



Funding and undertaking research during the first year of the COVID-19 pandemic: **COVID CIRCLE** lessons for funders

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GL  PID-R


UK Collaborative on
Development Research



This report provides specific recommendations for action by funders to improve the implementation of the Funders Principles both for the ongoing pandemic and for future epidemics and pandemics.



TABLE OF CONTENTS

1	EXECUTIVE SUMMARY	6
2.	INTRODUCTION	8
	2.1 Purpose	8
	2.2 Scope & aims	8
	2.3 Setting the scene	8
	2.3.1 Lessons learned from previous epidemics	9
	2.3.2 Funders principles for supporting high-quality research for the most pressing global needs in epidemics and	10
	2.4 This review	11
3.	THE FIRST YEAR OF THE COVID-19 RESEARCH FUNDING RESPONSE	16
	3.1 Overall timeline of LMIC-focused funding	16
	3.2 Funders of LMIC research	16
	3.3 International collaboration	23
	3.4 Institutions	25
4.	LESSONS LEARNT ON ENABLERS & CHALLENGES TO FULFILLING THE SEVEN PRINCIPLES	26
	4.1 Alignment to global research agendas and locally identified priorities - enablers & challenges	27
	4.1.1 Availability of research agendas and capacity for priority setting	27
	4.1.2 Partnerships & stakeholder engagement	28
	4.2 Research capacity for rapid research- enablers & challenges	28
	4.2.1 Rapid response & sustainable funding	28
	4.2.2 Funder policies & accountability	29
	4.2.3 Capacity strengthening	29
	4.3 Supporting equitable, inclusive, inter-disciplinary and cross-sectoral partnerships- enablers & challenges	30
	4.3.1 Inclusivity & interdisciplinarity	30
	4.3.2 Equity	30
	4.4 Open science & data sharing- enablers & challenges	31
	4.4.1 Policies into practice	31
	4.4.2 Infrastructure and capacity	32
	4.4.3 Research uptake	32

4.5 Protection from harm- enablers & challenges	32
4.5.1 Monitoring compliance	32
4.5.2 infection prevention & control	33
4.6 Appropriate ethical consideration- enablers & challenges	33
4.6.1 Rapid review	33
4.6.2 IP & data rights	33
4.7 Collaboration and learning through enhanced coordination	34
- enablers and challenges	
4.7.1 Research mapping	35
4.7.2 Convening	35
4.7.3 Promoting collaboration	35
4.8 Cross-cutting enablers and challenges and those	
identified beyond the funders principles	36
4.8.1 Cross-cutting barriers	36
4.8.2 Cross-cutting enablers	36
5. RECOMMENDATIONS FOR RESEARCH FUNDERS	37
5.1 Recommendations to funders for action	37
REPORT CONTRIBUTORS	39
ACKNOWLEDGEMENTS	40
REFERENCES	41

1. EXECUTIVE SUMMARY

It is essential that the global funders learn from the process of funding and undertaking research in the COVID-19 pandemic, both to inform ongoing responses within this pandemic and for future epidemics and pandemics. The COVID-19 Research Coordination and Learning Initiative (COVID CIRCLE) aims here to contribute to this through providing insights and recommendations to research funders, using evidence on the research response across both funders and researchers funding and undertaking research across low- and middle- income countries (LMICs).

As part of the development by UK funders of COVID-19 research aligned to the WHO Roadmap for the benefit of LMICs, the COVID CIRCLE initiative was established and delivered by the UK Collaborative for Development Research (UKCDR) and Global Research Collaboration for Infectious Disease Preparedness (GloPID-R). Through collaborative development while the Global Effort on COVID-19 (GECO) Health Research call (1) was being designed, a set of seven principles were developed by UKCDR, to help align research funders towards a coordinated effort for supporting high-quality research particularly important in times of epidemics and pandemics ('the Funders Principles') (2).

These principles build on best practice guidance from many stakeholders and were intended to set standards which would accelerate and improve research outputs. The commitments set out in the principles aim to ensure outputs are shared rapidly to enable consolidation and review, which in turn will inform policy and practice during the COVID-19 pandemic, and for future epidemics or pandemics.

Many examples of effective and innovative research funding and research practice in line with the principles have taken place during the COVID-19 pandemic to date. However, key challenges remain, which will require policy and funding innovation and sustained investment. Funding for COVID-19 research studies across LMICs has been thinly spread, with few multi-country research projects globally. This has resulted in a proliferation of heterogeneous small studies with limited impact for populations in LMICs (3). This has been compounded by equity issues relating to access to the products of globally funded research.

This report provides specific recommendations for action by funders to improve the implementation of the Funders Principles both for the ongoing pandemic and for future epidemics and pandemics. The learning in this report is framed around the COVID CIRCLE 'Funders Principles for Supporting High-Quality Research for the Most Pressing Global Needs in Epidemics and Pandemics'(2).

Lessons Learned

- The global research response to COVID-19 over the first year of the pandemic was unprecedented, with the UKCDR & GloPID-R COVID-19 Project Tracker capturing, as of 15th April 2021, 10,608 projects, funded by 201 funders, taking place across 142 countries, representing an investment of at least \$4.7 billion. Whilst there are limitations in the capture of this funding data limiting the conclusions that can be drawn (as detailed in the methodology), it indicates majority of funded research projects are taking place in High Income Countries, although the global distribution of funding has been shifting with greater international and domestic funding captured for research across LMICs
- Funder relationships and partnerships built during inter-epidemic periods are most easily activated during emergencies (eg. GloPID-R and WHO efforts on the COVID-19 R&D Roadmap; UKCDR and GloPID-R efforts on COVID CIRCLE).
- Both funders and researchers appreciated the early development of the WHO Blueprint & GloPID-R COVID-19 Research Roadmap priorities (4), although the delayed and in some cases lack of regionally developed research priorities hindered their ability to align both funding and research to these.
- Many funders faced multiple barriers to funding research rapidly in the pandemic (which were exacerbated when funding LMIC partners) and lessons can be learned from those who overcame these. Rapid funding was most easily facilitated through supplementing existing funded research activities and harnessing longstanding researcher partnerships and capacity.
- Researchers stated the major barrier to their research during the pandemic was rapid (or pre-existing) access to funding and suitable research capacity. Rapid research was enabled where pre-existing partnerships and some level of funding were already in place.
- Funders and researchers recognised the need for greater support for open science and data sharing practices in epidemics through ensuring trustworthy and equitable approaches which have the buy-in and support of LMICs. This was highlighted as an ongoing challenge by researchers working on COVID-19 across LMICs.
- Greater global funder collaboration is needed including joint funding to ensure that high-quality multi-country studies can be funded to address research needs during pandemics.

2. INTRODUCTION

2.1 PURPOSE

Facilitating learning from COVID-19 for research funders to improve future responses to epidemics and pandemics, in alignment with the COVID CIRCLE 'Funders Principles for Supporting High-Quality Research for the Most Pressing Global Needs in Epidemics and Pandemics'(2).

2.2 SCOPE & AIMS

This learning is framed around the agreed 'Funders Principles for Supporting High-Quality Research for the Most Pressing Global Needs in Epidemics and Pandemics' (see Section 2.3.2). We have taken a global view, with a LMIC focus. Evidence has been incorporated from the research response over the first year of the pandemic (until March 2021).

Aims

- Explore barriers and enablers to COVID-19 research funders fulfilling the Funder Principles for funding high quality research for the most pressing global needs in epidemics and pandemics.
- Identify potential enablers or windows of opportunity for the translation of the Funder Principles into practice within the ongoing research response for the COVID-19 pandemic in LMICs and for future epidemics and pandemics.

This report has been produced by synthesising data collected by the **COVID CIRCLE** team from January-June (2021) involving funder and researcher surveys; group consultations; key informant interviews and analysis of the data in the UKCDR & GloPID-R COVID-19 Project Tracker. This report focusses on implementable recommendations to the UKCDR and GloPID-R funders. These recommendations may also be of interest to other stakeholders including funders, policy makers and researchers beyond these networks. Recommendations focus on those principles where evidence was available, and further work will be necessary regarding certain principles (beyond the timeline of this report).

2.3 SETTING THE SCENE

Research funders have recognised the need to coordinate research funding during epidemics for many years, and this is the basis on which the **Global Research Collaboration for Infectious Disease Preparedness** (GloPID-R) was formed in 2013 by the European Commission and Heads of International Biomedical Research Organisations (HIROs) (5). GloPID-R is a global alliance of research funding organisations formed to facilitate coordinated research related to new and emerging infectious diseases with epidemic and pandemic potential. Since 2014 GloPID-R has mobilised and demonstrated the value in coordinating prioritisation and research funding during outbreaks including Ebola (2014-15 & 2018-19), Zika (2015-16), Lassa (2018), COVID-19 (2020-onwards). GloPID-R has achieved this through a variety of different mechanisms

including convening global members to identify research priorities, fostering joint funding partnerships and knowledge sharing (see: <https://www.glopid-r.org/our-work/>).

The World Health Organisation (WHO) Research & Development (R&D) Blueprint is a complementary global strategy and preparedness plan, allowing rapid direction for research and development activities during epidemics. The Blueprint team emerged in 2016 following the 2014-15 West Africa Ebola epidemic, building on the success of the highly effective vaccine development but aiming to address some of the gaps that were apparent in the global research response effort. The R&D Blueprint intends to develop an R&D roadmap for its list of priority diseases to guide the research effort.

Early in the COVID-19 pandemic the World Health Organisation (WHO) and GloPID-R convened the 'Global Research and Innovation Forum: Towards a Research Roadmap for the 2019 Novel Coronavirus meeting on February 11-12, 2020, resulting in the 'Coordinated Global Research Roadmap: 2019 Novel Coronavirus' (4) (WHO Roadmap), an unprecedented document for global research collaboration. Recognising the need for visibility of the aligned research funding response to address the priority areas identified in the WHO Roadmap, the **UK Collaborative on Development Research (UKCDR)** partnered with GloPID-R to launch the COVID-19 Research Project Tracker (6) on April 3 2020. The tracker maps newly funded (and repurposed) COVID-19 projects to the WHO Roadmap, allowing visibility of the funded research portfolio and its alignment to the identified research needs to deliver a more effective and coherent global research response.

The urgency and global scale of the research needs and response have been difficult to coordinate. There was particular concern that due to national research resource limitations in LMICs an uncoordinated approach could lead to a failure to address local research needs, failure of research to inform policy or unsustainable research capacity to respond to future outbreaks. The **UKCDR Epidemics Preparedness and Response Group** (in particular DHSC and MRC/UKRI who were setting up the joint GECO call (1) and Wellcome) and GloPID-R recognised the need to facilitate collective efforts for LMICs research and developed a set of Funders Principles to support high-quality research for the most pressing global needs in epidemics and pandemics and formed the initiative for **COVID-19 Research Coordination and Learning (COVID CIRCLE) Initiative** in August 2020 (2).

A key component of the COVID CIRCLE initiative was ongoing learning from the research response with a focus on LMICs. Here we present that learning from the first year of the COVID-19 research response.

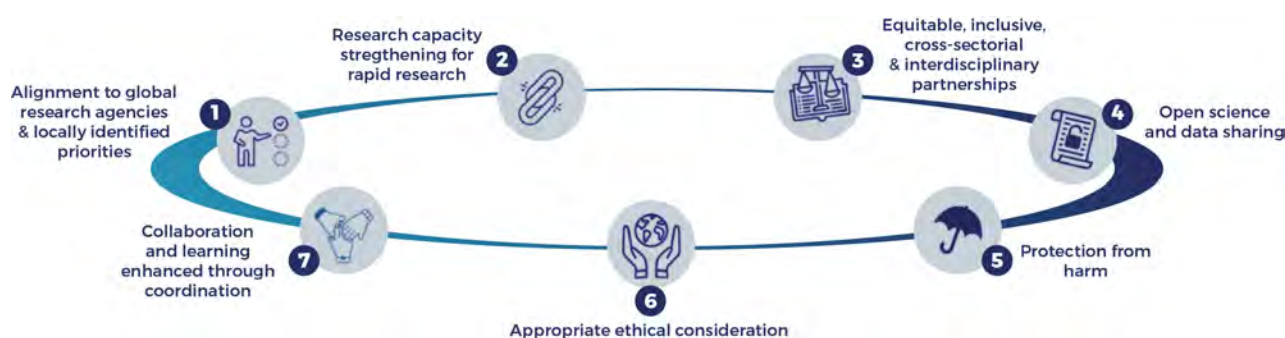
2.3.1. LESSONS LEARNED FROM PREVIOUS EPIDEMICS

Research funders have rapidly supported repurposing of existing studies and launched rapid funding calls to support research. Lessons in expediting research have been learned from undertaking research in the recent Democratic Republic of Congo Ebola outbreaks and West Africa Ebola, Zika and SARS epidemics. The COVID-19 pandemic has however led to unprecedented needs and challenges for coordination and resourcing of research in LMICs. Whilst research funders had learnt from research responses to a range of recent epidemics in LMICs, these lessons were not necessarily found to be fully transferable to the situation of a global pandemic, where research could be undertaken around the world.

At the outset of the COVID-19 Pandemic research funders recognised the need to coordinate COVID-19 research funding at all levels to prevent duplication and improve impact and that this would be particularly important in resource constrained environments. Funders such as EDCTP and the UK DHSC with MRC/UKRI launched early calls specifically to address the WHO Roadmap in LMICs. UKCDR and GloPID-R therefore agreed to a set of principles to align research funders towards a coordinated effort for supporting high-quality research for the most pressing global needs in epidemics and pandemics ('the Funders Principles').

These principles built on the substantive prior policy work by GloPID-R on research epidemic preparedness, relating to data sharing (7), clinical research (8) and social sciences (9) research combined with best practice for research with LMICs by UKCDR, ESSENCE, TDR and others (linked below) as well as the EDCTP and GECO call development.

2.3.2 FUNDERS PRINCIPLES FOR SUPPORTING HIGH-QUALITY RESEARCH FOR THE MOST PRESSING GLOBAL NEEDS IN EPIDEMICS AND PANDEMICS



These principles were developed in July 2020 (2) and are proposed for endorsement by research funders, donors, governments or any other entities supporting research to address the most pressing global needs on COVID-19 and for future epidemics and pandemics (collectively referred as "the funders"). The core principles are intended to be applicable for any epidemic and additional points of relevance for COVID-19 are indicated with an asterisk.

Principle 1. Alignment to global research agendas and locally identified priorities

To consider global research priorities, such as proposed by the World Health Organisation (WHO) and other multilateral entities or regional bodies such as the African Union, as well as local research priorities, in addition to funder strategic priorities, when funding research for global benefit.

