Health research capacity strengthening in low and middle-income countries: current situation and opportunities to leverage data for better coordination and greater impact.

Final Report

Prepared for use by the Mechanism for the review of investments in health research capacity strengthening in low- and middle-income countries (LMICs), convened by ESSENCE for Health Research.

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This paper was prepared in support of the work of the Mechanism for the review of investments in health research capacity strengthening in low- and middle-income countries (LMICs), convened by the ESSENCE for Health Research Initiative, which held its inaugural review meeting on the 4\(^{th}\) and 5\(^{th}\) of June 2020. The content of this document is based on secondary research, literature reviews and key informant interviews which though extensive, were by no means exhaustive, and were primarily conducted for the purpose of supporting the work of the Mechanism.

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1 EXECUTIVE SUMMARY

In April 2019, member agencies of the ESSENCE on Health Research Initiative (ESSENCE) at its annual meeting approved the Mechanism for review of investments in research capacity strengthening in low- and middle-income countries based on the recommendations of the ESSENCE Working Group on Developing a Mechanism for Reviewing Investments in Clinical Research Capacity Building (WGRI).

The approved review Mechanism comprises funders of health research capacity strengthening in LMICs, coming together to review their investments to collaboratively identify and address gaps. The periodic reviews to be undertaken through this mechanism are expected to highlight critical gaps, and provide evidence that could inform effective collaborative actions aimed at increasing the quantum of capacity strengthening investments in these countries, achieving better alignment with country leadership, and fostering higher levels of impact amongst funders of health research in LMICs.

Ahead of its inaugural review meeting scheduled for June 2020, the Mechanism, under the auspices of ESSENCE, commenced a review aimed at informing a set of concrete actions to be collaboratively pursued over the next three (3) years (June 2020 – June 2023). The review entailed three distinct but interrelated pieces of research and analysis:

1. **Mapping Research Capacity:** Use of an initial set of basic metrics and indicators to broadly assess the current state of national health research capacity across all countries (high, medium, and low income) in a simple but meaningful way to inform the work of the Mechanism.

2. **Assessing collaboration and coordination models:** An analysis of existing multi-funder, multi-stakeholder collaborations in research capacity strengthening through desk reviews and broad consultation to understand the facilitators and barriers to effective collaboration, and to identify a preferred collaboration model for the Mechanism.

3. **Assessing critical gaps:** A deep-dive analysis of eight (8) LMICs with lower levels of health research capacity to better and more fully characterize the capacity in these countries towards identifying opportunities to strengthen capacity, or better coordinate investments in capacity strengthening within these countries.

A summary of the key findings of the review is outlined below:

1. Significant progress has been made in reaching consensus on appropriate metrics and indicators for assessing national health research capacity, though data collation and reporting is still significantly constrained.

2. Given these data constraints, funders and stakeholders agree that the use of a basic set of indicators to provide an indicative measure of national health research capacity is feasible and valid. Applying the set of basic indicators agreed to for this review with data available for all countries (see chart on page 8) reconfirmed established knowledge on the extent to which disparities in national health research system capacities remain entrenched globally - with only a few exceptions.

3. Multi-funder, multi-stakeholder collaborations in LMIC health research capacity strengthening remain challenging to operate, but several workable models exist, and funders are finding successful approaches to surmount existing barriers. For ESSENCE, the strategic alliance model is appropriate for its purpose of strengthening global coordination of capacity building in health research.

4. Health research systems of countries with exceptionally low research capacity relative to health research need share similar critical gaps, most notably limited capacity to demand/originate research; absence of stable platforms for consistent engagement between researchers, policy makers and

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2 Based on World Bank’s classification of countries by income groups (accessed April 2020)
implementers to enhance the utility of research; and absence of sustainable local career pathways for researchers. This suggests that there is an opportunity for collaborative action if taken at scale by global funders, to be impactful and transformative.

To set the foundation for its success and increase its effectiveness over the next 3 years (June 2020 – June 2023), it is recommended that the Mechanism facilitates action to achieve several important outputs across the three key outcomes envisaged for its inaugural program of work. These recommendations include actions informed by the findings of the review process, as well as specific recommendations made at the inaugural meeting of the Mechanism which held virtually on the 4th and 5th of June 2020.

**Outcome 1:** Improve the availability and use of data on investments in research capacity strengthening in LMICs, and metrics/data for assessing national research capacity, by funders of health research (public and private).

1. Further development and improvement on the use of basic indicators to measure and represent national health research capacity for global mapping.
2. Establishing a minimum desired level of capacity and agreeing targets for increasing capacity in each country over time.
3. Regular (e.g., annual) metric-driven assessment of health research capacity at the country level in LMICs and use of the data to monitor and focus capacity-strengthening activities.3
4. A partnership to create country-focused collaborations aimed at enabling country led collation and reporting of data on health research capacity and health research capacity strengthening investments4,5.
5. A co-funded effort to improve resourcing of data sharing and data transparency platforms6 for health research and research capacity strengthening investments.
6. A structured dialogue/engagement process to advocate for the inclusion of health research data transparency commitments in health financing arrangements facilitated by multilateral institutions.7

**Outcome 2:** Strengthen collaborations on research capacity strengthening to improve efficacy of investments, minimize duplication and ensure alignment with country needs.

7. A structured effort aimed at facilitating shared learning and knowledge exchange on models for collaboration to strengthen health research capacity in LMICs to contribute to evolve a valuable body of knowledge on this topic.
8. Specific actions to improve the effectiveness of ESSENCE and solidify its leadership role as a strategic alliance of funders.
9. A discussion aimed at increasing the practice of structured reviews of various research capacity strengthening models active across LMICs to evolve real evidence of what works, and guide funders on ways to extend the impact of their investments in collaborative research capacity strengthening.

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3 In the African context, this could involve leveraging tools such as the AUDA-NEPAD Africa Innovation outlook which measures country performance on research and innovation https://www.nepad.org/publication/african-innovation-outlook-iii
4 An example of such a partner could be the Global Partnership for Sustainable Development (GPSDD), or similar organisations
5 The Global Partnership for Sustainable Development Data is a growing network of hundreds of members, including governments, the private sector, civil society, international organizations, academic institutions, foundations, statistics agencies, and other data communities. It was established to help stakeholders across countries and sectors fully harness the data revolution for sustainable development. http://www.data4sdgs.org/about-gpsdd
6 Data sharing and data transparency platforms for health research/health research capacity building include the Global Observatory of Health R&D and World RePORT
7 A good example is the World Bank’s Global Financing Facility (GFF). Commitments on data transparency could be a part of country-led plans that underpin GFF engagement with eligible countries.
Outcome 3: Foster collaborative actions by research funders to fill gaps in specific countries where research capacity is low relative to the need for research.

10. Coalitions between participating members of the Mechanism and national authorities/institutions to tackle critical health research capacity gaps identified in specific countries with the lowest levels of capacity, including assessments of specific needs in these countries, and implementation of programs designed specifically to strengthen capacity.

11. A deliberate collaborative effort to find globally scalable innovative solutions aimed at addressing the significant issue of lack of sustainable local career pathways for LMIC researchers.

12. Advocacy on norms and principles aimed at securing the commitment of funders of global health research to ways of working that directly translate to positive impacts on national health research capacity in LMICs. Such ways of working may include encouraging funders to:
   a. Designate a set of resources for which only countries with lowest capacity levels would be eligible.
   b. Adopt funding principles that encourage researchers and research institutions with high capacity in LMICs, to actively contribute to improving local relevance of research and directly advancing research translation.
   c. Collaborate with regional development institutions and regional initiatives to align health research capacity strengthening with other development programs (infrastructure, health systems strengthening etc.) that are being funded or implemented in LMICs.

13. A coordinated effort to elevate health research capacity strengthening in LMICs as a front burner issue with global health leaders and further its integration into the global health agenda, through as many platforms as possible, especially the Global Preparedness Monitoring Board (GPMB)\(^8\), leveraging global interest in health research and pandemic preparedness, heightened by the global COVID-19 pandemic.

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\(^8\) The GPMB is an independent monitoring and accountability body to ensure preparedness for global health crises. It is comprised of political leaders, agency principals and world-class experts, and its secretariat is hosted at the World Health Organisation. 
https://apps.who.int/gpmb/about.html
Mechanism for the review of investments in health research capacity strengthening in LMICs

2 BACKGROUND AND REVIEW APPROACH/METHODOLOGY

2.1 CONTEXT

In April 2019, member agencies of the ESSENCE on Health Research Initiative (ESSENCE) at its annual meeting approved the **Mechanism for review of investments in research capacity strengthening in low- and middle-income countries** based on the recommendations of the ESSENCE Working Group on Developing a Mechanism for Reviewing Investments in Clinical Research Capacity Building (WGRI). The approval followed the submission of the report of the WGRI, which had worked from August 2018 to March 2019 on **Recommendation #12** of the International Vaccine Task Force on Strengthening Country Capacity for Vaccines Research and Development (IVTF). The IVTF had been convened by the World Bank (WB) and the Coalition for Epidemic Preparedness and Innovation (CEPI) in October 2017 to develop a set of recommendations on strategic investments that can strengthen clinical research and clinical trial capacity in LMICs. **Recommendation #12** was geared towards ensuring synergy at country and regional levels, with respect to investments in research capacity, and research capacity strengthening in low and middle income countries.

The approved **Review Mechanism** comprises funders of health research capacity strengthening in LMICs, coming together to review their investments to collaboratively identify and address gaps. The periodic reviews to be undertaken through this mechanism are expected to highlight critical gaps, and provide evidence that could inform effective collaborative actions aimed at increasing the quantum of capacity strengthening investments in these countries, achieving better alignment with country leadership, and fostering higher levels of impact amongst funders of health research in LMICs.

The expected impacts of the mechanism are increased research on national health priorities as well as improved pandemic preparedness, arising from increases in efficiency and equity in capacity strengthening investments and decreased duplication of efforts.

The mechanism is designed to leverage three ongoing initiatives:

1. **The World Health Organization Global Observatory on Health Research and Development (Global Observatory)**: which works to establish metrics and support data collection to characterize health research capacity at the national and institutional level in a standardized way.
2. **World RePORT**: an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world’s largest funding organizations.
3. **ESSENCE**: which periodically convenes global funders and stakeholders to review investments, identify gaps and makes plans to enhance coordination and collaboration on investments in research capacity strengthening in LMICs.
Mechanism for the review of investments in health research capacity strengthening in LMICs

The three workstreams are interlinked with the core activities of one (ESSENCE) being based on the metrics definition and data aggregation work of the Global Observatory on Health R&D and World RePORT.

Ahead of its inaugural review meeting of June 2020, the Mechanism, under the auspices of ESSENCE, commenced a review aimed at understanding the current status of health research capacity in LMICs, the direction of investments in health research capacity strengthening, and the state of collaboration(s) on health research capacity strengthening.

2.2 **Review Approach and Methodology**

The review process was designed around three core pieces of research and analysis which have been progressed by three task teams (convened by the WGRI) working collaboratively. These are described below:

*Mapping Research Capacity*

1. Agreement on an initial set of basic indicators to broadly categorize health research capacity across all countries (high, medium, and low income⁹) in a simple but meaningful way to inform the work of the Mechanism. Four indicators were selected based on data availability and their contribution to the various elements of research capacity at the institutional and individual level, e.g., in signaling the volume of health research activity in the country (grants, clinical trials); research outputs (publications) and availability of the infrastructure to train future researchers (availability of higher education institutions). A key consideration as mentioned above is public access to data on the selected indicators to allow for cross country comparisons and ongoing tracking of the indicators for the purpose of the mechanism. The result is an aggregate measure that allows a crude but meaningful way for the group to use the information. The aggregate measure represents the mean of each country’s percentile ranking on each of the four indicators. The constituent components of this measure are accessible for more nuanced interpretation, but this

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⁹ Based on World Bank’s classification of countries by income groups (accessed April 2020)
measure is not intended to, and does not reflect the level of a nation’s research capacity, independent of this process. Table 1 below outlines the four indicators:

Table 1 – Four basic indicators selected for rapid analysis of national health research capacities

<table>
<thead>
<tr>
<th>#</th>
<th>Indicator</th>
<th>Metric</th>
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<tbody>
<tr>
<td>1</td>
<td>Clinical trial capacity</td>
<td>Number of clinical trials conducted in-country between 2016 and 2018 (annual average) based on data obtained from the Global Observatory of Health R&amp;D, sourced from the WHO International Clinical Trials Registry Platform&lt;sup&gt;10&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>Capacity to attract funding for health/clinical research</td>
<td>Volume of funded health/clinical research in-country as measured by number of grants by major global R&amp;D funders and recorded in the World RePORT&lt;sup&gt;11&lt;/sup&gt; platform between 2016 and 2018 (annual average).</td>
</tr>
<tr>
<td>3</td>
<td>Capacity to produce research output in peer reviewed journals</td>
<td>Number of scientific publications catalogued in the PubMed&lt;sup&gt;12&lt;/sup&gt; database in between 2016 and 2018 (annual average), whose authors are affiliated to the country.</td>
</tr>
<tr>
<td>4</td>
<td>Capacity to provide quality health research training</td>
<td>Number of higher education institutions providing doctorate degree for key health disciplines based on 2019 data obtained from the Global Observatory of Health R&amp;D sourced from the World Higher Education Database&lt;sup&gt;13&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Assessing collaboration and coordination models

2. An analysis of existing multi-funder, multi-stakeholder collaborations in research capacity strengthening through desk reviews and broad consultation to understand the facilitators and barriers to effective collaboration, especially as it pertains to research capacity strengthening in LMICs, and specific opportunities to improve their efficacy and identify an appropriate collaboration model for the Mechanism. Twelve (12) collaborations were studied for this purpose. These have been outlined in Table 2 below.

Table 2 – List of multi-funder, multi-stakeholder collaborations assessed as part of the review

<table>
<thead>
<tr>
<th>Sn</th>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EDCTP</td>
<td>European &amp; Developing Countries Clinical Trials Partnership</td>
</tr>
<tr>
<td>2</td>
<td>TDR</td>
<td>The Special Programme for Research and Training in Tropical Diseases</td>
</tr>
<tr>
<td>3</td>
<td>AESA/DELTAS Africa</td>
<td>The Alliance for Accelerating Excellence in Science in Africa/ Developing Excellence in Leadership, Training and Science in Africa</td>
</tr>
<tr>
<td>4</td>
<td>H3A</td>
<td>Human Heredity and Health in Africa Initiative</td>
</tr>
<tr>
<td>5</td>
<td>HIRO</td>
<td>Heads of International Research Organisations</td>
</tr>
<tr>
<td>6</td>
<td>HFSP</td>
<td>Human Frontier Science Program</td>
</tr>
<tr>
<td>7</td>
<td>BF</td>
<td>The Belmont Forum</td>
</tr>
<tr>
<td>8</td>
<td>GACD</td>
<td>Global Alliance for Chronic Disease</td>
</tr>
<tr>
<td>9</td>
<td>CARI</td>
<td>Coalition for African Research and Innovation</td>
</tr>
<tr>
<td>10</td>
<td>AESA/REMPRO</td>
<td>The Alliance for Accelerating Excellence in Science in Africa/ Research Management Programme in Africa</td>
</tr>
<tr>
<td>11</td>
<td>UKCDR</td>
<td>UK Collaborative on Development Research</td>
</tr>
<tr>
<td>12</td>
<td>ESSENCE</td>
<td>ESSENCE on Health Research</td>
</tr>
</tbody>
</table>

<sup>10</sup> https://www.who.int/ictrp/  
<sup>11</sup> https://worldreport.nih.gov/  
<sup>13</sup> https://www.whed.net
Assessing critical gaps

3. A deep-dive analysis of eight (8) LMICs to better and more fully characterize national health research capacity in these countries. The assessment aimed to improve understanding of demand for health research in these countries, and current capacity to produce and use research knowledge. These were outlined alongside gaps, lessons learned in developing research capacity, and specific opportunities to strengthen capacity, or better coordinate investments in capacity strengthening within these countries. The 8 countries were selected to be representative of countries at lower levels of capacity and higher urgency of need for research action (based on burden of disease), with consideration for regional diversity. The countries are listed in Table 3 below.

Table 3 – Countries selected for the deep dive study to further characterize health research capacity

<table>
<thead>
<tr>
<th>Sn</th>
<th>Country</th>
<th>Region</th>
<th>DALY/Capita(^{14})</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sierra Leone</td>
<td>Sub-Saharan Africa</td>
<td>0.82</td>
</tr>
<tr>
<td>2.</td>
<td>DR Congo</td>
<td>Sub-Saharan Africa</td>
<td>0.70</td>
</tr>
<tr>
<td>3.</td>
<td>Nigeria</td>
<td>Sub-Saharan Africa</td>
<td>0.78</td>
</tr>
<tr>
<td>4.</td>
<td>Haiti</td>
<td>Latin America and Caribbean</td>
<td>0.51</td>
</tr>
<tr>
<td>5.</td>
<td>Nepal</td>
<td>South Asia</td>
<td>0.32</td>
</tr>
<tr>
<td>6.</td>
<td>Guatemala</td>
<td>Latin America and Caribbean</td>
<td>0.28</td>
</tr>
<tr>
<td>7.</td>
<td>Lao PDR</td>
<td>East Asia and Pacific</td>
<td>0.41</td>
</tr>
<tr>
<td>8.</td>
<td>Moldova</td>
<td>Europe and Central Asia</td>
<td>0.40</td>
</tr>
</tbody>
</table>

The review, comprising the above core pieces of research and analysis took place from February 2020 through July 2020, straddling the inaugural meeting of the Mechanism, which held virtually on the 4th and 5th of June 2020. The purpose of the inaugural meeting of the mechanism was to deliberate and agree on a set of concrete actions to be collaboratively pursued through the Mechanism over the next three (3) years (June 2020 – June 2023). Three key areas of action were envisaged:

1. Improving the availability and use of data on investments in research capacity strengthening in LMICs, and metrics/data for assessing national research capacity, by funders of health research (public and private).
2. Strengthening collaborations on research capacity strengthening to improve efficacy of investments, minimize duplication and ensure alignment with country needs.
3. Fostering collaborative actions by research funders to fill gaps in specific countries where research capacity is low relative to the need for research.

Over the course of the two day meeting, ESSENCE members, LMIC research capacity strengthening stakeholders, health research funders and other participants deliberated on the findings of the review, and offered perspectives on priority actions in each of the three areas that should be collaboratively pursued through the Mechanism over the next 12 – 36 months. The review findings, and the deliberations at the meeting, collectively provide the basis for recommendations in this regard. The following sections of these document provides a concise summary of the review, the imminent imperatives for the work of the mechanism, and relevant supporting documentation.

\(^{14}\) DALY means Disability Adjusted Life Years and is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability, or early death in a country (https://www.who.int/mental_health/management/depression/daly/en/). DALY per capita is an expression of the disease burden of a country relative to its population.
3 SYNOPSIS OF FINDINGS AND KEY IMPERATIVES FOR THE MECHANISM (2020 – 2023)

3.1 SYNOPSIS OF KEY FINDINGS FROM THE REVIEW

Four key findings emerged from the three distinct but interrelated pieces of research and analysis (ref section 2.2) undertaken as part of the review process. These findings are presented in this section for each of the three key outcomes envisaged by the Mechanism.

Outcome 1: Improve the availability and use of data on investments in research capacity strengthening in LMICs, and metrics/data for assessing national research capacity, by funders of health research (public and private).

Key Finding #1: Significant progress has been made in reaching consensus on appropriate metrics and indicators for assessing national health research capacity, though data collation and reporting is still significantly constrained.

As part of its mandate, the WHO, through its Global Observatory for Health R&D has been coordinating an effort to revive its work on developing a framework to assess national health research systems (NHRS) capacity which commenced in 2004. Building on this work, the Observatory has been working with the six WHO regions to revise and expand on the list of indicators used to better capture the capacity of NHRS to inform countries’ plan to strengthen their capacity. The process of building consensus around the definition of selected indicators captured by the observatory has been anchored on the WHO’s regional network infrastructure and its associated connections with public health officials at country level. The list of indicators currently under consideration include 42 indicators. In developing this list, the Observatory considered two dimensions, the level of capacity and type of assessment. The level of capacity constitutes indicators for measuring capacity at the national, institutional, and individual levels. The type of assessment follows the agreed upon framework to assess NHRS in 2004, including 4 themes or functions namely:

1. Governance of research for health, and
2. Financing of research
3. Developing and sustaining resources for research for health
4. Producing and using research

The Observatory is currently in the process of refining, defining, and consulting with the six WHO regions to agree on the core set of indicators that all regions will collect. The process will involve a range of experts in this field to help refine and shape this work.

The above effort does not compensate for the need to strengthen national platforms to collect and share data on their domestic research output, investments, and capacity both for their own actions and to enable cross learnings and comparisons in a harmonized manner. Many LMICs do not have strong nationally-owned systems for collecting and reporting on data and indicators for assessing health research capacity, which limits their ability to effectively support regional systems for bottom-up collation of these data. An example of this is the Health GERD indicator (tracked by the Observatory and collected by UNESCO), which measures gross domestic expenditure on Health R&D, for which only 80 countries reported data in recent years (since 2010 or more recent). These data gaps are also faced by the World RePORT platform which monitors investments in research capacity/capacity strengthening by tracking grants made by major international funders of health research. In its current capacity, World RePORT only captures LMIC participation in internationally-funded research and does not detail local government investments in capacity...
Mechanism for the review of investments in health research capacity strengthening in LMICs

The tracking of data on investments in health research capacity made through forms other than grants remain largely under-reported.

Addressing these significant challenges faced by data aggregation and reporting is imperative for an effective global coordination mechanism that strives to be data driven in its decision making. Investing to sustain the progress made in getting countries to adopt and use common metrics and indicators for national health research capacity is crucial. Also, capacity constraints in developing and maintaining data collection platforms like the World RePORT and the Observatory will need to be addressed through investment in human resources and technology infrastructure. Efforts will also need to be aimed at ensuring that data sharing and reporting commitments made by data providers are consistently kept.

**Key Finding #2:** Given these data constraints, funders and stakeholders agree that the use of a basic set of indicators to provide an indicative measure of national health research capacity is feasible and valid. Applying the set of basic indicators agreed to for this review reconfirmed established knowledge on the extent to which disparities in national health research system capacities remain entrenched globally - with only a few exceptions.

As indicated in section 2.2, the review process entailed agreeing on the use of an initial set of basic indicators to broadly categorize health research capacity across all countries (high, medium, and low income\(^{15}\)) in a simple but meaningful way to inform the work of the mechanism. These basic indicators are part of the aforementioned NHRS indicators, and were selected based on data availability and their contribution to the various elements of research capacity at the institutional and individual level, e.g., in signaling the volume of health research activity in the country (grants, clinical trials); research outputs (publications) and availability of the infrastructure to train future researchers (presence of relevant higher education institutions). A key consideration in the selection of these indicators was the currently high levels of public access to data on the selected indicators to allow for comparisons across 180+ countries. The indicators were used to characterize countries into four national health research capacity bands: high, upper medium, lower medium and low.

The aggregate measure for each country was determined by a simple average of the country’s percentile rank on each of the four indicators relative to all other countries in the data set. For example, India is in the 99\(^{\text{th}}\) percentile (better than 99% of the countries in the data set) on the clinical trials indicator, 94\(^{\text{th}}\) percentile on attracting international funding for health/clinical research, 96\(^{\text{th}}\) percentile on producing research output in peer reviewed journals, and at the very top (100\(^{\text{th}}\) percentile) on number of institutions with doctoral programs in health fields. India’s average percentile rank across all four indicators is 97\(^{\text{th}}\), placing it within the *high capacity band* based on the classification table below:

<table>
<thead>
<tr>
<th>Sn</th>
<th>Capacity Band</th>
<th>Average Percentile Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>High</td>
<td>91 - 100</td>
</tr>
<tr>
<td>2.</td>
<td>Upper medium</td>
<td>76 - 90</td>
</tr>
<tr>
<td>3.</td>
<td>Lower medium</td>
<td>51 - 75</td>
</tr>
<tr>
<td>4.</td>
<td>Low</td>
<td>0 - 50</td>
</tr>
</tbody>
</table>

Figure 2 below is a world map indicating relative research capacity using the four basic indicators.

This approach to providing a simple and feasible way to characterize capacity given significant data constraints was considered valid by participants in the review process, especially because the results of the analysis matched

\(^{15}\) Based on World Bank’s classification of countries by income groups (accessed April 2020)
considerably with established knowledge on relative national capacities for health research. For example, findings from this analysis show that significant disparities in national health research capacities remain entrenched with the greatest disparities found between high income countries (HICs) and low income countries (LICs). There was broad consensus among participants of the review that the interpretation of these findings must be tempered by the significant limitations of these indicators as definitive evidence of national health research capacity, along with broad agreement that the use of these basic indicators was both pragmatic and useful in providing some indication of where research capacity investments that could be impactful.

Figure 2 - World map of relative research capacity - using basic indicators

The table below outlines the characterization of countries across each region into the four capacity bands using the basic indicators. The full list of countries in each capacity band is provided in the appendix section16.

