Why laboratory investment matters

Rethinking the role of laboratory services in global health

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Executive Summary

High quality laboratory services are one of the pillars of a strong health system. From a clinical perspective, access to laboratory diagnostics is needed to guide the effective care and treatment of patients. From a public health perspective, robust laboratory surveillance systems are needed to detect infectious diseases and track health metrics, providing valuable data to health system managers and policy makers.

Lives and livelihoods can be better protected with wider access to diagnostic services. It is estimated that 1.1 million premature deaths annually could be prevented in low- and middle-income countries (LMICs) if 90% of patients had the tests they need for just six conditions – diabetes, hypertension, HIV, and tuberculosis in the wider population, and hepatitis B and syphilis for pregnant women (Lancet Commission on Diagnostics, 2021).

Current laboratory services fail to meet the needs of patients in LMICs. Testing is generally only available for a narrow set of infectious diseases, driven by donor priorities. Funding needs to be strategically aligned with national health sector plans to ensure sustainable financing of laboratory systems.

Equity of access to clinical services should be a priority for policy makers and donors. Integrated governance of laboratory networks and coordination across the public and private sectors are needed to make progress towards universal health coverage. Improving laboratory diagnosis for more health conditions will reduce healthcare costs.

Laboratory staff need better pay and improved opportunities for career advancement. Improvements in laboratory management, infrastructure, and systems could elevate working conditions, increasing job satisfaction. Opportunities should be taken to leverage private sector technical expertise to boost public sector capabilities.

Poor infrastructure, unreliable supply chains and lack of expertise limit laboratory capabilities. Laboratories cannot function without safe facilities, reliable electricity, access to reagents and other supplies, and maintenance of equipment. Once these basics are met, investment in digital tools and data management systems can drive efficiency in service delivery, data sharing, and evidence-based policy making.

Better collaboration across One Health sectors will improve global health security. Human, animal, environmental, and food safety laboratories need to work more closely together to detect and support the mitigation of health threats.

Introduction

It is time to drive forward progress in strengthening health systems by investing in quality assured laboratories for clinical and public health functions. Despite their critical role in diagnostics, surveillance, and global health security, laboratories "have remained a historically neglected component of health systems in low- and middle-income countries" (LMICs)[1]. Nearly half of the global population has little or no access to diagnostics[2].

Momentum around Sustainable Development Goal (SDG) 3, which promotes healthy lives and wellbeing for all, will be undermined if investments are not made in laboratory services. SDG target 3.8 is to achieve universal health coverage for all, meaning that everyone can access essential health services without financial hardship. Approximately 4.5 billion people were not fully covered by essential health services in 2021, according to the global monitoring report for tracking universal health coverage[3]. The unfortunate reality is that laboratory services lag well behind other areas of progress.

In 2018, The Lancet published a series on pathology and laboratory medicine in LMICs, including a call to action for the international community to form a global alliance "with a mandate to align efforts and advocate for accurate diagnosis in evidence-based systems"[4]. The Lancet call to action sets out key recommendations for delivering modern, high quality, affordable laboratory services, including:

- involving laboratory professionals in health policy decision making;
- embedding sustainable financing for laboratory services within national health
- budgets and allocating resources appropriately within national laboratory plans;
- supporting the establishment of national accreditation programs;
- ensuring that sufficient human resources are in place and that personnel are equipped with the appropriate skills, training, and education; and
- establishing the appropriate infrastructure, including equipment and laboratory information systems, to ensure high-quality service delivery[4].

However, progress on these recommendations has been fragmented and slow, and the global alliance that was envisaged has not materialized. Investment is needed to achieve the goal of resilient and robust laboratory systems that serve the needs of patients and health systems.

In 2023, the World Health Organization (WHO) resolution on strengthening diagnostics capacity highlighted the importance of equitable access to diagnostics in supporting the fundamental human right to the highest attainable standard of health[5]. The resolution urged stakeholders to:

- develop or strengthen national and regional laboratory networks and support countries to develop and implement quality management systems for ensuring safe, affordable, and accessible diagnostic services;
- support countries to create optimized, integrated diagnostic networks and services that best serve national programmes to tackle all diagnostic needs, replacing existing, often siloed, services.