[The WHO R&D Blueprint](#) (10) was developed to help guide the research response for epidemics and pandemics and alignment with this and associated research roadmaps developed for a coordinated response focusses the funds available. It is recognised that certain global research priorities (or additional priorities) may be of particular relevance for research in resource limited settings and consideration of locally identified priorities should also be reflected in the funding process.

** For COVID-19 the [WHO Research Roadmap for COVID-19](#) (4) has been developed by the [WHO R&D Blueprint](#) (10) team building on consensus from global researchers to help guide the research response for COVID-19**

Principle 2. Research capacity for rapid research

a. To build upon existing research capacity and systems, where available.

For research to inform the health, economic and social policy and public health response in an ongoing epidemic or pandemic (or future outbreaks of the same pathogen) it needs to be implemented as rapidly as possible. Funders recognise that building on existing research capacity, platforms and systems is the fastest way to ensure high quality research is conducted and knowledge exchanged and that the long-term impacts of epidemics and recovery are addressed. Incorporation of epidemic relevant research questions into existing research studies (for example cohorts and clinical research networks) will be encouraged where possible, applicable and appropriate, to gain benefits from both rapid research activation, knowledge mobilisation and pre-existing relevant data.

b. To support capacity strengthening necessary for the research.

Funders recognise the need for strengthening research capacity in particular in resource limited settings and will consider the sustainability of any newly funded research capacity and whether it could be embedded for rapid activation in future outbreaks. Relevant guidance is provided by the work of the [ESSENCE Group](#) (11) including the [ESSENCE Good Practice Document on Capacity Strengthening](#) (12).

Principle 3. Equitable, inclusive, cross-sectoral and interdisciplinary partnerships

a. To support equitable partnership throughout the research process.

Equitable partnerships are needed to ensure successful, embedded research, which is locally relevant. Partnerships supported should be informed by relevant guidance such as [UKCDR's Equitable Partnership Principles](#) (13); [COHRED's](#) Research Fairness Initiative and Fair Research Contracting (14), and the Commission for Research Partnerships with Developing Countries (KFPE) [11 Principles for Research Partnership](#) (15).

** Funders may additionally support the aspiration that any new vaccines, diagnostics, and treatments developed for COVID-19 are globally available, appropriate, and affordable, regardless of where they have been developed or who has funded them, aligned with the [Global Collaboration ACT Accelerator](#) (16). **

b. To promote inclusive and cross-sectoral partnerships to ensure that research is most likely to impact policy and practice.

Inclusivity is needed to ensure consideration of vulnerable or marginalised groups in the research agenda. Public and community engagement plays a particularly important role in achieving and maintaining trust for research within communities for research during outbreaks, informed by guidelines such as the [UNAIDS Good Participatory Practice Guidelines for Biomedical HIV prevention Trials](#) (17).

Research partnerships should demonstrate that community and public engagement has taken place and will continue to do so.

Cross-sectoral partnerships across communities, government, public health and non-governmental organisations all help to ensure that the research funded is most likely to impact policy and practice for the relevant government and public health organisations.

c. To promote interdisciplinary research

The importance of interdisciplinary partnerships for relevant and effective research in epidemics has been highlighted, including through the joint work of the [UK Academy of Medical Sciences](#), UK Medical Research Council and InterAcademy Partnership (18).

Principle 4. Open science and data sharing

To require that research findings and data relevant to the epidemic are shared rapidly and openly to inform the public health response.

Rapid research findings, data sharing and open access publishing can accelerate health benefits through; facilitating research projects; reducing the duplication of work; and ensuring a clearer picture of the disease through pooled results to improve intervention effectiveness. Funders will be informed by relevant guidance such as the [GloPID-R Roadmap for Data Sharing](#) (7) (in particular, the guidance on grant conditions requiring rapid sharing of quality assured data and development and review of data management plans in alignment with the [FAIR Guiding Principles](#) for scientific data management and stewardship (19) as well as the associated [GloPID-R Principles of Data Sharing in Public Health Emergencies](#) (Timely, Ethical, Accessible, Transparent, Equitable, Fair, Quality) (20).

** For COVID-19 the joint statement on [Sharing research data and findings relevant to the novel coronavirus \(COVID-19\) outbreak is pertinent](#)* (21)*

Principle 5. Protection from harm

To take all reasonable steps to anticipate, mitigate and address harm to those involved with research funded.

Everyone involved in the research chain, from research funders, planners and practitioners to local community members, has the right to be safe from harm. Funders working in international development research will be informed by guidance such as [UKCDR's guidance on safeguarding in international development research](#) (22).

** For COVID-19 there is a companion piece on practical application of the [UKCDR safeguarding guidance during COVID-19](#) (23).**

Principle 6. Appropriate ethical consideration

To ensure appropriate ethical consideration is embedded throughout research conducted, in particular regarding access to the products of research.

Ethics should be at the heart of funding decision-making and considered throughout the research, including informing approaches to ensure that the optimal value is being obtained from the research for all parties involved. Relevant guidance is provided by the Declaration of Helsinki International Ethical Guidelines for Health-related research involving humans by the Council for International Organizations of Medical Sciences (CIOMS) , [Nuffield Bioethics for public health emergencies – recommendations](#) (24) and [The Global Code of Conduct for Research in Resource-Poor Settings](#) (25).

* For COVID-19 the [WHO Ethical Standards for research During Public Health emergencies: Distilling Existing Guidance to Support COVID-19 R&D](#) (26) is pertinent. *

Principle 7. Collaboration and learning enhanced through coordination

Coordination to ensure maximum impact of investments for research on the most pressing global needs for epidemics through cross- funder and cross- researcher collaboration learning and evaluation.

a. To map research funded, use these data to enhance coordination, and ensure it is publicly available.

Maximising the value of research investments requires accessible, comprehensive and coherent information on what and where others are investing to help identify funding gaps or duplication and inform or direct future investments. Research funded needs to be mapped publicly, for example through [World Report](#) (27).

For COVID-19 the [COVID-19 Research Project Tracker by UKCDR & GLOPID-R](#) (6) is pertinent. The Research Project Tracker is aligned with the [WHO Research Roadmap for COVID19](#) (4) to facilitate informed decision making and targeting of funds where there is need.

b. To foster collaboration between studies funded in epidemics and facilitate shared development of research protocols, data collection tools, data sharing and exchange of knowledge.

Collaboration between researcher communities can facilitate trust, foster new partnerships and improve research outcomes and their impact. Where relevant, funded researchers will be supported to embed in relevant or, co-create communities of practice or an equivalent that promote shared development of research protocols, data collection, purpose driven data and results sharing.

c. To where relevant to embed operational research and support impact evaluation across funded projects to learn from and improve future funder and researcher responses for epidemics.

Conducting research during epidemics is still a relatively new endeavour and it is important to embed operational research (research on research) and impact evaluation where relevant. In particular, this should aim to identify how the research response can be improved, including how to overcome barriers to achieving the Funder Principles outlined here (building on prior work undertaken by GloPID-R and GOARN Research such as the [PEARLES review](#) (28) and [GloPID-R Roadmap for Data Sharing](#) (7).

2.4 THIS REVIEW

The purpose of this review is to improve the implementation of the 'Seven Funders Principles for Supporting High-Quality Research for the Most Pressing Global Needs in Epidemics and Pandemics' for the ongoing COVID-19 pandemic and for future epidemics and pandemics.

The scope of this review focusses on implementable recommendations to global research funders (in particular members of the UKCDR and GloPID-R funders groups). These recommendations will also be of interest to other stakeholders including non-member funders, policy makers and researchers.

This review has been produced through synthesising the challenges to fulfilling the Funders Principles and potential solutions identified through the following means, by the COVID CIRCLE team over the last six months:

- COVID CIRCLE Living Mapping Review and additional 'vertical' analyses from the UKCDR & GloPID-R COVID-19 Project Tracker.
Full details available as Annex B.
- A funders survey (open 1st February to 15th March 2021) and funders group consultations (between 21st February and 22nd April 2021).
Full details available as Annex C.
- A researchers survey (open 20 March- 23 April 2021) and researcher group consultation (23 June).
Full details available as Annex D.

Challenges and potential solutions are mapped against the 'Funders Principles' and recommendations for improved practice are provided. We also provide case-studies (Annex A) to demonstrate examples of best practice in research funding against a range of the Principles.

3. THE FIRST YEAR OF THE COVID-19 RESEARCH FUNDING RESPONSE

The COVID-19 Research Project Tracker (6) was launched on April 3rd, 2020 in a joint effort by UKCDR and GloPID-R to further coordinate and synergise the funding of COVID-19 research to address the WHO Roadmap priority areas. The tracker is a live database of funded research projects across the world related to the current COVID-19 pandemic – including both newly funded and re-purposed research projects coded against the WHO Roadmap.

In order to facilitate interpretation of the tracker data, COVID CIRCLE established a Living Mapping Review (LMR) on Wellcome Open Research to provide three-monthly analyses across the tracker data (9). The LMR provides an overview of the full database, giving a comprehensive picture of the research funding response from the data available in the tracker.

The full methodology and limitations of the database are outlined in the LMR, however it is important to reiterate here that the comprehensiveness of the tracker is limited to the funders that have either provided data for the tracker, or had their data extracted from online sources (if available) and is further limited by the quality of that available data. In this respect, there were challenges in engaging with (and obtaining data from) health research funders beyond existing networks, either due to a lack of contacts or capacity from funders to contribute to the project (especially for funders whose award information is not in English such as China). This therefore means that the analysis presented below needs to be interpreted with caution, due to the many limitations. Additionally, the tracker does not contain information from industry.

The latest version (30), published on 1st July 2021 shows that, as of 15th April 2021, the database contained 10,608 projects funded by 201 funders taking place across 142 countries – representing an investment of at least \$4.7 billion. The majority of research funded aligns well to the WHO Roadmap Priorities, however low levels of funding for ‘Ethics considerations for research’ and ‘Animals and environmental research’ persist. In addition, the majority of funded research projects are taking place in High Income Countries, although the global distribution of funding has gradually been shifting with greater international and domestic funding captured for research across LMICs. However, many research gaps remain in LMICs including health systems, optimal personal protective use, health care worker support and community engagement. The LMR also shows that research is being funded beyond the remit of the WHO Roadmap, specifically relating to broader vaccine research, social sciences disciplines (policy and economy; education; logistics; and food security) and environmental research. In some cases, funders and researchers are increasingly starting to focus on recovery (rather than response) and COVID CIRCLE is now mapping the COVID-19 tracker data to the ‘UN Research Roadmap for the COVID-19 Recovery’ to capture this work better. Full details of this analysis are available in our ‘Living Mapping Review for COVID-19 funded research projects: nine-month update’ (30).

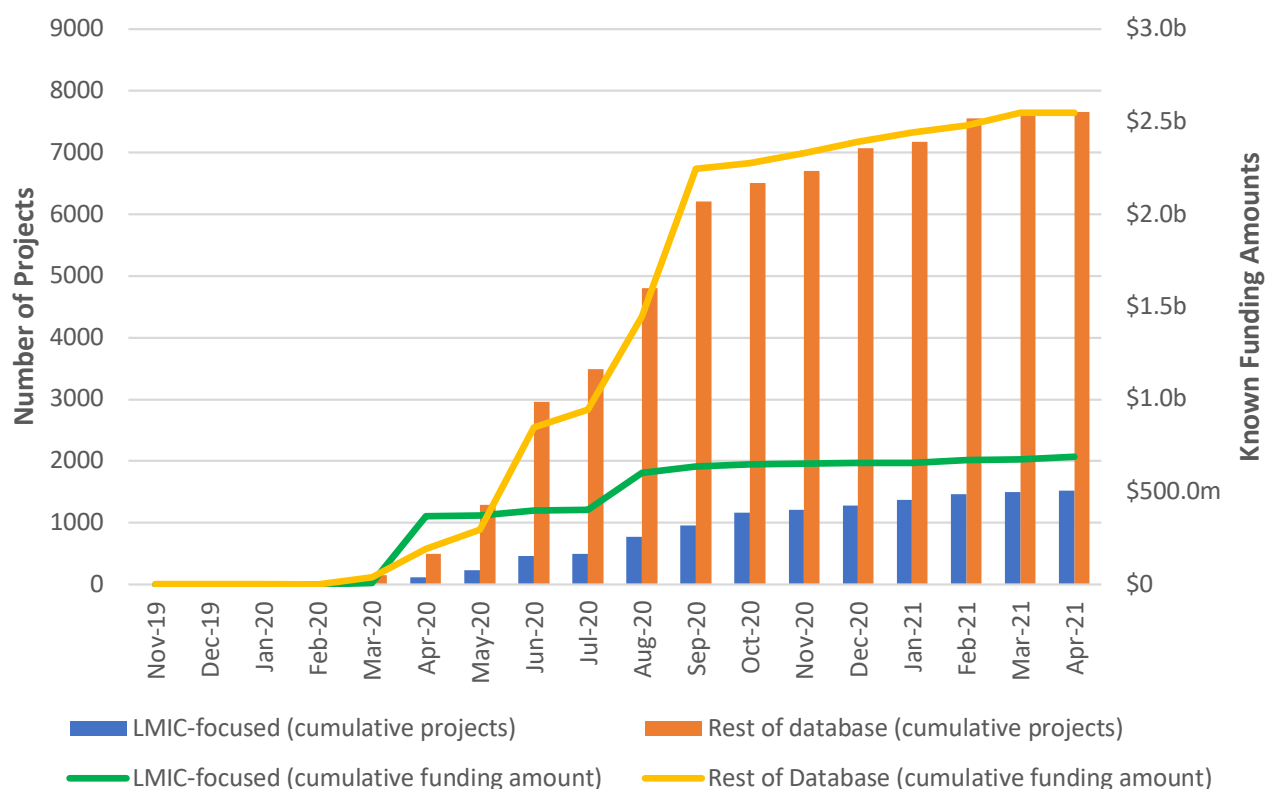
This report undertakes supplementary analyses on that same data set, with a focus on LMIC based (and 'LMIC-focused') research (defined as any research project that is taking place in at least one LMIC, even where this is in collaboration with HICs). These analyses specifically contribute to our learning in relation to the extent to which the Funders Principles may have been applied over the first year of the research response. Highlights are presented below, and the full analysis is available in the Annex.