Table 5 - Regional distribution of countries across the '4 capacity bands' using the basic indicators

<table>
<thead>
<tr>
<th>#</th>
<th>Regions</th>
<th>High</th>
<th>Upper Medium</th>
<th>Lower Medium</th>
<th>Low</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>East Asia &amp; Pacific</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>Europe &amp; Central Asia</td>
<td>6</td>
<td>17</td>
<td>18</td>
<td>7</td>
<td>48</td>
</tr>
<tr>
<td>3</td>
<td>Latin America &amp; Caribbean</td>
<td>1</td>
<td>5</td>
<td>8</td>
<td>16</td>
<td>30</td>
</tr>
</tbody>
</table>

16 Section 4.1
The data indicates that research publications in peer reviewed journals by high-income countries exceeded publications by low- and lower-middle income countries by a factor of twelve between 2016 and 2018, and high income countries conducted 45,790 clinical trials compared with 5,617 conducted in low- and lower-middle income countries during the same period. In terms of institutions awarding doctorate degrees relevant to health research, there were 4,118 such institutions in high income countries compared with 3,064 in low- and lower-middle income countries as at 2019.

Further analysis of the dataset indicate that national health research capacities remain weak in Sub-Saharan Africa relative to other regions of the world. The continent has the highest percentage of countries falling within the lowest capacity band and has the lowest level of output with respect to health research publications in the three-year period assessed (2016 – 2018). It also has the lowest number of institutions awarding doctorate degrees relevant to health research capacity except for the MENA region. The region however ranks relatively high in terms of ability to attract international grants for health research, though this is driven by ten countries (South Africa, Kenya, Uganda, Tanzania, Malawi, Nigeria, Zimbabwe, Ghana, Zambia and Ethiopia) which account for 82% of the total number of international grants for the region recorded within the dataset, with South Africa alone accounting for 28%. Considering the degree of effort directed to research capacity strengthening in the region within the last two decades, these figures highlight the persisting issue of balancing considerations of equity in the pursuit of scientific excellence in the region.

A look at eighteen of the leading lower-middle income countries in the data set shows that although most are out of the top quartile with respect to quantum of clinical trials, fourteen are in the top quartile on attracting international grant funding, and eleven are in the top quartile in health research publications. Eleven of the leading lower-middle income countries also appear in the top quartile of countries with degree of institutions awarding doctorate degrees relevant to health research, although there is no complementary data on the number of relevant doctorate degrees actually awarded by these institutions, to aid richer interpretation of this observation.

**Outcome 2: Strengthen collaborations on research capacity strengthening to improve efficacy of investments, minimize duplication and ensure alignment with country needs.**

**Key Finding #3: Multi-funder, multi-stakeholder collaborations in LMIC health research capacity strengthening remain challenging to operate, but several workable models exist, and funders are finding successful approaches to surmount existing barriers. For ESSENCE, the strategic alliance model is appropriate for its purpose of strengthening global coordination of capacity building in health research.**

More than forty-five multi-funder organisations, platforms, or programs set up with LMIC research capacity strengthening as a primary or secondary purpose were identified during the review. An analysis of a subset of twelve entities interviewed in the process indicate that while their overall purpose and strategic goals are broadly similar, two factors account for the substantive differences between their collaboration models namely:

- the purpose/objective of the capacity strengthening intervention; and
b) the approaches to securing the participation and sustained involvement of other funders or strategic stakeholders.

At least three distinct set of collaborative entities can be identified based on the purpose of the research capacity strengthening intervention. A set of collaborations target changes within the national health research system and are directly concerned with achieving improvements in the quality of research institutions and systemic capabilities such as research ethics, regulatory capabilities, and domestic funding. Another set of entities target capacity strengthening at a thematic level, working to strengthen communities of practice for distinct types of research such as implementation research, and transdisciplinary research. A third set adopt an approach to capacity strengthening that is not focused on specific themes or intervention, permitting for a diverse set of capacity building outcomes to be achieved.

Three related but distinct types of entities can be similarly identified based on the approach to securing the participation of key parties and sustaining stakeholder alignment adopted within these collaborations. These fall within a continuum best characterized by the extent to which alignment and participation are secured by formal agreements and strict rules and expectations of partnership, or the degree to which these relationships are sustained informally, independent of restrictive terms of engagement. The three dominant types of partnerships identified by the above means are described in literature as networks, strategic alliances, and strategic co-funding, with networks at the informal end of the continuum, and strategic co-funding at the opposite extreme. Figure 3 illustrates the characterization of collaboration models described above and maps the entities assessed as part of this review.
Figure 3 - Characterizing Collaboration Models

<table>
<thead>
<tr>
<th>Informal Networks</th>
<th>Specific</th>
<th>Focus of capacity building</th>
<th>Broad</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specialized Communities of Practice</td>
<td>Research Systems</td>
<td>Multi-dimensional</td>
</tr>
<tr>
<td>No Governing Board</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No legal entity and no formal agreements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evolving agenda based on developments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotating secretariat</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strategic Alliances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governing Board</td>
</tr>
<tr>
<td>Flexible arrangements for call funding</td>
</tr>
<tr>
<td>Priorities defined; agenda may shift</td>
</tr>
<tr>
<td>Hosted secretariat</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Formal Strategic Co-Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governing Board</td>
</tr>
<tr>
<td>Co-funding (projects &amp; organization)</td>
</tr>
<tr>
<td>Preset agendas and priorities</td>
</tr>
<tr>
<td>Fixed secretariat</td>
</tr>
</tbody>
</table>

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17 The three different archetypes for collaboration models used leverages a conceptual framework developed by GEO (Grantmakers for Effective Organizations) and can be accessed at [https://www.geofunders.org/](https://www.geofunders.org/). (i) Networks are basically a group of people connected by relationships, which can take on a variety of forms, both formal and informal. (ii) Strategic Alliances (or Coalitions) are forms of partnership among organizations working in pursuit of a common goal while maintaining organizational independence, or a commitment amongst multiple entities to an agreed purpose and shared decision making, while each party maintains autonomy. This could mean aligning programs or administrative functions or adopting complementary strategies. (iii) Strategic co-funding refers to partnerships among organizations that work in pursuit of a common goal. This could mean aligning programs or administrative functions or adopting complementary strategies but with a key difference being the presence of a commitment to collective execution where possible. Other archetypes defined by GEO include Public-Private Partnerships formed between government and private sector organizations to deliver specific services or benefits, and Collective Impact initiatives which are long-term commitments by a group of important actors from different sectors to a common agenda for solving a specific social problem.
Collaborations for research capacity strengthening in LMICs deal with several challenges that pose both operational difficulties and strategic risks to the realization of their intended outcomes. The most important barriers identified during the review are discussed below.

1. **Securing host country leadership and involvement**: A common challenge highlighted across a range of collaborations is the difficulty in securing the active participation and involvement of host country governments and public sector leadership in LMICs, especially in Sub-Saharan Africa. Consequently, most research collaborations in the region tend to function in isolation from broader local capacity strengthening efforts and may not necessarily tie-in to the national agenda of the host country. This creates an almost perpetual risk to realizing the long term benefits of several capacity strengthening investments, for both funders and host countries alike.

2. **Fostering funder alignment**: Significant management and operational bandwidth is used up managing the different funders in the collaboration. Across several multi-stakeholder collaborations, there is a tendency for funders’ to be rather individualistic in their approach, sometimes due to their need to adhere to rules defined by their parent organization or parent government. This situation typically comes at a cost, and at the expense of speed and responsiveness, as extensive and lengthy negotiation processes are followed to arrive at shared positions on important issues. These challenges also apply when dealing with member states with different interests and governmental structures e.g. getting funders to align on how much each member state contributes to the budget. Reaching collective objectives requires a lot of diplomacy and compromises and may in some cases lead to program ambitions being curtailed due to the complexity involved in finding consensus.

3. **Managing funding arrangements** – Most capacity strengthening collaborations engaged during this study seek to provide flexible options for financial participation by funding members and otherwise. The implication of this is that the ability to forecast future expenditure could be negatively affected by the budget situation of one or more funders. For several collaborations, contribution is voluntary and not mandated from member states. The amount given by member state is also not fixed. The fact that funders only give as they can in the absence of an agreed annual contribution means that funding is not always consistent, and this has a corresponding impact on other funding decisions. For example, a study may not be funded because a provider has run out of money, creating difficult situations for collaboration entities and researchers alike. This applies mostly to multi-layered, co-funding agreements which are complicated to structure and execute, and difficult to fund.

4. **Managing data collection and reporting** – Data collection, sharing and reporting within collaborations also pose significant challenges, especially when each entity has different reporting requirements, with some being less flexible than others. In addition, not all funders collect data in the same way therefore considerable effort to align data definitions, agree on data sharing protocols and harmonize data collection.

To successfully navigate these barriers, funders are applying specific principles – to the design of their collaboration model, and the strategy for implementation. The key principles highlighted from the review are outlined below.

1. **Shared vision/principles and mutual trust**: Critical to the strategic decisions made at inception on the composition of collaborations. Most funders reviewed indicated that several of the intrinsic complexities encountered in the process of research capacity strengthening are overcome by the presence of partners with whom they share a firm commitment towards the mission and the realization of the objectives of the collaboration. Similarly, important to sustaining trust is fostering a sense of equality in the collaboration and ensuring that no one organization’s agenda is considered more important than another.
2. **Flexibility:** This emerged as one of the primary strategies for sustaining collaborations in research capacity strengthening in LMICs. By providing a range of choices to members and potential partners in a collaboration on the terms of their participation, several collaborations can be successfully nurtured and sustained. This takes several forms, including choice to opt-out of specific calls or options to publish joint calls via separate portals. The Belmont forum for example uses the mechanism of collaborative research actions (CRAs), a unique adaptation of the typical joint calls for proposals which is designed to enable members of the forum align around a core research theme, while retaining the flexibility to adapt the research call to match specific country and/or organization-specific interests through the use of call annexes.

3. **Structure:** Refers to a gradual shift towards a higher degree of formalization of collaborations, with dedicated staff, well-resourced secretariat, legal agreements with members, and formal boards (or similar governing structures) with independent observers and senior leadership participation. Entails extensive investment in the setup phase, defining - in writing – all key expectations and responsibilities of each partner, shared goals, and guidelines. Collaborations are also increasingly developing medium to long term strategic plans, to provide more structure around the process of defining priorities and securing alignment from all involved. Funders use this approach to both build trust within the collaboration and mitigate execution risks.

Table 6 provides a high level summary of how funders are adapting collaboration models to navigate barriers to research capacity strengthening in LMICs.

**Table 6 - High-level summary of collaboration barriers and strategies being used to navigate them**

<table>
<thead>
<tr>
<th>#</th>
<th>Key Barriers</th>
<th>Strategies to navigate them</th>
</tr>
</thead>
</table>
| 1. | Differences in organizational rules and priorities affect alignment          | ▪ Greater use of formal structures and instruments  
▪ Adoption of corporate legal entities (e.g. GACD Action is a registered legal charity)  
▪ Memorandum of Understanding (MoU)  
▪ Strategic plans  
▪ Flexibility in collaboration arrangements  
▪ appendices to call for proposals  
▪ opt-in opt out to programs  
▪ virtual funding pools  
▪ parallel funding  
▪ flexible contributions (cash or kind) |
| 2. | Differences in data and reporting requirements                               | ▪ Align data definitions  
▪ Agree on data sharing protocols (including increasing use of open data systems)  
▪ Harmonize data collection  
▪ Dedicated FTEs in secretariats with responsibility for data management |
| 3. | Difficulties in securing host country leadership and involvement             | ▪ Dedicated platforms focused on national research system strengthening (e.g. CARI, REMPRO)  
▪ Support for national research agendas and local capacity building efforts  
▪ Reducing funder controls on research agenda definition and call preparation process |
| 4. | Difficulties in securing funding commitments consistently (instability of funding) | ▪ Larger collaborations to diversify funding sources  
▪ Flexible funding arrangements |
The above analysis should not be interpreted to mean that collaborations on research capacity strengthening in LMICs are functioning optimally and that all barriers are being successfully navigated. On the contrary, significant challenges remain and many collaborations perpetually struggle to tackle these barriers, sometimes at the expense of pre-defined goals and desired outcomes. There is therefore a need for greater knowledge sharing within the global health research capacity strengthening on models, techniques and strategies that are being adopted to tackle these barriers. Similarly important is the need for greater evidence on the extent to which these collaborations are achieving the desired impact pertaining to research capacity strengthening, as distinct from impact of funded research. Findings from the review indicate that although success tracking and measurement is actively ingrained into the operational ethos of these collaborations, emphasis tends to be on measuring the output from research funding and associated outcomes, in addition to operational performance. There is therefore a dearth of evidence with respect to the long term impact of capacity strengthening investments and the efficacy of collaboration models.

In concluding this aspect of the review, the findings on the models for collaboration, along with their respective characteristics (in terms of barriers and approaches to surmount them) were further analysed within the context of reaching a conclusive determination of a preferred collaboration model for the Mechanism. The strategic alliance model was considered appropriate for its purpose of strengthening global coordination of capacity building in health research. ESSENCE already functions as a partnership among organizations working in pursuit of a common goal while maintaining organizational independence, and has a secretariat, a steering committee, and a set of goals and objectives that the funders share, while its member/participating organizations remain independent. The expectation is that clarity in defining its collaborative model provides a direction for strengthening its effectiveness and that more collaborative partnerships will emerge because of commonalities forged through the ESSENCE mechanism.

**Outcome 3: Foster collaborative actions by research funders to fill gaps in specific countries where research capacity is low relative to the need for research.**

**Key Finding #4: Health research systems of countries with exceptionally low research capacity relative to health research need share similar critical gaps, most notably limited capacity to demand/originate research; absence of stable platforms for consistent engagement between researchers, policy makers and implementers to enhance the utility of research; and absence of sustainable local career pathways for researchers. This suggests that there is an opportunity for collaborative action if taken at scale by global funders, to be impactful and transformative.**

As indicated in section 2.2, understanding the critical gaps in countries with the lowest levels of capacity requires more insight than basic capacity indicators can yield. A ‘deep-dive’ analysis of eight LMICs was therefore conducted as part of the review, to provide rich data to characterize national health research capacity at the level of detail required to inform insight-driven collaborations for research capacity strengthening in these countries.

The selection of the eight countries was based on an analysis of relative national research capacity vis-a-vis urgency and severity of health research need, building on the earlier analysis of relative health research capacity, using basic indicators. This analysis was hinged on the need to ensure that the identification of LMICs that might require more urgent investment in research capacity strengthening is determined not only by their current health research capacity level, but also by the degree of potential impact of such investment, given the variances in the severity of the health challenges faced by respective countries. An additional indicator (DALY per capita) was therefore introduced to reflect the burden of the health challenge across LMICs, as a proxy measure for the need for health research. This analysis of research capacity against need for all LMICs, thus helped identify countries with the lowest level of capacity relative to their health needs and served as useful input into the country selection process for this aspect of the review.
Figure 4 and Figure 5 illustrate some of the outcomes of this analysis for low and lower middle income countries.

**Figure 4 – Scatter plot - severity/urgency of need vs relative research capacity – low income countries**

The eight countries assessed as part of this aspect of the review include: Nigeria, Sierra Leone, Democratic Republic of Congo, Lao (PDR), Nepal, Guatemala, Haiti, and Moldova. In addition to extensive desk research, twenty-six
experts from across these countries were interviewed to help characterize – in detail – the health research landscape in each of these countries. The country case studies are outlined in the appendix section. The characterization of health research capacity across the selected countries assessed national health research capacity along three dimensions:

1. **Level of demand for health research:** Assessed the impact of the country’s socio-economic and political context on research demand, perceptions on the utility of research in-country, extent of local leadership of the health research agenda setting and prioritization process, and the institutional framework governing health research.

2. **Capacity to produce knowledge:** Assessed factors critical to the production of health research outputs such as the quality of research institutions, enabling infrastructure for health research, capacity to employ and provide career pipeline for researchers, prevailing disciplinary knowledge and expertise, laboratory capacity, data management capacity, ethical review capability, degree of community participation in research and degree of research funding/investment.

3. **Capacity to utilize research evidence:** Assessed existence and efficacy of platforms for Knowledge translation and exchange, promotion of research impact and evaluation of research quality.

The analysis was geared towards understanding the above dimensions for each country, and on this basis, identifying the strategic opportunities for collaborative investments in research capacity strengthening for each country. Five critical gaps were identified as common across the countries assessed.

1. Weak national capacity to demand and originate research in alignment with pre-defined national priorities though individuals and institutions with advanced capacity are present in country.

2. Lack of stable platforms for consistent engagement between researchers, policy makers and implementers leading to limited national capacity to translate research evidence into policy and action.

3. Absence of sustainable local career pathways for researchers, compounded by limited investment in basic science skills and limited availability of complimentary specialist skills required to undertake quality research (e.g. laboratory technicians, data scientists, epidemiologists etc.).

4. Poor enabling infrastructure for research, especially hard infrastructure such as power, internet, and transportation.

5. Undeveloped health research data management capabilities despite strong health research system capabilities such as ethical review and community participation.

On the strength of the analysis, five common opportunities for collaborative investments in capacity strengthening in these countries were identified. These are outlined below:

1. **Leveraging individuals and institutions with high capacity to improve local relevance of research and advance research translation:** Across all countries assessed, national research capacity level was weakest in two of the three dimensions - level of demand for health research and the capacity to utilize research evidence. Majority of the key informants interviewed suggest that a significant amount of in-country health research in these countries do not serve the specific needs of the country and may end up not having a direct impact on the countries’ public health indicators or its health system. Further, a common observation was the presence of a few specific institutions staffed with a core of skilled individuals where the capacity to undertake health research at a considerably advanced level was present. Most of these institutions are ‘satellite entities’ of research organisations from HIC institutions and are not national entities. These institutions tended to have developed their capacity through years of participation in internationally funded
Mechanism for the review of investments in health research capacity strengthening in LMICs

research or through direct investment in research capacity building by international funders with relatively minimal support from the country governments.

The above findings indicate an opportunity for collaborative action to strengthen research capacity in these countries by using these centers or institutions as key entry-points to improve the local relevance of research and the use of research evidence to inform public health decisions/behaviors. This will entail working with these institutions in ways that improve their capacity to more actively support national research agenda setting and prioritization, collaborate more with other (weaker) institutions in these countries, and more actively engage with other actors in the health system to translate health research output into action.

2. **Mobilizing collaborative action to support sustainable local career pathways for researchers in country** – Across all countries assessed, arguably the single most important factor limiting the capacity to produce research knowledge or output is the lack of skilled research talent, due to the absence of a viable pathway for most young researchers to undertake research in their countries. Despite increasing opportunities for LMIC researchers to access training over the last two decades, the absence of viable career pathways on completion of training means that global investments being made by funders in training are not being fully harnessed for the benefit of the home countries of researchers. This constraint is exceptionally complex without a doubt, but it provides an opportunity for collaborative action to be truly impactful, if successfully mobilized to support innovation or advocacy that helps address this challenge.

3. **Leveraging regional development institutions and regional initiatives to advance research capacity strengthening**: Across the countries assessed several challenges limiting the capacity to produce health research knowledge are outside the immediate sphere of influence of actors in the health research system. This includes challenges such as primary infrastructure gaps (power, internet, transport etc.) which limit the ability to do research in some countries, lack of domestic research funding, and absence of skilled research support talent such as trained laboratory technicians, data analysts etc. Some of these countries, however, participate in regional development initiatives of a larger scope beyond research - wherein investments are being made to address some of these gaps. In addition, the regional institutions that drive these development initiatives have platforms that support collaboration and engagement across multiple countries in their implementation. Examples of these types of platforms include field epidemiology training network of programmes in regions such as West Africa and South East Asia where countries in the region come together to discuss experiences and epidemiological issues for the region. Platforms such as the Mekong Basin Disease Surveillance group and the Association of Southeast Asia Nations (ASEAN) could be leveraged to provide shared learning and shared capabilities that can help strengthen health research capacity in specific countries.

An opportunity exists to leverage these regional institutions and initiatives better to ensure that the research ecosystem benefits from investments that are being made by other development actors in tackling development challenges of a cross-cutting nature. The concept of ‘regional research hubs’ that are different in that they provide primarily for health research institutions (rather than country governments) in a region to collaborate and share health research infrastructure, assets and capabilities should be explored to advance national health research capacity.

4. **Forging collaborations to tackle specific critical gaps on a country by country basis**: The deep dive analysis yielded a few country specific issues and priorities for research capacity strengthening for each of the eight respective countries assessed. There is an opportunity for better coordination amongst funders working in these specific countries to tackle these issues at country level in a more effective way. Examples include the issue of lack of data management skills in Sierra Leone, and specific priority disease areas currently
underfunded in Moldova, where a deliberate review of ongoing work by different funders in these countries would likely yield areas of synergy within existing or future programs to address these gaps.

5. **Leveraging major global funding on pandemic preparedness to drive long term investments in research capacity strengthening in LMICs:** Across the countries assessed, a few notable lost opportunities for strengthening research capacity were highlighted - where a significant amount of funding was made available in response to an epidemic or crisis (e.g. Ebola) but not in a structured way, such that the level of improvements in national research capacity at the end of the crisis is negligible or not commensurate with the investments made. There is an opportunity to improve long term funding in research capacity as a component of investments in epidemic response. The current COVID-19 pandemic presents opportunities for greater attention to long term investment in research capacity strengthening in LMICs²⁻⁸.

² See UKCDR and GLOPID-R guidance document on supporting high-quality research for the most pressing global needs in epidemics & pandemics [https://www.ukcdr.org.uk/resource/funder-principles-for-research-in-epidemics](https://www.ukcdr.org.uk/resource/funder-principles-for-research-in-epidemics)
3.2 **KEY IMPERATIVES FOR THE MECHANISM**

This section of the paper outlines a set of strategic priorities and concrete actions to be collaboratively pursued under the auspices of the Mechanism based on the key findings of the review, and the outcome of deliberations at the June 2020 meeting.

To set the foundation for its success and increase its effectiveness over the next 3 years (June 2020 – June 2023), it is recommended that the Mechanism facilitates action to achieve several important outputs across the three key outcomes envisaged for its inaugural program of work.

**Outcome 1: Improving the availability and use of data on investments in research capacity strengthening in LMICs, by funders of health research (public and private)**

1. Further development and improvement on the use of basic indicators to measure and represent national health research capacity for global mapping.
2. Establishing a minimum desired level of capacity and agreeing targets for increasing capacity in each country over time.
3. Regular (e.g., annual) metric-driven assessment of health research capacity at the country level in LMICs and use of the data to monitor and focus capacity-strengthening activities.\(^{19}\)
   - **This builds on the work undertaken by the data and metrics task team during the review, and the products developed – world relative research capacity map and country classification into four by research capacity bands – leveraging data aggregated by the Global Observatory of Health R&D and World RePORT.**
   - **Would reflect consensus on the need to start with a minimum viable set of indicators that represent the aspect that funders are most interested in or have mandate to support, to ensure the product has utility and is demand-driven, while balancing the cost of collecting data vis-à-vis the demand.**
4. A partnership to create country-focused collaborations aimed at enabling country led collation and reporting of data on health research capacity and health research capacity strengthening investments.\(^{20,21}\)
   - **Builds on a specific recommendation made at the June 2020 inaugural review meeting session on data and metrics for LMIC health research capacity strengthening.**
5. A co-funded effort to improve resourcing of data sharing and data transparency platforms for health research capacity strengthening investments.\(^{22}\)
   - **World RePORT – To support changes in governance structure and platform development efforts aimed at improving the quantum of data through greater access to additional data sources, and improving the quality of data (timeliness, completeness, and accuracy).**

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\(^{19}\) In the African context, this could involve leveraging tools such as the AUDA-NEPAD Africa Innovation outlook which measures country performance on research and innovation [https://www.nepad.org/publication/african-innovation-outlook-iii](https://www.nepad.org/publication/african-innovation-outlook-iii)

\(^{20}\) An example of such a partner could be the Global Partnership for Sustainable Development (GPSDD), or similar organisations

\(^{21}\) The Global Partnership for Sustainable Development Data is a growing network of hundreds of members, including governments, the private sector, civil society, international organizations, academic institutions, foundations, statistics agencies, and other data communities. It was established to help stakeholders across countries and sectors fully harness the data revolution for sustainable development. [http://www.data4sdgs.org/about-gpsdd](http://www.data4sdgs.org/about-gpsdd)

\(^{22}\) Data sharing and data transparency platforms for health research/health research capacity building include the Global Observatory of Health R&D and World RePORT
Mechanism for the review of investments in health research capacity strengthening in LMICs

- **WHO Global Observatory** – To support ongoing efforts to improve country level and regional adoption and use of metrics for measuring health research capacity at national and institutional level.

6. A structured dialogue/engagement process to advocate for the inclusion of health research data transparency commitments in health financing arrangements facilitated by multilateral institutions.
   - Builds on a specific recommendation made at the June 2020 inaugural review meeting session on data and metrics for LMIC health research capacity strengthening.

**Outcome 2: Strengthening collaborations on research capacity strengthening to improve efficacy of investments, minimize duplication and ensure alignment with country needs.**

7. A structured effort aimed at facilitating shared learning and knowledge exchange on models for collaboration to strengthen health research capacity in LMICs to contribute to evolve a valuable body of knowledge on this topic.
   - Will build on the effort undertaken by the coordination and collaboration task team in the process of the review and include investing in networking and knowledge sharing activities such as webinars, workshops, and awards collaboration.

8. Specific actions to improve the effectiveness of ESSENCE and solidify its leadership role as a strategic alliance of funders.

