TESTING FOR HEALTHY AND SAFE LIVES

FIND STRATEGY 2021
FIND, the global alliance for diagnostics, seeks to ensure equitable access to reliable diagnosis around the world.

OUR MISSION

We connect countries and communities, funders, decision-makers, healthcare providers and developers to spur diagnostic innovation and make testing an integral part of sustainable, resilient health systems.

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FOREWORD

Since its emergence, COVID-19 has dominated international governmental attention and generated unprecedented mobilization of the funds and resources needed to support healthcare responses and economic interventions. Governments worldwide have been willing both to intervene and rapidly build capacity in their efforts to get the virus under control and protect their people. The pandemic has also reminded many of the interdependency of all countries in a health emergency, and the need for multinational and multisectoral cooperation.

This may not be new to those countries that continue to wrestle with the challenges such as Ebola and SARS, but it was clearly more unexpected for the highly industrialized countries of Europe and North America, whose populations have not faced comparable health challenges since the Spanish flu a century ago.

That testing surfaced as an Achilles’ heel in so many health systems around the world is not a surprise to those of us who have been advocating for diagnostics for years. We have known for some time that testing is the weakest link in the care cascade – preventing individuals from accessing the care they need, and also depriving decision-makers of the data that could enhance efficiency and effectiveness of healthcare delivery.

This new FIND strategy comes at the right time. After a year of battling COVID-19, governments must now see the value in systematically investing in testing, in prioritizing testing in national health strategies, in supporting local manufacturing, and in ensuring effective, real-time disease surveillance systems are in place. The virtuous cycle of innovation in both technology and access is key to strengthening our health systems so that they are both resilient and sustainable.

When the pandemic hit, low- and middle-income countries were already fighting not only deadly infectious diseases like tuberculosis, malaria and hepatitis, but also growing emergencies such as diabetes. Antimicrobial resistance is claiming lives at such a rate that it is on track to eclipse the losses due to COVID-19. Defeating these killers, making universal health coverage a reality, and ensuring that we have the early warning and response mechanisms in place to prevent another global pandemic, requires urgent and effective action. I believe FIND, working with partners as a global alliance for diagnostics, has the proven expertise and experience needed to transform testing so that everyone who needs a test can get one.

Health is a human right. With testing at the heart of our work, together we can rebuild a fairer, safer world.

H.E. AMINATA TOURÉ, FORMER PRIME MINISTER OF SENEGAL AND FIND GOODWILL AMBASSADOR
EXECUTIVE SUMMARY

DIAGNOSIS IS THE WEAKEST LINK IN THE CARE CASCADE

Quality, timely diagnosis is an essential enabler of health for all. Early diagnosis has been consistently linked to improved health outcomes and reduced out-of-pocket spending, and disease surveillance provides critical data to inform public health action. However, diagnosis is the weakest link in the care cascade, with basic diagnostic capacity available in just 1% of primary care clinics in low- and middle-income countries (LMICs).

No diagnostic tests exist for 60% of the “Blueprint” pathogens, which have been identified by the World Health Organization (WHO) as having the greatest outbreak potential. There is no appropriate test for 50% of the top 20 diseases responsible for the most lives lost. This lack of availability and access to quality, reliable tests threatens our ability to respond to health emergencies, and jeopardizes the achievement of universal health coverage (UHC).

Since 2003, FIND has been working to bridge product development gaps for essential diagnostics in collaboration with the international research community, the public sector, and industry. We have learned valuable lessons along the way, building on strengths across the diagnostics value chain from product development to delivery, identifying opportunities to better serve patients and their communities.

IN TIME FOR TESTING

In 2020, testing took centre stage, as the COVID-19 pandemic swept the world. Years of sustained neglect of diagnostics meant high- and low-income countries alike found themselves without the capacity to contain the spread of the virus, and fragile supply chains and nationalism sparked fierce competition for the procurement of the few tests available early on. Disruptions to essential health services had dire consequences for both infectious and non-communicable diseases (NCDs).

Against this bleak backdrop, unprecedented opportunities continue to emerge. Strong regional and country leadership led to rapid strengthening of testing and surveillance capacity. New digital technologies are improving diagnostics and testing, such as artificial intelligence algorithms that can enable computerized cough analysis to differentiate between COVID-19 and tuberculosis (TB). Connectivity paves the way for healthcare services to be accessed through mobile and digital apps, and the rise in wearables and at-home tests has the potential to transform self-monitoring and self-testing approaches.

AN END-TO-END ALLIANCE MODEL TO ACCELERATE GLOBAL EFFORTS TOWARDS UHC AND HEALTH EMERGENCY RESPONSE

FIND has been at the forefront of the global pandemic response, co-leading the Diagnostics Pillar of the Access to COVID-19 Tools (ACT) Accelerator – a ground-breaking collaboration of many of the world’s international health organizations – alongside the Global Fund and WHO.

Our new strategy seeks to harness the momentum around testing for COVID-19, exploiting emerging digital innovations, and building on our organization’s 20-year experience as a product development partnership focused on diagnosis of TB, malaria and lever fever management, hepatitis C, and neglected tropical diseases (NTDs).

Our end-to-end alliance model builds on the ACT-Accelerator framework to maximize impact, from innovation to implementation.

In support of UHC, our goal is to expand primary care testing to combat diseases that disproportionately affect vulnerable populations. Reducing the huge diagnostic gaps in TB, hepatitis, antenatal screening for both communicable diseases and NCDs, fever, pneumonia and NTDs will save lives and livelihoods, save health systems money, and contribute to global and national disease elimination targets.

To mitigate health emergencies, our goal is to strengthen diagnostic surveillance and response systems to contain outbreaks and improve pandemic preparedness, aligned with a One Health approach.

Harnessing partners’ strengths as part of an alliance will enable us to bring cutting-edge diagnostics to market faster and at scale, and increase the priority of essential diagnostics in national health programmes. Delivery of this ambitious plan will take US$100-120 million per year. But with at least 1 million lives being saved over the 3-year period, US$1 billion in savings to health systems and patients and at least 10 countries empowered with diagnostic data to inform policy and care, the return on investment is clear.

TOGETHER, WE CAN ENSURE THAT EVERYONE WHO NEEDS A TEST CAN GET ONE.
FIND, THE GLOBAL ALLIANCE FOR DIAGNOSTICS: 2021 STRATEGY AT A GLANCE

**VISION**
Testing for healthy and safe lives

**MISSION**
Drive equitable access to reliable diagnosis through collective action

**GOALS**

**Universal health coverage**
Expand primary care testing to combat diseases that disproportionately affect vulnerable populations

- **At-risk populations:** Minimize TB and hepatitis deaths from missed diagnosis
- **Women & children:** Strengthen antenatal screening for communicable and non-communicable diseases, and reduce deaths from undiagnosed fever and pneumonia
- **Marginalized populations:** Accelerate elimination of neglected tropical diseases via tailored testing strategies
- **Pandemic preparedness:** Build on broad COVID-19 testing capacity and the ACT-Accelerator model to establish sustainable early-warning and response systems for known and emerging pathogens
- **Antimicrobial resistance:** Build access to AMR testing and surveillance to safeguard drugs and reduce mortality

- **Digital tools:** Unlock the power of data to strengthen health systems and empower individuals
- **Diagnostic network design & optimization:** Use local data to design context-specific testing strategies and implementation models
- **Integrated biobank network:** Facilitate diagnostic development and implementation across diseases
- **Healthy markets:** Shape sustainable markets for quality-assured and affordable diagnostics
- **Sequencing:** Enable genomics for improved surveillance and diagnosis

**Health emergencies**
Strengthen diagnostic surveillance and response systems to contain outbreaks and improve pandemic preparedness, aligned with a One Health approach

- **At-risk populations:** Minimize TB and hepatitis deaths from missed diagnosis
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**HOW WE WORK**

**TECHNOLOGY INNOVATION**

**ACCESS INNOVATION**

- Partner with users and buyers to co-create fit-for-purpose tools with policy in place and a path to procurement
- Partner with countries to embed testing as an integral part of sustainable, resilient health systems

- Develop transformational diagnostic tools (including digital) to address unmet diagnostic gaps
- Generate evidence to inform policy & regulations
- Build out local production to reinforce local ownership and commitment to diagnostics
- Develop marketplace and market interventions to drive affordability and access
- Design new delivery models (including self-testing and digital) to increase access to testing
- Support countries to embed testing and surveillance into broader national health strategies
- Strengthen diagnostic capacity to enable implementation and quality uptake of innovative tools
- Support advocacy and mutually agreed accountability frameworks to strengthen commitment to testing

**PRINCIPLES**
Support country leadership
Build effective partnerships
Serve as a transparent and neutral source of insight
Empower people and communities
Build for sustainability

**ENABLERS**
Data
Sustained funding
Political commitment and partnerships
Quality, timely diagnosis is an essential enabler of health for all. Early diagnosis has been consistently linked to improved health outcomes and reduced out-of-pocket spending, and disease surveillance is key to identifying, responding to and containing new outbreaks. However, compared with vaccines and treatments, the value of diagnostics has historically been overlooked by policy makers, healthcare workers and patients alike. As a result, no diagnostic tests exist for 60% of the “Blueprint” pathogens, which have been identified by the World Health Organization (WHO) as having the greatest outbreak potential.

