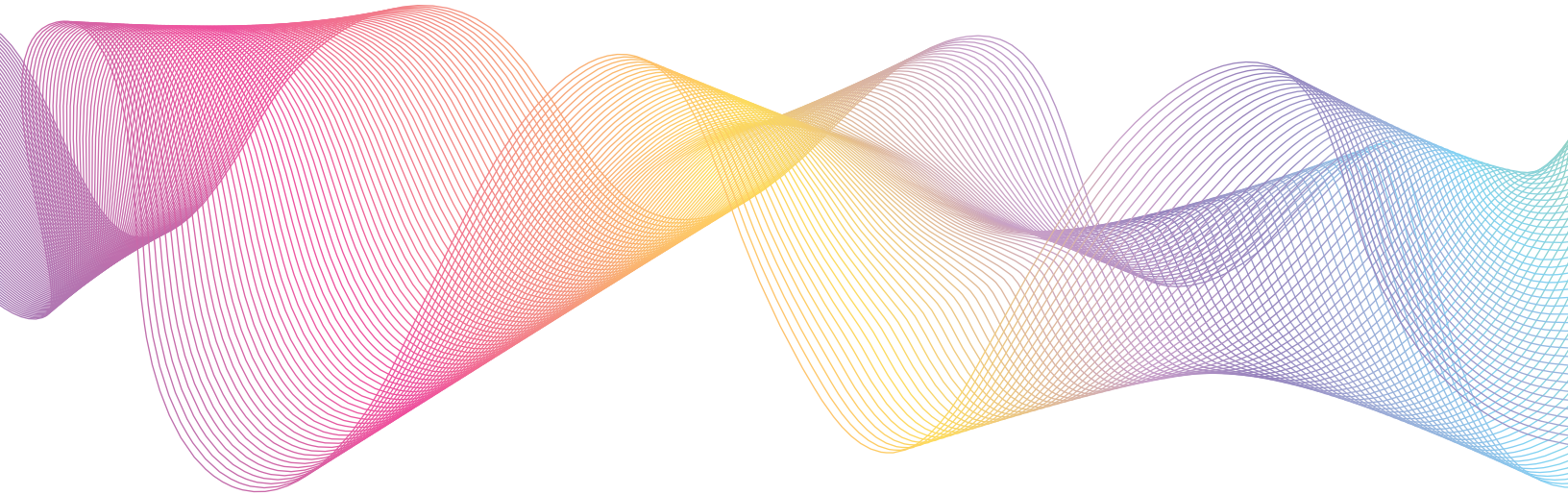
INDIA HEALTH FUND

A TATA TRUSTS INITIATIVE



Annual Report 2023-2024

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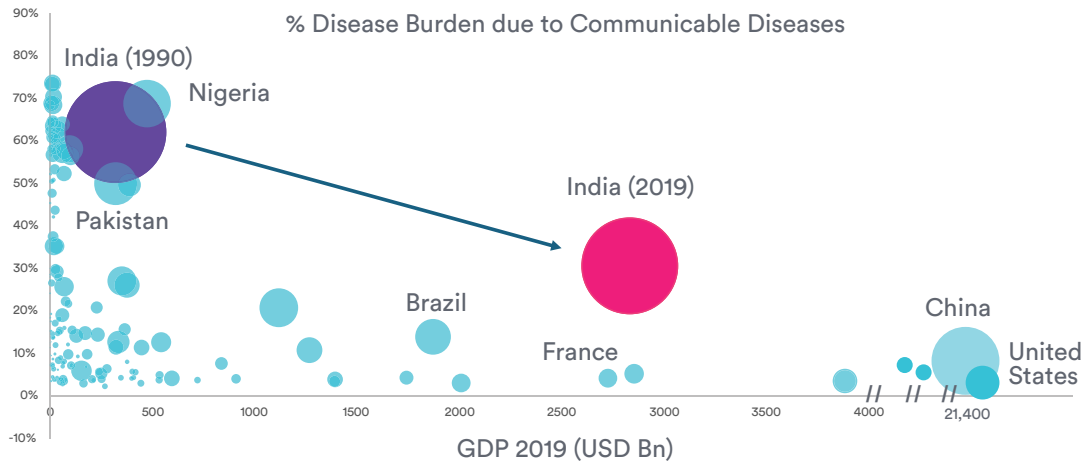
The India Health Fund Story

Over the last five decades, there have been significant strides in India's economic development with steady and stable acceleration. But when it comes to public health, the country has lagged in making a successful epidemiological transition (Figure 1). The country has continued to bear a disproportionately high burden of both communicable and non-communicable diseases, with the toll topping the global charts when it comes to diseases like tuberculosis (TB), numbers staying high for infectious diseases like malaria, and continued high risk of communicable disease outbreaks.



Source: World Bank Data, Global Burden of Disease Study 2019 (GBD 2019) Results, PwC Analysis
Area of Bubbles represents total burden of disease of the country

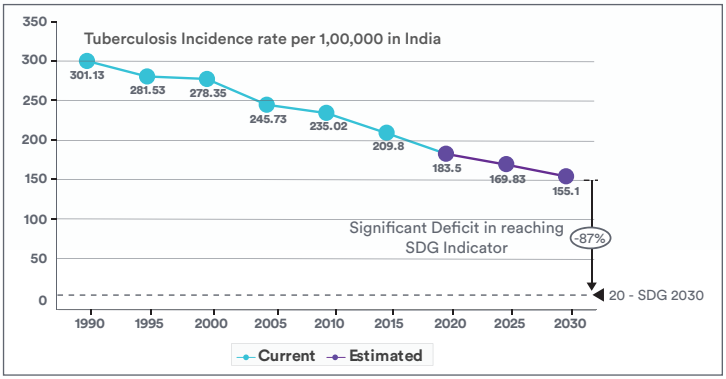
Figure 1: India stuck in Epidemiological Transition

Infectious Diseases demand attention

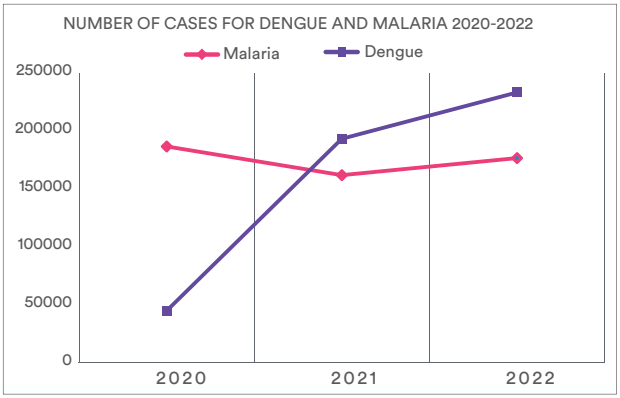
More than a fourth of the global TB burden is attributed to India, 95% of the country's population is at risk of malaria, dengue, and other vector-borne diseases; antimicrobial resistance rates are highest in the world. Climate change-related weather events like floods, heatwaves and droughts, that are increasingly becoming common, are compounding the burden of existing infectious diseases, potentially aggravating nearly 60% of them. Remote rural and tribal communities, urban low-income settlers, and vulnerable populations – women, children, elderly, those with existing morbidities – are bearing a disproportionate brunt of these diseases. Today, more than ever, infectious diseases demand attention, and a continued focus on them is critical.

