



Addressing Complexity in a Complex World

Application of an Ecological Approach to Define and Assess Malnutrition

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1

Disclosures

No conflicts to disclose

2

The Current Landscape

3

Core targets....

Food inSecurity: “lack of —access by all people at all times to enough food for an active, healthy life—is one of several conditions necessary for a population to be healthy and well nourished” [7]. The four pillars of food security are availability, access, utilization, and stability. **Food Security:** “—access by all people at all times to enough food for an active, healthy life—is one of several conditions necessary for a population to be healthy and well nourished” [7]. The four pillars of food security are availability, access, utilization, and stability.

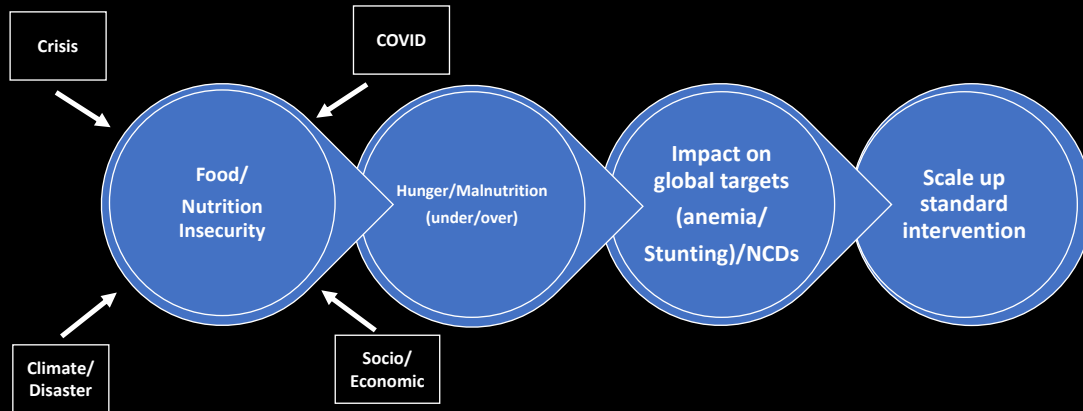
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Hunger: an uncomfortable or painful physical sensation caused by insufficient consumption of dietary energy. It becomes chronic when the person does not consume a sufficient number of calories (dietary energy) on a regular basis to lead a normal, active, and healthy life [10].

Malnutrition: “deficiencies or excesses in nutrient intake, imbalance of essential nutrients, or impaired nutrient utilization” [WHO].

4

The Linear Logic: Response to Public Health / Nutrition Challenges



This logic is understandably focused on programs and policy, but is limited with regard to addressing specific diet, nutrition and health issues because it ignores the biological and environmental realities of health and disease.

CONTEXT MATTERS!

5

Food is Medicine:

- “The White House Conference on Hunger, Nutrition, and Health — held in September 2022 — renewed national attention and issued a call to action to end hunger and reduce the prevalence of chronic disease in the United States by 2030. ”
- “Access to nutritious food is critical to health and resilience. Food Is Medicine reaffirms this connection, recognizing that access to high-quality nourishment is essential for well-being.”
- “By supporting the production of and facilitating access to nutritious food across a health continuum and range of settings, approaches to Food Is Medicine support immediate and long-term resources for people, communities, and systems.”
- [Food Is Medicine | odphp.health.gov](https://odphp.health.gov)

6

Adding Value...

