National Institutes of Health
Clinical Center, Translational Biobehavioral & Health Disparities Branch

Translational Biobehavioral and Health Disparities Branch (TBHD): From Community to Bench and Back

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Translational Biobehavioral and Health Disparities Branch

NIH Clinical Center

Presented to the Clinical Center Research Hospital Board

June 16, 2023

Mission & Vision, Goals, and Objectives

MISSION

Advance interdisciplinary translational science focused in biobehavioral, clinical, and community studies to improve whole person health.

VISION

A world where sustainable health-promoting behaviors improve the health of all local and global communities through a network of institutional, scientific, and community-engaged partnerships leading biobehavioral research.

Goal 1: Advance key biobehavioral research areas

1. Increase investigator publications in high-impact journals with a target of 6 annually
2. Create efficient SOPs for equipment, laboratory processes, and safety to allow continuous utilization of the lab
3. Standardize workflows and data analysis/manipulation for investigators routine use

Goal 2: Develop innovative training approaches

1. Recruit and identify diverse people with research, analytic, advanced clinical or community-based expertise seeking biobehavioral research experience and mentoring
2. Develop partnerships with academic center programs for underrepresented groups in science
3. Develop global partnerships to expose scientists and clinical research fellows to translational science and interdisciplinary research
4. Establish academic framework with student trainee programs in bioinformatics
5. Augment capabilities of translational science through pre-clinical and lab-based partnerships & training opportunities

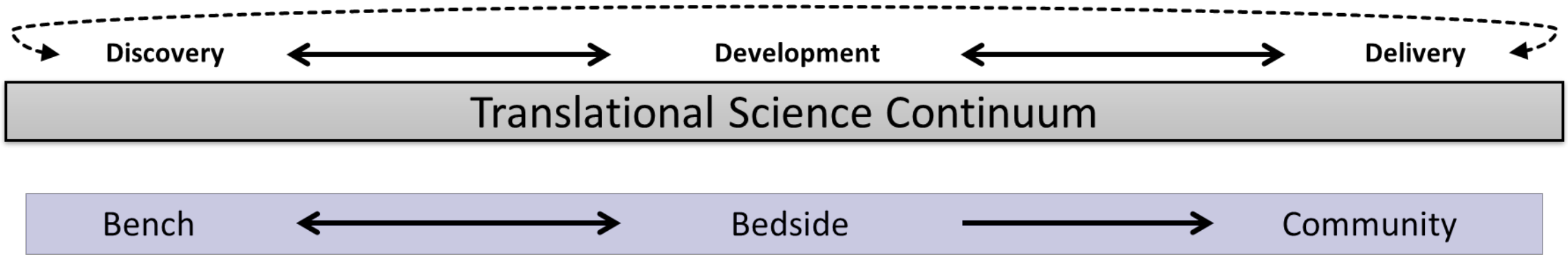
Goal 3: Build collaborations to complement & accelerate TBHD's Intramural research portfolio

1. Develop / deepen interdisciplinary intramural and extramural collaborative research endeavors in emerging research areas
2. Secure funding opportunities external to TBHD's budget to expand branch's mission
3. Increase exposure to branch research through speaking at national and international conferences

Goal 4: Support NIH's DEIA strategic goals

1. Use TBHD and Healthy People 2030 developed SDOH models to guide research
2. Cultivate a research & training environment for all trainees and employees to thrive
3. Conduct and support research that is important and relevant to diverse populations

Community to Bench and Back



Jennifer Barb, PhD
Katherine Maki, PhD, CRNP

The Human Microbiome in Health and Disease

Lena Lee, PhD, RN

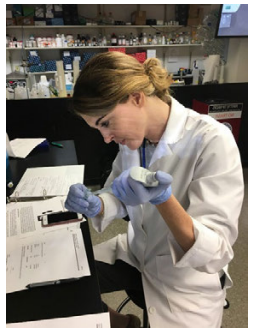
Reducing the Burden of Cancer & Treatment on Patients & Their Family Caregivers

