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Languages	English

The purpose of this concept note document is to clearly define the methodology for systematic scoping exercise to determine teams and researchers focused on emerging infectious diseases across Latin America and the Caribbean.

CONTENTS

1. INTRODUCTION

The Global Health Network (TGHN) (tghn.org) is a community of practice that established a decentralised governance structure based on three coordination hubs, Africa, Asia, and Latin America and the Caribbean, creating a collaborative network in the global southern hemisphere[1]. Operational delivery is undertaken by the Operational Support team located in the UK and across the globe, with members located within the coordination centres (partners) and wider collaborators in the regional networks. In Latin America and the Caribbean (LAC), the network operates through six national centres distributed in the region: Argentina, Brazil, Colombia, the Dominican Republic, Honduras and Peru.

The Global Health Network LAC (lac.tghn.org) mission is to strengthen health research capacities in the region through knowledge exchange and training. Its vision is to ensure that all individuals in the LAC can have access to better health practices, regardless of their geographical location or socioeconomic status[2]. To fulfil this mission and to pursue its vision, it is of utmost importance that we understand the landscape of trustworthy research in the region, the research priorities, which are the groups and institutions involved, and where research is taking place and the main topics of interest to LAC, in the area of infectious diseases.

According to the Organisation for Economic Co-operation and Development and The World Bank report Health at a Glance: Latin America and the Caribbean 2020, infectious diseases remain a relevant health issue in the region, compared to improvements made in non-communicable diseases. The emergence of viruses such as Zika, dengue, chikungunya and, more recently, SARS-CoV-2 has demonstrated the urgency of strengthening the capacity to detect, investigate and respond to emerging infectious diseases. LAC is a region particularly vulnerable to communicable diseases, given their socioeconomic, environmental and climatic conditions[3].

The pathogen genomics is also an important component of all infectious disease research providing crucial insights into the genetic underpinnings of pathogens and their interactions with host organisms. Recent studies[4,5] emphasise its value in identifying genetic markers associated with virulence, resistance to antimicrobial agents, and transmission dynamics. These genetic insights are pivotal for developing targeted therapies and vaccines, as well as for devising strategies to monitor and control outbreaks. Additionally, advancements in sequencing technologies have improved the capacity for genomic surveillance, enabling the monitoring of pathogen evolution and spread. This continuous surveillance supports timely public health interventions and contributes to the development of more precise medical approaches. Pathogen genomics is crucial for deepening our understanding of infectious diseases and enhancing public health strategies.

In 2023, Wellcome Trust and TGHN conducted a research prioritisation study of infectious diseases in three regions: Asia, Africa and LAC [Microbial Communities and Transmission Dynamics of Escalating Infectious Diseases][6]. Its results suggest diseases or priority areas where funding should be targeted in each region, indicating the importance and burden of such diseases. Based on such results, we will define our pathway to creating an interactive mapping tool and a searchable database of researchers and research groups activities in infectious disease and pathogen genomics across LAC.

One of the aims of The Global Health Network Latin America & the Caribbean: "Creating Equity in Health Research by Connecting Excellence and Sharing Know-how", funded by Wellcome, from now on TGHN LAC, is to connect and convene excellence in prioritised emerging infectious diseases research. To achieve this goal, it is important to identify the teams and actors conducting trustworthy relevant work, as this would increase opportunities for collaboration, resource optimisation, and research impact. This concept note presents the methodology to be applied at a scoping review exercise and introduces preliminary results involved in research on infectious diseases in the LAC region.

2. METHODOLOGY FOR SYSTEMATIC SCOPING EXERCISE TO DETERMINE RESEARCH GROUPS AND INSTITUTIONS FOCUSED ON EMERGING INFECTIOUS DISEASES ACROSS LAC

The methodology for this exercise has been initially designed to be an exploratory approach focused on infectious diseases at the regional level (LAC), and to ensure a continuous process of comprehensive and accurate identification throughout the TGHN LAC project. This scoping exercise aims:

1. To identify the research groups and institutions engaged in infectious diseases and pathogen genomics research in the LAC region.
2. To analyse the focus areas and geographical distribution of the research groups and institutions.
3. To provide a comprehensive database that can be used to generate an interactive map for fostering collaborations and guiding future research funding and policy decisions.

Figure 1 presents the following phases proposed to achieve the above objectives.

