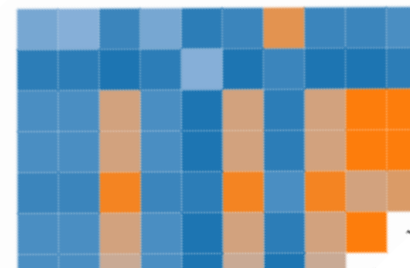


Linkage and equilibrium: Initiatives and opportunities in omics for nutrition R&D in the Philippines

Jacus Nacis

DOST-Food and Nutrition Research Institute
The Philippines

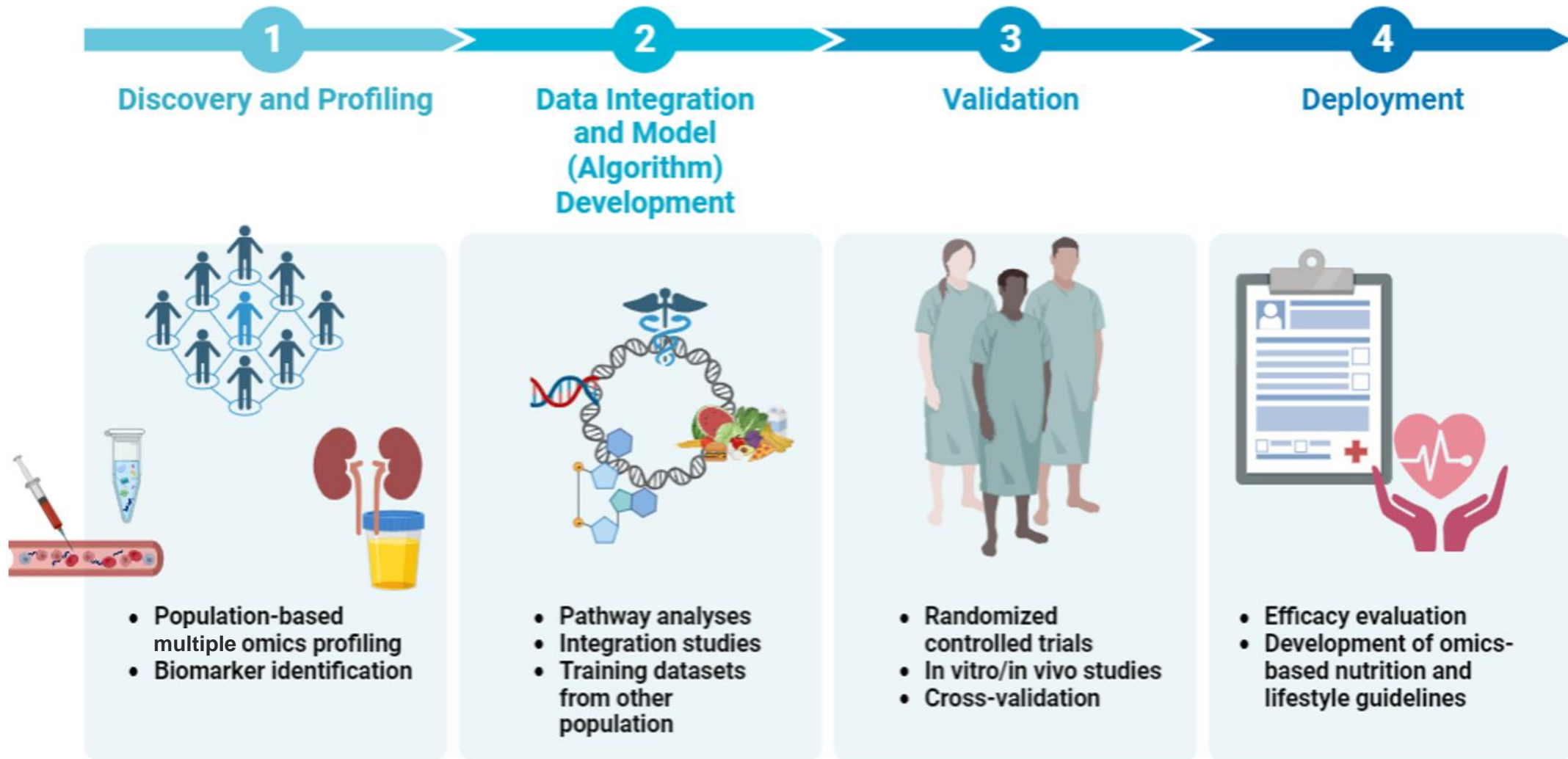
e-Asia Workshop for the 13th Joint Call for Proposals
Discovering Synergies: Connecting People Across Asian Research Frontiers
16-17 January 2024



