BILL & MELINDA GATES foundation

Development of innovative imaging or other technologies to measure individuals' dietary intakes

Request for Concept Memo

Proposal Deadline: July 22, 2016

Overview

Introduction

The Bill & Melinda Gates Foundation is committed to ensuring that all women and children have the nutrition they need to live healthy and productive lives. Globally, 45% of deaths of children under age 5 are attributable to undernutrition. For those who survive, undernutrition causes permanent physical and cognitive impairments–reducing a child's future productivity and earnings as an adult. By increasing our investment in nutrition over the next six years, we are working to spur continued commitment and accelerated action on nutrition in order to avert morbidity and mortality attributable to malnutrition.

Our overall nutrition strategy goals include: 1) Increasing effective coverage of proven nutrition interventions to avert deaths and to improve cognitive development; and 2) Developing and testing new solutions in interventions, implementation approaches, and data measurement systems to effectively tackle the unaddressed burden of undernutrition.

Within the Nutrition Strategy, the New Solutions initiative strives to accomplish these goals by increasing our understanding of the nutrition-related determinants of healthy birth, growth, and development across the lifecycle and developing, testing, and introducing new solutions to address malnutrition.

The New Solutions approach is three-fold; specifically, we:

- Support research to understand the full set of causes of undernutrition, to identify the right packages of interventions, and to establish optimal times to intervene;
- Develop, test, and roll-out new solutions; and
- Address the challenges and bottlenecks that impede effective implementation (including delivery systems and in-country capacity) via research, particularly for reaching young children, women and girls and addressing social and gender norms.

Currently, one of the critical barriers to establishing recommendations for optimal nutrition in vulnerable populations and for informing nutrition policies and programs, such as food fortification or dietary supplementation, is the lack of up-to-date, comprehensive and reliable data on individual dietary intake, particularly in low income country (LIC) settings. Current methods to measure dietary intake are time-consuming, costly, and skill/labor intensive.

The New Solutions initiative is seeking an organization, or consortium of organizations, to develop and evaluate improved methods to measure food and nutrient intake using innovative technology to overcome the many limiting factors of current methods. Possible examples of such technology include enhanced imaging methods to measure food intake and, possibly, appropriate image recognition software to identify individual food images and convert food intake to nutrient intake. We seek innovative methods that will be suitable to address some of the specific challenges encountered in LIC settings, such as lack of electricity or alternative power sources, poor lighting, unreliable internet connection and dietary practices that include shared food plates. The new technology should be socially and culturally acceptable in different settings.

The projects resulting from this investment will develop and test new solutions for the measurement of food and nutrient intake at the individual level in LIC, and will contribute to the set of tools that can be used to assess nutritional status at the individual level and thereby contribute to increasing the availability of valid, reliable and timely data to inform nutrition-related policy and programs. The resulting technology to collect and interpret individual food consumption data will be used to inform dietary intake recommendations and assist in formulating food and nutrition policies and programs, such as food fortification and/or dietary supplementation.

The selected partner(s) will demonstrate: a) the capacity for developing or refining innovative and relevant imaging technology (passive or active image capture), and b) the nutrition expertise and field experience required to assess the suitability of the novel technology for use in low income settings.

Background

Undernutrition contributes to 45% of all child deaths worldwide. While the prevalence of some forms of undernutrition has decreased in the past two decades, the number of affected individuals remains high, particularly in Africa and Asia. Accurate information on dietary

intake patterns and identification of gaps in nutrient intake are essential for the planning of effective health, nutrition, and agriculture programs and policies that aim to reduce the global burden of undernutrition.

Currently, individual dietary intake is assessed using direct observations and weighing of food preparation and consumption, or (more commonly) recall history of dietary intake during the previous 24 hours. The former method is very labor-intensive, and the latter is fraught with errors. In both cases, skilled personnel are required to collect and analyze the data, by converting food intake to nutrient intake (using standard food composition tables) and comparing with estimated dietary requirements. Moreover, these methods are time-consuming, and the data processing imposes a significant lag in data analysis. Thus, there is a high demand, from researchers, clinical practitioners, and consumers, for innovative dietary measurement approaches that reduce the personnel requirements, improve the quality of information collected and simplify the analysis and interpretation of data. Further, this information is vital to inform policy makers and other stakeholders on nutrition needs at the country level. While a number of novel dietary assessment technologies exist today, none have been implemented in resource-poor, LIC settings, where there is a large information gap on food and nutrient intakes.