Despite the introduction of the WHO Essential Diagnostics List in 2018, testing remains (now very conspicuously) absent from national health strategic plans, without a dedicated budget line.1 Basic diagnostic capacity exists in just 1% of primary care clinics and 14% of hospitals in low- and middle-income countries (LMICs).2 Without tools available to diagnose common causes of fever or cough, how can we expect early detection of potential disease outbreaks? In addition to being disproportionately affected by life-threatening diseases, vulnerable populations are often invisible to policy makers and can thus find themselves excluded from conventional healthcare services.3

For every patient in the world who is diagnosed with a disease, a second goes undetected.4 One in three cases of tuberculosis (TB) – the leading infectious disease killer in the world, claiming 1.5 million lives each year – is not diagnosed or reported;5 one in three people with diabetes in LMICs have never had their blood glucose measured.6 Misdiagnosis is just as consequential. Two in five maternal deaths may have been preventable with a correct diagnosis, according to a study in Mozambique.7 A study in Tanzania found that just 45% of patients treated for malaria actually had the disease.8

The result is a patient deprived of the care or treatment that they really need, and over-prescription of antibiotics that fuels the deadly rise of antimicrobial resistance (AMR). Lack of access to quality, reliable tests threatens our global health security and jeopardizes the achievement of universal health coverage (UHC).

COVID-19 thrust diagnostics and testing into the spotlight, highlighting years of under-investment and neglect. Yet unprecedented opportunities also emerged, with effective regional leadership rapidly ramping up testing capacity, and new digital technologies paving the way for mobile and at-home testing.

COVID-19 has disrupted essential health services for both infectious and non-communicable diseases.14-16

<table>
<thead>
<tr>
<th>Disease</th>
<th>Expected increase in deaths in 2020 in high-burden settings due to disruption</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>+10%</td>
</tr>
<tr>
<td>TB</td>
<td>+20%</td>
</tr>
<tr>
<td>Malaria</td>
<td>+36%</td>
</tr>
<tr>
<td>Maternal</td>
<td>+43%</td>
</tr>
</tbody>
</table>

Countries reporting disruption to NCD services

66% HIV
64% NCDs

Challenges spanned non-communicable diseases (NCDs) and infectious diseases, as people encountered new obstacles to accessing health services for reasons including fear of contracting COVID-19, lack of transport options during lockdown periods, and worries about paying for medical care in the face of employment uncertainties.
Against this bleak backdrop, however, unprecedented opportunities also emerged. Strong regional and country leadership, such as the African Union Commission and the Africa Centres for Disease Control and Prevention (Africa CDC) Partnership to Accelerate COVID-19 Testing (PACT) initiative, led to rapid strengthening of testing and surveillance capacity. New digital technologies are providing immense opportunities to improve diagnostics and testing, such as artificial intelligence algorithms that can enable computerized cough analysis to differentiate between COVID-19 and TB. The focus on connectivity paves the way for healthcare services to be accessed through mobile and digital apps, and the rise in wearables and at-home tests has the potential to transform self-monitoring and self-testing approaches.

Crucially, the value of the actionable data that testing provides at every stage of a pandemic has become self-evident, with countless lives being saved from COVID-19 through effective test-trace-isolate strategies. Vaccines are critical, but the emergence of COVID-19 variants shows that there is no magic bullet – testing remains as crucial as ever to monitor and control disease spread. Now is the moment to address gaps across the whole diagnostic value chain that have been quietly claiming the lives of people with treatable diseases for decades. The Access to COVID-19 Tools (ACT) Accelerator was formed to ensure equitable access to tests, treatments and vaccines, in recognition that all three are interdependent and equally important for safeguarding health. The Diagnostics Pillar of the ACT-Accelerator, co-convened by FIND and the Global Fund, brought together over 30 international partners and provides valuable experience and insights that lay the groundwork for the formation of a global alliance for diagnostics that can live on beyond the pandemic.

For every single percentage point by which we can reduce the overall diagnostic gap, 25,000 lives could be saved. Closing it completely will require transformative, scalable approaches that are backed by both political will and funding (including domestic resources). Unified, collective action is vital, as progress towards the UN Sustainable Development Goals is receding in the face of the pandemic, global health security remains a major risk, and the achievement of UHC by 2030 is in jeopardy. The time to act is now.
Improving equitable access to testing is at the core of our work: everyone who needs a test should be able to access one, when and where they need it, without financial hardship, stigma or discrimination. Primary healthcare and community-based organizations have a unique role to play in realizing this vision, not just in ensuring appropriate care and health monitoring for individuals in their communities, but also being on the front-lines against global threats including disease outbreaks and AMR.

WHO and UNICEF define primary care as a key process in the health system that supports first-contact, accessible, continued, comprehensive and coordinated patient-focused care.\(^{21}\) In November 2018, UN Member States affirmed their commitment to UHC in the Astana Declaration, describing primary care as a “cornerstone of a sustainable health system for UHC and health-related Sustainable Development Goals”. This vision of equitable access to quality diagnosis is the driving force behind our work, and unlocking the value of diagnostics in primary care requires the availability of rapid, easy-to-use and affordable diagnostic tools (including self-tests and point-of-care tests) as part of an integrated health system that links diagnosis to care.

**Vulnerable populations**

Vulnerable populations can be excluded from accessing health services because of their age, gender, ethnicity, disability, or sexual orientation or because of their socio-economic status, geographic location, or the impact of humanitarian crises. The testing needs of vulnerable populations can hold the key to democratizing testing for all. The success of this strategy will be determined by our ability to reach:

- Pregnant women and children
- People living with HIV
- Urban poor
- Migrants and refugees
- Hard-to-reach rural populations
- Indigenous populations
- Prisoners
- Sex workers
- People who inject drugs
- Men who have sex with men

A FOCUS ON GENDER AND EMPOWERING WOMEN CAN INCREASE ACCESS TO TESTING FOR EVERYONE

Sex and gender play an often-underestimated and ill-understood role throughout the research, development, and implementation process for all health technologies. For diagnostics and testing, gender norms and roles are critical determining factors to ensure the first step – diagnosis – is not missed in the cascade of care. Everyone, regardless of gender, will need a diagnostic test at some time in their lives, yet gender roles can exacerbate specific access barriers. In a study of pregnant women in South West Nigeria, 97% reported relying on their husbands for money to access antenatal testing and care; in Myanmar, only 40% of female factory workers in Myanmar sought testing for TB symptoms because they were not allowed to take time off work.\(^{22}\) In some cases, the testing gap is more significant among men because social norms lead to increased health risks and insufficient focus on prevention. In addition to needing tests for conditions and diseases common to all, including HIV/AIDS, TB, and COVID-19, women additionally require tests unique to their reproductive systems, such as antenatal tests related to pregnancy.

In healthcare delivery, women themselves have a crucial role to play. UHC, including essential diagnostic testing, will be primarily delivered by women, as they form the vast majority of the health and social care workforce. On the policy front, women political leaders have shown their formidable influence in prioritizing health issues. At the community level, women are critical health influencers in families and communities. Testing empowers people by providing crucial information that improves lives and increases prosperity for all. But without a specific focus, we may fail to address the gender-related barriers to testing.

