

Nutrigenomics and the Future of Nutrition

Setting the Stage: Introduction & Overview

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Disclosures

- Member, NAREEE Advisory Board & Chair, REE Scientific Advisory Council
- Member, Planning Committee for Vitamin D Standardization Program
- Visiting Scientist, NIH Office of Dietary Supplements, 2016-2017
- NIH funding (Vitamin D Metabolism in Pregnancy)



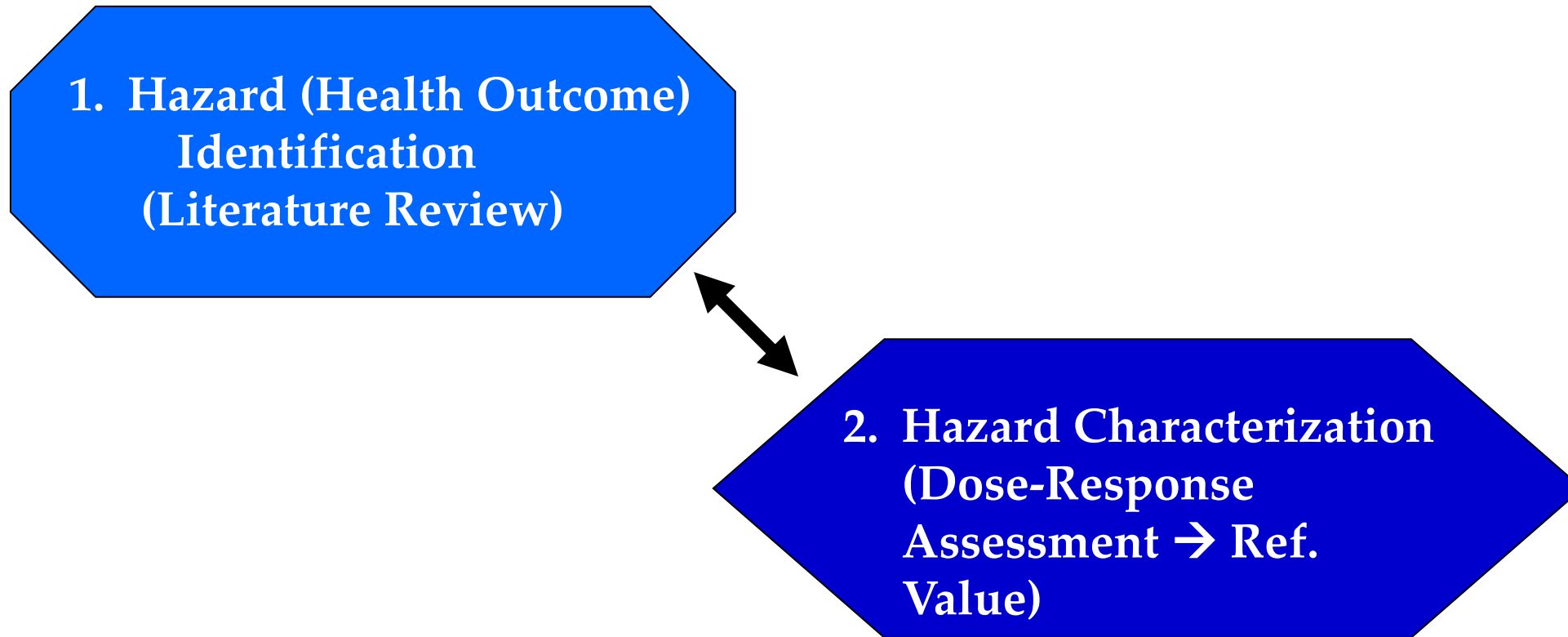
Objectives

- **Overview Population-based Dietary Guidance**
 - Food-based Dietary Guidelines
 - Dietary Requirements
 - Nutritional Kinetics and Dynamics Relative to Population-based Dietary Requirements
- **Nutrigenomics and Transition to Individually-based Dietary Guidance**
 - Personalized Nutrition
- **Complexities for Transition Ahead**



Decision-Making Steps:

Health Outcome



Synthesizing the Evidence

– Food-based Dietary Guidance

- European Food Safety Authority (EFSA)
- US Dietary Guidelines: Nutrition Evidence analysis Library (NEL) modeled on AND Evidence Analysis Library

