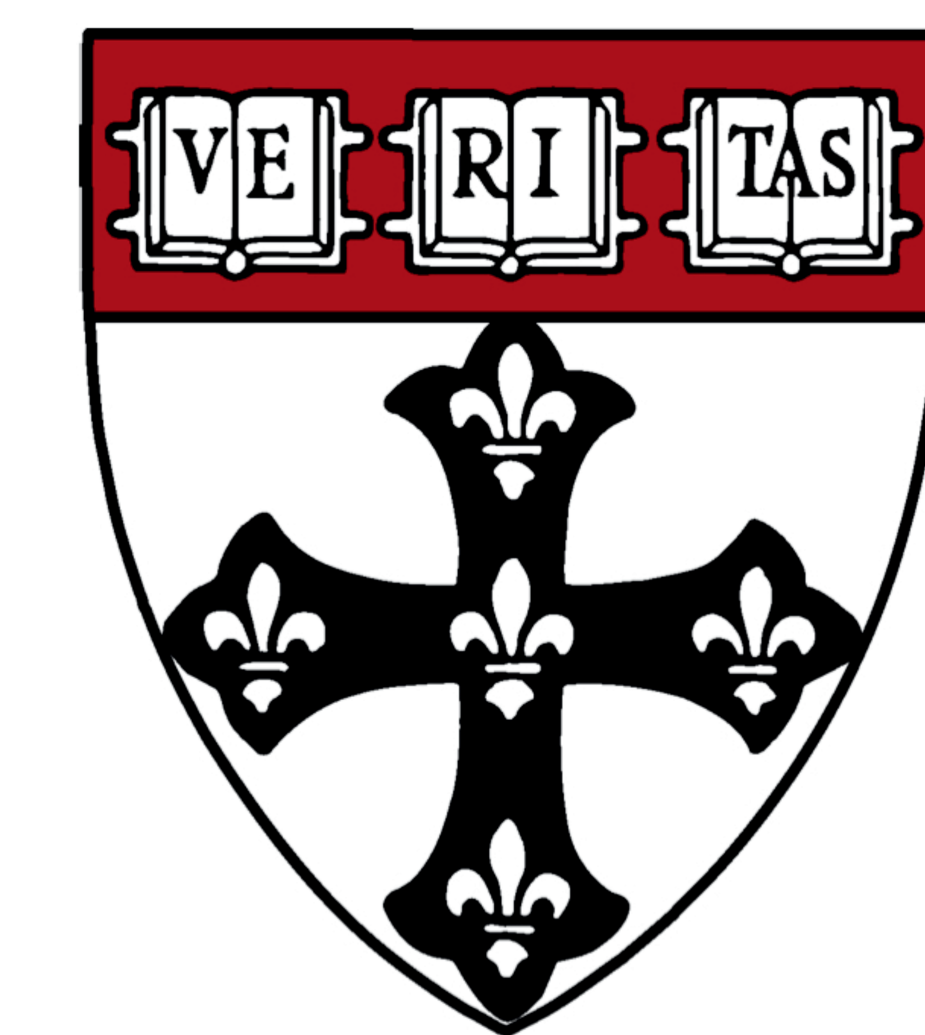


Epidemiology Microbiome Collection Core

Olivia Ambrose^{1,2}, Xochitl Morgan^{1,2}, Curtis Huttenhower^{1,2}

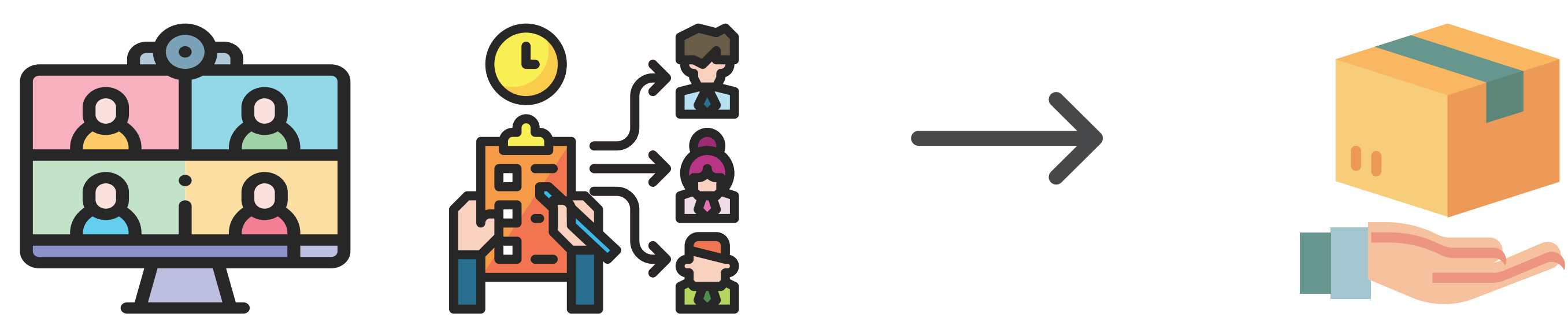
¹ Broad Institute of MIT and Harvard; ² Department of Biostatistics, Harvard T.H. Chan School of Public Health



The Epidemiology Microbiome Collection Core at the Broad Institute (EMCC), formerly the Harvard Chan Microbiome Collection Core (HCMCC), was established in response to growing demand for validated microbiome sample collection solutions and user-friendly in-home sampling workflows.

Under the umbrella of the Harvard Chan Microbiome in Public Health Center (HCMPH), EMCC supports population-scale microbiome research aimed at advancing our understanding of the microbiome and improving population health. EMCC has developed multi-carrier-compatible home stool and oral microbiome collection kits designed to enable cost-effective multi-omic studies, building on the intellectual and infrastructure foundation established through HMP2 (the second phase of the NIH Human Microbiome Project) and the Massachusetts Life Sciences Center (MLSC)-funded MICRO-N (MICRObiome Among Nurses) study. Through customizable collection kits and study-specific logistics support, EMCC enables researchers to perform a wide range of molecular assays tailored to diverse research needs.

EMCC services



Microbiome Collection Workflow

- Collection Plan Design
- Kit Configuration
- Distribution Logistics
- Transport Planning
- Sample Handling & Storage