For example:

- The tests that women need are often not available in health systems
- Gender inequality creates information, financial, and cultural barriers for women to access testing
- Women lack trust in testing services, and may fear procedures, diagnosis, and stigma
- Barriers to testing are compounded for marginalized women, especially in humanitarian contexts
- Female health workers can scale up testing for everyone, if enabled with training, resources, and decent work
- Taking testing to women at home and work, and self-testing, can expand testing to more women and more people in communities

THE RIGHT TO HEALTH DEPENDS ON EQUITABLE ACCESS TO QUALITY DIAGNOSIS

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FIND was founded in 2003 to bridge existing product development gaps for essential diagnostics by initiating and coordinating research and development (R&D) projects in collaboration with the international research community, the public sector, and the in vitro diagnostics industry.

Our previous strategy, spanning the period 2015–2020, expanded an alliance of partners to focus on translating the technical world of product development into access to diagnostic solutions that meet patient needs in low-resource settings.

Over the last 5 years, we have solidified FIND’s position as a nimble, specialist organization, with strengths across the diagnostics value chain from R&D to delivery, able to rapidly adapt to a changing global environment. We have learned valuable lessons along the way, identifying opportunities to build or shift our approach and better serve patients and their communities.
In partnership with the Indian government, we expanded the molecular testing market with the approval of the first point-of-care molecular platform from an Indian manufacturer (Truenat™), now available in more than 50 countries. WHO endorsed Truenat tests for initial diagnosis of TB and detection of rifampicin resistance in July 2020, and a total of 6 million TB tests were tendered by the Indian national TB programme the same year. With tests currently available on the Truenat platform for over 14 global health priority diseases including malaria, HIV, hepatitis and gonorrhoea, the expanding instrument base was also used to conduct 5 million COVID-19 tests in 2020.

FIND and WHO coordinated an independent global quality assurance programme for malaria rapid diagnostic tests (RDTs) for a decade, resulting in a 77% reduction in non-compliant or poor-quality tests, with 90% of malaria RDTs sold globally now complying with WHO criteria. The programme tested over 5,000 RDT lots – over 900 million RDTs – destined for more than 70 endemic countries. Lot testing was supported by donors and conducted free of charge for health ministries, malaria control programmes, RDT procurers, implementing organizations and RDT manufacturers. Since 2011, lot testing has been mandatory for all Global Fund grant recipients and has been adopted by all other major RDT procurers. Following successful completion of the programme, the project transitioned to WHO at the end of 2018.

Making hepatitis C virus (HCV) screening, confirmation and care available at primary care level, including HIV community clinics, through the introduction of RDTs has increased linkage to care from less than 50% to over 99% – and the higher levels of test use has driven down prices. For example, our work to introduce HCV RDTs into the Malaysian public health system in a decentralized screening model resulted in over 8000 life-years saved. Switching to risk-based screening from general screening was found to reduce the cost of finding one positive case from more than US$40 to US$10, with overall cost savings to the Malaysian health system of US$1.3 million. Data such as these have led to HCV policy changes in Malaysia, India and Myanmar.

As a result of our experience in diagnostics for global health and a track-record in successful partnerships, FIND was nominated to co-convene the Diagnostics Pillar of the Access to COVID-19 Tools (ACT) Accelerator – a ground-breaking collaboration of many of the world’s international health organizations – alongside the Global Fund and WHO. Together we were able to condense development timelines for antigen rapid tests into just 8 months (compared with 5 years for HIV rapid tests), and secure access to 120 million tests for LMICs through volume guarantees. We quantified the value of diagnostics, with analysis demonstrating that the life of a hospital worker is saved for every 1,042 tests conducted, and provided data and use case guidance that informed public policy and generated evidence for governments to make decisions on lockdowns and other interventions.

ACTAccelerator
ACCESS TO COVID-19 TOOLS
A SHIFT IN APPROACH THAT LEVERAGES LEARNINGS AND HARNESSES OPPORTUNITIES

LESSONS LEARNED

- For diagnostic tools to have transformational impact, novel business approaches are required, such as co-creation with users and buyers to ensure new tests meet their needs. Otherwise, there will be limited demand (i.e. lack of market "pull").
- The diagnostic "wild west" (i.e. many low-quality products that are not fit-for-purpose) harms global health systems and patients. Independent evaluation and a transparent marketplace are required by procurers and policy makers.
- A lack of common data systems and standards around diagnostic data collection and reporting impacts the quality and timeliness of decision making.
- Co-funding via innovative financing mechanisms is a viable approach, e.g. loans versus grants for diseases less impacted by market failure.

STRENGTHS

- FIND benefits from significant end-to-end product development experience, including building in-country production capacity, and a robust understanding of technology R&D pipelines for in vitro and digital diagnostics, "pull").
- FIND has trusted relationships across a range of test developers, end users and evaluators, and has extensive clinical trial expertise for rapid regulatory and policy change in multiple diseases, across Phases I to IV, including sample collection and sharing to support development and validation of new tests.
- FIND has market-shaping know-how that can improve equitable access (via both "push" and "pull" mechanisms).

POST-COVID-19 OPPORTUNITIES

- Diversified manufacturing capacity has emerged that can be harnessed to build sustainable supply, affordability and local ownership.
- Technology advances can be applied to broader global health needs and expanded use cases beyond formal healthcare settings (e.g. self-testing platforms, easy-to-use rapid tests, digital tools).
- Collection of high-quality samples has been expedited, with sequencing for surveillance.
- Active market-shaping initiatives can lower prices and nudge local procurement towards higher quality tests (e.g. access to trade finance mechanisms can be provided to support non-traditional donor-funded procurement, such as pharmacies and other private sector channels).

SHIFT FOR 2021 STRATEGY

- Strengthened focus on new products for surveillance as well as point-of-care tests for primary care, including rapid and self tests.
- Market "pull" mechanisms and active market shaping initiatives are being elevated as central elements to drive R&D and improve uptake.
- Regional innovation and manufacturing hubs are being built out or strengthened.
- Marketplace and evidence platforms are being broadened to enable policy makers and procurers to make data-driven decisions.

RESEARCH & PRODUCT DEVELOPMENT

- COVID-19 has exposed massive gaps in diagnostic systems and capacity (i.e. testing limited to central laboratories, lack of diagnostic literacy among policy makers), as well as important data gaps.
- Adoption of and demand for essential diagnostics require funded national strategies and capacity to be built at all levels – from leadership to the conduct of tests – alongside improved data systems and building proficiency for data-driven planning, and monitoring of progress and impact.

ACCESS

- The ACT-Accelerator has enabled political engagement at the highest levels, as well as the engagement of a diverse, broad stakeholder group (including buyers, WHO, local policy makers and communities) from the beginning; leveraging partner strengths along the value chain accelerates product development, policy and uptake, while adapting rapidly to evolving needs.
- There is no single strong partner to support LMIC capacity development and early and improved country engagement – which means this relies on a well-coordinated partner network in countries.

PARTNERSHIP

- FIND has a substantial history of working through collaborations that leverage partner strengths across the value chain, to deliver on objectives.
- In addition to its headquarters in Geneva, FIND has established offices in India, Kenya, South Africa and Viet Nam, complemented by a flexible country operations model (currently in 20 LMICs) that builds on local partnerships to ensure that it can have broad health systems impact.

- Testing should move beyond formal healthcare settings only, and linkage to care can be provided through digital tools.
- Integrated, patient-centric care delivery can be improved by breaking testing silos and harnessing existing health infrastructure.
- There is appetite among key stakeholders for strengthening surveillance networks that can service multiple diseases for sustainability.

- Support to countries is being deepened, for data-driven diagnostics systems planning, leveraging digital data to improve service delivery and cost-effectiveness, and to monitor impact, as well as to sustainably build diagnostics capacity at all levels.
- We are evaluating innovative delivery models to build implementation blueprints with multisectoral engagement.
- We are strengthening the voice of communities in design and delivery of people-centred, integrated screening and testing strategies, and implementation models.