The functions of laboratory systems and services

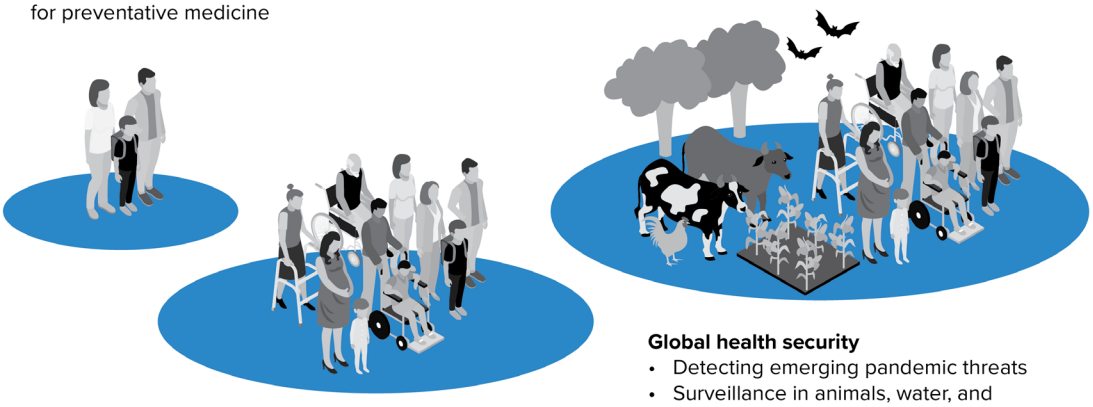
Broadly speaking, health service laboratories provide clinicians, public health workers, policy makers, and populations with clinical and public health information.

Clinical functions include providing quality assured and timely testing and diagnosis for communicable, genetic, and chronic diseases, toxin exposure, and monitoring chronic conditions[6]. Clinicians, health service managers, and policy makers use these results to guide the correct care and treatment for their patients, sometimes supplemented by point-of-care (POC) testing, which can be delivered without the need for laboratory space. To support the clinical function, an appropriate repertoire of tests is required.

The proportion of people with a health condition who are undiagnosed is termed the diagnostic gap[2]. This varies from 35% to 62% depending on the country, according to 2021 data. It is estimated that reducing the diagnostic gap to 10% for just six conditions – diabetes, hypertension, HIV, and tuberculosis in the wider population, and hepatitis B and syphilis for pregnant women – would prevent 1.1 million premature deaths annually in LMICs[2]. When sufficiently resourced and well managed, laboratory services yield dividends widely across health systems.

Functions of health service laboratories

Clinical diagnosis
- Diagnostic testing for disease
- Managing chronic conditions
- Monitoring health biomarkers for preventative medicine



Public health
- Tracking health metrics
- Disease surveillance
- Generating evidence for policy

Global health security
- Detecting emerging pandemic threats
- Surveillance in animals, water, and the environment
- Compliance with International Health Regulations

The public health functions of the laboratory system include population-based disease surveillance, identifying the causative agents for outbreaks and supporting outbreak response, laboratory-based surveillance of health metrics, and providing valuable data to health system managers and policy makers. When viewed across One Health sectors, laboratories also support testing for zoonotic diseases, food safety, and environmental testing.

National public health systems therefore depend on laboratory networks to provide a range of quantitative results relating to health protection. When combined with health management information, this provides a robust evidence base for informed decisions on health priorities and the allocation of limited resources.

The world is still recovering from the acute public health emergency of the COVID-19 pandemic, and international attention remains focused on global health security. Detecting emerging and reemerging infectious disease outbreaks (in humans, animals, and by zoonoses) is especially relevant and will be further exacerbated by a range of factors including climate change and globalization[7]. Robust laboratory surveillance systems are therefore crucial to detect emerging and reemerging infectious diseases with epidemic potential, antimicrobial resistance (AMR), as well as reinforcing International Health Regulations (IHR) (2005) and the Global Health Security Agenda.

