

Diagnostic network optimization

A network analysis approach to patient-centred, cost-efficient diagnostic systems

WHY OPTIMIZE DIAGNOSTIC NETWORKS?

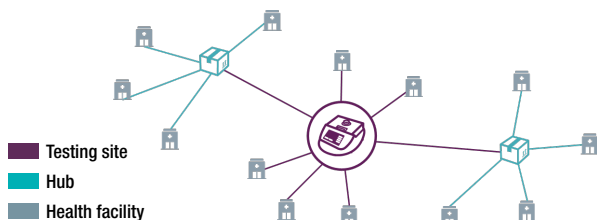
Underfunded and inefficient diagnostic networks cause gaps in testing access and quality that limit patient care. In low- and middle-income countries, basic diagnostic capacity is available in just **1% of primary care clinics and 14% of hospitals**. **Close to half of the world's population** has limited or no access to diagnostics.

Making diagnostic networks more efficient and accessible is key to enabling healthcare for all. However, these networks are highly complex, involving multiple health facilities, laboratories, devices and tests shaped by local factors and budgetary constraints. It is a challenge to systematically evaluate trade-offs between potential interventions that aim to increase access, improve utilization and limit costs.

Diagnostic network optimization (DNO) helps analyse the current diagnostic network and recommends the optimal type, number and location of diagnostics and an associated sample referral network. It enables the greatest access to services to achieve disease goals and health equity, in the context of limited resources.

DNO-RECOMMENDED DIAGNOSTIC NETWORK DESIGN

An integrated sample referral system links health facilities and hubs to testing sites with available testing capacity in the most efficient manner.



OPTIMIZED DIAGNOSTIC NETWORKS DELIVER

- ✓ THE RIGHT AMOUNT OF TESTING
- ✓ IN THE RIGHT PLACE
- ✓ AT THE RIGHT TIME
- ✓ TO MEET STRATEGIC HEALTH GOALS
- ✓ AT SUSTAINABLE COSTS

WHAT CAN DNO DO?

- Show whether current demand is met by the existing network
- Recommend if new devices are needed to meet targets, and if so, how many
- Recommend locations for new devices
- Reveal where spare capacity exists in current devices
- Show the impact of testing integration

HOW CAN DNO BE USED?

-  **COMPARE COSTS AND OUTPUTS** to shape investments for systems strengthening
-  **INFORM** evidence-based strategic national plans and guidelines
-  **GUIDE** funding requests
-  **INFORM PROCUREMENT DECISIONS** (new devices, instruments, vehicles and third-party providers)
-  **ESTABLISH OR REROUTE** sample referrals

DNO in 5 steps

1. DEFINE SCOPE AND OBJECTIVES OF DNO

2. COLLATE AND PREPARE DATA



Sites



Demand



Test types



Costs

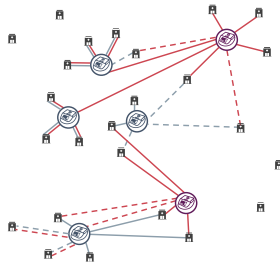


Referral policies



Transport policies

3. BUILD BASELINE MODEL



4a. ADJUST DATA INPUTS & APPLY CONSTRAINTS



Sites



Demand



Tests



Time & distance



Addition of new labs



Budget

DNO OUTPUTS INCLUDE:

- site locations
- testing capacity
- utilization levels
- sample referral flows
- overall costs

4b. ANALYSE & COMPARE SCENARIOS

Compare scenarios to deliver the right balance of:

ACCESS



COSTS



UTILIZATION



5. SELECT & IMPLEMENT DNO OUTPUTS



Select



Monitor



Update

Define the scope of analysis

in consultation with stakeholders, including the tests and devices, and the specific objectives tailored to the country priorities and budgetary constraints.

Identify and collate data inputs, then clean, prepare and validate data for entry,

e.g., location and name of health facilities, test and device types, testing volumes, transport modes and frequency, costs, sample referral linkages.

Build the baseline model,

a digital representation of the current diagnostic network, that helps to visualize the network layout, demand for testing and utilization of existing capacity. Identify gaps (such as laboratories running over- or under-capacity, long referral times and distances) and compare the current state against programme goals.

Adjust model inputs and assumptions

such as allow/restrict new sites, change testing demand and add a new test to an existing device. Apply constraints such as the maximum service time/distance between facilities and labs, allow or restrict adding new labs/devices and the overall budget.

Use DNO outputs

to visualize and compare the impact of potential changes on the network and service delivery. Re-adjust data inputs and modify constraints to refine scenarios.

Select preferred scenarios

based on priorities and feasibility. Use them to guide decision-making for planning, procurement and funding, e.g., add tests on devices with spare capacity; establish sample transport system; relocate or procure devices.

Implement and monitor selected outputs.

Update models periodically or when significant changes occur in inputs or assumptions.

DNO CAN BE PERFORMED WITH VARIOUS SOFTWARE TOOLS THAT HELP INTEGRATE TEST DEMAND, TESTING CAPACITY UTILIZATION, COST EFFICIENCY AND ACCESS.

FIND OUT MORE

<https://www.finddx.org/dno/dx-network-opt/>