Diagnostic network optimization

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.

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

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

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

A network analysis approach to patient-centred, cost-efficient diagnostic systems
DNO in 5 steps

1. DEFINE SCOPE AND OBJECTIVES OF DNO

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.

2. COLLATE AND PREPARE DATA

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.

3. BUILD BASELINE MODEL

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.

4a. ADJUST DATA INPUTS & APPLY CONSTRAINTS

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.

4b. ANALYSE & COMPARE SCENARIOS

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.

5. SELECT & IMPLEMENT DNO OUTPUTS

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.findx.org/dno/dx-network-opt/