Recent outbreaks this century revealed the gaps in many countries' health and laboratory systems. Many national governments (in collaboration with international donors and implementing partner organizations) have taken steps to improve and strengthen public health laboratory networks as a result.[A] This includes implementing quality management systems in alignment with international standards and making better use of technology, forecasting, and modelling.

Case Study

Programs like Strengthening Laboratory Management Toward Accreditation (SLMTA), supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the US Centers for Disease Control and Prevention (US CDC), and Stepwise Laboratory Quality Improvement Process Towards Accreditation (SLIPTA), developed by World Health Organization Regional Office for Africa (WHO AFRO), support countries to strengthen laboratory services towards accreditation from a recognized accreditation body. The programs are complementary, with SLMTA providing the training and SLIPTA conducting progress audits, designed to build competencies across all essential capabilities, including the management of records, personnel, equipment, inventory, processes, and facilities[8]. As of mid-2023, nearly 400 laboratories in LMICs have achieved accreditation through the programs[9].

A Progress in strengthening laboratory capacity in LMICs has been driven by organizations such as the Africa CDC, WHO Regional Offices, African Society for Laboratory Medicine, and Pasteur Network. LMIC institutions working on local and regional health issues and laboratory capacity building include the Noguchi Memorial Institute for Medical Research in Ghana, Institut National de Recherche Biomédicale in the Democratic Republic of the Congo, and the International Centre for Diarrhoeal Disease Research, Bangladesh.

Challenges and moving forward

Despite the critical role of laboratories in clinical diagnostics and public health surveillance, many laboratory systems lack the funding and continuous resourcing that are required to operate effectively across all the necessary functions. To address this, shortcomings in governance and integration, sustainable financing, the laboratory workforce, and infrastructure must be overcome.

Moreover, the increasing burden of non-communicable diseases (NCDs), and the complex comorbidities that result, require more holistic laboratory services than are currently provided across many LMIC health systems. NCDs such as diabetes, cardiovascular disease, and chronic kidney disease require biochemical measurements for diagnosis and management of the condition over time to effectively treat the patient. However, there is often little to no provision of histopathology, endocrinology, or even basic blood biochemistry services in laboratories. Instead, the large majority of investments are directed towards specific disease programs, which provide testing for a narrow set of infectious diseases such as HIV or tuberculosis[10].

Vulnerabilities of laboratories and laboratory networks in LMICs include:

- limited prioritization and integration of laboratories within the overarching national health system;
- siloed investments and programs that focus on single issues or a narrow set of diseases without considering the broader needs of patients and populations;
- inadequate management and support for the laboratory workforce including training and career progression opportunities; and
- poor physical and operational infrastructure that hinders efficiency of service delivery.

These vulnerabilities illustrate the critical need to improve prevention, detection, reporting, and response efforts through ongoing capacity building and mainstreaming of laboratory systems.

While working to address these challenges, the principle of equity—which is central to universal health coverage—should be one of the major considerations for clinical laboratory service delivery. Equal access to clinical services must be ensured for disadvantaged groups including rural populations, minority ethnic or religious groups, low income individuals, and people with disabilities. This requires diagnostic literacy among care providers, civil society organizations, and the population at large. Demand-side intervention is needed to pressure health system planners to improve access to essential diagnostics

1. Weak governance and integration

World Health Organization Regional Offices for Africa (WHO AFRO) and South-East Asia (WHO SEARO) have recently released regional strategies focused on diagnostic and laboratory networks and surveillance[11,12]. These strategies include priority activities aimed at strengthening national leadership and governance of laboratory services and networks, such as advocating for stronger political commitment to laboratory systems, establishing a dedicated national focal point to coordinate laboratory services across One Health sectors, and creating or reinforcing laboratory units at the ministries of health "to ensure coordination of all diagnostics and integration of the public and private sectors for better coordination"[11]. There are further opportunities for laboratory strengthening in the forthcoming revisions to the IHR (2005) and in the ongoing discourse surrounding the Pandemic Treaty.