3.1 OVERALL TIMELINE OF LMIC-FOCUSED FUNDING

To understand the (approximate) timeline of the research response to the pandemic, Figure 1 displays data on the publication date of award information by funders (where available). The increase in the number of LMIC-focused projects was greatest in August 2020 (276 projects) – two months after the peak increase for the rest of the (non-LMIC-focused) database in June 2020 (1,678 projects). Figure 1 also shows that a greater proportion of LMIC-focused data was added to the tracker in the final six months under consideration (November 2020 - April 2021) compared to the rest of the database.

In terms of funding amounts, while Figure 1 shows that the greatest increase for LMIC-focused projects took place in April 2020 (\$28.2m), five months prior to the greatest increase experienced for the rest of the database (\$841.3m in September 2020), it is worth reiterating the issues with the completeness of the financial information. Specifically, financial information could only be obtained for 59.2% of the projects in the entire database. This figure is reduced to 45.1% when only considering LMIC-focused projects. With less than half of the LMIC-focused projects having financial information, greater emphasis in this analysis is therefore placed on the number of projects.

Figure 1 – Cumulative number of projects and known funding amounts by publication date of award information of projects on tracker



Note for Figure 1: Financial information available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects). Publication date available for 86.5% of projects in entire database (88.9% for LMIC-focused projects).

3.2 FUNDERS OF LMIC RESEARCH

A total of 102 funders based in 35 countries have funded LMIC-focused COVID-19 research. Looking at the timeline (Figure 2), Canadian funders were the first to fund LMIC-focused COVID-19 research– collectively responsible for 82.1% of all funded LMIC-focused projects by March 2020. More specifically, Figure 2 shows the Canadian Institutes of Health Research (CIHR) and the International Development Research Centre (IDRC) alone accounted for 67.9% of all funded LMIC-focused projects by this time.

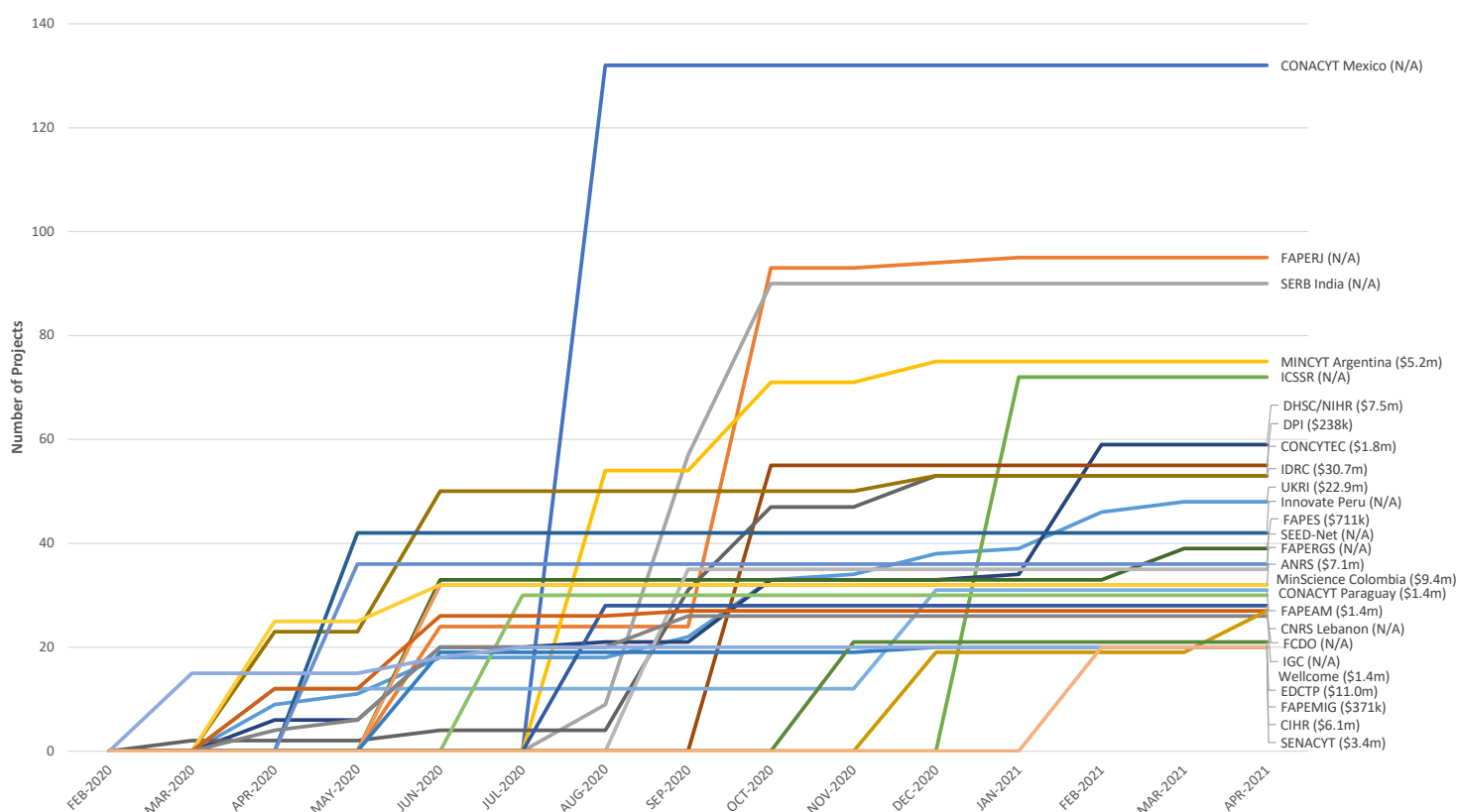
To understand the thematic nature of the research funded by the ten funders with the greatest number of LMIC-focused research, table 1 summarises their portfolios, respectively, against the WHO priority areas. Notably, the top two priority areas for each of the ten funders included in table 1 were either the priority area of ‘Social sciences in the outbreak response’ or ‘Virus: natural history, transmission and diagnostics’. At the other end of the spectrum, less than half of the funders in table 1 funded any projects under the ‘Animal and environmental research on the virus origin, and management measures at the human-animal interface’ priority area, with only half funding any research relevant to either ‘Candidate vaccines R&D’, or ‘Ethics considerations for research’.

Figure 3 restricts the analysis by displaying which funders based in high-income countries (HICs) awarded the greatest number of LMIC-focused research to understand the international research response to the challenges of the pandemic faced by LMICs.

Four of the 16 funders included in Figure 3 have demonstrated an active and significant commitment to funding research addressing challenges relating to COVID-19 in LMICs throughout the time period under consideration, having awarded projects in at least 5 different months. At a national level, funders based in the UK awarded 222 LMIC-focused projects – the most of any HIC (accounting for 13% of all LMIC-focused projects), followed by funders based in Canada (5.2%), France (5.0%) and the United States (3.5%).

When looking at the LMIC-focused portfolio of these funders (Table 2), research projects are typically more concentrated on a smaller number of WHO priority areas compared to the portfolio of funders based in LMICs (Table 1).

Figure 2 - Timeline of funders awarding the greatest number of LMIC-focused research projects by date of publication of award information. funding amounts indicated in brackets*.



Minimum 20 LMIC-focused research projects with database date information.

Note for Figure 2: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects). Publication date available for 86.5% of projects in entire database (88.9% for LMIC-focused projects).

**Funding amounts for individual organisations do not account for co-funding between multiple organisations as no information was provided on how funding amounts were divided between the co-funding organisations.*

Table 1 - Portfolio by WHO priority area of top 10 funders of LMIC-focused research.

Numbers shaded in grey indicate the WHO Priority Area with the greatest number of projects for that funder.

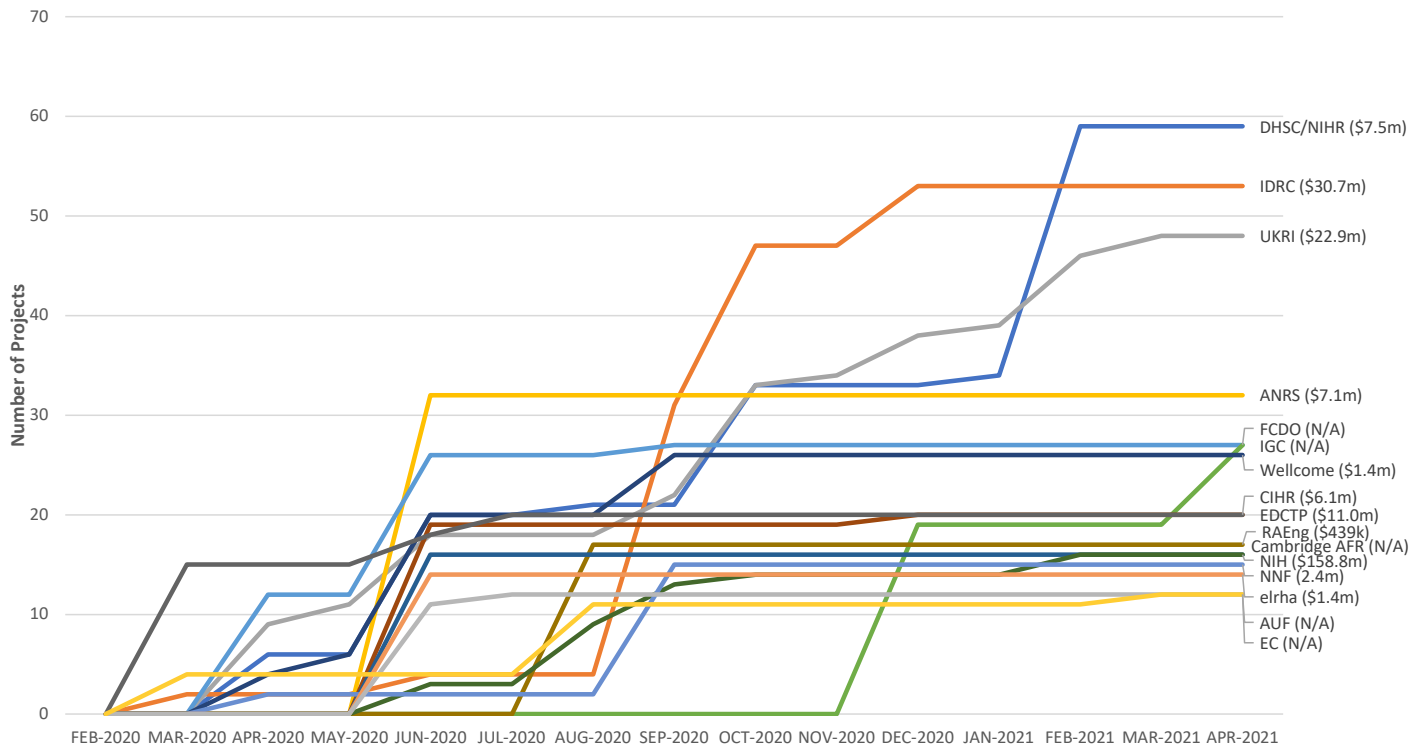
	Virus: natural history, transmission and diagnostics	Animal and environmental research	Epidemiological studies	Clinical characterization and management	Infection prevention and control	Candidate therapeutics R&D	Candidate vaccines R&D	Ethics considerations for research	Social sciences in the outbreak response	TOTAL LMIC - focused Projects
CONACYT Mexico	38	1	14	17	15	12	4	2	42	132
FAPERJ	34	2	14	38	4	17	3	0	6	95
SERB India	28	0	30	9	11	24	2	0	2	90
FAPESP	34	0	7	45	3	22	6	0	10	78
MINCYT Argentina	21	2	11	17	17	7	0	0	15	75
UKRI	17	2	15	7	10	3	1	2	42	74
ICSSR	0	0	0	3	8	0	0	2	59	72
DHSC/NIHR	8	0	10	3	15	2	0	2	42	59
DPI - Universidade de Brasilia	5	0	6	5	6	4	0	1	25	55
IDRC	1	0	6	5	5	1	0	0	48	55

Note for Table 1: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

Abbreviations and acronyms:

- CONACYT** - Consejo Nacional de Ciencia y Tecnología
(Mexico National Council of Science and Technology);
- DHSC** - Department of Health and Social Care (UK);
- DPI** - Decanato de Pesquisa e Inovação (Dean of Research and Innovation);
- FAPERJ** - Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro
(Research Foundation of the State of Rio de Janeiro);
- ICSSR** - Indian Council of Social Science Research;
- IDRC** - International Development Research Centre;
- MINCYT** - Ministerio de Ciencia, Tecnología e Innovación
(Argentina Ministry of Science, Technology and Innovation);
- NIHR** - National Institute for Health Research;
- SERB** - Science and Engineering Research Board;
- UKRI** - UK Research and Innovation.

Figure 3 - Timeline of funders based in high-income countries awarding the greatest number of LMIC-focused research projects by date of publication of award information. Funding amounts indicated in brackets*.



Minimum 10 LMIC-focused research projects with database date information.

Note: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects). Publication date available for 86.5% of projects in entire database (88.9% for LMIC-focused projects).

**Funding amounts for individual organisations do not account for co-funding between multiple organisations as no information was provided on how funding amounts were divided between the co-funding organisations.*

Table 2 – Portfolio by WHO priority area of top 10 funders based in high-income countries of LMIC-focused research.

Numbers shaded in grey indicate the WHO Priority Area with the greatest number of projects for that funder.

	Virus: natural history, transmission and diagnostics	Animal and environmental research	Epidemiological studies	Clinical characterization and management	Infection prevention and control	Candidate therapeutics R&D	Candidate vaccines R&D	Ethics considerations for research	Social sciences in the outbreak response	TOTAL LMIC - focused Projects
UKRI	17	2	15	7	10	3	1	2	42	74
DHSC/NIHR	8	0	10	3	15	2	0	2	42	59
IDRC	1	0	6	5	5	1	0	0	48	55
ANRS	4	4	12	5	2	2	0	0	11	35
FCDO	2	0	5	1	7	0	0	1	20	28
Wellcome	4	0	8	2	6	5	1	3	14	28
IGC	0	0	1	0	1	0	0	0	27	27
EDCTP	12	0	11	7	1	1	2	0	1	23
CIHR	3	1	5	4	1	1	0	0	10	20
Institut Pasteur	7	2	8	4	1	0	0	0	0	17
RAEng	2	0	0	4	6	0	1	0	6	17

Note for Table 2: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMI -focused projects).

Abbreviations and acronyms:

- ANRS** - Agence nationale de recherche sur le sida et les hépatites virale (National Agency for AIDS Research);
- CIHR** - Canadian Institutes of Health Research;
- DHSC** - Department of Health and Social Care (UK);
- EDCTP** - European & Developing Countries Clinical Trials Partnership;
- FCDO** - Foreign, Commonwealth and Development Office;
- IDRC** - International Development Research Centre;
- IGC** - International Growth Centre;
- NIHR** - National Institute for Health Research;
- RAEng** - Royal Academy of Engineering;
- UKRI** - UK Research and Innovation.

