Optimizing access and efficiency of diagnostic systems using OptiDx

OptiDx
OPTIMIZING DIAGNOSTIC NETWORKS

A user-friendly, open-access network analytics tool

THE CHALLENGE: LACK OF DATA-DRIVEN DIAGNOSTIC SYSTEMS DESIGN

Inadequate testing capacity, coupled with gaps in coverage and quality, limit access to quality treatment for all patients. Basic diagnostic capacity is available in just 1% of primary care clinics and 14% of hospitals in low- and middle-income countries (LMICs). Globally, of the 10 million people infected with tuberculosis, 3 million are "missing" from health systems, and one third of infants who have been exposed to HIV have not been tested. Diagnostic systems are fragile, and access is highly inequitable. A year after the virus first emerged, COVID-19 testing rates in LMICs were 10 times lower than those in high-income countries.
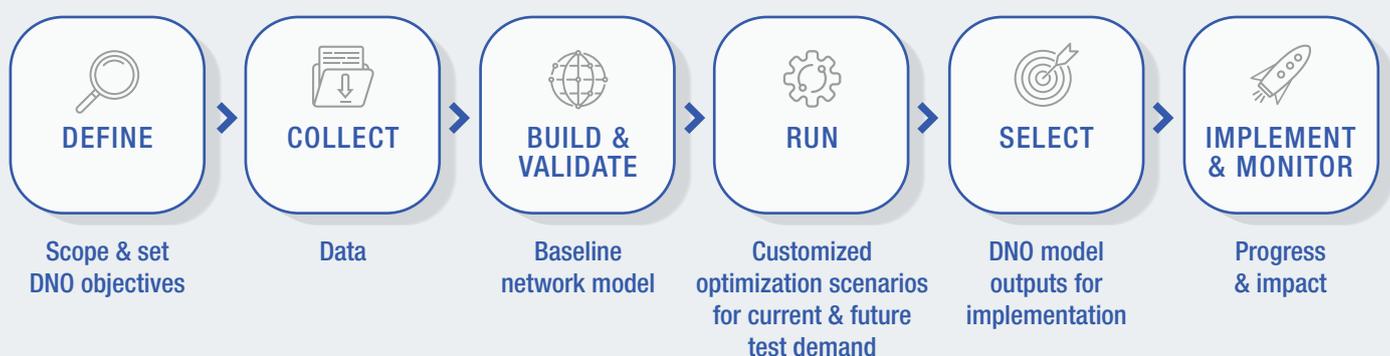
Strengthening diagnostic systems and closing these testing gaps is essential to save lives and achieve universal health coverage (UHC) goals. A key barrier to testing is a lack of tools for diagnostic planning and delivery: network data analytics require complex and context-dependent data inputs and assumptions, but today much is based on manual methods and expert consensus. The result is a limited ability to systematically evaluate trade-offs between improving access and cost efficiency within budgetary constraints.

THE NEED: DIAGNOSTIC NETWORK OPTIMIZATION

Diagnostic network optimization (DNO) is a geospatial network analytics approach that aligns demand for testing and capacity, to improve patient access to services in the most cost-effective way. DNO seeks to answer the question:

What is the optimal type, number and location of diagnostics and an associated sample referral network that enables greatest patient access to services, while maximizing overall efficiency?

Optimizing a diagnostic network

DEFINE	COLLECT	BUILD & VALIDATE	RUN	SELECT	IMPLEMENT & MONITOR
Scope & set DNO objectives	Data	Baseline network model	Customized optimization scenarios for current & future test demand	DNO model outputs for implementation	Progress & impact