9. A discussion aimed at increasing the practice of structured reviews of various research capacity strengthening models active across LMICs to evolve real evidence of what works, and guide funders on ways to extend the impact of their investments in collaborative research capacity strengthening.
   - Builds on the dearth of data and evidence on evaluation observed during the review and provides evidence to support a longer-term vision and a collaborative approach on research capacity strengthening in LMICs.

**Outcome 3: Fostering collaborative actions by research funders to fill gaps in specific countries where research capacity is low relative to the need for research.**

10. Coalitions between participating members of the Mechanism and national authorities/institutions to tackle critical health research capacity gaps identified in specific countries with the lowest levels of capacity, including assessments of specific needs in these countries, and implementation of programs designed specifically to strengthen capacity.
   - Builds on the deep dive analysis led by the Critical gaps task team and will entail coordination amongst funders working in specific countries to tackle these issues at country level in a more effective way, leveraging previous or ongoing health research or health research capacity strengthening activity in the targeted country(ies).

11. A deliberate collaborative effort to find globally scalable innovative solutions aimed at addressing the significant issue of lack of sustainable local career pathways for LMIC researchers.
   - Builds on the identification of this issue during the country deep-dives as arguably one of the most important challenges limiting national research capacity in LMICs.

12. Advocacy on norms and principles aimed at securing the commitment of funders of global health research to ways of working that directly translate to positive impacts on national health research capacity in LMICs. Such ways of working may include encouraging funders to:

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23A good example is the World Bank’s Global Financing Facility (GFF). Commitments on data transparency could be a part of country-led plans that underpin GFF engagement with eligible countries.
- Designate a set of resources for which only countries with lowest capacity levels would be eligible.
- Adopt funding principles that encourage researchers and research institutions with high capacity in LMICs, to actively contribute to improving local relevance of research and directly advancing research translation.
- Collaborate with regional development institutions and regional initiatives to align health research capacity strengthening with other development programs (infrastructure, health systems strengthening etc.) that are being funded or implemented in LMICs.

These potential commitments will build on the key findings of the review and include norms and principles that encourage minor but impactful changes to health research funding. The changes encouraged will be designed to support institutional and individual behaviors in the direction of greater local relevance of research, better inter-institutional collaboration in-country, greater interaction between researchers and public health authorities, greater commitment to developing young researchers, and adoption of leading practices in research management, among others.

13. A coordinated effort to elevate health research capacity strengthening in LMICs as a front burner issue with global health leaders and further its integration into the global health agenda, through as many platforms as possible, especially the Global Preparedness Monitoring Board (GPMB)\textsuperscript{24}, leveraging global interest in health research and pandemic preparedness, heightened by the global COVID-19 pandemic.

\textsuperscript{24} The GPMB is an independent monitoring and accountability body to ensure preparedness for global health crises. It is comprised of political leaders, agency principals and world-class experts, and its secretariat is hosted at the World Health Organisation.  
https://apps.who.int/gpmb/about.html
## 4 ADDENDUM: SUPPORTING DOCUMENTATION ON THE FINDINGS OF THE REVIEW

### 4.1 LIST OF COUNTRIES BY RELATIVE RESEARCH CAPACITY USING BASIC INDICATORS

**Table 7 - Full list of countries grouped by capacity bands (using basic indicators of capacity) and DALY per capita**

<table>
<thead>
<tr>
<th>#</th>
<th>Research Capacity Band</th>
<th>List of Countries</th>
<th>DALY Per Capita (Av)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>High (13)</td>
<td>Australia, Brazil, Canada, China, France, Germany, India, Italy, Japan, Poland, Spain, United Kingdom, United States</td>
<td>0.29</td>
</tr>
<tr>
<td>2.</td>
<td>Upper Medium (38)</td>
<td>Argentina, Austria, Bangladesh, Belgium, Chile, Colombia, Czech Republic, Denmark, Egypt, Finland, Greece, Hungary, Indonesia, Iran (Islamic Republic of) Ireland, Israel, Kenya, Korea, Rep., Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Peru, Philippines, Portugal, Romania, Russian Federation, South Africa, Sweden, Switzerland, Thailand, Turkey, Uganda, Ukraine, Vietnam</td>
<td>0.32</td>
</tr>
<tr>
<td>3.</td>
<td>Lower medium (60)</td>
<td>Algeria, Armenia, Belarus, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Cambodia, Cameroon, Costa Rica, Côte d'Ivoire, Croatia, Cuba, Cyprus, Democratic Republic of the Congo, Ecuador, Estonia, Ethiopia, Georgia, Ghana, Guatemala, Iceland, Iraq, Jordan, Kazakhstan, Latvia, Lebanon, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Mali, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Nepal, Panama, Paraguay, Qatar, Rwanda, Saudi Arabia, Senegal, Serbia, Singapore, Slovak Republic, Slovenia, Sri Lanka, Sudan, Tanzania, Tunisia, United Arab Emirates, Uruguay, Venezuela, RB, Zambia, Zimbabwe</td>
<td>0.38</td>
</tr>
<tr>
<td>4.</td>
<td>Low (72)(^{26})</td>
<td>Afghanistan, Albania, Angola, Antigua and Barbuda, Azerbaijan, Bahamas, Bahrain, Barbados, Belize, Bhutan, Brunei Darussalam, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Congo, Democratic People's Republic of Korea, Djibouti, Dominican Republic, El Salvador, Equatorial Guinea, Eritrea, Fiji, Gabon, Gambia, Grenada, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Jamaica, Kiribati, Kuwait, Kyrgyz Republic, Lao PDR, Lesotho, Liberia, Libya, Maldives, Malta, Mauritania, Mauritius, Micronesia, Fed. Sts., Montenegro, Namibia, Nicaragua, Niger, Oman, Papua New Guinea, Samoa, São Tomé and Príncipe, Seychelles, Sierra Leone, Solomon Islands, Somalia, South Sudan, St Lucia, St Vincent and the Grenadines, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Turkmenistan, Uzbekistan, Vanuatu, Yemen, Rep.</td>
<td>0.42</td>
</tr>
</tbody>
</table>

---

\(^{25}\) Highlighted countries selected for the deep-dive study

\(^{26}\) The ‘low’ capacity band contains most small island states for good reason, as building advanced health research capacities is not a typical development imperative for these countries.
4.2 **June 2020 Review Meeting: Scope, Objectives and Key Activities**

The purpose of the June 2020 inaugural review meeting is to deliberate and agree on a set of concrete actions to be collaboratively pursued through the Mechanism over the next three years (June 2020 – June 2023) in furtherance of the overarching goal of ensuring synergy at country and regional levels, and across funders of health research, with respect to investments in health research capacity, and research capacity strengthening in LMICs.

The WGRI reconvened in December 2019 to begin the review process, adopting an inclusive and participatory approach, with three topic areas identified, and task teams (with a team lead) assigned to each area. The three topic areas are described below:

**Data and Metrics Task Team**

This team was tasked with a high-level review of current health research capacity levels in LMICs, using a set of basic universally applicable indicators and data available through the WHO Global Observatory for Health R&D and the World RePORT platforms. The objective of this effort is to inform understanding of the current state-of-play with respect to health research capacity in LMICs, and to inform agreement within the Mechanism on a defined course of action to improve the widespread availability of data and reporting on health research capacity and research capacity strengthening within LMICs via the aforementioned platforms. Specific outputs expected from the task team ahead of the June 2020 meeting were:

1) An agreed-upon set of basic indicators using widely available data to characterize health research capacity at the national level for the purposes of the mechanism.

2) A set of global charts allocating countries to 4 research capacity bands, using the basic metrics in step 1 to inform the next tasks of the mechanism.

3) A set of recommendations aimed at improving the availability of data, and the extent of data sharing and reporting on health research capacity and investments in health research capacity strengthening in LMICs, given due emphasis on the need for forward-looking data on capacity strengthening investments, and the need to more effectively track investment forms/channels that are currently not effectively inventoried.

**Coordination and Collaboration Task Team**

This team was tasked with a review of the prevailing models of multi-funder, multi-stakeholder collaborations in health research capacity strengthening in LMICs through a broad consultation with specific actors operating within different models to better understand strengths, weaknesses and opportunities for improving health research capacity strengthening collaborations in low resource settings. The effort was designed to inform member’s approach to new collaboration models, and/or changes to existing models, aimed at increasing the quantum and equity in investments in LMIC health research capacity strengthening, achieving better alignment with country leadership, and fostering higher levels of effectiveness amongst strategic funders of health research in LMICs. Specific outputs expected from the task team ahead of the June 2020 meeting were:

1) A conceptual framework for characterizing coordination and collaboration models for health research capacity strengthening in LMICs.

2) Analysis of the facilitators of successful capacity strengthening collaboration, barriers to effective collaboration and specific opportunities to improve the efficacy of collaborations in health research capacity strengthening in these countries.

**Critical Gaps Task Team**

This team was tasked with leveraging data on current capacity levels (based on the output of the data and metrics task team) to identify strategic opportunities to steer collaborative action towards addressing critical gaps and strengthening capacity in countries and institutions with the lowest levels of health research capacity, and
incommensurate levels of investment in research capacity strengthening. This effort is geared towards achieving progress towards a course of action and/or a set of programmatic interventions in select countries aimed at strengthening capacity in specific countries where health systems and health research capacity are very weak and the prospects of new investments in research capacity strengthening are very low. Specific outputs expected from the task team ahead of the June 2020 meeting were:

1) Identifying potential priority countries with greatest gaps based on an evidence-based approach e.g., lowest band in health research capacity metrics with considerations for population and/or health research need.
2) Evidence on best practices and lessons learned in developing research capacity in countries and institutions with low/lowest levels of capacity.
3) Deeper dive into select countries with low/lowest levels of capacity to more fully characterize health research capacity, gaps, and priority actions to increase capacity, including a model for country stakeholder involvement.
### 4.3 Basic Capacity Indicators – Raw Data

Table 7 – List of low and middle income countries by basic capacity indicators

<table>
<thead>
<tr>
<th>Sn.</th>
<th>Country</th>
<th>Income</th>
<th>Clinical Trial</th>
<th>Intl. Grants - World RePORT</th>
<th>Publications - PubMed</th>
<th>Training Instns Offering PhDs</th>
<th>Percentile (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>UMIC</td>
<td>6,055</td>
<td>627</td>
<td>177,887</td>
<td>583</td>
<td>98%</td>
</tr>
<tr>
<td>2</td>
<td>India</td>
<td>LIC</td>
<td>3,148</td>
<td>510</td>
<td>38,961</td>
<td>637</td>
<td>97%</td>
</tr>
<tr>
<td>3</td>
<td>Brazil</td>
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<td>1,373</td>
<td>460</td>
<td>30,219</td>
<td>561</td>
<td>95%</td>
</tr>
<tr>
<td>4</td>
<td>Mexico</td>
<td>UMIC</td>
<td>452</td>
<td>164</td>
<td>10,701</td>
<td>540</td>
<td>90%</td>
</tr>
<tr>
<td>5</td>
<td>Thailand</td>
<td>UMIC</td>
<td>789</td>
<td>247</td>
<td>5,915</td>
<td>110</td>
<td>89%</td>
</tr>
<tr>
<td>6</td>
<td>Turkey</td>
<td>UMIC</td>
<td>773</td>
<td>60</td>
<td>17,099</td>
<td>135</td>
<td>88%</td>
</tr>
<tr>
<td>7</td>
<td>Argentina</td>
<td>UMIC</td>
<td>382</td>
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</tr>
<tr>
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<td>52</td>
<td>2,215</td>
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<td>85%</td>
</tr>
<tr>
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<td>3,182</td>
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<td>84%</td>
</tr>
<tr>
<td>10</td>
<td>South Africa</td>
<td>UMIC</td>
<td>314</td>
<td>1,047</td>
<td>8,035</td>
<td>30</td>
<td>84%</td>
</tr>
<tr>
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<td>Peru</td>
<td>UMIC</td>
<td>139</td>
<td>194</td>
<td>1,148</td>
<td>99</td>
<td>82%</td>
</tr>
<tr>
<td>12</td>
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<td>82%</td>
</tr>
<tr>
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<td>Pakistan</td>
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<td>4,809</td>
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</tr>
<tr>
<td>14</td>
<td>Malaysia</td>
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<td>211</td>
<td>71</td>
<td>5,538</td>
<td>57</td>
<td>81%</td>
</tr>
<tr>
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<td>Kenya</td>
<td>LMIC</td>
<td>69</td>
<td>530</td>
<td>1,779</td>
<td>43</td>
<td>81%</td>
</tr>
<tr>
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<td>Vietnam</td>
<td>LMIC</td>
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<td>145</td>
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</tr>
<tr>
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<td>LMIC</td>
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<td>1,441</td>
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</tr>
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<td>UMIC</td>
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<td>40</td>
<td>2,886</td>
<td>61</td>
<td>80%</td>
</tr>
<tr>
<td>19</td>
<td>Egypt</td>
<td>LMIC</td>
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<td>28</td>
<td>8,062</td>
<td>38</td>
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</tr>
<tr>
<td>20</td>
<td>Indonesia</td>
<td>LIC</td>
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<td>54</td>
<td>1,653</td>
<td>455</td>
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</tr>
<tr>
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<td>Philippines</td>
<td>LMIC</td>
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<td>78</td>
<td>884</td>
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</tr>
<tr>
<td>22</td>
<td>Bangladesh</td>
<td>LMIC</td>
<td>59</td>
<td>127</td>
<td>1,529</td>
<td>97</td>
<td>79%</td>
</tr>
<tr>
<td>23</td>
<td>Iran (Islamic Republic of)</td>
<td>UMIC</td>
<td>3,041</td>
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<td>298</td>
<td>161</td>
<td>76%</td>
</tr>
<tr>
<td>24</td>
<td>Uganda</td>
<td>LIC</td>
<td>69</td>
<td>479</td>
<td>1,251</td>
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<tr>
<td>25</td>
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<td>41</td>
<td>176</td>
<td>952</td>
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</tr>
<tr>
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</tr>
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<td>2,584</td>
<td>29</td>
<td>71%</td>
</tr>
<tr>
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<td>Ghana</td>
<td>LMIC</td>
<td>29</td>
<td>127</td>
<td>1,222</td>
<td>25</td>
<td>71%</td>
</tr>
</tbody>
</table>
## Mechanism for the review of investments in health research capacity strengthening in LMICs

<table>
<thead>
<tr>
<th>Sn.</th>
<th>Country</th>
<th>Income</th>
<th>Clinical Trial</th>
<th>Intl. Grants - World RePORT</th>
<th>Publications - PubMed</th>
<th>Training Instns Offering PhDs</th>
<th>Percentile (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>Serbia</td>
<td>UMIC</td>
<td>203</td>
<td>23</td>
<td>2,283</td>
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<td>67%</td>
</tr>
<tr>
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<td>Tunisia</td>
<td>LMIC</td>
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<td>15</td>
<td>1,792</td>
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<tr>
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<td>Senegal</td>
<td>LMIC</td>
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<td>52</td>
<td>416</td>
<td>44</td>
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</tr>
<tr>
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<td>Morocco</td>
<td>LMIC</td>
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<td>17</td>
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<tr>
<td>35</td>
<td>Malawi</td>
<td>LIC</td>
<td>37</td>
<td>174</td>
<td>599</td>
<td>10</td>
<td>66%</td>
</tr>
<tr>
<td>36</td>
<td>Ecuador</td>
<td>UMIC</td>
<td>9</td>
<td>28</td>
<td>768</td>
<td>43</td>
<td>66%</td>
</tr>
<tr>
<td>37</td>
<td>Zambia</td>
<td>LMIC</td>
<td>24</td>
<td>123</td>
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<td>16</td>
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</tr>
<tr>
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<td>Cameroon</td>
<td>LMIC</td>
<td>14</td>
<td>54</td>
<td>736</td>
<td>22</td>
<td>64%</td>
</tr>
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<td>Kazakhstan</td>
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<td>10</td>
<td>371</td>
<td>97</td>
<td>64%</td>
</tr>
<tr>
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<td>Zimbabwe</td>
<td>LMIC</td>
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<td>144</td>
<td>405</td>
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<td>64%</td>
</tr>
<tr>
<td>41</td>
<td>Burkina Faso</td>
<td>LIC</td>
<td>15</td>
<td>29</td>
<td>361</td>
<td>36</td>
<td>63%</td>
</tr>
<tr>
<td>42</td>
<td>Nepal</td>
<td>LIC</td>
<td>31</td>
<td>39</td>
<td>936</td>
<td>10</td>
<td>63%</td>
</tr>
<tr>
<td>43</td>
<td>Sri Lanka</td>
<td>UMIC</td>
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<td>22</td>
<td>775</td>
<td>16</td>
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</tr>
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<td>Sudan</td>
<td>LMIC</td>
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<td>426</td>
<td>41</td>
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</tr>
<tr>
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<td>183</td>
<td>29</td>
<td>63%</td>
</tr>
<tr>
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<td>Cuba</td>
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<td>8</td>
<td>433</td>
<td>41</td>
<td>62%</td>
</tr>
<tr>
<td>47</td>
<td>Côte d’Ivoire</td>
<td>LMIC</td>
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<td>24</td>
<td>228</td>
<td>65</td>
<td>62%</td>
</tr>
<tr>
<td>48</td>
<td>Costa Rica</td>
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<td>15</td>
<td>401</td>
<td>30</td>
<td>61%</td>
</tr>
<tr>
<td>49</td>
<td>Algeria</td>
<td>UMIC</td>
<td>24</td>
<td>3</td>
<td>639</td>
<td>65</td>
<td>61%</td>
</tr>
<tr>
<td>50</td>
<td>Jordan</td>
<td>UMIC</td>
<td>45</td>
<td>7</td>
<td>1,462</td>
<td>18</td>
<td>61%</td>
</tr>
<tr>
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<td>Cambodia</td>
<td>LMIC</td>
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<td>43</td>
<td>285</td>
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<td>60%</td>
</tr>
<tr>
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<td>Myanmar</td>
<td>LMIC</td>
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<td>17</td>
<td>219</td>
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<td>59%</td>
</tr>
<tr>
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<td>Belarus</td>
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<td>3</td>
<td>310</td>
<td>42</td>
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</tr>
<tr>
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<td>Mozambique</td>
<td>LIC</td>
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<td>69</td>
<td>274</td>
<td>13</td>
<td>58%</td>
</tr>
<tr>
<td>55</td>
<td>Democratic Republic of the Congo</td>
<td>LIC</td>
<td>15</td>
<td>15</td>
<td>131</td>
<td>39</td>
<td>58%</td>
</tr>
<tr>
<td>56</td>
<td>Mongolia</td>
<td>LMIC</td>
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<td>12</td>
<td>996</td>
<td>30</td>
<td>57%</td>
</tr>
<tr>
<td>57</td>
<td>Moldova</td>
<td>LMIC</td>
<td>32</td>
<td>15</td>
<td>91</td>
<td>25</td>
<td>55%</td>
</tr>
<tr>
<td>58</td>
<td>Venezuela, RB</td>
<td>UMIC</td>
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<td>5</td>
<td>410</td>
<td>41</td>
<td>54%</td>
</tr>
<tr>
<td>59</td>
<td>Bolivia</td>
<td>LMIC</td>
<td>5</td>
<td>17</td>
<td>164</td>
<td>34</td>
<td>54%</td>
</tr>
<tr>
<td>60</td>
<td>Rwanda</td>
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<td>53</td>
<td>270</td>
<td>6</td>
<td>54%</td>
</tr>
<tr>
<td>Sn.</td>
<td>Country</td>
<td>Income</td>
<td>Clinical Trial</td>
<td>Intl. Grants - World RePORT</td>
<td>Publications - PubMed</td>
<td>Training Instns Offering PhDs</td>
<td>Percentile (Mean)</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------</td>
<td>--------</td>
<td>----------------</td>
<td>------------------------------</td>
<td>-----------------------</td>
<td>------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>61</td>
<td>Bosnia and Herzegovina</td>
<td>UMIC</td>
<td>41</td>
<td>3</td>
<td>394</td>
<td>20</td>
<td>54%</td>
</tr>
<tr>
<td>62</td>
<td>Botswana</td>
<td>UMIC</td>
<td>8</td>
<td>79</td>
<td>252</td>
<td>5</td>
<td>54%</td>
</tr>
<tr>
<td>63</td>
<td>Mali</td>
<td>LIC</td>
<td>11</td>
<td>51</td>
<td>202</td>
<td>5</td>
<td>53%</td>
</tr>
<tr>
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<td>Iraq</td>
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<td>1</td>
<td>664</td>
<td>28</td>
<td>53%</td>
</tr>
<tr>
<td>65</td>
<td>Macedonia</td>
<td>UMIC</td>
<td>15</td>
<td>5</td>
<td>351</td>
<td>19</td>
<td>53%</td>
</tr>
<tr>
<td>66</td>
<td>Benin</td>
<td>LIC</td>
<td>5</td>
<td>12</td>
<td>361</td>
<td>22</td>
<td>53%</td>
</tr>
<tr>
<td>67</td>
<td>Madagascar</td>
<td>LIC</td>
<td>4</td>
<td>24</td>
<td>192</td>
<td>22</td>
<td>52%</td>
</tr>
<tr>
<td>68</td>
<td>Armenia</td>
<td>UMIC</td>
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<td>3</td>
<td>255</td>
<td>33</td>
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</tr>
<tr>
<td>69</td>
<td>Paraguay</td>
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<td>3</td>
<td>201</td>
<td>52</td>
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</tr>
<tr>
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<tr>
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<td>Haiti</td>
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</tr>
<tr>
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<td>Nicaragua</td>
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<tr>
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<tr>
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<td>Lao PDR</td>
<td>LMIC</td>
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<td>55</td>
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<td>39%</td>
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<tr>
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<td>UMIC</td>
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<td>Niger</td>
<td>LIC</td>
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<tr>
<td>Sn.</td>
<td>Country</td>
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<td>Intl. Grants - World RePORT</td>
<td>Publications - PubMed</td>
<td>Training Instns Offering PhDs</td>
<td>Percentile (Mean)</td>
</tr>
<tr>
<td>-----</td>
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<td>37%</td>
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<td>Togo</td>
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<tr>
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</tr>
<tr>
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<td>Fiji</td>
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<td>105</td>
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<td>36%</td>
</tr>
<tr>
<td>95</td>
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<td>LMIC</td>
<td>2</td>
<td>4</td>
<td>68</td>
<td>9</td>
<td>36%</td>
</tr>
<tr>
<td>96</td>
<td>Korea DPR</td>
<td>LIC</td>
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<td>-</td>
<td>15</td>
<td>17</td>
<td>33%</td>
</tr>
<tr>
<td>97</td>
<td>Burundi</td>
<td>LIC</td>
<td>3</td>
<td>3</td>
<td>34</td>
<td>7</td>
<td>33%</td>
</tr>
<tr>
<td>98</td>
<td>Montenegro</td>
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<td>4</td>
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<tr>
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</tr>
<tr>
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<td>Chad</td>
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<tr>
<td>102</td>
<td>Libya</td>
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<tr>
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<td>Central African Republic</td>
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<td>6</td>
<td>34</td>
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<td>29%</td>
</tr>
<tr>
<td>105</td>
<td>Bhutan</td>
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<tr>
<td>106</td>
<td>Lesotho</td>
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<td>4</td>
<td>3</td>
<td>24</td>
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<td>107</td>
<td>Swaziland</td>
<td>LMIC</td>
<td>4</td>
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<td>62</td>
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</tr>
<tr>
<td>108</td>
<td>Guyana</td>
<td>UMIC</td>
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<td>4</td>
<td>25</td>
<td>4</td>
<td>27%</td>
</tr>
<tr>
<td>109</td>
<td>Guinea-Bissau</td>
<td>LIC</td>
<td>4</td>
<td>5</td>
<td>52</td>
<td>-</td>
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</tr>
<tr>
<td>110</td>
<td>Somalia</td>
<td>LIC</td>
<td>5</td>
<td>-</td>
<td>20</td>
<td>6</td>
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</tr>
<tr>
<td>111</td>
<td>Mauritania</td>
<td>LMIC</td>
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<td>0</td>
<td>21</td>
<td>2</td>
<td>23%</td>
</tr>
<tr>
<td>112</td>
<td>Yemen, Rep.</td>
<td>LIC</td>
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<td>-</td>
<td>5</td>
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<td>20%</td>
</tr>
<tr>
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<td>Timor-Leste</td>
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<td>-</td>
<td>1</td>
<td>21</td>
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<td>20%</td>
</tr>
<tr>
<td>114</td>
<td>Cape Verde</td>
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</tr>
<tr>
<td>115</td>
<td>Samoa</td>
<td>UMIC</td>
<td>-</td>
<td>1</td>
<td>23</td>
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</tr>
<tr>
<td>116</td>
<td>Solomon Islands</td>
<td>LMIC</td>
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<td>1</td>
<td>27</td>
<td>-</td>
<td>18%</td>
</tr>
<tr>
<td>117</td>
<td>Eritrea</td>
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<td>-</td>
<td>23</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td>118</td>
<td>Belize</td>
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<td>0</td>
<td>17</td>
<td>-</td>
<td>16%</td>
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<tr>
<td>119</td>
<td>Maldives</td>
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<td>-</td>
<td>13</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>120</td>
<td>Djibouti</td>
<td>LMIC</td>
<td>1</td>
<td>-</td>
<td>13</td>
<td>1</td>
<td>13%</td>
</tr>
</tbody>
</table>
Table Notes:

- **Clinical trials data** is annual average number of trials conducted in-country between 2016 and 2018. Source: Global Observatory for Health R&D
- **International grants data** is annual average number of internationally funded grants for health research recorded on World RePORT between 2016 and 2018. Source: World RePORT
- **Publications** (measure of research output) is annual average number of country-affiliated scientific publications on PubMed between 2016 and 2018.
- **Training institutions offering PhDs** is the number of institutions in the country offering Doctorates relevant to health research based on data from the World Health Education Database. Sourced from the Global Observatory for Health R&D
- **Percentile** is the mean percentile for each country based on their percentile rank on each of the four basic indicators.
- **Fields returning ‘0’** indicates that the data source reports no clinical trial grant, publication, or training institution for that country. **Fields returning ‘-’** indicates that the data source does not include the country in its coverage, or is reporting no available data for that country on the specific indicator.