Figure 1. Summary of the scoping exercise phases.
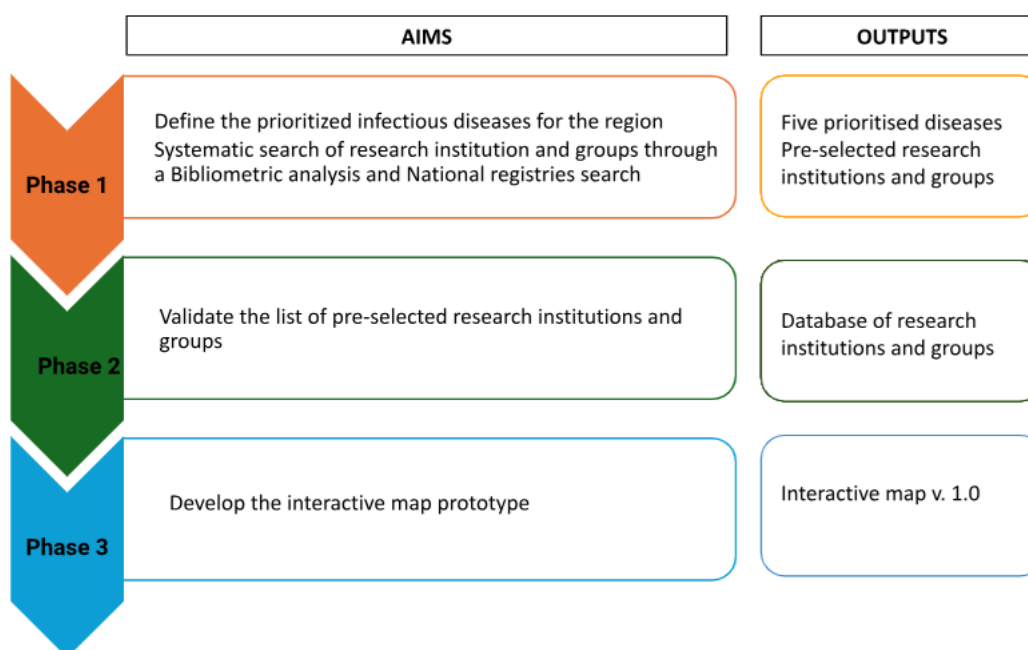
Source: Elaborated by LAC Consortium.

2.1. Phase 1

Specific Aim: To define the priority diseases relevant for the region, the research institutions and research groups engaged in infectious diseases from the LAC region.

2.1.1. Prioritisation of diseases

In 2023, the LAC partners participated in the Microbial Communities and Transmission Dynamics of Escalating Infectious Diseases Study[6]. Wellcome and TGHN conducted this research prioritisation study by engaging a broad research community to understand funding priorities for research on microbial reservoirs and transmission dynamics of escalating infectious diseases and outline important areas where Wellcome and other stakeholders are best placed to act. The data on the prioritised diseases for the systematic review will be based on the results of this study.

The study employed a mixed method approach, using a validated adapted Delphi technique. This involved a cross-sectional global priority-setting survey launched in March 2023, which was followed by three regional workshops held in June 2023. These workshops built upon the survey findings, targeting Low- and Middle-Income Countries (LMICs) in the Global South. The priority-setting survey assessed the perceived escalating diseases posing the greatest infection threats, the types of research needed, and barriers and facilitators to conducting research. The three hybrid regional workshops were hosted in Asia-Pacific, LAC, and Africa with participants from a wide range of career stages, disciplines, and sectors, including academic and non-academic public and animal health researchers, laboratory workers and policy/decision-makers to build on the survey findings[6].

Figure 2. Steps of Microbial Communities and Transmission Dynamics of Escalating Infectious Diseases Study.
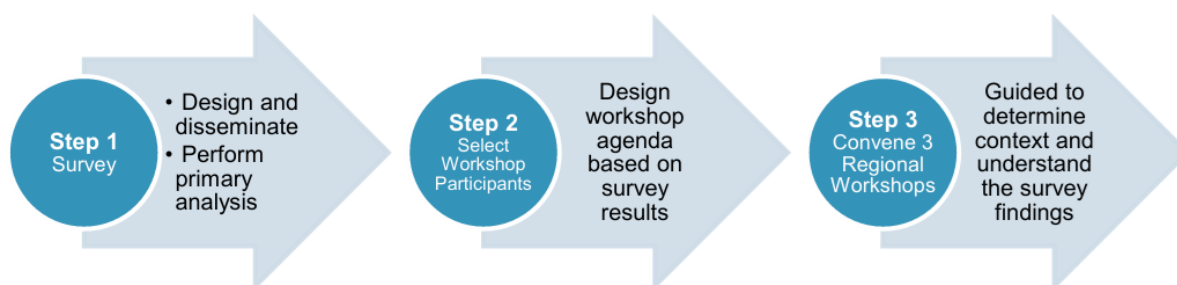
Source: Wellcome Trust, The Global Health Network. Microbial Reservoirs and Transmission Dynamics of Escalating Infectious Diseases[6].

