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 strategies, or mixes of national or subnational strategies, to reach the greatest number of individuals at risk of deficiency and at lowest cost. The MINIMOD tools currently address 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.

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

- What specifically are the prevalence of inadequate intakes and deficiencies of different MNs?
- What will be the impacts on that prevalence level of alternative MN intervention programs, those currently in place and hypothetical 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 ranking of alternative MN intervention programs in terms of cost-effectiveness?
- 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?
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 tool), and excessive intake
• to judge alternative program interventions in terms of effectiveness and especially cost-effectiveness
• to take a subnational view of inadequate MN intakes and 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 cost model provides estimates of the costs of alternative micronutrient intervention programs, and combinations of them, over space and time.

Combining MN program costs and impacts allows for a ranking of alternative MN intervention programs in terms of efficiency.

The economic optimization model identifies the least-cost strategy for achieving a pre-specified policy objective, or, the maximum contribution to that objective for a given budget constraint, and identifies alternative policy pathways from current intervention programs to more cost-effective programs, over space and time.

How long does it take?

The collection and analyses of underlying individual dietary intake and biomarker data take approximately 18 months. The MINIMOD-Full nutrition model can be developed in approximately 12 months. Intervention program cost data collection and analysis take approximately 6 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 MINIMOD-Full tool (including data collection) can be developed in approximately 24 months by a team of data collectors and researchers. The MINIMOD-SD tool, which primarily makes use of secondary data, can be developed in approximately 6 months.

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 MINIMOD-Full nutritional needs and benefits model requires detailed, nationally representative data on dietary intake and biomarkers.

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