REQUEST FOR INFORMATION (RFI)
DIAGNOSTIC NETWORK OPTIMIZATION (DNO) LITE

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CONTENTS

1. List of acronyms

DNO	Diagnostic Network Optimization
FIND	Foundation for Innovative Diagnostics
HIV	Human Immunodeficiency Virus
LMIC	Lower- and Middle-Income Country
RFI	Request for Information
RFP	Request for Proposals
TB	Tuberculosis
WHO	World Health Organization

2. Background Information:

FIND is accelerating equitable access to reliable diagnosis around the world. We are working to close critical testing gaps that leave people at risk from preventable and treatable illnesses, enable effective disease surveillance, and build sustainable, resilient health systems. In partnership with the World Health Organization (WHO), other global health agencies and the G20/G7, we are driving progress towards global health security and universal health coverage. We are a WHO Collaborating Centre for Laboratory Strengthening and Diagnostic Technology Evaluation. For more information, please visit www.finddx.org

A diagnostic network refers to a connected system that combines human resources, facilities, referral systems, and diagnostic testing devices to detect, manage, and monitor diseases in clinical or public health settings[1]. This network encompasses physical components like testing sites, devices, and tests, as well as operational rules and policies governing sample referral linkages. The primary objective of a diagnostic network is to ensure the right amount of testing is provided, at the right place and time, to the appropriate individuals, while maintaining affordability and sustainability[2]. The network aims to deliver accurate test results promptly, supporting patient care and informing public health decision-making in alignment with national goals and strategies. Countries typically establish a national laboratory network integrated into the multi-tiered health system, involving both public and private healthcare providers. Each tier offers specific tests based on population needs, infrastructure requirements, and resource limitations[3].

Designing *optimal* diagnostic systems is complex and highly context-dependent, relying on multiple data inputs and assumptions. Throughout several years of operation in the Diagnostics Network Optimization (DNO) field, FIND has been dedicated to supporting low- and middle-income countries (LMICs) to strengthen diagnostic systems through data-driven analysis and optimization, termed DNO. Important variations in epidemiology, geography and health systems – often within the same country – must also be accounted for, as well as budgetary considerations. DNO 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. Together with other approaches to support countries to identify gaps and develop tailored interventions, such as patient pathway analysis and structured assessments, DNO 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.

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[1] https://www.finddx.org/wp-content/uploads/2022/12/20220909_guide_to_DNO_FV_EN.pdf
[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5516913/
[3] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5433810/

FIND has worked with partners to develop and deploy software to conduct DNO analysis, and delivered insights to more than 20 countries that have shaped strategic and operational planning and investment decisions. Despite these successes, such analyses require significant investment in time and resources to compile the necessary data needed, and there is a need for simpler tools that can rapidly deliver insights with more limited data requirements and more limited analyst skills. To address this need, the purpose of this Request for Information (RFI) is to outline the requirements for a simplified and user-friendly tool that can be readily adopted by countries lacking mature data systems and deployed in a shorter time frame with less advanced analyst proficiency.

3. Statement of Purpose:

FIND is planning a software development project for a tool that can assist with geospatially powered mapping and network analysis, see further details below. FIND will be looking for partner/s in developing the tool and will be using the responses from this RFI to make decisions around the feasibility of going to a Request for Proposals (RFP) in the future. The purpose of this RFI is to allow FIND to assess supplier responses and use the results in future decision making. FIND makes no obligation or undertakings in any way to:

- Go to Tender; or
- Accept any RFI information received from suppliers; or
- Include supplier responding to this RFI in any future tender invitation; or
- Any other commitment to supplier whatsoever, including any intention to form a contract with any supplier for provision of this opportunity.

4. Scope of Work and Objectives

The software development project intends to create a free, open-source tool that simplifies and facilitates geospatially powered mapping and network analyses. The tool aims to empower users with basic optimization capabilities, requiring minimal data inputs and catering to non-advanced users. It will enable users to make network adjustments and interrogate the resulting implications. Additionally, interoperability will be a key feature, as the tool should integrate with other software and have the ability to ingest data from external systems when necessary. By offering a user-friendly interface and enhanced interoperability, this tool aims to bridge the gap in DNO capabilities, particularly in resource-constrained settings. The benefits of this tool would include reducing project time from 6 months to only 1-3 months by streamlining complexity and the data inputs required, providing an additional option for geospatially powered mapping and network analyses to countries without advanced data systems or readily available data, and assisting them in preparing for full DNO implementation in the future.