According to a WHO AFRO report, only 26 out of 47 African member countries (55%) have established directorates or a unit for laboratory services within their ministries of health as of mid-2023. The target is for at least 80% of these countries to have a functional governance structure for diagnostic and laboratory services by 2032[11]. The lack of an integrated governance structure hinders coordination of laboratory services within health systems, including efficient provision of services and linkage to clinical care and quality assurance. A lack of data sharing leads to missed opportunities for laboratory data to be used in health policy decision making.

Case Study

A good example of integrated laboratory governance is the Ethiopian Public Health Institute (EPHI), which sits within the national structure of health agencies accountable to the Ministry of Health. EPHI's mandates include health research, public health emergency management, and laboratory services. The laboratory unit within EPHI is responsible for building the capacity of the national public laboratory network, including implementing research and diagnostic validation, enhancing quality assurance programs, supporting laboratories to achieve accreditation, strengthening various services (eg, clinical, public health, biosecurity) and providing in-service training. EPHI has relationships with regional state and city health bureaus within Ethiopia, and international partnerships including the WHO, Food and Agriculture Organization, USAID, US CDC, PEPFAR, and World Bank[14].

Often laboratory directorates are under-supported from a political perspective, and a ministerial level task force may help ensure that the right level of support is given. In turn, there needs to be demand for improvements from clinicians (led by chief medical officers and professional associations), who work on the frontline and face patients every day, and public health professionals involved in disease control or surveillance programs. These groups are often not included in major decisions or in the planning of services, resulting in a lack of user buy-in at an early stage.

Helpful resources exist for establishing high-quality national laboratory networks that meet international standards, such as the SLMTA and SLIPTA programs and WHO AFRO's "Guidance for Establishing a National Health Laboratory System"[13]. With practical tools and resources to support, there is much work to be done in establishing national laboratory units within ministries of health to strengthen laboratory systems in LMICs. However, implementation of these guidelines is often dependent on donor funding, with insufficient domestic financing available to make sustainable progress.

2. Vertical and unsustainable financing

Among the most significant barriers to building strong, sustainable, and resilient laboratory systems that deliver holistic services is the lack of consistent and sustainable funding. There is “limited recognition of the central importance of diagnostics” at a policy level where funding decisions are made[2]. National governments tend to have competing investment priorities—essential infrastructure, security, basic social services—with insufficient financing to address them all. While some governments remain unable to invest sufficiently into laboratory services, official development assistance and other forms of donor aid are still essential. National spending on laboratory services can be difficult to quantify as it may be captured in different aspects of national health accounts, including hospital, preventative, and ancillary services[15].