Disruptive innovations to the rescue

There exist national and global goals to eliminate infectious diseases. But we still have a long way to go to meet the targets of TB elimination by 2025 or malaria elimination by 2027 (Figure 2), with the impact of climate change making these targets even more challenging. (Read more: op-ed by Dr. Lucica Ditiu, Executive Director of Stop TB Partnership, and IHF's CEO, Madhav Joshi in Times of India, March 2024).



Source: Global Burden of Disease (2019); Suwantika AA, Kautsar AP, Zakiyah N, Abdulah R, Boersma C, Postma MJ. Cost-Effectiveness Analysis of Spending on Research and Development to Address the Needs for Innovative Therapeutic Products in Indonesia. Ther Clin Risk Manag. 2020 Oct 14;16:969-977. doi: 10.2147/TCRM.S260377. PMID: 33116546; PMCID: PMC7569028.



Dengue and malaria cases increased between 2020-2022, These trends hinder India's progress towards its 2030 targets of zero indigenous mortality from dengue.

Figure 2: Way to go to achieve elimination targets

Disruptive science- and technology-based innovations, that are more accurate, efficient, accessible, equitable and affordable, are needed to bridge the gap, especially at the primary care level and for the underserved communities, where the gap is the widest and deepest. For instance, as per the 2021 Lancet Commission on diagnostics, nearly half the world does not have adequate access to the most basic diagnostics, and at the primary care level in low- and middle-income countries, 4 in 5 lack access. There is a lack of lab infrastructure,

shortage of skilled technicians to carry out the tests and interpret the results, limited availability of tools for screening, diagnosis, surveillance, etc. It is there, at the lowest level of care, that promising innovations should be brought closer to the patients, strengthening health systems and bettering public health outcomes (Read more: Power of Digital Health tools in addressing infectious diseases, an article by Kalyani Sharma, in Express Healthcare on IHF's work).

The Funding Gap

But, despite the tremendous potential in, and case for game-changing innovations for infectious diseases, the development, validation, and evidence generation of these "bankable and scalable" solutions has lacked patient capital. Financing the development of these urgently needed tools has remained inadequate and fragmented. For instance, globally, there is a $1 billion funding gap for new tools for TB; the investment gap for vector-borne diseases and antimicrobial resistance (AMR) is growing due to the impact of climate change and growing drug resistance; and there is only 10% spending on diagnostics. India spends a mere 0.64% of its total GDP on R&D, a large part dedicated to drug development and basic research.

Bridging the Gap through Catalytic Funding

Conceived by the Tata Trusts in 2017 in strategic partnership with The Global Fund to fight AIDS, Tuberculosis and Malaria, India Health Fund (IHF) was launched as a catalytic fund which provides patient capital to de-risk the development of science and technology-based innovations which address infectious diseases, develops partnerships in India and other LMICs to scale these solutions and collaborates to develop financing mechanisms for further development and scale-up. The disease areas IHF works on are all climate-sensitive (Read more: "A health bomb that's ticking", Tata Trusts Horizons, April 2024).

IHF has established itself as the only dedicated source of funding for innovation in infectious diseases in India and is one of the few funding organizations in the world with a singular focus on infectious diseases, with a technical and commercial evaluation process for funding assessed as best in class (Read more: “Donors to the fore”, Tata Trusts Horizons, December 2023). IHF is leading the development of several collaborative initiatives for digitizing the continuum of care for TB, climate and health adaptation, diagnostics for AMR, and AI in healthcare to further this goal.

IHF works in five areas:

The impact we aim to achieve

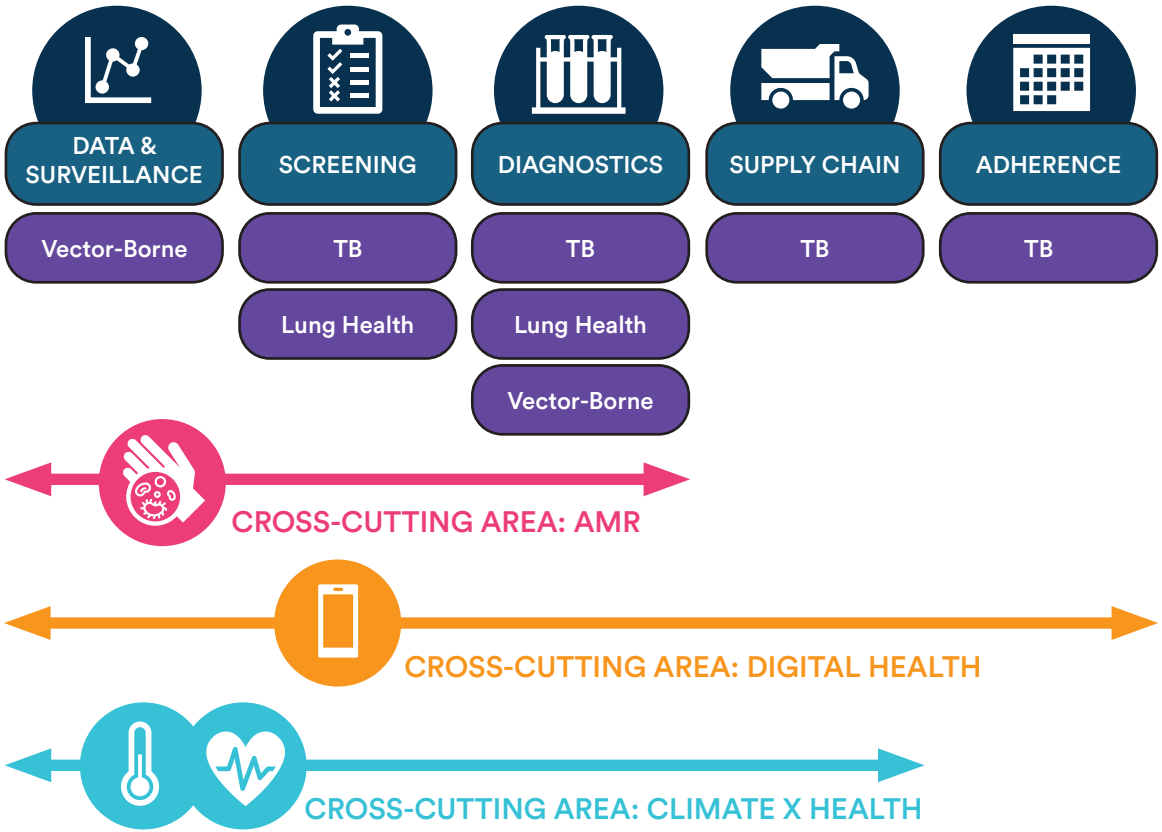
For India Health Fund, investing in innovations is a means to an end, where the end can take any of the following forms:

Early diagnosis and improved access to primary care.	Reducing infection transmission.	Bridging the skill gap in healthcare workers.	Ensuring scalability and financial sustainability.