– Nutrient Requirements

- Dietary Reference Intakes (DRI)
- EURRECA, SCAN & EFSA

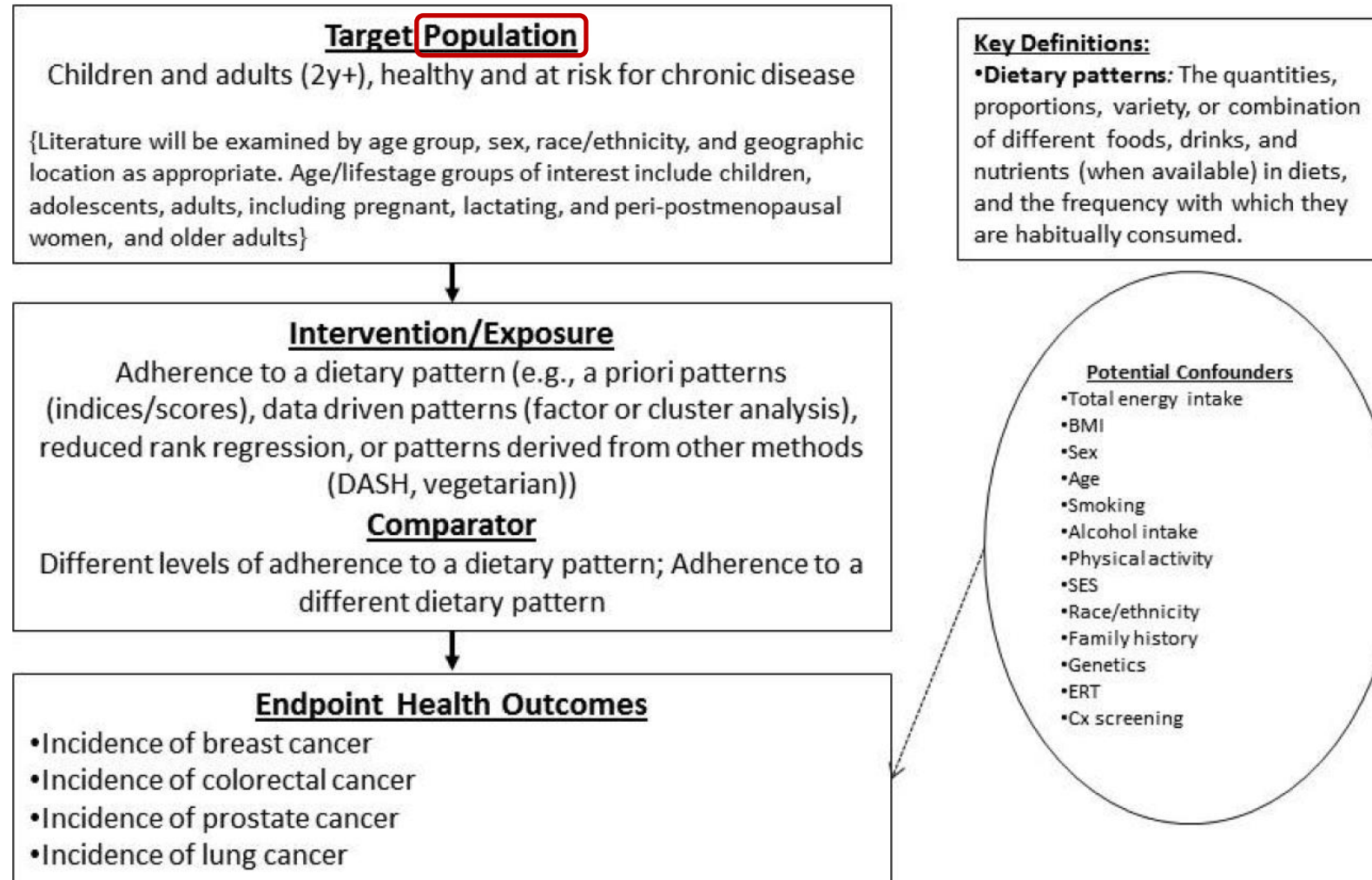


EFSA Scientific Opinion Establishing Food-Based Dietary Guidelines

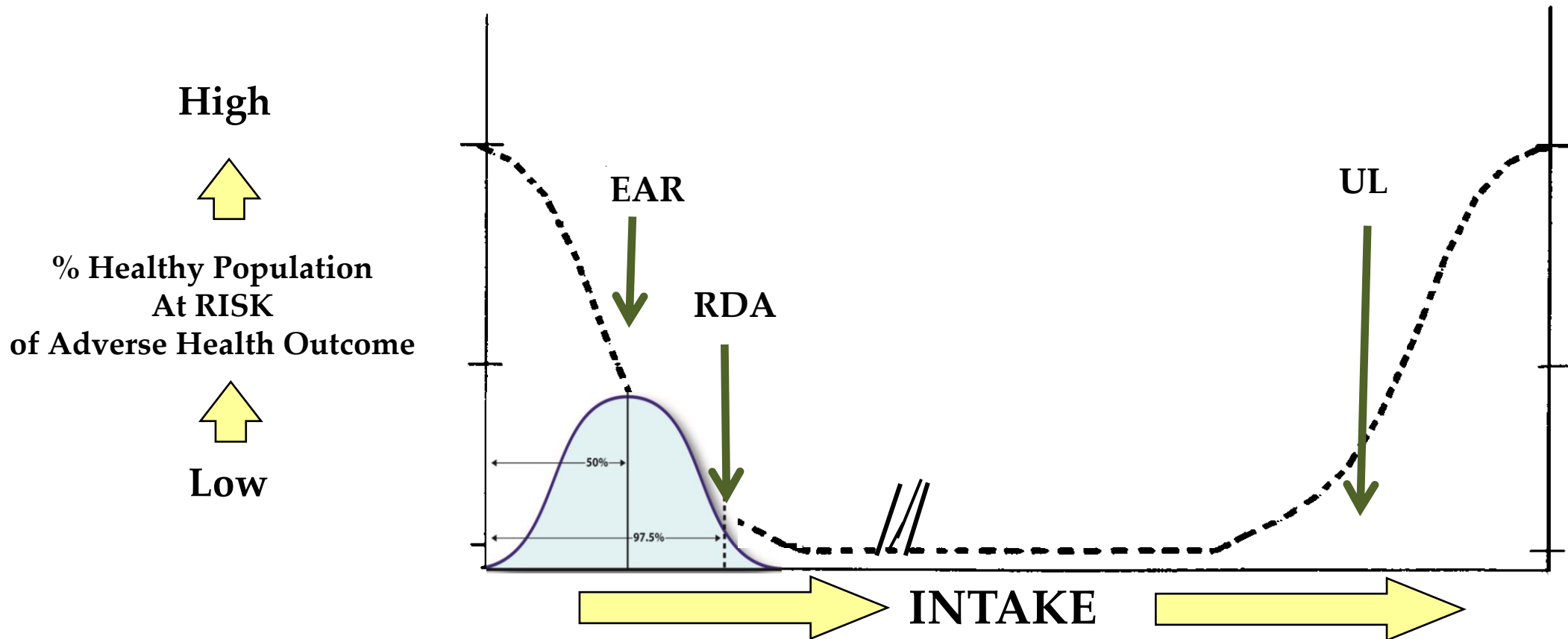
- Integrate scientific knowledge about nutrients, foods & health in order to identify dietary patterns that facilitate achievement of *desirable food and nutrient intakes*
- Focus: diet-disease relationships of particular relevance to the specific population
- Use step-wise approach to identify
 - diet-health relationships (review evidence)
 - country specific diet-related health problems
 - nutrients of public health importance
 - foods relevant for food-based dietary guidelines
 - food consumption patterns