<table>
<thead>
<tr>
<th>Sn.</th>
<th>Country</th>
<th>Income</th>
<th>Clinical Trial</th>
<th>Intl. Grants - World RePORT</th>
<th>Publications - PubMed</th>
<th>Training Instns Offering PhDs</th>
<th>Percentile (Mean)</th>
</tr>
</thead>
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<tr>
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<td>Comoros</td>
<td>LMIC</td>
<td>1</td>
<td>-</td>
<td>6</td>
<td>1</td>
<td>13%</td>
</tr>
<tr>
<td>122</td>
<td>St Lucia</td>
<td>UMIC</td>
<td>-</td>
<td>3</td>
<td>17</td>
<td>-</td>
<td>13%</td>
</tr>
<tr>
<td>123</td>
<td>South Sudan</td>
<td>LIC</td>
<td>-</td>
<td>27</td>
<td>-</td>
<td>1</td>
<td>11%</td>
</tr>
<tr>
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<td>-</td>
<td>13</td>
<td>-</td>
<td>9%</td>
</tr>
<tr>
<td>125</td>
<td>Turkmenistan</td>
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<td>-</td>
<td>1</td>
<td>1</td>
<td>9%</td>
</tr>
<tr>
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<td>Vanuatu</td>
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<td>-</td>
<td>12</td>
<td>-</td>
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<tr>
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<td>-</td>
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<td>-</td>
<td>6%</td>
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<tr>
<td>128</td>
<td>São Tomé and Príncipe</td>
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<td>-</td>
<td>2</td>
<td>-</td>
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<tr>
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</tr>
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<td>-</td>
<td>6</td>
<td>-</td>
<td>1%</td>
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</tr>
<tr>
<td>131</td>
<td>Kiribati</td>
<td>LMIC</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>

The table above shows the mechanism for the review of investments in health research capacity strengthening in LMICs.
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6 ANNEX 1 – COUNTRY CASE STUDIES: FILLING THE GAPS IN COUNTRIES WITH WEAK CAPACITY RELATIVE TO NEEDS

Case studies of eight countries selected for the deep dive study to further characterize health research capacity in low- and middle-income countries (LMICs)
NIGERIA

1. Extent of demand for health research

Country Context & Policy/Institutional Landscape for Health Research

Nigeria is a country in Sub-Saharan Africa and borders the Gulf of Guinea, between Benin on the west and Cameroon on the east. It is a lower middle income country with an annual GDP of $2229.9 per capita and a total population of 200.963 million in 2019. According to the World Governance Indicators (WGI) index, the country has high political instability and low levels of government effectiveness. The Freedom House ranks Nigeria as ‘partly free’ overall with a score of 47/100 in their assessment of the real-world rights and freedoms enjoyed by individuals in the country. The United Nations Development Program’s (UNDP) Human Development Report groups Nigeria under the category of countries with low equality in HDI achievements between women and men. Summarily, political instability, low level of government effectiveness, limited right of access to information and limited freedom enjoyed by individuals create a challenging socio-economic and political landscape in Nigeria.

Governance and coordination of national health research in Nigeria is currently the responsibility of the Federal Ministry of Health (FMoH), anchored by the Department of Health Planning & Research. The department also coordinates the National Health Research Ethics Committee of Nigeria (NHREC) which is responsible for ensuring that ethical and scientific standards for health research are met in Nigeria. The NHREC has responsibility for determining the guidelines for the functioning of health research ethics committees across Nigeria, registering and auditing health research ethics committees, setting norms and standards for conducting research on humans and animals, including norms and standards for conducting clinical trials, adjudicating complaints about the functioning of health research ethics committees and advising the FMOH and State Ministries of health on any ethical issues concerning research. Nigeria also has a fully operational public health agency – the National Centre for Disease Control (NCDC), which also has its own health research committee.

Perceptions of the Utility of Health Research & Research Culture

Overall, the general perception of the utility of health research in Nigeria is lower mid-range, and the research culture is not as developed as it should be, considering that active health research has been ongoing in Nigeria for more than four decades. Most of the demand for health research is driven by external actors and health research is not considered as a priority by many indigenous institutions outside of academia. There is little commitment to health research by political leadership at the national level and in the states. Instead, Nigeria has mostly academic institutions and self or externally funded individuals that are very committed to health research. The persistence of a major disconnect between policy makers, researchers and implementers within the health system, constrain the country’s ability to develop a stronger research culture. Despite the constraints, the culture of health research at individual and institutional level has led to a lot of medical research output. These are mostly in the form of publications in international journals without any real local dissemination, peer review or translation.

This landscape is seeing a gradual shift however, with the incidences of Lassa fever outbreaks in recent years and the ongoing COVID-19 pandemic triggering action from the Government to invest more in research and evidence based policy making to strengthen the health system. The Federal Ministry of Health (FMoH) is working in close concert with the World Health Organization (WHO) and other health agencies such as the Nigeria Center for Disease Control (NCDC) to develop a national

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27 WGI index of -2.19 for Political Stability and Absence of Violence/Terrorism and -1.02 for Government Effectiveness Index in 2018, in a range from approximately -2.5 (weak) to 2.5 (strong) governance performance
28 Freedom in the World 2020
29 Gender Development Index (GDI) of 0.868, Group 5 in 2018
30 Website of the National health Research Ethics Committee of Nigeria (NHREC) https://nhrec.net/
health research agenda. In the past few years, there have been several meetings coordinated by the Department of Health Research & Planning to fast-track the development of a national health research agenda and framework for health research capacity strengthening. While a national health research agenda has not yet been published, there have also been efforts to develop disease specific research agenda, notably for Lassa fever led by the NCDC working in collaboration with the WHO. Presently therefore, health research priorities in Nigeria are largely determined by external funders who work directly with individuals and research institutions on a range of research topics, which may or may not be related to specific local research needs or priorities.

1.2. Capacity to produce knowledge

*Systems and infrastructure enabling the conduct of health research*

Most health research in Nigeria is carried out by academic and medical institutions as well as by individual researchers usually working with international organizations/donors. The country has 121 higher education institutions offering disciplines related to health research. There is active health research output coming out of the University of Ibadan, University of Lagos, University of Benin, University of Nigeria, and a host of other first and second generation universities across the country. Several public health research institutions are also regularly active, including the Nigerian Institute of Medical Research and the Institute of Human Virology. Nigeria has considerable human capacity to produce top tier health research output. Several universities have training programs in post graduate research up to the Doctorate level, and there are many Nigerian nationals who have trained in top tier institutions in the world. Nigeria’s MBBS qualification has pre-requisites in community health and medical students must take part in a research project before graduation.

The Global Competitiveness Index had a score of 2.76 on its index for quality of research institutions for Nigeria, placing it as one of the lowest in the world. Nigeria had 38.79 full time researchers per million population (Research Density) as far back as 2007. A total of 16,002 scientific publications whose authors are affiliated with the country are catalogued on PubMed between 2014 and 2019, and over 80 research organizations received grants for health research from at least 7 international funders between 2016 and 2018.

The WHO Global Health Observatory has a score of 73.33% for Nigeria in terms of laboratory capacity across the following areas: existence of office for collaboration of laboratory services, number and qualification of laboratory staff, the supply management system (including quality, availability, and delivery of supplies), specimen collection, storage and transportation, and maintenance of laboratory equipment. The Redeemer’s University houses the African Center of Excellence for Genomics of Infectious Diseases (ACEGID) which has a well-equipped BSL-3 Laboratory capable of handling dangerous organisms including carrying out genome sequencing and is currently being used for COVID sequencing. Nigeria’s considerably strong laboratory capacity has recently supported work by the NCDC and the National Biotechnology Development Agency (NABDA) in collaboration to extract viral DNA in Nigeria. There are also PEPFAR supported laboratories which carry out NAIMA sequencing primarily for HIV, the National Veterinary Research Institute with its own sequencing laboratory, and a few other private laboratories with sequencing capabilities. Additionally, with the incidences of pandemics especially COVID19, there has been an increasing focus on capacity building for laboratories across the 36 states of the federation.

There is no dedicated source of domestic funding for health research in Nigeria. However, the Tertiary Education Trust Fund (TETFUND) has set up a National Research Fund for the “resuscitation of research activities in Nigeria’s Public Tertiary Institutions” which section 20 of the TETFUND Act defines as public “Universities, Polytechnics and Colleges of Education.” The fund has issues calls for proposals in 19 thematic areas one of which is ‘Health and Welfare’. The Central Bank of Nigeria (CBN) in March 2020, launched the Healthcare Sector Research and Development Intervention Scheme (HSRDIS), as part of

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21 2017 WEF Global Competitive Index in a range from 1 [extremely poor] to 7 [extremely good]
its policy response to the COVID-19 pandemic, to help “strengthen the public healthcare system with innovative financing of research and development (R&D) in new and improved drugs, vaccines and diagnostics of infectious diseases in Nigeria”\(^{33}\). The scheme is designed to providing grants for R&D in new or revalidation of drug molecules, phytomedicines and vaccines for the control, prevention and treatment of infectious diseases, boosting domestic manufacturing of validated drugs herbal medicines and vaccines, improved the capacity of the biotechnological and pharmaceutical companies, institutions, researchers, and research institutes in the developing therapies, supporting capacity of relevant health agencies towards attaining WHO Maturity Level 3, and facilitating R&D partnerships between academia (researchers, research institutes and universities) and industry.

Nigeria does not currently report national data on gross domestic R&D expenditure on health (health GERD). Data from the World RePORT\(^{34}\) health research data aggregation platform estimates that internationally funded health research grants in Nigeria amounted to US$75.7m between 2016 and 2018. Figure 1 summarizes funding for health research in Nigeria from international grants for the 2016 to 2018 period based on World RePORT data.

**Figure 6 - International health research awards in Nigeria (estimates based on reported data on World RePORT - Donors & Recipients**

![Graph showing international health research awards in Nigeria](image)

**Perspectives on capacity to produce quality health research output**

Overall, the capacity to produce quality health research in Nigeria is quite well developed, despite the existence of significant constraints. Several centers of excellence for health research are rapidly emerging, and the talent pool for health research scientists (both in country and in the diaspora) is quite strong. Despite this potential, research is still rarely seen as a viable career path in Nigeria due to poor remuneration structures and unfavorable working conditions in academic institutions and public research institutions. This has led to a massive brain drain as young talent look for better research

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\(^{33}\) Central Bank of Nigeria Healthcare Research and development Grant Guidelines

\(^{34}\) World RePORT is an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world’s largest funding organizations. There are limitations to the financial data presented by World RePORT due to the differences in level of reporting detail by each of the funding organizations. For example, NIH records only have financial data when it is a direct award, while the EC submits financial disbursements by each participating institution, and by year. World RePORT continues to work to enhance the consistency of financial reporting across all funding organizations that submit data to it. Please see the following links for more information about data presented by World RePORT - [https://worldreport.nih.gov/app/#/about](https://worldreport.nih.gov/app/#/about) & [https://worldreport.nih.gov/app/#/release-notes](https://worldreport.nih.gov/app/#/release-notes)
opportunities and infrastructure outside the country. Access to quality infrastructure and equipment for research is challenging, but good enough due to the availability of quality laboratory facilities across the country. However, the talent pool to support research work, in terms of top tier laboratory assistants, good data analysts and laboratory technicians is lacking in depth.

Several research institutions in Nigeria have built particularly good relationships with international funders and are increasingly looking to work more with these partners on the research needs of the country. There are couple of externally funded initiatives currently aimed at improving the research clime in Nigeria. There is the HIV/AIDS program funded by PEPFAR which has included an evidence gathering component, and the Lassa fever program funded by CEPI aimed at strengthening capacity for vaccine trials by building epidemiological study capacity of medical researchers. There are other local programs with research capacity strengthening components. The health research ecosystem however, still lacks an effective framework for research collaboration leading to overlapping interests, duplication of research efforts, and sub-optimal utilization of research capacity strengthening investments.

Nigeria follows the ICH Good Clinical Practice (GCP) guidelines for clinical trials a physician density of 3.827 per 10,000 population and has a few healthcare organizations with international accreditations from the Joint Commission International (JCI) and International Standard Organisation (ISO). Data management capabilities – in terms of skilled persons in the use of research data capture and management software are well developed although there is no common data management infrastructure to curate and manage government health research data in the country. There is therefore need to invest in collaborative research data management systems and knowledge sharing between institutions. Research ethics capabilities are also very well developed. The National Health Research Ethics committee (NHREC) is composed of experts from diverse backgrounds and the ‘Chair’ is appointed every 2 years on a renewable basis. Most universities have internal review boards (IRB) and these must be registered with (and audited by) the NHREC. Members take professional and certification courses before they are licensed as IRBs with only the NHREC certified as class ‘A’ in Nigeria. Capacity for effective community participation in health research in Nigeria is also very well developed.

1.3. Capacity to utilize research evidence

Perspectives on capacity to translate and utilize research evidence to drive health policy

Capacity for translating research evidence to influence public health policy and practice is weak. There are currently no well-established national platforms for the exchange of knowledge from health research. In the past, Nigeria had an operational research center led by Professor Okale that offered small grants of $5,000 with the end goal of translating research into policy. One of its recorded successes is the management of malaria among nomadic populations. The center is no longer operational. The practice of translation of health research into policy in Nigeria appears to be considerably influenced by the disposition of the Federal Minister of Health. Some practitioners believe that when health ministers are health economists by professional background, more attention is placed on health research and evidence based policy making, then when health ministers are clinicians. Between 2003 and 2007, it was not unusual for the minister of Health to hold ‘policy dialogue process’ symposiums with policy makers, researchers, and politicians to deliberate on health research issues and this relatively bridged the gap between researchers and policy makers. This is now rarely the case as research has not been mainstream for a little over a decade now. Health research output from Nigeria is now mostly focus at publication in international journals without import for local knowledge sharing, collaboration, and translation.

There are however a few knowledge translation platforms promoted by various organizations within various sub-segments of health research. USAID and DFID each have their own policy evidence to action programs, and little effort has gone into bringing all these together to create a stronger voice for translating research. The level of commitment of the Ministry of

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35 As at 2013
Health to research at the federal and state level has been too weak to support an overarching national /state health research agenda which can engender a collaborative approach to health research and national priorities.

1.4. Imperatives for health research capacity strengthening

Experts on the health research landscape in Nigeria highlight several key opportunities for collaborative efforts by funders and global stakeholders aimed at strengthening health research capacity in Nigeria.

1. Helping the country to set-up an effective collaborative structure for the coordination of health research such that research funding from multiple sources can be better directed towards national health research priorities, and strategic health research capacity strengthening investments (e.g. the PEPFAR funded training and investment which have not been sustained) can be better sustained.
   - *Given the limitations with the institutional structure of the Nigerian Institute for Medical Research (NIMR) that has starved it of funding and left it unable to play a coordinating role, focus should be on ensuring that such a structure is independent and not hobbled by the constraints that apply to civil service entities.*

2. Support for the establishment of a basket fund for investments in health research and research capacity strengthening with focus on driving innovations not just in laboratory medicine but in clinical medicine, rehabilitative medicine, cancer research and others.

3. Support for a data repository for health research.

4. Support for policy dialogue processes such that health research activities can be better integrated with the multi-level stakeholder engagement required to facilitate the translation of research evidence into action.

5. Support for investment in extending health research beyond disease control which is currently the primary focus to other areas like mental health, child and maternal health, and diagnostic medicine which currently pose greater challenges to the health system.

6. Support for research training that is more intentional and focused on building a critical mass in research capacity rather than focusing on sporadic disconnected groups. This should include both top tier and mid-tier professionals who can step down their skills and trainings to others.

7. Support with ensuring that research programs /projects are evidence driven with quality control measures in place to ensure the integrity of research output at both national and state levels.
SIERRA LEONE

1. Extent of demand for health research

Country Context & Policy/Institutional Landscape for Health Research

Sierra Leone is a country in Sub-Saharan Africa precisely located on the southwest coast of West Africa. It is a low-income country with an annual GDP of US$504.5 per capita and a total population of 7.81 million in 2019. According to the World Governance Indicators (WGI) index, the country has high political instability and low levels of government effectiveness. The Freedom House ranks Sierra Leone as ‘partly free’ overall with a score of 65/100 in their assessment of the real-world rights and freedoms enjoyed by individuals in the country. The United Nations Development Program’s (UNDP) Human Development Report groups Sierra Leone under the category of countries with low equality in HDI achievements between women and men. Summarily, political instability, low level of government effectiveness, limited right of access to information and limited freedom enjoyed by individuals create a challenging socio-economic and political landscape in Sierra Leone.

Governance and coordination of health research in Sierra Leone is currently the responsibility of the Ministry of Health and Sanitation (MoHS), which houses the office of the Sierra Leone Ethics and Scientific Review Committee in the Directorate of Policy, Planning & Information (DPPI). Since the end of the Ebola epidemic in 2015, the country has made deliberate strides to strengthen its public health capabilities through improvements to the disease surveillance and response system, the readying of rapid response teams, upgrading laboratory capacity and the establishment of a standing Emergency Operations Centre. To build on these successes, the MoHS has decided to establish the Sierra Leone National Public Health Agency (NPHA) to improve public health, guard against outbreaks and coordinate response to future emergencies. The yet-to-be established agency is expected to anchor the country’s efforts at having a strong and coordinated public health research capacity that informs policy and public health programs.

Perceptions of the Utility of Health Research & Research Culture

Overall, the general perception of the utility of health research in Sierra Leone is low, and the research culture is still quite undeveloped. This is largely attributed to the lack of interest in research by the Central Government. However, since the advent of the Ebola outbreak in Sierra Leone, the conduct of internationally designed and facilitated vaccine trials have contributed to changing mentality of government officials and the perception of research utility, giving research more prominence. There is an increasing desire to increase the research footprint in Sierra Leone, concerted efforts to build sites that receive capacity building for clinical trials, and more people willing to be leaders in research compared to several years ago.

A further constraint that impacts the development of a vibrant research culture in Sierra Leone is human resource related. There are simply not enough physicians in the health care delivery system, so physicians cannot afford to be freed up to do research. Overall, within the education system, there are very few faculty with PhDs, and the few researchers available are not dedicated to research as a career – having other occupational engagements which keeps them busy. The footprint for health research in the country is therefore small and a strong drive for privatization in the country has led to most research studies being carried out by private labs and services. However, a few personnel transfers to the public health system in Sierra Leone over the past two years have been very impactful. This includes the new Chancellor at the University of Sierra Leone.

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36 (WGI index score of -0.03 for Political Stability and Absence of Violence/Terrorism and -1.14 for Government Effectiveness in 2018, in a range from -2.5 (weak) to 2.5 (strong).
37 Freedom in the World 2020
38 Gender Development Index (GDI) of 0.882, Group 5 in 2018
39 Sierra Leone National Health Sector Strategic Plan 2017 - 2021
who has provided strong leadership in pushing for a research agenda in Sierra Leone, starting with ensuring that a strong research infrastructure is in place for grant management.

Sierra Leone does not yet have a national policy on health research nor a defined health research agenda and the country is still very dependent on foreign partnerships to keep research activities going. This includes US National Institutes of Health (NIH) funding of health research activities at the Kenema Government Hospital (KGH) and the University of Sierra Leone (USL) in collaboration with the Vanderbilt Institute for Global Health, primarily aimed at supporting specific clinical trials.

1.2. Capacity to produce knowledge

Systems and infrastructure enabling the conduct of health research

There are no institutions dedicated to the conduct of health research in Sierra Leone. Instead, the NIH and a few international organizations partner with community based organizations to carry out research and related programs with most of the ongoing research being related to Lassa fever and undertaken at the KGH. The Lassa Fever Unit at the KGH is heavily funded and supported by the NIH. The College of Medicine & Allied Health Sciences (COMAHS) at the USL is said to have been known for research in the past but lost its status and significant funding after the civil war. Along with the Makana University, these are currently the two major institutions focused on human health.

The Global Competitiveness Index had a score of 2.56 on its index for quality of research institutions for Sierra Leone, placing it as one of the lowest in the world\(^{40}\). There is no reported data for the country on the number of full time researchers per million population (Research Density). A total of 668 scientific publications whose authors are affiliated with the country are catalogued on PubMed between 2014 and 2019, and 14 research organizations received grants for health research from 5 international funders between 2016 and 2018.

The WHO Global Health Observatory has a score of 75.83\(^\%\) in laboratory capacity across the following areas: existence of office for collaboration of laboratory services, number and qualification of laboratory staff, the supply management system (including quality, availability, and delivery of supplies), specimen collection, storage and transportation, and maintenance of laboratory equipment. This is largely driven by the presence of a well-equipped P3 laboratory funded from the NIH Lassa Funding Grants in Kenema, which is capable of handling dangerous organisms, and carrying out all molecular work although not equipped to do sequencing. The laboratory has been previously used as a testing center for Ebola. The maintenance and repair of infrastructure at this laboratory is also covered by the grant. There are a few other public health reference laboratories with research potential in Sierra Leone and many laboratory scientists have been trained to test for diseases with the country currently able to test for 11 of the 14 priority diseases.

There is no dedicated source of domestic funding for health research in Sierra Leone and the country does not currently report national data on gross domestic R&D expenditure on health (health GERD). Data from the World RePORT\(^{41}\) health research data aggregation platform estimates that non-NIH funded health research grants in Sierra Leone amounted to US$23.2m between 2016 and 2018. The World RePORT indicates that the US NIH funded 41 studies (mostly in KGH and COMAHS) of a total of 64 studies internationally funded during this same period but does not indicate the quantum of this

\(^{40}\) 2017 WEF Global Competitive Index in a range from 1 [extremely poor] to 7 [extremely good]  
\(^{41}\) World RePORT is an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world’s largest funding organizations. There are limitations to the financial data presented by World RePORT due to the differences in level of reporting detail by each of the funding organizations. For example, NIH records only have financial data when it is a direct award, while the EC submits financial disbursements by each participating institution, and by year. World RePORT continues to work to enhance the consistency of financial reporting across all funding organizations that submit data to it. Please see the following links for more information about data presented by World RePORT - https://worldreport.nih.gov/app/fl/about & https://worldreport.nih.gov/app/fl/release-notes
funding. Figure 1 summarizes non-NIH funding for health research in Sierra Leone for 2016 to 2018 based on World RePORT data.

**Figure 7 - International health research awards in Sierra Leone (excluding US NIH) - Donors & Recipients**

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**Perspectives on capacity to produce quality health research output**

**Overall, the capacity to produce quality health research output in Sierra Leone is very weak, despite the existence of stove-piped capacity for research on Lassa fever.** Several factors account for this, including the extremely limited number of quality institutions involved with health research in country. While other institutions aside from USL and KGH are increasingly becoming more involved with research, they also lack the required human and material resources to drive research. Capacity to undertake research is also constrained by lack of funding and lack of government interest in areas of research, especially in the provinces. This has discouraged new entrants into the field while also triggering a brain drain to other sectors and other countries. Across institutes of learning in Sierra Leone in general, the remuneration for trainers and instructors is so low that they actively seek alternative sources of income to the detriment of their research students. Quite a low number of faculty members in Sierra Leone are trained in research and while there have been efforts to bridge this gap through the establishment of research training modules/courses by institutions like the West African College of Physicians, the West African College of Surgeons, and the sponsorship program on the Masters in Clinical Research at the Vanderbilt University, very few make research a career after completing the program. Other critical limiting factors to the establishment of a health research environment in Sierra Leone is epileptic power supply, which severely impacts the running of labs and the storage of specimens for research purposes. There is also limited supply of water, internet, and other basic supplies like freezers which require significant financial outlay to maintain.

Sierra Leone follows ICH **Good Clinical Practice** (GCP) guidelines for clinical trials but has a physician density of 0.25 per 10,000 population and zero health care organizations with international accreditations. In the wake of the Ebola crises, clinical researchers from KGH and COMAHS were trained on RedCap (a database for collecting and sharing clinical data remotely for analysis). Yet the shift to electronic and other digital platforms is constrained by sub-standard internet connectivity and widespread computer and data management illiteracy. The Institutional Review Board (IRB) and Ethics Committee in Sierra Leone are efficient with good turnaround time for the process though the cost is onerous. It is currently being revamped with
focus on trainings around research ethics, standardizing templates, sample sharing agreements, informed consent documents, and other best practices especially dealing with new requirements that have come up under epidemics and pandemics. Community participation has become common place especially since the response to the Ebola crises. This capacity has been largely developed on the back of Ebola survivor studies, where survivor associations are used as community liaisons working closely with the local communities. There is still some underlying distrust in the government for political reasons and research is occasionally impeded by community-level pushbacks. These pushbacks tend to be managed by engaging community leaders and taking a more ground-up approach to community engagement for research.