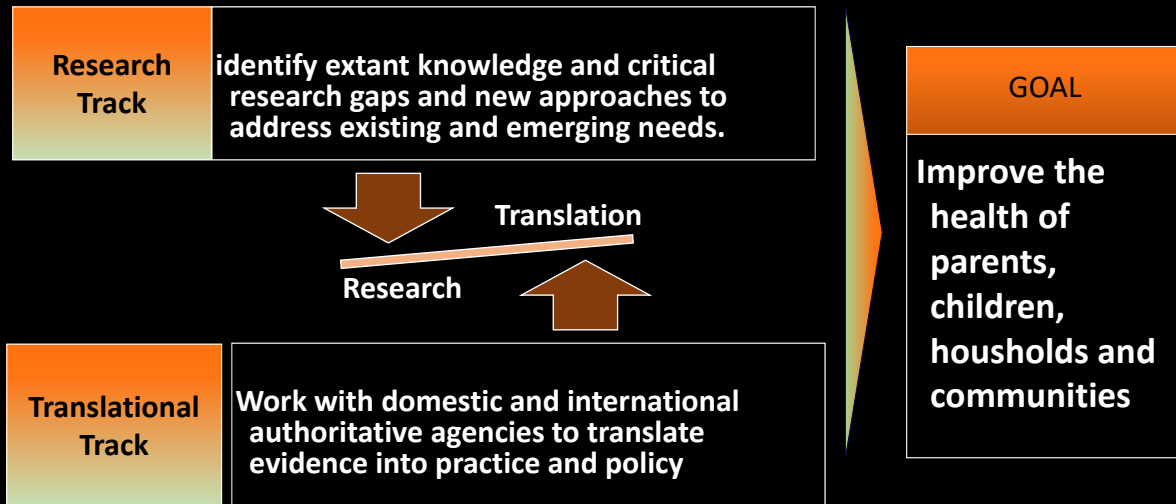
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Our Overarching Goals

- Provide information and service to **support the entire food/nutrition research and global health enterprise.**
- Specifically, **develop approaches to support accurate assessment methodologies** that are applicable and relevant to users domestically and internationally in both the public and private sectors.
- Serve the **breadth of the food and nutrition user community** including:
 - ❖ Researchers (lab/clinical/surveillance)
 - ❖ Clinicians/healthcare providers
 - ❖ Program (creators/implementors/evaluators)
 - ❖ Technical agencies/Policy makers (data consumers)
- Identify opportunities for development and deployment of new technologies
- Identify research gaps

8

Our Approach to Addressing the Role of Nutrition in Health



9

Guiding Principles

Nutrition research should not be limited to what we consume.

Food insecurity ≠ hunger ≠ malnutrition and the ability to distinguish between these conditions is critical to achieving health aspirations and avoiding unintended consequences.

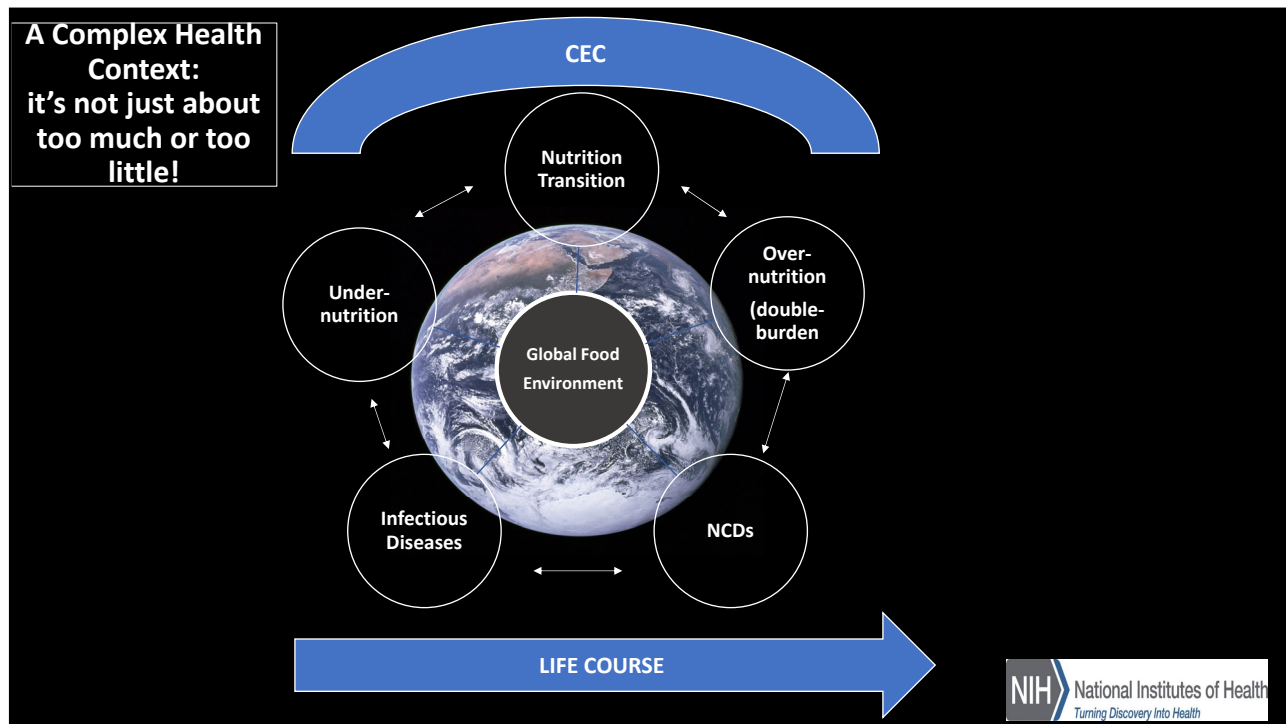
Nutrition is inextricably involved in *all* biological systems.

