INDIA HEALTH FUND
A TATA TRUSTS INITIATIVE

PROGRESS REPORT
June 2020

ACCELERATING NEW IDEAS TO TACKLE INFECTIOUS DISEASES

CONFLUENCE
FOR HEALTH ACTION AND TRANSFORMATION FOUNDATION
SEEDED BY TATA TRUSTS

Message from the CEO

India Health Fund (IHF) was conceived to accelerate our progress towards the elimination of infectious diseases by addressing the gaps in funding for product development, in mentorship and in market access that are often faced by small and mid-size entities with powerful ideas that have the potential to significantly improve outcomes in the diagnosis, treatment and prevention of infectious diseases. IHF also works to develop effective business models, implementation partnerships and financing mechanisms which help to significantly scale up these solutions - enabling impact at scale.

Since its incorporation in 2017, IHF has established partnerships with stakeholders and organizations from across the ecosystem which collectively works towards the elimination of infectious diseases. These partnerships have enabled us to identify areas for focus and helped develop a portfolio of high-potential innovations that could significantly improve the cascade of care in tuberculosis (TB), malaria and now COVID-19. Given the need to ensure the rapid deployment of all solutions to ensure affordable access at scale, IHF is also developing implementation partnerships to facilitate cost-effective deployments. Some of these solutions have already entered the public and private healthcare systems, with support from IHF.

The spread of COVID-19 has reminded us of the crippling impact of infectious diseases and the need to ensure that we continue to invest in solutions that address them. Innovation and the role of research and development have never been more important than they are today. We believe that IHF has a unique opportunity to work with our partner network and play a leading role in identifying and supporting the development and deployment of solutions which that can have a significant impact in controlling COVID-19 and other infectious diseases. Our focus at IHF, therefore, is shifting from solutions for specific diseases to the development of technology and diagnostics based platform solutions which can be adapted for more than one disease.

With collaborations and partnerships being the key to the fight against COVID-19 and other infectious diseases, the team at IHF welcomes the opportunity to collaborate with you to co-create solutions, support their development and to enable their scale-up.

We look forward to your continued support as we evolve in our mission to eliminate infectious diseases.

Madhav Joshi
Chief Executive Officer
India Health Fund

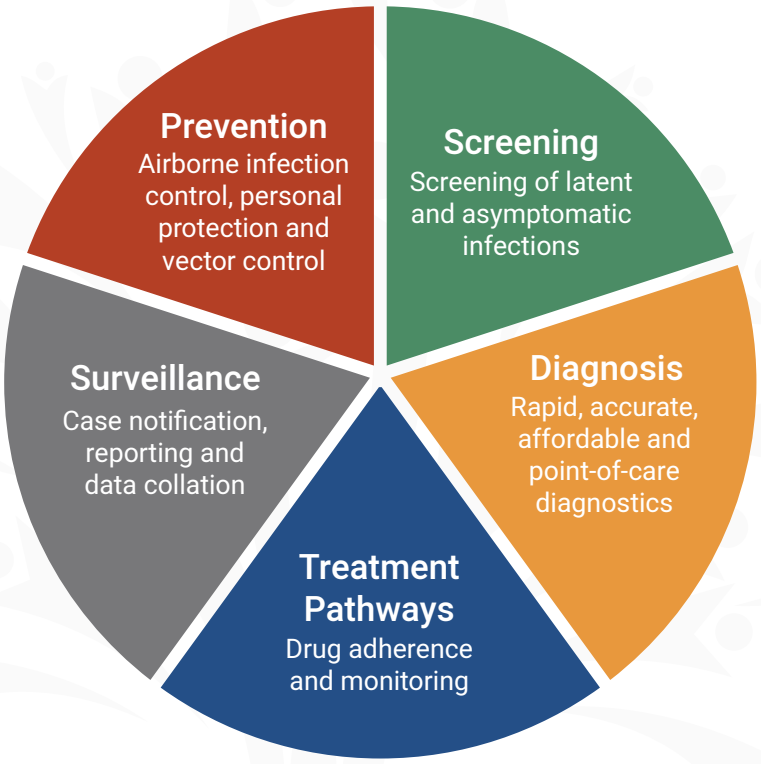
In 2017, the Tata Trusts, in a strategic partnership with The Global Fund to Fight AIDS, Tuberculosis and Malaria, announced the launch of India Health Fund. Their aim was to create an organization which could collaborate with the private and public sectors to develop and scale up innovative solutions, business models and financing mechanisms to improve outcomes in diagnosis, treatment, prevention and eventual elimination of infectious diseases.