Out of the 3,700 infectious diseases research stakeholders who responded to the survey, 86.9% were from LMICs. Quantitative analysis from the priority-setting exercise identified that the 27.2% of respondents from LAC perceived Dengue, Tuberculosis (TB), Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS), Malaria, COVID-19, Arbovirus, Respiratory Infections, Vector-borne Diseases, Antimicrobial Resistance (AMR) and Chikungunya to present the greatest risk of escalation across the region[4]. Considering the methodological approach, the wide range of respondents and the important new insights into perspectives on infectious disease research, the top five infection threats perceived by LAC respondents as most at risk of escalation, or currently escalating across the region, will be subjected to bibliometric analysis.

2.1.2. Bibliometric analysis

Bibliometrics is the application of mathematical and statistical methods to any written source that is based on the facets of communication and considers elements such as authors, publication title, document type, language, abstract and keywords or descriptors. It is considered both the set of quantitative techniques applied to the analysis of documentary sets, their producers, and consumers,

and a tool through which the state of science and technology can be observed in the global production of scientific literature at a given level of specialisation[7].

A bibliometric study will be conducted to identify the research groups and institutions engaged in infectious diseases research from the LAC region (See table 2). The search will be conducted in Scopus, Embase, Literatura Latinoamericana y del Caribe en Ciencias de la Salud (LILACS), Scientific Electronic Library Online (Scielo) and Pubmed, the most widely used academic database with indexed journals in the region.

The search strategy will include the following key terms: "Infectious diseases", "Latin America", "Caribbean", "South America", "Central America"; specific diseases: "Dengue", "Tuberculosis", "HIV/AIDS", "Malaria", "COVID-19" and "Pathogen Genomics"; and countries from the LAC region considering South America, Central America and Caribbean, based on the UN geoscheme regions used by the United Nation Statistics Division[6]. The inclusion criteria of the search will consider all fields of the databases ("All Fields") and all documents under the classification of "Articles" and a time frame of the last 5 years. Articles not related to infectious diseases will be excluded.

The articles obtained through the search will be analysed using bibliometric and network indicators with a bibliometric package (VOSviewer[9]) or Artificial intelligence (AI) (possibly Rayyan[10]). The analysis will focus on three components:

1) Authors analysis: We will Identify authors working in the prioritised infectious diseases (See Section 2.1.1), analyse the geographic distribution of these researchers, examine the affiliations and institutions of the authors.

2) Collaboration Network: We will map out co-authorship networks to understand the collaboration patterns among researchers, and to identify key collaborative clusters and their geographic spread.

3) Citation Analysis: We will analyse the citation patterns to determine the most influential papers, researchers and institutions, and to identify the most cited works and their impact on the field.

Bibliometric indicators, such as main authors, co-authors, affiliation, countries, years, and co-authorships will be calculated using VOSviewer[10] to perform network analysis, including co-authorship and co-occurrence of terms. Several types of maps will be created, including those related to co-authorship between authors, organisations and countries. A flow chart of the bibliometric analysis process in detail will be produced and shared with the results of this phase as a report.

2.1.3. National registries search

We will complement the search by looking into national databases, professional associations, student associations or academic institutions, and through the TGHN LAC network and partners (See table 2). We will include only data that is publicly available. Some of the sources available are the following, but not limited to:

Table 1. Organisations and sources to identify researchers and groups engaged in infectious diseases, by country.