To get to these outcomes, India Health Fund works at two levels:

- **Catalyzing the development of individual innovations for infectious diseases**, that improve access, affordability and equity in the delivery of primary care to the underserved and vulnerable communities.
- and **nurturing collaborations and collaboratives** that enable scale-up of these tools, increase the financing available for development, evidence generation, knowledge sharing, and sustainability of these tools as well as of the companies developing them.

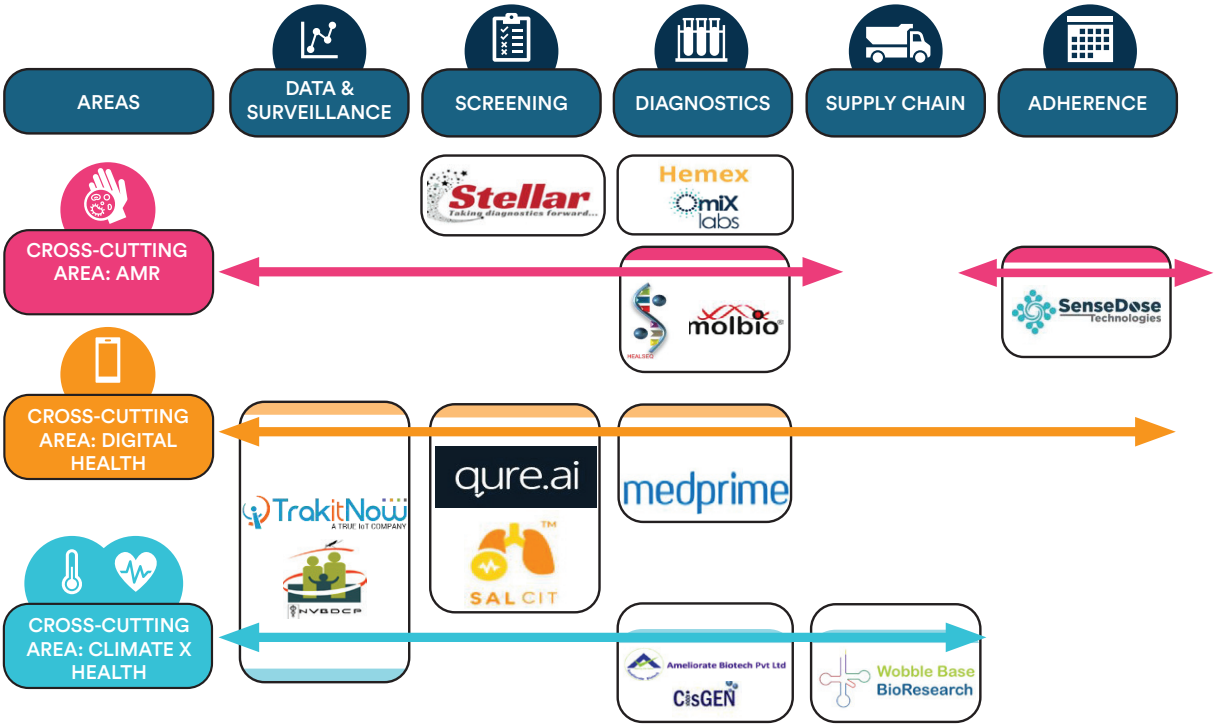
Areas of our work in infectious diseases



Catalyzing the development of individual innovations for infectious diseases

India Health Fund has been supporting the development of innovations with the potential to have an impact at scale -- whether it is by providing grant funding, supporting with product development, clinical or community validation, or assisting with technical guidance, evidence generation, investment, and use cases. Today, IHF's funding, support, and mentoring have led 14 projects further in their innovation journey, with 5 of these being deployed in public health settings, and several others on their way to delivering impact at the last mile – ready to scale in private, public, and global markets. These IHF-supported tools are more accessible, more affordable, and have better resource efficiency. The result? They are yielding better diagnostic rates and times, improving treatment linkage, reducing the toll of infectious diseases for patients, and strengthening health systems, right to the lowest level of care. This is success for us.

A glimpse of India Health Fund-supported projects and their impact so far



Ongoing Projects

1 Stellar Diagnostics: The world's first point-of-care rapid test for accurate, low-cost triage of potential TB patients

The Problem

- Absence of a point-of-care, effective, fast, and affordable TB triage test to narrow down presumptive TB patients. 7-10 presumptive TB suspects have to be tested to identify one TB patient.
- Detection using molecular methods is highly accurate but less accessible, expensive and requires intensive training of technicians.

The Solution

- Accurate, affordable, rapid TB triage test that is fit for point of care -- requires no lab infrastructure and minimal training of healthcare workers.

What will it deliver ?

Once developed, the product will aim to have a target **sensitivity >95%** and **specificity >80%**

POC TB triage test **aligns** with **NTEP** and **WHO's** priorities

The test will **reduce turnaround time from test to results to 20 minutes** enabling triaging

Aimed at a **target test cost of <INR 200 (US$2.4)**, the test will reduce out-of-expenditure of the patient, help cut the number of avoidable expensive molecular diagnostic tests for disease confirmation, and lead to improved resource planning by the government.

Where do we stand today?

Laboratory-based test performance improvements of the triage test are currently in progress, while field trial preparation is on. Application for manufacturing license has been submitted to CDSCO. There is an urgent demand from the WHO and CTD to fast-track product development of the test. Multi-centric clinical validation is planned at 4 sites: The National Institute for Research in Tuberculosis (NIRT), National Institute of Tuberculosis and Respiratory Diseases (NITRD), The ICMR-Regional Medical Research Centre, and Christian Medical College, Vellore. IHF is actively engaged with Stellar to ensure completion of the project and for commercial manufacturing and distribution support.

2 Swaasa: Non-invasive AI-based mobile application that can detect active TB cases in minutes from cough sounds

The Problem

- Unavailability of non-invasive, near-patient, affordable, rapid, and accurate screening tools for TB.
- Current methods are manual and subjective involving visual inspection, and patient questionnaires.

