Biotechnology Industry Research Assistance Council
(BIRAC)
A Government of India Enterprise

Request for Proposal (RFP)
Grand Challenges India Funding Opportunity
On

Enhanced TB Diagnostics and Adjunct Technologies for Sample Collection and Processing

Jointly funded by

Department of Biotechnology (DBT)
Ministry of Science and Technology
Government of India

&

Gates Foundation (BMGF)

Grand Challenges India Call on Enhanced TB Diagnostics and Adjunct Technologies for Sample Collection and Processing

ABOUT GRAND CHALLENGES INDIA

In 2012, the Department of Biotechnology, Government of India, and the Gates Foundation signed a Memorandum of Understanding (MoU), where both parties agreed to collaborate on scientific and technological research to alleviate some of the world's most critical global health and development issues, for the benefit of the people of India and other developing countries.

To provide India-specific solutions for the country, which can then be adapted for use in other developing countries, this partnership seeks to identify opportunities to initiate and support scientific and technical research in the nation. The partnership specifically focuses on strengthening India's scientific translation capacity, promoting research, developing scientific and technical solutions for infectious diseases, investigating ways to lower maternal and child mortality and morbidity, and developing scientific and technical advancements in data science, artificial intelligence, agriculture, food, and nutrition, among other areas.

Grand Challenges initiatives follow these core principles:

1. Strategic and well-articulated grand challenges serve both to focus research efforts and capture the imagination and engage the world's best researchers.
2. Projects are selected based on national and societal needs and transparent calls for proposals seeking the best ideas.
3. Funders, investigators, and other stakeholders actively collaborate to accelerate progress and integrate advances to ensure these advanced technologies reach to developing countries' masses
4. Projects are selected not only for scientific excellence, but also for their likelihood to achieve the desired impact, and they are milestone-driven and actively managed to thatend.
5. Projects and investigators will have to follow global access commitments to ensure the fruits of their research are available to those most in need.

Here we announce a call on 'Enhanced TB Diagnostics and Adjunct Technologies for Sample Collection and Processing" a program directed at addressing challenges that we face in TB disease detection, elimination, and eradication in India. The call is aimed at development/promoting low-cost, accurate, rapid molecular diagnostics and tests that can be performed in community settings to help meet the first milestone of the End TB Strategy. Additionally, it will also support technologies that streamline sample processing (collection, lysis and preparation) in low-resource environments.

BACKGROUND

Globally, tuberculosis (TB) has regained global prominence as the leading infectious disease killer, causing significant mortality rates due to antimicrobial resistance (AMR) and HIV-related mortality. India alone accounting for 26% of global TB cases in 2023, is pivotal to fight against TB globally.

Effective diagnostics are the cornerstone of TB disease management. Early and accurate detection is critical for timely treatment initiation, reducing transmission, and improving patient outcomes. However, diagnosis is often considered as the weakest link in the TB cascade/ continuum of care, where diagnostic delays are very common.

To meet the ambitious WHO global targets for 2023-2027 expecting 90% of the patients to access quality assured diagnosis and treatment, India needs to make an upfront investment in improved diagnostics and TB research

The WHO has recommended rapid diagnostics (WRDs) for TB diagnosis, but only 25% of facilities and 38% of patients have access to them, highlighting the significant disparity in TB diagnosis and drug resistance.

However, despite advancements in molecular and lateral flow assay (LFA) diagnostics, major gaps remain in accessibility, affordability, and implementation, particularly in resource-limited settings. There are currently no instrument-free, true point-of-care (PoC) molecular diagnostic tools that are effective for detection of TB. While simple tuberculosis lipoarabinomannan (TB LAM) tests represent a unique solution for *Mycobacterium tuberculosis* (MTB) detection using noninvasive sampling with urine, diagnostic accuracy is modest for people living with HIV (PLHIV) and otherwise poor. Expanding access to highly accurate testing, particularly in closer proximity to patients, is critical to ending the TB epidemic.