4.1 User Roles

The following user roles are envisioned:

- Overall admin rights for the FIND team or delegated responsible party(ies)
- Country groups: users can be added to a group for a country.
    - Users can be part of multiple country groups
    - Users in a country group should only be able to view their countries' data
    - Each country group should have an admin that can add/remove users
    - Country groups should have "create/edit" and "view only" users
        - "View only" users should only be able to view results

4.2 Assumptions and constraints

The following list of assumptions are envisioned:

- The end user will have basic computer skills. They would have simple excel skills like capturing data, and would be comfortable uploading files into a cloud-based system. Assume that the user would not be able to do any coding, and that the interface should be point and click, or drag and drop, rather than code.
- The end user will not always have the data readily available. The majority of data will be uploaded via an Excel template. The tool may need to ingest data from predefined sources where necessary, e.g. Population data from WorldPop.
- The use case will be limited to one to three disease types (e.g. TB and HIV).
- The software will make several assumptions about laboratory devices and their properties, with the option for user to change information if needed
- As the default assumption, straight line distance will be used for optimization, functionality where the user can choose to use road networks should be available. Calculating these road network distances should not require more than a click of a button for the end user, and they should not leave the tool.
- The following functionalities are assumed to be *OUT* of scope for this project
    - Vehicle routing
    - Vehicle tracking
    - Live specimen tracking from collection to test site
- Security
    - The tool make use of features that ensure the platform is secure and that no unauthorized users will be able to gain access to any data and/or outputs

4.3 Functional Requirements

4.3.1 Overview of expected Data Inputs

The high-level data inputs are defined below. In addition, it is important to note that different countries will have different sets of data available, in different systems and locations. For all data inputs, the user should be able to view a table of the data, and be able to edit any of the fields in the table. For all data inputs, they should be pre-loaded from available public sources, where possible.

- Facilities
    - Health facility name, GPS coordinates, Administration 1 area (eg. Province)
- Laboratory
    - Name and coordinates
- Hubs (optional, depends on country)
    - Name and coordinates.
    - We envision this to be a bit more complex, and hence would be lower priority
- Tests
    - The test type being considered for the network (eg. HIV, TB or a combination)
- Devices
    - The device types and number available at each lab
    - As noted, assumptions about properties of the device types will be made in the backend so the user does not have to enter them, but the user can edit them if necessary. Similarly with the number of shifts for each device (eg. Running 8-hours/day vs 24 hours/day)
    - Assumptions on the number of tests by disease type will be made in the backend, with the option to change for the end user
- Capacity
    - Capacity should be automatically calculated using the device information assumed/provided.
- Mode of transport
    - A default mode of transport and time will be assumed. E.g. Motorbike with average speed of 50km/h

    - The user can change it, if necessary
- Health facility demand
    - The demand of the disease type at each facility
    - Ideally, this data would be pre-populated for countries, with the option for the country to load their own demand data if they have it
- Referral pathways
    - Historical referral pathways will not be considered
    - The user should have the option to optimize nationally, or within the Admin 1 (province) areas only
- Testing
    - Historical testing should be pre-populated where possible and data is available. Alternatively, it should be sourced from in country sources.

4.3.2 Visualizations

The software should provide a combination of dashboard type interactive visuals that include a combination of filters, graphs and maps. Dashboards should cover capacity, demand, utilization, network overview and scenario comparison.

4.3.3 Optimization

The software should be able to perform simple optimization based on the data inputs available. The software will have several pre-loaded optimization workflows which will guide the user through the steps required to perform the optimization. A key feature will be the ability to compare different scenarios as a result of changes in assumptions.

4.3.4 Baseline scenario

This will be the first and default step for any analysis. Based on the data inputs provided by the user, the system will run an optimization to link facilities to their closest laboratories, provided there is capacity at the laboratory. The outputs should include the utilization of each device (and lab), and the referral pathway from facility to laboratory (straight line distance at assumed travel speed). There should be an option to limit referrals to within Admin 1 areas.