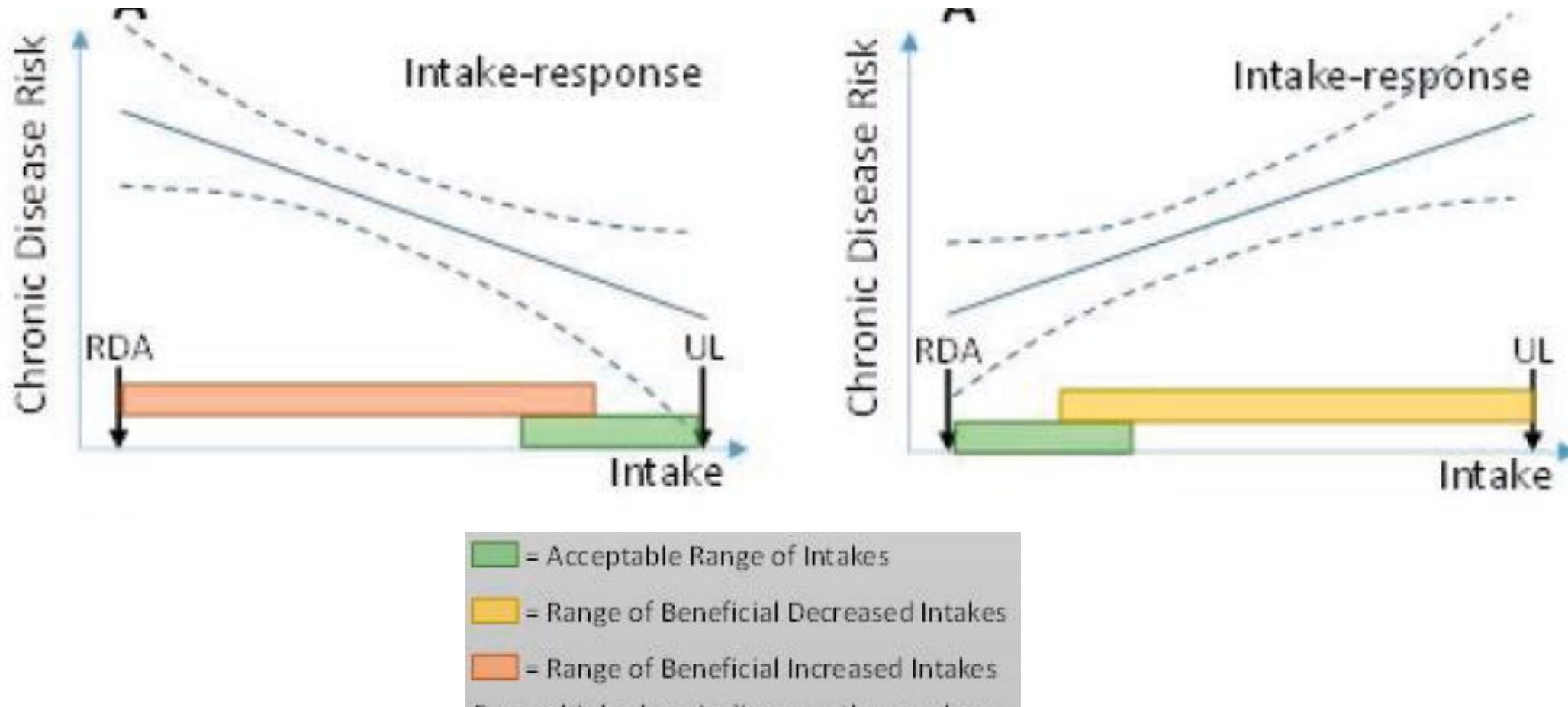
U.S. Dietary Guidelines NEL- Analytic Framework & SR Questions for Dietary Patterns & Cancer



DRI: Distribution of Requirement Frequency & Risk