- Increased political will and effective regional leadership have emerged for investment and prioritization of diagnostics due to a heightened awareness of the need for robust testing systems.
- The ACT-Accelerator offers a springboard for accelerated diagnostic innovation and implementation.

- We are building on the ACT-Accelerator model to form an alliance of partners, coordinate local networks and give procurers and countries a seat at the table early in the product development process.
- Pathfinder countries are being supported to demonstrate the impact of strong diagnostic systems and demand aggregation.
FIND, the global alliance for diagnostics, seeks to ensure equitable access to reliable diagnosis around the world. We connect countries and communities, funders, decision-makers, healthcare providers and developers to spur diagnostic innovation and make testing an integral part of sustainable, resilient health systems.

**OUR OPERATING MODEL HARNESSES THE STRENGTHS OF AN ALLIANCE OF PARTNERS, BUILDING ON THE COVID-19 TESTING MOMENTUM AND OUR PRE-PANDEMIC SUCCESSES**

- Co-creation of patient-centric tools (including digital, open technologies)
- Public-private partnerships
- Local innovation and manufacturing
- Systematic data collection and analysis
- Modelling
- Definition of local requirements
- Policy-shaping and diagnostic strategies
- Demand aggregation
- Technical implementation
- Systematic data collection and analysis
- Modelling
- Definition of local requirements
- Policy-shaping and diagnostic strategies
- Demand aggregation
- Technical implementation
- Political engagement
- Thought leadership
- Financing
- Norms and standards
- Agenda setting
- Member state engagement
- Monitoring and evaluation
- End-to-end involvement, e.g. co-creation of new tools to ensure they are fit for purpose
- Support for uptake in communities
- Advocacy

**TESTING FOR HEALTHY AND SAFE LIVES**

**AN ALLIANCE TO ADVANCE THE GLOBAL AGENDA**
**ACCELERATING GLOBAL EFFORTS TOWARDS UHC AND HEALTH EMERGENCY RESPONSE**

Strong, universally accessible health systems are essential for both day-to-day patient care and to mitigate health emergencies – UHC and global health security have been described by Dr Tedros Adhanom Ghebreyesus, Director General of WHO, as “two sides of the same coin.”

**FIND 2021 STRATEGY LAYS THE GROUNDWORK TO ACCELERATE GLOBAL EFFORTS TOWARDS UNIVERSAL HEALTH COVERAGE AND HEALTH EMERGENCY RESPONSE**

In support of UHC, our goal is to expand primary care testing to combat diseases that disproportionately affect vulnerable populations. Reducing the huge diagnostic gaps in TB, hepatitis, antenatal screening for both communicable diseases and NCDs, fever, pneumonia and neglected tropical diseases (NTDs) will save lives and livelihoods, save health systems money, and contribute to global and national disease elimination targets. Wherever possible, we are looking to decentralize testing so that services can be made available closer to patients, within health systems as well as outside of formal healthcare settings.

To achieve this, we are supporting R&D for products that can address WHO Essential Diagnostic List priorities, including commoditized tests (i.e. low cost, long shelf life, easy to use, mass distributed) and digital solutions, produced through regional manufacturing hubs. This includes self-tests that are co-created with users and procurers to optimally meet patient needs, as well as multi-pathogen platforms and multiplex tests to support the move towards an evidence-based, integrated approach to testing. We are also striving to improve the usability of existing tests, for example by supporting targeted redesign that can make them more suitable for community-based use. Complementary digital tools will enable diagnostic data to be captured and fed into health information systems, to inform policy and planning.

We are pursuing active market sustainability initiatives to increase the availability and affordability of new tests. To ensure that stakeholders can access verified information on diagnostic tools, we are building a digital marketplace that is being paired with targeted investments and technology transfers, to build local manufacturing capacity in LMICs. We are working with local partners to demonstrate the impact of innovative delivery models, notably through communities and in non-formal health settings. We are also supporting countries to introduce policy changes that can improve access to testing, such as embedding self-testing into national health strategies and insurance schemes, and to expand procurement channels to non-donor channels (such as the private sector).

To mitigate health emergencies, our goal is to strengthen diagnostic surveillance and response systems to contain outbreaks and improve pandemic preparedness, aligned with a Health One approach. Testing is the first line of defence against outbreak pathogens such as SARS-CoV-2 and Ebola virus, but also the “silent pandemic” of AMR by improving access to AMR testing and surveillance to safeguard drugs and reduce mortality. Our fight against COVID-19 is far from over, and requires intensified efforts to realize mass testing for test-trace-isolate implementation and sequencing-based surveillance – so that viral evolution does not jeopardize progress.

We are striving to leverage ACT-Accelerator partnerships to protect the gains being made during the pandemic and build a more permanent structure that can deliver sustained supply and predictable demand of WHO Blueprint pathogen tests, as well as providing permanent early-warning and response systems. We are working to support development of broad menu, flexible tests – which can build from existing networks such as the WHO GISRS (Global Influenza Surveillance and Response System) and PIP (Pandemic Influenza Preparedness), or the International Atomic Energy Agency’s ZODIAC (Zoonotic Disease Integrated Action). Fast development of new tests depends on transparent evidence and sample sharing, and data integration is needed to support One Health initiatives. These all go hand-in-hand with capacity in countries for both centralized and decentralized real-time surveillance and mechanisms for scale-up of outbreak pathogen testing.

Alongside our efforts to serve diseases and populations, we are working to strengthen health systems and transform the diagnostic ecosystem by redoubling our efforts in key disease-agnostic activities. These include sequencing to improve surveillance and diagnosis, fostering an integrated biobank network to facilitate diagnostic development and implementation across diseases, and diagnostic network design and optimization so that data can be maximized to deliver context-specific testing strategies.

To enable accountability from all parties, we aim to cement the essential place of diagnostic testing within health systems through political commitments at the highest levels. This end-to-end scope requires a robust, transparent business model built for diagnostic sustainability, designed to harness collective action and create a virtuous cycle of technology innovation (supply of new or improved tools) and access innovation (demand from countries).
### COLLECTIVE ACTION, FROM INNOVATION TO IMPLEMENTATION

**Technology innovation**
Partner with users and buyers to co-create fit-for-purpose tools with policy in place and a path to procurement.

- **Develop transformational diagnostic tools**
  - We partner with countries, communities and patients to understand diagnostic gaps, working collaboratively to fill them through proactive technology scouting and open calls to co-create new tests and digital solutions with users and buyers. We manage an R&D portfolio of innovative diagnostics and tools that are suitable for all levels of the health system. We also develop and maintain open-access resources to enable test development, including an integrated biobank network and data repositories for the development and testing of artificial intelligence solutions.

- **Generate evidence**
  - We design and conduct operational and evidence-generation studies (including phase I–IV clinical trials) through a streamlined clinical trial programme. This programme leverages a multi-country trial site network that reflects the intended setting of use and allows for comparative performance evaluation studies. The data generated are shared with all stakeholders to inform global and national health policies, regulatory approvals, strategies and funding decisions, product selection for procurement and advocacy to support uptake.

- **Build out local production**
  - We work with diagnostics developers and local manufacturers on innovative business approaches such as technology transfers to produce diagnostics closer to the people who need them. This strengthens local innovation ecosystems while diversifying and securing supply chains.

- **Develop marketplace and market interventions**
  - We provide a digital marketplace to bring transparency to the market and share verified information and evidence on new tests, aggregate demand and leverage existing procurement channels. We address market failures jointly with partners, including affordability challenges, regulatory bottlenecks and supply chain issues, through targeted market interventions, such as innovative pricing models (including non-exclusive licensing agreements), increased access to financing through all procurement channels (including public and private sector), and volume guarantees.

**Access innovation**
Partner with countries to embed testing as an integral part of sustainable, resilient health systems.

- **Design new delivery models (including self-testing and digital)**
  - We support the development of global research agendas and priorities, and generate evidence through implementation studies to strengthen existing recommendations and expand use cases. We work with country leadership, local partners and communities to drive operational research that can inform scalable, effective models for implementation and inform policy, including research on how digital tools can be used to strengthen patient and community-level testing and surveillance. Our focus is on driving the uptake of self-testing, delivery of testing services through community channels, and other models that can enable diagnosis beyond formal health services and closer to patients.