3.3 INTERNATIONAL COLLABORATION

Of the more than 10,500 projects in the tracker being conducted in 142 countries, available data suggests that only 425 projects (4.0%) take place across multiple countries, thereby making them ‘multi-country projects’. Although likely an underestimation, due to variability in reporting this level of detail, this does indicate low levels of ‘multi-country projects’ during the pandemic. However, the data also suggests that projects taking place across multiple countries mostly involve at least one LMIC (62.8% of multi-country projects), as indicated in table 3. Looking at collaborations across income groups, while table 3 suggests that the most common type of cross-income group collaboration occurs between HICs and middle-income countries (MICs), collaborations with the least developed and low-income countries occurred more frequently with MICs rather than HICs.

Table 3 - Summary of types of multi-country collaborations

TYPE OF MULTI-COUNTRY COLLABORATION	NUMBER OF PROJECTS
Any multi-country collaboration	425
At least one LMIC	267
At least one LMIC and at least one high-income country	153
At least one least developed and/or low-income country and at least one high-income country	42 (21 when excluding projects that also focus on a middle-income country)
At least one middle-income country and at least one high-income country	132 (111 when excluding projects that also focus on a least developed and/or low-income country)
At least one least developed and/or low-income country and at least one middle-income country	81 (60 when excluding projects that also focus on a high-income country)





















Note for Table 3: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

The top funders of the 425 multi-country projects are displayed in Table 4. Of these, 8 projects were pre-existing and explicitly repurposed for COVID-19 (although many more may have been linked to pre-existing funding). In total, 70 organisations have funded multi-country projects (which is reduced to 46 when only considering LMIC-focused research) and 90% of those are based in HICs. Across those funders with at least one multi-country project, on average, 52.7% of the portfolio is LMIC-focused. However, when only considering funders that have multi-country projects that involve at least one LMIC, the average proportion of the portfolio that is LMIC-focused increases to 80.1%.

Table 4 - Top-10 funders of multi-country projects and LMIC-focused multi-country projects by number of projects

FUNDER	NUMBER OF MULTI-COUNTRY PROJECTS
European Commission	59
UK Research and Innovation (UKRI)	51
International Development Research Centre (IDRC)	39
Canadian Institutes of Health Research (CIHR)	25
Dept. Health and Social Care / National Institute for Health Research (DHSC/NIHR)	24
Sino-German Center for Research Promotion	20
Wellcome	16
Agence Nationale de Recherche sur le Sida et les Hépatites Virale (ANRS)	15
Volkswagen Stiftung	14
National Institutes of Health (NIH)	13
Research Council of Norway	13
FUNDER	NUMBER OF LMIC-FOCUSED MULTI-COUNTRY PROJECTS
International Development Research Centre (IDRC)	38
UK Research and Innovation (UKRI)	33
Dept. Health and Social Care / National Institute for Health Research (DHSC/NIHR)	20
Canadian Institutes of Health Research (CIHR)	19
Sino-German Center for Research Promotion	19
Agence Nationale de Recherche sur le Sida et les Hépatites Virale (ANRS)	15
Wellcome	15
BRICS-STI	12
European Commission	12
European & Developing Countries Clinical Trials Partnership (EDCTP)	11

Table 5 - Top-10 funders of multi-country projects and LMIC-focused multi-country projects by known funding amounts

FUNDER(S)	KNOWN FUNDING AMOUNT AWARD TO MULTI-COUNTRY PROJECTS
National Institutes of Health (NIH)	 \$259.8m
European Commission	 \$82.8m
International Development Research Centre (IDRC)	 \$25.8m
UK Research and Innovation (UKRI)	 \$10.7m
Agence Française de Développement (AFD)	 \$10.5m
COVID-19 Therapeutics Accelerator (Wellcome / Bill & Melinda Gates Foundation)*	 \$9.1m
Canadian Institutes of Health Research (CIHR)	 \$8.7m
UKRI / Dept. Health and Social Care / National Institute for Health Research*	 \$8.7m
Dept. Health and Social Care / National Institute for Health Research (DHSC/NIHR)	 \$7.4m
Research Council of Norway (RCN)	 \$5.6m
FUNDER(S)	
National Institutes of Health (NIH)	 \$157.5m
European Commission	 \$45.4m
International Development Research Centre (IDRC)	 \$25.0m
Agence Française de Développement (AFD)	 \$10.5m
COVID-19 Therapeutics Accelerator (Wellcome / Bill & Melinda Gates Foundation)*	 \$9.1m
UK Research and Innovation (UKRI)	 \$8.8m
Dept. Health and Social Care / National Institute for Health Research (DHSC/NIHR)	 \$7.4m
Canadian Institutes of Health Research (CIHR)	 \$5.9m
European & Developing Countries Clinical Trials Partnership (EDCTP)	 \$5.2m
UKRI / Dept. Health and Social Care / National Institute for Health Research*	 \$4.6m

Note: Financial information available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

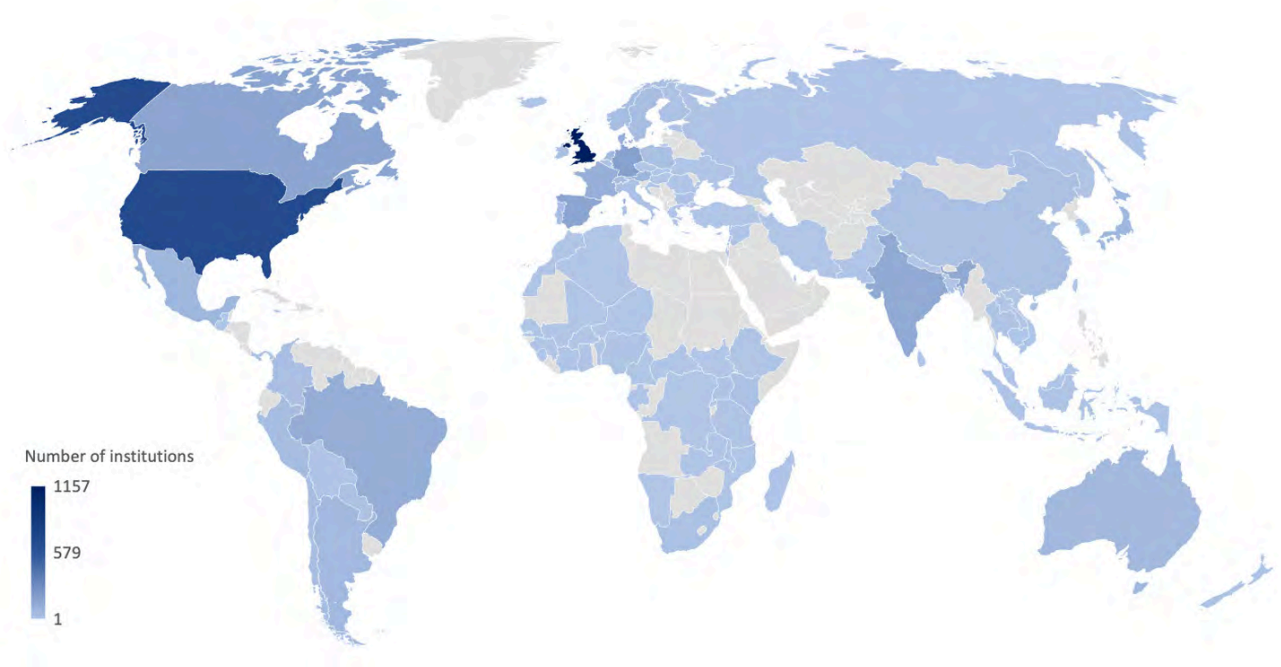
*Indicates co-funding between multiple organisations listed.

3.4 INSTITUTIONS

The 10,608 COVID-19 research projects under consideration for this analysis were awarded to 3,995 institutions based in 101 countries (Figure 4) – though institutional data was missing for 578 projects (5.4%).

While individual Canadian institutions ranked highly in terms of being designated as the ‘lead’ institution for the greatest number of projects (including six institutions in the top ten), lead institutions are most commonly located in the UK (1,157 institutions), the United States (663), and Germany (182). Overall, of the 3,995 institutions leading on COVID-19 research, only 720 (18.0%) are based in LMICs.

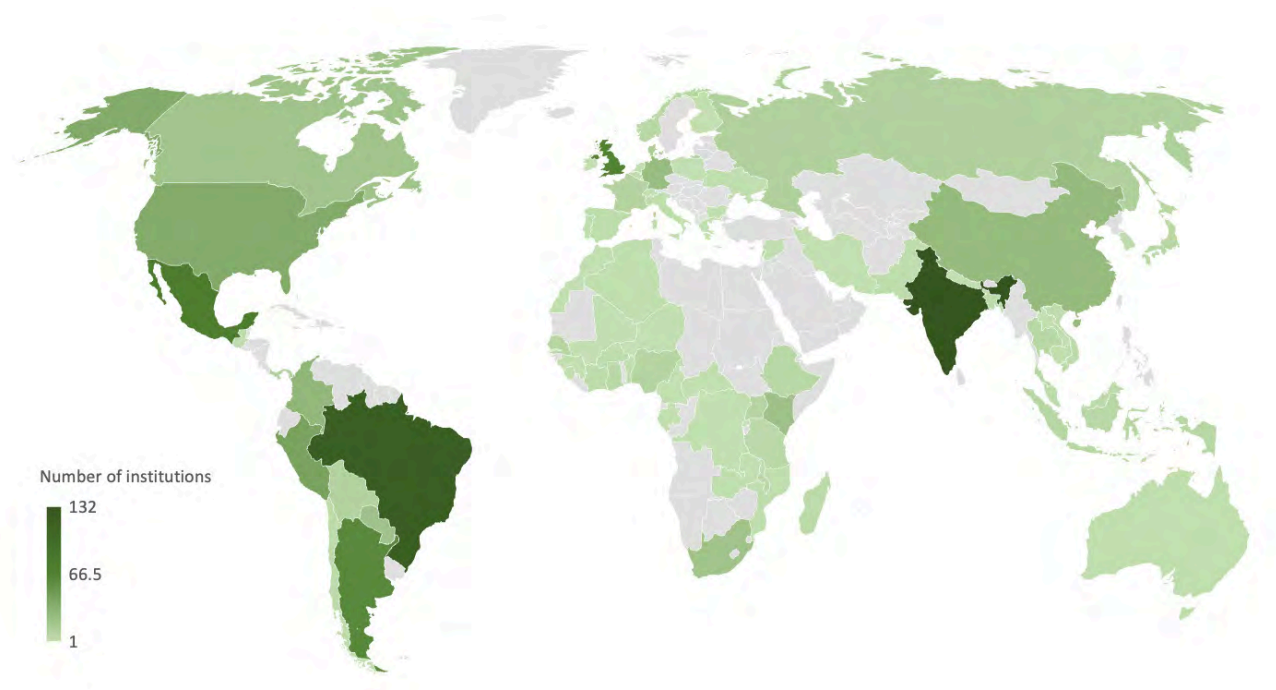
Figure 4 - Location of institutions leading on COVID-19 research



When only considering LMIC-focused research, a total of 910 institutions based in 78 countries were designated as the lead institution (figure 5) – most commonly located in India (132 institutions) and Brazil (118). Furthermore, at an individual level, each of the top five institutions leading on the greatest number of LMIC-focused research projects is based in Brazil.

While 214 of these institutions leading on LMIC-focused research are based in HICs, approximately one quarter of these institutions (24.8%) have led on more than one LMIC-focused project. On average, LMIC-focused research constituted 49.7% of the portfolio of a lead HIC institution that has led on at least one LMIC-focused project. This figure is reduced to 32.2% when only considering HIC institutions that have led on at least two LMIC-focused projects.

Figure 5 - Location of institutions leading on LMIC-focused COVID-19 research



4. LESSONS LEARNT ON ENABLERS & CHALLENGES TO FULFILLING THE SEVEN PRINCIPLES

Enablers and challenges to effective research during the first year for the COVID-19 response have been elucidated through the COVID CIRCLE surveys and stakeholder consultations and are here mapped against the COVID CIRCLE Funders Principles with associated potential solutions. Cross-cutting enablers and challenges are presented at the end of this section.

Timeliness is one of the most important factors in the response to epidemics and pandemics and many of the barriers highlighted are related to this factor. Several of the solutions cut across multiple principles and are presented at the end. Evidence relating to certain principles (in particular 'partnerships' and 'protection from harm') will require further collation beyond the timeline of this review.

4.1 ALIGNMENT TO GLOBAL RESEARCH AGENDAS AND LOCALLY IDENTIFIED PRIORITIES- ENABLERS & CHALLENGES

1. Alignment to global research agendas and locally identified priorities:

To consider global research priorities, such as proposed by the World Health Organisation (WHO) and other multilateral entities or regional bodies such as the African Union, as well as local research priorities, in addition to funder strategic priorities, when funding research for global benefit. The WHO R&D Blueprint was developed to help guide the research response for epidemics and pandemics and alignment with this and associated research roadmaps developed for a coordinated response focusses the funds available.

It is recognised that certain global research priorities (or additional priorities) may be of particular relevance for research in resource limited settings and consideration of locally identified priorities should also be reflected in the funding process. * For COVID-19 the WHO Research Roadmap for COVID-19 has been developed by the WHO R&D Blueprint team building on consensus from global researchers to help guide the research response for COVID-19

4.1.1 AVAILABILITY OF RESEARCH AGENDAS AND CAPACITY FOR PRIORITY SETTING

The WHO has led the global response to the COVID-19 pandemic with the prompt triggering of its R&D Blueprint mechanism. Through a collaborative meeting with GloPID-R (February 14-15 2020), key research priorities were identified rapidly. This roadmap facilitated funders and researchers to closely align their activities to the areas of greatest research need. The timely availability of the WHO Research Roadmap was viewed as key to enable funders to align their responses to it.

LMIC-based stakeholder perspectives were incorporated into the WHO Research Roadmap through the in-person consultations and supplemented by collaborative exercises (including the effort between The Global Health Network, COVID CIRCLE and the African Academy of Sciences (31). Delayed development or absence of regional research priorities was a clear barrier for alignment. A regional set of priorities has been developed through an all of Africa approach led by the Africa Centres for Disease Control and Prevention, African Academy of Sciences, WHO Regional Office for Africa, and the African Union Development resulting in a consolidated regional research agenda (32). Other regions, however, are still yet to develop research agendas for COVID-19 which align with local needs.