Addressing these barriers requires innovative, decentralized, PoC, rapid molecular diagnostics and tests that can be performed in community settings. Additionally supporting technologies that streamline sample processing (collection, lysis and preparation) in low-resource environments is also essential.

Due to its distinctive cell wall structure and resistance to traditional chemical lysis methods, MTB typically requires instrumented mechanical lysis to achieve high sensitivity in molecular diagnostic assays (https://academic.oup.com/cid/article/78/5/1313/7596605). Therefore, developing adjunct technologies for sample collection, lysis, and preparation is crucial. Pre-analytical solutions, such as simplified sample collection and stabilization, and instrument free sample lysis specifically for TB could enable more reliable and consistent results while reducing reliance on complex laboratory infrastructure. Investing in these supportive

technologies and diagnostic instruments can enhance the accessibility, scalability, and effectiveness of tuberculosis diagnosis, particularly for underserved populations.

THE CHALLENGE

Recent improvements in diagnostic testing have enabled molecular and lateral flow testing to be performed closer to the patient than ever and in some cases at home with a fully consumable test format. The challenge lies in developing range of solutions upstream to testing, that enable easier, more affordable, and self-administered sample collection, sample preparation and lysis when needed. Additionally, development of innovative PoC tests with faster turnaround times that offers the opportunity for same-day treatment initiation at all levels of healthcare in high -TB environments is another significant challenge. Based on ongoing modelling work, these solutions will offer a reduction in incidence and mortality.

Given the same, the specific objectives of this challenge will be to address one or all of the following

1. **Test involving new sampling methods**

   It is important to move away from sputum and towards more accessible and easier -to collect samples for TB diagnosis. It is also important to assess the suitability of other sample types, such as saliva or blood for TB testing. Oral swab collection and handling for TB testing must be optimized and standardized.

   Swabs are anticipated to facilitate the adaptation of a COVID-19 test approach to TB once an ideal sample technique has been developed. The call solicits

   a. Closed systems for TB using tongue swab, other samples or sputum.
   b. Distributable TB molecular diagnostic kit that works well with tongue swab, other samples and sputum (focus on tongue swab)
   c. Point of Care (PoC) TB NAAT using tongue swab.

2. **Self-Sample Blood Collection Devices (Phlebotomist-free blood collection)**
   a. Solutions must enable phlebotomist-free collection of at least 1 mL of whole blood with performance comparable to phlebotomist-collected samples. Key parameters include sample quality, volume collected, failure rate, and ease of use.
   b. Solutions must ensure that the sample is stable for at least 24 hours at temperatures up to 40°C and humidity up to 70% without the need for cold chain.
   c. Ideally, the solution should be compatible with serum or plasma generation but must, at minimum, enable robust whole blood collection.

d. If design includes a sample collection or container component (e.g., a tube or cup), storage device must prevent leakage and/or aerosolization of contents during storage and transportation.
e. If design includes a buffer, it must be compatible with downstream immunoassay or nucleic acid amplification and detection without need for extraction or purification.
f. Solutions developed must be simple enough for use at home by a layperson or by a low-level healthcare worker.

3. Sample Collection for MTB

a. Solutions must enable collection of reproducibly consistent specimen biomass that does not require pipetting.
b. If design includes a sample collection or container component (e.g., a tube or cup), storage device must prevent leakage and/or aerosolization of contents during storage and transportation.
c. If design includes a buffer, it must be compatible with downstream lysis and nucleic acid amplification and detection without need for extraction or purification.
d. Samples must be stable for up to 72 hours at temperatures up to 40°C and humidity up to 70% without the need for cold chain.
e. Solutions must be safe for administration and simple enough for home use by a layperson or low-level healthcare worker.