The Solution

- Smartphone-based app that analyzes cough sound signatures to screen for pulmonary TB using a proprietary AI algorithm.
- Can be used anywhere, without additional training of healthcare workers.

What will it deliver ?

Once validated, the proprietary application aims to give:

<60-second turnaround time from test to result vs. current Active Case Finding tools that are manual and time-consuming

90% target **accuracy** for TB detection

INR 5 (US$0.6) TB screening cost per assessment

Where do we stand today?

Multi-centric algorithm validation on a sample of 6000 patients is currently underway through AIIMS Delhi.

This project is co-funded by India Health Fund and ACT Grants.

3 Omix: A low-cost LAMP-based trio test to detect and distinguish respiratory ailments COVID-19, influenza and TB

The Problem

Diseases like TB, influenza and COVID-19 manifest similar disease symptoms making accurate diagnosis at primary and secondary health care centers difficult, often needing patients to take multiple tests, which can be costly, time-consuming, and increases the risk of the patient's condition deteriorating.

The Solution

- OmiX iAMP is a platform trio test that uses Loop-mediated Isothermal Amplification (LAMP) technology to detect COVID-19, TB, and Influenza.
- The point-of-care, automated platform is designed for use in low-resource settings, with simplified sample extraction and visual readout to facilitate diagnosis, which reduces the need for a skilled workforce to interpret test results while making the test error-free.
- With higher specificity, better throughput, and ease of use, the platform overcomes the limitations of current molecular diagnostics and could be made available to patients in areas with low testing load.

What will it deliver ?

The end-to-end automated platform aims to have:

~90% sensitivity and **~95% specificity**

Test price of **INR 1000 – 1500 (US$12-18)** for 3 diseases vs current test prices that range from ~INR 3000 – 15000 (US$36-180)

Better throughput of **100-120 test/8 hours** compared to current throughput 10-12 tests/8 hours, thereby bettering cost efficiency and reducing the time taken for linkage to treatment.

Where do we stand today?

Product development and in-lab validation has been completed with 90% sensitivity and 95% specificity. The next steps include multi-centric clinical validation, regulatory approval, manufacturing license, and market scale-up.

4 TBSend card: a novel sputum storage and transportation device for TB testing

The Problem

Due to the limited number of accredited TB testing laboratories, sputum samples are transported to centralized facilities for molecular testing. Sample transportation takes time, leading to an increased risk of contamination of samples and loss of viable cultures. Around 10% of all sputum samples get contaminated during transit.

It also means high costs and logistical complexities such as the need for cold chain to maintain sample quality. Such challenges delay testing and affect correct test reporting.

The Solution

- TBSend card from Wobble Base allows sputum samples to be easily and safely stored and transported by storing sputum DNA (for >6 years) on a solid cellulose matrix coated with proprietary reagents.
- DNA can be released from the card at a centralized laboratory using a brief protocol and tested on any DNA testing platform for TB diagnosis.
- For biosafety, the card has a pick-up handle, is placed in a container with an airtight lid to prevent spillage and contamination, and sputum is mixed with a denaturant to inactivate TB bacteria before sample storage.
- TBSend card is an open system that is compatible with all forms of TB NAAT tests and a platform system that can be adapted to other body fluids such as blood, serum, and plasma.

What will it deliver ?

The card aims to achieve the following:

- Pricing of **INR 5 per test (US$ 0.06)** (INR 25 (US$0.3) including the extraction) compared to current products that are priced at >INR 165 (US$2).
- Reduction in loss of samples due to transportation issues by almost **25%**
- Reduction in loss of quality samples due to lack of cold chain facilities by **70%**
- Enhanced adaptability of smaller laboratories to cater to MTB DNA-based testing due to improved mean DNA concentrations by **25%**
- Reduced infections among TB workers due to decreased biohazard risk by nearly **50%**
- **Reduced burden** on healthcare resources by eliminating the need for cold chain

Where do we stand today?

An independent biosafety study of the TB Send card is to be conducted by ICMR – NIRT Chennai before its multi-centric clinical validation.

5 Medprime: Artificial Intelligence-based detection, parasitic load calculation, and species differentiation for faster and more accurate diagnosis of malaria

The Problem

- Conventional microscopy-based detection, the primary tool for malaria detection, misses about 25% cases in India; the problem further exacerbated in hard-to-reach remote areas.
- Dependence of detection on skills and training of microscopy technicians, makes interpretation subjective, leading to underdiagnosis and poor surveillance.

The Solution

- Medprime Technologies' solution digitizes blood slide images making them readable even remotely.
- The algorithm is faster, more cost-effective and more accurate, is locally trained by machine learning, and automatically detects, identifies and differentiates between malarial parasites (P. falciparum and P. vivax).
- Particularly useful in identifying infections with low-parasite loads, which are commonly missed by conventional microscopy.
- The algorithm will prove important for training and research.

What will it deliver ?

- **30% less time taken** for slide viewing, image processing, and result reporting.
- **Platform algorithm:** Microscope agnostic, can be used in WBC differentiation, histopathology, and cytopathology for cancer, and sickle cell disease and can run samples like blood, urine, stool, and pus.
- **Eliminate the need for trained manpower** and allows for remote operation.
- Aims to achieve **99% sensitivity** and **specificity** with AI, eliminating human error
- Support training and research by live-streaming slides anywhere in the world
- Open design that reduces maintenance and costs compared to a closed design

Where do we stand today?

Medprime Technologies has effectively deployed microscopes in five public health centres across Odisha, Madhya Pradesh, Tamil Nadu, and Uttarakhand, where 150,000 images from ~480 slides are being scanned. The current accuracy of the algorithm stands at around 76%. The next steps will include engagements with the National Institute of Malaria Research (NIMR) for external validation and Municipal Corporation of Greater Mumbai (MCGM) for use as a training tool for microscopy.

6 Ameliorate: A fever panel to detect dengue, chikungunya, and malaria

The Problem

- Malaria, dengue, and chikungunya have similar symptoms, leading to misdiagnosis or delayed diagnosis. Co-infections are often missed.
- Rapid Diagnostic Tests (RDTs) on the market detect single diseases, are unavailable in remote locations, have a high cost.

The Solution

- Multi-disease RDT fever panel for dengue, chikungunya and malaria.
- Equipment free, easy-to-use.
- Instantaneous result, no need for cold chain facility, biosafety lab.

What will it deliver ?

Once validated, the RDT will aim to have:

- Cost of **INR 200 (US$2.4)**, which is **1/20th** the price of existing fever panels that cost INR 3000-4000 (US$36- US$48)
- **3x disease detection:** Malaria (both Pv and Pf), Dengue, Chikungunya, and co-infection detection.
- **3x shelf life** as it can be stored at 2-4° C for 18 months vs. usual tests that have a shelf life of 6 to 12 months.
- High **sensitivity of 100%**, High **specificity of 95%**
- **Faster treatment decision**

Where do we stand today?