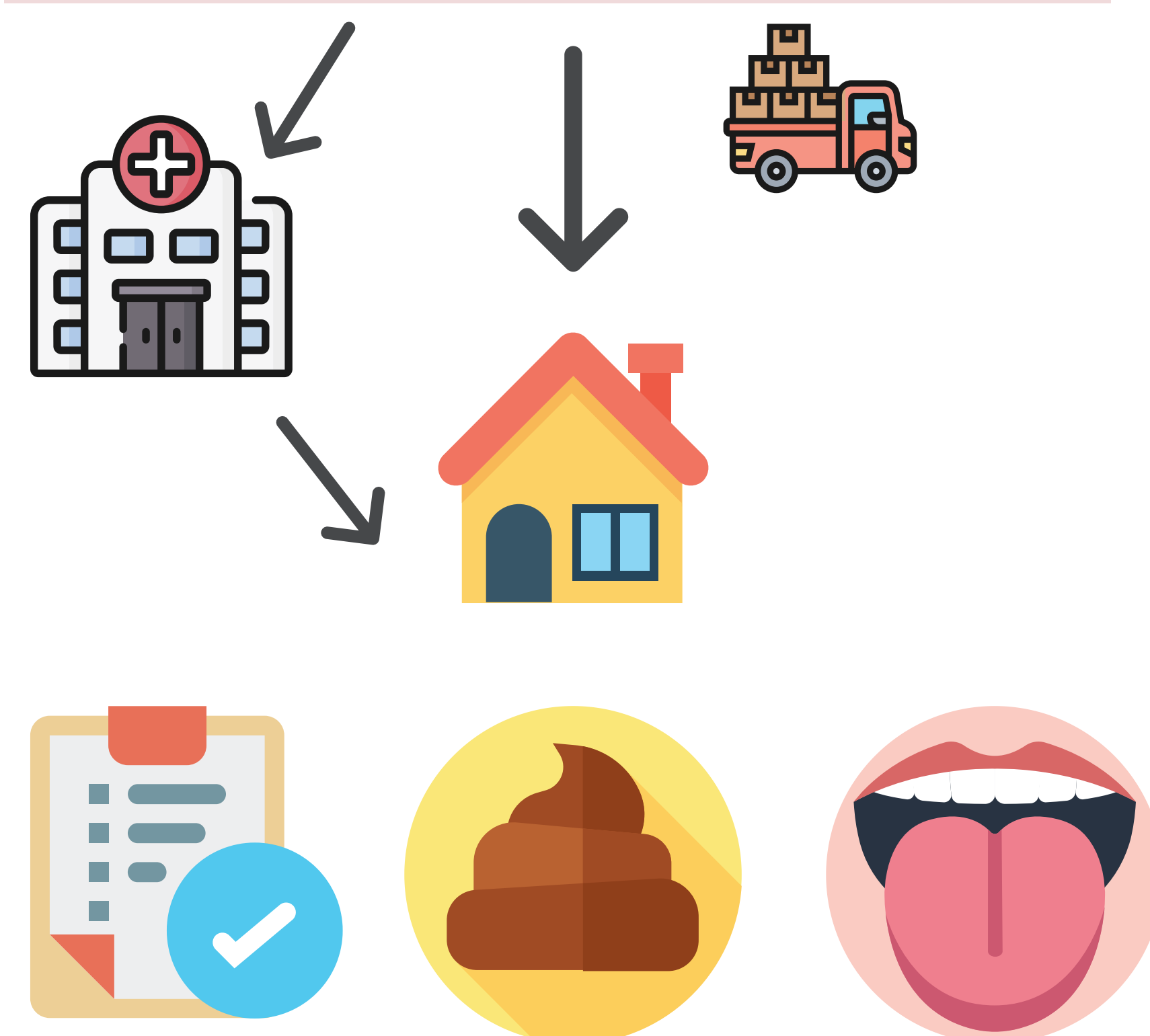
Kit Distribution & Deployment

- Custom Kit Ordering
- Kit Configuration & Implementation
- Ambient Shipping Logistics
- Clinical Site or Direct-to-Participant Delivery