This grant will support development and evaluation of novel technologies to collect and interpret individual food consumption data using imaging or other novel methods to measure food intake and, possibly, appropriate software to recognize individual and mixed foods, quantify the amounts consumed, and convert food intake to nutrient intake.

We have previously supported Tufts University to carry out a landscape analysis of available technologies used to measure food and nutrient intakes. This analysis found a number of examples of active and passive technologies used to measure food and nutrient intake. These include, but are not limited to:

1) Active capture (photographic or video imaging of food preparation and consumption, which requires either the participation of the family members or the presence of a data collector in the home to manually operate the device and capture images of each food being prepared and consumed).
2) Passive capture (video which takes pictures automatically in real time or semi-automatically at intervals. Passive image capture is preferable, but possibly more challenging, due to the uncertainty of how to capture food preparation AND food consumption, and possible concerns about privacy).

With both forms of image capture, food items could be identified and quantified by either a dietician or food recognition software, and the food intake then converted to nutrient consumption using incorporated software and local food composition data.

The two technology options have distinct strengths and weaknesses. The first relies on simpler technology, but is more labor intensive, requiring active participation from the family or external data collector. The second is preferable, but carries greater technical complexity and possible ethical challenges related to privacy issues. We will entertain proposals for both technologies, and hybrids of each approach. Other forms of innovative dietary intake measurement methods not listed above may also be considered. The innovative technology must account for the context of LIC settings. Most of the current technologies used for active and passive image capture require a certain degree of literacy of the study subject or external observer, and may rely on reliable access to power and internet connectivity, so these may not be suitable for LIC settings. Ideally, the technology would also incorporate methods of determining whether individual foods are produced in the home, or purchased/acquired outside of the home as packaged or processed foods, so that the dietary data can be used to identify potentially fortifiable foods for designing food fortification programs.

Anticipated Outcomes

Vision: Support the Nutrition Strategy's goal of developing and testing new solutions in interventions, implementation approaches, and data measurement systems to effectively tackle the unaddressed burden of undernutrition.

Goal: New solutions identified, tested, and readied for introduction for improving the measurement of dietary and nutrient intake in low income settings, so as to make available valid, reliable and timely dietary intake data to inform policy and programming and to track progress at the global and national levels.

Primary outcomes: Two new forms of dietary assessment technology developed, based on image capture and possibly image recognition: 1) active capture in the form of manual photo or video image capture, and 2) fully automated passive image capture capability (in the form of video, either real-time or in time intervals) of food preparation and consumption; and field testing to validate the new technology against reference dietary intake assessment methods.

It is expected that investing in the development and field validation of these new technologies for improved dietary assessment will lead to more widely available food and nutrient intake data of higher quality and collected more frequently, which will lead to improved nutrition policies and programs at the national and global level based on this information.

Scope and Approach

Scope and Approach: This request for proposal is seeking two levels of technology development (active and passive image capture) or hybrids of the two approaches. The applicant teams must include 1) individuals with experience in developing technology adaptable to the LIC context, and 2) experts in human nutrition and/or public health in a LIC context. The project activities should include the

technology development or refinement, as well as field testing to validate the new technology against accepted reference dietary intake methods.

- Budget: Submissions up to $1,500,000.00 USD in funding will be considered.
  - The total amount of funds set aside for this RFP is up to $2,500,000.00. The Gates Foundation is interested in funding 2-3 grants, up to $1,500,000.00 each. Therefore, proposed budgets are expected to fall in the $500,000.00 to $1,500,000.00 range. The level of funding proposed by applicants should reflect where the organization is in the technology development process.
- Timeline requirement: grant duration of less than two and a half years
- Geographic scope: Asia and Sub-Saharan Africa, LIC settings. Preference given to submissions in which the technology can perform in both rural and urban settings.
- Technological capacity: Advanced innovative technology capable of active or passive capture of image-based dietary assessment (food preparation and consumption) appropriate for LIC context (considering issues such as power source, in-home lighting, data transfer, local food consumption practices and social acceptability).
- Nutritional capacity: Field experience and nutritional expertise to carry out validation, employing the use of standard quantitative dietary assessment methods and appropriate food composition tables.