THE SOLUTION: OptiDx

OptiDx is a web-based open-access software that supports data-driven planning of diagnostic testing services. It was developed by FIND, LLamasoft (a Coupa company) and the USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project. OptiDx brings industry best practices in supply-chain network analytics to inform design and optimization of diagnostic networks.
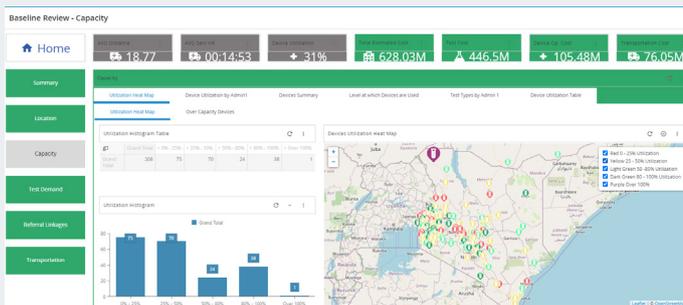
Since 2016, FIND has worked in partnership with LLamasoft and Ministries of Health in Kenya, Lesotho and the Philippines to explore the impact of diagnostic network design and optimization. The work highlighted the need to build capacity across LMICs to independently conduct similar analyses across other priority diseases and in an integrated manner. OptiDx was developed to address this need and is currently being piloted in a multi-country study across a range of diseases.

Key questions that OptiDx can answer:

- How is the demand and capacity of diagnostic tests distributed across the country? Where are the gaps?
- How can the current diagnostic network be optimized to meet existing and future demand?
- Is procurement of more devices needed? If yes, which devices, how many and where should they be located?
- How is the sample referral and transport system currently organized? How can it be optimized to improve turnaround time and reduce costs?
- What efficiencies can be generated through integration of testing and sample referral?

THE IMPACT

- **Improving access to diagnosis** leads to reduced diagnostic delay and loss to follow up, resulting in more people diagnosed and treated.

- **Increased network efficiency** results in reduced procurement and operating costs, enabling better prioritization of available resources.

- **Better network visualisation** empowers countries, strengthens coordination among partners and enables better decision making.

IN KENYA DNO informed Kenya's National Strategic Plan for Tuberculosis, Leprosy and Lung Disease 2019-2023, revision of Kenya's National Integrated sample referral system (SRS) guidelines, and led to development of a practical guide for county operational planning for integrated SRS which is already used to strengthen referral systems in 15 counties and being scaled up countrywide. Recommended device capacity and locations have been used to develop donor funding requests.

IN THE PHILIPPINES, DNO informed updates of the Philippine Strategic TB Elimination Plan (PhilSTEP), the Laboratory Network Strategic Plan (LNSP), and a donor funding request; a potential 28 million USD savings in device procurement costs were enabled through the DNO analysis. The National TB Control Program (NTP) and partners followed DNO results in procuring and allocating GeneXpert® devices.

OptiDx screenshot – visualization of testing demand and device utilization

THE VISION

Integrated and patient-centred diagnostic networks that deliver accurate, timely and accessible testing at costs sustainable for health systems, and rapidly adapt to emerging threats. **To achieve this vision OptiDx helps:**

OPTIMIZE CURRENT USE OF DIAGNOSTICS by evaluating trade-offs in access, equity and efficiency of various interventions	**INFORM INTRODUCTION OF NEW DIAGNOSTICS** by evaluating cost-effectiveness and understanding decision drivers	**EXPEDITE TESTING STRATEGIES FOR EMERGING DISEASES** by rapid DNO analysis using pre-existing network models

ENABLES COUNTRIES

to build and maintain an up-to-date, comprehensive, integrated digital network model that is:

- coordinated and owned by Ministries of Health and used by all partners
- based on standard data templates and with appropriate data security
- backed by in-country capacity building to update and use model outputs for strategic planning and funding requests

OptiDx OPTIMIZING DIAGNOSTIC NETWORKS   FIND Because diagnosis matters   LLamasoft A Coupa Company   BILL & MELINDA GATES foundation   USAID FROM THE AMERICAN PEOPLE   USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM Procurement and Supply Management   PEPFAR U.S. President's Emergency Plan for AIDS Relief