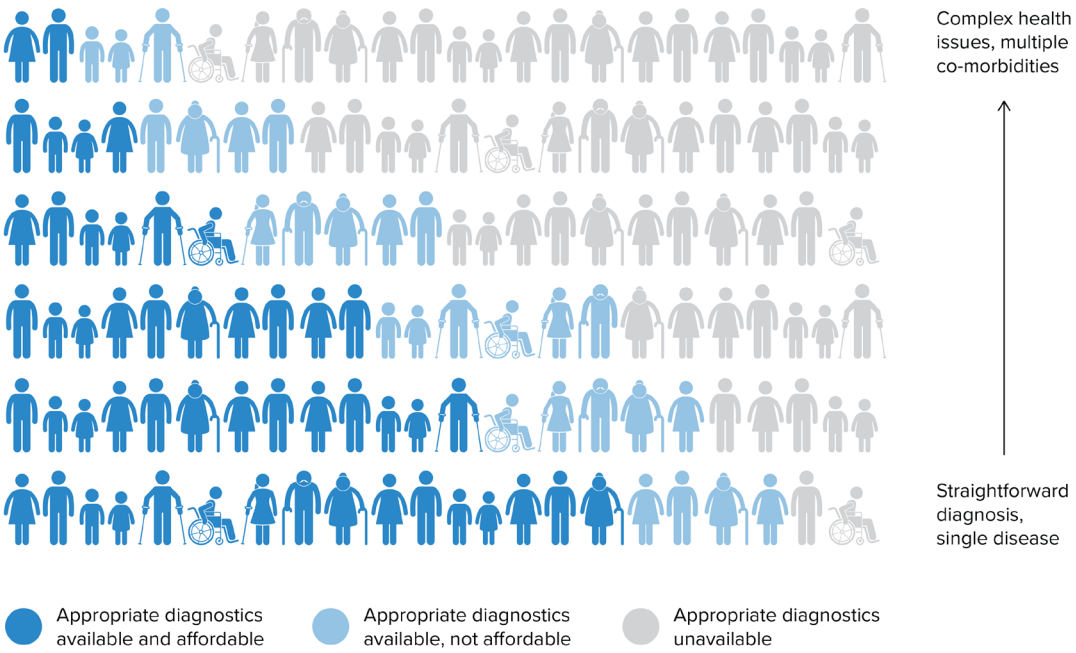
Too often, investments in laboratory services address a narrow set of diseases matching donor priorities, such as malaria, tuberculosis, or HIV. By contrast, there is a severe shortage of funding aligned with sector-wide planning, which is disease-agnostic and population- and patient-centered. In reality, most patients present at healthcare facilities with non-specific symptoms such as fever, and many have comorbidities. Without the ability to rely on a range of diagnostic tests, the clinician is often unable to identify the various factors that led to the illness, and therefore the patient may be ineffectively managed. Single-issue diagnostics can also create unintended consequences, such as untargeted use of antibiotics, when the limited selection of available tests return negative results[16].

Case Study

The WHO Essential Diagnostics List (EDL) is “an evidence-based register of in vitro diagnostics (IVD) that supports countries to make national diagnostic choices”[17]. The EDL aims to improve national laboratory services by guiding prioritization of IVDs based on allocation of often scarce resources, to be adapted to the national context and needs. This can support national laboratory networks and donors to prioritize the highest-impact laboratory services to address pressing health issues[18].

Donor-funded programs for specific diseases have been immensely important for improving health outcomes where those diseases are major contributors to morbidity and mortality; their life-saving work has been of huge value. However, there are many drawbacks to this siloed approach. For example, after the donor funding cycle has ended services may become unsustainable leading to short-lived progress. In addition, when different services within laboratory systems are funded by different donors they lack coordination and integration. This can lead to issues such as parallel specimen referral pathways for different diseases, while specimen referral for other diseases remains unsupported. There are often different reporting systems for different diseases, creating more work for staff. Other consequences may be the under-use of platforms due to low demand creation and the delivery of equipment without adequate training, ongoing supplies, or service and maintenance support[10]. Furthermore, bursts of earmarked funding in response to health emergencies, such as the COVID-19 pandemic or an outbreak of Ebola virus disease, are needed to address these crises but can leave laboratory systems just as unprepared for the next health emergency.

Gaps in diagnostics funding



*for illustrative purpose only, does not represent real statistics

Sustainable financing of laboratory networks will require a more strategic alignment of donor aid with national health system priorities, based around sector-wide plans, which strengthen laboratory systems rather than only supporting specific services.

National governments (and other national stakeholders) must be steadfast in their objectives, and international donors must be pragmatic. Reducing reliance on international aid will lessen the negative impacts of shifts in donors' domestic policies on even the most successful programs in recipient countries.

Achieving this vision will require donors to shift away from the siloed funding of disease-specific services in favor of broader investments. In turn, the way in which donors evaluate impact will require a shift. Although simple metrics, such as the number of HIV tests conducted or number of laboratories performing malaria diagnosis, are easy to communicate, they show a very narrow picture. Numerous quality indicators for laboratories exist but are not universally applied and depend on the services provided. Projects aimed at strengthening laboratory systems require a carefully planned monitoring and evaluation strategy to demonstrate impact to donors.