Research Themes in Nutrition Omics R&D DOST-FNRI The Philippines

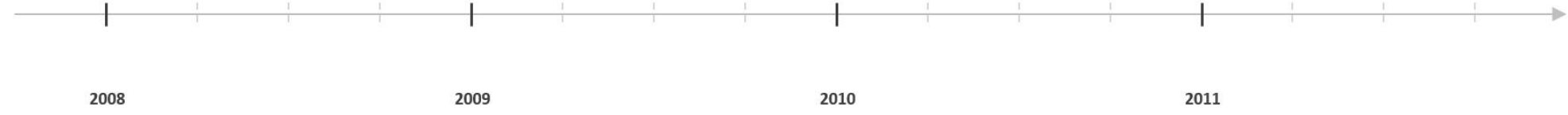
Focus:

- Individual functional responses to different diets
- Specific dietary biomarkers for targeted foods and diets
- Interrelationship between risk factors for certain diseases and different diets (and food components)

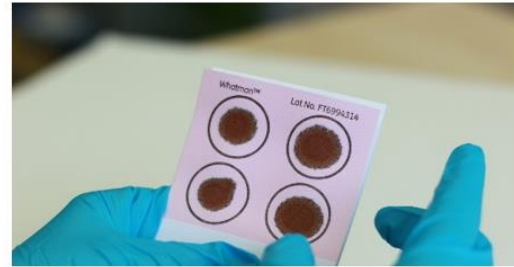




National Nutrition Survey goes genomics



DOST and DOST-FNRI cognizant of the inevitability of genomics + nutrition



Collection of DNA from adult participants of the 2008 National Nutrition Survey to initiate the first-generation of nutrigenomics research at the Institute

- *DOST-FNRI currently maintains a database of more than 3000 individuals with nutrition, health, and genomics data*



- Phase 1: SSB study - adolescents (2021-2024)



Using ENNS data and urine metabolomics and blood genomic samples

- Uni-feature analysis
- Prediction model approach

Merged energy and nutrient intakes + beverage x metabolomics x genomics algorithm for validation

- Phase 2: Expansion to energy and nutrient intakes - all age groups (2024-2026)

