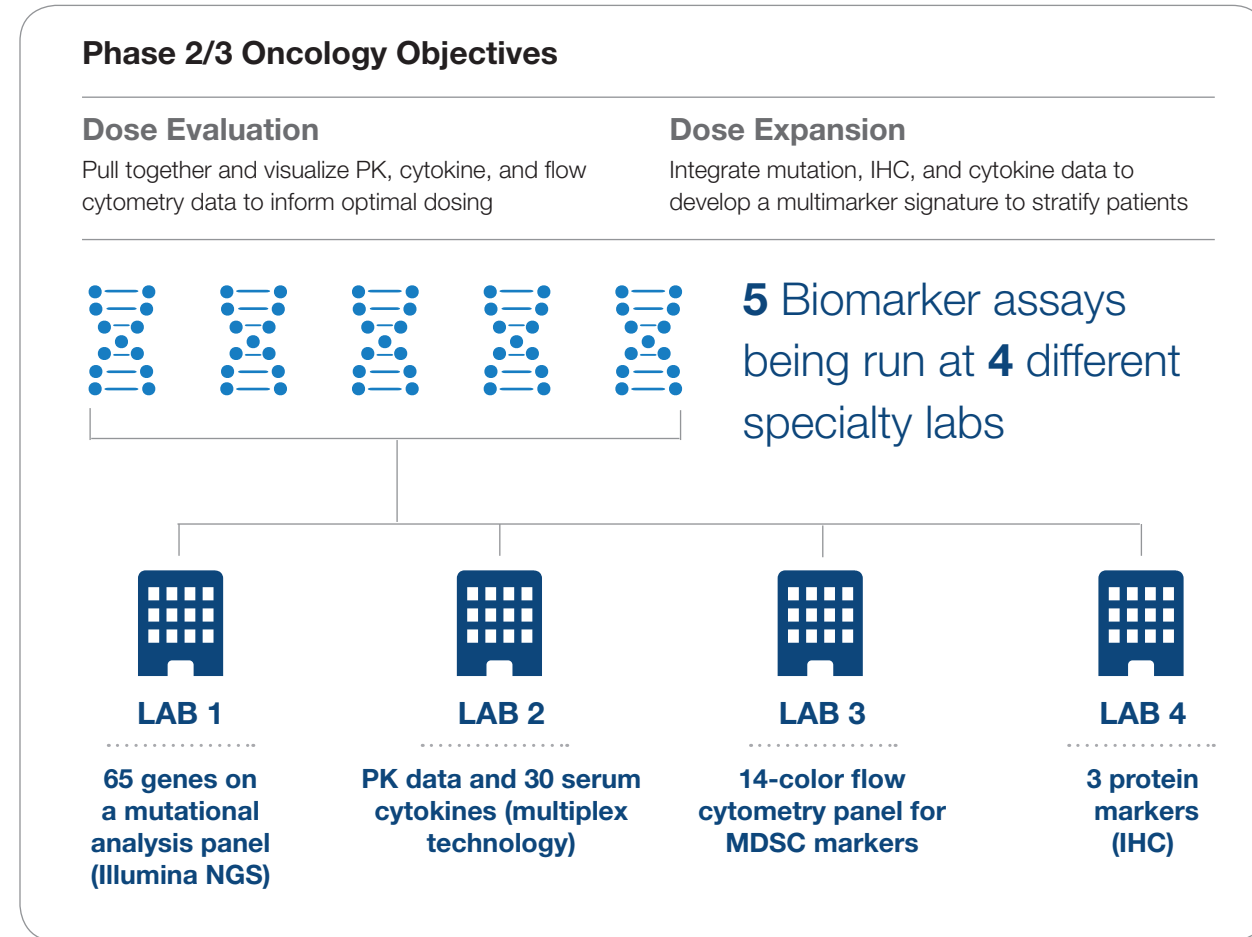
In parallel with this expanding role of biomarkers, emerging and advancing technologies have led to an increase in both the volume and diversity of biomarker data being collected in clinical studies. Historically, there was an emphasis on high-throughput genomic studies and associated methodologies and computing frameworks; however, there has been a boom in the use of high-content assays (eg, flow cytometry), novel 3D assays (eg, NanoString nCounter) and complex targeted assays (eg, NGS panels in cancer, epigenetics, multiplex immunoassays, and IHC). Clinical studies now incorporate a wide array of nontraditional data coming from specialized technologies and specialty labs.