Country	Organisations/Sources
Argentina	● Consejo Nacional de Investigaciones Científicas y Técnicas

	● ReNIS - Registro Nacional de Investigaciones en Salud
	● Registros provinciales de investigaciones en salud:
	    ● Provincia de Buenos Aires. Comisión Conjunta de Investigación (CCIS)
	    ● Provincia de Córdoba. Sistema de Evaluación, Registro y Fiscalización de las Investigaciones en Salud (SERFIS)
	    ● Provincia de Neuquén. Comisión Asesora de Investigaciones Biomédicas en Seres Humanos (CAIBSH)
	    ● Provincia de Río Negro. Registro Público Provincial de Investigaciones en Salud
	    ● Provincia de Río Negro. Registro Público Provincial de Investigaciones en Salud Humana
	    ● Provincia de Santa Fe. Registro de Protocolos de Investigación
	    ● Provincia de Mendoza. Registro Provincial de Investigación en Salud (RePRIS)
	● ANLIS Malbran
	● Instituto Nacional de Medicina Tropical (INMeT)
	● Instituto Nacional de Enfermedades Infecciosas (INEI)
	● Centro Nacional de Diagnóstico e Investigación en Endemo Epidemias (CeNDIE)
	● Instituto Nacional de Enfermedades Respiratorias (INER)
	● Instituto Nacional de Enfermedades Virales Humanas (INEVH)
	● Instituto Nacional de Epidemiología (INE)
	● Unidad Operativa Centro Nacional de Genómica y Bioinformática (UOCNGB)

Brazil	● Observatory on Science, Technology and Innovation in Health (Observatório CT&I em saúde) of the Oswaldo Cruz Foundation (Fiocruz) ● Directory of Research Groups in Brazil - Lattes ● Brazilian Society of Infectious Diseases
Colombia	● Asociación Colombiana de Salud Pública ● Min Ciencias-grupos de investigación ● Asociación Colombiana de Empresas Sociales del Estado y Hospitales Públicos ● ASOHOSVAL Asociación de Hospitales y Empresas Sociales del Estado del departamento del Valle del Cauca ● INVIMA - Dispositivos médicos -Listado de asociados y establecimientos certificados ● Asociación Colombiana de Infectología (ACIN) ● Instituto Nacional de Salud- Enfermedades transmisibles ● Subdirección de Investigación del Instituto Nacional de Salud ● CEIP Centro de Estudios en Infectología Pediátrica S.A.S ● CIDEIM Centro Internacional de Entrenamiento e Investigaciones Médicas

	● Instituto Colombiano de Medicina Tropical-Universidad CES ● Fundación Salud para el trópico- tropical health foundation ● Asociación Colombiana de Parasitología y Medicina Tropical ● Grupo en enfermedades infecciosas en cáncer y alteraciones hematológicas (GREICAH) ● Biología y Control de Enfermedades Infecciosas (BCEI) ● Grupo de Investigación en Epidemiología y Geografía de la Salud (GIEGS) ● Grupo de Investigación en Enfermedades Infecciosas y Tropicales (GIET) ● Centro de atención y diagnóstico de enfermedades infecciosas (CDI) ● Grupo Genómica de Microorganismos Emergentes ● Laboratorio de Geosalud ● Fundación Instituto de Inmunología de Colombia (FIDIC) ● Enfermedades Tropicales (CEINTROP) ● Centro de Investigaciones en Microbiología y Parasitología Tropical (CIMPAT) de la Universidad de los Andes
Honduras	● Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACIT) ● Biblioteca Virtual en Salud de Honduras ● UNAH (Universidad Nacional Autónoma de Honduras) Researchers´ catalog ● Instituto de Enfermedades Infecciosas y Parasitología Antonio Vidal ● Asociación Hondureña de Parasitología ● Sociedad Hondureña de Enfermedades Infecciosas
Peru	● National Researchers Registry RENACYT from the National Council of Science, Technology and Technological Innovation CONCYTEC, and DINA directory. ● PeruCRIS ● Universities databases and registries.

Dominican Republic	● Ministry of Education, Science, and Technology (MESCYT) databases of:
	  ○ National Research Career
	  ○ Conference presentations at the national conference (past 2 years)
	  ○ Grants awarded through the National Fund for Innovation and Scientific and Technological Development (FONDOCYT)
	● Approved current and past projects in the National Health Bioethics Council's database
	● Dominican Society of Infectology
	● Dominican Association of Medical Public Health Practitioners
	● Academic institutions' registries

Source: Elaborated by LAC Consortium based on exploratory screening in search engines.

2.2. Phase 2: Selection and validation of research groups data

Specific Aim: To validate the final list of research institutions and groups for the interactive map prototype.

All research groups and institutions related to the prioritised diseases, preselected on phase 1, will be registered in a database with their public contact information. As data will include only public information there's no legal restriction on data protection. Personal information of individual researchers considered sensitive will not be collected or used in this scoping exercise.

During phase 2, the data validation process, the research groups will be informed of the use of their public information in the map and will have the option to update or opt out of the interactive map in accordance with the UK Data Protection Act 2018[11] and local regulations of data protection of the members of the TGHN LAC Consortium[12-15].