1.3. Capacity to utilize research evidence

*Perspectives on capacity to translate and utilize research evidence to drive health policy*

**Capacity for translating research evidence to influence public health policy and practice is weak.** There are no established platforms for the exchange of knowledge from health research. There used to be an annual bio-medical research gathering but it has not occurred since the Ebola outbreak. The Ministry of Health serves as a repository where every publication, surveillance and other reports are submitted monthly seemingly at the discretion of organizations and researchers. There are no mechanisms reported for the promotion of research impact in Sierra Leone.

1.4. Imperatives for health research capacity strengthening

Country experts in the health research landscape in Sierra Leone highlight five key opportunities for collaborative efforts by funders and global stakeholders aimed at strengthening health research capacity in Sierra Leone.

1. The Sierra Leone Government and international donor organizations should invest more in pre-service training in research practices to include extensive data management skills training.

2. There should be multi-level engagements to build strong collaborations and increase the number of people engaged with research.

3. Standardize the research related processes like grants management, data management and ethics review etc., and have a joint centralized sharing and review system

4. Invest in new and existing research facilities and faculties with courses designed in collaboration with top tier universities and institutions.

5. Shift research focus to other provinces and empower the provinces to run their own research programs.
HAITI

1. Extent of demand for health research

Country Context & Policy/Institutional Landscape for Health Research

Haiti is a North American country located on the island of Hispaniola in the Greater Antilles archipelago of the Caribbean Sea, to the east of Cuba and Jamaica and south of The Bahamas and the Turks and Caicos Islands. It is a low income country with an annual GDP of $754.6 per capita and a total population of 11.26 million in 2019. According to the World Governance Indicators (WGI) index, the country has high political instability and low levels of government effectiveness. The Freedom House ranks Haiti as ‘partly free’ overall with a score of 38/100 in their assessment of the real-world rights and freedoms enjoyed by individuals in the country. The United Nations Development Program’s (UNDP) Human Development Report groups Haiti under the category of countries with low equality in HDI achievements between women and men. Summarily, political instability, low level of government effectiveness, and limited freedom enjoyed by individuals create a challenging socio-economic and political landscape in Haiti. Haiti has also had to deal with a major natural disaster—a magnitude 7.0 earthquake that struck Haiti on the afternoon of January 12, 2010, to compound the development challenge in a country that had suffered from decades of political, economic, and social setbacks as well as high levels of poverty and inequalities.

Governance and coordination of national health research in Haiti is not currently well defined in Haiti, although the default responsible entity is the Ministry of Public Health and Population (MSPP). The Ministry was severely affected by the 2010 earthquake which left its building in ruins and displaced all ministry staff, who worked out of temporary quarters and tents until 2013. There is also a National Public Health Laboratory National (LNSP) which plays a key role in the provision of laboratory services within the national health system.

Perceptions of the Utility of Health Research & Research Culture

Overall, the general perception of the utility of health research in Haiti is low but gradually growing, although most health research is externally funded. There is one major organization with recognizable interest in mainstream health research - ‘Les Centres GHESKIO’ which focuses on diarrhea, AIDS, and cholera among other diseases afflicting the Haitian citizenry. Although the Government does little to support health research both in terms of direct funding and necessary infrastructure, GHESIKO works in close concert with the Ministry of Health and other institutions to deliver health research programs. The research culture in Haiti was for a long time challenged by a hostile attitude towards the idea of research, as it was perceived as an attempt to use Haitians for experiments. This perception has changed over time with academic institutions taking an increasing interest in research including medical and nursing schools. With the advent of the COVID19 pandemic, both public and private institutions are taking more interest in the health development space and 17 centers are currently being trained in HIV/AIDS, Tuberculosis, Cholera, and COVID diagnosis and testing.

Although Haiti does not currently have a national health research agenda, GHESKIO, as the country’s leading health research focused organization actively works on research projects that are directly relevant to the nation’s disease burden, and has achieved major research breakthroughs in the management of chronic diarrhea, cholera and HIV/AIDS that have been adopted by the health system.

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42 WGI index of 0.63 for Political Stability and Absence of Violence/Terrorism and -1.91 for Government Effectiveness Index in 2018, in a range from approximately -2.5 (weak) to 2.5 (strong) governance performance
43 Freedom in the World 2020
44 Gender Development Index (GDI) of 0.890, Group 5 in 2018
1.2. Capacity to produce knowledge

Systems and infrastructure enabling the conduct of health research

Most health research in Haiti is led by Gheskio, which was created in 1982 and is recognized globally as one of the first institutions in the fight against HIV/AIDS. It is one of the largest care providers in the Americas for AIDs and tuberculosis, a leading research center in the Caribbean on AIDs and TB and has the largest training center in Haiti. Gheskio works closely with representatives from the MSPP, and has achieved and maintained a status of utility by the Haitian government which is given to institutions deemed essential for the wellbeing of healthcare systems (another such organization with the designation is the Red Cross). Gheskio operates two centers focused on vocations – operational research, training, and patient care with the goal of developing public health models that can be scaled and implemented nationwide. There is also the Quisqueya University which is supported by Fogarty to develop a master’s in public health program with a research based/practitioner model.

The Global Competitiveness Index had a score of 2.26 on its index for quality of research institutions for Haiti, placing it among the lowest in the world45. A total of 567 scientific publications whose authors are affiliated with the country are catalogued on PubMed between 2014 and 2019, and 21 research organizations received grants for health research from at least 1 international funder between 2016 and 2018.

In 2017, Haiti achieved a score of 80% in Laboratory Capacity across the following areas: existence of office for collaboration of laboratory services, number and qualification of laboratory staff, the supply management system (including quality, availability, and delivery of supplies), specimen collection, storage and transportation, and maintenance of laboratory equipment. There are two top tier laboratories – the national laboratory supported by the Center for Disease Control (CDC) and Gheskio’s laboratory. The national laboratory is PSL-3 and both laboratories are equipped to carry out COVID testing. There are 41 centers across Haiti that can conduct rapid testing for Tuberculosis but global embargos on c-fed TB tests have negatively impacted their testing capacity.

There is no dedicated source of domestic funding for health research in Haiti and the country does not currently report national data on gross domestic R&D expenditure on health (health GERD). Data from the World RePORT46 health research data aggregation platform estimates that internationally funded health research grants in Haiti amounted to a minimum of US$5m between 2016 and 2018. Figure 1 summarizes funding for health research in Haiti from international grants for the 2016 to 2018 period based on World RePORT data.

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45 2017 WEF Global Competitive Index in a range from 1 [extremely poor] to 7 [extremely good]
46 World RePORT is an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world's largest funding organizations. There are limitations to the financial data presented by World RePORT due to the differences in level of reporting detail by each of the funding organizations. For example, NIH records only have financial data when it is a direct award, while the EC submits financial disbursements by each participating institution, and by year. World RePORT continues to work to enhance the consistency of financial reporting across all funding organizations that submit data to it. Please see the following links for more information about data presented by World RePORT - https://worldreport.nih.gov/app/#/about & https://worldreport.nih.gov/app/#/release-notes
Overall, the capacity to produce quality health research in Haiti is undeveloped, despite the existence of a research institution with advanced research capabilities. Although GHESKIO has built significant capacity over its four decades of existence, the concentration of health research investments in GHESKIO creates a high administrative overhead on the institution and limits to some degree, efforts at strengthening capacity in other provinces of Haiti. Brain drain is also a major concern for Haiti as many talented young scientists leave the country without returning while those that remain must be suitably motivated (including sponsored trainings in top tier global institutions) to stay engaged/involved.

Sustainability is also a concern as all of the funding for health research in Haiti is external and the political instability in Haiti periodically affects the flow of external research funding. The US National Institute for Health (NIH) is the dominant funder of research in Haiti through GHESKIO. Other external institutions active in funding health research Haiti are global health intervention programs such as CARE (the largest provider for AIDS and TB care), Global Fund, and PEPFAR. Their efforts are concentrated in central regions and not the provinces, and these institutions mostly fund direct research activities and do not cover indirect/infrastructure costs such as electricity, equipment maintenance which are a major challenge.

There is no national data management infrastructure to curate and manage government health research data in the country although the NIH occasionally collects data from programs by institutions with more direct government participation such as GHESKIO. Although there is now a National Ethics Committee, individual institutions typically have their own Internal Review Boards (IRB) and utilize the ethics review systems of their funders. GHESKIO for example works to meet the standards of the NIH audits and evaluates regularly from laboratories to ethical research practices. Community participation capabilities are
fairly well developed as community relationships are critical to conducting any research in the provinces due to the complex emergency setting. Most research programs take a collaborative approach with the communities for safety and sustainability.

1.3. Capacity to utilize research evidence

*Perspectives on capacity to translate and utilize research evidence to drive health policy*

*Capacity for translating research evidence to influence public health policy and practice is quite strong.* There are no specific platforms for knowledge translation, knowledge sharing and the promotion of research impact in Haiti but research translation is very well integrated within institutions at a programmatic level. This is primarily due to the history of successful local adaptation of research breakthroughs including adapted public models for the treatment of infantile diarrhea, HIV/AIDS in adults and children, PMTCT, TB prevention and care, MDRTB, cholera prevention and care. There is however significant scope for improving local collaboration and knowledge sharing, as the local health research organizations still have a competitive relationship with each other, and mostly operate in silos.

1.4. Imperatives for health research capacity strengthening

Experts on the health research landscape in Haiti highlight several key opportunities for collaborative efforts by funders and global stakeholders aimed at strengthening health research capacity in the country.

1. Greater focus by external funders on supporting the local health priorities. The focus should be on the welfare of Haitians and local need should be taken into context in designing or carrying out research programs

2. Local talent should be invested in by both the government and international partners to create a sustainable research climate. Capacity building should take a holistic approach – skills transfer, provision of tools, and creation of research opportunities.

3. Support for more local collaboration across research organizations and more for policy dialogue processes such that health research activities can be better integrated with the multi-level stakeholder engagement required to facilitate the translation of research evidence into action.

4. Research programs should be implemented with the big picture in mind and aim at meeting long term development objectives. There is need to competitively split resources between both short, medium, and long term research and development projects.
GUATEMALA

1. Extent of demand for health research

Country Context & Policy/Institutional Landscape for Health Research

Guatemala is a country in Central America bordered by Mexico to the north and west, Belize and the Caribbean to the northeast, Honduras to the east, El Salvador to the southeast and the Pacific Ocean to the south. It is a lower middle income country with an annual GDP of $4,620 per capita and a total population of 16.6 million in 2019. According to the World Governance Indicators (WGI) index, the country has high political instability and low levels of government effectiveness. The Freedom House ranks Guatemala as ‘partly free’ overall with a score of 52/100 in their assessment of the real-world rights and freedoms enjoyed by individuals in the country. The United Nations Development Program’s (UNDP) Human Development Report groups Guatemala under the category of countries with medium quality in HDI achievements between women and men. Summarily, political instability, low level of government effectiveness, limited right of access to information and limited freedom enjoyed by individuals create a challenging socio-economic and political landscape in Guatemala.

Governance and coordination of national health research in Guatemala is currently the responsibility of the Ministry of Public Health and Social Welfare (MSPAS), anchored by the General Directorate of Regulation, Surveillance & Health Control. Under the Directorate, there are the Departments of Regulation of Health and Environment Programs which are in charge of stewardship of the health sector, among others. The departments develop actions to promote health research, prepares regulations required for the correct application of ethical and scientific standards/codes in health research, including monitoring programs for diseases. Guatemala also has a fully operational Center for Disease Control Global Disease Detection Regional Center that coordinates activities with local, regional and global bodies, and carries out its own research investigations.

Perceptions of the Utility of Health Research & Research Culture

Overall, the general perception of the utility of health research in Guatemala is low, and the research culture is not as developed as it should be, considering that active health research has been ongoing in Guatemala for more than six decades. Most of the demand for health research is driven by external actors and support for health research by political leadership at the national level is inconsistent as it is dependent on who is in power per tenure. Instead, Guatemala has evolved into a system of self or externally funded individuals and academic institutions committed to health research which is heavily concentrated on tropical diseases, water, and sanitation. There is also a big divide between research institutions and policy makers which strongly impedes the country’s chances of developing a stronger research culture. These have resulted in the medical research output being quite low with only a trickle making it into international journals still without any real local dissemination, peer review or translation.

In recent years, Guatemala has gotten more positive support from the United States Government, the National Institutes of Health, and the Center for Disease Control with increased collaboration with the MSPAS and academic/research institutions like the Universidad de Valle de Guatemala. There is also the support from the Institute of Nutrition for Central America and

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47 WGI index of -0.54 for Political Stability and Absence of Violence/Terrorism and -0.68 for Government Effectiveness Index in 2018, in a range from approximately -2.5 (weak) to 2.5 (strong) governance performance
48 Freedom in the World 2020
49 Gender Development Index (GDI) of 0.943, Group 3 in 2018
50 Website of the Guatemalan Ministry of Public Health and Social Assistance (MSPAS) [https://www.mspas.gob.gt/institucional/unidades-departamentos/regulacion-vigilancia-y-control-de-la-salud.html](https://www.mspas.gob.gt/institucional/unidades-departamentos/regulacion-vigilancia-y-control-de-la-salud.html)
Panama (INCAP), a regional institution, which constituted for 65% of health research funded through the NIH between 2017 and 2019. The year 2020 has seen an increased push for funding for health and health research from the Government in Guatemala especially with the ongoing COVID-19 pandemic. The Ministry of Health (MSPAS) is working in close concert with the World Bank and health agencies such as the Center for Disease Control (CDC) to develop response and research strategies. However, the country is still a long way from having a clear national agenda for research or priority areas and this is, to a large extent, attributed to the endemic political instability which has been the primary focus of the government and development agencies. Presently in Guatemala, health research priorities are largely determined by external funders who work directly with individuals and research institutions on a range of research topics, which may or may not be related to specific local research needs or priorities.

1.2. Capacity to produce knowledge

Systems and infrastructure enabling the conduct of health research

Most health research in Guatemala is carried out by academic and medical institutions as well as by individual researchers usually working with international organizations/donors. The country has 20 higher education institutions offering disciplines related to health research with active output from the Universidad del Valle de Guatemala (UVG) being the foremost academic institution for health research. Several health research institutions are also active especially the Biomedical and Psychosocial Research Center – Global Trauma and Health Research Program. The human capacity to produce top tier health research output in Guatemala is low as many researchers leave the country in search of work and better opportunities. There is no defined career ladder or progression for researchers within the country and many of them, in country, can only find work with the few donor organizations and implementing partners present.

The Global Competitiveness Index for quality of research institutions in Guatemala for 2017 was low at 3.4, placing it among the countries with medium quality of output in the world51. Guatemala had 14.07 full time researchers per million population (Research Density) as at 2017. A total of 962 scientific publications whose authors are affiliated with the country are catalogued on PubMed between 2014 and 2019, and 24 Research Organizations received grants from 4 international funders both directly and indirectly between 2016 and 2018.

The WHO Global Health Observatory has a score of 29.17% for Guatemala in terms of laboratory capacity across the following areas: existence of office for collaboration of laboratory services, number and qualification of laboratory staff, the supply management system (including quality, availability, and delivery of supplies), specimen collection, storage and transportation, and maintenance of laboratory equipment. Laboratory capacities have been largely dependent on dedicated government funding/resources with some degree of support from the CDC. Most laboratories in Guatemala are basic and, even with some external support, not a lot of effort has been directed towards building their research capacities.

There is no dedicated source of domestic funding for health research in Guatemala. The country completed public expenditure reviews, health sector assessments, and expenditure tracking using National Health Accounts in 2012, 2015, and 2017, but resource mapping for health research is not yet underway. However, the Ministry of Health (MSPAS) is collaborating with the Global Financing Facility (for Women, Children and Adolescents) supported by the World bank and there is the National Crusade for Nutrition 2020-2024 to focus on research into addressing chronic malnutrition in the country52. Over the next couple of years, it is expected that the absence of an overarching national/state health research agenda would be history and be replaced with a collaborative approach to health research systems and national priorities.

51 2017 WEF Global Competitive Index in a range from 1 [extremely poor] to 7 [extremely good]
52 https://www.globalfinancingfacility.org/guatemala
Guatemala spent 27% of its total national gross domestic R&D expenditure on health (health GERD) in 2015. Data from the World RePORT\textsuperscript{53} health research data aggregation platform estimates that internationally funded health research grants in Guatemala amounted to no less than US$13.7m between 2016 and 2018. Figure 1 summarizes funding for health research in Guatemala from international grants for the 2016 to 2018 period based on World RePORT data.

Figure 9 - International health research awards in Guatemala (estimates based on reported data on World RePORT - Donors & Recipients

Perspectives on capacity to produce quality health research output

Overall, the capacity to produce quality health research in Guatemala is quite limited, especially in light of the existing constraints. While Guatemala has a strong but small talent pool for health research practitioners (both local and international), the continuity and sustainability of health research is severely handicapped by the ever changing socio-political atmosphere. Quality infrastructure and equipment for research is limited and access is challenging leaving a talent pool that is lacking in depth, in terms of top tier laboratory assistants, good data analysts and laboratory technicians, to support research.

Guatemala follows the ICH Good Clinical Practice (GCP) guidelines for clinical trials but there is no data available on the physician density per 10,000 population\textsuperscript{54} and it has only one internationally accredited healthcare organization from JCI. Data management capabilities – in terms of skilled persons in the use of research data capture and management software are somewhat developed although there is no common data management infrastructure to curate and manage government

\textsuperscript{53} World RePORT is an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world’s largest funding organizations. There are limitations to the financial data presented by World RePORT due to the differences in level of reporting detail by each of the funding organizations. For example, NIH records only have financial data when it is a direct award, while the EC submits financial disbursements by each participating institution, and by year. World RePORT continues to work to enhance the consistency of financial reporting across all funding organizations that submit data to it. Please see the following links for more information about data presented by World RePORT - https://worldreport.nih.gov/app/#!/about & https://worldreport.nih.gov/app/#!/release-notes

\textsuperscript{54} As at 2013
health research data in the country. There is therefore need to invest in collaborative research data management systems and knowledge sharing between institutions. Research ethics capabilities are also very well developed. The General Directorate of Regulation, Surveillance & Health Control of MSPAS has its own Institutional Review Board which has been strengthened over the years and has data management capabilities. All NIH funded projects are expected to register with the Directorate and show that the registering institution meets the standards for performance at the same level as any standard US organization. The requirements of the IRB are usually covered by the PI (direct grantee) prior to sub-granting projects and all organizations (local and international) are subject to the ethical review board.

1.3. Capacity to utilize research evidence

_Perspectives on capacity to translate and utilize research evidence to drive health policy_

**Capacity for translating research evidence to influence public health policy and practice is weak.** Once evidence is produced, it takes a while for the regulatory bodies and institutions in Guatemala to accept and utilize the new knowledge. Occasionally, new research is accepted but adoption is easily truncated in the face of delays with making the necessary regulatory changes. There are also constraints around the quality of population data necessary for funding and implementation of programs. There are currently no well-established platforms for the exchange of knowledge from health research outside of those owned and used by individual organizations and their grantees. None exist at the national or state level and the minimal commitment of the Ministry of Health has for a long time impeded the establishment of a collaborative knowledge exchange platform. Most of the health research output in Guatemala is from collaboration with external bodies for publication in international journals with limited or zero local sharing and knowledge translation.

1.4. Imperatives for health research capacity strengthening

Experts on the health research landscape in Guatemala highlight several key opportunities for collaborative efforts by funders and global stakeholders aimed at strengthening health research capacity in the country.

1. Helping the country to set-up an effective collaborative structure for the coordination of health research such that research funding from multiple sources can be better directed towards national health research priorities, and strategic health research capacity strengthening investments (e.g. the resource mapping for the prevention of chronic malnutrition) can be better sustained.

2. Support for the establishment of a basket fund for investments in health research and research capacity strengthening with focus on driving innovations not just in laboratory medicine but in clinical medicine, rehabilitative medicine, cancer research and others. This should be administered independent of the Government to ensure continuity.

3. Support for developing long-term sustainable strategy for capacity building in health research at all levels backed up by adequate funding and infrastructural support.

4. Support for investment in extending health research to the provinces outside Guatemala city and creating a research culture across the country.
LAO PDR

1. Extent of demand for health research

Country Context & Policy/Institutional Landscape for Health Research

LAO PDR is a land linked country bordering Myanmar, Cambodia, China, Thailand, and Vietnam. It is a lower middle income country with an annual GDP of $2,542 per capita and a total population of 67 million in 2018. 68 percent of LAO PDR’s population live in rural areas, but urbanization is occurring at a rate of 4.9 percent each year. According to the World Bank, LAO PDR is one of the fastest growing economies in East Asia and the Pacific. It has improved access to electricity, schools, roads, and has become an important energy exporter. According to the World Governance Indicators (WGI) index, the country is politically stable though it has low levels of government effectiveness. The Freedom House ranks LAO PDR as ‘not free’ overall with a very poor score of 14% in their assessment of the real-world rights and freedoms enjoyed by individuals in the country. The United Nations Development Program’s (UNDP) Human Development Report groups LAO PDR under the category of countries with medium equality in HDI achievements between women and men. Summarily, the decent level of political stability, combined with low levels of government effectiveness, and extremely limited freedom enjoyed by individuals create a complex socio-economic and political landscape in LAO PDR.

Governance and coordination of national research is the responsibility of the Ministry of Science and Technology with the Ministry of Health its primary implementation partner on health research. There is a Health Research Council within the Ministry of Health, which is not fully functional currently.

Perceptions of the Utility of Health Research & Research Culture

Overall, the general perception of the utility of health research in LAO PDR is low and the research culture is not well developed. Despite having national research policies, plans and strategies, the ability to execute is limited. Meetings and midterm reviews to follow up on their progress and implementation are irregular or absent. Although the government has an appetite for research data, this does not translate into the need to prioritize more funding for research. Most of the research funding in LAO PDR is by international organizations such as the French Government via Institut Pasteur, which supports research through the Institute of Public Health and Tropical Medicine and the Lao Oxford Mahosot Wellcome Trust Research Unit-LOMWRU, a clinical research institution in partnership between LAO PDR and Oxford University. The Ministry of Health has developed a research agenda focused on health education, disease research and strengthening the capacity of the LAO PDR researcher with funding from the European Union (EU). The lack of domestic funding for research means that health research in LAO PDR is not quite based on the national research agenda.

1.2. Capacity to produce knowledge

Systems and infrastructure enabling the conduct of health research

The bulk of health research in LAO PDR undertaken by two institutions - Institut Pasteur and LOMWRU. They both have the requisite infrastructure and resources (well-trained research staff and good administration) to produce world class research.

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55 UNDP 2020
56 World Bank 2020
57 WGI index of 0.42 for Political Stability and Absence of Violence/Terrorism and -0.67 for Government Effectiveness Index in 2018, in a range from approximately -2.5 (weak) to 2.5 (strong) governance performance
58 Freedom in the World 2020
59 Gender Development complex score is 0.929 and placed in group 3 in 2018
The government owned research institutions are the Institute of Public Health and Institute of Health Sciences, both are under the Ministry of Health. To be better run, the University of Health sciences which was under the Ministry of Education was moved under the Ministry of Health. Other organizations e.g. NGOs carrying out research depend on funding from the likes of DFID and USAID.

The Global Competitiveness Index had a score of 3.51 on its index for quality of research institutions for Lao PDR. A total of 333 scientific publications whose authors are affiliated with the country are catalogued on PubMed between 2014 and 2019. The WHO Global Health Observatory has a score of 85.83 for Lao PDR (in 2016) in terms of laboratory capacity across the following areas: existence of office for collaboration of laboratory services, number and qualification of laboratory staff, the supply management system (including quality, availability, and delivery of supplies), specimen collection, storage and transportation, and maintenance of laboratory equipment. The capital city of Lao PDR is the only part of the country with good facilities in terms of laboratories. In the facility where the LMOWRU project is based there are BSL 1, 2 and 3 laboratories, with the BSL-3 lab being the only one currently functional in Lao PDR. This laboratory is supported by the LOMWRU project and would not be available without this research collaboration. Most of the labs are focused on disease and tropical medicine. The National Center for Laboratory and Epidemiology (NCLE) also has good BSL 3 labs with previous support from the European Union though its functionality is currently hampered by lack of sufficiently trained and capable staff.

There is no dedicated source of domestic funding for health research in Lao PDR. Lao PDR does not currently report national data on gross domestic R&D expenditure on health (health GERD). Data from the World RePORT health research data aggregation platform estimates that internationally funded health research grants in Lao PDR amounted to US$75.7m between 2016 and 2018. Figure 1 summarizes funding for health research in Lao PDR from international grants for the 2016 to 2018 period based on World RePORT data.