Streamlined Post-Collection Sample Management

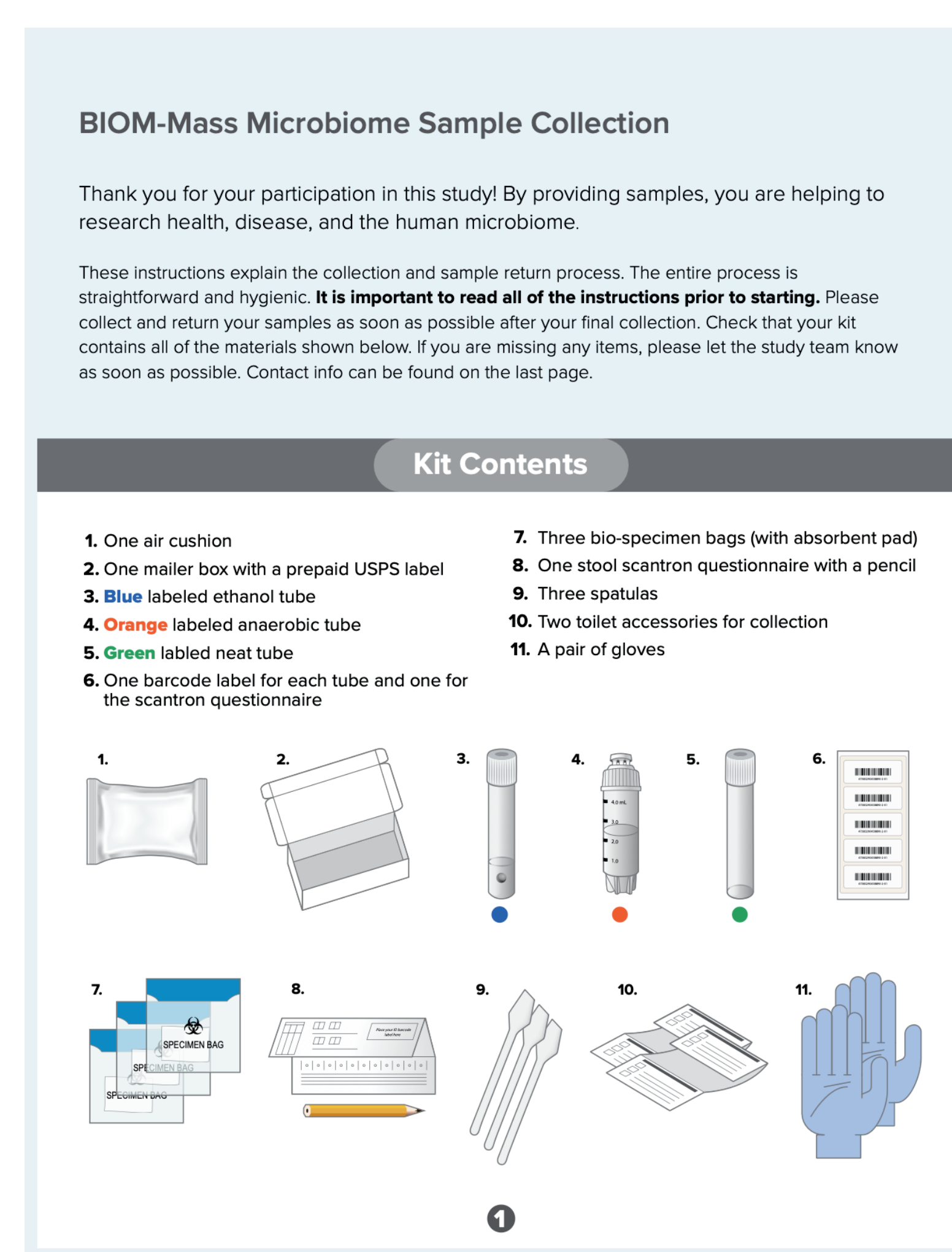
- Barcode-Based Sample Tracking
- Secure BiOS Freezer Storage (-80°C)
- Rapid Sample Retrieval
- Shipment Coordination for Sequencing