A country-led, sector-wide approach to health system planning must include laboratory services as one pillar to ensure that this is seen as a valid investment. An investment case for national laboratories, including costed delivery targets, can support integration into national budgets and can aid donors in supporting impactful services. Laboratory services are too often seen as a cost rather than an investment, and the dividend on investment is often realized in other areas of healthcare, such as reduced length of stay in hospital. For an effective investment case to be made, political will and support is required. Over time, value will be demonstrated through improvements in correct diagnoses, leading to less spending on inappropriate treatments, faster recovery, and return to productivity. Value will also be added through more efficient procurement and supply chain processes, and faster detection and containment of health security threats. As these savings are aligned to national agendas and countries make progress with economic development, laboratories will become further integrated into national health budgets.

3. Maintaining a well-qualified workforce

Training and retention of laboratory staff, and management of the workforce across laboratory networks, are key human resource issues that must be addressed for laboratories to operate effectively. Currently, laboratories in many LMICs face workforce challenges including staff shortages, high turnover and attrition, and low morale. For example, during the COVID-19 pandemic, Indonesia's laboratory network was hindered by a shortage of trained staff that could perform SARS-CoV-2 testing across many of the 34 provinces of Indonesia's vast archipelago, which restricted the number of diagnostic tests performed and the country's ability to accurately measure the incidence of infections[19].

Tiered laboratory networks consist of different levels of laboratory services increasing in complexity from local health centers to district hospitals to regional and national reference laboratories. There should be appropriately skilled workforces at the central and peripheral levels, clearly defined structures of authority, standard operating procedures, and a harmonized approach to specimen collection and transport with other sites across the network to minimize turnaround time of services[20].

Laboratory science is generally not viewed as an attractive career in many LMICs due to issues such as low salary and lack of career advancement opportunities. Well-qualified laboratory staff can get frustrated with the low pay and lack of incentives in the public sector, and therefore are often drawn to private sector laboratories with better technology, infrastructure, and staff benefits[21]. In government laboratories, skills gained during training are often difficult to maintain at facility level due to a lack of management support, high staff turnover, or problems with equipment and supply of consumables and reagents. Rural laboratories tend to face greater challenges recruiting qualified staff due to remote and undesirable locations.

Fleming Fund Country Grantee FHI360 project in Vietnam. Credit: Vu Ngoc Dung.

Raising awareness of the integral role that laboratory scientists play in health systems is an important way to start improving the attractiveness and recognition of a career in laboratory science. Longer term, political leadership will be needed to establish clear and structured career pathways with job titles and salaries aligned to national standards. In-service training opportunities must be provided for continuous professional development, including mentorships, e-learning opportunities, and rotational deployment (particularly in rural postings)[21].

Joint training with human, animal, and environmental laboratory staff can help to ensure standardized procedures across the One Health sectors and build collaboration and data sharing. In a survey of pathologists in LMICs, faculty training and mentorship was the highest rated solution for improving laboratory services among 267 respondents[22]. Management skills training for laboratory managers can support a more positive workplace culture, and the shift from disease-specific functions to broader structural improvements in laboratories should elevate working conditions, increasing job satisfaction.

Opportunities should be taken to leverage private sector technical expertise to boost public sector capabilities. This can include internships, mentorships, work placements, training of public sector professionals in private institutions, and research collaborations between public and private institutions[22]. Private sector laboratories can also be included in integrated networks of tiered laboratories, and financing mechanisms established to subsidize private sector service provision. Ministries of health and private sector institutions need to establish trust and mutually defined goals, and closely monitor the benefits of these partnerships to ensure more sustainable funding.

Case Study

The Fleming Fund, a UK aid program supporting countries across Africa and Asia to strengthen surveillance for antimicrobial resistance, builds skilled public workforce capacity through its Fellowship Scheme in 20 LMICs. Fellows in human and animal health are primarily selected from public institutions for on-the-job training and mentorship, and are tasked with passing new skills on to colleagues[23]. In Nigeria, the first cohort of professional fellows conducted a series of training sessions on AMR for 132 people including laboratory scientists, microbiologists, and veterinary and human health epidemiology officers, from local facility level up to state director level.