Validation with 200 samples was done at Patna, Belgaum and Srikakulam. The project is now awaiting Central Drugs Standard Control Organisation (CDSCO) manufacturing license. Next steps include developing partnerships for fabrication, product optimization, and field deployment.

7 Moskeet: an AI-based real-time surveillance tool to detect and predict mosquito-borne disease outbreaks

The Problem

- Vector surveillance depends on time-consuming manual processes for larvae collection, analysis and reporting due to the shortage of entomologists.
- Widely used vector-control methods like fogging are partially effective and not species-specific. Growing insecticide resistance among mosquitoes.
- Changing weather patterns leading to vector-borne disease outbreaks in endemic and new regions.

The Solution

- AI-based algorithm to identify and measure concentrations of different mosquito species based on wing beat frequencies.
- Automated AI/ML-based vector surveillance in real time for Malaria, Dengue, Chikungunya, Japanese Encephalitis and Zika.
- Data on climate and epidemiology can be combined with vector surveillance data to predict disease outbreaks and climate change hotspots, making this a Climate and Health innovation.

What will it deliver ?

20x Speed of gathering and interpreting surveillance data

3x Improved surveillance

85% reduction in surveillance cost compared to manual methods

Where do we stand today?

- As part of the project, 10,000 machine-learning data sets have been collected for each of the 10 mosquito species. Lab tests and semi-field validation have been completed for all the 10 species with a 75% species identification accuracy.
- TrakItNow is working with Brihanmumbai Municipal Corporation (BMC) and ICMR-Regional Medical Research Centre (RMRC), Bhubaneswar to pilot the device in field conditions, starting September 2024.
- Moskeet being a Climate and Health innovation, the data collection and analysis will also account for climate parameters along with entomological parameters.

8 Healseq: A first-of-its-kind RT-PCR test for early detection of DR-TB, assess end of treatment, monitor TB treatment response, and detect extrapulmonary TB

The Problem

- As per protocol, the response to 1st line TB treatment is measured at 8 weeks post-initiation. Poor responders then undergo DR-TB testing and treatment adjustment. Delayed identification of poor responders increases drug resistance, disease transmission, and patient side effects. There is a critical need to rapidly identify poor responders, halt ineffective therapies, curb drug-resistant TB spread, and improve outcomes.
- Treatment endpoint is often defined by national/global programme guidelines. However, a one-size-fits-all approach might not necessarily "cure" every patient. There is a need to assess, in a personalized manner, whether a person is cured at the end of treatment, or the treatment needs to continue/changed to 2nd line.
- TB diagnosis relies largely on sputum samples, which becomes a bottleneck for detecting extrapulmonary TB and pulmonary TB in non-sputum producers. Sputum handling also presents serious biosafety issues.

The Solution

- HealSeq's innovation is a biomarker-based blood RT-PCR test, which detects RNA signatures from TB patients as early as 2 weeks after treatment initiation. The abundance of these RNAs can help physicians classify patients as good treatment responders, intermediate, or poor responders, soon after treatment initiation. Intermediate or poor responders can immediately undergo treatment modification or further confirmatory testing for DR-TB.

- The test will also have applications as an “End-of-treatment test”, helping determine whether the treatment has worked, and a patient has been cured.
- As the technique does not rely on sputum samples, the test is well-suited for diagnosis of extrapulmonary TB and pulmonary TB in non-sputum producers.

What will it deliver ?

Improved treatment outcomes by identifying DR-TB much earlier and treatment being corrected faster.

First-ever end-of-treatment test. Achieves therapy individualization for patients who require longer or shorter therapy to cure

A **first-of-its-kind reliable test** for EPTB

INR <1000 (< US$ 12) projected cost per test, which is 1/6th the cost of multiple tests needed during TB treatment. The test can be done using existing RT-PCR infrastructure in the country.

Where do we stand today?

Healseq has completed product development, and is evaluating the test in five tertiary hospitals in Karnataka. Backed by IHF, Healseq is in talks with partners for assay refinement, third-party validation, and commercialization. Healseq is also exploring test’s global applicability for therapy individualization, treatment monitoring and novel use cases like paediatric TB, subclinical TB, bacteriologically-negative pulmonary TB and latent-TB populations on high risk of converting to active TB. Healseq is also developing a mobile App to comprehensively interpret test results, suggest possible reasons for poor treatment response, and generate actionable insights for clinicians.

Completed Projects

9 Truenat – a fast PCR-based TB detection method to find the missing millions

The Problem

The absence of affordable point-of-care testing facilities and skilled technicians leads to continued use of microscopy, undiagnosed TB cases, and the spread of infection and mortality.

The Solution

- Compact, battery-operated point-of-care RT-PCR system.
- Operable by minimally trained health workers.
- Test results are available in 90 minutes – enabling same-day reporting and treatment initiation.

Where does it stand today?

50% share of total molecular testing for TB in India; **1/3rd share of drug-resistant cases** detected in India and **15% share of presumptive TB patient** examinations done by Truenat.

>7000 machines in use by the National TB Elimination Programme. The Global Fund and the Stop TB Partnership are funding the global rollout.

20% cost reduction achieved.

10 TMEAD (Tuberculosis Monitoring Encouragement Adherence Drive): A digital pill-box that helps TB patients adhere to their treatment

The Problem

- The long duration and side effects of TB medication often lead to a lack of treatment adherence by patients, leading to the emergence of drug-resistant TB and disease recurrence by 6-fold.
- Currently ensuring treatment adherence depends on healthcare workers following up manually with patients which comes with limitations of reach and self-reporting by patients.

The Solution

- SenseDose Technologies' TMEAD is a physical reusable device that helps TB patients successfully complete their treatment using digital adherence technology.
- Device is pre-filled with prescribed medicines pre-sorted by dose, uses Internet of Things & cellular network technology to remind patients when medication is due, dispenses medicines, monitors their uptake and rings a physical alarm and sends digital reminders when patients miss their medication. TMEAD also notifies health workers in real time about patients' adherence to treatment, easing their workload, enabling remote patient monitoring and improving case tracking.

Where does it stand today?

>800 patients used TMEAD in Maharashtra and Gujarat as part of the IHF-supported project.

The validation achieved **99% treatment adherence** with TMEAD compared to standard therapy of care (90% adherence).

The intervention was deemed **cost-effective** based on health technology assessment by Dept. of Health Research, Ministry of Health and Family Welfare, Government of India.

Based on these positive outcomes, TMEAD is currently **being integrated with the Nikshay platform**, and recommended by Central TB Department to the states.