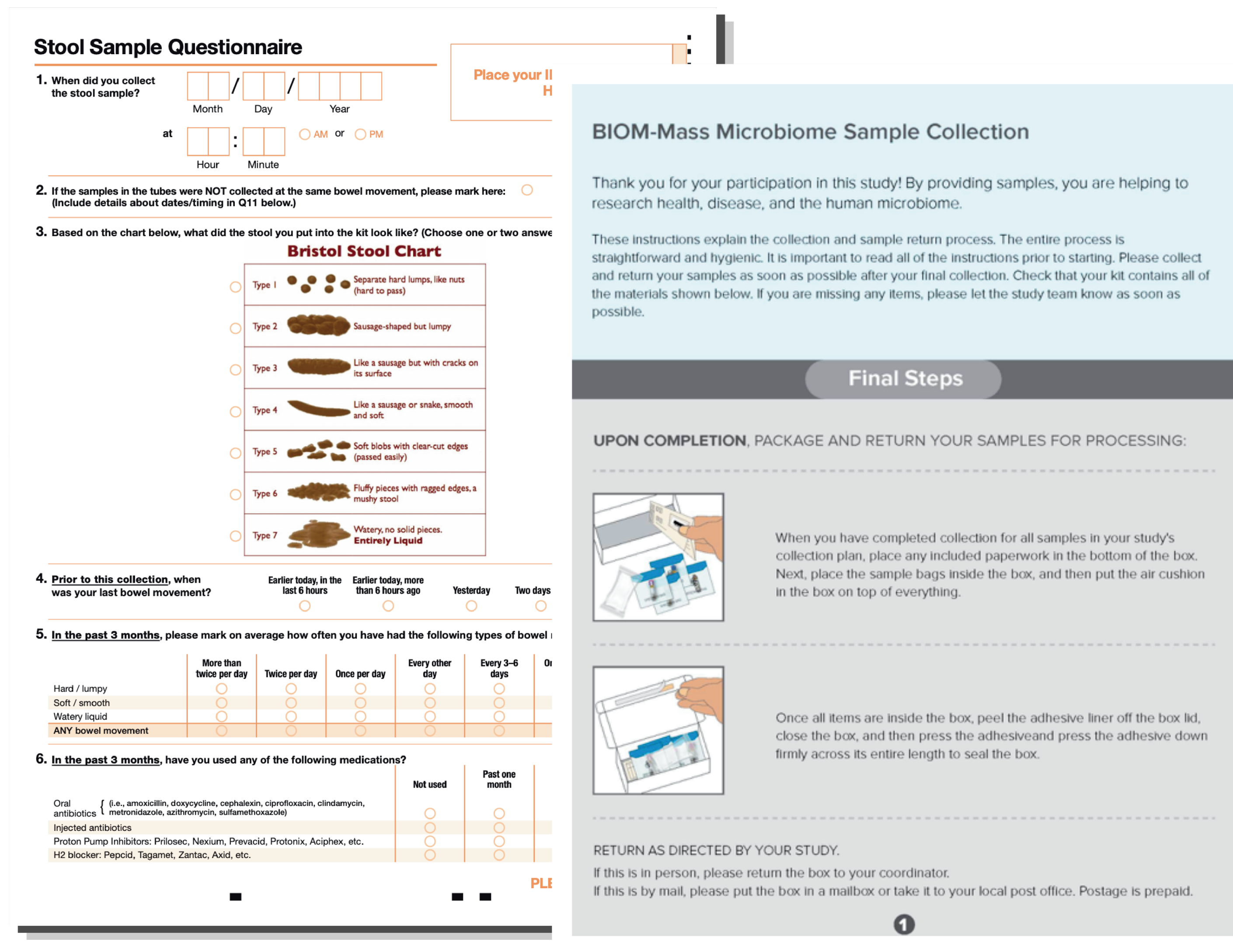
At-home sample collection

Pre-paid return shipment

A scalable platform for gut and oral microbiome sample collection

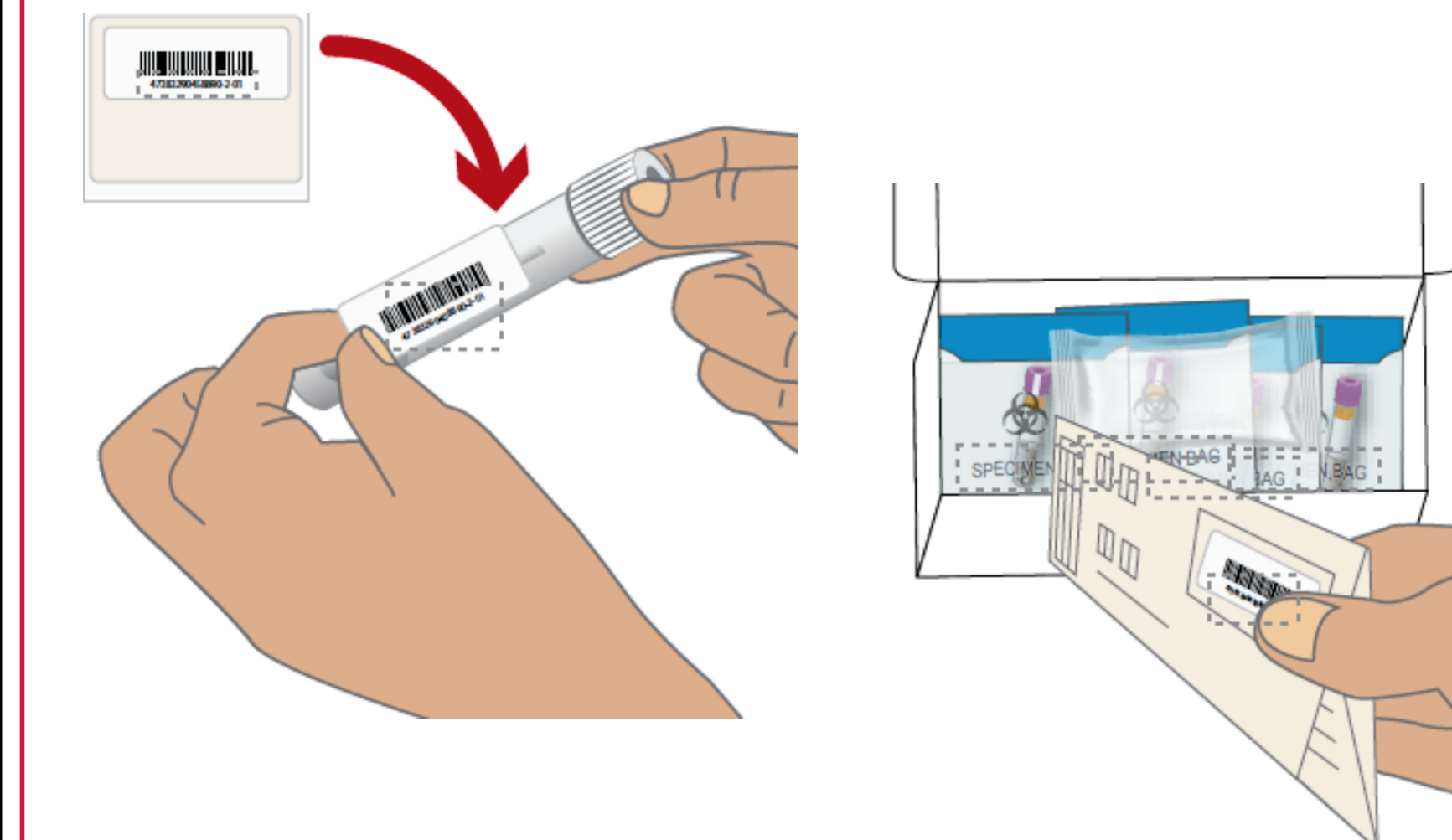


This customizable microbiome sample collection kit eliminates the need for expensive, bulky, and inconvenient ice packs by utilizing room-temperature stabilization media compatible with a wide range of molecular assays, including amplicon (16S), metagenomic, metatranscriptomic sequencing, metabolomics, and other multi-omic applications. The platform also includes an anaerobic transport option that preserves live microbes, enabling downstream culture-based and gnotobiotic research applications.



