CBPH USC | UCLA Center on Biodemography and Population Health

Improving Study-Lab Collaborations

Reducing Friction in the Biospecimen-Data Pipeline

Biomarker Network Meeting, May 6, 2026

CBPH hosted a meeting in April 2026 with representatives from selected Population Studies and Biomarker Labs to discuss challenges and best practices in study-lab collaborations

OBJECTIVES

- **Identify common challenges** in the biospecimen-to-data pipeline to improve study–lab collaborations in biomarker research
- **Translate collective experience** into practical guidance, best practices, and resources for the broader research community

6
Participating labs
Spanning proteomics, genomics, methylation, immunology & microsampling

4
NIA-funded Studies
HRS, Add Health, MIDUS, HS&B

5
Major themes
Identified across all sessions as recurring challenges

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https://gero.usc.edu/cbph/biomarker-resources/

CBPH Biomarker Resources

Biomarker Study Design | Biomarker Collection Protocols | Biomarker Measurement

Improving Study – Lab Collaborations

A practical framework for designing stronger biomarker studies

This diagram maps best practices across the full biospecimen-to-data pipeline, helping teams reduce friction, standardize processes, and generate high-quality, reliable data through early planning, quality control, and clear communication.

Download Improving Study - Lab Collaborations

Download Standard Operating Procedure

1. STUDY DESIGN

FRICTION POINT:
MISALIGNED ASSAYS & PLATFORMS

RECOMMENDATIONS

Engage labs early

Choose compatible platforms

Map sample volume

- **Engage the lab partner at the proposal stage** to ensure scientific aims are feasible and budgets are accurate.
  - *Study teams should look beyond cost; commercial labs may be cheaper but often offer less transparency regarding QC and methodology compared to academic scientific partnerships.*
- **Choose platforms compatible with study goals** - understand the specific specimen type, volume, and storage requirements for each assay.
- **Set collaboration terms in writing** before the work begins, including defining the scope of work, authorship expectations, and data access protocols.

2. BIOSPECIMEN COLLECTION

RECOMMENDATIONS

FRICTION POINT:
DEVICE FAILURES & VARIABILITY

Pilot protocols

Optimize collection

Track pre-analytic factors

- **Piloting Protocols**: Collection methods should be piloted in the specific target population (e.g., older adults or rural settings) to assess failure rates and develop supplementary field instructions.
- **Systematic training and refresher protocols for field staff** are necessary to ensure consistency across multiple sites or long-term studies.
- **Track pre-analytical factors** (e.g., collection time, collector ID, device lot numbers, and shipping conditions) as these can account for a large degree of lab errors and can be used as covariates in later analyses.

3. LAB PROCESSING

RECOMMENDATIONS

FRICTION POINT:
ASSAY LIMITATIONS & QC ISSUES

Match sample to assay

Standardize QC

Validate & calibrate

- Teams should budget for and insist on **embedded QC samples**, such as blinded duplicates and reference standards, in every batch.
- **Standardization and Calibration:** Plan for staged validation -> pilot new biomarkers in matched samples (e.g., DBS vs. plasma), test across realistic field conditions, and only scale after confirming comparability, stability, and interpretability.
- Maintaining a regular dialogue and offering labs **scientific investment** can increase their engagement and lead to higher-quality data.

4. DATA RETURN

FRICTION POINT:
INCONSISTENT DATA FORMATS

RECOMMENDATIONS

Pre-specify outputs

Require QC docs

Standardize format

- **Outputs:** Agree in advance on data formats and file structures, variable naming conventions, metadata requirements, and that labs will provide QC metrics, documentation of processing steps, and flags for problematic samples.
- Study teams should **always request raw data** (e.g., intensities or raw counts) rather than just derived (e.g., clocks) or normalized values, as standards for processing change over time.
- **Independent Study-Side QC:** While the lab performs internal checks, the study team must conduct its own QC to ensure results are plausible relative to known participant data, such as age, sex, BMI, and health status.

5. DATA ANALYSIS

FRICTION POINT:
CALIBRATION & COMPARABILITY

RECOMMENDATIONS

Use reference samples

Calibrate across platforms

Integrate with contextual data

- **Reference samples** help to determine if observed variation is biological vs. technical and whether unexpected findings are real vs. assay artifacts.
- Batch and platform effects should be treated as **primary analytic concerns** and included as covariates in statistical models.
- Results should reproduce **well-established biological and social patterns**, such as expected correlations with age or education.

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CROSS-CUTTING PRINCIPLES

COORDINATION
Align with other studies

STANDARDIZATION
Use shared protocols

VALIDATION
Invest in calibration

DOCUMENTATION
Capture collection details

DATA RETURN
Use standard formats

COMMUNICATION
Maintain lab dialogue

Late lab engagement

Mixing platforms

No QC

Poor documentation

PLAN EARLY • STANDARDIZE ASSAYS • PRIORITIZE QUALITY

Forthcoming Resources and Next Steps

Lab Information

- Survey of labs
  - Lab details (incl. prior experience working with population studies)
  - Assays and platforms
  - Friction points

Resource Documents

- Study-Lab Agreements
- Data Return Formats
- QC Recommendations

Future Action items (shared tasks Biodemography Center/Biomarker Network)

- International field collection follow-up meeting (virtual)
- Explore NIA mechanisms for incentivizing lab buy-in
- Create guidance on biorepository storage after grant/project end
- Cross-discipline training between lab scientists and social scientists
- Propose inviting manufacturer reps to future Biomarker Network meeting