NUTRITION MODELING CONSORTIUM

MINIMOD

The Micronutrient Intervention Modeling Project

Developed by the University of California, Davis

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Summary

Micronutrient deficiencies are major contributors to morbidity and mortality among children and women globally. Intervention strategies include:

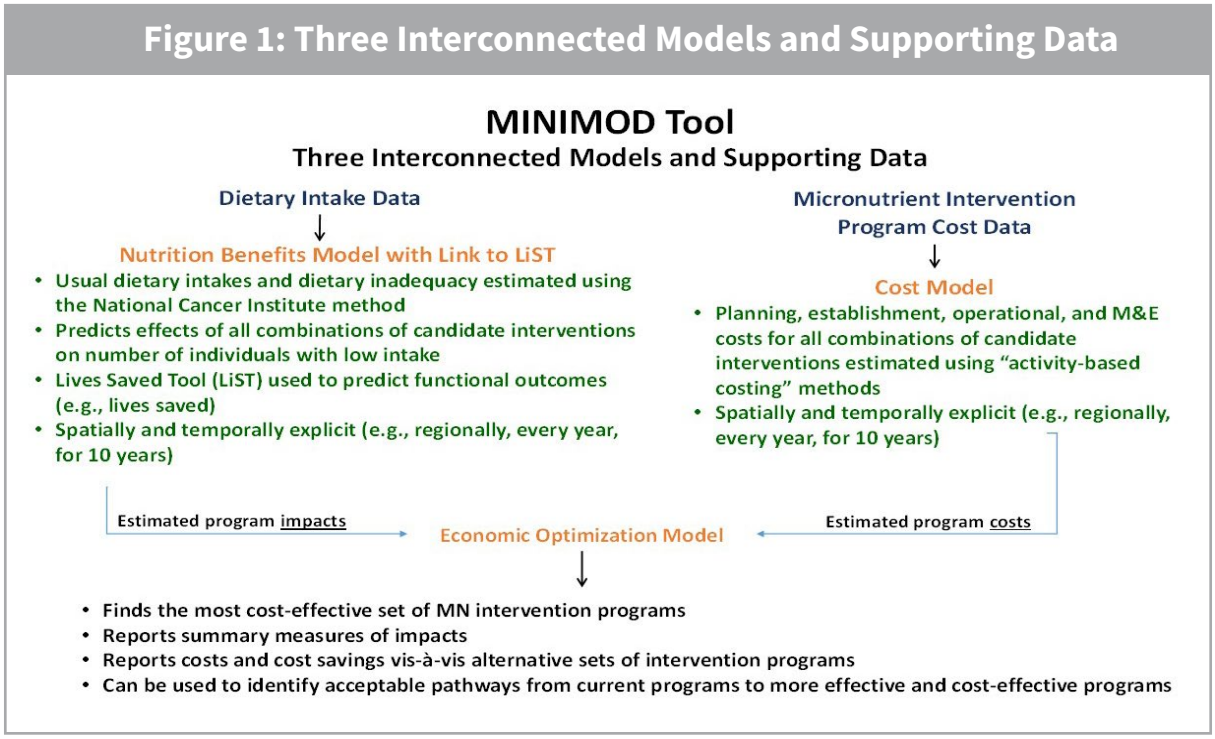
1) micronutrient supplementation;
2) large-scale food fortification;
3) social and behavior change communications to promote dietary changes and/or breastfeeding; and
4) agricultural interventions, including agro- and biofortification. However, little guidance is available on how to select the most appropriate intervention strategy, or mix of national or subnational strategies, to reach the greatest number of individuals at risk of deficiency and at lowest cost. The MINIMOD model currently addresses issues related to vitamin A (VA), vitamin B12, folate, iron, zinc, calcium, and iodine, with particular focus on children 6-59 months and women of reproductive age.

Key Questions Addressed

The MINIMOD tool is designed to address the following types of questions (all questions can be addressed at the national and subnational levels):

- What specifically is the prevalence of a given MN deficiency?
- What will be the impacts on that prevalence level of alternative MN intervention programs?
- What will be the costs of alternative MN intervention programs, and combinations of them, over a 10-year planning time horizon?
- What is the most cost-effective strategy for addressing a given MN deficiency, subject to funding and other constraints, over a 10-year planning time horizon?
- What practical policy pathways exist for transitioning from current MN intervention programs to more cost effective sets of programs?

Figure 1: Three Interconnected Models and Supporting Data



How does this help nutrition decision making?

Policy engagement specialists use the MINIMOD data and models, and the results of model simulations, to inform policy discussions around micronutrient deficiencies. More specifically:

The MINIMOD conceptual framework reminds decision-makers;

- to define a desired measure of impact (e.g., reach, cover-age, effective coverage, supplemental intake, lives saved and anemia cases avoided (in collaboration with the LiST model), and excessive intake
- to judge alternative program interventions in terms of effectiveness and especially cost-effectiveness
- to take a subnational view of micronutrient deficiencies and of program impacts
- to take the long view – e.g., a 10-year timeframe for decision-making

The nutrition benefits model provides estimates of the impacts (using various measures of impact) of alternative micronutrient intervention programs and combinations of them, over space and time

- the program cost model provides estimates of the costs of micronutrient intervention programs and combinations of them, over space and time
- the economic optimization model identifies the least cost method for achieving a pre-specified micronutrient objective, or, the maximum impact for a given budgetary constraint and is used to identify alternative policy pathways from current intervention programs to more cost-effective programs, over space and time

What are the data needs?

The full1 MINIMOD tool requires nationally representative dietary intake and biomarker data, and spatially explicit micronutrient intervention program costs; the former require field-based surveys and subsequent laboratory analyses of biomarker data, and the latter can be collected via focus-group interviews with or reviews of accounts of agencies/actors responsible for designing/ managing micronutrient intervention programs. Demographic data are provided by the LiST tool.

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 optimization modeling is complex, but generic computer code is available and can be modified and run by supervised MS-level 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: Flexibility: A broad array of national and subnational policy scenarios can be developed.

Robustness tests: Algorithms have been developed to test the robustness of model results under uncertain nutritional benefits and program costs.

Multiple indicators of impact: Over a half-dozen indicators of impact in included in the model, including excessive intake.

Multiple beneficiary groups: Young children or women of reproductive age can be included in modeled scenarios; the model keeps track of the effects of intervention program on untargeted beneficiaries.

Multi-program focus: Individual programs or combinations of programs, including programs being contemplated or under development, can be included in model simulations.

Multi-year timeframe: The model includes a flexible, multi-year planning timeframe.

Limitations: Data requirements: The nutrition benefits model requires de-tailed, nationally representative data on dietary intakes and biomarkers.

Technical expertise: Relatively high levels of technical expertise are required to run the nutrition benefits and economic optimization models.

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