Knowing an individual's nutrient status reveals little about etiology, function or effect.

Nutritional status is both an *input* and an *outcome of health, disease and therapeutics*, and

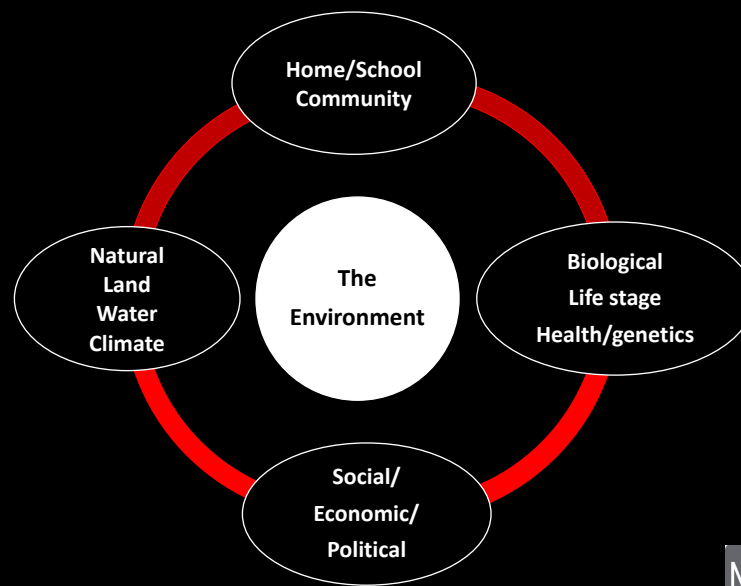
Nutritional status informs all aspects of the diet'/nutrition enterprise.