IHF's primary objective is to identify, support, nurture and ensure sustainable scale-up of innovations in the domain of infectious diseases, where market failure has restricted investments in research and development. IHF aims to aggregate funding from public and private sources to increase investments for the development of effective solutions which address gaps and to maximize the impact of these solutions through partnerships which enable their large-scale implementation.

While IHF's initial focus was on TB and malaria, the organization has been quick to address the challenge of COVID-19 and is working to both adapt solutions already available for other diseases to ensure speed to market, and also support the development of breakthrough solutions for diagnosis, treatment, and prevention of COVID-19. We aim to ensure these are globally relevant and accessible around the world.

COVID-19 has served as a reminder that multi-sectoral collaborations are critical for a coherent and effective response to infectious diseases. For this, IHF has developed a multi-pronged approach for identifying and supporting innovations, and towards building sustainable partnerships to deliver these solutions at scale.

Our Focus Areas



Our Approach

Identify Priority Areas

- Map infectious disease landscapes
- Identify gaps and prioritize problem areas

Find and Fund Solutions

- Identify promising innovations
- Create a pipeline of viable, path-breaking innovations
- Support, nurture, and fund innovations

Manage Portfolio

- Provide supervision and mentorship
- Develop partnerships to provide support at various stages in the innovation lifecycle
- Facilitate clinical validation and implementation
- Support a pathway for business sustainability
- Translate products into implementable projects

Facilitate Market Entry & Health Systems Integration

- Provide guidance on regulatory approvals, go-to-market strategy, policy and advocacy
- Coordinate with the government and the private sector to support market entry
- Develop partnerships for deployment
- Conduct impact assessments

Partners and Supporters

Collaboration with partners helps India Health Fund to enable solutions navigate their journey from lab to last mile. Our partner organizations are diverse, and represent leading government, non-government, multilateral, public and private organizations.

An Evolving Approach to Address Emerging Challenges

Between 2017-2019 IHF worked with partners to identify and develop new solutions which could have a significant impact in improving outcomes in the diagnosis, treatment and prevention of TB and malaria. Working with these partners ensured that these challenges were addressed in a well-rounded manner after taking diverse perspectives into account. IHF is presently supporting six solutions which are at various stages of development and deployment.

While the world continues to address the challenges posed by neglected diseases like TB and malaria, the unprecedented spread of COVID-19 has emerged as the most significant public health challenge in recent history. With rising rates of infection and mortality, there is an urgent need to leverage science and technology to develop solutions which can help to tackle this disease.

In order to fast-track the development and deployment of solutions for COVID-19, India Health Fund has supported the adaptation of a diagnostic test developed for TB based on the Truelab platform (developed by Molbio Diagnostics, supported by India Health Fund) to develop a diagnostic test for COVID-19 which uses the same diagnostic platform, and an AI-based screening tool for COVID-19 based on a similar tool developed for TB (developed by Qure.ai, supported by India Health Fund). These demonstrate the opportunity to leverage diagnostics and technology-led solutions for more than one disease, and India Health Fund is actively working on developing several more such platform solutions. Our network of partners is playing a key role in supporting the identification, development, and rapid deployment of these solutions.

A snapshot of IHF's progress in the last year

Our Portfolio

Focus Area	Entity	Disease	Project
Screening	qure.ai	TB & COVID-19	A point-of-care, smartphone-based chest X-ray(CXR) TB triage for analog CXRs and a web-based solution for digital CXRs.
Diagnosis	Hemex Health	Malaria*	A $1, one-minute test for magneto-optical detection of malaria, affordable, easy-to-use, accurate, rapid diagnostic.
	Centre for Health Research and Innovation / Truenat™	TB & COVID-19	Affordable early diagnosis test of TB and Rifampicin through PCR amplification and probe-based detection.
	VALETUDE PRIMUS HEALTHCARE	TB*	Portable and easy-to-use TB test device through immuno-magnetic cell capture technology with last mile connectivity.
	CiSGEN	TB*	Affordable point of care animal TB diagnostic kit for TB control.
Adherence and Surveillance	TMEAD / SenseDose Technologies Pvt Ltd	TB	Tamper-proof, lightweight, tech enabled TB Monitoring Encouragement and Adherence Drive

* Developing new solutions for COVID-19

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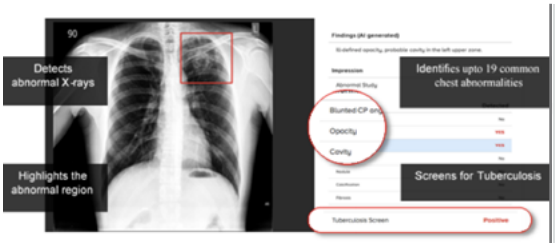

Qure.ai Technologies Private Limited

An artificial intelligence-based tool to improve the screening of TB

About

Qure.ai uses Artificial Intelligence (AI) to make disease screening more accessible and affordable.