4. Sample Lysis Devices (Instrument-free lysis) for TB lysis

a. Novel devices must demonstrate feasibility of MTB cell inactivation (by standard biosafety analysis protocols) and lysis (as compared to mechanical lysis via bead beating or sonication) without the need for a reusable instrument. (https://academic.oup.com/cid/article/78/5/1313/7596605).
b. The solution must break open the MTB cells (>50% lysis efficiency compared to mechanical lysis via bead beating or sonication) without damaging target DNA.
c. Resulting lysate must be stable for up to 72 hours at temperatures up to 40°C and humidity up to 70% without the need for cold chain.
d. Ideally, no additional instruments should be required to complete the steps. However, if any are necessary, they must be compact, easily transportable, battery-powered, and cost-effective (under $50 USD).
e. The solution must be simple and safe enough to be performed at home by a lay user or by a low-level health care worker.

5. **Sample Clean up and Analyte Concentration**
    a. Pre analytical solutions to improve analyte quality for improved assay performance including but not limited to sample clean up, analyte concentration, analyte concentration and interference removal.
    b. The solution must demonstrate equivalence with laboratory sample clean up methods and analyte concentration kits.

6. **New testing technologies**
    Alternative non-invasive diagnostic test examining volatile organic compound (VoC) in exhaled breath analysis (XBA), face mask sampling, electronic nose tests and filter bearing blow tubes, must be investigated as sensitive PoC for direct nucleic acid or antigen-based pathogen detection.

Ideally, the proposal will:

- Solicit variety of upstream testing solutions that make sample collection, preparation, and lysis simpler, less expensive, and self-administered PoC or near-to-care tests;
- Diagnostics for underserved populations, such as children and individuals with disseminated and/or paucibacillary TB;
- Product candidates that detect TB using specimens other than sputum (blood, serum, urine, stool, breath, swabs), enabling the identification of extrapulmonary or paucibacillary TB in adult and pediatric patients
- Solutions or diagnostics that may be able to overcome the infrastructure and cost-related drawbacks of current diagnostic techniques
- The assessment of new TB diagnostic approaches in the context of current clinical algorithms in TB-endemic nations are also noteworthy.
- Brief laboratory tests on a diagnostic prototype or prototypes to verify functionality and viability prior to a clinical review.
- Place a strong emphasis on systematically observing, validating, and quantifying the improved outcomes balanced with cost-effectiveness from its use.

Priority will be given to proposals that have:

- The diagnostics that will assess the suitability of other sample types (other than sputum), such as saliva or blood for TB testing
- have already completed a pilot before this Grand Challenge. The call will encourage projects which already have their PoC, prototypes is ready for further validation or clinical testing based on their Technology Readiness Level (TRL) 2 - 6.
- have lessons/tools that can be transferred to other use cases/situations/ contexts with minimal change.

- Identified and clearly describe one or more novel, solutions that will be studied, including a description of how these methods and test(s) are novel and appropriate for a clinical evaluation.
- a planned initial study(ies) to assess new solutions/diagnostic Techniques/tests, and how feedback on the technology's performance will be given to diagnostic developers.
- the potential for innovative solution /diagnostics to enhance the care cascade for TB and provide a plan for utilizing the solution/diagnostic in an endemic situation.
- the existing TB diagnostic capabilities and technologies, such as smear, culture, and molecular approaches, that will serve as a baseline for comparison at the clinical sites

We will not consider funding for proposals that:

- Do not explicitly target TB solutions or diagnostics.
- Do not have timely access to necessary data, decision-maker time, commitment, and interest (a recommendation/request letter will be advantageous).
- Do not include a validation plan.
- Do not provide any thought toward scale-up and sustainability.
- Applications that propose establishment of new clinical infrastructure.
- Applications that propose to establish a public biorepository (i.e., a repository to maintain and distribute samples).

Evaluation Criteria:

- Feasibility and innovation in meeting collection, processing, and/or lysis requirements.
- Cost-effectiveness and scalability.
- Analytical performance and validation data as per published guidelines.
- Alignment with decentralized or point-of-care needs as per published guidelines.
- Product shelf life and ambient temperature, and transportation stability in target LMIC countries as suggested by Global Fund Priority Country List.