10

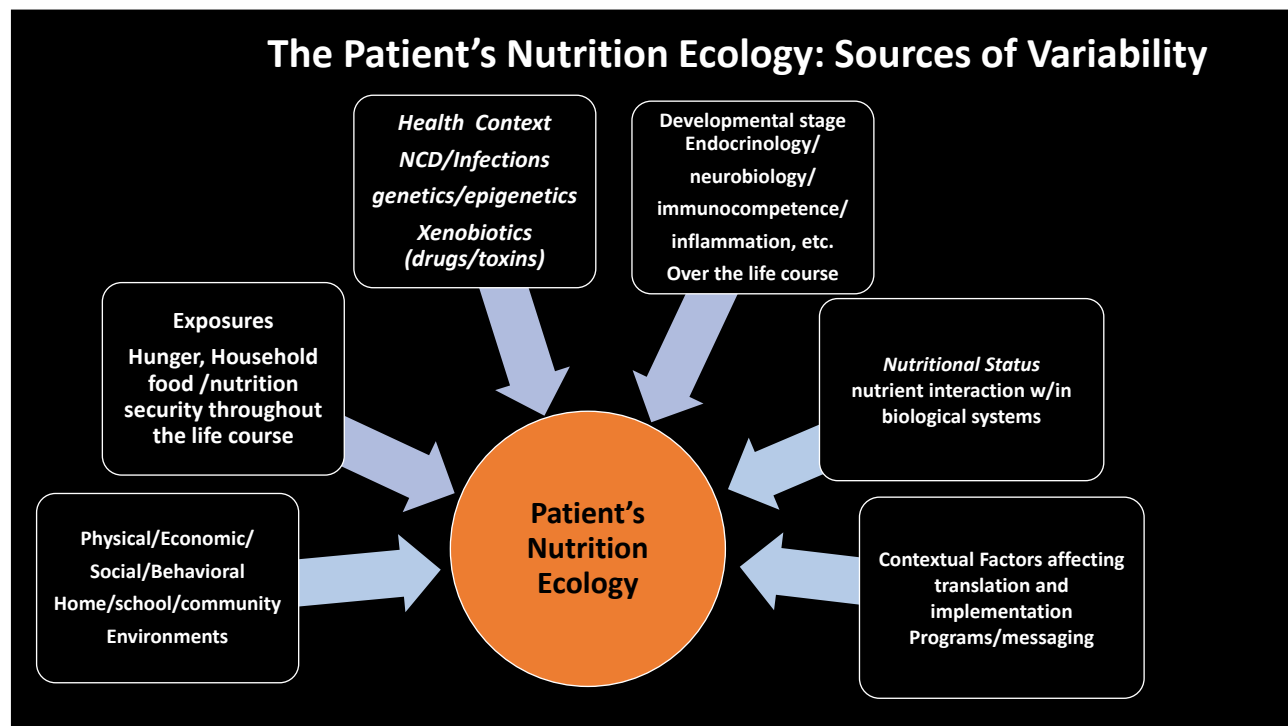


11

The “Environment”- A holistic view



12



13

Principles of Nutritional Assessment

14

A few words about “precision”

What exactly do we mean by precision? Is it

- a) the ability to differentiate between health and disease in individuals, and to compare the prevalence of a condition among populations or before and after an intervention? Or
- b) is it, more broadly speaking, the quality, condition, or fact of being sensitive, or specific and precise (i.e., more inclusive of the sources of variability that might affect a given outcome of interest)?

The former concerns method-ology and the ability to correlate a response with an indicator;

the latter depends on the ability to identify multiple interactions with the indicator. Both are critical. But to date, we have neither the ability to measure the multiple burdens of malnutrition nor the means to accurately assess the etiology of nutrition-related problems. (raiten et al., Nutrients. 2024)



15

The core target: Nutritional Status

Nutritional status is the operational measure of the adequacy of the diet to support health and is the result of a series of genetic, behavioral, physiological, and metabolic processes involved in acquiring, and utilizing dietary substances/nutrients required to support growth, repair, and maintenance of the body as a whole or in any of its parts [Raiten and Combs, 2015]

Conceivably, from both a clinical and public health perspective, nutritional assessment should be viewed as involving more than one nutrient and, functionally, as the potential interactions of multiple nutrients within biological systems of interest.(Raiten et al., 2021: NABV)



16

The challenge with the way we use nutritional status is.....



As most commonly used, it's a "snapshot" in time, that may tell us about the presence of a potential problem but tells us nothing about its etiology! (e.g., is a given status the result of a dietary insufficiency or a physiological response to disease or xenobiotics?).

AND,

By itself cannot answer the question:

Is the person sick because they are malnourished or are they malnourished because they are sick?



17

Core questions underlying nutritional assessment

Our ability to understand the role of nutrition in health is driven by our capacity to address four fundamental questions:

1. Where do normal nutrient requirements end and specific health/physiological condition-related interactions and needs begin?
2. What is the role of diet/nutrition in conditions that require special consideration above and beyond the provision of a balanced diet that contains all essential nutrients required for growth, development, and health?
3. What is the role of factors within an individual's internal (health, genetics, developmental stage, etc.) and external (home, school, community, food system, physical) environment that contribute to these differences?
4. What are the best types and amounts of evidence to support the establishment of standards of care and the development of programs to address the role of nutrition in health promotion and disease prevention?