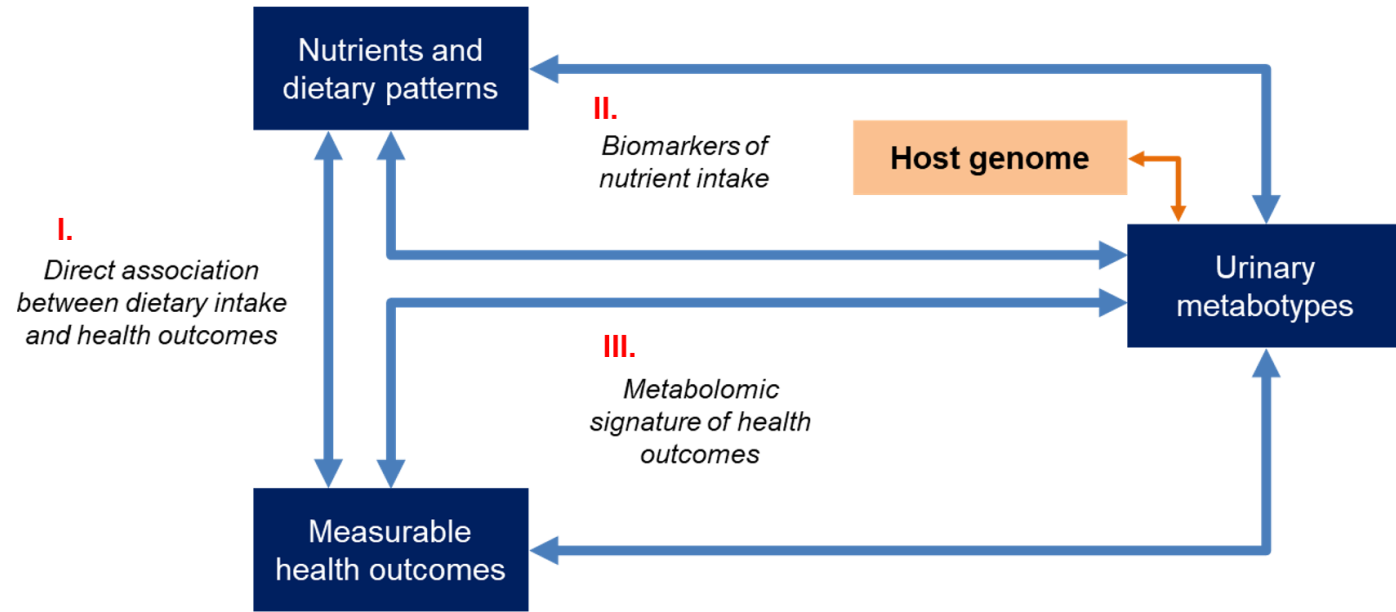


Using ENNS data and (all) urine metabolomics and (subsample of) blood genomic samples

- Network analysis approach

2021 - 2026

2027 -



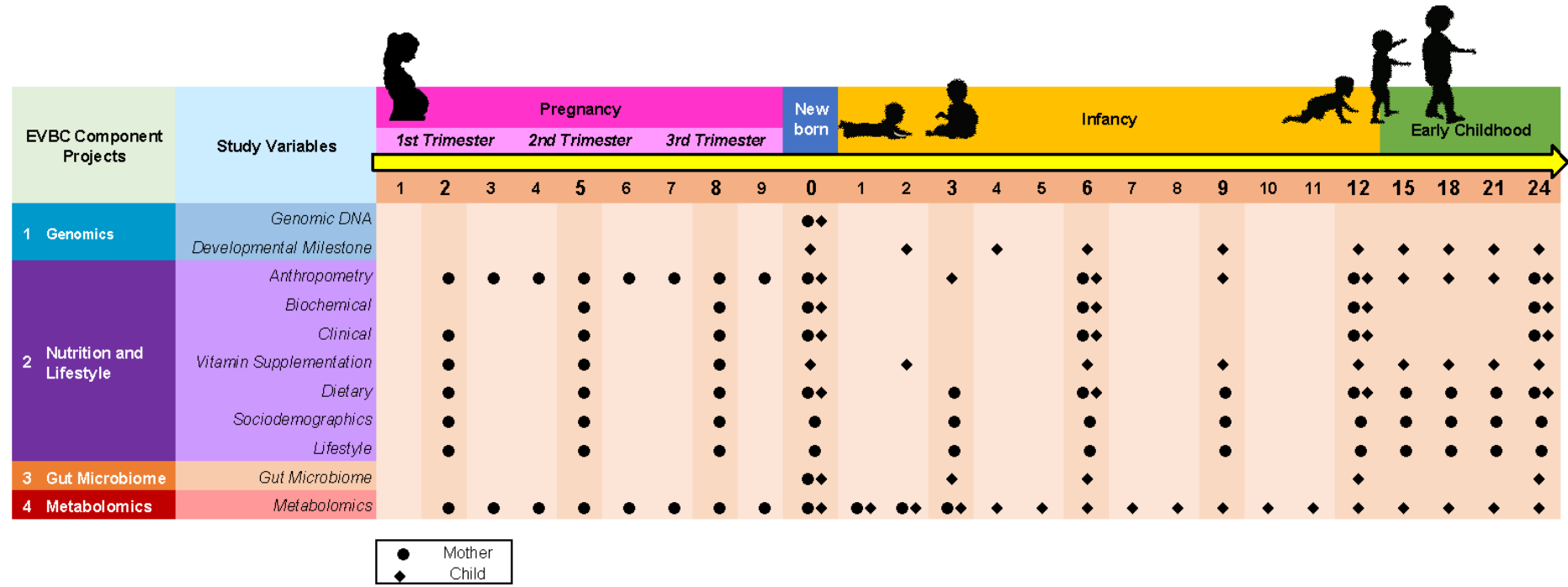
With the genomics x metabolomics profiling studies, we aim to achieve the following:

1. Associate diet with health outcomes
2. Identify biomarkers
3. Establish metabolomic signatures of health outcomes



The Eastern Visayas Birth Cohort

54 months, 4902 mother-child pairs



• Mother
♦ Child



The Eastern Visayas Birth Cohort



Study 1: Genomics



Genomic understanding of the “intergenerational cycle of growth failure” and the establishment of personalized dietary recommendations

Study 2: Lifestyle, Nutrition, & Biochemistry

Impacts of lifestyle, nutritional status, and environmental factors on pregnancy and infant health outcomes



Study 3: Gut microbiome

Perspectives on the relationship of gut microbial composition and the early detection of the onset of stunting and malnutrition



Study 4: Metabolomics

Links of metabolites with genetic variation, nutrition, and microbiome in shaping early-life health and nutrition

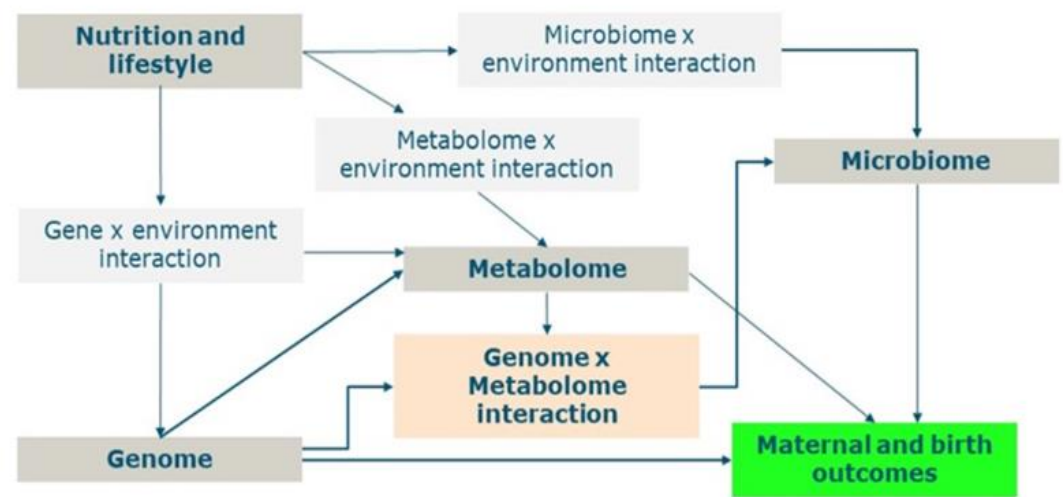
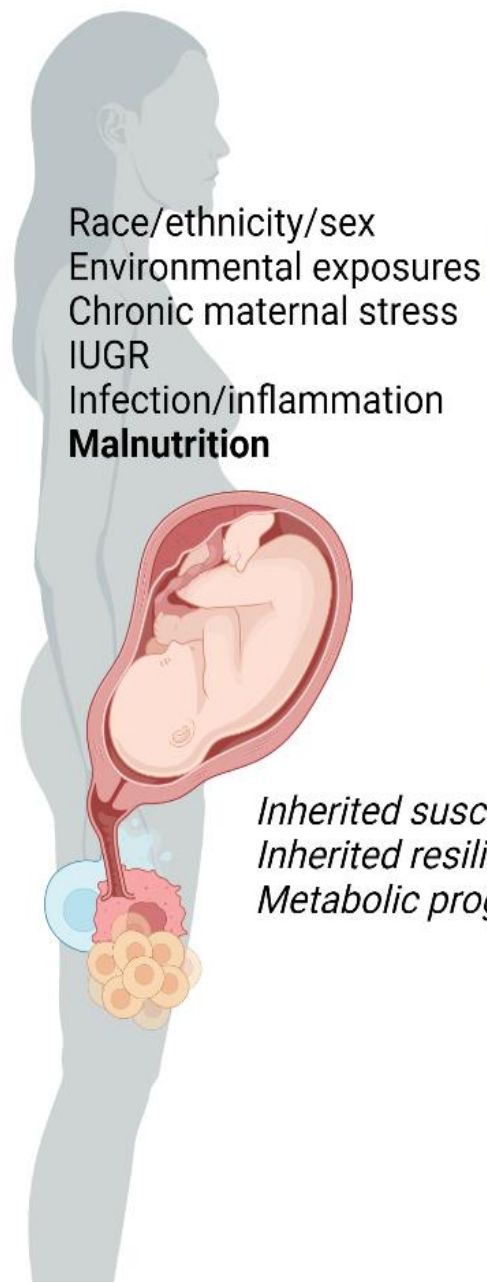