The Problem

The prevalence of non-digital X-ray imaging and the lack of skilled technicians in smaller towns and semi-urban areas contributes to delayed diagnosis and initiation of treatment, leading to increased transmission of infections.

The Solution

Qure.ai has developed qXR, a highly accurate smartphone-based chest X-ray screening device that uses AI to detect TB and other lung abnormalities. The device was trained using 2.5 million chest X-rays and takes only three seconds to screen an analog X-ray for potential abnormalities, facilitating rapid diagnosis and confirmatory tests for TB.

Qure.ai has already adapted their IHF-funded chest X-ray solution to enable the progression monitoring of COVID-19. This is enabling rapid triage of patients with lung damage consistent with COVID-19 and ensures early access to advanced care.

IHF Support

IHF is supporting the development of the qXR tool for analog X-ray-based screening of adult and paediatric tuberculosis.

The qXR solution developed by Qure.ai has now been deployed across ten hospitals and three high-volume care centres in Mumbai for progression monitoring of diagnosed COVID-19 patients. This technology will help significantly reduce the workload of skilled technicians who can consequently cater to a larger volume of patients due to the assistance of this technology. Currently, this technology is in use in about 16 countries for progression monitoring of COVID-19.

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HemexDx Private Limited

A rapid and accurate diagnostic platform for malaria screening and diagnosis.

About

HemexDx is a company which specialises in the development of low cost, rapid diagnostics devices.

The Problem

Most malaria patients lack access to a rapid and accurate diagnosis test for malaria which can identify asymptomatic cases and cases with a low-parasite load. This often delays initiation of treatment. The problem is especially severe in remote areas where malaria prevalence is the highest.

The Solution

The Hemex Gazelle platform provides a one-minute accurate rapid diagnostic test for malaria. The device uses magneto-optical detection of hemozoin, a metabolite produced by malaria parasites within red blood cells and is immune to genetic mutations which reduce diagnostic accuracy in other tests. The platform can differentially diagnose both Plasmodium falciparum (Pf) and Plasmodium vivax (Pv) in a single blood sample.

IHF Support

IHF is currently supporting Hemex Health for validation of the Gazelle platform through a clinical partnership with the National Institute of Malaria Research and the National Institute for Research in Tribal Health.

Hemex Health is also developing a six-minute, microchip electrophoresis-based diagnostic assay for COVID-19 which uses the same device.

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Molbio Diagnostics Private Limited (through the Centre for Health Research and Innovations)

A molecular diagnostic tool to bring real time diagnosis of TB at the point-of-care.

About

Molbio Diagnostics has developed a range of point-of-care molecular diagnostics for faster diagnosis of infectious diseases.

The Problem

Many patients with TB lack access to an accurate and rapid molecular diagnostic test at the point-of-care, leading to incorrect diagnosis in a large number of cases.

The Solution

The Truelab Real Time Quantitative micro PCR system developed by Molbio Diagnostics is a compact, battery-operated system which provides test results at the point-of-care within one hour. This enables same day reporting and initiation of evidence-based treatment of TB. The device provides testing at a significantly lower cost than existing solutions.

TrueLab has received WHO pre-qualification for tuberculosis testing and has been widely procured for use in several states in India.

IHF Support

IHF is working towards deploying Truenat at community health centres in Uttar Pradesh, through the Centre for Health Research and Innovation (CHRI) and establishing a process for last-mile connectivity and implementation.

This assessment will also focus on ensuring cost effectiveness and developing protocols for implementation at the sub-district level to support the national roll-out of the device.

Molbio has developed an assay for COVID-19 which has received approval from the CDSCO for COVID-19 testing. It can provide COVID-19 diagnosis within one hour at a lower price than other available RT-PCR tests. IHF is actively involved in supporting the wider rollout of the Truenat Beta COV test.

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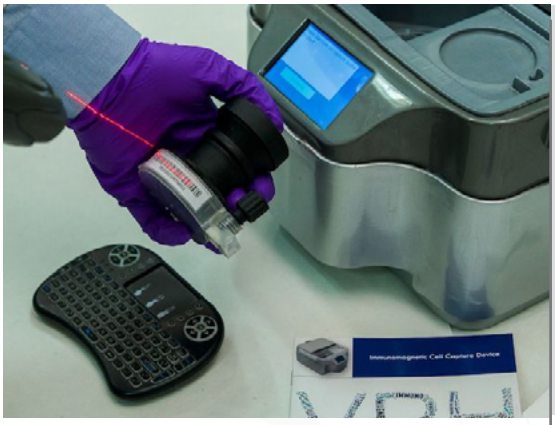

Valetude Primus Healthcare Private Limited

A safe sample collection and patented immuno-magnetic cell capture technology to enable faster diagnosis of TB at the community level.