The shift to virtual global meetings has provided greater opportunity for LMIC participation in multilateral research agenda updates. Open access to research outputs has further improved the update of research agendas. The more recent efforts to develop these need to be built on and both GloPID-R and UKCDR can play a role in ensuring these meet their respective funder audiences.

For future epidemics and pandemics research agendas from WHO and/or other advisory/funding agencies need to be aligned and adapted to local research needs of LMICs. The articulation of the needs and gaps and strategies to address them should be led by LMICs rather than being directed by external stakeholders.

4.1.2 PARTNERSHIPS & STAKEHOLDER ENGAGEMENT

Harnessing existing partnerships and networks with in-depth contextual knowledge enabled the identification of local priorities including those unique to vulnerable groups such as refugee and migrant populations. Engaging local and regional stakeholders in research priority setting ensured on-the-ground knowledge was factored into research particularly, in the identification of evolving local and regional priorities.

However, a major gap for funders was the lack of information regarding the local needs and gaps based on different regions. Establishing geographical hubs led by LMICs (which GloPID-R is currently piloting) will address this gap and be key for preparedness. Such hubs will enable understanding the local funding landscape and potentially facilitate interactions with regional research and policy organisations. Funders also stated a barrier to funding LMIC research priorities was the shortage of appropriate reviewers.

4.2 RESEARCH CAPACITY FOR RAPID RESEARCH ENBALERS & CHALLENGES

2. Research capacity for rapid research

a. To build upon existing research capacity and systems, where available.

For research to inform the health, economic and social policy and public health response in an ongoing epidemic or pandemic (or future outbreaks of the same pathogen), it needs to be implemented as rapidly as possible. Funders recognise that building on existing research capacity and systems is the fastest way to ensure high quality research is conducted and knowledge exchanged and that the long-term impacts of epidemics and recovery are addressed. Incorporation of epidemic relevant research questions into existing research studies (for example cohorts and clinical research networks) will be encouraged where possible, applicable and appropriate, to gain benefits from both rapid research activation, knowledge mobilisation and pre-existing relevant data.

b. To support capacity strengthening necessary for the research.

Funders recognise the need for strengthening research capacity in particular in resource limited settings and will consider the sustainability of any newly funded research capacity and whether it could be embedded for rapid activation in future outbreaks. Relevant guidance is provided by the work of the ESSENCE Group including the ESSENCE Good Practice Document on Capacity Strengthening.

4.2.1 RAPID RESPONSE & SUSTAINABLE FUNDING

To generate urgently needed evidence in response to the pandemic, rapid response funding calls were launched. Several approaches were taken by funders to ensure initiation of rapid research including supplementing existing grants, pivoting on-going research to COVID-19 and expediting proposal review and funding processes (specific examples are given in the case studies).

However, funders identified the challenge of ensuring quality was not compromised in rapid research, particularly with respect to maintenance of research rigor and adherence to ethical standards. Further, shortages of appropriate reviewers, delayed ethical approvals due to insufficient capacity in local LMIC Institutional Review Boards also prohibited rapid research. The demand for researchers with expertise in particular disciplines in LMICs outstripped supply, further inhibiting rapid research in some fields, pointing to the need for further individual research capacity strengthening.

Where there was availability of previous or existing local and institutional sources of funding researchers were able to rapidly mobilise a research response particularly where established, trusted and effective working relationships were already in place, along with existing staff capacity. Many researchers found challenges in obtaining funding for COVID-19 research in LMICs during the pandemic and were reliant on funding already in place for other research to initiate new COVID-19 research activities.

Many pre-existing projects had to submit new proposals during the COVID-19 pandemic causing unnecessary bureaucracy in cases where researchers were already set up to conduct the research needed. Researchers specifically pointed to the lack of funding for sustained collaboration which could have been pivoted to COVID-19. The lack of fora and regional networks was also identified as a barrier. In some cases, researcher-related delays resulted from the grant application processes where, for instance, there were delays in responding to funder enquiries on proposed research or other administrative queries relating to financial checks. Here, a well-structured organisational set up in research offices, particularly in LMICs, could address this.

4.2.2 FUNDER POLICIES & ACCOUNTABILITY

Funding new research involves complex processes and differing accountabilities (eg. to governmental or charity laws) which contributed to delays in both funder and researcher activities and, in effect, delayed rapid initiation of research. Although many funders modified their funding policies to facilitate rapid funding decision making some challenges relating to disbursement of funding were identified. Bureaucratic processes involved in administering funds, particularly to LMIC-based partners and lengthy contracting and due diligence processes often delayed rapid research funding and may have led to limited funding of projects involving LMIC researchers. Finding independent reviewers to review funding decisions was also recognised as a barrier in funding LMIC institutions.

Funders are accountable for public funds and need to balance rapid funding against inherent accountability which can contribute to delays in rapid research. A potential approach to addressing this challenge involves empowering funders to take emergency

decisions in advance of emergencies/crises. Through these laid down policies and procedures funders can override contract law to speed up funding allocation in emergencies such as the COVID-19 pandemic.

4.2.3 CAPACITY STRENGTHENING

Individual research capacity strengthening through training and leadership among LMIC researchers is a continuing need to provide a broad base of researchers to respond to epidemics and pandemics.

Sustainable funding and supplementing existing successful networks (with prior funding arrangements) during the pandemic, rather than setting up new partnerships, was also identified as a way to prevent delays. Such networks need sustainable funding between epidemics to build capacity and partnerships with academic stakeholders and importantly policy stakeholders across LMICs (without needing to competitively re-apply). Further, preparedness planning should include the provision of contingency funding for such epidemics research groups in order that resourcing decisions can be made at their level to expedite research in the event of an outbreak.

4.3 SUPPORTING EQUITABLE, INCLUSIVE, INTER-DISCIPLINARY AND CROSS-SECTORAL PARTNERSHIPS- ENABLERS & CHALLENGES

3. Supporting equitable, inclusive, cross-sectoral and interdisciplinary partnerships

a. To support equitable partnership throughout the research process.

Equitable partnerships are needed to ensure successful, embedded research, which is locally relevant. Partnerships supported should be informed by relevant guidance such as UKCDR's Equitable Partnership Principles; COHRED's Research Fairness Initiative and Fair Research Contracting, and the Commission for Research Partnerships with Developing Countries (KFPE) 11 Principles for Research Partnership. * Funders may additionally support the aspiration that any new vaccines, diagnostics, and treatments developed for COVID-19 are globally available, appropriate, and affordable, regardless of where they have been developed or who has funded them, aligned with the Global Collaboration ACT Accelerator. *

b. To promote inclusive and cross-sectoral partnerships to ensure that research is most likely to impact policy and practice. Inclusivity is needed to ensure consideration of vulnerable or marginalised groups in the research agenda. Public and community engagement plays a particularly important role in achieving and maintaining trust for research within communities for research during outbreaks, informed by guidelines such as the UNAIDS Good Participatory Practice Guidelines for Biomedical HIV prevention Trials. Research partnerships should demonstrate that community and public engagement has taken place and will continue to do so. Cross-sectoral partnerships across communities, government, public health and non-governmental organisations all help to ensure that the research funded is most likely to impact policy and practice for the relevant government and public health organisations.

c. To promote interdisciplinary research. The importance of interdisciplinary partnerships for relevant and effective research in epidemics has been highlighted, including through the joint work of the UK Academy of Medical Sciences, UK Medical Research Council and InterAcademy Partnership.

4.3.1 INCLUSIVITY & INTERDISCIPLINARITY

Examples of best practice for inclusivity involved engaging research partners with local expertise which ensured 'voices from the ground' were heard. This promoted the inclusion of marginalised and vulnerable groups and ensured their unique research priorities were factored in research.

For an effective response to the COVID-19 pandemic, a wide breadth of interdisciplinary research is crucial for gaining insights into various aspects of the disease and its impacts. Interdisciplinary partnerships promote the generation of rich research evidence, uptake of research outputs and policy change. However, in some cases, these partnerships are still perceived as being between the various biomedical disciplines with limited or no involvement of the social sciences and thus, constituted a challenge to interdisciplinary research. The data from the COVID-19 Project Tracker however indicates some level of partnership with social sciences research with 10.5% of projects categorised against one of the seven medical research priorities areas AND either ethics or social sciences. (see Annex).

4.3.2 EQUITY

Some funders and researchers recognised that the short timelines for development of novel research projects during the pandemic limited the ability to set up truly equitable partnerships, for example there was limited funding or time for partnership development and difficulty connecting with partners. Again, pre-existing partnerships with established trust were more likely to result in equity (eg. ISARIC, MORU Clinical Care Asia Network). Networking, webinars and opportunities for researchers to communicate and engage were viewed as enablers with an emphasis on co-creation and shared ownership of resources. Issues with equity in access to the products of research is covered in 3.6.

4.4 OPEN SCIENCE & DATA SHARING- ENABLERS & CHALLENGES

4. Open science and data sharing

a. To require that research findings and data relevant to the epidemic are shared rapidly and openly to inform the public health response.

Rapid research findings, data sharing and open access publishing can accelerate health benefits through; facilitating research projects; reducing the duplication of work; and ensuring a clearer picture of the disease through pooled results to improve intervention effectiveness. Funders will be informed by relevant guidance such as the GloPID-R Roadmap for Data Sharing (in particular, the guidance on grant conditions requiring rapid

sharing of quality assured data and development and review of data management plans in alignment with the FAIR Guiding Principles for scientific data management and stewardship) as well as the associated GloPID-R Principles of Data Sharing in Public Health Emergencies (Timely, Ethical, Accessible, Transparent, Equitable, Fair, Quality).
* For COVID-19 the joint statement on Sharing research data and findings relevant to the novel coronavirus (COVID-19) outbreak is pertinent*

4.4.1 POLICIES INTO PRACTICE

Existing data sharing initiatives and best practice guidance such as the GloPID-R Data Sharing Roadmap were perceived to have influenced data sharing practice in response to the pandemic. Data sharing agreements built into equitable partnerships also encouraged data sharing. Some examples of best practice relating to data sharing are detailed in the Annexed Case Studies relating to 'ICODA' and 'afrimap'. However, implementation was impaired by the limited awareness of existing policies, lack of clarity on optimal requirements for data sharing (for the various types of research) and a lack of standardisation of data sharing requirements among funders and researchers. The limited experience of some funders and researchers with data sharing and in-country legal prohibitions contributed to data sharing hesitancy and was thus a significant challenge to adherence to best practice.

4.4.2 INFRASTRUCTURE AND CAPACITY

Internet access and access to databases enabled adherence to the data sharing principle, particularly by LMIC researchers. Conversely, limited capacity in LMICs to adhere to data sharing requirements was identified as an important challenge to conducting effective research especially regarding meeting data storage requirements. Poor data quality and lack of standardisation were continued issues observed by researchers alongside hesitancy in sharing clinical data or data secrecy. This was further worsened by inadequate funder support, for instance, in provision of specific funding for technical support for data sharing and outlining optimal requirements.

Lack of standardised infrastructure resulted in a proliferation of data platforms being used with limited inter-linkage. This was compounded by the barrier that data is already kept separately in different sectors, creating issues with standardisation and linkage.

4.4.3 RESEARCH UPTAKE

Funders identified the need for open science to explicitly support research uptake through putting greater focus on ensuring that data is shared in a useable format for different audiences including decision makers and policy makers.

4.5 PROTECTION FROM HARM- ENABLERS & CHALLENGES

5. Protection from harm:

To take all reasonable steps to anticipate, mitigate and address harm to those involved with research funded. Everyone involved in the research chain, from research funders, planners and practitioners to local community members, has the right to be safe from harm. Funders working in international development research will be informed by guidance such as UKCDR's guidance on safeguarding in international development research. * For COVID-19 there is a companion piece on practical application of the UKCDR safeguarding guidance during COVID-19.*

4.5.1 MONITORING COMPLIANCE

The availability of Standard Operating Protocols (SOPs) for research, safeguarding guidance and ethical standards were enablers to practicing the protection from harm principle. The requirement of research projects to undergo ethics review also promoted adherence to safeguarding guidance although monitoring compliance following the award of grants was identified as an important challenge.

Here, there is a need to balance regular monitoring of grantees with allowing sufficient time for undertaking research.

4.5.2 INFECTION PREVENTION & CONTROL

Conducting research during a pandemic presents unique risks of potential harm to researchers and research participants. Of importance is the increased risk of COVID-19 transmission. Innovative methods of conducting research while maintaining social distancing, remote activities which prevent face-to face contact (where feasible) and adhering to other infection and prevention control measures have been crucial for protection from harm. Regular PCR testing (among research teams) and personal protective equipment use were also identified as enablers to effective research. However, severe personal protective equipment shortages were a challenge to protection from harm and were exacerbated in LMIC settings.

4.6 APPROPRIATE ETHICAL CONSIDERATION - ENABLERS & CHALLENGES

6. Appropriate ethical consideration:

To ensure appropriate ethical consideration is embedded throughout research conducted, in particular regarding access to the products of research. Ethics should be at the heart of funding decision-making and considered throughout the research, including informing approaches to ensure that the optimal value is being obtained from the research for all parties involved. Relevant guidance

is provided by the Declaration of Helsinki International Ethical Guidelines for Health-related research involving humans by the Council for International Organizations of Medical Sciences (CIOMS) , Nuffield Bioethics for public health emergencies – recommendations and The Global Code of Conduct for Research in Resource-Poor Settings. * For COVID-19 the WHO Ethical Standards for research During Public Health emergencies: Distilling Existing Guidance to Support COVID-19 R&D is pertinent. *

4.6.1 RAPID REVIEW

A major consideration for rapid research is ensuring rapid ethics reviews do not compromise research quality. Availability of WHO ethics guidelines specific to COVID-19 (33) was viewed as an enabler to guide best practice. Rapid ethics reviews were facilitated by the formation of COVID-19 specific ethics review boards and outlining processes for expedited review of projects with existing ERB approvals. Collaboration with local research partners with expertise in local ethics review processes was identified as a key enabler for ensuring contextually appropriate ethical considerations. Several factors contributed to delayed ethics approvals including limited capacity which was exacerbated by bureaucratic processes and in some instances, a lack of standardised ethics guidelines for COVID-19 research.