60 2017 WEF Global Competitive Index in a range from 1 [extremely poor] to 7 [extremely good]
61 World RePORT is an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world's largest funding organizations. There are limitations to the financial data presented by World RePORT due to the differences in level of reporting detail by each of the funding organizations. For example, NIH records only have financial data when it is a direct award, while the EC submits financial disbursements by each participating institution, and by year. World RePORT continues to work to enhance the consistency of financial reporting across all funding organizations that submit data to it. Please see the following links for more information about data presented by World RePORT - https://worldreport.nih.gov/app/#!/about & https://worldreport.nih.gov/app/#!/release-notes
Overall, the capacity to produce quality health research in Lao PDR is undeveloped - despite the existence of institutions with advanced research capabilities – but improving rapidly. A key challenge accounting for this is that of human resource availability. Most researchers in Lao PDR are physicians and there is a dearth of non-physician scientists doing public health research. As a result, there is a skills gap for epidemiologists, biologists, diagnosticians, and related disciplines, to have a sustained capacity to produce quality research in Lao PDR. This is compounded by the fact that Lao PDR has one of the lowest doctor - patient ratio in South East Asia, hence there is a significant strain on physicians in the health system, with the attendant effect on availability of physicians to undertake useful medical research. Although brain drain is not a key problem in Lao PDR - majority of trained scientists tend to return to, or stay back in the country after their training, there are not enough people going into research due to the absence of a clear cut career path for researchers in the country. Those in diaspora with PHDs and master’s degrees tend not to remain in research when they return due to the paucity of opportunities and lack of a viable career trajectory. Due to the lack of qualified researchers in Lao PDR, organizations like LOMWRU resort to employing researchers from neighboring countries such as Thailand. In addition to the human resource challenge, the public research institutions lack the skills, capabilities, and resources to carry out high quality research. Only 8 higher education institutions offer disciplines related to research for health, and the enabling environment for research, though challenging is improving rapidly. Internet access and electricity for example, have improved significantly in the last 5 years.

There is therefore a need to develop research capacities and career tracks for young people interested in research and academia. The government is gradually making progress in this regard, by ensuring that medical residents are required as part of their training to carry out a short research project after their residency. The National Institute for Public Health runs an MSc in public health and now has more people doing research. A further challenge with producing quality research is the significant amount of effort required for research organizations and programs to get operationalized in Lao PDR. Several
restrictions are placed by the government for organizations interested in conducting research, and the process of securing Memorandum of Outstanding (MoUs) for research is particularly challenging.

Data management is one area where the country is fast improving. A field epidemiology training programme was established to train young physicians on data management, data collection, quality, utilization, interpretation etc. The programme has been in place for 10 years. The Ministry of Health has a steady cohort of staff that take part in the programme and have received this training. However, majority of the data scientists in the country work in private sector due to the better remuneration and working conditions available.

Lao PDR has good ethical review capabilities. Its first ethical committee was established in the Health Sciences University in 2001, and the National Ethics Committee for Health Research was established in 2002. The ethics committee actively engages on design training models for researchers, guidelines and standard operating procedures for research, revision of guidelines for ethical reviews, and strengthening research protocols. There are free clinical practice courses on ethics of research lasting 2-3 days each year to train any clinicians doing research.

Community participation is a new but fast growing capability in Lao PDR. Involvement of the community in research is quickly being adopted across health research projects. For example, a recent study undertaken across 4 villages had around 2,000 stakeholders involved including the village heads and health volunteers. An expert on community engagement was employed and most projects undertake necessary community engagement before commencement. A range of recent studies on qualitative research, therapeutics, and anti-microbial resistance have required significant community involvement and there have been no reported major issues with securing sample sizes for community participation.

1.3. Capacity to utilize research evidence

*Perspectives on capacity to translate and utilize research evidence to drive health policy*

**Capacity for translating research evidence to influence public health policy and practice is low but growing.** There are no established platforms or coordinated mechanism by which research knowledge is shared, transferred, or discussed for the purpose of utilizing research evidence to influence health policy. This area looks set to improve with the set-up of the Health Innovation Technology Assessment Programme (HITAP) from Thailand in partnership with Wellcome for the purpose of research translation into policy and for building the capacity of Lao PDR people on health policy.

**1.4. Imperatives for health research capacity strengthening**

Experts on the health research landscape in Lao PDR highlight several key opportunities for collaborative efforts by funders and global stakeholders aimed at strengthening health research capacity.

1. Supporting the strengthening of research career pathways through fellowship programs for PHDs and Masters
2. Investing in hard infrastructure such as laboratories to enable quality research work to be done especially as it concerns technicians and scientists.
3. Supporting the government to set and prioritize a health research agenda.
4. Developing better resources and systems for public health statistics and data management
5. Investment in quality management training with a focus on good clinical practice and research ethics.
6. Listen to local experience and knowledge to better understand the needs of the people.
7. Supporting the development of sustainable platforms for knowledge sharing and transfer.
8. Supporting institutions in Lao PDR to better leverage relationships and institutions in other countries for the benefit of health research. Such groups include:

- **Institut Pasteur and Wellcome relationships in Cambodia, Vietnam, Paris. There is good coordination with the Oxford group and Wellcome Trust network.**

- **Field epidemiology training network of programmes around the region that come together to discuss experiences and epidemiological issues for region.**

- **Mekong Basin Disease Surveillance group comprises of the Mekong region, lower Mekong countries plus Yukong province in China.**

- **Association of Southeast Asia Nations (ASEAN) which consists of 10 countries in Southeast Asia that Lao PDR belongs to. They have a lot of influence on health policy and working level health related activities.**

- **The WHO Western Pacific Regional Office – based in Manilla brings countries together regionally at the health ministerial level and technical level.**
DEMOCRATIC REPUBLIC OF THE CONGO (DRC)

1. Extent of demand for health research

Country Context & Policy/Institutional Landscape for Health Research

Democratic Republic of the Congo (DRC) is a country located in Central Africa and centered on the Congo Basin. It is a lower middle income country with an annual GDP of $545.2 per capita and a total population of 86.7 million in 2019. According to the World Governance Indicators (WGI) index, the country has high political instability and low levels of government effectiveness. The Freedom House ranks DRC as ‘not free’ overall with a score of 18/100 in their assessment of the real-world rights and freedoms enjoyed by individuals in the country. The United Nations Development Program’s (UNDP) Human Development Report groups DRC under the category of countries with low equality in HDI achievements between women and men. Summarily, political instability, low level of government effectiveness, limited right of access to information and restricted freedom enjoyed by individuals create a challenging socio-economic and political landscape in DRC.

Governance and coordination of national health research in DRC is currently the responsibility of the Ministry of Public Health with operational functions embodied within a number of subordinate parastatals including the Institute of Tropical Medicine, Institute of Biomedical Research (NIBR), and the Kinshasa School of Public Health. Although weak, the state authority is present in the area of health research, as the state provides a regulatory framework. Longstanding patterns of interaction exist between state and non-state actors seeking to improve public health and, in many cases, private actors have stepped in to fill the void created by the lack of state health care provision. This interactive engagement of non-state actors contributes to creating a form of networked governance through the engagement with state institutions for health system management and institutional development. However, networked governance does not function optimally, because, although non-state interventions fill the void where the state falls short, the DRC state has faced the challenge of interacting with partners with fragmented and horizontally competing agendas.

Perceptions of the Utility of Health Research & Research Culture

Overall, the general perception of the utility of health research in DRC is low, and the research culture has not had room to develop with the recent history of the country rife with war and corruption considering the 6 years of civil war followed by over a decade of civil unrest. Most of the demand for health research is driven by external actors and health research is not considered as a priority by many indigenous institutions outside of academia. There has been little commitment to health research by political leadership at the national level and in the states. Instead, DRC has mostly academic institutions and self or externally funded individuals that are very committed to health research. The persistence of a major disconnect between policy makers, researchers and implementers within the health system, constrain the country’s ability to develop a stronger research culture.

This is gradually changing with the new administration as the President and the First Lady recently spent some time visiting the Children’s National Medical Center asking about policies and research plans for the future. Scientists who work in laboratories under the National Institute for Biomedical Research (NIBR) are collaborating with external partners and are up
to date on global research policies. However, the NIBR’s researches revolve around priorities largely determined by external funders, which may or may not be related to specific local research needs or priorities.

1.2. Capacity to produce knowledge

*Systems and infrastructure enabling the conduct of health research*

Most health research in DRC is carried out by academic and medical institutions as well as by individual researchers usually working with international organizations/donors. The country has 54 higher education institutions offering disciplines related to health research. The several public health research institutions are also regularly active, especially those covered by the parastatals under the Ministry of Public Health such as the University of Kinshasa, there is also output from the University of Kisangani and the University of Musabani.

The Global Competitiveness Index had a score of 3.30 on its index for quality of research institutions for DRC, placing it in the lower-medium range in the world66. DRC had 10.56 full time researchers per million population (Research Density) in 2015. A total of 667 scientific publications whose authors are affiliated with the country are catalogued on PubMed between 2014 and 2019, and there are 17 Research Organizations that received grants from at least 3 international donors between 2016 and 2018.

The WHO Global Health Observatory has a score of 85.83% for DRC in terms of laboratory capacity across the following areas: existence of office for collaboration of laboratory services, number and qualification of laboratory staff, the supply management system (including quality, availability, and delivery of supplies), specimen collection, storage and transportation, and maintenance of laboratory equipment. The University of Kinshasa has a BLS-3 laboratory which is a well-equipped to handle dangerous organisms including carrying out genome sequencing. The country also has other laboratories in the University of Kisangani and University of Musabani which are relatively effective but not as equipped as that in Kinshasa. The laboratory in Kinshasa is the only one in the country where epidemiology and virology is carried out. There is no dedicated source of domestic funding for health research in DRC. However, the DRC Pooled Fund has been set up under the authority of the United Nations Humanitarian Coordinator to “channel resources to projects within the Humanitarian Action Plan” with focus on priority humanitarian needs with Health being one of the cluster priorities67, and seeks to strengthen the capacity of already existing networks and systems.

DRC does not currently report national data on gross domestic R&D expenditure on health (health GERD). Data from the World RePORT68 health research data aggregation platform estimates that internationally funded health research grants in DRC amounted to no less than US$22.7m between 2016 and 2018. Figure 1 summarizes funding for health research in DRC from international grants for the 2016 to 2018 period based on World RePORT data.

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66 2017 WEF Global Competitive Index in a range from 1 [extremely poor] to 7 [extremely good]
68 World RePORT is an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world’s largest funding organizations. There are limitations to the financial data presented by World RePORT due to the differences in level of reporting detail by each of the funding organizations. For example, NIH records only have financial data when it is a direct award, while the EC submits financial disbursements by each participating institution, and by year. World RePORT continues to work to enhance the consistency of financial reporting across all funding organizations that submit data to it. Please see the following links for more information about data presented by World RePORT - [https://worldreport.nih.gov/app/#!about](https://worldreport.nih.gov/app/#!about) & [https://worldreport.nih.gov/app/#!release-notes](https://worldreport.nih.gov/app/#!release-notes)
Overall, the capacity to produce quality health research in DRC is quite well developed, despite the existence of significant constraints. Several centers of excellence for health research are rapidly emerging, and the talent pool for health research scientists (both in country and in the diaspora) is quite strong. Despite this potential, many researchers still leave the country but a few eventually return in hopes of getting research jobs in the country, especially those who traveled out with the support of the University of Kinshasa. Access to quality infrastructure and equipment for research is challenging, with poor remuneration structures and unfavorable working conditions in academic institutions and public research institutions. This has led to a massive brain drain as young talent look for better research opportunities and infrastructure outside the country. However, the talent pool to support research work, in terms of top tier laboratory assistants, good data analysts and laboratory technicians is lacking in depth.

NIBR is the key institution conducting Health Research in DRC as well as the University of Kinshasa being the main research university. A lot of researchers tend to leave the country – sometimes with the support of the University of Kinshasa – but many eventually return in hopes of getting research jobs in the country. The NIH has also started an exchange program with students visiting the United States to learn genetic research skills and there is an increased push for research to extend beyond communicable diseases to other health concerns. Now, priority is given to malaria and Ebola which is where most of the external support is focused. Fogarty, WHO, Wellcome etc. are a few of the international organizations active in DRC, there is also some funding from Japan and Germany to conduct research for the major health challenges. Expectedly, the vast majority of specialists are tropical and infectious diseases specialists with the more famous researchers tending to work on either Ebola or Malaria which is where the funding and support is concentrated. There are other local programs with research capacity strengthening components. The health research ecosystem however, still lacks an effective framework for research collaboration leading to overlapping interests, duplication of research efforts, and sub-optimal utilization of research capacity strengthening investments.
DRC follows the ICH Good Clinical Practice (GCP) guidelines for clinical trials but has a physician density of 0.9 per 10,000 population\(^{69}\) and no healthcare organizations with international accreditations from JCI and ISO. Data management capabilities – in terms of skilled persons in the use of research data capture and management software is severely lacking, and there is no common data management infrastructure to curate and manage government health research data in the country. There is therefore need to invest in collaborative research data management systems and knowledge sharing between institutions. There has been recent major investment in data infrastructure with the purchase of data servers, storage devices etc., and there is a gradual shift of field research data collecting and reporting from paper based to electronic records. Research ethics capabilities are also very well developed. Ethics review of health research happens through the Kinshasa School of Public Health, which is the primary place where ethical reviews happen outside the NIBR. Individual organizations and externally funded research also have their own ethical review processes they follow. There is also the Directorate of Pharmacy and Medicine of the Ministry of Public Health that is the regulatory authority responsible for allowing clinical trials. In addition, DRC follows the G-EthicalEval\(^{70}\) which indicates that an ethics committee (EC) must review the scientific validity and ethical acceptability of any research proposal involving human subjects. Capacity for effective community participation in health research in DRC is also very well developed and the communities where researches are conducted are quite involved in the research process. Each area has zonal and hospital administrators responsible for facilitating community participation and the recruitment of locals for various aspects of the field work including doctors residing or working within the region of the research.

1.3. Capacity to utilize research evidence

*Perspectives on capacity to translate and utilize research evidence to drive health policy*

Capacity for translating research evidence to influence public health policy and practice is fair. DRC as a whole has a national scientific symposium or meeting every one-two years to discuss all topics. The most recent (2020) was held in Kinshasa and covered malaria, Ebola, and HIV as the primary focus. There are also platforms on NCDs, genetic expansion etc., and a host of smaller meetings happening throughout the year where different research teams exchange ideas, make presentations, and some knowledge translation. This has engendered a faster capacity building among researchers in the last few years. However, health research output from the country remains low and is mostly focused at publication in international journals with little import for local knowledge sharing, collaboration, and translation. The level of commitment of the Ministry of Health to research at the federal and state level has been too weak to support an overarching national /state health research agenda which can engender a collaborative approach to health research and national priorities.

1.4. Imperatives for health research capacity strengthening

Experts on the health research landscape in DRC highlight several key opportunities for collaborative efforts by funders and global stakeholders aimed at strengthening health research capacity in the country.

1. Support with basic infrastructure like water and electricity, the absence of which fundamentally limits researchers.

2. Helping the country to set-up an effective collaborative structure for the coordination of health research such that research funding from multiple sources can be better directed towards national health research priorities, and strategic health research capacity strengthening investments can be better sustained.

\(^{69}\) As at 2013

3. Support for the establishment of a basket fund for investments in health research and research capacity strengthening, especially at the university level, with focus on driving innovations and exchange programs with top tier global research institutions.

4. Support for policy dialogue processes such that health research activities can be better integrated with the multi-level stakeholder engagement required to facilitate the translation of research evidence into action.

5. Support for investment in extending health research beyond disease control which is currently the primary focus to other areas like mental health, child and maternal health, and diagnostic medicine which currently pose greater challenges to the health system.
MOLDOVA

1. Extent of demand for health research

Country Context & Policy/Institutional Landscape for Health Research

Moldova, also known as the Republic of Moldova, is a country in Eastern Europe bordered by Romania to the west and Ukraine to the north, east, and south. It is a lower middle income country with an annual GDP of $4,498.5 per capita and a total population of 2.65 million in 2019. According to the World Governance Indicators (WGI) index, the country has high political instability and low levels of government effectiveness\(^1\). The Freedom House\(^2\) ranks Moldova as ‘partly free’ overall with a score of 60/100 in their assessment of the real-world rights and freedoms enjoyed by individuals in the country. The United Nations Development Program’s (UNDP) Human Development Report groups Moldova under the category of countries with high equality in HDI achievements between women and men\(^3\). Summarily, political instability, low level of government effectiveness, limited right of access to information and limited freedom enjoyed by individuals create a challenging socio-economic and political landscape in Moldova.

Governance and coordination of national health research in Moldova is currently the responsibility of the Ministry of Health, Labor & Social Protection which is the central specialized body of public administration that ensures the implementation of governmental policies in the field of health. Decisions on legal, regulatory and policy developments for public health services are made at the central level and divided between parliament, government and the Ministry of Health which is also saddled with the responsibility for ensuring that ethical and scientific standards for health research are met in Moldova. The Ministry of Health carries out these responsibilities through the Department of Public Health and the National Center for Public Health (NCPH) – to develop health policies, legislations and regulations, as well as monitor and evaluate these services /systems\(^4\). The NCPH also strives for the development of public health experts, and performs public health research.

Perceptions of the Utility of Health Research & Research Culture

Overall, the general perception of the utility of health research in Moldova is low, and the research culture is not as developed as it should be, considering that health research was active when Moldova was under the Soviet Union until its dissolution in 1991. After its independence, the country has taken steps to rebuild all systems including setting up a research system albeit at a much smaller scale than previously existed. Being an agricultural economy, most of the research in Moldova is agricultural driven and this is reflected in policy documents which show the divide of funding, coordination organization, and researchers into different strategies. There have been recent health research reforms and restructuring with many research institutes being revamped to take on the role of agencies having affiliations with different universities or private institutions. An example is the Academy of Sciences which is the main scientific organization that coordinates research in areas of science and technology and works in close collaboration with the State Medical University and some scientific medical institutes.

The budget for all these institutions was recently revised at the Presidential level and there is an initiative with the World Health Organization to develop an ‘evidence-based policy making’ approach for health research funding. Moldova is gradually opening up to more external funding and collaboration targeted at health research and the objective is for all external support

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\(^1\) WGI index of -0.35 for Political Stability and Absence of Violence/Terrorism and -0.47 for Government Effectiveness Index in 2018, in a range from approximately -2.5 (weak) to 2.5 (strong) governance performance

\(^2\) Freedom in the World 2020

\(^3\) Gender Development Index (GDI) of 1.007, Group 1 in 2018

to be centralized. The onset of the COVID19 pandemic has also triggered the release of more funding from the government earmarked for health research, to support laboratories and health practitioners responding to the pandemic, and to make healthcare research more attractive at the University level for international candidates.

1.2. Capacity to produce knowledge

*Systems and infrastructure enabling the conduct of health research*

Most health research in Moldova is carried out by academic and medical institutions as well as by individual researchers usually under the Ministry of Health and under the auspices of the Academy of Sciences. The country has only 2 higher education institutions offering disciplines related to health research. Generally, infrastructure for research output is quite weak and many researchers have relied on the benevolence of research centers in neighboring Ukraine, Russia, Romania, and Bulgaria, to carry out their research. The State University has a long standing collaboration with the US State of North Carolina especially for nursing and dentistry, and has an exchange program with Germany. The incentive for the researchers being that they would have international publications in their name and access to standard laboratories.

The Global Competitiveness Index had a score of 2.89 on its index for quality of research institutions for Moldova, placing it as one of the lowest in the world. Moldova had 696 full time researchers per million population (Research Density) as at 2018. A total of 510 scientific publications whose authors are affiliated with the country are catalogued on PubMed between 2014 and 2019, and over 21 research organizations received grants from at least 3 international funders between 2016 and 2018.

The WHO Global Health Observatory has a score of 95.83% for Moldova in terms of laboratory capacity across the following areas: existence of office for collaboration of laboratory services, number and qualification of laboratory staff, the supply management system (including quality, availability, and delivery of supplies), specimen collection, storage and transportation, and maintenance of laboratory equipment. There are laboratories based at different medical scientific organizations across the country – there is the State Medical University, institutions such as the Institute for Tuberculosis, Institute of Cardiology, and Institute of Mother & Child. There are also laboratories at the National Agency of Public Health and special departments under the national Academy of Sciences, apart from the many private laboratories that are quite well equipped.

Moldova does not currently report national data on gross domestic R&D expenditure on health (health GERD). Data from the World RePORT health research data aggregation platform estimates that internationally funded health research grants in Moldova amounted to more than US$1.1m between 2016 and 2018. Figure 1 summarizes funding for health research in Moldova from international grants for the 2016 to 2018 period based on World RePORT data.

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75 2017 WEF Global Competitive Index in a range from 1 [extremely poor] to 7 [extremely good]
76 World RePORT is an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world's largest funding organizations. There are limitations to the financial data presented by World RePORT due to the differences in level of reporting detail by each of the funding organizations. For example, NIH records only have financial data when it is a direct award, while the EC submits financial disbursements by each participating institution, and by year. World RePORT continues to work to enhance the consistency of financial reporting across all funding organizations that submit data to it. Please see the following links for more information about data presented by World RePORT - [https://worldreport.nih.gov/app/#/about & https://worldreport.nih.gov/app/#/release-notes](https://worldreport.nih.gov/app/#/about & https://worldreport.nih.gov/app/#/release-notes)
**Perspectives on capacity to produce quality health research output**

**Overall, the capacity to produce quality health research in Moldova is quite well developed, despite the existence of significant constraints.** Several centers of excellence for health research are rapidly emerging, and the talent pool for health research scientists (both in country and in the diaspora) is quite strong with many of them trained in top tier research approaches. Despite this potential, there is low investment in research infrastructure creating unfavorable working conditions in academic institutions and public research institutions. This has led to a massive brain drain as young talent look for better research opportunities and infrastructure outside the country. The health research ecosystem still lacks an effective framework for research collaboration leading to overlapping interests, duplication of research efforts, and sub-optimal utilization of research capacity strengthening investments.

Moldova follows the ICH [Good Clinical Practice (GCP)](https://www.ich.org/technology/good-clinical-practice-gcp.html) guidelines for clinical trials a physician density of 32,002 per 10,000 population[^77] and has only one healthcare organization with international accreditations from JCI and ISO. Data management capabilities – in terms of skilled persons in the use of research data capture and management software, are well developed with an established data collection system at the national level split per regions for easier geographical collaborations. These data was previously collected and stored as paper records and a switch to digital data collection, processing, and preservation systems has commenced, and development of these platforms are supported by organizations like the University Agency of La Francophonie and the World Health Organization. These systems, especially at the national level, still need to be strengthened for more collaborative research data management systems and knowledge sharing between institutions. Research ethics capabilities are also very well developed. The National Center for Public Health works in close concert with the National Agency for Accreditation in Research that has an ethical committee to validate research and knowledge quality

[^77]: As at 2013
across different research institutions and revise the quality of publications. The Academy of Science also has an ethical board that validates the research potential of research proposals while there is a separate Ethics Board of Research established at the State Medical University to evaluate all research projects within the university. Moldova has an independent ethical board for evaluation of clinical studies at the national level as well as a separate entity for research done on animals. Any animal trials done within the country have to be evaluated by the national board for research done on animals and academic institutions are not expected to conduct clinical trials. All ethical regulations in Moldova are established at the level of the European Union and the country has an ethical person for Horizon 2020.

1.3. Capacity to utilize research evidence

*Perspectives on capacity to translate and utilize research evidence to drive health policy*

**Capacity for translating research evidence to influence public health policy and practice is weak.** A policy for the development of the health sector in Moldova has been in development for 20 years with several aspects tied to research policies guided by WHO. This includes the translation of research with regards to public health but with lower emphasis on clinical research. The country has a consortium of research institutions in the health sector with about 300 PhD students who step-down knowledge and practices to young researchers. For every research performed with the participation of indigenous research institutions, it is expected that there would be an implementation component. In some instances, the implementation is limited to the institution where the research was carried out and is not spread nation-wide despite its overarching benefits across the country.

There is also the challenge of knowledge translation with national policies and strategies resulting from research. This has often been attributed to the level of trust from government parastatals in research that is locally conducted. There is a better chance of acceptance of research that is performed in the areas of national priorities, internationally proven, or is backed by an international organization. There is also a need to shift the demand for research to more local content (taking a ground up approach) on the part of the government which would lead to increased support, and the translation of a lot more local research content.

1.4. Imperatives for health research capacity strengthening

Experts on the health research landscape in Moldova highlight several key opportunities for collaborative efforts by funders and global stakeholders aimed at strengthening health research capacity in the country.

1. Helping the country to set-up an effective collaborative structure for the coordination of health research such that research funding from multiple sources can be better directed towards national health research priorities, and strategic health research capacity strengthening investments can be better sustained.

2. Support for the establishment of a basket fund for investments in health research and research capacity strengthening with focus on driving innovations not just in laboratory medicine but in clinical medicine, rehabilitative medicine, cancer research and others.

3. Support for a data repository for health research.

4. Support for policy dialogue processes such that health research activities can be better integrated with the multi-level stakeholder engagement required to facilitate the translation of research evidence into action. This would include Civil Society Organization’s involvement and interfacing more with local groups in affected communities.

5. Support for investment in extending health research beyond disease control which is currently the primary focus to other areas like cardiovascular health, epidemiology, and other non-communicable diseases.
NEPAL

1. Extent of demand for health research

Country Context & Policy/Institutional Landscape for Health Research

Nepal, officially the Federal Democratic Republic of Nepal, is a country in South Asia. It is a low income country with an annual GDP of $1,071.1 per capita and a total population of 28.6 million in 2019. According to the World Governance Indicators (WGI) index, the country has high political instability and low levels of government effectiveness. The Freedom House ranks Nepal as ‘partly free’ overall with a score of 56/100 in their assessment of the real-world rights and freedoms enjoyed by individuals in the country. The United Nations Development Program’s (UNDP) Human Development Report groups Nepal under the category of countries with low equality in HDI achievements between women and men.