4. Physical and operational infrastructure

The global COVID-19 pandemic and Ebola and Marburg outbreaks in sub-Saharan Africa exposed persistent gaps in existing infrastructure, including outdated facilities, communications networks, utilities, roads, and transportation services. Some of these challenges go beyond the scope of laboratory improvements but are key to supporting laboratory staff and services. For example, reliable road networks facilitate the procurement of necessary equipment, consumables and reagents, as well as the transport of specimens and personnel. Facilities should be safe and secure places to work, with the required level of biosafety and biosecurity being front and center of infrastructure design and development, as well as providing safe personal facilities such as changing areas and toilets.

Laboratory service capabilities are strictly limited by the available equipment and supplies (as well as expertise). In a study of 14 African countries, only 1.3% of the 50,000 medical laboratories performed bacteriology testing, an important group of complex laboratory services that require a variety of supplies and specialist skills. This leaves much of the population without access to these valuable diagnostic services[24]. Rural laboratories tend to have greater challenges with supplies due to the difficulty or time required to reach these facilities, and trained biomedical engineers for equipment maintenance are more often located in urban areas. In the Philippines, for example, a major challenge reported in providing laboratory services to rural populations is “poor infrastructure to house, power, and maintain diagnostic equipment, and logistical challenges with obtaining diagnostic equipment and reagents”[25].

In the procurement of new laboratory equipment, maintenance requirements and calibration schedules need to be considered. Often due to poor planning on the side of well-intentioned donors, many hospitals and laboratories in LMICs have “‘medical equipment graveyards’ of obsolete or broken donated biomedical equipment” with equipment donated without sustainable funding for maintenance or the necessary consumables[26]. Emphasis on a general set of maintenance processes for essential diagnostics should also be seen as an essential component of laboratory strengthening. Too often, systems break down for want of a simple part or modest engineering skills required to remedy a fault. In all cases more sophisticated laboratory instruments, such as automated bacteriology platforms, should be provided alongside long service and maintenance contracts. Similarly due to poor planning from well-intentioned donors, LMIC laboratories often have an array of equipment from different manufacturers that require non-standard consumables from specific companies. It is not possible to keep systems running without committing to the often higher-priced items.

Digital infrastructure and innovative technology can facilitate more effective management of laboratory systems and services once the more basic requirements, such as electricity supply, are in place. Electronic laboratory information management systems (LIMS) for digital record keeping and data management can significantly improve the efficiency of data sharing and workload management. The 76th World Health Assembly resolution on strengthening diagnostics capacity urged member states to “establish routine data collection systems for monitoring key data on the… use of diagnostics, and to use these data for evidence-based policy making”[5]. Electronic LIMS enable better use of data in decision making; for example, reports can be generated for quality indicators across the laboratory network and interventions targeted where they are most needed, ensuring the best use of limited resources. LIMS

can also be used to rapidly communicate test results back to referring clinics, wards, clinicians, and patients, avoiding any errors in transcription. This can create a virtuous cycle, leading to improved use of laboratory services and improved patient care[22].

Due to dispersed and rural populations having poor accessibility to clinical facilities across many LMICs, there is a need for expanded access to POC testing. These tests have the advantage of being done outside the laboratory setting and can broaden access to diagnostic tests. Such technology is widely in use for HIV and malaria testing and monitoring, and POC innovations for other diseases are increasingly commonplace in LMIC settings. In Haiti, POC tests for biochemical measurements (creatinine, cholesterol, and HbA1c) supported community health workers in diagnosis of diabetes, chronic kidney disease, and dyslipidemias in a community-based screening study of NCDs[27]. Challenges were noted regarding the temperature requirements of the POC tests, which are often designed with high-income countries in mind. To overcome other issues of unreliable electricity supply and reagent stockouts, more and more POC testing devices are being developed with internal power sources and reagents[22]. This approach introduces the challenge of quality control of testing. Staff conducting POC tests must be trained on their appropriate use and interpretation, and these tests and their results should be integrated into the larger laboratory network, including digital records and quality assurance processes.