- **Support countries to embed testing and surveillance into broader national health strategies**
  - We provide catalytic support to countries to develop policy and incorporate testing and surveillance into funded national health strategies. This includes joint assessment of needs, customizing global implementation guidance to account for local contexts, and provision of initial test volumes to catalyse use. We work with regional and country partners to promote integrated, patient-centric testing that leverages existing diagnostic infrastructure (e.g. for HIV) and streamlines patient pathways (e.g. symptom-based testing for both COVID-19 and TB in the same patient visit).

- **Strengthen diagnostic capacity**
  - We work with local and regional partners to build in-country diagnostic capacity that will enable uptake of existing and new tools. We provide technical assistance to strengthen laboratories and optimize diagnostic networks for improved patient access, high-quality sample collection, enhanced sequencing capacity and robust data infrastructure for information sharing. We also work with WHO and other partners to develop implementation guidance, create training materials and programmes, and engage local networks to deliver training for healthcare workers and laboratory technicians.

- **Support advocacy and mutually agreed accountability frameworks**
  - We work with partners on targeted advocacy efforts from global and ministerial to community levels, to raise the profile of testing and increase diagnostic literacy. We support the development of mutually agreed accountability frameworks, including country action plans, to strengthen commitment to testing and monitor the implementation of diagnostic strategies, and ensure continued assessment of our work.

### OBJECTIVES

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ROADMAPS FOR ACTION

DIAGNOSTIC ECOSYSTEM

- Digital Tools: Unlock the Power of Data to Strengthen Health Systems and Empower Individuals
- Diagnostic Network Design & Optimization: Use Local Data to Design Context-Specific Testing Strategies and Implementation Models
- Integrated Biobank Network: Facilitate Diagnostic Development and Implementation Across Diseases
- Healthy Markets: Shape Sustainable Markets for Quality-Assured and Affordable Diagnostics
- Sequencing: Enable Genomics for Improved Surveillance and Diagnosis

DISEASES & POPULATIONS

- At-Risk Populations: Minimize TB and Hepatitis Deaths from Missed Diagnosis
- Women & Children: Strengthen Antenatal Screening for Communicable and Non-Communicable Diseases, and Reduce Deaths from Undiagnosed Fever and Pneumonia
- Marginalized Populations: Accelerate Elimination of Neglected Tropical Diseases via Tailored Testing Strategies
- Pandemic Preparedness: Build on Broad COVID-19 Testing Capacity and the ACT-Accelerator Model to Establish Sustainable Early-Warning and Response Systems for Known and Emerging Pathogens
- Antimicrobial Resistance: Build Access to AMR Testing and Surveillance to Safeguard Drugs and Reduce Mortality
Digital technologies have a vital role to play in diagnosis across the healthcare cascade – from supporting screening and ensuring accurate diagnosis to providing treatment monitoring information. With trained healthcare personnel often in short supply at all levels, expanding access to diagnosis for people in remote and rural areas of LMICs can be especially challenging. Connected diagnostics can be deployed widely and used in community settings, reducing the need for people to travel to centralized laboratories for a test, while ensuring that population-level data are collected for diagnostic surveillance that can help decision makers optimize the allocation of resources and develop policy.

To drive demand for screening and diagnosis, focus is needed early in the patient pathway to empower patients and their influencers to build health knowledge, develop agency and engage in more efficient care-seeking. Digital health solutions that provide clinical decision support to healthcare workers (in the community, in primary care and in the local private sector) can help them work with greater efficiency and improve the quality of care. To enable effective use of diagnostic data for surveillance, as well as electronic health records and supply chain management, interoperability is critical between various diagnostic devices, systems and applications.

Our focus is on collaboration with Ministries of Health, technology companies, device manufacturers and implementation partners to support the development and scale up of fit-for-purpose digital solutions that can be integrated into existing workflows, address users’ pain points, and that are suitable for healthcare workers’ digital literacy levels and local digital infrastructure.

**WORKSTREAMS**

1. Support the development of solutions that are supplementary to existing tests as well as novel digital diagnostics, to bring testing closer to patients and detect complications early.
2. Support, along with key partners such as WHO, the development of frameworks and implementation guidance for a user-centred evaluation platform for digital diagnostic technologies, including artificial intelligence-based diagnostic technologies for LMICs.

**INDICATIVE DELIVERABLES**

1. Digital toolkit aimed at reducing care-seeking delay and linking patients to care early
2. At least 3 digital tools for enabling data capture and use for near-patient, community-level diagnostics and surveillance
3. Evaluation platform for generating evidence on – and informing adoption of – digital diagnostics in LMICs

**context-specific testing strategies and implementation models**

Designing optimal diagnostic systems is complex and highly context-dependent, relying on multiple data inputs and assumptions. Important variations in epidemiology, geography and health systems – often within the same country – must also be accounted for, as well as budgetary considerations.

Diagnostic network optimization takes a geospatial network analytics approach, used in many manufacturing industries, to improve patient access to services in the most cost-efficient way. Using data to inform instrument placement, sample transportation, referral mechanisms, staffing, and geographical prioritization, diagnostic access can be increased for those most in need, while also ensuring cost efficiency and feasibility. Data can also inform integration of diagnostic tools and services (such as testing for COVID-19 using molecular diagnostics already in place for TB), to provide patient-centred services and resource allocation across health sectors and programmes.

Together with other approaches to support countries to identify gaps and develop tailored interventions, such as patient pathway analysis and structured assessments, diagnostic network optimization can help target the right mix of diagnostic solutions to where they are needed most, at costs sustainable for health systems, and is able to rapidly adapt to emerging threats.

Our focus is on helping countries to build and maintain comprehensive, integrated digital network models that are coordinated and owned by Ministries of Health and used by all partners, with common standards for data collection, reporting and data management.

**WORKSTREAMS**

1. Optimize use of current diagnostics through diagnostic network optimization that can inform countries’ strategic plans, as a routine element of health systems and supported by sustainable funding mechanisms
2. Inform introduction of new diagnostics by using diagnostic network optimization to compare cost-effectiveness of different implementation models and understand decision drivers for use of new tests in different settings
3. Expedite testing strategies for new/emerging diseases by ensuring they are informed by rapid deployment of diagnostic network optimization analysis, using pre-existing network models

**INDICATIVE DELIVERABLES**

1. Pilot in 4 countries and launch OptiDx, an open-access software for conducting diagnostic network optimization across diseases in LMICs
2. Scale up use of OptiDx and establish diagnostic network optimization as a key element in country strategic planning and investment decisions for at least 20 countries
3. Enable at least 20 countries to optimize multi-disease molecular testing networks to improve access and deliver efficient and sustainable services
4. Inform design and optimization of surveillance networks for at least 2 diseases in at least 1 region
INTEGRATED BIOBANK NETWORK: FACILITATE DIAGNOSTIC DEVELOPMENT AND IMPLEMENTATION ACROSS DISEASES

Biobanks – also known as specimen or sample banks – are repositories of pathogen samples (such as blood or sputum) that have been collected from people with specific diseases. Well-characterized samples are vital to commercial and academic researchers for the development, validation, evaluation and quality assessment of new and existing diagnostic tools.

Samples collected regularly from key strategic sites can also enable genetic sequencing that underpins comprehensive disease surveillance programmes.

With development needs constantly shifting as new scientific avenues are explored, there is often a mismatch between the samples needed and those available, which can hamper product development. With no standardized global process for sample collection, sample quality can vary greatly, and access to them can be limited. Import and export restrictions on biological material inhibits transport of specimens between high-burden countries where samples are usually collected, to developers’ laboratories, which are often located elsewhere. Building specimen bank capacity in countries provides local ownership of data and research.

Ethical considerations are also key. Countries – and individuals – should be involved in decisions on how samples are used, ownership of data and research.

Our focus is on fostering inclusive, ethical collection and use of fit-for-purpose, high-quality samples, when and where they are needed, to streamline the whole diagnostic development process.

WORKSTREAMS

1. Develop a network of integrated, disease-agnostic biobanks in strategic locations, with harmonized procedures, that are adapted to industry needs and support in-country research.

2. Build on existing work to implement a virtual biobank directory that provides an open-access, global view of sample availability, with guidance on sample use.