of Adverse Outcome in Generally Healthy Population



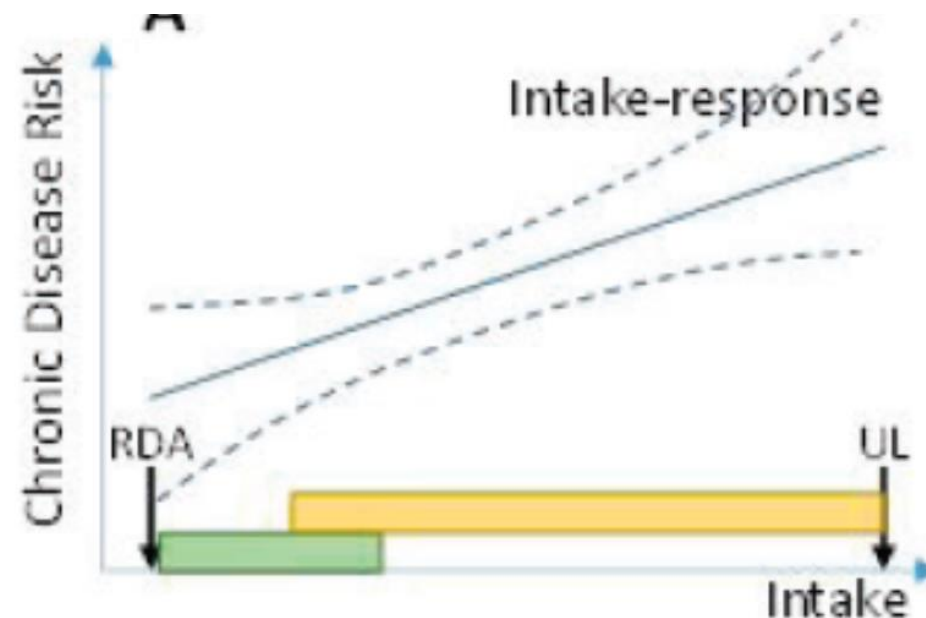
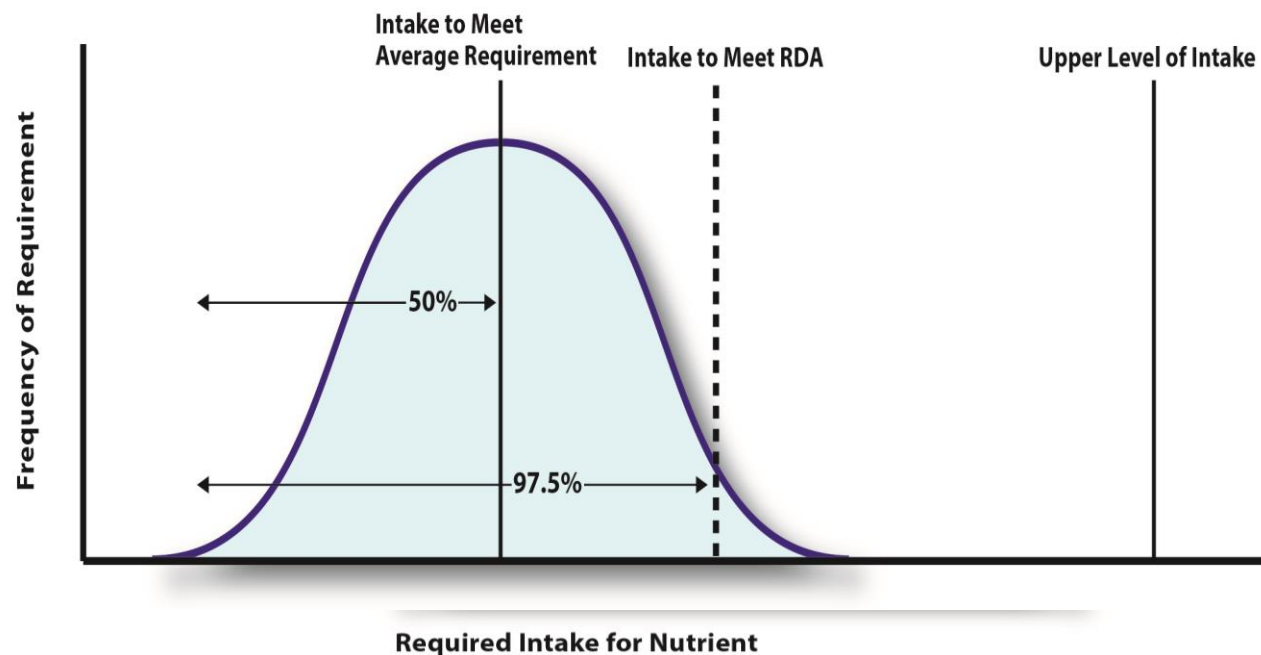
Proposed Chronic Disease DRI: Range of Effect