Nepal's governance and development challenges have been exacerbated by frequent changes in government and the absence of elected local bodies since 2002. The lack of political consensus in the past several years has delayed national budgets and prevented much-needed economic reform, although the government passed a full budget in every year (UNDP Report 2013). Nepal’s internal conflict officially ended in 2006, with the signing of the Comprehensive Peace Accord (CPA). In 2007, the Interim Constitution of Nepal was adopted. It created an interim Legislature-Parliament, a transitional government reflecting the goals of the 2006 People’s Movement - the mandate of which was for peace, change, stability, establishment of the competitive multiparty democratic system of governance, rule of law, promotion and protection of human rights, full press freedom and independence of judiciary based on democratic values and norms. Nepal has enjoyed relative political stability for the past 2.5 years which is necessary for any country to function optimally and affects everything including research.

Governance and coordination of national health research in Nepal is currently the responsibility of the Nepal Health Research Council (NHRC). It has the Ethical Review Board (ERB) and the Health Research Monitoring Committee (HRMC), with operational functions of providing scientific study and quality health research in the country with the highest level of ethical standards. The primary responsibility of the NHRC is to promote and coordinate health research with the objective of bringing about improvement in health issues of national priorities. NHRC cooperates with the Ministry of Health (MoH), nongovernment agencies, private sectors and other relevant ministries to provide consultation, assistance, and advice in all matter related to health research, policies and health care services. The council promotes research competencies of the national scientist through research training and grants. NHRC also acts as a national regulatory body for maintaining technical and ethical standards of health research within the country.

Perceptions of the Utility of Health Research & Research Culture

Overall, the general perception of the utility of health research in Nepal is strong, and the research culture is developing despite a challenging environment. Most of the demand for health research is driven by external actors and health research is not considered as a priority by many indigenous institutions outside of academia. Nepal has a National Health Research Policies/Plans and Strategy, though poorly executed. The Ministry of Health and Population, Government of Nepal in collaboration with stakeholders and partners has been involved in defining health research agenda and updating the health research priorities using a problem and evidenced based approach. The priority areas in health research has been defined through a rigorous and continuous process through workshops, consultative meetings as well as expert meetings and past

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78 WGI index of -2.19 for Political Stability and Absence of Violence/Terrorism and -1.02 for Government Effectiveness Index in 2018, in a range from approximately -2.5 (weak) to 2.5 (strong) governance performance
79 Freedom in the World 2020
80 Gender Development Index (GDI) of 0.897, Group 5 in 2018
81 Website of National Health Research Council (NHRC) of Nepal http://nhrc.gov.np/
and present policy makers’ meetings. All the departments, divisions, centers, and hospitals within the Ministry of Health & Population including Directors and other representatives as well as representatives from various other hospitals, I/NGOs and civil society were not left out in the process. Besides the meetings and workshops, other mechanisms such as feedback through email was used to ensure that the important areas Nepal’s health care systems are incorporated (NHRC 2019). Based on the national level consultation meeting “prioritization of essential national research agenda”, the following five different broad areas were identified:

- National commitment to capacity building
- Institutional strengthening
- Building research capacity
- Creating awareness and demand for research activities
- Promotion of health research

Priority areas in health research are: health care delivery system, communicable diseases, non-communicable diseases, neonatal and child health, reproductive health, mental health and substance abuse, injuries, accidents and violence, nutrition and food safety, environmental and occupational health, traditional medicine, urban health and geriatric health.

This landscape is seeing a gradual shift with the relatively new politically stable environment and the ongoing COVID-19 pandemic triggering action from the Government to invest more in research and evidence based policy making to strengthen the health system, there is an increased interest and involvement of many institutions and organizations in health research, and health research is being aligned to national health priorities due to the effort of the NHRC.

1.2. Capacity to produce knowledge

*Systems and infrastructure enabling the conduct of health research*

Most health research in Nepal is carried out by academic and medical institutions as well as by individual researchers usually working with international organizations/donors. The country has 3 higher education institutions offering disciplines related to health research but they are pretty inadequate, and the NHRC also has its own research training program. Several health research institutions are active in the country including the Oxford University Clinical Research Unit (OUCRU – Nepal) which is funded by Wellcome, the German-Nepal Tuberculosis Project (GENETUP), and the Britain Nepal Medical Trust. The human capacity to produce top tier health research output in Nepal is low as many researchers leave the country in search of work and better opportunities.

The Global Competitiveness Index had a score of 2.70 on its index for quality of research institutions for Nepal, placing it in the lower-medium range in the world. The country had 61 full time researchers per million population (Research Density) in 2002. A total of 5,216 scientific publications whose authors are affiliated with the country are catalogued on PubMed between 2014 and 2019, and there are 34 Research Organizations that received grants from at least 4 international donors between 2016 and 2018.

The WHO Global Health Observatory has a score of 69.17% for Nepal in terms of laboratory capacity across the following areas: existence of office for collaboration of laboratory services, number and qualification of laboratory staff, the supply management system (including quality, availability, and delivery of supplies), specimen collection, storage and transportation, and maintenance of laboratory equipment. The standard laboratories are located in the University Hospitals while that supported by Wellcome is considered one of the best in the country – all of which are classified as BLS-3. Outside of these,

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82 2017 WEF Global Competitive Index in a range from 1 [extremely poor] to 7 [extremely good]
laboratory capacity is poor and it can be difficult, if not impossible, to find other standard laboratories. There is no dedicated source of domestic funding for health research in Nepal. In 2004, the NHRC made a submission to the Ministry of Health for 2% of the total national health budget be allocated for Health Research Promotion but resource mapping for health research is not yet underway. However, collaboration continues with international organizations and external donators for continued support. Over the next couple of years, it is expected that with the implementation of a proper funding plan plus the technical and other support from international agencies and implementing partners, the absence of an overarching national/state health research agenda would be history and be replaced with a collaborative approach to health research systems and national priorities.

Nepal does not currently report national data on gross domestic R&D expenditure on health (health GERD). Data from the World RePORT health research data aggregation platform estimates that internationally funded health research grants in Nepal amounted to more than US$49.2m between 2016 and 2018. Figure 1 summarizes funding for health research in Nepal from international grants for the 2016 to 2018 period based on World RePORT data.

*Figure 13 - International health research awards in Nepal (estimates based on reported data on World RePORT - Donors & Recipients*

Perspectives on capacity to produce quality health research output

Overall, the capacity to produce quality health research in Nepal is quite well developed, despite the existence of significant constraints. Several centers of excellence for health research are rapidly emerging, and the talent pool for health research scientists (both in country and in the diaspora) is quite strong. Despite this potential, research is still rarely seen as a viable career path in Nepal due to poor remuneration structures and unfavorable working conditions in academic institutions and public research institutions. This has led to a massive brain drain as young talent look for better research environments.

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83 World RePORT is an open-access, interactive mapping database project highlighting biomedical research investments and partnerships from some of the world’s largest funding organizations. There are limitations to the financial data presented by World RePORT due to the differences in level of reporting detail by each of the funding organizations. For example, NIH records only have financial data when it is a direct award, while the EC submits financial disbursements by each participating institution, and by year. World RePORT continues to work to enhance the consistency of financial reporting across all funding organizations that submit data to it. Please see the following links for more information about data presented by World RePORT - [https://worldreport.nih.gov/app/#!/about](https://worldreport.nih.gov/app/#!/about) & [https://worldreport.nih.gov/app/#!/release-notes](https://worldreport.nih.gov/app/#!/release-notes)
opportunities and infrastructure outside the country. Access to quality infrastructure and equipment for research is challenging, but good enough due to the availability of quality laboratory facilities across the country. However, the talent pool to support research work, in terms of top tier laboratory assistants, good data analysts and laboratory technicians is lacking in depth.

To this effect the NHRC, academic and established researchers and their network, conduct trainings with emphasis on promoting interdisciplinary research and developing skills in participatory research activities for health personnel and health service managers. At the back of this, health research skills have been introduced into the curriculum of major academic health institutions, medical schools, and universities. Schools teaching this as part of their curriculum include, the Institute of Medicine, B.P. Koirala Institute of Health Sciences, Patan Academy of Health Sciences, National Academy of Medical Sciences.

Several research institutions in Nepal have built particularly good relationships with international funders and are increasingly looking to work more with these partners on the research needs of the country. There are a couple of externally funded initiatives currently aimed at improving the research clime in Nepal such as the mobilization of Award from Rockefeller Foundation for "Capability Strengthening of Health Research Network in Nepal," and resources mobilized from Mary-knoll Father and Brothers for research promotion. Nepal has seen a lot of multilateral agencies also offer support to the health sector – DFID, GIZ, Japan, the EU which is focused on capacity building for rural health, and the USAID which recently pulled out. Research in the country has been focused on epidemiology of infectious diseases like tuberculosis, and the vast majority of researchers are tropical and infectious diseases specialists which is where the funding and/support is concentrated. There are other local programs with research capacity strengthening components. The health research ecosystem however, still lacks an effective framework for research collaboration leading to overlapping interests, duplication of research efforts, and sub-optimal utilization of research capacity strengthening investments.

Nepal follows the ICH Good Clinical Practice (GCP) guidelines for clinical trials with no data available for the physician density per 10,000 population. The country has no healthcare organizations with international accreditations from JCI but has 2 with ISO certifications. Data management capabilities – in terms of skilled persons in the use of research data capture and management software is severely lacking, and there is no common data management infrastructure to curate and manage government health research data in the country. There is therefore need to invest in collaborative research data management systems and knowledge sharing between institutions. Research ethics capabilities is quite developed. Ethics review of health research happens through the Nepal Health Research Council (NHRC) who set the standards and protocols for conducting research in Nepal, its duties include: screening, reviewing and approval of research proposals; providing technical guidance and possible support including services for scientists, researchers; monitoring and evaluation of all the research conducted at the field level, with its Ethical Review Board responsible for reviewing the scientific validity and ethical acceptability of research proposals. Capacity for effective community participation in health research in Nepal is on the rise and increasingly demanded. Communities are being consulted in the design and implementation of research and disseminated to communities. There are layered approvals before a research project can commence and one such layer is from the District Administration Office where the appropriateness of the project is judged from the community perspective. Representatives from the District Health Office, local mayor or deputy mayor, various other community leaders are present during this review process – this also minimizes the risk of overlapping agendas.

1.3. Capacity to utilize research evidence

Perspectives on capacity to translate and utilize research evidence to drive health policy

Capacity for translating research evidence to influence public health policy and practice is weak. A lot of the research output from the NHRC becomes policy but there is near zero commitment to implementing/enforcing the policies and, on the rare
occasion, when there is an implementation, it is not scaled up despite strong evidence supporting it. Nepal also suffers from incontinent shuffling of government office holders with implications for continuity – new ministers are appointed and the whole knowledge translation process starts afresh. Outside of the NHRC, there are no well-established translation platforms except the internal ones promoted by various organizations within various sub-segments of health research. USAID and DFID each have their own policy evidence to action programs, and little effort has gone into bringing all these together to create a stronger voice for translating research.

The level of commitment of the Ministry of Health to research at the federal and state level has been too weak to support an overarching national/state health research agenda which can engender a collaborative approach to health research and national priorities. Inadvertently, the health research output from the country remains low and is mostly focused at publication in international journals with little import for local knowledge sharing, collaboration, and translation.

1.4. Imperatives for health research capacity strengthening

Experts on the health research landscape in Nepal highlight several key opportunities for collaborative efforts by funders and global stakeholders aimed at strengthening health research capacity in the country.

1. Development of research opportunities and projects of mutual scientific interest.
2. Training/capacity building programs for young researchers.
3. Short and long-term training and fellowships (grant).
4. Developing joint research, training, technology transfer and exchange visit for researchers to foster shared learning and exchange.
5. Establishing of provincial research council and research biomedical lab.
6. Establishment and strengthening laboratory centers of excellence for quality control.
7. Promotion of clinical trial, Cochrane review, systematic review, and meta-analysis through international collaborative networks.
7 ANNEX 2 – CASE STUDIES: COLLABORATION MODELS FOR RESEARCH CAPACITY STRENGTHENING IN LMICs

Brief case studies on models for strengthening collaboration and coordination for research capacity strengthening in low- and middle-income countries
Overview and structure of collaboration

TDR, the Special Programme for Research and Training in Tropical Diseases (now referred to as infectious diseases) was established in 1975. Its purpose is to improve the health and well-being of people burdened by infectious diseases through research and innovation.

TDR is based in and was initiated by the World Health Organization (WHO). It is co-sponsored by the United Nations Children’s Fund (UNICEF), the United Nations Development Program (UNDP) and the World Bank. It operates within a broad framework of intergovernmental and interagency cooperation and participation. The executing agency is the World Health Organization (WHO). In addition to the co-sponsors, there are co-operating parties which include donors, co-sponsors, government and members states, foundations, and agencies.

Coordination & Collaboration (C&C) model

TDR is a strategic co-funding partnership underpinned by a binding memorandum of understanding (MoU) for the purpose of fostering research and innovation in a specific health research domain (infectious diseases).

Other funders are medium and high income countries including Ghana, Nigeria, Malaysia, Thailand, India, UK, Sweden, Luxemburg, Spain, Germany Belgium, and Japan, among others. There is no mandatory annual funding contribution from either sponsors or other funders. In kind contributions are accepted and all partners have an equal voice on the board regardless of financial contribution.

Perspectives on key organizational and operational attributes that facilitate effective collaboration

- **Formal structure:** TDR indicates its highly formal governance structure as a key factor in its success. TDR has a Memorandum of Understanding which guides its functions, composition, and operation. Its governance structure includes a Joint Coordinating Board (JCB), a Standing Committee (SC) and a Scientific and Technical Advisory Committee (STAC). The strategic plan of TDR is developed by the Secretariat and approved by the Joint Coordinating Board (JCB). The JCB decides on planning and execution of the strategic plan and overseeing of the standing committee. It is made up of 28 members (12 representatives of the government; 6 government representatives from the countries TDR is working in, 6 members chosen from JCB and then 4 co-sponsors). It has a chairman and Vice-Chair that are elected every 3 and 2 years, respectively. The JCB meets annually. The Standing Committee is responsible for the finances and management of TDR. It is made up of the 4 co-sponsors, chairman and vice-chairman of the JCB, Chair of STAC, 1 representative of the governments contributing to TDR and one representative of a disease endemic country. SC meets twice a year. The Scientific and Technical Advisory Committee (STAC) provides scientific oversight and is made up of 15 scientists and other technical personnel who serve in their personal capacities. It has a Chair and meets once a year.

- **Approach to fostering and sustaining alignment:** TDR partners come to the table with trust already established because of the credibility of the WHO platform, on which the partnership rests. It builds upon this further by having

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84 [https://www.who.int/tdr/en/](https://www.who.int/tdr/en/)
an established (and documented) prioritization process that outlines how the partners make decisions, in order to sustain alignment and reduce conflicts among co-sponsors and cooperating parties on project selection, defining research agendas, and deciding on geographic focus areas among others. The process aims to facilitate the development of a competitive, innovative, strategically oriented and balanced portfolio, foster accountability in the prioritization of projects, ensure coherence and collaboration with relevant stakeholders, including WHO regional offices and disease control programs, and support a consistent, credible and transparent process of prioritization. TDR also maintains a conflict of interest document that guides how conflicts should be handled.

- **Promotion of equity in partnership:** TDR’s collaboration approach emphasizes equity in partnership, ensuring that no partner feels that they are being taken advantage of by other partners who may be promoting their own interests. This is an especially important priority for the collaboration, and it strives to ensure no partner feels taken for granted. Elements of this principle can be found in its approach to funding, wherein any contribution (cash or kind) gives a stakeholder an equal voice in the partnership. Further, representatives from each region take turns on the Board and an independent external review is undertaken every 5-6 years that presents to the Board a view of performance prepared independent of the partners.

- **Emphasis on performance measurement:** TDR has a structured performance measurement framework used to annually measure all its activities at various stages of performance (outputs, outcomes, impact). Success is measured by changes in public health outcomes, and focus is on ensuring that TDR’s research activities are not designed for the novelty of research alone. TDR uses already determined metrics to assess its performance. Indicators typically cover the assessment of technical deliverables, the application of core values and managerial efficiency. Some outcome indicators include evidence of funding agency and/or national government adoption/use of TDR reports in strategy and priority setting, evidence of TDR facilitated stakeholder consultations being used to set priorities, evidence of LMICs leading new/strengthened health research initiatives, and the number of health research institutions that accessed further funding attributable to TDR, among others.

- **Leveraging platform infrastructure:** TDR provides a viable platform for its partners and collaborators to leverage the WHO platform to undertake research and research capacity strengthening activities in LMICs. It works closely with many WHO departments, research programs and hosted partnerships in Geneva and across the six WHO regional offices. A key advantage of this is that it reduces the risk for funders when going into new locations. E.g. Researchers focused on antimicrobial resistance can go to Nepal, Uganda, or Myanmar and work in the WHO country office, secure contacts with the local health ministry, and harness the already-established infrastructure.

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**Notes on TDR & LMIC Research Capacity Strengthening (RCS)**

TDR’s three strategic functions include: supporting training, leadership development and project-related capacity building to strengthen the ability of countries and regions to respond to their own research needs; promoting evidence-based priority setting to identify emerging needs in research and capacity strengthening; and collaborating with WHO, TDR co-sponsors and partners for harmonization and alignment with global health goals.

TDR’s LMIC research capacity strengthening initiatives are aimed at combating the challenge of inequities in research capacity and partnerships within these countries, by supporting individual training, institutional development, and regional networks or platforms. Its key programs in RCS includes:

- Working with 7 universities (3 in Africa, 2 in Asia, 1 in Latin America, 1 in Middle East) with 2-year masters programs in implementation research. Students are funded to study in their own region (helps with brain drain

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87[https://www.who.int/tdr/capacity/en/](https://www.who.int/tdr/capacity/en/)
and keeping families together), are linked together for networking. Program design ensures sustainability at the end of the TDR intervention.

- Regional training centers in 6 WHO regions with links to regional networks that provide short-term (2-week) training opportunities focused on implementation research, research ethics, etc.
- Online implementation research courses that the training centers can use
- Capacity building linked to certain programs. E.g. a UNDP access and delivery program focused on introducing laws or regulations to countries that to bring new commodities like drugs or diagnostics; TDR would provide training in implementation research or pharma.
- A clinical research and development fellowship: This is a one-year programme designed for scientists from LMICs, to work with pharmaceutical and research institute partners to learn how to lead clinical drug and vaccine trials. The programme has supported 72 fellows from 26 countries.

- Direction of future investments in RCS -

TDR says its 2018-23 strategy is to build on past successes while focusing more on identifying barriers to effective health interventions. It will work on the recognition that developing new solutions alone does not suffice and will invest in supporting local and regional capacity building to ensure that solutions can be actualized. TDR will continue to meld research with training and use regional centers to increase institutional strength and sustainability, while developing the skills of individuals. It plans to work more closely with regulatory agencies, to influence, strengthen and improve safety for research and support long-term monitoring and evaluation.
Overview and structure of collaboration

The Global Alliance for Chronic Disease (GACD), is a collection of the world’s largest public health research funders jointly funding practical research into lifestyle diseases or non-communicable diseases-NCDs (heart, lung, diabetes, mental health and some cancers) in low-income settings and vulnerable populations. GACD was established in 2007 with its origins in the grand challenges identified in NCD. The grand challenges partnership of which GACD is an outcome, saw the need for greater joint international funding to tackle the rising epidemic of NCDs.

The alliance currently comprises fifteen associate members. Associate Members of GACD are publicly funded national, subnational, or multi-country research funding organisations, or foundations, trusts, or philanthropic organisations with a mission which includes the funding of research on chronic, non-communicable diseases in low- and middle-income countries and vulnerable populations. They include: Australia’s National Health and Medical Research Council, Argentina’s Ministry of Health, Brazil’s São Paulo Research Foundation (FAPESP), Brazil’s National Council for Scientific and Technological Development (CNPq), Canadian Institutes of Health Research, Chinese Academy of Medical Sciences, European Commission’s Health Directorate in the Research & Innovation DG, Indian Council of Medical Research, Japan Agency for Medical Research and Development, New Zealand’s Health Research Council, South African Medical Research Council, Thailand’s Health Systems Research Institute, UK’s Medical Research Council. UK’s Department of Health and Social Care (DHSC) and USA’s National Institutes of Health.

Coordination & Collaboration (C&C) model

TDR is a strategic co-funding partnership legally set-up as a registered charitable incorporated organization (CIO) in the UK (GACD Action), for the purpose of fostering research and innovation in a specific health research domain (non-communicable diseases).

All research projects that are part of GACD research programs receive their funding from the GACD Associate Member organisations that are participating in each respective programme. GACD does not administer any funding.

Perspectives on key organizational and operational attributes that facilitate effective collaboration

- Increasingly formal structure: GACD has recently moved towards a more formal structure with its registration as a legal charity in the UK with a board of trustees. It also has a strategy board which meets several times a year on conference calls and once a year in person. The Board of Trustees are volunteers with expertise in medical research and science funding, investments, and charity management. It works closely with the Strategy Board. The Strategy Board provides recommendations on topics including research funding and programmatic priorities to the Board of Trustees. They also provide first-line review of the implementation and delivery of the strategic plan. The Programme Subcommittee oversees the research project life cycle through the joint development, coordination, and alignment of the portfolio of research awards made by GACD. This also includes overseeing the scientific direction of the GACD Research Network. GACD has permanent staff who coordinate the day to day activities of the alliance and are funded.

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88 Source: [https://www.gacd.org/about/people-and-organisation/associate-members](https://www.gacd.org/about/people-and-organisation/associate-members)
89 Source: [https://www.gacd.org/funding](https://www.gacd.org/funding)
by contributions from the Associate Members. It benefits from shared support services in finance and HR management through its linked charity, the Medical Research Foundation\(^9\).

Steps taken in this direction are a recognition of the challenges around the collaboration which include ensuring financial contributions come in on time, and facilitating the logistical challenges associated with multi-stakeholder engagement to agree on collective priorities while still meeting expectations of individual agencies, and getting consensus at board meetings. With the switch to a charity, new the secretariat has been strengthened and commitments are obtained from funders to maintain the secretariat.

- **Thematic focus and common processes foster alignment:** GACD’s approach to building its partnership relies on maintaining a strong thematic focus. The core of the collaboration is mostly around the disease issues themselves and the agenda setting is robustly focused on these issues. GACD’s adoption of a multidisciplinary and multisectoral projects which include policy makers, researchers, and implementers is also a critical binding factor for the partnership. It does this by engaging as a consortium every 1-3 years to agree on a topic and then issues a funding call around that theme. This is preceded by the work of the programmatic committee that puts together topic options and ideas for the Board to advise and decide. The GACD’s approach is that of a coordinated funding activity, rather than a common call. However, the Associate members all agree to the call text and the agreed topic and work towards a single timeline (with some exceptions for the EU and NIH). The alliance uses a shared portal to issue the calls, but awards are made by funders, respectively. The GACD has in the past come together around disease burdens like hypertension, diabetes, environmental lung disease (air pollution, tobacco), mental health, prevention of cancers, etc. Its overall aim in this is to seek to understand how to move health burdens into more a manageable realm in low-resource settings.

- **Operational flexibility to manage complexity** – Managing the alliance can be quite complex due to the number of partners and the diversity of their interests and respective organisational goals. Although there is an expectation that every member will participate in network meetings and try to participate in every funding call, the latter is not always the case and the partnership allows for the flexibility for members to opt out depending on financial capacity. Each year funders must re-dedicate themselves to the organization by signing up formally to indicate their continued participation in the alliance.

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**Notes on GACD & LMIC Research Capacity Strengthening (RCS)**

GACD’s primary goal is to enhance knowledge around chronic diseases. Implementation research is a key area and although capacity building is secondary to research goals, it is complementary and fully embedded in the research projects. GACD’s core work in research capacity strengthening is primarily around building implementation science capacity and capability in relation to NCDs. It pursues this through:

- **Implementation Science training** - an annual event with the objective of building capacity amongst researchers in the local context.

- **GACD Research Network** - provides a platform for researchers to initiate, develop and participate in collaborative initiatives and learning with the intention of building capacity and contributing to the body of scientific knowledge.

- **GACD working groups** - facilitate ongoing collaborations across different sites, diseases, contexts, and geographic location, and showcase some of the shared interests of researchers within the GACD Research Network.

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\(^9\) [https://www.medicalresearchfoundation.org.uk/](https://www.medicalresearchfoundation.org.uk/)
- Annual scientific meeting - bringing together representatives from GACD funded projects and member agencies, as well as local researchers, policymakers and programme implementers to facilitate discussion and share learnings around implementation science

GACD’s research capacity strengthening work is not LMIC-specific. However, LMIC typically fund projects in their home countries.

- Direction of future investments in RCS -

GACD hopes to continue focusing on its core objectives and extending its alliance to include low-income countries. It also plans to undertake an independent evaluation of the program.
Overview and structure of collaboration

The UK Collaborative on Development Research (UKCDR) is a collaboration of government departments and public research funders in international development that aim to have strategic coherence and believe that research across disciplines and in partnership with low- and middle-income countries is essential to drive global development progress. It was established in 2007 as the UK Collaborative on Development Sciences (UKCDS) in response to a House of Commons Science and Technology Select Committee inquiry into the use of science in international development. With the UK government’s shift in strategy for development aid in 2015 funds for international research were distributed across government departments other than the Department for International Development (DFID) and UKCDR became a mechanism for coherence of the spending on research across these organisations. This change was based on a July 2016 recommendation of the House of Lords Science and Technology Committee, for the creation of a coherence and coordination mechanism for government ODA-research funds. The Strategic Coherence for ODA-funded Research (SCOR) Board was established in 2017 to provide high-level coherence for UK ODA research following that recommendation. In June 2018, UKCDS was rebranded the UK Collaborative on Development Research (UKCDR) to reflect the diverse and changing landscape, and to align with a new vision and aims under the strategic direction of the SCOR Board.