4.6.2 IP & DATA RIGHTS

Intellectual Property and data rights were viewed as major barriers to equity in research and to access to the products of research in LMIC contexts. The GloPID-R SAG report (33) has already identified this as a key area for members to determine how funders can rethink their guidance and influence going forwards. The report highlights the needs to explore 'new conceptions of IP, technology transfer, and data sovereignty that better produce social goods than the current patent/trademark/copyright trade-secrets system'. This work will be explored through the GloPID-R data sharing working group.

4.7 COLLABORATION AND LEARNING THROUGH ENHANCED COORDINATION- ENABLERS AND CHALLENGES

7. Collaboration and learning enhanced through coordination:

To ensure maximum impact of investments for research on the most pressing global needs for epidemics through cross- funder and cross-researcher collaboration learning and evaluation.

a. To map research funded, use these data to enhance coordination, and ensure it is publicly available. Maximising the value of research investments requires accessible, comprehensive and coherent information on what and where others are investing to help identify funding gaps or duplication and inform or direct future investments. Research funded needs to be mapped publicly, for example through World Report.

For COVID-19 the COVID-19 Research Project Tracker by UKCDR & GLOPID-R is pertinent. The Research Project Tracker is aligned with the WHO Research Roadmap for COVID19 to facilitate informed decision making and targeting of funds where there is need.

b. To foster collaboration between studies funded in epidemics and facilitate shared development of research protocols, data collection tools, data sharing and exchange of knowledge. Collaboration between researcher communities can facilitate trust, foster new partnerships and improve research outcomes and their impact. Where relevant, funded researchers will be supported to embed in relevant or, co-create communities of practice or an equivalent that promote shared development of research protocols, data collection, purpose driven data and results sharing.

c. To where relevant to embed operational research and support impact evaluation across funded projects to learn from and improve future funder and researcher responses for epidemics. Conducting research during epidemics is still a relatively new endeavour and it is important to embed operational research (research on research) and impact evaluation where relevant. In particular, this should aim to identify how the research response can be improved, including how to overcome barriers to achieving the Funder Principles outlined here (building on prior work undertaken by GloPID-R and GOARN Research such as the PEARLES review and GloPID-R Roadmap for Data Sharing.

4.7.1 RESEARCH MAPPING

The COVID CIRCLE initiative aimed to strengthen the coherence of the research response to COVID-19 and facilitate coordination and collaboration among funders and researchers. In particular, mapping and analysis of projects captured in the UKCDR and GloPID-R tracker, enabled identification of research gaps and opportunities for collaboration. Many funders reported having used the tracker to support strategy review, funding call specifications and funding decisions during the pandemic. The benefits were seen in the transparency on what is being funded, identification of the gaps and mapping to the WHO Roadmap.

Funders and researchers identified that it is also important to track other factors relevant to research quality including capacity strengthening and strength and equity of partnerships in research involving LMICs. Visibility of capacity is essential to ensure researchers are aware of what capacity is available and how they can collaborate. Various efforts such as those by The Global Health Network, The African Academy of Sciences and ESSENCE for Health Research are mapping capacity, but these could be strengthened.

4.7.2 CONVENING

Virtual conferencing during the pandemic has greatly enhanced global convening. The WHO Blueprint has shown positive convening power, bringing together 10,000 people in their last research agenda priority setting meeting. GloPID-R has also convened a range of successful Synergies meetings with global participation on Vaccines, Therapeutics, Transmission, Social Sciences Research, Long COVID and Research in LMICs (35, 36, 37, 3). A remaining challenge is how to translate such convening into greater and more effective collaboration.

4.7.3 PROMOTING COLLABORATION

Existing partnerships and networks which promoted exchange of ideas, data sharing and dissemination of research outputs were identified as enablers of effective research, although insufficient investment to sustain these partnerships was identified as a challenge. Further, the lack of key collaborative networks in South East Asia, for example, similar to the Africa CDC was a challenge to coordination and collaboration. The move to virtual events following COVID-19 travel restrictions encouraged greater participation and engagement in COVID-19 related research conferences and meetings.

Funders identified that 'how they fund' could be improved to support collaboration, as current models do not effectively promote it. The issue of large numbers of trials and trial networks was viewed as one that funders could and should address, to ensure that prioritised research questions can be answered in the most efficient and effective way, particularly in LMICs. This is especially pertinent as many of these small trials have resulted in underpowered studies unable to meet their aims. Funder collaboration to promote and ensure, fewer and more efficient trials was sought and aligns with the recent G7 Clinical Trials Charter (38).

The GECCO case study (Annex) highlights the development of the COVID CIRCLE Researcher platform specifically to support their community of researchers undertaking COVID-19 research across LMICs to collaborate (along with researchers funded by other UK based calls). Activities on this platform are aimed at facilitating research to policy and practice.

Improved collaboration across research funding and public health funding was also identified as an enduring challenge, with some national funders able to cover both but increased linkage and highlighting of gaps needed.

4.8 CROSS-CUTTING ENABLERS AND CHALLENGES AND THOSE IDENTIFIED BEYOND THE FUNDERS PRINCIPLES

4.8.1 CROSS CUTTING BARRIERS

Timeliness and availability of funds were perhaps unsurprisingly the main cross-cutting barriers identified by both funders and researchers during the pandemic. For researchers, all aspects of setting up new high-quality research projects were more challenging both due to the pandemic and in partnerships in LMICs.

For funders, governance (including bureaucracy) and political issues were key cross-cutting barriers to applying the Funders Principles.

The COVID-19 tracker funding analysis showed limited international and interdisciplinary projects and the huge proliferation of small national based projects. It also shows that many funding calls were time-limited and there was not sustained funding activity throughout the first year of the pandemic.

4.8.2 CROSS CUTTING ENABLERS

Pre-existing arrangements, including: funding mechanisms, funding relationships and research networks and collaborations were identified as key enablers to ensuring an effective research response to the COVID-19 pandemic in alignment with the Funders Principles. The need to build partnerships during inter-epidemic periods was therefore seen as key. Visibility of these partnerships was also seen as a key enabler, with both research capacity and research activity mapping viewed as important for this.

Whilst many pieces of good policy guidance exist (as referenced in the principles) greater guidance on applying best practice now needs to be developed to strengthen the implementation of the principles and recommendations in this report, incorporating the lessons learned. It was concluded that guidance for implementation on practice across the principles, could improve research generally beyond epidemics and pandemics. This would then be more likely to result in 'high- quality research for the most pressing global needs' for future epidemics and pandemics.

5. RECOMMENDATIONS FOR RESEARCH FUNDERS

The challenges and potential solutions outlined to achieving the Funders Principles require action from a range of stakeholders. Highlighted here are the recommendations on the actions that funders could pursue either individually or collectively. These build from the greater detail provided on enablers and challenges to implementing the Funders Principles (section 4.), the analysis of the first year of the COVID-19 research funding response (section 3.) and the case-studies (Annex A). Key recommendations include the need for greater long-term funding of networks which provide the capacity to pivot to emerging diseases; the need for greater guidance, support and systems to realise Open Science; and greater global coordination including joint funding mechanisms.

5.1 RECOMMENDATIONS TO FUNDERS FOR ACTION

1. Alignment to global research agendas and locally identified priorities

- a. Support for the development and strengthening of research networks involving local funders in advance of future pandemics to facilitate leadership for regional and local research priority setting, and adaptation of priorities and sub-priorities from WHO and/ or other advisory agencies for local needs of LMICs.
- b. Provide agile mechanisms for dedicated funding or direct funding to low-and middle-income countries to match their research needs for epidemics and pandemics.

2. Research capacity for rapid research

- a. Ensure sustained funding for building research capacity in between epidemics and pandemics (including highly trained researchers through training including leadership training and small grants for early researchers) linked with public health capacity building (including surveillance), clinical trial and research platforms and national clinical data systems (where available). These can then be built on and linked by rapid response supplemental funding.
- b. Funder coordination to rethink the proposal review process during emergencies through a risk-based approach.
- c. Introduce funder policies which outline governance to override normal funding processes in emergency situations. Test these funding mechanisms during peace time to leverage them during emergencies.

3. Equitable, inclusive, cross-sectoral and interdisciplinary partnerships

- a. Increase emphasis on interdisciplinary research for epidemics involving LMICs.
- b. Increase (high-income country) funder activity on epidemic research in least developed and low-income countries in recognition that supporting HIC research gaps alone does not end a pandemic.

4. Open science and data sharing

- a. Raise awareness among funders and reviewers of the advantages of the open-science approach for epidemics and pandemics and existing initiatives and policy guidance.
- b. Develop clear consistent data management and sharing guidelines across funders working with the research community, for rapid sharing data for different kinds of research (i.e. for biomedical research versus social sciences research) within epidemics and pandemics in alignment with the GloPID-R Data Sharing Roadmap.
- c. Provide guidance and funding to support with data sharing during epidemics or pandemics e.g. set up of data sharing platforms in advance.
- d. Evaluate the implementation & impact of open science during COVID-19.

5. Protection from harm

- a. Specific funding allocation for PPE equipment training and other IPC controls for those involved in the research process.

6. Appropriate Ethical Consideration

- a. Removal of operational bottlenecks to speed up ethics review process in emergencies.
- b. Increased research activity to explore ethical dilemmas in epidemics specifically in LMICs.

7. Collaboration and learning enhanced through coordination

- a. Provide funding for repurposing or extending existing partnerships, collaboration networks or coordination mechanisms.
- b. Enhanced collaboration between funders - potentially via reviewing analyses of tracker data to understand funding landscape and identify synergies and possible joint international funding calls to improve funding efficiency.
- c. Learn from existing rapid funding mechanisms (see case studies on R2HC and EDCTP) and those funders who developed rapid funding for COVID-19 (eg. UKRI, CIHR rolling calls) .

8. Cross-cutting

- a. Develop guidelines for “operationalising” the seven funders principles.
- b. Embed application of the seven principles in the entire funding process.
- c. Launch joint funding calls to enable international research partnerships beyond individual funder remits.
- d. Provide funding for diverse types of research e.g. health systems research funding, applied research, implementation science, cohort studies.
- e. Develop guidance for funders to support research uptake within the timescales of an epidemic.



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Annexes for the report
**Funding and undertaking research during
the first year of the COVID-19 pandemic**
COVID CIRCLE lessons for funders

November 2021

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UK Collaborative on
Development Research

ANNEXES

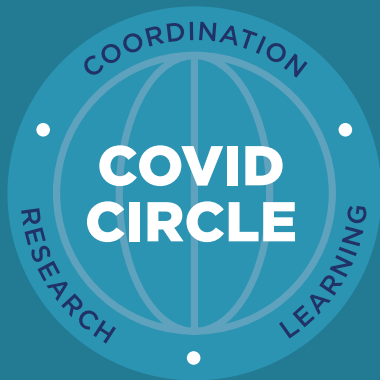
ANNEX A. CASE STUDIES..... 1

ANNEX B. COVID CIRCLE ONE YEAR COVID-19 FUNDING ANALYSIS2

ANNEX C. COVID CIRCLE FUNDERS SURVEY REPORT30

ANNEX D. COVID CIRCLE RESEARCHERS SURVEY REPORT46

ANNEX A. CASE STUDIES



Case studies for the report

Funding and undertaking research during the first year of the COVID-19 pandemic: COVID CIRCLE lessons for funders

A collection of research projects and programmes demonstrating innovative best practice in research in epidemics



UK Collaborative on
Development Research





As part of the report *'Funding and undertaking research during the first year of the COVID-19 pandemic: COVID CIRCLE lessons for funders'*, we have developed seven case studies involving research projects and programmes which have demonstrated innovative best practice in research in epidemics. Each case study highlights factors of success in applying one or more of the Seven Funder Principles for supporting high quality research for the most pressing global needs in epidemics and pandemics, to inform future funding and research practice.

INTRODUCTION

The 2014-2016 West Africa Ebola outbreak highlighted the inadequacies of global health research systems to respond to acute crises and galvanized global health actors around initiatives to boost preparedness and capacity for effective future epidemic response. Key among these is the WHO Research & Development Blueprint mechanism which focusses on priority pathogens of epidemic potential and outlines a framework for prompt response to disease outbreaks.

This mechanism was rapidly triggered at the onset of the current COVID-19 pandemic in early 2020 resulting in a WHO Coordinated Global Research Roadmap to which several funders aligned their research responses.

Further, funders drew on their experiences from funding research during the West Africa Ebola outbreaks (2014-2016), Zika epidemic (2015-2016), North Kivu Ebola epidemic (2018) and other acute health emergencies to refine their approach to funding COVID-19 related research.

The Global Effort on COVID-19 Health Research (GECO), European and Developing Countries Clinical Trial partnership (EDCTP) and Research for Health in Humanitarian Crises (R2HC) funding programmes in particular have demonstrated innovative funder practices which are highlighted here.

pages

3-5



Africa CDC Response to COVID-19

pages

6-8



afrimapr building blocks for the operational COVID-19 health response

pages

9-11



COVID-19 Child Abuse Prevention Emergency Response

pages

12-15



European and Developing Countries Clinical Trials Partnership (EDCTP) COVID-19 Response

pages

16-19



Global Effort On Covid-19 Health Research (GECO)

pages

20-22



International COVID-19 Data Alliance (ICODA)

pages

23-26



Research for Health in Humanitarian Crises (R2HC) COVID-19 Response



Africa CDC Response to COVID-19

The Africa CDC Response to COVID-19 programme aimed to develop a unified regional approach by Africa Centres for Disease Control and Prevention (Africa CDC) and the African Union to tackle the rapid spread of COVID-19. In collaboration with multi-sectoral partners, Africa CDC developed an overarching framework for Africa's COVID-19 preparedness and response. Through implementing the framework, this programme has contributed to building research capacity, cross-sectoral and multi-disciplinary partnerships and supported coordination and collaboration for pandemic preparedness and emergency response.

Funders: Wellcome and UK Foreign, Commonwealth & Development Office (FCDO)
Fund/Funding programme: Wellcome/FCDO Joint Initiative on Epidemics Preparedness (JIREP)

Total investment: £2m

Project dates: 10 April 2020 - 10 April 2021

Lead Institutions: African CDC & the Institute Pasteur Dakar

Partner Institutions: Wellcome, UK Foreign, Commonwealth and Development Office (FCDO), Africa CDC, WHO, African Union, and member states.

Countries of focus: Multiple African countries [Pan-African focus – 5 sites/hubs across Africa through the Africa CDC coordinating centres – Ethiopia (the Africa CDC headquarters), Kenya (East Africa regionals collaborating centre), Nigeria (Western centre), Gabon, Zambia (Southern centre)] with 20% funding provided to each centre.