INDICATIVE DELIVERABLES

1. At least four sites in LMICs supported with capacity building to enable membership of the integrated biobank network, with standardized procedures and collections established.

2. Operationalize virtual biobank directory prototype for at least 10 diseases, by adding collections and facilitating access to samples.

MORE DETAILS ON THIS ROADMAP: www.finddx.org/biobank

HEALTHY MARKETS: SHAPE SUSTAINABLE MARKETS FOR QUALITY-ASSURED AND AFFORDABLE DIAGNOSTICS

New diagnostic tests must overcome multiple “valleys of death” on the road from R&D to delivery, any one of which can prevent them from becoming viable products ready for use by those who need them.

If test developers do not see the need for a new diagnostic or do not have an indication of the potential return on their investment, R&D may never get started. Similarly, if manufacturers do not see a viable market, then investment in manufacturing is at risk – especially investment in the high costs of automation, which can often be too a product becomes affordable to the end user. Policy makers depend on reliable evidence to be able to support new innovations, which is generated from robust clinical trials that also need investment. The complex, multi-faceted process of procurement across the public and private sectors involves registration, forecasting, supply chain management and health systems strengthening to support delivery. Distributions often need to assume significant risks, such as payment delays from buyers and foreign exchange rates, as well as the high cost of capital, which can lead to significant mark-ups that render a test unaffordable.

Engaging suitable delivery channels across public and private sector hospitals, laboratories and pharmacies can result in long lead times in development of standard procedures, and supportive policy frameworks.

Our focus is on identifying opportunities to engage stakeholders and find solutions to unblock bottlenecks along this continuum and create a viable, efficient and sustainable market environment, so that new innovations can reach those who need them without delays.

WORKSTREAMS

1. Provide market intelligence that improves data and information transparency for both supply and demand, and meets the needs of buyers and sellers.

2. Work with partners to devise and implement tailored market interventions across the continuum.

INDICATIVE DELIVERABLES

1. Functional market intelligence data and reports to inform appropriate interventions on both demand and supply (targeting 1 per test identified in the R&D portfolio).

2. Access to capital (grants or forgivable loans) facilitated for assay developers, manufacturers and distributors to support the business case and ensure affordability for a new diagnostic with at least 1 “exemplar” arrangement coordinated.

3. Volume commitment-linked access terms, negotiated for at least 1 new diagnostic (e.g. volume guarantee, advanced market commitment).

4. Evidence from at least 7 countries for 3–4 innovative delivery channels engaged in the public health response, while decentralizing access to new diagnostics.

5. Digital marketplace to connect buyers (including workplaces, industry or private sector healthcare providers without access to existing procurement portals, such as Wambo) and suppliers to facilitate and aggregate procurement.

MORE DETAILS ON THIS ROADMAP: www.finddx.org/healthy-markets
Sequencing is a process used to understand the genetic makeup of a biological organism. Next-generation sequencing (NGS) collectively describes various high-throughput, rapid, and scalable sequencing technologies that are used to determine the DNA or RNA sequence of the complete genome or part of a genome. NGS enables rapid identification of unknown pathogens, discovery of novel genetic variations, and improved understanding of disease-causing pathogens, to inform the development and utility of tests, treatments, and vaccines. An increasingly critical application of sequencing is genomic surveillance, which uses sequencing data to identify outbreaks of existing or novel pathogens, and to understand how pathogens are introduced and spread through a population.

The goal of our sequencing programme is to establish the use of NGS technologies for the diagnosis of drug-resistant TB, and genomic surveillance of COVID-19, TB, AMR, and other outbreak-prone diseases. Our anchor project is designed to generate evidence and boost in-country capacity to support the global adoption of targeted NGS for affordable, scalable, and rapid TB drug-susceptibility testing. Bringing the power of sequencing closer to communities with a high burden of drug-resistant TB will enable rapid diagnosis and comprehensive treatment guidance and catalyse an eventual decrease in its transmission.

As part of the ACT-Accelerator Diagnostics Pillar Genomic Surveillance Working Group, we are strengthening genomic surveillance capacity in LMICs as part of the COVID-19 response. We are also working on sequencing for AMR surveillance and viral haemorrhagic fevers.

Our focus is on enabling end-to-end sequencing solutions – from sample processing to bioinformatics and interpretation – for disease surveillance and diagnostics in LMICs.

**WORKSTREAMS**

1. Generate clinical evidence to support WHO global guidance and policy on the use of targeted NGS for drug-resistant TB diagnosis, so that patients can be linked to the most appropriate care as fast as possible
2. Enable tools for analysis and interpretation of sequencing data to inform action, including variant identification and prediction of drug resistance
3. Provide technical and operational guidance for country capacity building and implementation of sequencing-based surveillance and diagnosis
4. Inform industry and donors on technology and access gaps via landscapes, target product profiles, capacity mapping and needs assessments

**INDICATIVE DELIVERABLES**

- First WHO-endorsed global TB mutations catalogue to predict drug resistance from genetic data generated by molecular and sequencing-based tests
- Implementation guide and roadmap for country planning and adoption of sequencing for infectious disease surveillance in LMICs, with an initial focus on drug-resistant TB
- Global capacity mapping framework to support implementation of genomic surveillance, resource allocation, and country prioritization for COVID-19 and beyond
- Operational roadmap to inform investment case to strengthen sequencing and bioinformatics capacity in LMICs for surveillance, as part of the ACT-Accelerator Diagnostic Pillar Genomic Surveillance Working Group

**MORE DETAILS ON THIS ROADMAP:** www.finddx.org/sequencing
Finding the missing millions of people with TB or hepatitis who are not diagnosed or reported to health systems has remained an elusive goal, despite the existence of tests and effective treatments for both diseases. Our TB and hepatitis strategy focuses on approaches to reduce the diagnostic gap through the development of new tests, especially those that can be used closer to the point of care, and innovation in delivery models. Diagnosis of both diseases requires a decentralized approach to testing programmes, with more tests suitable for community and self-testing, supported by digital tools that can ensure linkage to care. Easy-to-use, high-quality tests must be accompanied by innovation in the delivery of testing programmes and a switch to active case-finding, particularly to reach at-risk populations who are disproportionately affected.

TUBERCULOSIS

In 2019, 10 million people fell ill with TB and 1.5 million people died from the disease. One in 10 people with TB were believed to be co-infected with HIV, and close to half a million people developed drug-resistant TB. More people received life-saving treatment than ever before, largely due to improved detection and diagnosis, but a staggering 2.8 million people remain undiagnosed or unreported every year. Most TB cases are found among the urban poor, and improving access to diagnosis remains a key priority to meet the WHO End TB strategy of 90% reduction in the annual TB deaths by 2030. COVID-19 has negatively impacted services in most high-burden countries, and is threatening to reverse global progress against TB. TB case notifications declined by a third in 2020, and it is projected that there will be an additional 4.7 million cases of TB between 2021 and 2025 due to disruptions related to the pandemic.

Our focus is on strengthening community-based testing and enabling integrated testing strategies for respiratory symptoms to find the millions of missed cases.

WORKSTREAMS

1. Expand portfolio of sampling methods (including non-sputum-based, platforms and digital tools for TB and COVID-19)
2. Generate evidence for policy to enable active case-finding for TB by bringing testing closer to patients through community and self-testing
3. Support new delivery models to increase access to testing, in particular for drug-resistant TB, and strengthen sequencing capabilities for surveillance

INDICATIVE DELIVERABLES

- An expanded portfolio of open-access resources for developers of TB diagnostics and implementing countries, including an expanded validation platform for ongoing computer-aided detection (CAD) development and implementation planning
- Evidence dossiers to support policy evaluation of 5 new TB tests
- 5 new CE-marked tools for detection of TB and integrated testing strategies, including at least 1 digital diagnostic solution
- Expanded use of molecular testing for TB through the uptake of new sampling strategies, notably through private sector channels
- Market interventions for 3 new TB and associated tests to increase affordability
- Ten demonstration studies on community, self-sampling and bi-directional screening approaches
- Technical guidance and best practice materials to support countries and partners in prioritizing decisions

HEPATITIS C

Despite a ground-breaking cure for HCV completing development in 2014, there has been limited progress towards reaching the WHO goal of hepatitis elimination by 2030. Over 400,000 people die annually due to HCV and 71 million people globally are living with HCV. Almost 80% of people living with HCV are in LMICs, and of those, less than 10% are estimated to have been diagnosed. The HCV cure is already widely available in LMICs, usually at affordable prices, the challenge again remains finding the missing millions, as fewer than one in five of those living with HCV have been diagnosed. There is a great lack of simplified, decentralized diagnostics that can be integrated into existing healthcare models, and few countries are willing to embark on HCV elimination as “pathfinders” for others.