18

Examples of Current Approaches to malnutrition Screening

- Global Leadership initiative for Malnutrition: GLIM
- Subjective Global Assessment (SGA)
- ASPEN adult

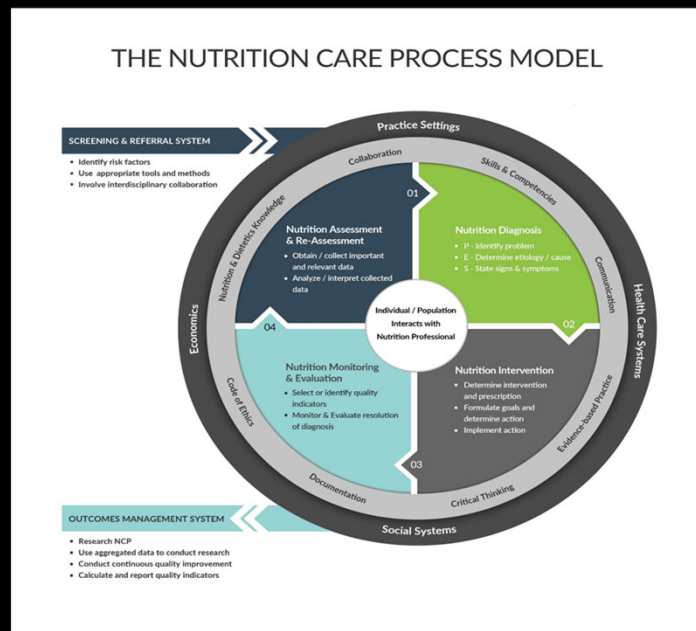
each of these are based on observations/bio-indicators reflecting systemic perturbations that while nutrition sensitive are generally not nutrition-specific. They are most often reflective of changes in phenotypic (body composition, BMI, etc.), "function: (hand-grip strength) and general etiology (inflammatory status, diet record)

Working Premise:

Current tools designed to screen for or define "malnutrition" lack the sensitivity and specificity to develop context specific etiologically based interventions for nutrition care.

19

Once triggered, the adaptation of the ecological approach as part of the Nutrition Care Process.



20

Assessing the Determinants of Malnutrition and Implications for Treatment “ADMIT”

Goals and Objectives

21

ADMIT

Objective:

To take an ecological approach, i.e., examining the relationships among individuals (as complex biological systems) and their interactions with their internal (biological, health, nutritional, developmental) and external (diet, socio-demographic, physical) environments. In order to support clinical assessment and the development of evidence-informed standards of care to meet nutritional needs and optimize outcomes for patients during and after discharge.

Goal:

To examine the issues of nutritional needs and assessment of individuals presenting for and during nutrition care and, using the outputs of this evaluation, develop an etiology based approach to interventions and translation and implementation strategy to support those responsible for clinical care in the US and globally.

Specifically, ADMIT will include the identification of both

- what we know about five core themes (biological, environmental/psycho-social context, assessment, implication for etiology-based interventions and elements of translation and implementation) and
- gaps in our knowledge that will inform a detailed research agenda.

22

ADMIT WG Themes : all addressed from a life course perspective and across settings

1. **Biology:** Identification of priority biology/nutritional needs and considerations (e.g., specific diseases, genetics, and xenobiotic (therapeutic/recreational drugs, toxins) as they impact on nutritional status and function and exert effect on key biological systems, , e.g., growth, neurodevelopment, endocrinology/reproductive health, inflammation, , etc., and relevant outcomes across the life course.
2. **Food Environment and choice:** Identification of priority physical, , psycho-social and related environments that might impact on dietary intake/choice, nutrition security, and nutrition sensitive and specific outcomes
3. **Approaches to Assessment:** Best practices in Nutritional assessment (exposure, status, function, effect and how these inform and are informed by current and emerging practices, standards of care. And emerging technologies (e.g., MHealth, AI, multiplex assays, -omics, etc.)
4. **Capacity and resource needs:** Context-specific capacity needs and approaches to assess nutritional status and its determinants across the nutrition care continuum.
5. **Translational and implementation science research needs:** to support the development and implementation of context-specific, etiological based new approaches to nutritional assessment across the nutrition care continuum., including coverage of applicability and feasibility of new/emerging technologies (e.g., , MHealth, AI, multiplex assays, dried blood spot etc.)

23

THANK YOU!

24