NUTRITION MODELING CONSORTIUM

Optifood

Developed by London School of Hygiene & Tropical Medicine and the World Health Organization's Department of Maternal, Newborn, Child and Adolescent Health and Nutrition for Health and Development

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Summary

Designed to develop and test population-specific food-based recommendations, and to identify "nutri-ent gaps" in local diets.

Key Questions Addressed

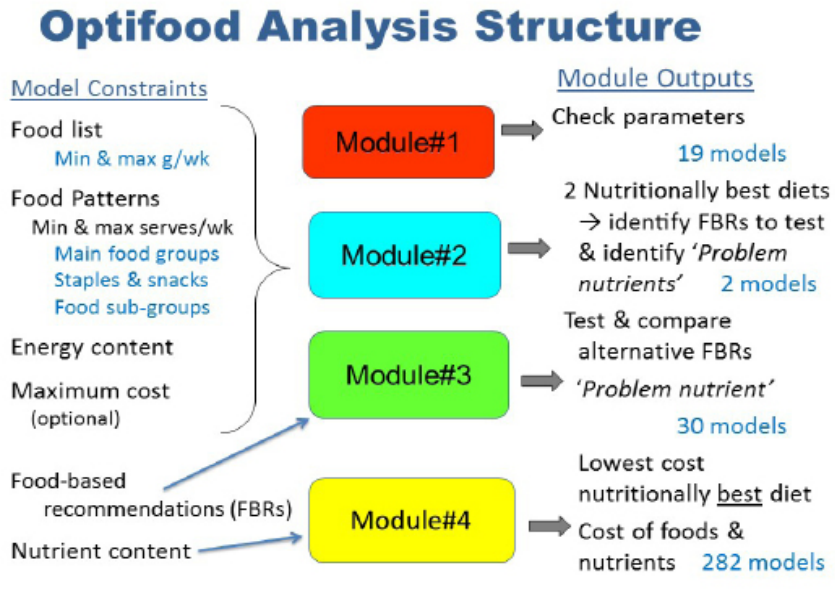
Optifood's three-analytical modules (see Figure 1) , Modules 2-4), use linear programming analyses to ad-dress the following key questions:

Module 2: Is it possible to model a realistic diet, using local foods, that meets energy requirements and recommended nutrient intake (RNI) levels of protein and 11 micronutrients [1]? If such a diet cannot be modelled, which nutrient requirements cannot be met and to what extent (i.e., % RNI achieved)? Which foods or food sub-groups are the best sources of nutrients in these diets? Which individual Food-Based Recommendations (FBRs) (e.g., 7-servings of fruit/w, 5-servings of green leafy vegetables/w, 7-servings of milk/w, etc.) are worthwhile testing in Module 3?

Module 3: Is it possible to select a diet that achieves energy requirements and the RNI for all nutrients2? When developing a set of FBRs, which set will ensure that only a low percentage of the population is at risk of inadequate intakes for the highest number of nutrients? Which nutrients will likely remain inadequate for some individuals in the population? When testing an existing set of FBRs – will it ensure dietary adequacy for the population?

Module 4: What is the lowest cost, nutritionally "best" diet? What foods does it include and to what extent does it meet nutrient requirements? What are the most expensive food sources of nutrients in this diet? What are the most expensive RNIs to achieve?

Figure 1: Optifood Analysis Structure



How does this help nutrition decision making?

Optifood helps select FBRs for a population, and identifies 'problem nutrients' i.e., nutrients that will likely remain low in diets based on locally available foods as they are currently consumed. This information can inform decision-makers involved in developing food-based dietary guidelines, fortification policies or agriculture programmes/policies; or for advocacy purposes on the need to increase availability, accessibility and affordability of nutritious foods.

What are the data needs?

The data needs are: (1) quantitative individual level dietary data, for a population of interest, including a list of foods consumed, the minimum and maximum grams per week each food could be realistically con-sumed, the range in number of servings per week that foods from each food group, food sub-group, staple foods and snacks could be consumed; (2) average body weight of the population; (3) for adults, an estimate of average physical activity levels (Optifood pro-vides optional values); (4) an estimate of the bioavailability of iron (options = 5%, 10%, 12% and 15%) and zinc (options = low, moderate, high); and (5) the cost per 100 g edible portion for each food modelled (op-tional). If food cost data are not available, then Module 4 cannot be run. Optifood has an internal food compo-sition table (n=1937 food/food composite dishes), algorithms to calculate average energy and protein requirements and RNIs (FAO/WHO algorithms and RNIs). Recipes, for these food composite dishes are not documented in Optifood. The user has the option to upload locally-specific energy requirements, RNIs and food composition table or to modify those internal to Optifood.

What technical resources are needed to implement this tool?

Techniques for collecting dietary intake and biomarker data are known and user-friendly data collection tools are available. Senior research personnel generally plan and oversee data collection efforts, but those involved directly in data collection can have MA-level or BS-level training. Analyses of dietary intake and biomarker data are complex. Algorithms for processing and analyzing dietary intake data exist; super-vised MS-level staff can use them and interpret the results. The analysis of biological samples requires specific types of laboratory equipment, which are becoming more available in developing countries; MS-level trained technicians can per-form the analyses.

Techniques for collecting and analyzing MN intervention program cost data are known; both can be done by supervised MS-level staff. The economic optimi-zation modeling is complex, but generic computer code is available and can be modified and run by supervised MS-lev-el staff. Across the board, analytical methods and hardware are evolving quickly, and becoming more available, cheaper, and more user-friendly; training is available for all aspects of data collection and research at UC Davis, and elsewhere.

How long does it take?

The collection and analyses of underlying dietary intake and bio-marker data take approximately 18 months. The nutrition benefits model can be developed in approximately 12 months. Intervention program cost data collection and analysis take approximately 12 months. The development of the economic optimization model takes approximately 6 months. These various data collection and model development activities can occur simultaneously, hence, the full MINIMOD tool can be developed in approximately 24 months by a team of data collectors and researchers.

Strengths and limitations?

Strengths:

Scope: it can be used to identify "problem nutrients", select and evaluate FBRs for any group (by age, sex or life stage) in any country

Flexibility: country-specific RNIs and food composi-tion data can be used in the analyses; and from the list of nutrients users can select the RNIs they would like to model.

Rapid: Once the model parameters are set-up, in Op-tifood, each analysis takes seconds to run and a com-plete set of analyses can be done in several hours. There is also an option to copy model parameters (e.g., to add novel foods to the food list), which saves time and ensures model comparability.

Rigor: all model parameters are locked after set-ting-up the model parameters, which ensures compa-rability across all module outputs.

Limitations: Considerable time may be required to collect and pro-cess the data needed to set-up, in Optifood, model pa-rame-ters in preparation for an Optifood analyses. Rel-atively high levels of technical expertise required: the quality of the results and their interpretation depends on the quality of the data used to define model pa-rameters (ideally 7-days of intake) and the skill of the end-user/s. There is an element of subjectivity when defining model parameters and running Module 3 to test and select a set of food based recommendations.

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