11 qXr: An AI-based, automated chest X-ray screening tool to detect TB (and other lung disorders) within minutes

The Problem

- Screening an X-ray to look for changes in the appearance of lungs that are suggestive of TB is a workforce-heavy and time-consuming process. All TB screening is done manually.
- Limited availability of trained radiologists for confirmatory X-ray screening.
- Long lead time for diagnosis among patients identified at risk during screening – increasing transmission risk and disease progression.

The Solution

- Qure.ai's CE-certified and WHO-recommended AI-based mobile phone application to screen chest X-rays for TB.
- qXR uses a novel AI algorithm to analyze chest X-ray of a patient, with minimal training required for a technician.
- Classifies X-rays, identifies lung abnormalities and highlights them on the X-ray, enabling the detection of TB within minutes.
- Trained and tested on over 4.2 million chest X-rays using deep learning.

Where does it stand today?

As part of the IHF project, the **development of qXR and qTrack for reading chest X-rays** (analog and digital) and screening for TB was completed.

120000+ patients were screened for TB using qXR across 28 sites.

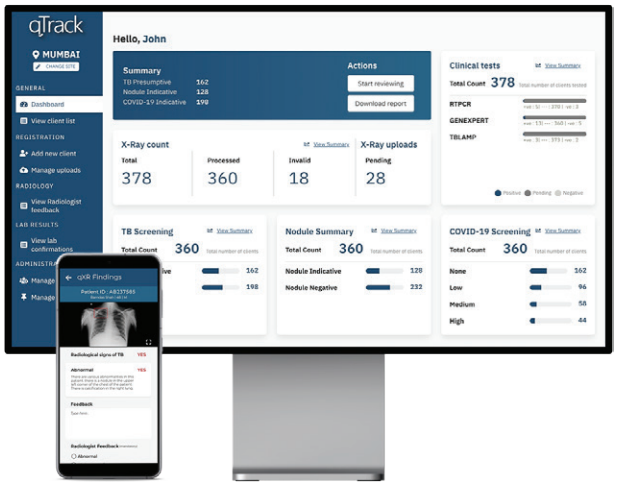
The pilot in three states showed:

106% increase in **TB Notifications**

Detection of 11% asymptomatic cases

Yielded **a 2 min turnaround time** from test to result

Read more: “Unlocking the potential of AI in revolutionizing healthcare in India, especially for the underserved (ET Healthworld, March 2024).”



12 Gazelle: A 1-minute $2 point-of-care RDT for differential diagnosis of malaria

The Problem

- Absence of an accurate, rapid diagnostic test for malaria leading to delayed diagnosis, especially in remote areas.
- 2-4% of malaria cases are missed due to genetic mutations, leading to false negatives and potentially fatal consequences for patients.
- Existing tests are either very expensive or need highly skilled microscopists.

The Solution

- Gazelle from Hemex Health is a one-minute, highly sensitive and accurate, point-of-care, rapid diagnostic test for malaria that works on a simpler principle of detecting Hemozoin, a metabolic by-product formed due to malaria infections.
- The hand-held device can detect both Plasmodium falciparum (Pf) and Plasmodium vivax (Pv) using a single blood sample at the patients' doorstep.
- Enables automated data acquisition and transmission of case-patient details to the malaria surveillance system resulting in real-time reporting.

Where does it stand today?

Current **sensitivity: 89%; specificity: 91%; accuracy 91%**

Platform test supports multiplexing by testing for other diseases such as sickle cell disease, beta thalassemia, that often occur in the same area as malaria.

Test price: **US$2 per test**

Turnaround time is **1 minute for diagnosis and differentiation** between Pv and Pf

Hemex Health has **completed the validation study** in association with the third-party validator – the National Institute of Malaria Research in Gujarat and Chattisgarh.

While Gazelle for malaria detection is under development, it is already being used in resource-limited settings for rapid detection of **Sickle Cell Disease across 27 countries worldwide** including in India.

13 CisGEN: Cutting down cattle to human transmission of TB

The Problem

- Up to 10% of human TB cases are attributed to cattle-to-human transmission.
- Low diagnosis rate of bovine TB due to lack of an efficient test. The current test is time and labour-intensive and takes 4 days and 2 farm visits by a veterinary doctor, increasing the risk of disease transmission.

The Solution

- CisGEN's accurate, rapid and affordable bovine TB test kit uses a unique combination of antigens to differentiate types of myco-bacterium.
- Truly a "One Health product" that looks at the interconnectedness between humans, animals, and the environment.
- Kit deployable in farms with mini-mally trained manpower and does not need any bio-containment facility.

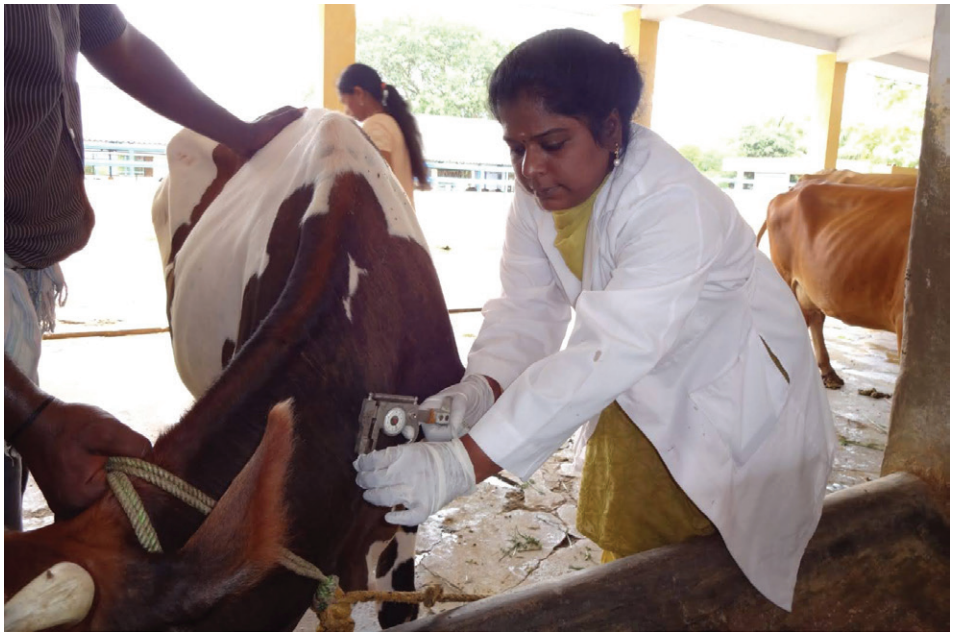
Where does it stand today?

<10 min testing time

95% sensitivity and **100% specificity** based on in-lab validation in India, UK, Ethiopia

Platform technology that can detect other diseases in cattle like Brucellosis, Johne's disease and Bovine Infectious Rhinotracheitis, and can be used in other domestic and wild animals. Kit has already been adapted for another common zoonotic disease Brucellosis.