Our focus is on increasing access to HCV testing, and enabling test-and-treat strategies.

WORKSTREAMS

1. Expand active case-finding through the creation of targeted community screening packages, using multiplex tests and deployment of fit-for-purpose self-testing strategies
2. Support decentralized, simplified, integrated services through true point-of-care confirmatory testing and liver staging, to allow same day test-and-treat

INDICATIVE DELIVERABLES

- Toolkits to facilitate the introduction of cost-effective national screening programmes
- A true point-of-care core antigen (cAg) RDT
- Evidence on combination RDTs
- WHO-approved HCV self-tests available for use, including a supporting digital patient-centred toolkit
- Testing packages for best use and scale up of self-testing

MORE DETAILS ON THIS ROADMAP: www.finddx.org/at-risk-populations
IMPROVE ANTENATAL CARE SCREENING FOR NON-COMMUNICABLE AND INFECTIONOUS DISEASES

Hypertensive disorders of pregnancy and gestational diabetes contribute extensively to over 2.7 million infant deaths, 2.6 million stillbirths, 303,000 maternal deaths, and preventable maternal and infant morbidity annually. Globally, cardiovascular diseases and diabetes are responsible for almost 20 million deaths every year, occurring at a disproportionate rate in LMICs (65% of all premature deaths occur in these countries). Despite evidence demonstrating the health, economic and development value of screening and detection of NCDs, particularly in women of childbearing age, many still lack access to the testing interventions necessary to achieve UHC.

Our focus is on combining our efforts in infectious disease diagnostics to screen pregnant women for HIV, syphilis, hepatitis B, and malaria, with strengthened NCD screening globally, contributing towards the WHO target of 80% availability of affordable basic NCD technologies.

WORKSTREAMS

Strengthen antenatal NCD testing through better access to NCD testing overall
Increase access to infectious disease testing for women, targeting HIV, syphilis and hepatitis B testing in antenatal care

INDICATIVE DELIVERABLES

- Optimized multi-parameter cardiometabolic point-of-care device
- Technology innovation for self-monitoring of blood glucose for diabetes
- Up to 5 affordable existing NCD tools available to countries (including blood glucose test strips and HbA1c tests)
- Community and patient engagement models developed for holistic, integrated chronic disease management
- HIV/syphilis/hepatitis B combination RDT with digital decision tool and impact use cases

IMPROVE THE SURVIVAL AND WELL-BEING OF CHILDREN AFFECTED BY FEVER AND PNEUMONIA

In 2019, 5.2 million children died before they reached 5 years of age. Nearly half (45%) of early childhood deaths were due to infectious diseases that present with fever and other symptoms, for example a cough in the case of bacterial or viral pneumonia. Malaria and pneumonia are among the main contributors to those deaths resulting from inappropriate care or triage at the first point of contact with health providers. A lack of tools to support referral and treatment decisions contributes to the high mortality of children even when they reach the health system. Alongside this first triage decision, healthcare teams also need to assess the appropriate course of treatment for malaria and other illnesses.

The already challenging work of frontline healthcare workers has further been exacerbated by COVID-19. It was estimated at the beginning of the pandemic that an additional 1 million children will die due to health system disruptions, including a lack of appropriate triage tools. Additional innovations at point-of-care and community levels are needed to tackle child mortality and morbidity by ensuring every child who needs medical attention is triaged, and patients with febrile illnesses and pneumonia are identified, monitored, and cared for at the appropriate health system level. These innovations will be key to supporting syndromic surveillance activities, and to helping countries stay on track to achieve the SDG targets of reducing under-5 mortality to at least as low as 25 deaths per 1,000 live births, and ending the malaria epidemic, by 2030.

Our focus is on improving triage and differential diagnosis at the lowest levels of the health system.

WORKSTREAMS

Improve triage of children at the point of care for timely referral of severe infections and differential diagnosis between typhoid, dengue, malaria and COVID-19, to inform appropriate treatment
Support global malaria elimination with improved tools for Plasmodium falciparum and other threats to effective diagnosis
Support the uptake of integrated fever management approaches

INDICATIVE DELIVERABLES

- Expanded use of at least 2 next generation electronic clinical decision aid tools
- At least 2 next-generation triage tools to support the assessment and monitoring of patients
- Bundle of point-of-care tests for fever / pneumonia management (including typhoid, dengue, malaria and COVID-19)
- At least 2 next-generation malaria tests to improve P. falciparum and P. vivax management
- Targeted country roadmaps to help advance integrated diagnostic algorithms for malaria and other febrile illnesses
MARGINALIZED POPULATIONS: ACCELERATE ELIMINATION OF NEGLLECTED TROPICAL DISEASES VIA TAILORED TESTING STRATEGIES

Our focus is on addressing key diagnostic gaps that must be filled to achieve the respective disease targets.

INDICATIVE DELIVERABLES

1. Develop a diagnostic pipeline aligned with the needs identified in the WHO NTD 2021–2030 roadmap and support advocacy to address critical product and funding gaps
2. Improve diagnosis and surveillance for NTDs with particularly significant diagnostic unmet needs: Buruli ulcer, Chagas disease, sleeping sickness (HAT), leishmaniasis, lymphatic filariasis, onchocerciasis and schistosomiasis

PANDEMIC PREPAREDNESS: BUILD ON BROAD COVID-19 TESTING CAPACITY AND THE ACT-ACCELERATOR MODEL TO ESTABLISH SUSTAINABLE EARLY-WARNING AND RESPONSE SYSTEMS FOR KNOWN AND EMERGING PATHOGENS

The COVID-19 pandemic has had devastating health and economic impacts, with over 3 million deaths to date and an expected total cost of between US$1 and US$15.8 trillion globally. The pandemic has focused global attention on the importance of diagnostics and testing data to drive public health decision-making: the use of ongoing testing and surveillance to guide targeted lockdowns rather than broad restrictive measures, for example, could lower the economic burden 5-fold.

Although the threat of a global pandemic due to a rapidly spreading, lethal respiratory pathogen had been documented prior to COVID-19, global funding for pandemic preparedness had been reactionary and not well sustained. Diagnostics have always been the cornerstone for early warning, response and containment, yet they remain chronically inappropriate for global needs: significant diagnostic gaps remain for six of the ten WHO R&D Blueprint priority diseases, including an as-yet-unidentified disease X.

The global response to COVID-19 has created a tremendous opportunity to bolster overall pandemic preparedness and response: it has demonstrated the importance of sequencing capacity for rapid pathogen and variant identification, and the benefit of open sharing of information between pathogen-specific experts and the global community, including genomic data, to track pathogen evolution and spur rapid test development. The need for fit-for-purpose testing networks to enable sustained, rapid differential diagnosis integrated across care networks from the community to tertiary level has also been highlighted.

Our focus is on leveraging our COVID-19 response activities, including experience from the ACT-Accelerator, to break the cycle of “panic then forget” for testing and surveillance for outbreak-prone pathogens.