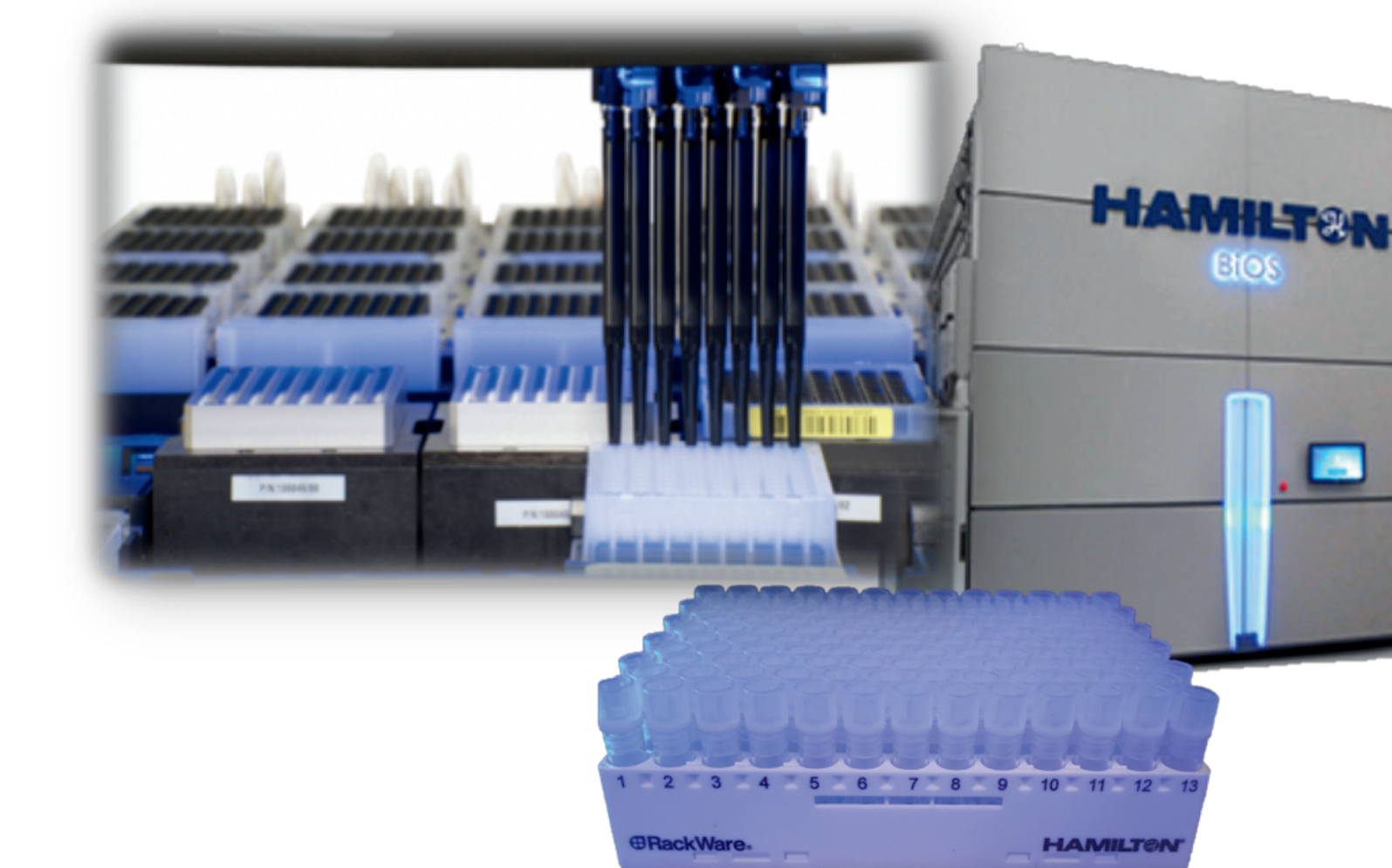
Beyond customizable storage media, this sample collection kit includes user-friendly instructions and collection accessories designed to simplify the in-home stool sampling experience. Standardized questionnaires capture relevant metadata, including medication use, diet, anthropometric measurements, and gastrointestinal health status via the Bristol Stool Scale. Its modular design enables researchers to customize kit components to study-specific needs, supporting cost-effective microbiome research from pilot studies to large-scale cohorts involving tens of thousands of participants.