Population Approach Reflects Individual Uncertainty

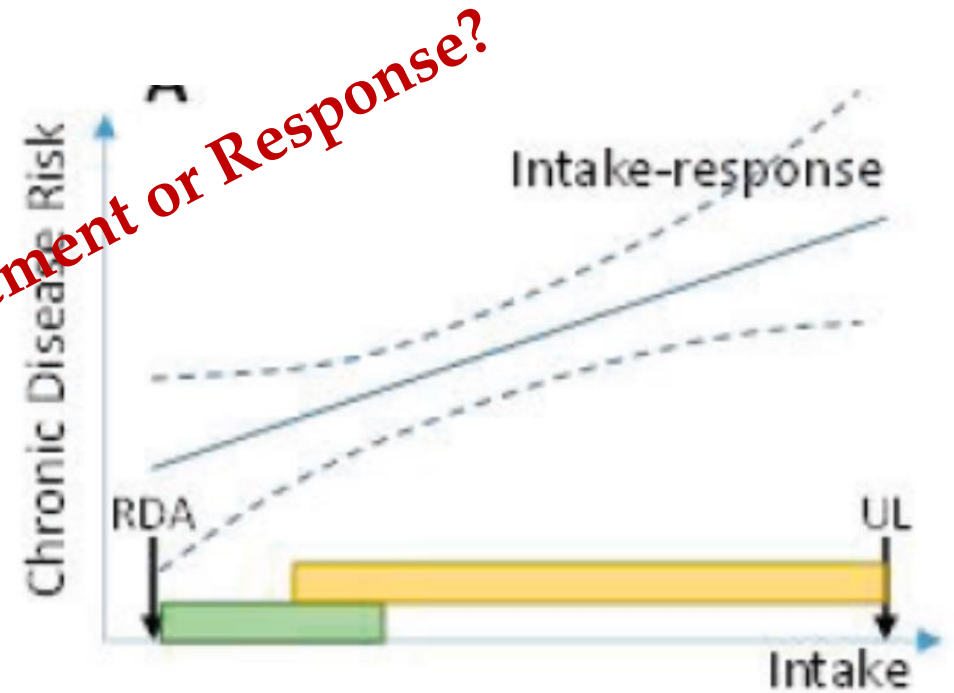
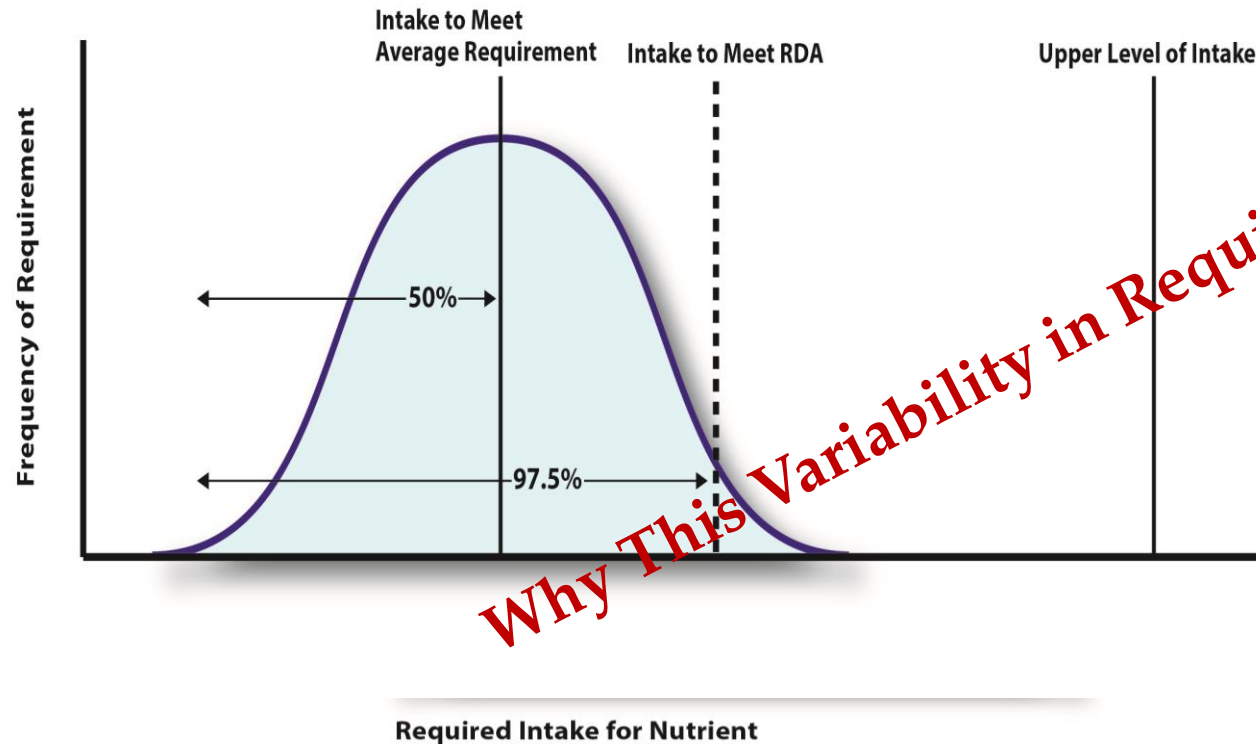