The selection of the groups for the map will be based on their affiliation with a research organisation, their responsiveness to outreach efforts, and their involvement in active projects within the last five years. The groups who opt out during the validation process will be removed from the database. All data collected will be stored following data protection and pertinent privacy measures.

2.3. Phase 3: Interactive Map Development

Designing an interactive map to showcase resources and researchers on infectious diseases involves several key steps. First, collect and process data, ensuring it includes geographic coordinates, contact information and information on (depending on filters). Secondly, employ a technology stack with interface frameworks that are compatible with the TGHN platform, enabling both interactive visualisation and the capability for users to input their data directly into the map. Thirdly, configure the backend with suitable servers and a geospatial database that supports advanced spatial queries and analysis. Implement the map by initialising it, adding markers for resources and researchers, and enabling interactivity with click events and info panels. Develop an API to serve data and ensure regular updates and maintenance. Enhance the map with search functionality, filters, and data visualisations to make it a comprehensive tool for stakeholders to find and collaborate on infectious disease research. Deploy the application using hosting services at TGHN LAC.

Once the map prototype is developed, it will be presented to the identified groups and promoted throughout the research community and TGHN LAC communities of practice engagement activities. In addition, a method that can further contribute to the resulting stakeholder map are live actor mapping sessions. With this engagement method, the research groups are invited to participate in live mapping sessions to construct an actor map. This map helps identify key participants who are not yet involved, opportunities for building relationships, and identify the strength of connections among actors. It also highlights areas for improving the performance of the research system in prioritised emerging infectious diseases. An actor map also helps determine the most influential research groups or their particular strengths across the research life cycle. Live actor mapping sessions are ideally conducted in-person, but they can also be adapted to virtual settings through the use of digital tools used by LAC partners, such as Jamboard, Menti, and others.

The update process of the map will be carried out annually using AI and a self registration option for researchers/groups (See table 2).

3. TIMELINE

The following timeline outlines the strategic milestones and key activities for the development and publication of the Concept Note, culminating in the launch of the Interactive Map (Table 2).

Table 2. Scoping exercise and interactive map development timeline.

Task	Period (2024)
Concept Note	
Draft by the working group	June - August
Approval by TGHN LAC Steering Committee members	August - September
Publish on TGHN LAC page	September
Phase 1	
Prioritisation of diseases	July
Bibliometric analysis	September
National registries search	September
Database based on the bibliometric analysis and national registries	September
Results report of the scoping exercise to determine the distribution and active focus of infectious disease research across LAC	October
Phase 2	
Validation of preselected research groups	October
Contact researchers and groups about the potential use of their public data for the map	October
Consolidation and lock-in of final list of groups to be included in the map	October
Database review to ensure accuracy and relevance of data	October
Phase 3	
Define map structure, design and user interface	September - October
Integrate and visualise data on the map	October
Conduct pilot testing to identify flaws and validate functions of the map	November
Create tutorial for partners and users about the map	November
Launch the interactive map version 1.0	December
Promote activities towards the usage of the map	December though 2025

| Map update | August 2025, 2026, 2027, 2028... |

Source: Elaborated by LAC Consortium.

4. FINAL REMARKS

This concept note outlines the methodology for the scoping exercise aiming at developing a comprehensive database to construct an interactive map highlighting groups and researcher institutions focused on emerging infectious diseases across the LAC region.

While conducting the review, potential limitations, such as uneven publication distribution among LAC countries, may be identified. To minimise, alternative sources will be consulted to gather information on researchers and groups not covered by the initial bibliometric analysis. Moreover, the inclusion criteria will encompass authors affiliated with multiple institutions and those outside the LAC region. Given that each country has specific resources to work with, there may be differences in the way data is gathered for new versions of the map. Finally, we recognize that in the bibliometric analysis phase, some indicators, such as total publications, h-index, may represent the commonly used metrics of author performance. However, it is acknowledged the limitation of this search as these indicators do not necessarily reflect the most rigorous and trustworthy research[16].

The resulting database and interactive map are poised to facilitate collaborations and inform future research funding and policy decisions. Furthermore, the interactive features and searchable database will enable ongoing monitoring and assessment of progress towards achieving research equity in infectious diseases within the region, particularly through the TGHN LAC initiatives in capacity building and knowledge mobilisation.

All processes and activities proposed at this scoping exercise will be carried out in compliance with fundamental ethical principles.

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