About

Valetude Primus Healthcare (VPH) specialises in developing new diagnostic technologies for infectious diseases.

The Problem

Testing for TB can be time consuming and results may vary according to the conditions of the laboratory and expertise of the technician. This contributes to misdiagnosis and a resulting delay in treatment initiation.

The Solution

VPH has developed the technology to enable rapid, accurate and affordable TB diagnosis without the need for skilled technicians at primary health centres. This technology can significantly reduce the risk of exposure to infection for healthcare workers during sample collection, and is relevant for several infectious diseases, including COVID-19.

The technology used to diagnose TB in this solution is being modified to diagnose COVID-19. This repurposing would result in a much safer and effective mechanism for collection of samples from patients being tested for COVID-19.

IHF Support

IHF is currently working with VPH towards clinical validation in partnership with various institutions.

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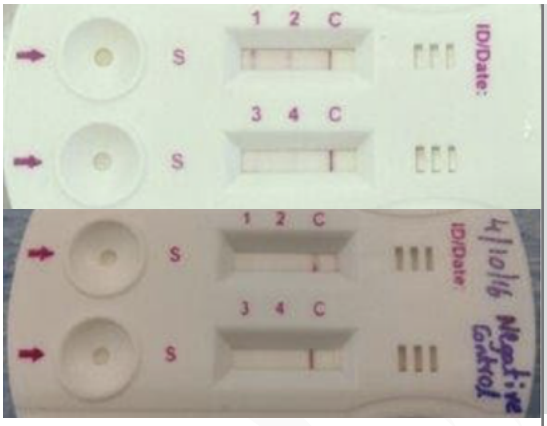

CisGen Biotech Discoveries Private Limited

A unique combination of antigens and use of technology to efficiently diagnose bovine tuberculosis.

About

CisGen Biotech Discoveries has developed a test kit with a unique combination of native and recombinant antigens to detect bovine tuberculosis (bTB) and differentiate between TB and environmental mycobacterium infections.

The Problem

The transmission of TB from animals to humans is estimated to be very high. TB control in India cannot be achieved without integrating animal TB control within the national TB program.

The Solution

Differentiating between TB and environmental mycobacterium infections helps reduce false positive test results in a variety of animal species (such as cattle, sheep, goats, wild animals).

The antigen-based assay of this kit is similar in principle to the existing first-line diagnostic assays for COVID-19 and can also be suitably modified for designing a COVID-19 diagnostic for human use.

IHF Support

CisGen is working with IHF for prototyping and validation of the point-of-care testing kit for identification of TB among infected animals.

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SenseDose Technologies Private Limited

An Internet of Things-based technology to improve patient adherence to medication.

About

SenseDose Technologies has developed the Tuberculosis Monitoring Encouragement Adherence Drive (TMEAD) to improve patient adherence to their prescribed TB treatment regimen.

The Problem

Side-effects of medication and stigma associated with TB can often lead to a lack of treatment adherence and completion of prescribed courses of treatment by patients, leading to the emergence of drug-resistant forms of TB.

The Solution

The TMEAD device has prescription medicine pre-loaded with fixed doses and uses the Internet of Things (IoT) to monitor adherence by providing alarms and digital reminders to patients, caregivers, and health workers. It initiates alerts to health workers in case patients are non-responsive. The device allows easier patient follow-up and reduces manual intervention by nearly 40 percent. The device and platform are disease agnostic and allow for long-term adherence monitoring of other chronic diseases.

IHF Support

IHF is supporting TMEAD to work with the Indian Institute of Public Health, Gandhinagar for the clinical validation and cost-effectiveness analysis of this device.

Modifying and adapting the device for COVID-19 will include a connected wearable attachment which has a temperature sensor that sends out alerts and which will allow patients and healthcare workers to remotely monitor patients.

The Indian start-up ecosystem has a vibrant pool of innovators and entrepreneurs capable of addressing critical health challenges with novel ideas and solutions which leverage the latest developments in science, technology and product design. Many of these solutions can provide significantly superior outcomes in the diagnosis, treatment and prevention of infectious diseases when compared with available solutions, but lack financial support for development and validation, mentorship to develop as successful operations and market access to scale up globally. India Health Fund will continue to work with partners to help bridge these gaps and support the development and scale up of a larger number of solutions in our mission to accelerate the elimination of infectious diseases by leveraging the power of new ideas and innovation.

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