A. RDA CORRECTLY APPLIED



DRI: Distribution of Requirement in Healthy Population

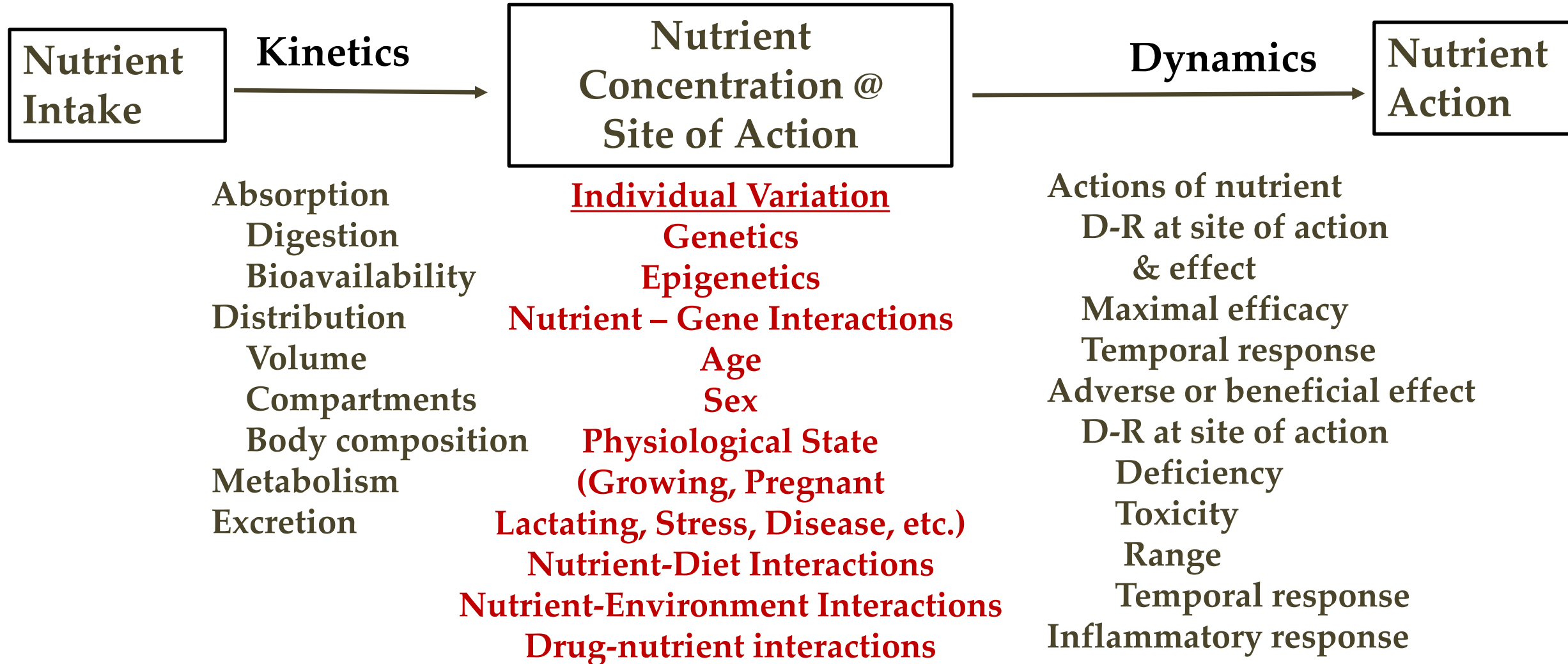
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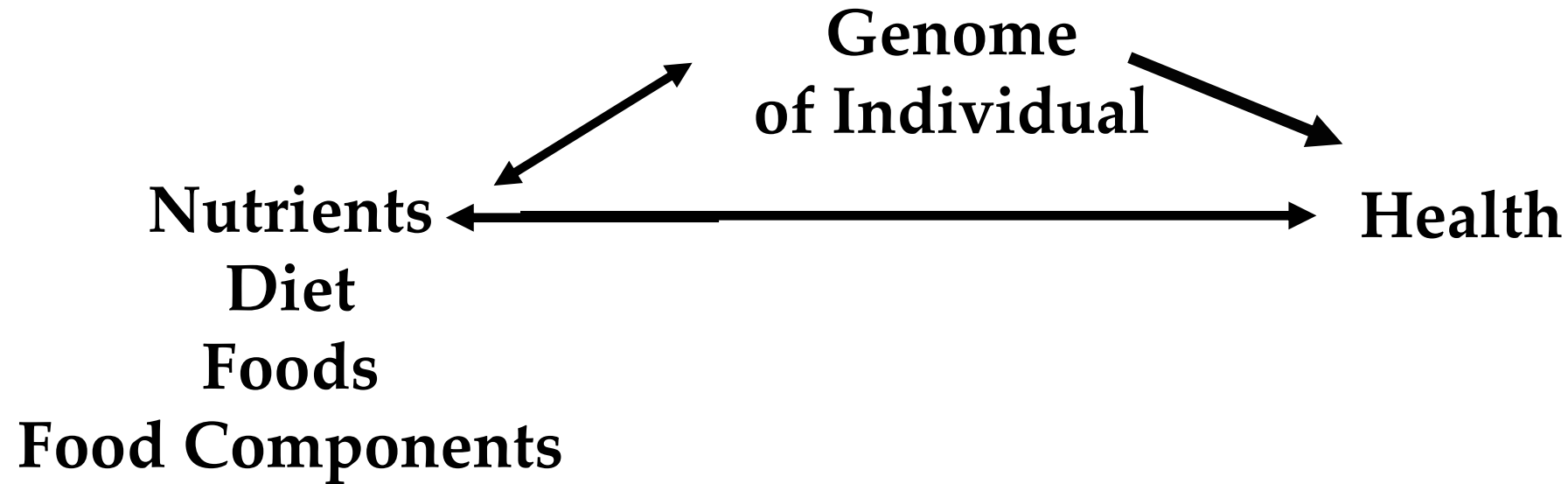
Why This Variability in Requirement or Response?