Funding Level

We will consider proposals for awards of up to INR 80,0000/-, for each project, provided to the organization, with a term of up to 18 months. The project needs to be led by investigators in India. Global partners may be included, but proposals must

demonstrate that 100% of the funding is going to an organization within the Country. Application budgets should be commensurate with the scope of work proposed. GCI encourages collaborations based on the belief that synergies between experts across diverse disciplines are important for the challenges that we seek to address. Should you want to apply as a collaboration, please ensure the following questions are sufficiently answered in your proposal. Are the applicants, including all sub-contractors, willing to collaborate and share experimental methods, data, and resources among the other independently funded members of the program consortium?

RULES AND GUIDELINES

a) Application Process

Please be advised that the entire application process is online through the BIRAC portal.

i. Proposals in the correct format will be submitted on the online portal by interested applicants

ii. The application will be seeking the following information in the project proposal:

- Introductory information: A short description of the specific problem your proposal addresses.
- Proposal information: A clear hypothesis with a brief description of the work (to achieve proof of concept for your idea, including limited field testing/validation).
- Path to impact: Next steps if you are successful in this work. How would you scale it up and/or apply it to other problems?
- Ethical use of technology and data: Describe the potential bias that may arise from historic disadvantage or devaluation of certain social groups or individuals in the target population, human context, and societal values affecting your use case (including assumptions about gender, race, and geography) and how you think you may be able to mitigate this bias.

iii. After an initial triage, review panels established under the Grand Challenges India partnership will evaluate the proposals submitted.

iv. Post proposal review and legal eligibility check, the applicants will be invited to present their proposals in detail to TAG.

v. Pending financial and technical due diligence, the final awardees will be selected by the TAG.

vi. Once Due Diligence is successfully completed, award certificates will be awarded to the selected GCI applicants.

vii. GCI- BIRAC will then enter in to separate funding agreements with successful cost recipient(s) to govern the project terms and conditions and fund disbursement modalities.

b). Application instructions*

1. Please visit the BIRAC website at www.birac.nic.in and follow the link to the registration and submission portal.
2. If you are applying to a BIRAC/GCI scheme for the first time, please note that you will have to register on the portal. The verification and activation of your new account may take up to 24 hours before you can apply for the scheme. Please take this into account while applying.
3. The online form needs to be filled completely with all appropriate documents uploaded.
4. Please also ensure that the Proposal Summary document is uploaded based on the format provided. Incomplete proposals will be rejected in the triage round.

* We will not be able to provide individual feedback to applicants who are not selected for further rounds.

c) Schedule

Call opens- 3rdth March 2025

Call closes – 18th April 2025

Shortlisting/finalizing the proposals – 18th May 2025

Award announcement- 18th June 2025

Initiation of Grant Making -18th July 2025

Final report submission -18th February 2027

d) Eligibility criteria

This RFP is India-led; the program is open to nonprofit organizations (society, trust and foundation), for-profit companies (start-ups), government agencies, individuals, and academic and research institutions.

Project cost will be sanctioned to researchers and innovators who are Indian individuals or Indian entities*, we also encourage partnerships with researchers of national/international expertise, subject to the call guidelines.

Note: Please read the following carefully to understand the category you will be applying under and the documentation that may be requested should your proposal be selected for further financial due diligence. This call is open to:

i) In case of the individual, applicant should be an Indian academic scientist, researchers and Ph.D students (citizen of India) who must be willing to incubate at a

recognized institute/ incubator and submit a letter of intent for the same.

ii) **Companies**

- Companies incorporated under the Indian Companies Act, 2013 having a minimum of 51% Indian ownership.

iii) **Limited Liability Partnership**

- Limited Liability Partnership (LLP) incorporated under the Limited Liability Partnership Act, 2008 having a minimum half of the persons who subscribed their names to the LLP document as its Partners should be Indian citizens.

iv) **Indian institution/ universities/ public research organization**

- Academic institutions established in India and having NAAC/ UGC/ AICTE or any equivalent recognition certificate or any other Public/Government supported organization

v) **Society/ Trust/ NGO/ Foundation/ Association**

- Society/ Trust/ NGO/ Foundation/ Association established in India under the relevant Indian Law having at least half of the stakeholders (partners/ trustees/ members/ associates etc.) as Indians.