This presents 2 distinct but related key challenges: (1) biomarker data management and (2) data integration. This brief focuses on biomarker data management; the issues of data integration are discussed in a companion brief.

A recent study of clinical development success rates from 2006 to 2015 showed the benefit of using biomarkers for patient selection results in a 3-fold increase in the likelihood of approval from phase 1

A Case in Biomarker Data Management

Precision's approach to biomarker data management can be seen in the context of a phase 2/3 dose evaluation and expansion oncology study with 5 biomarker assays being run at 4 different specialty labs.



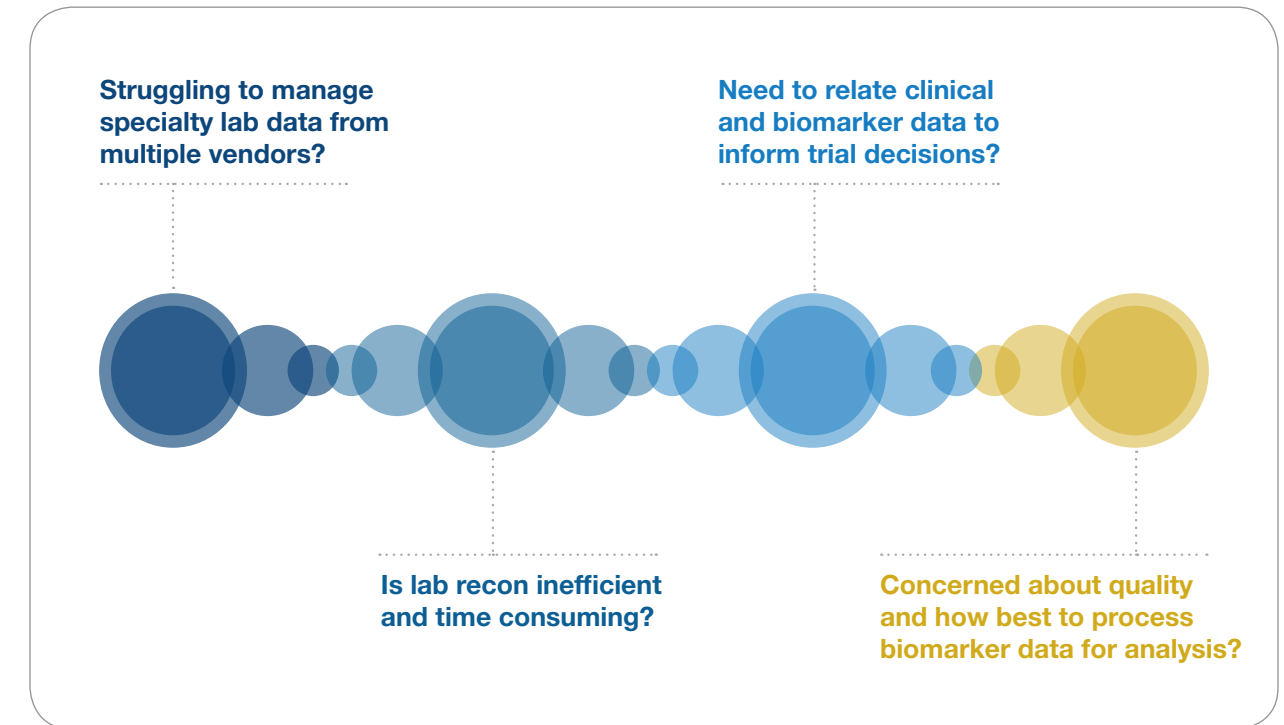
What Sponsors are saying about our approach to biomarker data management:

“The timely, interactive visualization of PK and flow data together enabled us to make dose adjustments to optimize the therapy”

“This is a game-changer for clinical research”

Challenges of Specialty Labs and Biomarker Assays

Managing specialty lab vendors and harmonizing biomarker data generated from various assays in a high-quality, efficient manner appropriate for a clinical trial is a major challenge. In the case study described, there are a number of pain points that come into play.