Finally, diagnostic integration utilizes technology that can process different tests for a variety of diseases using the same platform. This technology was utilized during the COVID-19 pandemic to test for SARS-CoV-2 using existing GeneXpert instruments for tuberculosis testing, by adding a new SARS-CoV-2 cartridge to the technology. Prior to the COVID-19 pandemic, numerous LMICs had already begun to pilot test diagnostic integration, including Cameroon, India, Zimbabwe, Brazil, and Malaysia, for diseases including HIV, tuberculosis, human papillomavirus, and hepatitis B and C viruses[28].

Normalizing diagnostic integration will require “alignment across different disease programs, donors, technical agencies, implementing partners, and suppliers”, which is yet another reason to shift away from siloed programming[29]. Use of these technologies can lead to more efficient services and greater value for money across disease programs when laboratory services and technologies are shared[28].

Conclusion

Laboratory services are a crucial part of robust and resilient health systems. They must serve the health needs of the population to support universal health coverage and achievement of the SDGs. In addition to clinical functions, public health functions in human, animal, environmental, and food testing laboratories underpin global health security.

Commitment from governments, partners, and donors is required to overcome current challenges faced by many laboratory systems in LMICs. This will be achieved with strong governance and integration into the wider health system, efficiency gains by breaking down silos and promoting sector-wide planning, support for the laboratory workforce, and improvements in physical and operational infrastructure.

The ultimate aim is to establish a holistic package of preventative, diagnostic, treatment, and surveillance services to support health systems strengthening, universal health coverage, and global health security. Achieving this vision will lead to improved health outcomes from community to international level. For local communities, lives will be saved and livelihoods protected due to improved accessibility to diagnostic services for treatment and management of health conditions. At the national level, closing the diagnostic gap will lower the overall cost of treatment. Data generated by laboratory networks will inform prioritization of health needs and interventions, supporting value for money in planning of national health budgets. In turn, improved resilience and a more effective response to new and endemic diseases will be realized. Finally, at the global level, pandemic preparedness will be enhanced as improved surveillance across One Health sectors means emerging threats are detected, reported, and contained more quickly.

A Call to Action

Two years since the **report** of the Lancet Commission on Diagnostics called on the international community to recognize the importance of laboratory services in health systems, the continued inadequacy of diagnostic services in low- and middle-income countries puts everyone at risk.

We call on policy makers, international donors and stakeholders across global health systems to act together to accelerate change. Here are our recommendations:

- **National health system priorities, based on sector-wide plans, should guide donor investments** with the overall aim of improving the quality and accessibility of services across the clinical spectrum.
- **Countries need a dedicated unit for laboratory services within the Ministry of Health** with high-level political support to improve integration of laboratory services within the broader health system.
- **Policy makers need to develop an investment case for national laboratory services,** including costed delivery targets.
- **Closer collaboration is needed for laboratory services delivery** to maximize the coordination, effectiveness, and impact of laboratory investments at all levels.
- **Laboratory professionals need clear career pathways and specialist training opportunities** to increase job satisfaction and improve staff retention.
- **Improved technology and data management systems are needed to drive efficiency** and quality of service alongside investment in people to enhance capabilities of laboratories.
- **Services should be planned with a focus on universal health coverage,** ensuring that all members of society are able to access services without hardship.

Author biographies

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Organization biographies

Mott MacDonald

Mott MacDonald is a global management, development and engineering consultancy that works across sectors, including global health security, infrastructure, and climate change. We take a system strengthening and One Health approach to deliver sustainable impact, partnering with clients and communities to improve health outcomes worldwide.

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Management Science for Health – MSH

MSH works with all levels of the health system—from government ministries to frontline health workers—to address key global health challenges and achieve universal and equitable health services for all.

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ICF

ICF collaborates with host country governments, locally-based partners, and international development agencies to design and implement projects that promote sustainable, resilient societies. Our work aims to facilitate inclusive growth and sustainability; alleviate poverty; support clean energy; advance climate change solutions; and address environmental, social, and health needs.

icf.com

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