5. INFORMATION TO BE PROVIDED

5.1 Self-declaration

Please complete the template provided.

5.2 Supplier capabilities and performance

- A description of the core supplier business with relevant previous case studies to support the description

5.3 Certifications and awards

- Details of all relevant certifications held (ex. ISO), if applicable

5.4 Indicative Pricing

Timelines: Please provide estimated timelines for the development of the proposed solution. Include any key milestones or dependencies that should be considered.

Budget Range: Indicate the estimated budget for your proposed solution.

5.5 Other information

This section describes key information to be included in your response.

Problem statements: Provide some key geospatially powered mapping and network analysis problem statements that you expect the user to be able to answer with this solution. Some example problem statements are included below:

- What does an overview of my network, including referral linkages by closest distance, look like?
- What does utilization look like if we combine two test types on the same platform? Eg. TB & HIV.
- Will I still have spare capacity if I double demand?

Data inputs: Please provide your feedback and recommendations on the list of data inputs provided. Are there any data inputs that should be added or removed based on your expertise?
Currently, data is collected through an Excel template, what are your comments around this? What better alternatives exist?
Additionally, please share your ideas on how to pre-populate or source data from different sources. Kindly specify the potential sources you would utilize.

Technology stack: Is open-source technology a viable option for this solution? Please provide some reasons for your answer. Additionally, please specify the core technology or software components that your solution would utilize to create the desired outcome. Would you use an existing solution and customize it, or would you recommend developing one from the beginning?

Optimization: Describe what optimization algorithm/engine you would use for this tool? We acknowledge that there are commercially available supply chain solutions with advanced capabilities, but we are specifically interested in your insights on prioritizing geospatially powered mapping and network analysis functionality that aligns with typical use cases (see problem statements). Please outline the key optimization functionality you propose to include in the software to achieve this balance, taking into account factors such as user experience, ease of adoption, and technical feasibility. Where applicable, how do you propose to perform these optimization tasks without cost information?

Integration: For more advanced DNO analyses, that are beyond the scope of this tool, the user should be able to export their data from this tool into another application. How do you see this working? What industry standard formats could be used to ensure that this process is seamless?

Maintenance: What would you propose as a feasible way of maintaining the tool?

Capacity Building: Comment on whether online training, in person training or a combination would be best suited to this kind of tool.

6. How to respond

To ensure a comprehensive and standardized evaluation of the received information, we kindly request that you adhere to the following guidelines when preparing your response:

Response Format: Please provide your response in a clear and well-structured format. Use section headings and numbering to correspond with the sections and questions outlined in the RFI document, allowing for ease of review and evaluation. Responses must be prepared in English, and submitted in Microsoft Word and PDF format. Submissions should be emailed to DNOAdmin@finddx.org with the subject line "Response to RFI DNO Lite."

Complete and concise Information: Provide complete and concise information that directly addresses the questions and requirements specified in the RFI. Avoid excessive marketing materials or generic statements. Instead, focus on providing specific and relevant details about your company, expertise, and proposed solutions.

7. Timelines

	Activity	Expected date
1	Publication of RFI	11 August 2023
2	Closing for submission of written queries	25 August 2023
3	Publicly available responses	1 September 2023
4	Closing of RFI	15 September 2023

8. Questions and Communications Protocol:

Please email questions to: DNOAdmin@finddx.org. Questions will be accepted until 25 August 2023. Submitted questions (and corresponding answers) will be publicly available at: https://www.finddx.org/about-us/donors-and-partners/calls-for-partners/.

9. Confidentiality

If required, FIND can sign a Confidentiality Disclosure Agreement (CDA) with interested Applicants/Bidders prior to proposal submission. FIND will not disclose the proposal to third parties without the prior written agreement of the proposal submitter. Review of proposals will be carried out by an internal FIND team as well as a team of external experts (which may or may not include members of FIND's independent Scientific Advisory Committee), all of whom are under confidentiality and are recused if found to have a potential conflict of interest (which they are obliged to disclose). Any specific questions concerning confidentiality should be addressed to the FIND team.

10. Appendix/ices:

No Appendices are included in this RFI.