Nicole Farmer, MD

Biobehavioral Approach to Diet-Related Health Disparities in Patients and Vulnerable Populations

Gwenyth R. Wallen, PhD, RN

Health Behaviors and Chronic Care Management in Diverse and Vulnerable Populations



Social Determinants and the 3 Pillars of Health

THE THREE PILLARS OF HEALTH

- EXERCISE
- SLEEP
- NUTRITION

Stress Reduction Intervention: VR Technology

- **Why User Virtual (VR) Technology?**
  - VT technology has become more immersive, affordable, and portable
  - VR can help relaxation, mindful, mediation, distraction and entertainment
- **Experience Nature through VR**
  - Attention Restoration Theory (ART): Nature exposure has been positively effective in reducing physiologic and perceived stress
- **Protocol: Nature-based VR for Caregivers**
  - **Purpose:** To assess the feasibility and acceptability and examine the effectiveness of the nature-based VR intervention in hematopoietic stem cell transplant (HSCT) caregivers
  - **Study Population:** Family caregivers of HSCT recipients
  - **Intervention**
    - 360 high-definition nature videos with nature sounds
    - VR content (e.g., beach, lake, forest, meadow)
    - 20 minutes daily for 4 weeks

Nicole Farmer, MD Section on Dietary Behaviors and Biopsychosocial Health

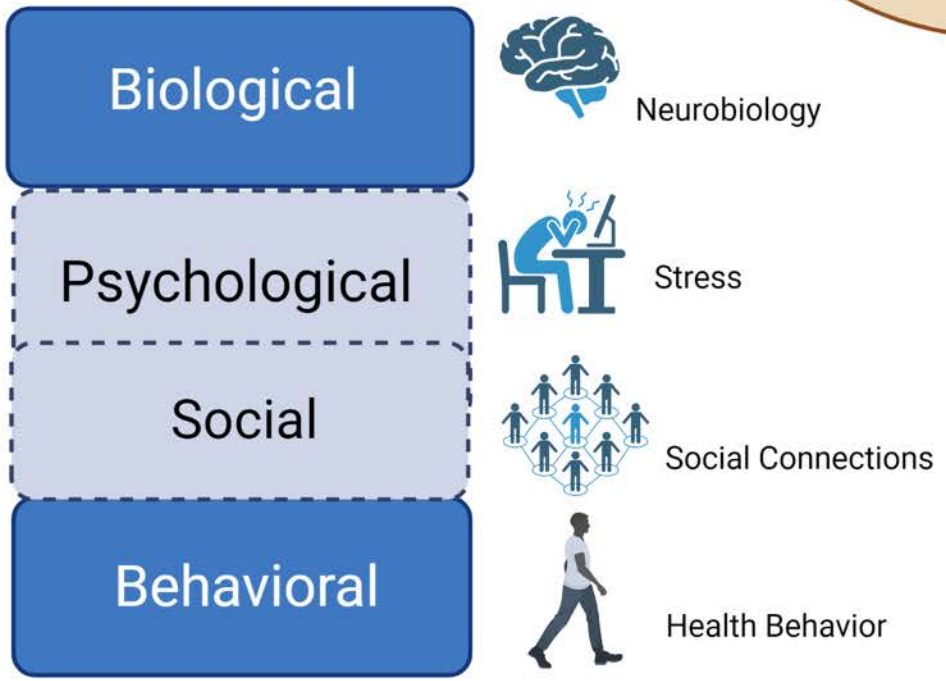
Adverse Social Determinants of Health

- Food Environments
- Discrimination
- Neighborhood SES

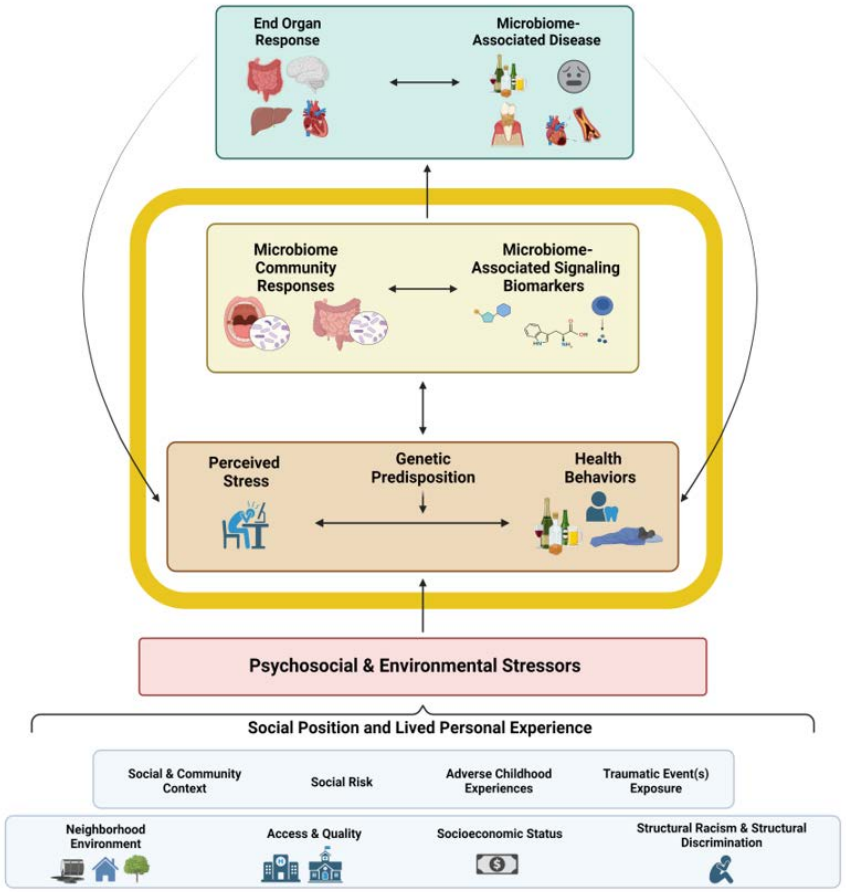
Biobehavioral Mechanisms

Impacts on Community & Personal Health

- Dietary Intake
- Human Microbiome Diversity
- Well-Being



Katherine Maki, PhD The Biobehavioral and Integrated Metagenomics (BIOM) Unit



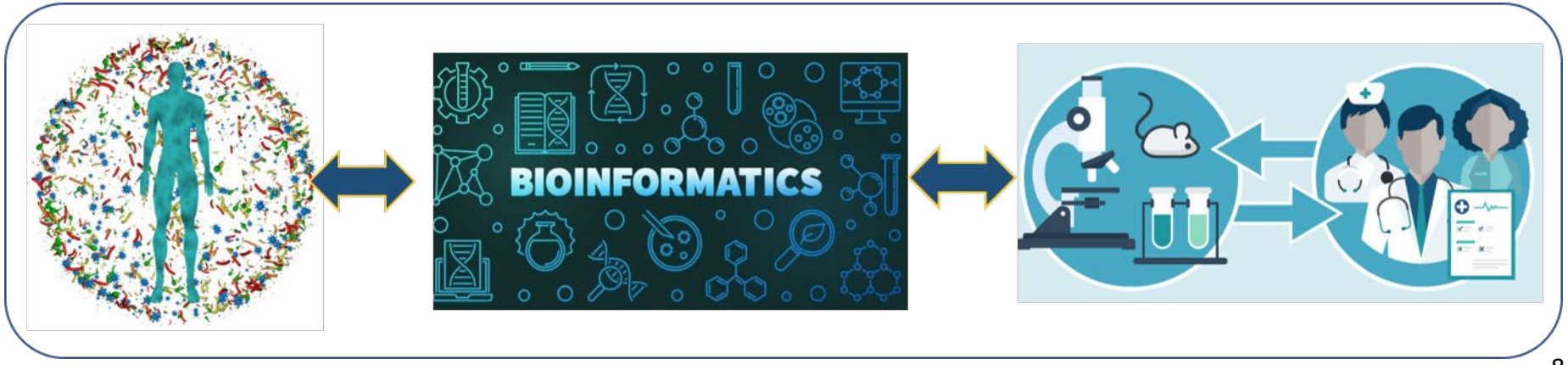
Adapted from Powell-Wiley et al. (Farmer, Wallen). *Circulation Research, 2022.*