Rules & Guidelines

Eligibility

Funding Criteria

This public call to solicit concept memos will be followed by a private request for full proposals from a selected sub-set of finalists. Factors that will be considered in the selection of finalists are:

- Alignment with the Nutrition / New Solutions strategy
- Appropriateness of proposed dietary intake assessment technology for low-income settings (for example, in settings that do not have electricity or internet connection) and are socially acceptable,
- Realistic time-lines for completion in less than two and a half years and within the specified budget (up to $1,500,000.00)
- Adequacy of field testing in at least one LIC in Asia and/or sub-Saharan Africa
- Demonstrated track record of successful projects in this area
- Adherence to the Gates Foundation's Global Access principles, as described in the Key Terms & Conditions section of this RFP application
- Applicants may include academic institutions, research institutions, NGOs, and commercial organizations (note: if the applicant is an India-based organization, it must be able to legally accept foreign funding, including FCRA)
- Joint Proposals: Joint proposals are a partnership or consortium of organizations. The Foundation is willing to consider joint proposals submitted by a partnership of applicants. If a joint proposal is submitted, the concept memo should clearly state the proposed primary grantee organization and the partner(s) / sub-grantees

Exclusion Criteria

This public call to solicit concept memos will NOT consider funding for:

- Submissions that are not in alignment with the Nutrition / New Solutions strategy
- Infrastructure to support the technology development (facilities for development, labs, etc.)
- Animal studies
- Submissions above $1,500,00.00 USD
- Submissions for a project timeframe longer than 2.5 years
- Submissions from organizations that are unable to receive funds from a U.S.-based private Foundation
- Submissions that do not reflect the Gates Foundation's Global Access principles (per the Key Terms & Conditions below)
- Direct donations or grants to individuals
- Political campaigns and legislative lobbying efforts
- Projects that focus exclusively on high-income countries
- Building or capital campaigns
- Projects that exclusively serve religious purposes

Evaluation Criteria

Proposals will be selected for funding in a two-phase process: a) an open / public call to solicit brief Concept Memo submissions, including an opportunity for applicants to submit clarifying questions, followed by b) a private request for proposal process with selected finalists who will be invited to submit a full detailed proposal package with proposal narrative, budget, and results framework.

Concept memo submissions, as well as the second phase detailed proposal packages, received by the deadline will be evaluated on the following criteria:

- Ability of the technology to capture recipe content, quantity and type of individual foods and mixed dishes consumed, and conversion of food intake to nutrient intake using standard food composition tables
- Feasibility to implement technology in low-income settings (including consideration of ultimate costs to implement technology sustainably and at scale)
- Technological capacity of applicant team (prior experience in the areas of image capture) and experience addressing technological challenges
- Nutrition knowledge of applicant team, experience working with dietary assessment and demonstrated ability to validate results
- Experience of applicant team in low income settings
- Budget amount
- Realistic timeline, particularly in terms of technology development and adaptation in LIC setting
- Evidence of timely and successful delivery in previous work

Activities and Timeline

June 13, 2016 – Request for concept memos announced.
June 27, 2016 – 5:00 PM (PST): Deadline for any clarifying questions to be submitted by applicants via email to NutritionRFP@gatesfoundation.org.
July 1, 2016 – 5:00 PM (PST): Responses to applicant questions posted by the foundation to the online submission form
July 22, 2016 – 5:00 PM (PST): Deadline for applicants to submit concept memos and biographical information to the online submission form.
August 29, 2016 – 5:00 PM (PST): Finalists notified; private invitation for request for full proposal distributed to finalists.
September 23, 2016 – 5:00 PM (PST): Deadline for full proposal submissions from finalists (method of submission to be shared in RFP invitation).
December 2016 / January 2017: Awards announced.

Timeline subject to change.

How to Submit a Proposal

Response Requirements

To apply, please submit a concept memo and biographical information, as requested below. Other attachments will not be reviewed. Proposals must be submitted in English.