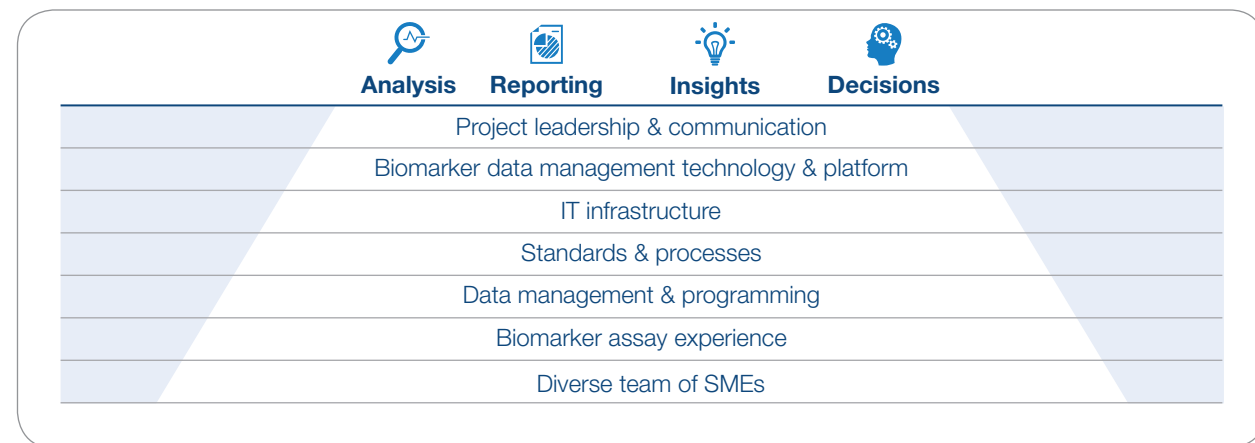
For any Sponsor whose study starts after December 17, 2016, additional considerations arise as the FDA requires data to be submitted in formats supported by FDA and listed in its Data Standards Catalog (ie, CDISC SDTM, ADaM). To meet these requirements, it will be necessary to bring new rigor to biomarker data in regulatory submissions and generate CDISC-compliant data sets and documentation for specialty lab data generated to support the clinical study.

The management and processing of specialty lab data, as well as visualization and collaboration around the data, clearly represent an unmet need in clinical studies. Addressing this fundamental gap in clinical trial operations and translational research has the potential to result in time and cost savings for the Sponsor and mitigate a major risk to interim and final study deliverables.