Treatment Seeking Individuals with Alcohol Use Disorder

- Come from a wide variety of backgrounds and disproportionately have history of previous trauma exposure
- Often have extremely poor sleep quality when presenting for inpatient treatment
- Sleep quality also shown to be predictor of relapse post-discharge by our group
- Biggest challenge is maintaining sobriety when discharged from inpatient treatment and are back in the community
- Elevated risk of neglecting oral care and dental screening- paired with alcohol's effects on mouth predispose subjects to poor dentition and disrupted oral microbiome

Jennifer J. Barb, PhD Data Analytics and Translational Science Unit

- Understand connections between oral and gut microbiome data and clinical measures and symptoms in individuals with Alcohol Use Disorder and Myalgic encephalomyelitis/ Chronic Fatigue Syndrome
- Develop and apply bioinformatics to population databases investigating disease associated health disparities
- Develop multivariate data integration strategies of systems biology addressing disease-specific health outcomes within TBHD's research focus and the NIH-IRP mission



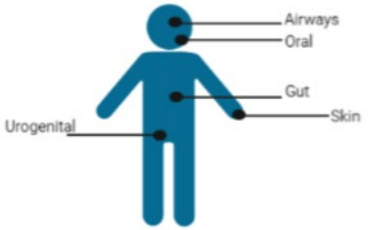
Geographic Social Vulnerability and Human Microbiome Diversity

Aims

Physical environments can influence the human microbiome. Environments are often disparate and contribute to differences in exposures that could impact microbiome diversity.

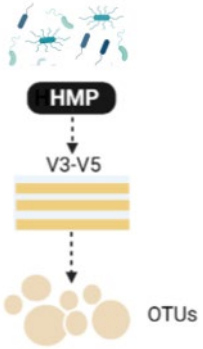
Aim 1: Explore associations between geographic social vulnerability index (SVI) and microbiome alpha-diversity across body sites among Human Microbiome Project Phase 1 participants.

Aim 2: Determine if SVI contributes to racial/ethnic variation in the microbiome.



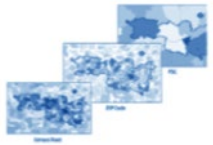
Healthy Cohort from Texas and Missouri, U.S

Methods



V3-V5 OTU table used to calculate one OTU per broad site to determine alpha-diversity metrics

Available residential information Postal Sorting Code (PSC), first three digits of participant's zip code

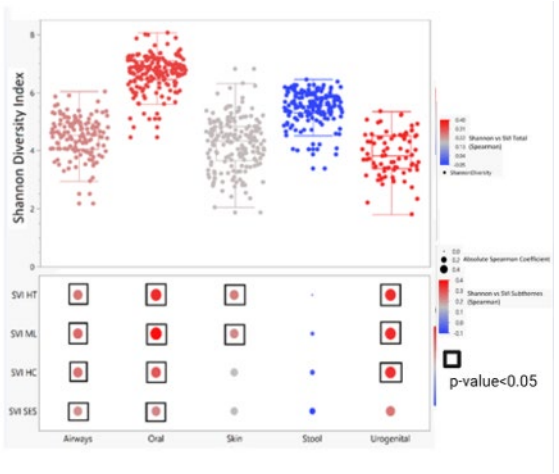


Census tract data from U.S. Census 2010 aggregated to the level of PSC for each participant

CDC Social vulnerability index calculated for each PSC

Results

Significant relationship between geographic social vulnerability and alpha diversity across oral, skin, airways and urogenital sites.



n=201, controlled for age, gender, BMI

Geographic social vulnerability was a significant mediator for racial/ethnic differences in urogenital microbiome diversity for Hispanic/LatinX and women identified as Other.