BACKGROUND

As COVID-19 cases emerged in Africa, African leaders united to develop a joint African continental strategy to deal with the rapid spread of the COVID-19 pandemic. On February 22nd 2020 in collaboration with WHO, The African Union and Africa CDC, developed the [‘common pandemic preparedness strategy’](#) to provide an effective, united response against the pandemic. Africa’s comprehensive continent-wide response strategy against the crisis was boosted by the Wellcome/FCDO JIREP funding. The strategy highlighted the importance of greater coordination, collaboration, cooperation and communication and intends to provide direct technical assistance to Member States in the six strategic technical areas: laboratory and sub-typing, surveillance and enhanced port of entry screening, infection prevention and control, clinical case management, risk communication and [supply chain management](#).¹ The Institute Pasteur Dakar, Senegal managed the funds for the project activities on behalf of [African CDC](#).² Keeping research capacity strengthening at the core of the project, the African CDC project highlighted the value of multi-sectoral partnership, collaboration and coordination for pandemic preparedness and emergency response.

PRINCIPLES IN PRACTICE

Research capacity for rapid research

Within two months of the first African COVID-19 cases, Africa CDC received funding from Wellcome/FCDO for emergency response in resource limited contexts. To ensure rapid disbursement of funds, Institute Pasteur Dakar (IPD) managed the funding on behalf of Africa CDC. As previous Wellcome grantees, IPD had existing mechanisms to rapidly receive and manage research funding which enabled Wellcome/FCDO to circumvent the potential complexities of funding an institution which they had not previously funded. IPD also provides an existing research platform and reputation to facilitate research in response to COVID-19. The Wellcome/FCDO funding facilitated specialised training in different aspects of the response including exchange of data, knowledge, and information; stockpiling and distribution of essential commodities needed by the member states, which enhanced research capabilities of local institutions. The institutional capacity built through this funding in the early stages of the pandemic (e.g. through laboratory strengthening, surveillance, clinical case management, infection prevention and control etc), enabled a stronger emergency

response system, which will benefit future research response to epidemics and pandemics – particularly laboratory and sequencing components.

Equitable, inclusive, cross-sectoral, and interdisciplinary partnerships

For this project, which was by LMIC researchers, cross-sectoral and multi-disciplinary partnerships were formed across different sectors including partnerships between the African Union, WHO, Regional Economic Communities, member states, private sector actors, donors, foundations, and other stakeholders. These partnerships helped to harmonise the political, social, economic, and public health [responses to the pandemic](#).³ By providing support to develop relevant policies and implement essential public health operations across the continent, the cross sectoral and multilateral partnerships developed by Africa CDC facilitated greater regional response to the COVID-19 pandemic. In addition, Africa CDC gained trust through public and community engagement, ensuring consideration of marginalised and vulnerable people through inclusive partnership.

Protection from harm

The grant conditions for this project highlighted risk mitigation for COVID-19 projects. During the early stages of the pandemic, there was widespread recognition of the difficulties and expense of sourcing personal protective equipment (PPE). To address this and ensure researchers were protected from harm, Wellcome and FCDO implemented a change in grants policy, allocating specific funding to ensure PPE was provided for all researchers and participants, which they aim to sustain for future funding of epidemics research projects.



Collaboration and learning enhanced through coordination

This project exemplifies the importance of regional coordination and collaboration in response to an epidemic. As a result of the collaboration between partners, the resultant diverse expertise, additional regional resources, and in country collaborators, strengthened the regional response to the COVID-19 pandemic. In addition, the multisectoral collaboration and coordination catalysed research to policy pathways supporting the uptake of research.

The existing funding partnership between Wellcome & FCDO through the Joint Initiative on Epidemics Preparedness (JIREP), which was established in response to the 2014 Ebola pandemic, also enabled coordination in research funding response, and built on the funders complementary expertise and systems (FCDO's in-country experience and Wellcome's previous funding of Institute Pasteur). This facilitated rapid disbursement of funds at a pivotal time in the pandemic, which enabled rapid response.

KEY TAKEAWAYS

Key learning and recommendations are as follows:

1. The Africa joint continental strategy for COVID-19 outbreak led by Africa CDC demonstrates the value of multisectoral partnerships for political and regional collaboration, particularly in low resource settings where capacity may be limited, and therefore efficient resourcing is a greater priority.
2. The existence of the Wellcome funding relationship with Institute Pasteur enabled rapid disbursement of funds. However, there is a need for improved processes and mechanisms to enable rapid funding to LMIC institutions and partnerships.
3. Cross-funder coordination and pre-established funding partnerships support rapid response during emergencies. Partnership between research funders also ensure efficient and coordinated funding which builds on each funders systems and expertise.
4. The joint strategy highlighted the importance of funders prioritising locally led research and local capacity building in resource limited settings which enhance the capabilities of local institutions to handle future epidemics or pandemics.
5. The programme highlighted the importance of adaptability from funders through the funding allocation for personal protective equipment (PPE) to protect researchers and participants from harm during global health emergencies, particularly in low resource settings.
6. Rapid funding is essential to respond to global health emergencies of new infectious diseases. However, this is most effective where it builds on pre-existing research capacity for epidemics and pandemic response. Furthermore, funding preparedness activities in between epidemics is important to ensure effective and pre-emptive response for future epidemics and pandemics.

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afrimapr building blocks for the operational COVID-19 health response

The afrimapr team contributed to the COVID-19 response efforts by documenting gaps and identifying challenges in using open data on health facility locations in Africa, building on their ongoing Open Research Fund project building R components and providing training for mapping health data in Africa. Their work enables researchers and program planners to understand the available data and how it could be used and improved to inform responses. In doing so, afrimapr contributed important input to conversations about capacity building and tools for analysis in resource-limited settings.

KEY INFORMATION

Funders

Wellcome Trust Fund/Funding programme: Open Research Fund, discretionary funding awarded through the ORF and the Wellcome Data for Science and Health group (split 50%)



Total investments: £118,565 (£68,658 + £49,907)

Project dates: January 2020 – June 2021

Lead Institutions: Liverpool School of Tropical Medicine

Partner Institutions:

University of Leeds, University of Bath, Talarify (South Africa), Higher Education Strategy Centre (Ethiopia)

Countries of focus: UK, South Africa, Malawi, Ethiopia, Kenya

BACKGROUND

afriMAPr aimed to create software components – building blocks – for mapping health data in R, a free and open-source data language and software that is increasingly used in research and operational settings. These blocks would build the capacity of data scientists and analysts across the African continent to create data-driven maps that would support operational planning and responses to crises. Originally funded under the [Wellcome's Open Research Fund \(ORF\)](#)¹, supplementary funding was given to the afriMAPr team in response to the COVID-19 pandemic to extend their approach to examine health facility location data in Africa. They identified and assessed available data sets, highlighting the incompatibilities between these, as well as implications for planning and operations. In constructing software components to strengthen the ability of local researchers to create their own tools, the project emphasizes collaboration and capacity building around open data.

PRINCIPLES IN PRACTICE

Alignment to global research agendas and locally identified priorities

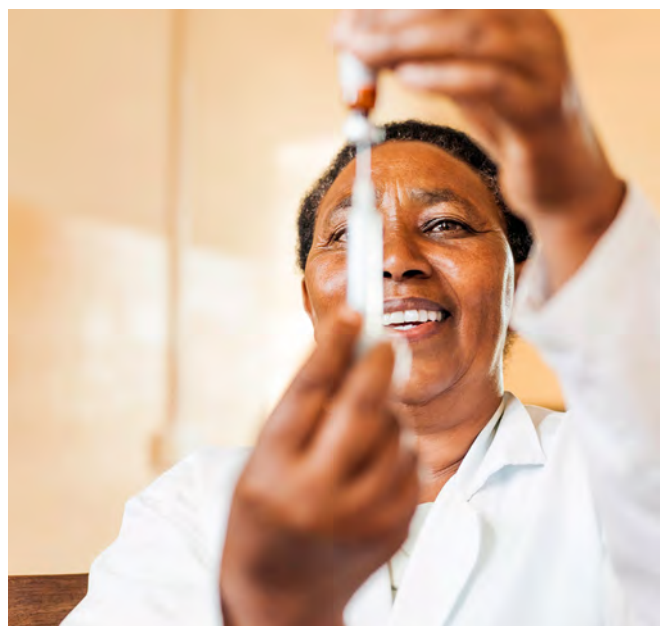
afriMAPr, as a set of open software components, can be tailored to fit the needs of researchers and operational planners. As such, it is well-placed to facilitate the pivoting and re-alignment of the activities of researchers and organisations to emerging priorities. When the COVID-19 pandemic emerged, the afriMAPr team shifted focus to develop and strengthen the components considered useful in the operational response.

Equitable, inclusive, cross-sectoral and interdisciplinary partnerships

The original project was built with a multi-institution and multidisciplinary team, which relied on existing partnerships with organizations with strong ties to data communities in several countries in Africa. Training materials are available on the [afriMAPr website](#)², with initial trials of online sessions with participants from Africa and a planned half-day tutorial at a conference for R users in July. These sessions will be led in English and French, with 60 participants. The afriMAPr blocks, as components rather than an end output, enable partnerships to be built around their application. The free software employing the blocks allows all to collaborate and use it freely.

Open science and data sharing

Using free and open-source data language enables researchers and partners to share and collaborate, without barriers of technical access. Using publicly available data, the components have increased access and usability of the data that is available. They also highlighted the gaps that remain in making data open and accessible, including closed data within organisations that is used in operational planning. It is unknown how applicable the afriMAPr tools are for this data, as it is not available to test and use. afriMAPr shows the possibilities for open science when data sets are available and tools can be made to harness these.



Collaboration and learning enhanced through coordination

The afriMAPr project has created several components (or packages) in R now [available on Github](#)³ – afriHealthsites, afriCOVID and afriAdmin, improving usability of health facility locations, subnational COVID data, and administrative boundaries respectively. afriMAPr recently [showcased their activities](#)⁴ in an online presentation as part of [Open Education Week](#)⁵, attracting more than 70 registrants from African countries. Their work and [associated paper](#)⁶ have been discussed by WHO, GAVI, and MSF working groups for the COVID-19 response, and they have been accepted as a technical partner in a WHO & UNICEF COVAX [GIS working group](#)⁷. Through this, their work is offered to countries to assist in COVAX planning, with most recent funding through MapAction to document the availability of open health facility location data for

South Sudan in a pilot project to inform the COVID-19 response. Remaining true to their original goals, local uptake of tools and use of the building blocks to conduct local mapping and analysis remains a priority, as are the relationships and collaboration required to gather and incorporate local feedback. While they sought to support operational planning during the COVID-19 pandemic by assisting with the use of open health facility location data, they were impeded by a lack of high-quality open data and support to improve this. Furthermore, a lack of familiarity with the open-source approach was apparent in peer reviews of their paper, which focused on the database element over the open-source code that enabled it. Though its content was immediately operationally relevant, the manuscript was in review for 6 months, which hindered afrimapr's ability to disseminate their findings and approach among different groups.

KEY TAKEAWAYS

1. Funding schemes like ORF can identify innovative projects in non-crisis times, that can then be expanded and supplemented when required to fill emerging needs.
2. afrimapr's open-source approach enabled quick collaboration and knowledge-sharing during the pandemic. Leaning on existing connections, it was able to quickly shift activities to adapt to emerging needs.

3. Closed data sets within organizations and groups that do not make their software components and analysis tools open-source make collaboration between developers difficult. Much code and data remaining unshared, with many opportunities to improve the efficiency of data use to inform health related research and operations.
4. A barrier to publications and dissemination of knowledge is the limited familiarity of peer reviewers with open-source approaches to data sharing and open science.

RECOMMENDATIONS

1. Consistent sharing of data and collaboration could lead to increased standardisation of data and ability to use data across multiple settings.
2. Increased awareness among funders of the strengths and long-term benefit of open-source approaches will increase their reach and can inspire open science from the start of data collection and preparation to the analyses, dissemination and operational use.

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COVID-19 Child Abuse Prevention Emergency Response

In response to the COVID-19 pandemic, the 'COVID-19 Child Abuse Prevention Emergency Response' project developed a set of evidence-based open-source resources that reached over 193.6 million families to reduce parent stress and prevent child abuse at a pivotal point during the pandemic. The resources were also used by 33 governments, the WHO, UNICEF, USAID, and other implementing partners. The project built on the existing research capacity and systems established by the broader '[Parenting for Lifelong Health](#)' programme. The success of the projects activities and subsequent outcomes highlight the importance of long-term research capacity building, multi-sectoral partnerships, and open-access resources in response to public health emergencies.

Funders: UK Research and Innovation (UKRI), University of Oxford, Oak Foundation, The Human Safety Net, & LEGO Foundation. UKRI GCRF Accelerate Hub

Fund/Funding schemes: UKRI GCRF/Newton Fund Agile Response call to address COVID-19; University of Oxford COVID-19 Research Response Fund; TIDES/Oak Foundation grant, The Human Safety Net donation, LEGO Foundation grant. UKRI GCRF Accelerate Hub.

Total investment: £1662,537 (UKRI GCRF/Newton Fund: £472,297, LEGO: £716,875, Oak: £145,503, THSN: £124,155.09, University of Oxford: £203,707.18)

Project dates: 14 Aug 2020- 13 Feb 2021

Lead Institutions: University of Oxford

Partner Institutions: UNICEF, WHO, USAID, Centers for Disease Control and Prevention, Child Helpline International, UNODC, World Without Orphans, World Childhood Foundation, the Global Partnership to End Violence Against Children, the Civil Society Forum to End Violence Against Children, Parenting for Lifelong Health, Early Childhood Development Action Network, Clowns Without Borders South Africa, Together for Girls, LEGO Foundation & multiple universities: University of Oxford, University College London, University of Cape Town, Ateneo de Manila University, University Putra Malaysia, Bangor University, University of KwaZulu-Natal.

Countries of focus: Global including all DAC countries (except Western Sahara, Guinea, and North Korea)

BACKGROUND

Challenges faced by families and children were significantly exacerbated by COVID-19 due to the social and economic ramifications of the pandemic, and [mobility and social networking disruptions](#)¹. Globally, more than 1.37 billion children were out of school or childcare which increased the risk of an [upsurge in child abuse](#)². In response to the crisis, the University of Oxford built on their alliance with multiple global and local grass roots partners to prevent child violence and mitigate parenting stress during the peak of the crisis. Through this project, they aimed to deliver evidence-based resources against child violence to [57 million families in DAC countries](#)³.