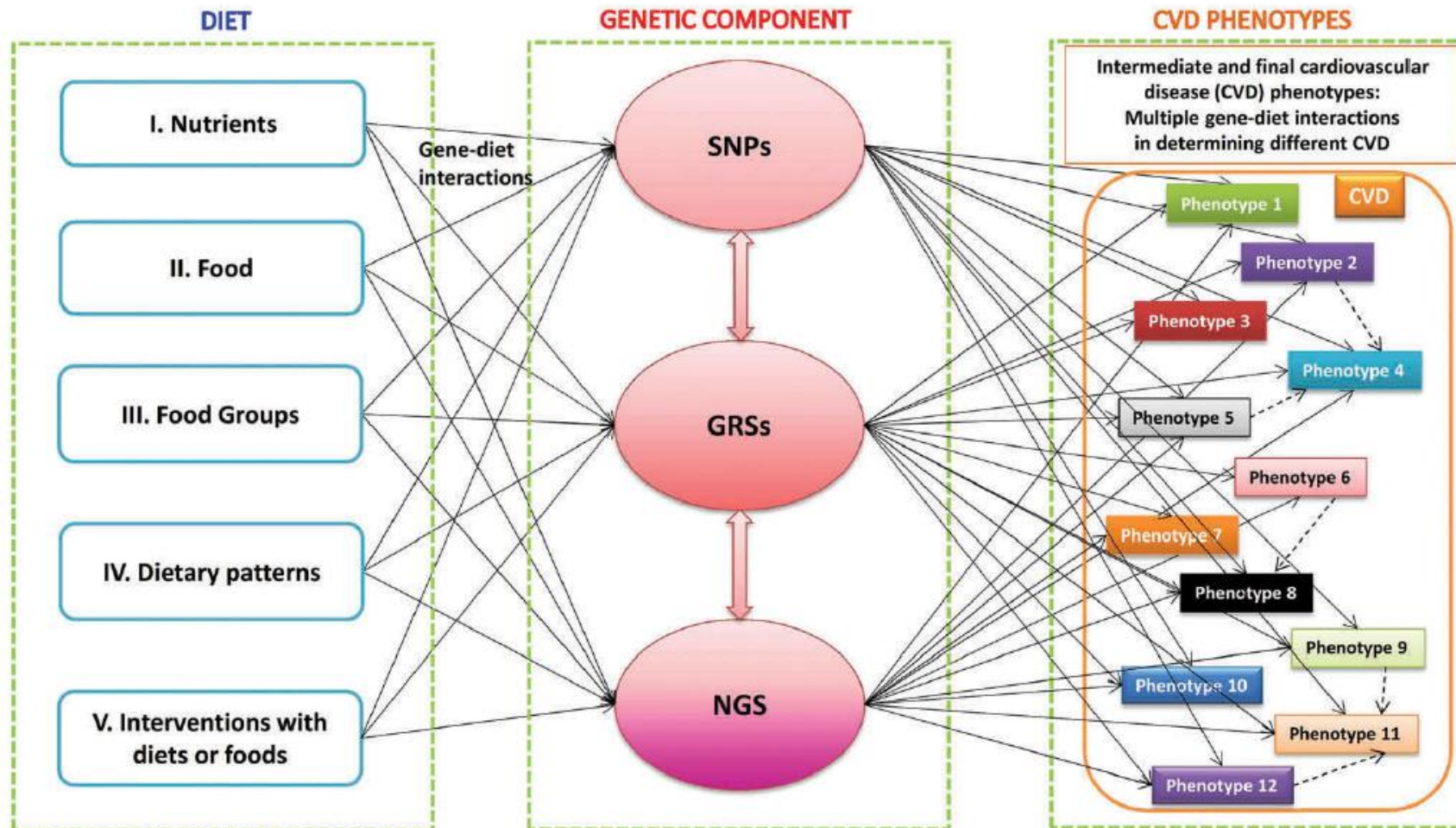
Nutritional Kinetics, Dynamics & Requirements



Nutrigenomics Personalized Nutrition



Complexities of Nutrigenomics & Chronic Disease Endpoints: CVD



Consumer & Food Behaviors

- Health not only driving force
- TASTE often primary force
- Behavior change neither easy nor understood fully
- Barraged by conflicting information



Integrating Population-based & Personalized Dietary Guidance?

- 43 nutrients
 - Variable amounts in foods
 - Necessary dietary pattern must provide even less abundant
- Other bioactive food components
- Nutrigenomics incomplete



Nutrigenomics & Future of Nutrition: Complexities & Opportunities

- Interrelationship of diet, genomics & health (disease prevention): Session 1
- Application of nutrigenomics to diet tailored to individual: Session 2
- Policy & ethical implications: Session 3
 - Nature & strength of evidence
 - Consumer perspective & behavior
- Opportunities: Session 4