- **Concept memo** describing the proposed project, using template provided (up to 5 pages maximum page length, using Arial 9 font size for responses). Include in the concept memo:
    - **A description of the general approach to be taken** (i.e. describe the technology proposed, how the technology will be developed, how the technology will be validated, where the validation will be done, and the primary organization and partner organizations involved).
    - **Brief description of organization(s) and any partners involved**, and each organization's expertise in the appropriate field for their contribution to the project (enter into concept memo's question #3)
    - **A high level approximate budget** for the proposed activities (enter into concept memo's question # 5). Include a breakout of proposed technology development and field-testing costs (i.e. how much of the effort would be devoted to technology development versus field testing). Please include the following line items: Salary, Fringe, Travel, Equipment, Supplies, Subcontracts, Other Direct Costs and Indirect Costs.
    - **A high level timeline** for the proposed activities (enter into the concept memo's question # 6).
- **Principal Investigator (PI)/Team overview, including Biographical information** or resume for PI/leads. Brief bios may be submitted in a separate attachment using the format of the applicant's preference (up to 2 pages maximum for all bios, not counted against the 5 page concept memo limit).

Submission Instructions

Submit your response (concept memo and biographical information) online. You must complete the online submission form and upload your completed concept memo and biographical information for the foundation to process your request. Please do not mail a duplicate hard copy after submitting your response online. Please do not send any additional attachments or information (videos, books, program materials, etc.) beyond the requested concept memo and biographical information.

Help Contact(s)

Applicants may submit any clarifying questions on this request for concept memo to NutritionRFP@gatesfoundation.org. Questions should be submitted by 5:00 PM PST on Monday, June 27, 2016. Responses to all questions will be posted on the online submission form by 5:00 PM PST on Friday, July 1, 2016 so that all applicants will be able to access all clarifying questions and all associated responses.

More Information

Reference

You can find these reference materials as well as other helpful links in the online submission form.

- Appendix 1: Gates Foundation Nutrition Strategy Presentation
- Appendix 2: Gates Foundation Nutrition Strategy Fact Sheet
- Appendix 3: Tufts University landscape review of dietary assessment technologies
- Indirect Cost Policy
- Working with For-Profit Organizations (a reference for any applicant organizations that are considered “for-profit”)

Frequently Asked Questions (FAQ)

Who can participate? This is an open solicitation. We welcome submissions from organizations in both public (e.g. NGO, government, academic, research) and private sectors (commercial organizations). If a for-profit organization is submitting a concept memo, please review the Working with For-Profit Organizations reference document.

When are responses due? Concept memo responses are due on **July 22, 2016**.

When will the finalists for the request for proposal process be selected? The concept memos will be reviewed and finalists invited to participate in developing a full proposal package will be notified by August 29, 2016.

When will the award(s) be announced? Once the full proposal process is completed, it is expected that the final awards would be announced in December 2016 or January 2017.

Will I receive any compensation for submitting? You will not receive any compensation for your submission even if it is used by the foundation or third parties in any way.

What will the foundation do with my submission? The foundation will review all submissions. We may also share your submission, or ideas contained within it, with the public or partners to ensure that good ideas and new innovations are broadly disseminated and available for use. With this in mind, please ensure that any materials you provide under this solicitation are your own, and understand that the foundation and others will have a right to use your submission freely, upon delivery, for noncommercial purposes.

May I use my own organization templates to submit the concept memo? The Foundation requires concept memos to be submitted using the Gates Foundation-supplied template. Other formats will not be considered.

Key Terms and Conditions

A. Disclosure Notice

To help the foundation with its review of RFP responses, the foundation may disclose proposals, documents, communications, and associated materials submitted to the foundation in response to this RFP (collectively, “Submission Materials”) to its employees, contingent workers, consultants, independent subject matter experts, and potential co-funders. Please carefully consider the information included in the Submission Materials. If you (the “Applicant”) have any doubts about the wisdom of disclosure of confidential or proprietary information, the foundation recommends you consult with your legal counsel and take any steps you deem necessary to protect your intellectual property. You may wish to consider whether such information is critical for evaluating the submission or if more general, non-confidential information may be adequate as an alternative for these purposes.