Experts of the relevant discipline as mentors should be a part of the proposal such as healthcare professionals, data analytics experts, m-health specialists, management experts, logistics experts, M&E experts among others.

***Note:** The evaluati on of eligibility shall be based on the status of documents as on the closing date of the call.*

Through national and international collaboration, we expect that sharing experimental methods, data, and resources will ultimately improve the ability to compare and validate local research findings and to develop interventions and products that can have impact at a greater scale.

e) Evaluation methodology

Grand Challenges India (GCI) along with stakeholders' team will screen the proposals for eligibility. If the application is found to be incomplete or not complying with the provisions described in the RFP, the application will be considered ineligible. The GCI and stakeholders' team will make assessments and recommend shortlisted applications for further evaluation to the Technical Advisory Group (TAG), comprising of national and international subject matter experts. Proposals that meet the eligibility criteria will be submitted to TAG for further review and evaluation.

The TAG will invite the grantees for interaction and/or written clarifications when it is beneficial to ensure that any outstanding questions are resolved before concluding the full review.

As applicable, the technical and financial due diligence processes (site visits) of the shortlisted applications will be carried out by GCI. A final decision on applications to be funded will be made by the Competent authority based on the recommendations of the Technical Advisory Committee (TAG).

f) Allowable Costs

Usually, the allowable cost will include:

- Indirect Cost/Non-Recurring Budget: **Equipment and Accessories** (Upto 30% of proposed cost) list of equipment's, if required and justification in relevance to the project activities (Quotations supporting proposed equipment and accessories)
- Direct Costs/Recurring Budget (Realistic figures): up to 60% of proposed cost inclusive of **Manpower**, **Travel, Outsourcing, Research Contingency** (In case any activity to be outsourced)
- Up to 10 % of recurring cost for **Project/Institute Overhead.**

***Note:** Justifications to be provided for roles of each aspect of manpower involved, consumables proposed, travel (Local and International in case if any), research contingency and trainings.

Budget heads without cap will be considered on case-to-case basis and based on call specifics by Technical Advisory Group (TAG).

g) Warranty

The GCI Applicants shall warranty that the statements and particulars contained in the full proposal and supporting documents are correct. They have to further warrant that they are under no contractual restrictions or legal disqualifications or any other obligations which would prohibitthemfrom undertaking the present Project, entering into any Agreement in this regard etc.

j)Project Intellectual Property

The initiative is guided by the Memorandum of Understanding on the collaboration between the Department of Biotechnology, Govt. of India and the Gates Foundation signed on July 18, 2012. As a part of this MOU fair and transparent processes will be established to ensure that projects and investigators funded under initiatives make global access commitments to ensure the fruits of their research are available to those most in need. This will include, but not be limited to, the ability to license

any technology developed under this agreement to manufacturers in India subject to these global access commitments and to the relevant provisions of the Indian laws including specific requirements on licensing under the Patents Act 1970.

To this end, project IP means intellectual property generated during the conduct of the Project by the GCI applicants, but excluding the intellectual property generated before initiation of this Project and any IP generated outside the scope of this Project even during the term of this Project. The ownership and control of the intellectual property shall remain with the GCI cost recipient(s), or other collaborating organizations or institutions as agreed with the cost recipient, subject to any applicable local policies and the collaborative process described above, including arrangements between the cost recipient and other individuals or institutions.

GCI cost recipient(s) agree to conduct and manage the Project and the resulting products, services, processes, technologies, materials, software, data or other innovations (collectively, "Funded Developments") and any IP that arises in the manner that ensures "Global Access." Global Access requires that

1) The knowledge and information gained from the Project be promptly and broadly disseminated

2) The Funded Development is made available and accessible at an affordable price to people most in need within developing country.