1
Discovery and Profiling

The Eastern Visayas Birth Cohort



Exposome / DOHAD



- Maternal outcomes**
Birth outcomes
- Height
 - Weight
 - Head circumference
 - Preterm birth
 - Apgar score
- Neonatal morbidities
Life-long morbidities

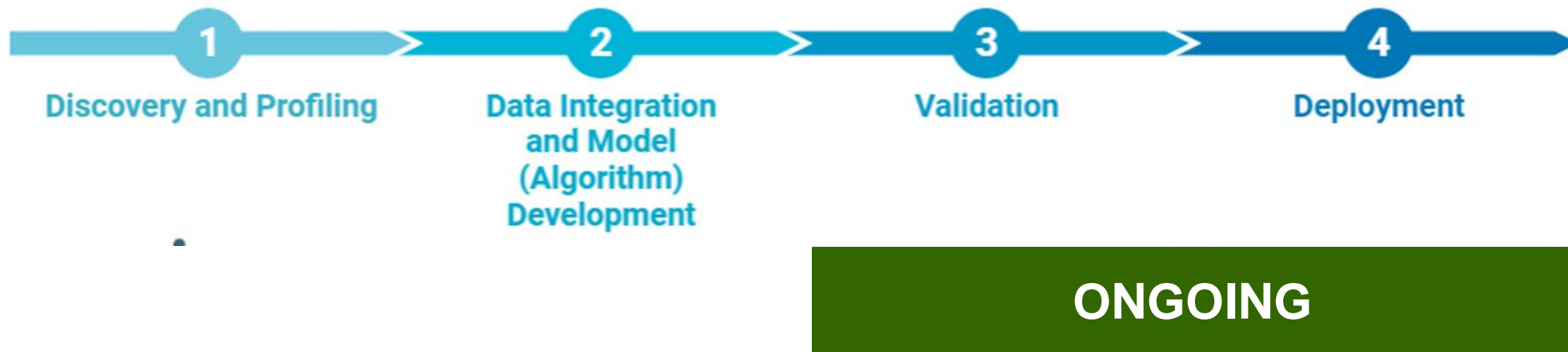


ONGOING

- Genome x metabolome studies using the national survey data and samples
- The Eastern Visayas Birth Cohort