Notwithstanding the Applicants characterization of any information as being confidential, the foundation the foundation is under no obligation to treat such information as confidential.

B. Disclaimer

This RFP is not an offer to contract or award grant funds. The foundation assumes no responsibility for the Applicants cost to respond to this RFP. All responses generated by this RFP become the property of the foundation.

C. Release and Verification

In exchange for the opportunity to be awarded a grant or contract, the Applicant agrees that the foundation may, in its sole discretion: (1) amend or cancel the RFP, in whole or in part, at any time; (2) extend the deadline for submitting responses; (3) determine whether a response does or does not substantially comply with the requirements of the RFP; (4) waive any minor irregularity, informality or nonconformance with the provisions or procedures of the RFP; (5) issue multiple awards; (6) share responses generated by this RFP with foundation staff, consultants, contingent workers, subject matter experts, and potential co-funders; and (7) copy the responses.

Applicant agrees not to bring a legal challenge of any kind against the foundation relating to the foundation's selection and award of a grant or contract arising from this RFP.

Applicant represents that it has responded to the RFP with complete honesty and accuracy. If facts provided in Applicant's response change, Applicant will supplement its response in writing with any deletions, additions or changes within ten days of the changes. Applicant will do this, as necessary, throughout the selection process. Applicant understands that any material misrepresentation, including omissions, may disqualify it from consideration for a grant or contract award.

By responding to this RFP, you are representing: (i) that you have authority to bind the named Applicant to the terms and conditions set forth above, without amendment; and (ii) that you agree to be bound by them.

D. Global Access and Intellectual Property

Intellectual property (IP) rights and the management of IP rights are likely to play a critical role in achieving the goals of this project. To this end, the foundation requires that all applicants understand the foundation's Global Access requirements and how they impact intellectual property – both Background intellectual property and new IP. Specifically, the foundation requires the following Global Access commitments of all Grantees:

You will conduct and manage the Project and the Funded Developments in a manner that ensures Global Access. Your Global Access commitments will survive the term of the Agreement. "Funded Developments" means the products, services, processes, technologies, materials, software, data, other innovations, and intellectual property resulting from the Project (including modifications, improvements, and further developments to Background Technology). "Background Technology" means any and all products, services, processes, technologies, materials, software, data, or other innovations, and intellectual property created by You or a third party prior to or outside of the Project used as part of the Project. "Global Access" means: (a) the knowledge and information gained from the Project will be promptly and broadly disseminated; and (b) the Funded Developments will be made available and accessible at an affordable price (i) to people most in need within developing countries, or (ii) in support of the U.S. educational system and public libraries, as applicable to the Project.

The foundation may also require additional Global Access commitments, including the submission of a Global Access Strategy, Global Access milestones and a non-exclusive license to the foundation in order to ensure that Global Access can be achieved.

The foundation will be selecting applicants based on the conclusion that their technologies and expertise will be most appropriate for the success of this RFP.

As part of the foundation's review and evaluation of each response, the foundation will conduct due diligence with respect to each applicant's ability and commitment to manage intellectual property in a manner consistent with the stated scientific and charitable goals of the foundation. Due diligence activities may include inquiry into an applicant's:

1) Freedom to operate (FTO) and ability to freely use and acquire needed background technology;

2) Commitment to promote the utilization, commercialization and availability of Funded Developments for public benefit

The foundation encourages you to include this information in your response.

For more information about Global Access, see http://globalaccess.gatesfoundation.org/.

About the Bill & Melinda Gates Foundation

Guided by the belief that every life has equal value, the Bill & Melinda Gates Foundation works to help all people lead healthy, productive lives. We work with partner organizations worldwide to tackle critical problems in four program areas. Our Global Development Division works to help the world's poorest people lift themselves out of hunger and poverty. Our Global Health Division aims to harness advances in science and technology to save lives in developing countries. Our United States Division works to improve U.S. high school and postsecondary education and support vulnerable children and families in Washington State. And our Global Policy & Advocacy Division seeks to build strategic relationships and promote policies that will help advance our work. Our approach to Grantmaking emphasizes collaboration, innovation, risk-taking, and, most importantly, results.

To learn more about the foundation's work, visit www.gatesfoundation.org.