INDICATIVE DELIVERABLES

1. Develop and deploy diagnostic tools to enable containment and clinical management of COVID-19 and other outbreak-prone pathogens, in support of acute outbreak responses
2. Enable testing strategies and systems for mass screening for COVID-19, particularly outside of healthcare settings, in support of a return to normality
3. Create a permanent early-warning and response system through a global network to build resiliency

MORE DETAILS ON THIS ROADMAP: www.finddx.org/marginalized-populations

MORE DETAILS ON THIS ROADMAP: www.finddx.org/pandemics
ANTIMICROBIAL RESISTANCE: BUILD ACCESS TO AMR TESTING AND SURVEILLANCE TO SAFEGUARD DRUGS AND REDUCE MORTALITY

Increased AMR is one of the top ten threats to public health according to WHO; it is the cause of severe infections, disease complications, longer hospital stays and increased mortality. There are currently 700,000 deaths every year due to drug-resistant strains of common bacterial infections, and it is estimated that this will increase to 10 million deaths per year by 2050— with LMICs being the most affected. Testing plays a key role in reducing AMR by improving diagnosis of infections to prevent unwarranted use of antibiotics, and to rapidly detect and contain resistant infections. The COVID-19 pandemic is causing significant setbacks in the fight against AMR. There is growing concern that many people with COVID-19 are being prescribed inappropriate antibiotics, which may be fuelling an increase in drug resistant infections, particularly in countries lacking antimicrobial stewardship (AMS) programmes and with limited access to diagnostic tools.

The growth of AMR is expected to result in a 25% increase in healthcare costs in low-income countries and a 6% increase in high-income countries by 2050. AMS programmes are rudimentary or do not exist at all in most LMICs, and there is an acute need for accessible diagnostics for blood stream infections, especially those associated with neonatal sepsis as well as severe hospital-acquired infections. Data are critical for better patient management and the development of clinical guidelines, but there is currently a lack of both global and local AMR data.

Our focus is on preventing AMR development and mortality through developing and improving diagnostic systems.

WORKSTREAMS

Preserve existing and new antibiotics by supporting the development and enabling the use of point-of-care tests for gonorrhoea and chlamydia (NG/CT), and other sexually transmitted infections at primary care level.

Implement innovative AMR packages (diagnostic technologies, digital solutions, AMR data) to reduce the mortality rate in patients with severe infections in hospitals (including neonatal sepsis).

Empower on-the-ground decentralized AMR surveillance efforts (including sequencing) to strengthen the One Health approach and improve use of local data.

INDICATIVE DELIVERABLES

- 1–2 affordable point-of-care tests for NG/CT
- 1–2 field evaluation studies to inform WHO Prequalification on NG/CT point-of-care tests
- Demonstration studies for NG/CT point-of-care tests
- Digital decision support and data collection tools to support AMS programmes
- A simplified blood culture system adapted for LMICs to enable the use of point-of-care tests for AMR detection or price reduction for existing automated systems
- Demonstration studies on cost-effectiveness of bundled AMR diagnostic solutions for level two of the healthcare system, including digital solutions
- Support for the development of decentralized surveillance systems in 2 countries

MORE DETAILS ON THIS ROADMAP: www.finddx.org/amr
Harnessing partners’ strengths as part of an alliance platform will enable us to bring cutting-edge diagnostics to market faster and at scale, and increase the priority of essential diagnostics in national health programmes.

Delivery of this ambitious plan will take US$100–120 million per year. But with at least 1 million lives being saved over the 3-year period, US$1 billion in savings to health systems and patients, and at least 10 countries empowered with diagnostic data to inform policy and care, the return on investment is clear.

**ENABLING EQUITABLE ACCESS TO INNOVATIVE TESTS FOR 1 BILLION PEOPLE IN LMICs AND SAVING 1 MILLION LIVES: FIND TARGETS 2021–2023**

**DELIVERABLES**
- 10 transformational & affordable new primary care tests co-created with buyers and users
- 3 regional manufacturing hubs established, addressing 10 local priorities
- 10 market-shaping interventions designed and implemented to improve availability and affordability of tests
- 10 exemplar countries supported to embed testing and surveillance into national health strategies
- Diagnostic capacity strengthened across LMICs (100,000 health workers trained, 1,000 laboratories strengthened, diagnostic networks optimized in 10 countries)
- Annual diagnostic purchasing power of US$1 billion achieved through alliance partnerships

**OUTCOMES**
- Diagnostic gap reduced by at least 10% in key populations
- 1 billion tests available for procurement on global access terms
- 10+ countries with national health strategies that include funded diagnostic components, supported by Essential Diagnostics Lists
- 100 laboratories contributing quality data to global surveillance network

**IMPACT**
- Equitable access to innovative tests for 1 billion people in LMICs, 1 million lives saved
- Save 1 million lives through accessible, quality diagnosis
- Save US$1 billion in healthcare costs to patients and health systems
- Empower at least 10 countries with diagnostic data to inform policy and care
With 160 core staff across four country offices and our Geneva-based headquarters, our agile partnering model amplifies our reach in the countries in which we work. FIND continues to be an official WHO Collaborating Centre for Laboratory Strengthening and Diagnostic Technology Evaluation. Our work is underpinned by three key enablers: data, sustained funding, and political commitment and partnerships, as well as five operating principles. Our global access policy drives equitable access to testing, and our robust governance structure ensures accountability as well as expert input.

**FIND GOVERNANCE STRUCTURE**

**TRANSPARENT, IMPARTIAL PROCESSES ACROSS ALL OUR WORK**

We have in place a robust approach to mitigate conflicts of interest when working with a broad range of upstream and downstream partners. We issue open requests for proposals to determine where to invest, relying on independent experts to ensure requirements are objectively defined and decision-making is impartial. We ensure criteria at all stages are transparent and publicly accessible.

FIND retains no financial interest in any product we support, including no intellectual property rights and no royalties. We are not a regulatory body and do not recommend products; rather, we work to generate high-quality data that can enable others to make informed decisions.

Once a product is marketed and has secured all the required approvals, it is made available through eligible procurement channels. The eventual product selection and procurement decision lies solely with the procurer.

This end-to-end approach was successfully pressure-tested by the ACT-Accelerator Diagnostics Pillar with the development, scale up and roll out of antigen rapid tests for COVID-19.

More information can be found on our website here: [www.finddx.org/governance](http://www.finddx.org/governance)
**FIND OPERATING PRINCIPLES**

**SUPPORT COUNTRY LEADERSHIP**

Foster country-led innovation and commitment to diagnosis

**FOSTER EFFECTIVE PARTNERSHIPS**

Build agile end-to-end alliance to coordinate, accelerate and maximize impact of diagnostic investments

**EMPOWER PEOPLE AND COMMUNITIES**

Strengthen pivotal role of communities and individuals in the prioritization of needs, uptake and innovative delivery of tests

**SERVE AS A TRANSPARENT AND NEUTRAL SOURCE OF INSIGHT**

Provide open resources and data to enable innovation and evidence-based, transparent decision making

**BUILD FOR SUSTAINABILITY**

Build sustainable, scalable diagnostic systems mindful of the financial and environmental impact of testing programmes

**OUR GLOBAL ACCESS POLICY DRIVES EQUITABLE ACCESS TO TESTING**

- Focus development and trials for regulatory clearance on transformative diagnostic technologies appropriate for LMICs
- Strengthen local production and diversify supply chains through technology transfer and knowledge sharing with LMICs
- Negotiate access terms with innovators and manufacturers (fair pricing, intellectual property rights, non-exclusive licensing agreements, registration in LMICs, supply and service commitments...)
- Build on existing allocation mechanisms for equitable supply of tools to LMICs
- Support inclusion of diagnostics in national strategies and build capacity to facilitate adoption of sustained testing

**ENABLERS THAT ARE FUNDAMENTAL TO OUR SUCCESS**

**DATA**

Centres of excellence, data-sharing agreements

**SUSTAINED FUNDING**

US$100–120 million per year

**POLITICAL COMMITMENT AND PARTNERSHIPS**

Goodwill ambassadors, political champions, civil society, global, regional and local partnerships

**WE ACHIEVE A BROAD GEOGRAPHIC FOOTPRINT THROUGH A DIVERSE ENGAGEMENT MODEL**

**GLOBAL, REGIONAL AND LOCAL PARTNERSHIPS**

Build working relationships with implementation partners to support their diagnostics work and coordinate efforts across partners

**SECONDMENTS**

Support secondments into Ministries of Health to build technical capabilities at ministerial level

**IN-COUNTRY CONSULTANTS**

Hire local, in-country consultants with deep understanding of country needs and context

**COUNTRY OFFICES**

Provide permanent regional base with limited core staff to coordinate regional activities

**NIMBLE AND EFFICIENT ENGAGEMENT**

Provide permanent regional base with limited core staff to coordinate regional activities