Establishing suitable Global Access agreements among the GCI cost recipients will be a condition of receiving funding.

GCI cost recipients commit to meeting the following criteria at a minimum:

1) For successful tools/technologies that have been supported through field testing, the projects under this agreement must apply for regulatory approval in India as well as for certification/WHO prequalification to ensure that successful innovations/tools/technologies supported through the GCI are available at affordable costs to those most in need. BIRAC and the Foundation will support successful projects through introductions to third party manufacturers, introductions to WHOs DTAG as well as introductions to relevant technical experts for the next phases. This could include contracts for local manufacturing etc.

2) For projects where novel tools/technologies methods have shown promising results BIRAC, and the Foundation will work with the projects and investigators on a clear development pathway to ensure that the investments made through the GCI are supported for public health benefits.

During the term of this Agreement and for 5 years after, GCI recipient will submit upon request annual intellectual property reports related to the Funded Developments, Background Technology, and any related agreements using the PMU-BIRAC's templates or forms, which we may modify from time to time.

h) Confidentiality

During the tenure of the Project, GCI-BIRAC will undertake to maintain strict confidentiality and refrain from disclosure thereof, of all or any part of the information and data exchanged/generated from the Project for any purpose other than purposes in accordance this RFP. Please note that all proposals, documents, communications and associated materials submitted (collectively, "Submission Materials") will become the property of BIRAC and will be shared with other funding partners or potential funding partners.

Number of applications received and the countries from which they originated will be published. The proposals will be subject to confidential external review by independent subject matter experts and potential co-funders, in addition to in- house analysis.

i) Research Ethics and Regulatory Approvals

GCI Cost recipient(s) shall be responsible to obtain all the necessary requisite approvals, clearance certificates, permissions and licenses from the Government/local authorities for conducting its activities/ operations in connection with the Project.

j) The fund disbursement and project implementation shall be governed by the specific funding agreement that will be duly executed.

k) Dispute resolution and Arbitration:

In the event of any dispute or difference between the Parties hereto upon or in relation to or in connection with this RFP, such dispute or difference, shall be resolved amicably and in good faith by mutual consultation.

If such resolution is not possible, then the unresolved dispute or difference whatsoever arising between the Parties out of or relation to the construction, meaning, scope, operation or effect of this RFP or the validity the breach thereof or in respect of any defined legal relationship associated therewith or derived therefrom dispute shall be submitted for arbitration to International Center for Alternate Dispute Resolution (ICADR), an autonomous organization working under the aegis of the Ministry of Law & Justice, Department of Legal Affairs, Government of India. The Authority to appoint the arbitrator(s) shall be the ICADR. The Arbitration under this Clause and provision of administrative services by ICADR shall be in accordance with the ICADR Arbitration Rules, 1996. The award made in pursuance thereof shall be binding on the Parties. The venue of arbitration shall be New Delhi and the arbitration proceedings shall be conducted in English Language. The provision of this Clause shall not become inoperative notwithstanding the Contract expiring or ceasing to exist or being terminated or foreclosed.

l) **Program Monitoring Mechanism**:

Project Monitoring Committee (PMC)

The projects shall also be monitored and mentored regularly by a Project Monitoring Committee (PMC) constituted by GCI for each project.

Reporting of Progress:

On Successful completion of each Milestone, the applicant will be required to submit a detailed Milestone Completion Report (MCR) as per the prescribed format

The MCR will be assessed by the PMC/ TAG for its completion. On recommendation of the PMC/TAG, the next Milestone budget will be released.

Contact us:

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For enquiries:

Please email: GCI- BIRAC at Dr Richa Vashishtha, Senior Manager (Programmes) at pmubmgf.birac@nic.in or Dr Chandra Madhavi, Chief Manager pmubmgf.birac5@nic.in or at +91-1129878000 with the subject line: Grand Challenges India-TB call.