PLANNED

- Integrative omics
- Validation studies from omics datasets of other population

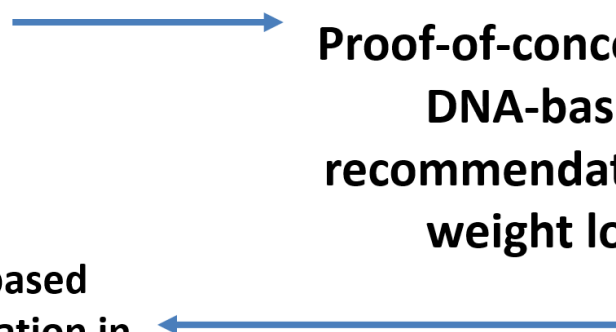


- Local context and reception
- Racial/ethnic disparity
- Need for evidence

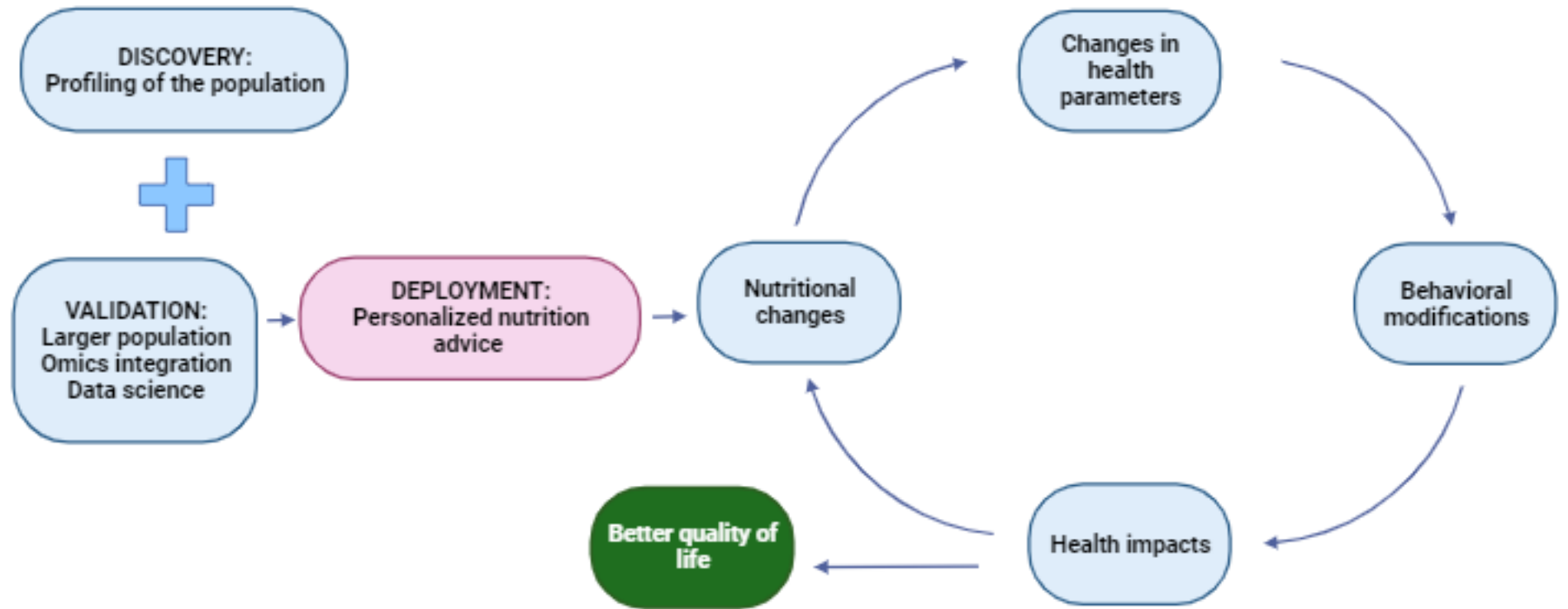


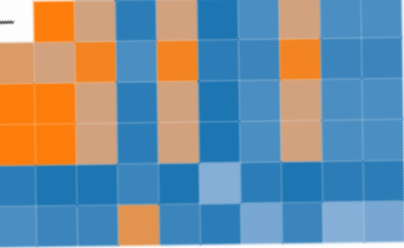
Proof-of-concept RCT
DNA-based
recommendation for
weight loss

“Filipinized” gene-based
nutrition recommendation in
routine clinical setting

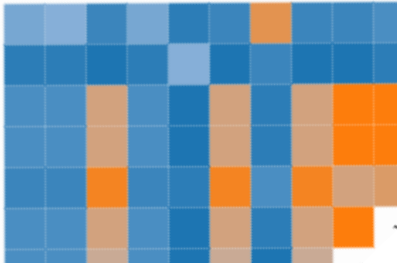


Explore meaningful information with our profiling data, while striving to venture in making sense of this network of information to bring worthwhile interventions...





Linkage and equilibrium: Potential areas of collaboration

- Expansion and sharing of omics information to facilitate validation studies
 - Capacity-building and collaborative research in multi-omics integration and data science (nutrition survey and birth cohort data)
 - Asia-wide deployment of omics interventions (creation and execution of gene-based nutrition and lifestyle interventions)
- 

Thank you.



Jacus S. Nacis

Senior Science Research Specialist

Nutritional Genomics Unit, Nutrition Biochemistry Section

Nutrition and Food R&D Division

DOST-Food and Nutrition Research Institute

Taguig City, Philippines

jacusrnacis@gmail.com / jacus1.nacis@wur.nl