INR 50 (US$ 0.6) projected cost per animal



14 Digitizing national malaria statistics

The Problem

- Effective monitoring and surveillance of vector-borne diseases is critical for disease control.
- Current primary care-level surveillance and reporting is based on time-consuming and error-prone manual and paper-based methods that are slow, and lack real-time reporting, consistency across states, data back-up and storage possibility, and data analytics for identifying disease trends.
- Need for a robust real-time and complete malaria surveillance system.

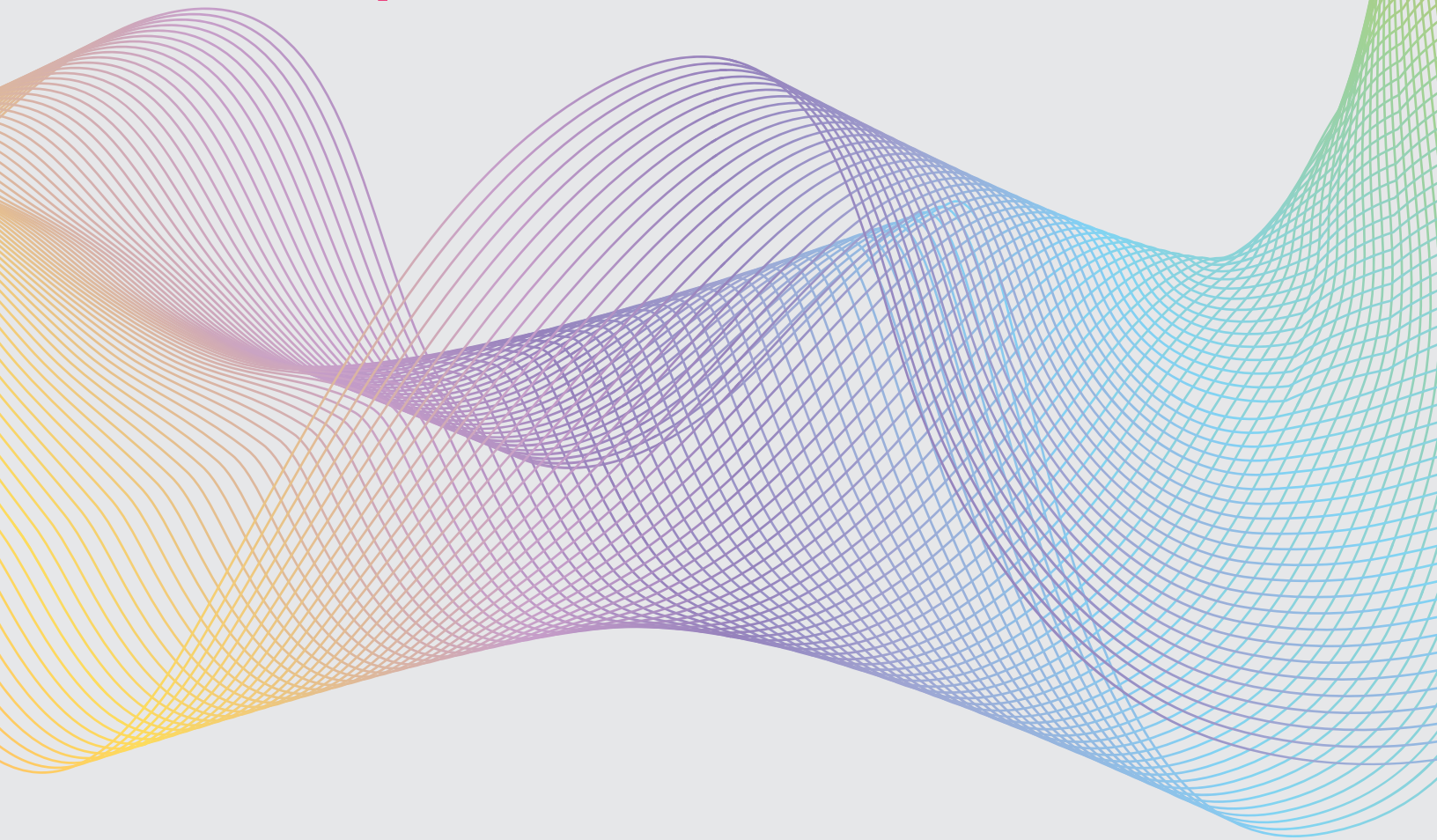
The Solution

- IHF collaborated with The Ministry of Health and Family Welfare's National Vector Borne Disease Control Program (NVBDCP), Government of India, to strengthen malaria surveillance by supporting the development of a digital dashboard with 10 years of retrospective data.
- Dashboard has applications for retrospective data analysis, evidence generation and knowledge building.

Where does it stand today?

Today, the dashboard is being used to track key metrics at country, state and block/taluka levels such as total cases recorded, total positive cases, no. of rapid diagnostic tests being performed, no. of blood slides examined, case distribution by age, no. of severe cases, deaths, etc.

Nurturing Collaborations and Collaboratives



Each of the 14 projects that IHF has supported (listed above) is a testament to the transformation that individual innovations can bring to health systems. Whether it is innovations in existing areas such as PoC screening and diagnostic tools for TB, vector-borne diseases or AI-enabled imaging solutions, surveillance, or forecasting tools; or it is emerging focus areas in antimicrobial resistance and climate and health, with an emphasis on vulnerable and high-risk populations.

However, to reap the impact at scale of these seeds that we have sown, we need force multipliers. This has been a clear lesson for us from our seven years of working as a catalyst. These force multipliers are our valued partners. Collaborations and collaboratives are a crucial part of what will help us get farther and reach global and national goals faster.

Collaborations

Collaborators for individual IHF-backed innovations have supported our innovators throughout their journey. From users like BMC and NTEP who helped in problem identification; to partners like ICMR who supported our projects with validation and evidence generation; to organizations like JHPIEGO, BMC, FIND, who are making market entry, market adoption and market access possible for our projects; and finally, co-funders like ACT Grants who shared the risks in supporting development and validation of Swaasa by Salcit Technologies, or DBT/BIRAC with whom we are co-funding 75 digital health innovations (through Amrit Grand Challenge - जनCARE) to strengthen the healthcare ecosystem in India, especially in Tier-2 and Tier-3 cities.

About "Amrit Grand Challenge - जनCARE"

Launched by **DBT/BIRAC, MeitY, and NASSCOM** in collaboration with **Grand Challenges India (GCI)** and several other partners, with **IKP Knowledge Park** as its implementation partner. IHF was invited by **BIRAC** to be a co-funder in this initiative for the development and validation of promising emerging technologies.

Through this initiative, **75 digital health innovations** have been co-funded to strengthen healthcare ecosystem in India.