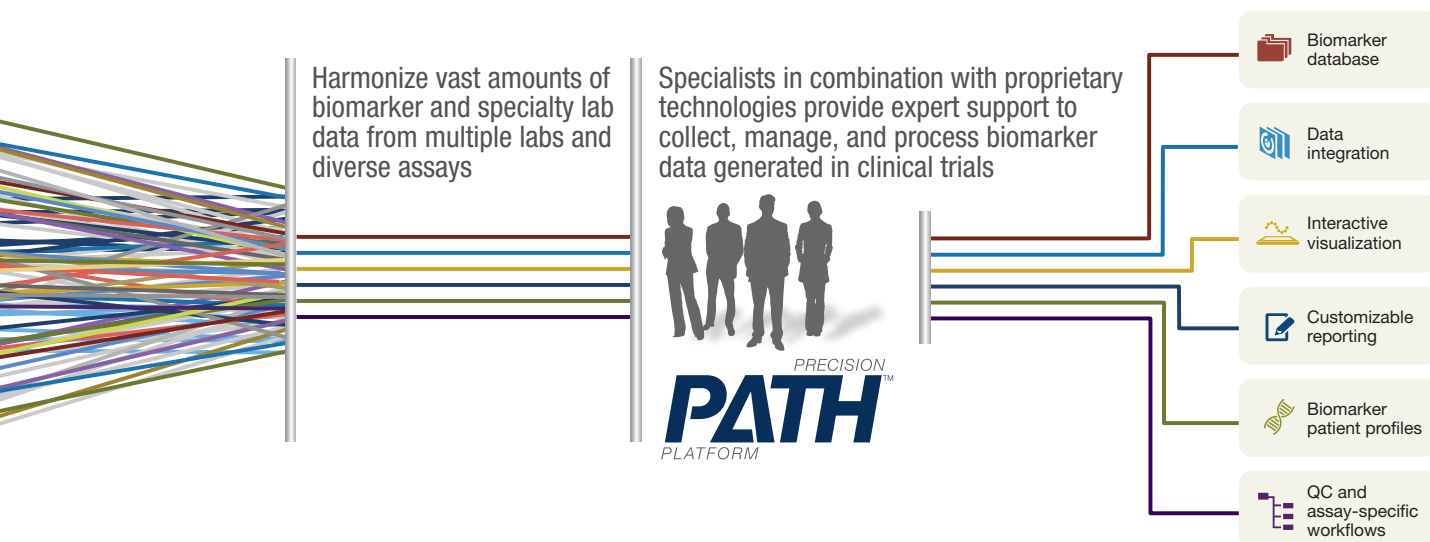
The Precision Approach to Biomarker Data Management

Precision has developed a unique approach combining services and technology to collect, manage, and deliver specialty lab data—from multiple lab vendors and assays—in the context of global clinical studies. Success requires a cross-functional team of specialists including data scientists, translational informaticians, biomarker data management programmers, and data managers. Innovative data scientists—with the skill to design, validate, and operate technologies specifically engineered to address the challenges of biomarker data management—combine with data managers and programmers to implement workflows and adapt traditional processes to meet the needs of specialty lab data.

Before you can perform an analysis, generate reports, gain insights, and make decisions, the foundation must be built for efficient, quality biomarker data management.



Biomarker Data Management



The case study exemplifies a scenario where biomarker data management is critical to the Sponsor's ability to address key study objectives. Precision's experts deliver practical solutions with demonstrated real-world success, leveraging our PATH Platform in providing a centralized database for biomarker data, data transfer, and data integration/collaboration, as well as interactive reports and support for ongoing trial activities.

This biomarker data management solution is complementary to clinical data management and existing systems (eg, LIMS, EDC) and leverages Precision's PATH Platform to provide:

- Centralized access: Store and access all specialty lab data in a single biomarker database
- Data reconciliation: Expedite time-consuming recon activities between labs and EDC
- Biomarker patient profiles: Customizable looks at the patient level, enhanced with biomarker data
- Quality control: Implement assay-specific workflows and incorporate custom workflows
- CDISC compliance: Deliver CDISC-compliant data sets for specialty lab data
- Real-time derivation: Create new or combined biomarker variables for on-the-fly reporting
- Integrated data: Interactively visualize biomarker data to inform clinical trial evaluations with built-in functionality such as heat maps, PCA, 3D plots, correlations, and descriptive summaries

Beyond this, the platform lends to data integration for key objectives such as dose evaluation, multimarker biomarker signature development, and biomarker-defined patient stratification, as well as linking to novel insights on pathways, networks, and chemicals for drug positioning and future study design.

Conclusion

Traditional data management and statistics functions, as well as existing systems such as LIMS or EDC technologies, have not been structured to address the volume and complexity of specialty lab data generated in modern clinical research. As such, effective biomarker data management should be foundational to clinical trial operations.

In this major oncology trial, the Sponsor found the Precision approach of combining specialists and innovative informatics was transformative to its ability to reach key clinical trial objectives.

Prepared by:

Jared Kohler, PhD

Managing Director, Biomarker and IVD Analytics

Tobi Guennel, PhD

Principal, Biomarker and IVD Analytics

Scott Marshall, PhD

Managing Director, Biomarker and IVD Analytics



THE FUTURE OF MEDICINE IS PRECISION

precisionformedicine.com

© 2017. All rights reserved.