Farmer et al. (Wallen). MSystems, 2023 *In Press*

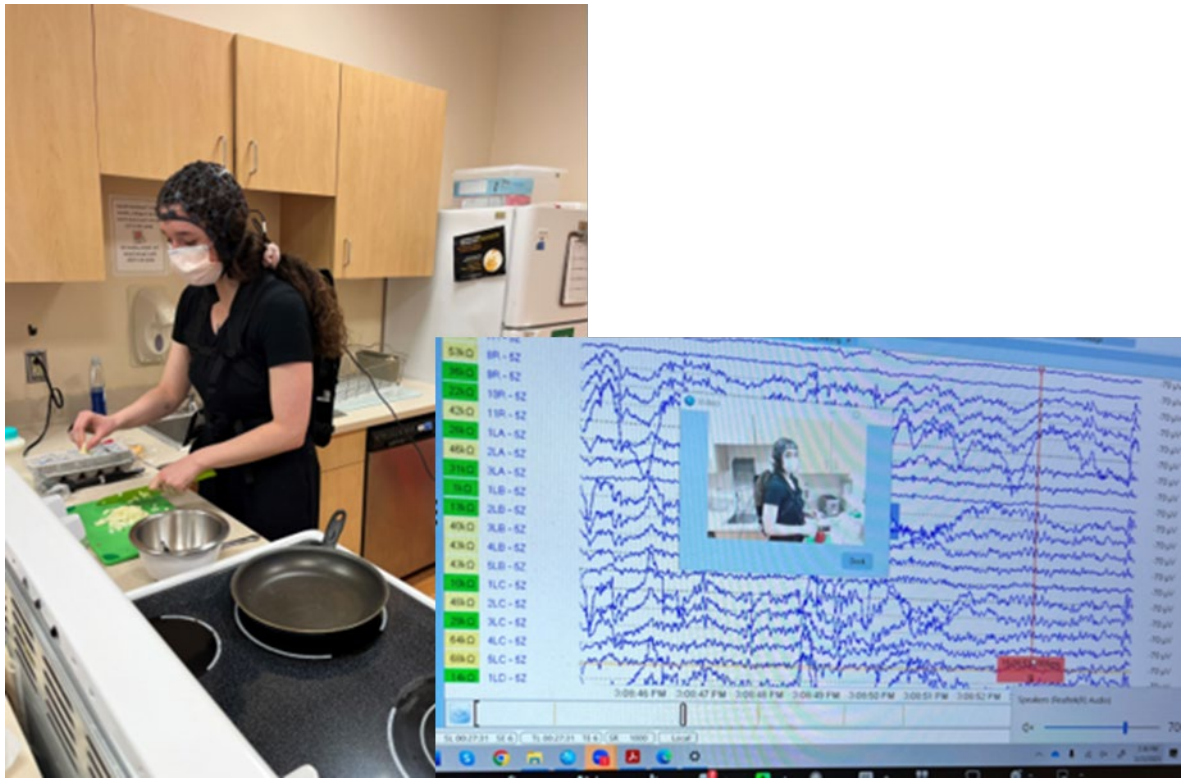
Interdisciplinary Team Science with Clinical Departments

- Department of Laboratory Medicine (DLM)
- Radiology and Imaging Sciences (RADIS)
- Rehabilitative Medicine Department (RMD)
- Clinical Center Nursing Department (CCND)

What's Next for TBHD?

- Building Microbiome Salivary Science Capabilities

- Mobile Electroencephalogram (EEG): Measuring Cognitive Workload



THANK YOU FROM OUR ENTIRE TEAM!!!