Membership of the UKCDR currently comprise the Department for Business, Energy, and Industrial Strategy (BEIS), Department for Health and Social Care (DHSC), UK Research and Innovation (UKRI), and Wellcome Trust. Other members include the Foreign and Commonwealth Office (FCO), the Department for Environment, Food and Rural Affairs (DEFRA), the Government Office for Science and the devolved government administrations in the UK. Other stakeholders include the UK and international research community, research funding delivery partners, and the NGO, philanthropic and private sectors.

Coordination & Collaboration (C&C) model

UKCDR is a strategic alliance. It is not setup as legal entity and is structured to be independent of any one organisation. Its operation is underpinned by an MOU which is non-legally binding and brings mandate, commitments, and responsibilities of all parties, within a single reporting structure. Under the umbrella of the MOU, the UKCDR has individual funding agreements with each funder.

Perspectives on key organizational and operational attributes that facilitate effective collaboration

- **Leadership commitment and involvement:** UKCDR is designed to ensure involvement of the highest levels of leadership of its member organisations. It therefore has a highly committed and influential board, led by an independent chair who is not a member of any of the funders (Professor Peter Piot from the London School of Hygiene and Tropical Medicine as at August 2020). This high level of leadership involvement supports strong communication internally across the different funders and enables decisions reached collectively to be successfully implemented across each of the member organisations as buy-in from their respective leaders has already been obtained.

- **Formal governance and operating structure:** The UKCDR has become increasingly more formalized as it has evolved over the years. It is governed by the Strategic Coherence for ODA-funded Research (SCOR) Board; which is responsible for most of the decision making and adopting its strategies, and in addition to being chaired by an independent member, it benefits from the involvement of the Chief Scientific Advisers and Directors of its core...
members. The board holds quarterly meetings and the secretariat staff is made up of a dedicated team. Its use of an MOU and funding agreements has seen a significant shift in this direction (it did not have MOUs or funding documents at the start) which has provided needed clarity and helped get all members aligned on a common purpose and strategy. These shifts have been in recognition of the challenges with managing different organizations with different agendas.

- **Communication and data core to building alignment**: UKCDR aims to align all funders around specific issues relevant to the effective conduct of international development research. For example, it recently launched safeguarding principles for adoption by all entities undertaking UK-funded research in development. It has produced good practice guidance to help members address issues that emerge with lessons already learned from other groups. It also carries out specific analysis for its members including analyzing the UK’s research investment in specific countries or thematic areas.

The UKCDR adopts two main mechanisms to align members - 1) a top down approach through its influential board (SCOR) which oversees UKCDR’s work, its collaborative agenda and operations.; and 2) a bottom up approach wherein different funder groups that link to research communities engage directly with the UKCDR secretariat around areas where they believe more collaboration would be beneficial. These ideas are then taken to the board for review. The secretariat meets with the board about three times a year on the average but has met with much more frequency since the advent of the COVID-19 pandemic, indicating a strong intent to leverage communication to drive greater alignment during a period of high need. To align members around a research agenda, the UKCDR invests in building an evidence base to gain full understanding of what is already being funded. Data analysis is used to understand what each organization is funding, where these funds are being directed, and who the recipients are. Findings are presented to the board to guide decisions about how to reorganize, avoid duplication of efforts, improve specific actions or processes, and complement each other more. The UKCDR collects data from participating organisations and has partnered with the GLOPID-R network to get information on funders beyond the UK. UKCDR and GLOPID-R currently has a COVID research project tracker for worldwide research investments and projects across funders, classified against WHO’s priorities for R&D. UKCDR assesses and uses this data to engage with an epidemics funder group to discuss what is needed where and how to go forward. Not all funders collect data in the same way so UKCDR is actively working to align members around data collection standards and practices with a view to harmonizing data collection. It emphasizes building trust before seeking data and invests a significant amount of time on diplomacy necessary to ensure transparency and clarity of purpose around its use of data.

- **Commitment to measuring impact**: UKCDR has an established M&E structure with a clear theory of change and indicators used to track impact and success. It publishes an annual report each year and an independent evaluation is conducted every few years which goes into detail on its activities and operations. This commitment to measurement enables the board and stakeholders to exercise the right level of accountability over the collaboration, ensuring that it stays relevant to its purpose.

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**Notes on UKCDR & Research Capacity Strengthening (RCS) in LMICs**

The Research Capacity Strengthening Group (RCSG) is UKCDR’s main mechanism for coherence and coordination in research capacity strengthening research capacity strengthening. It was established in 2008. It brings together UK funders and practitioners to share, learn, connect, and improve practice in research capacity strengthening. Its’ aims are to improve communications, coordination, networking, connections, and shared learning between capacity strengthening initiatives in the UK and to use shared learning and knowledge to improve practice and effectiveness of members’ research capacity strengthening work. UKCDR also has other core groups focused on disasters, health epidemics, and communications, respectively.
Overview and structure of collaboration

The European & Developing Countries Clinical Trials Partnership (EDCTP) is a public-public partnership between European and sub-Saharan African countries. It was established in 2003 with a vision to reduce the individual, social and economic burden of poverty-related infectious diseases in sub-Saharan Africa, by supporting collaborative research to develop accessible, suitable, and affordable medical interventions\(^9\). It also serves as an instrument used to bridge research and technical capacity in Europe in collaboration with African partners.

Members of the EDCTP association includes 14 European countries namely Austria, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, and United Kingdom; and 16 African countries namely Burkina Faso, Cameroon, Congo, Ethiopia, Gabon, The Gambia, Ghana, Mali, Mozambique, Niger, Nigeria, Senegal, South Africa, Tanzania, Uganda and Zambia. Angola and Switzerland participate as aspirant members of the EDCTP Association\(^\text{92}\). EDCTP has established MOUs for collaboration with CDC Africa and WHO Afro.

Coordination & Collaboration (C&C) model

EDCTP is a strategic co-funding partnership. It is legally established as an association and members are bound by the articles of association that guides how the collaboration works including its decision-making processes. It is governed by a General Assembly which has the principal responsibility to ensure that all necessary activities are undertaken to achieve the statutory objectives of EDCTP and that its resources are properly and efficiently managed. The voting members of the General Assembly are the countries participating in the EDCTP Association. The African Union, the European Union and the World Health Organization also send representatives as observers. The primary purpose of the collaboration is to fund clinical research for medical tools to detect, treat and prevent poverty-related infectious diseases in sub-Saharan Africa.

Perspectives on key organizational and operational attributes that facilitate effective collaboration

- **Formal structure:** The General Assembly is the main governing body of the organization. It entrusts the management of the Association and the oversight of the Secretariat to the EDCTP Association Board. The Board manages the organization and supervises the Secretariat on behalf of the General Assembly. Members are appointed by the General Assembly and serve a tenure of two years, renewable once. The Chairperson and up to two Vice-Chairpersons are appointed in function. They also act as the Chairperson/Vice-Chairperson(s) of the General Assembly. The Scientific Advisory Committee (SAC) is the main advisory body to the General Assembly and the Secretariat. The SAC together with the secretariat, develops the strategic framework for EDCTP and advises the General Assembly on technical and scientific matters relating to the EDCTP programme. It is made up of independent scientific experts from Europe and Africa. The Secretariat executes the activities of the organization.

- **Common processes to foster alignment (and inherent challenges):** EDCTP produces a business plan that all EDCTP partners agree to, providing a basis for stakeholder alignment prior to program commencement and execution. A consultative process is also undertaken at the start of the program through which key stakeholders including

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91 https://www.edctp.org/
92 Source: https://www.edctp.org/get-know-us/
scientists, policymakers, and others provide input to improve resource allocation. At these stakeholder meetings, several country representatives are scientists who represent themselves or their institutions, while other represent their countries in national capacity. Despite its formal structure, EDCTP still finds the process of securing buy-in and participation from national governments/public sector leadership in LMICs particularly challenging. A further challenging aspect of this process is managing the different priorities of the different member countries and establishing consensus around priorities.

Alignment slippages are operationally unavoidable especially when the EDCTP works with funders whose goals, timing of grants, etc. may not be entirely similar. The EDCTP leverages platforms like ESSENCE for Health Research to learn more about what other funders are doing and get more aligned with them. EDCTP also leverages platforms like the Coalition for Africa Research and Innovation (CARI), working to develop shared plans alongside other funders.

Other challenges include lack of a platform (beyond the EDCTP website) to share annual work plans, and a platform for capacity building data that EDCTP grantees can use to share information on their capacity building efforts and outcomes. The EDCTP is currently working to develop a more robust data collation and management system in conjunction with the UK, ready to use by December 2020. Also lacking is a tool that helps take inventory of where the scientists trained under the EDCTP program are, and how they are connected to the different national programs, etc. For example, the EDCTP partners with the African CDC to train epidemiology experts but relies on the Africa CDC to advise on public health institutes to partner with, in each country. Given that not all member states contribute in cash, the absence of a common framework for quantifying what member countries contribute ‘in kind’ hinders alignment. This information is necessary for EDCTP to make a stronger case to certain countries to do more in certain areas.

Notes on EDCTP & LMIC Research Capacity Strengthening (RCS)

EDCTP’s primary mandate is to support clinical research. This includes interventional clinical studies, phase I–III safety and efficacy studies/pharmacovigilance, post licensing effectiveness studies (pragmatic trials), and product-focused implementation research. It issues calls for proposals and the best groups/individuals win grants for research, mostly to be undertaken in sub-Saharan Africa where the highest disease burden lies. Capacity development/research capacity strengthening (both individual and institutional) is attached to these projects.

EDCTP’s research capacity strengthening efforts are aimed at:

- Research Infrastructure development.
- Building expertise and scientific leadership through Master’s, PhD, and fellowship programmes; and
- Strengthening the regulatory environment for research through the development of ethical review, legal, and regulatory capacities in sub-Saharan Africa to ensure clinical research is managed to the highest possible international standard.

Since 2014 EDCTP has spent 608.41m Euros on 271 projects:

- 529.04m Euros (89.95% of total spend) and 84 projects on collaborative clinical trials and clinical studies (HIV/AIDS, TB, malaria, lower respiratory tract infections, diarrheal diseases and neglected tropical diseases)
- 51.27m Euros (8.4% of total spend) and 37 projects on clinical research capacity strengthening activities. Within this category are efforts to strengthen regional networks (western, central, eastern, and southern Africa) with a focus on mentorship, capacity building, networking, etc.
- 31.10m Euros (5.1% of total spend) and 130 fellowships on Fellowship programmes.
EDCTP also funds several large research consortia, in which many capacity strengthening programs are embedded. In recognition of the need to strengthen national programs for research, it recently started a program in collaboration with the WHO Afro Region and the National Health Research Strengthening Program (NHRS). A barometer with a set of questions for how prepared a country is for doing research was developed. EDCTP goes through this survey with countries to assess current levels of capacity. It published (in BMC Global) a report with findings from this survey two years ago following a convening in Senegal, but this research gap survey work is currently on hold due to disruptions related to the global COVID19 pandemic. It also had a workshop last year with the African Union to discuss gender gaps and promote women in research. It actively stays involved in research capacity strengthening initiatives with like-minded organisations like the African Academy of Science.

EDCTP also supports international networking by promoting North–South, South–South and North–North networking and developing relationships with multiple private- and public-sector organizations in order to foster productive relationships between European and African individuals and institutions, concentrate efforts, promote efficiency and avoid duplication by aligning European and African funders, institutions and authorities; and attract investment from partners in the private, public and charitable sectors.

- Direction of future investments in RCS -

EDCTP is currently running a 10-year programme (2014 to 2024). The goals for this time horizon include the following:

- Fund at least 150 clinical trials
- Maintain or increase proportion of clinical trials with African leadership
- Fund at least 74 capacity building activities
- Maintain involvement of 31 African countries and add at least two new countries
- Provide personal support for at least 400 African researchers
- Ensure 80% of countries hosting clinical trials have functional ethics committees
- Ensure 50% of countries hosting clinical trials have functional regulatory bodies.
- Attract additional countries as EDCTP2 Participating States or partners.
- Increase contribution from sub-Saharan African countries to at least €30M
- Increase contribution from public or private partners to €500M

EDCTP recognizes capacity retention as a significant issue limiting research capacity strengthening and would support efforts aimed at developing strategies to improve capacity retention.
Overview and structure of collaboration

The Human Frontier Science Program (HFSP), was established in 1989, after being initiated in June 1987 by Prime Minister Nakasone of Japan. The initiators were Canada, the European Communities, France, Germany, Italy, Japan, the United Kingdom of Great Britain and Northern Ireland and the United States of America. It is implemented by the International Human Frontier Science Program Organization (HFSPO). The HFSPO is a unique international collaboration in frontier life sciences research. It promotes innovative, cutting edge research at the frontiers of the life sciences through international collaboration in the spirit of science without borders and for the benefit of humankind.93

The HFSPO is governed by the Board of Trustees with advice from the Council of Scientists and the Program is implemented by the Secretariat, headed by a Secretary-General. It is supported financially by voluntary contributions from its members, currently Australia, Canada, France, Germany, India, Italy, Japan, New Zealand, Norway, the Republic of Korea, Singapore, Switzerland, the United Kingdom of Great Britain and Northern Ireland, the United States of America and the European Commission.94

Coordination & Collaboration (C&C) model

The HFSPO is a strategic alliance legally set-up as an Association with international membership, governed by the local law on Associations applicable in the Haut-Rhin, Bas-Rhin, and Moselle (Articles 21 to 79 IV of the Local Civil Code), France. It is established to specifically promote, and fund basic research (across disciplines, not just health) focused on sophisticated and complex mechanisms of living organisms through international cooperation.

Perspectives on key organizational and operational attributes that facilitate effective collaboration

- **Formal structure:** HFSP is governed by a Board of Trustees which is the ultimate decision making body of the organization. Each member appoints one or two persons to represent it on the board. The President is the legal representative of HFSP and the Chair of the Board of Trustees and is responsible, with the assistance of the Secretary-General, for day-to-day management. The Board of Trustees meet annually. A Steering Committee is a Committee of the Board of Trustees that provides management oversight of HFSP. It is composed of the President, the two Vice-Presidents, and the Treasurer. The Council of Scientists provides independent scientific advice to the Board of Trustees. They are appointed by the Board of Trustees to serve for two years, renewable once for a further two years. The Secretary-General is an employee of HFSP. He or she is the head of the Secretariat and is appointed by and accountable to the Board of Trustees. The Secretariat comprises dedicated staff employed by the HFSPO. They deliver the program activities.

- **Operational flexibility to manage complexity** – Managing the alliance can be quite complex due to the number of partners and the diversity of their interests and respective organisational goals. Managing the research collaborations is also similarly challenging because different locations have different barriers to research. LMIC researchers for example can face challenges with logistics, infrastructure, accessing resources, while other countries

93 [https://www.hfsp.org/about/governance/hfspo-statutes](https://www.hfsp.org/about/governance/hfspo-statutes)
94 ibid
face bureaucracy, visa issues, travel, access, etc. The program addresses these complexities by providing the research teams with funding as a lump sum grant and allowing them complete flexibility in how they distribute and use their funds, enabling them to navigate specific challenges as they see fit. Flexibility is also ingrained in the strategic decisions related to what research to fund. HFSP does promote a specific agenda or an area of research. It funds basic research broadly, and its review committee members who select the projects for funding look for proposals that address basic questions in life sciences or address basic mechanisms of diseases. Emphasis is on funding frontier and high-risk research projects that would not be easily funded by other organizations, and supporting physicists, engineers, mathematicians, etc. to work with life scientists to bring new skills and perspectives to the life sciences.

- **Approach to defining/measuring success and impact:** Member countries define the success of HSFP by how good the research projects are, how successful they are in the long run, and how they lead to outputs and outcomes. They also look at how successful each country is in attracting researchers to their country and how successful researchers from their country are in getting funded. HFSP publishes annual reports about the projects that are funded. It conducts an international review on the organization itself, which is mostly focused on the outputs of HFSP funded research.

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**Notes on HFSP & LMIC Research Capacity Strengthening (RCS)**

HFSP has two core operational mechanisms, both of which involve capacity building activities:

1) Fellowship programs where individuals are selected to do 3-year post-doc fellowships in other countries; and

2) Grant scheme – wherein research groups from different countries together apply for funding to conduct research. The research grants can be used in multiple ways including to undertake research, hire/train scientists, send them to specific labs to get trained in new areas of research that contribute to the group’s work, etc. Focus is on innovative basic research with emphasis on novel and interdisciplinary approaches.

3) Career development to help former HSFP fellows develop and operate their own laboratory.

HFSP also fosters international collaborations through awardee meetings aimed at increasing interdisciplinary and intercontinental research collaboration, and scientific workshops used to achieve further engagement and capacity building towards the promotion of basic life science research.

- **Direction of future investments in RCS** -

HFSP’s capacity strengthening investments are embedded within its grants and fellowship programs. Its 2020 – 2022 strategy indicates an intent to continue to support the program of frontier life science research and international collaboration through the research grants (Program and Emerging Investigators) and fellowships (Long-Term and Cross-Disciplinary) schemes. It plans to increase the amount awarded to successful Research Grant and Fellowship applicants, in recognition of the growth in complexity, breadth and interdisciplinarity in the last three decades.

It plans to continue to use international peer review of the highest quality as the sole method of deciding which applications to recommend for funding. It also hopes to expand HFSP membership to other leading life science research countries, encouraging all countries with excellence in basic life science research to apply for membership.
Overview and structure of collaboration

The Belmont Forum was founded in 2009 as a partnership of funding organizations, international science councils, and regional consortia who recognized the need for international cooperation and co-ordination for advancing global international environmental change research. Belmont forum is driven by the ‘Belmont Challenge’ a vision that encourages ‘international transdisciplinary research providing knowledge for understanding, mitigating and adapting to global environmental change’.

The forum is made up of 29 funding agencies across 6 continents. Its projects are funded though the coordination of the individual members. Members are legally allowed to mobilize resources from national or international research funds and are engaged in activities that address the Belmont Challenge.

Coordination & Collaboration (C&C) model

The forum is a strategic alliance focused on interdisciplinary research in a specific domain (global environmental change).

Forum members and partner organizations in the alliance work collaboratively to meet the goals of the Belmont challenge by issuing international calls for proposals, committing to best practices for open data access, and providing transdisciplinary training.

Perspectives on key organizational and operational attributes that facilitate effective collaboration

- **Formal structure:** The forum benefits from having a structured governance, management, and operational architecture that is tailored to the nature of the collaboration. This consists of (1) members (funding agencies) that can mobilize national or international resources to support research aligned with the Belmont Challenge; (2) forum partners - organizations that subscribe to the Belmont Challenge, but do not fund research and/or do not meet the criteria for membership; and (3) a secretariat serves as the administrative arm of the forum and is tasked with carrying out decisions made during the plenary meetings. Governance is provided by a Steering committee with two co-chairs who are elected by members and serve for a 3-year renewable period. The forum’s organisational and operational structure also includes a Group of Program Coordinators (GPC) who are convened to coordinate and manage the forum’s grant making process.

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95 https://www.belmontforum.org/about/
96 They include the Inter-American Institute for Global Change Research (IAI, the Americas), Ministry of Science, Technology and Productive Innovation (MINCyT, Argentina), the Commonwealth Scientific and Industrial Research Organisation (CSIRO, Australia), the Austrian Science Fund (FWF, Austria), São Paulo Research Foundation (FAPESP, Brazil), Natural Sciences and Engineering Research Council of Canada (NSERC, Canada), National Natural Science Foundation of China (NSFC, China), Ministry of Science and Technology (MOST, Chinese Taipei), European Union Commission (EC), French Research Alliance for the Environment (AllEnvi, France), French National Agency for Research (ANR)/Ministry of Higher Education, Research and Innovation, German Research Foundation (DFG, Germany), Federal Ministry of Education and Research (BMBF, Germany), Ministry of Earth Sciences (MoES, India), National Research Council (CNR, Italy), Strategic Support Programme for Scientific Research (PASRES, Ivory Coast), Ministry of Education, Culture, Sports, Science and Technology (MEXT, Japan), Japan Science and Technology Agency (JST, Japan), National Council of Science and Technology (CONACYT, Mexico), the Dutch Research Council (NWO, Netherlands), Research Council of Norway (RCN, Norway), Qatar National Research Fund (QNRF, Qatar), National Research Foundation (NRF, South Africa), Swedish Research Council for Environment, Agricultural Sciences, and Spatial Planning (Formas, Sweden), Swedish Research Council (VR, Sweden), Thailand Science Research and Innovation (TSRI, Thailand), The Scientific and Technological Research Council of Turkey (TÜBİTAK, Turkey), Natural Environment Research Council (NERC, United Kingdom), and National Science Foundation (NSF, USA)
Members and partners of Belmont are bound by a Memorandum of Understanding (MoU). To ensure that members are aligned, members have to formally agree to contribute to Belmont Forum operations (with their work force, financial resources, and existing research and innovation investments, etc.), participate in collaborative research in conformity with the MOU, and contribute to the Belmont Forum secretariat, either through in-kind contribution or through an annual fee (defined on a yearly basis to support Secretariat staff and activities). All approved and verified member organizations have voting rights, are invited to all plenary meetings and closed sessions at those meetings, can lead and propose themes for collaborative research, and can serve on the Steering Committee. Forum partner organizations can work closely with the Forum as it develops its funding, training, and data agendas. Partners do not have voting rights but are invited to all plenary meetings and may participate in closed plenary sessions.

**Unique framework for collaboration:** The Collaborative Research Actions (CRAs) is a unique mechanism through which the forum forges alignment and synergy amongst members and partner organizations for the purpose of channeling resources towards specific research projects. It is at the very core of the forum’s strategy for collaborative research. CRAs are used to institute joint international calls for proposals in partnership with interested forum members and partner organizations. All Belmont members do not have to take part in every CRA, so participating members have a platform to coalesce around their common interests in the process of developing the CRA. Each CRA is developed and administered by a group of Program Coordinators (GPC) and the Thematic Program Office (TPO). The GPC is responsible for the implementation of the call and it comprises at least one member of each partner organization taking part in the CRA. The TPO is made up of 1 or 2 funding organizations leading the development and administration of the CRA. Because different organizations invest in different themes, the composition of the Group of Program Coordinators is different for each CRA.

Themes covered by CRAs have included Freshwater Security, Coastal Vulnerability, Food Security and Land Use Change, Climate Predictability and Inter-Regional Linkages, Biodiversity and Ecosystem Services, Arctic Observing and Science for Sustainability, and Mountains as Sentinels of Change. New themes are developed through a scoping process which builds on the outcomes of annual plenary meetings where research topics are determined. At the plenary, an idea is proposed, and the scoping review is conducted over a year through meetings, papers, and networking events. The outcome of the scoping review is presented at the next plenary meeting and voted upon.

Each proposal submitted to a CRA theme consist of a project co-developed by natural scientists, social scientists, and stakeholders that hail from at least three countries. Stakeholder is used in its broadest sense in CRAs, representing the potential to co-develop and co- implement projects with communities, policymakers, business and industry, unionized bodies, tribal organizations, non-governmental organizations, and many others. The research itself can take place within one or more countries anywhere in the world, but the team itself must be eligible for support from three funding organizations participating in the CRA.

Projects are advertised under the auspices of the forum and funding is done from a virtual pool – with each funding organization defining its own support as an annex to the CRA. While call texts are broad, members can provide specifics in its annexes. The Forum therefore provides one call and one peer review process, while each country funds its own researchers. To encourage more innovation and ensure high quality of research in all funded projects, training and research is intertwined across projects, the Forum also encourages cross country researchers to join other funders in other countries. This helps connect strong researchers that did not get funding to other research projects.

The key attributes in the forum’s collaboration model include flexibility, which enables it to work with a large number of countries on a CRA (the use of the country annexes particularly instrumental in this regard) and its embrace of a bottom-up approach that lets the community decide the best ways to answer the broad call questions. In addition, its use of theme-specific CRAs uniquely ensures that coalitions of the willing work together on specific themes and
projects. Collaboration is also enhanced by the resource agnostic nature of participation, wherein members and partner organizations are permitted to support CRAs in different ways with no minimum requirement.

Figure 14 – Belmont Forum – Organisation/Operational Structure

Notes on Belmont Forum & LMIC Research Capacity Strengthening (RCS)

Capacity building for translational research is an important objective of the forum, although its capabilities in this regard are still in an emerging phase, and its activity in LMICs is currently limited. The forum is looking to work more with entities that do more research capacity strengthening such as SIDA, Wellcome and IAIGCR and attract more support from LMIC organizations. It emphasizes the teaching of a transdisciplinary approach and through its e-Infrastructure and Data Management initiative, works to enhance the broader capacity to conduct transnational environmental change research.

97 https://www.belmontforum.org/about/#1491365122468-0e124fce-9fd34da7-4edf
98 https://www.bfe-inf.org/