Priority areas within digital health:

- **Access to primary healthcare in tier-2, tier-3 cities and rural settings:** Low cost/scalable/viable innovations with relevant lifespan, Synergy with physical & Digital/ Hybrid system for primary healthcare.
- **Solutions to enhance patient compliance:** Patient tracking systems, Patient health record management, Patient enrolment system, Patient Triaging, Digital identity, Health protection & health promotion/health education
- **Health Data Collection, Predictive Analysis and digital learning in medicine:** Image-based diagnosis, clinical decision support system, Smart and connected hospitals, Disaster management, Early screening/ Tertiary Prevention/ Disability delay, Decision support system, Self-learning/training solutions, Computation/ Predictive Analysis at local & global level.
- **Data Privacy, Storage and Security Solutions:** Federated learning models, Offline-online hybrid healthcare model, self-learning management systems, healthcare financing/insurance, Data Integration solutions, Exchange of Information solutions.
- **Solutions for improved community outreach:** Interventions to facilitate to/ through Asha workers, Supply chain technologies, logistics, resource allocation tools, Digital bridge for a connected healthcare system.
- Innovations also need to be **aligned to the National Digital Health Mission (NDHM)** and will attempt to support the various verticals of managing digital health records and patient compliance standards mandated for Indian citizens.

Collaboratives

Next up, we are developing collaboratives that can ensure scale for our innovations and sustainability for our innovators. These initiatives that IHF is leading/co-leading will:

FUNDING	EVIDENCE GENERATION	ADOPTION	KNOWLEDGE SHARING
Provide seamless funding for innovations across TRLs	Generate evidence of impact, cost-effectiveness and potential to scale through pilot deployments and operational research activities	Scale up public health adoption in India and the world	Enable knowledge dissemination activities for quicker adoption and scale

Recent collaboratives from this year that are building on what IHF was doing individually are:

India's first and only public-private pooled fund by IHF and BIRAC

The development of innovations for infectious diseases still remains underfunded, with most funding coming from the government being marked for basic scientific research. Addressing this challenge of inadequate and fragmented funding, IHF and Biotechnology Industry Research Assistance Council (BIRAC), a Public Sector Enterprise under the Department of Biotechnology, Government of India,

came together to create India's first and only public-private aggregator dedicated to the development of diagnostics and digital tools to tackle infectious diseases relevant for India and other developing countries, towards bettering equity and access to healthcare. Announced in January 2024, the pool will bring forth complementary strengths of the IHF and BIRAC network and partnerships across public and private sectors. The funding and support for early-, mid- and late-stage innovations will help them scale their lab-to-market journey and reach the hands of those who need them the most. The partnership is set to support digital tools, diagnostics, and decision-support solutions for infectious diseases such as tuberculosis, vector-borne diseases, and antimicrobial resistance.

Joint Collaborative for Climate and Health: Lighthouse for Asia with AVPN, Monash University and C-CAMP

In April 2024, IHF co-launched "The Climate x Health: Lighthouse for Asia" in collaboration with AVPN, C-CAMP, and Monash University. The hub aims to unite social investors to address climate and health challenges across Asia. The initiative is designed to be a coalition for Asian thought and action leaders to come together and generate evidence, share knowledge around the critical nexus of climate change and public health, develop and scale adaptive locally relevant solutions, and mobilize much-needed capital towards better understanding and responding to the climate and health crisis.

About India Health Fund

Set up by the Tata Trusts in 2017, India Health Fund is a not-for-profit company which funds and de-risks the development of science and technology-based innovations for communicable diseases, develops partnerships in India and other developing countries to scale these solutions and collaborates to develop financing mechanisms for their development and scale. IHF has a particular focus on providing grants as patient capital to start-ups, small and medium sized companies for the development and validation of prototype-ready innovations which align with national priorities and has a particular focus on affordable solutions for primary care. This funding bridges a critical funding gap (the "valley of death") which has limited the development and adoption of these solutions and serves as a catalyst for further funding and collaborations to help them scale in India and other LMICs. IHF has established itself as the only dedicated source of funding for innovation in infectious diseases in India and is one of the few funding organizations in the world with a singular focus on infectious diseases, with a technical and commercial evaluation process for funding assessed as best in class.

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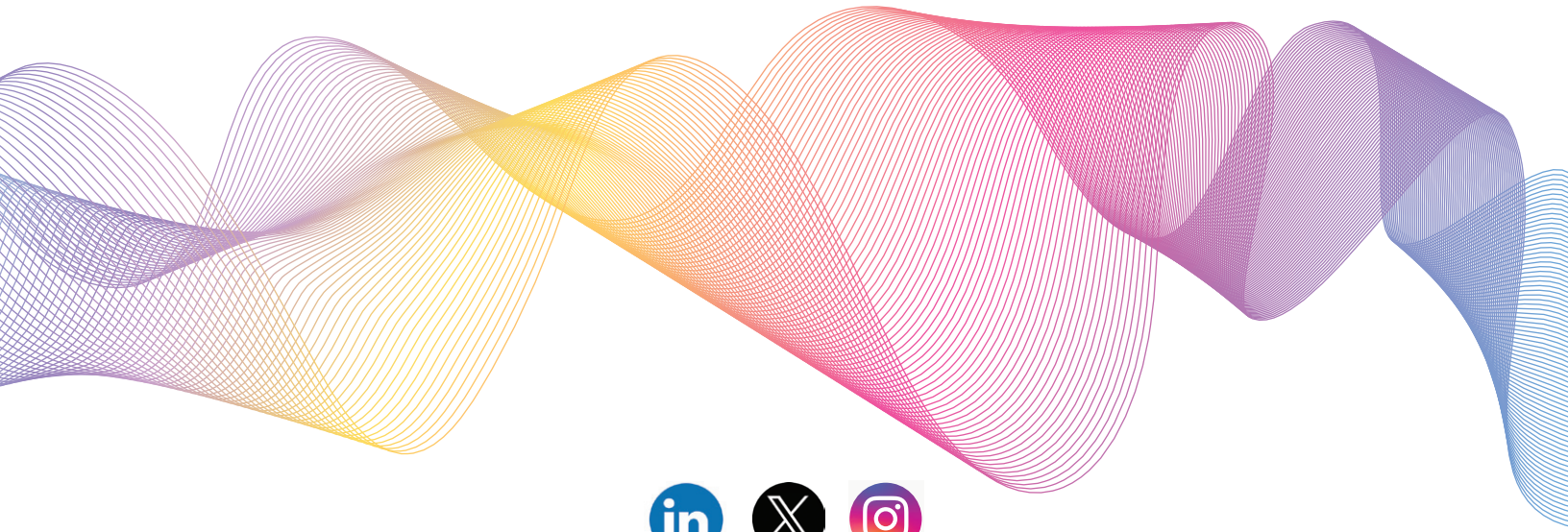

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