EMCC-supported study activities within the BIOM-Mass platform



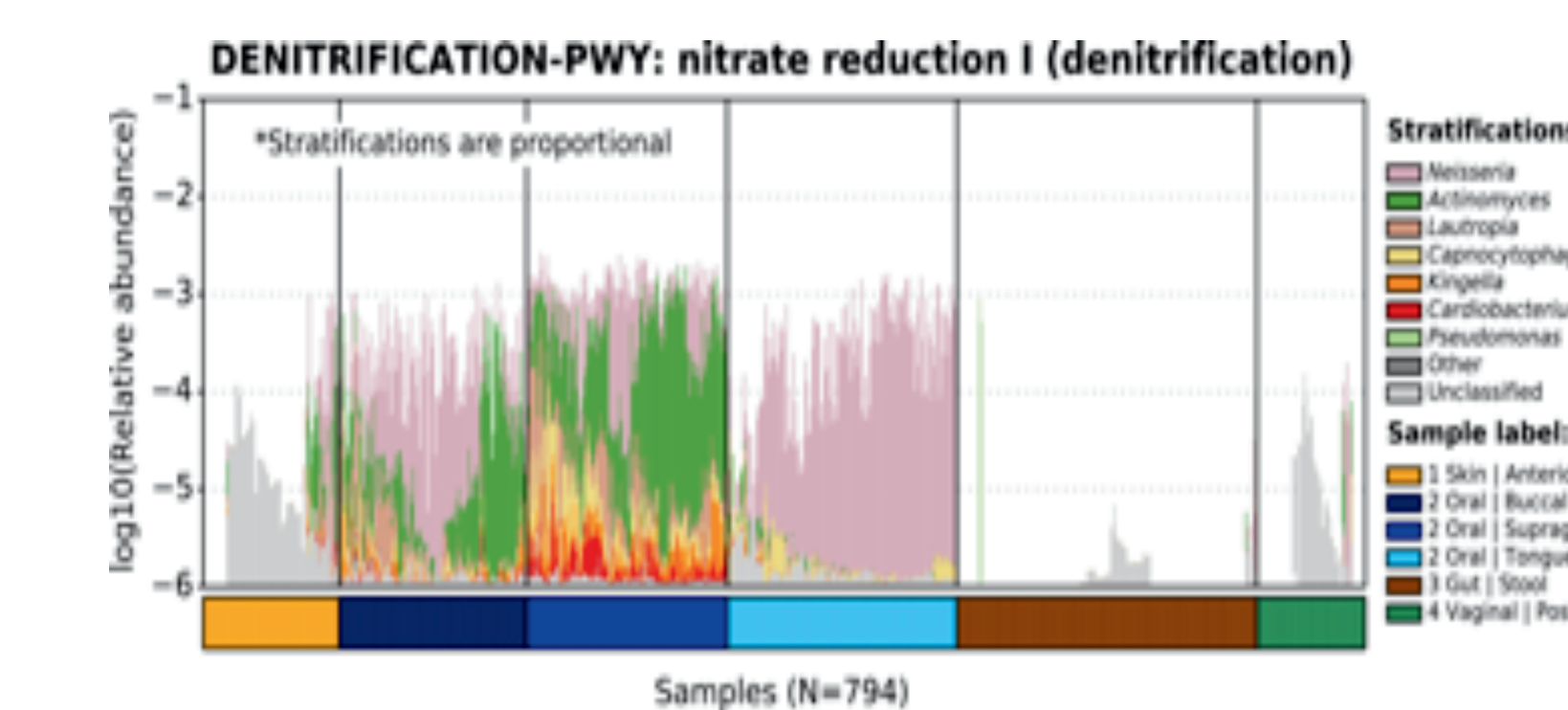
Pre-Collection

- Pre-Collection + Study Support
- Participant Enrollment
- Kit Ordering
- Kit Distribution



Sample Collection

- At-Home Self-Collection
- Prepaid Sample Return Labels



Post-Collection

- Automated Aliquoting
- Long Term -80°C Storage
- Data Generation
- Data Analysis Via Microbiome Analysis Core

Microbiome population health research opportunities

- Population-scale microbiome study datasets accessible through the BIOM-Mass Data Portal (<https://biom-mass.org>)
- Integrative microbiome informatics and data analysis via the Harvard Chan Microbiome Analysis Core
- Long-term biospecimen storage through the Harvard Chan BiOS Freezer Core
- Gnotobiotic mouse experimentation via the Harvard Chan Gnotobiotic Center for Mechanistic Microbiome Studies
- Educational course offerings in microbial communities and human microbiome research through the Harvard Chan Microbiome in Public Health Center

Special thanks to the Massachusetts Life Sciences Center (MLSC), the Harvard Chan Microbiome Platform Steering Committee, Eric Rimm (Director, Harvard Chan BiOS Freezer), and Christine Everett (Laboratory Manager, BWH/Harvard Cohorts Biorepository) for their support.

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