In the early stages of the pandemic, grants from the LEGO Foundation, Oak Foundation, and the University of Oxford COVID-19 Research Response Fund, as well as the UKRI GCRF Accelerate Hub supported the initial groundwork, by establishing relationships with key partners and developing the evidence-based child abuse prevention programme content. Subsequent UKRI GCRF/Newton funding built on this and facilitated the global delivery of COVID-19 parenting resources, enabling rapid scale-up in low resource settings, multi-sectoral engagement, easy access for resource limited populations, and adaptive evaluation. In the immediate and urgent pandemic response period, the project demonstrated the value of capacity building, multi-sectoral collaborative partnerships, and data sharing, with demonstrated effectiveness against child violence.

The materials have been distributed across 193.6 million families, and taken up by 33 governments, and incorporated onto websites by UNICEF, WHO, and the World Childhood Foundation and more – exceeding the target milestones and expectations. The project has also delivered initial impact. A survey of 1371 families receiving COVID-19 Parenting resources in Nepal, Malawi, Cambodia, South Africa, Sri Lanka, Zambia, Pakistan, North Macedonia, India and Cameroon also reported 78% reduction in physical abuse and 76% less emotional abuse for children, as well as a 84% increase in parent engagement in play, 91% increased confidence in positive relationship building, 84% increase in confidence to protect children from online and offline sexual abuse, and [74% increase capacity to cope with parenting stress](#)⁴.



PRINCIPLES IN PRACTICE

Alignment to global research agendas and locally identified priorities

Due to existing partnerships with WHO, UNICEF and grassroots organizations and networks, this project had an in-depth understanding of local needs and priorities. As a result, the resources developed were easily adaptable to different contexts. For instance, the Malaysian University of Putra Malaysia is working with the Department of Islamic Development (JAKIM) to produce a faith-based package integrating COVID-19 Parenting resources with messages from the Quran, Hadith or sirah for use by religious leaders to [support families during the pandemic](#)⁵. Additionally, and importantly, this project proactively contributed to WHO and UNICEF's COVID-19 priorities on protecting children against elevated violence during the pandemic.

Research capacity for rapid research

The COVID-19 Parenting project ensured rapid response to the pandemic by utilising the pre-existing research capacity and systems, which were established in part due to previous UKRI funding.

From 2012-2019 UKRI/ESRC supported evidence-based in-person parenting programmes, which built institutional and individual capacity through various schemes including UKRI GCRF Accelerating Achievement for Africa's Adolescents Hub, UKRI/ESRC studentships and UKRI/ESRC Future Leaders Awards. The additional funding provided in 2020 through the UKRI GCRF/Newton Fund COVID-19 rapid response call, enabled the project to build on the existing capacity and partnerships, which facilitated a rapid and

timely response to the COVID-19 crisis. As a result, within 6 months, the resources were translated into 100 languages, and [reached over 193.6 million people in 198 countries and territories](#) ⁶.

Open science and data sharing

Open access of the COVID-19 parenting project resources led to wide uptake and impact. Additionally, the use of open-source platforms and accessible versions of the resources enabled collaboration with over 600 implementing partners in 198 countries and territories and supported 33 governments. Lessons learned from the project were also actively shared with the global community of practitioners, policymakers and academics preventing violence against children through different channels: social media, meetings, webinars, and reports.

Equitable, inclusive, cross-sectoral, and interdisciplinary partnerships

The COVID-19 parenting program was developed and implemented through extraordinary stakeholder engagement and trusted partnerships, demonstrating the value of multilateral and cross-sectional partnerships for efficient response during a global health emergency. Multi-sectoral partners from grassroots to global level were involved in this project, which enabled rapid delivery of locally relevant content through equitable partnerships between these institutions and organisations. The project placed significant emphasis on co-creation and shared

ownership of resources, which also supported the wide dissemination and uptake of the resources. Public and community engagement was also an integral part of this project, which enhanced the acceptance of the parenting resources in local communities. The focus on inclusivity through these partnerships further ensured easy access for families with disabilities and limited contexts such as humanitarian settings (e.g., refugees, internally displaced persons).

KEY TAKEAWAYS

1. A combination of long-term and rapid response funding is important to ensure effective research response in epidemics and pandemics. Long term funding enables capacity building for research, which can then be built on by rapid response funding to facilitate fast and effective research response during epidemics and pandemics for greater impact.
2. Multi-sectoral and interdisciplinary partnerships across global, national, and local levels are important in ensuring rapid and effective research response. Furthermore, relationships and trust established through long term partnerships facilitate greater collaboration and coordination for greater impact.
3. Innovative and open resource dissemination methods, which are based on understanding of cultural context and local priorities ensure acceptance and large-scale impact of research.

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European and Developing Countries Clinical Trials Partnership (EDCTP) COVID-19 Response

EDCTP is the major channel of European support to global health research in Africa aimed at developing tools for the prevention and control of poverty-related infectious diseases. The EDCTP initiated a rapid emergency funding mechanism under its [Research and Innovation Actions](#) in response to the COVID-19 pandemic. This response is remarkable in that it harnessed existing rapid funding mechanisms and built on previous investments in pandemic preparedness and capacity strengthening activities that were initiated after the Ebola 2014-2016 outbreak.



KEY INFORMATION

Funders

European Commission, European and African Participating States

Total investments: Over €4.75m was initially invested in COVID-19 emergency call. Additional support from Participating States raised this amount to €12.75m (as of May 2021)

Duration of COVID-19 Emergency call: Opened on 3 April 2020 and closed on 17 April 2020

Number of projects funded: 28 projects funded (as of May 2021)

Countries of focus: Funded projects are being implemented in 25 sub-Saharan African Countries. Each project is conducted by a consortium of at least 2 European and 1 African institution

BACKGROUND

The European and Developing Countries Clinical Trials Partnership (EDCTP) is a public-public partnership, launched in 2003. Supported by the European Commission's Horizon 2020 Research and Innovation programme, which has provided a €683m investment for the period between 2014 and 2024, the EDCTP2 programme is implemented by an association of 14 European and 16 African countries. The €683m EU investment is complemented by contributions from European and African Participating States, and further support is received from third party partners.

Research is normally funded through annually launched funding calls with research themes outlined in annual workplans which are approved by the European Commission. Workplans for a particular year are submitted in the preceding year or approval. Hence the 2020 workplan, which was drafted in the course of 2019, included funds earmarked for emergency response in the event of to an infectious disease outbreak in 2020.

European countries

Austria, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden and the UK.

African countries

Burkina Faso, Cameroon, Congo, Ethiopia, Gabon, The Gambia, Ghana, Mali, Mozambique, Niger, Nigeria, Senegal, South Africa, Tanzania, Uganda and Zambia

PRINCIPLES IN PRACTICE

EDCTP's [Emergency COVID-19 response call](#) inspired the development of the [COVID CIRCLE funder principles for supporting high-quality research for the most pressing global needs in epidemics & pandemic](#). Some examples of innovative practice of the Principles are highlighted below.

Alignment to global research agendas and locally identified priorities

The call was aligned to the [WHO Research Roadmap](#) with a focus on the following four thematic gaps: therapeutics, diagnostics, serological testing and understanding the natural history of infection.

Research capacity for rapid research

Investment in pandemic preparedness

Following the 2014 West Africa Ebola outbreak, an EDCTP Call for Proposal aiming to develop a new workstream for epidemic preparedness was approved by the European Commission as part of the 2016 EDCTP Work Plan. The €10m from the H2020 program was matched by the Participating States supported the initiation of the African coalition for Epidemic Research, Response and Training (ALERRT) and the Pan-African Network for Rapid Research, Response, Relief and Preparedness for Infectious Diseases Epidemics (PANDORA-ID-NET). The continued support for these international multidisciplinary consortia built research capacity and promoted a rapid response at the onset of the COVID-19 pandemic. For instance, ALERRT was involved in the development of crucial guidance and protocols (adapted to the African context) for the clinical management of COVID-19¹ and PANDORA-ID-NET carried out early studies that informed countries about the necessary strategies for the detection of COVID-19 cases at points of entry in various African countries².

Rapid research mechanism

Since 2018 the EDCTP Strategic Research Agenda has included an emergency response mechanism to support research response in the event of an infectious disease outbreak. This was incorporated into annual work plans with a commitment of €2.25m by the European Commission. The first projects funded under this mechanism were in response to the 2018 Ebola outbreak in the Democratic Republic of Congo and lessons learnt from the this call have informed the process used to activate the mechanism in response to the COVID-19 pandemic. The 20 COVID-19 projects initially funded under this mechanism (as of June, 2020) increased to 28 projects (as of May, 2021) after additional funds were secured from Participating States including France, Sweden, South Africa, Austria, Norway and the United Kingdom.

Specific modifications to normal funding processes to facilitate rapid research include:

1. Call readiness ahead of the approval of the 2020 work plan (which was still under review at the onset of the pandemic) leading to rapid launch of the emergency call.

2. Shortening call duration to 2 weeks
3. Expedited proposal review process
 - a. Shortening duration of expert review process
 - b. Organising a series of small consensus meetings
4. Support for the initiation of research in advance of proposal review and contracting
 - a. Applicants with fundable proposals could ask for an immediate start date for projects, the earliest being the date of call closure. Any accrued costs were potentially eligible for reimbursement. Although this favoured the initiation of rapid research, less-resourced institutions could have been put at a disadvantage
5. Expedited contracting processes

Trigger Criteria for emergency response

An official declaration of a situation as:

1. a Public Health Emergency of International Concern (PHEIC) according to the World Health Organization
2. a public health emergency under Decision 1082/2013/EU
3. an emergency under applicable national frameworks and regulations.

COVID-19 research through existing grants (funded prior to COVID-19)

Conditions stipulated in the Horizon 2020 framework do not allow supplementation of existing awards (in addition to agreed project budgets). Acknowledgement of the potential to generate evidence on COVID-19 led to EDCTP accepting amendment requests from projects seeking to add on COVID-19 research questions to their previous objectives.

Equitable, inclusive, cross-sectoral and interdisciplinary partnerships

EDCTP's funding model promotes inclusivity and interdisciplinarity with research partnerships required to include at least two European and one African partner in their research. 15 of the 28 COVID-19 projects are led by institutions from Sub-Saharan Africa.



Open science and data sharing

Costs related to data management and data sharing are eligible for reimbursement during the project duration.

Appropriate ethical consideration

Consistent long-standing investments in ethics and regulatory capacities of countries in Sub-Saharan Africa have strengthened capacity for ethical oversight and governance over the years. Over 45 grants (valued at €15.59m) to support ethics capacity were awarded by EDCTP between 2014-2020. EDCTP has supported the African Vaccine Regulatory Forum (AVAREF) bringing together multi-country experts who play a key role in ethics guidance during the COVID-19 pandemic.

Collaboration and learning enhanced through coordination

Strategic partnerships

EDCTP provides a coordinated approach to the European Union's support for collaborative clinical research addressing poverty-related infectious disease in Sub-Saharan Africa. These efforts are supported by strategic partnerships with policy and governance agencies including WHO Afro, AUDA-NEPAD and Africa CDC to promote collaboration.

In addition to the emergency response mechanism for COVID-19, EDCTP collaborated with the Africa CDC to launch a call for "Capacity development for disease outbreak and epidemic response in sub-Saharan Africa" in 2020. The objective of the call is to establish a cohort of epidemiologists and biostatisticians to boost capacity for surveillance of infectious diseases outbreaks.

Another collaboration with the Botnar Research Centre for Child Health (BRCH) resulted in jointly funded multi-country research projects aiming to mitigate the impact of COVID-19 through improved surveillance and management of infections.

Researcher support

The EDCTP knowledge hub is an online platform which fosters researcher collaboration and supports researchers from low- and middle-income countries with data management and research protocol development resources.

Engagement with funder coordination activities

EDCTP engaged with the UKCDR & GloPID-R COVID-19 Research Projects Tracker and associated Living Mapping Review of COVID-19 funded research projects to guide the prioritisation of funded projects. These resources serve as “important tools used by funders including EDCTP to gather information on knowledge gaps in terms of research topics and geographical coverage”.

SUMMARY OF LEARNING

Key learnings include:

1. Capacity to undertake rapid research is facilitated by:
 - a. Prior investment in pandemic preparedness initiatives
 - b. Existence of a ‘tested’ emergency response mechanism which could rapidly be activated

2. Researcher support promotes application of the COVID CIRCLE Seven Principles.
3. Strategic partnerships and collaborations with diverse global health actors strengthens the research response to the COVID-19 pandemic.
4. Flexibility of EDCTP to review and adapt call process to facilitate rapid research response funding.

RECOMMENDATIONS

Key recommendations include:

1. Continued investment in preparedness initiatives and resourcing of existing programmes e.g. AVAREF
2. Flexibility and adaptability to emerging research needs in a rapidly evolving pandemic considering:
 - a. Changing research priorities
 - b. Impact of the pandemic and public health interventions on research processes including field work, transport of biospecimen between countries etc.

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Global Effort On Covid-19 Health Research (GECO)

GECO is a cross-UK funder initiative specifically targeted at the COVID-19 research response, to address knowledge gaps in applied research in low-and-middle-income countries (LMICs), as defined by OECD-DAC classification. The call was underpinned by: the need to employ a truly global approach to health research in LMICs, taking cognisance of the unique contextual research needs; alignment to best research practice guidance (by GECO and other UK funders); and the need to address gaps in research evidence based on WHO Research Roadmap (and other research priorities).

KEY INFORMATION

Funders

UK Research and Innovation (Medical Research Council - MRC) and the UK Department of Health and Social Care (DHSC) through the National Institutes of Health Research (NIHR)
Funds form part of UK Official Development Assistance (ODA) commitments

Duration of funding call

The call was open between 18th May and 28th September, 2020 and decisions were made on a rolling basis in 3 consecutive rounds

Total investments: £11.6m

Number of projects:

Round 1 & 2 - 19 projects

Round 3 - Impacted by the recent review of UK ODA funding allocation. Further updates on these awards are pending

Countries of focus:

Projects involve 21 countries across Africa, Southeast Asia, Latin America and South America

BACKGROUND

The COVID-19 pandemic poses a particular challenge for resource-constrained settings considering the wide-reaching health, economic and social impacts. Given the global nature of the pandemic funders of the GECO call were quick to recognise that research portfolios could be skewed to high-income settings, potentially leaving pertinent research questions relevant to or specific to LMICs unaddressed. Further to take a truly global approach to tackling the pandemic it was recognised that “a global pandemic requires a world effort to end it – none of us will be safe until everyone is safe”¹. The GECO call was therefore launched to address specific gaps in funded research addressing specific areas of the [WHO Coordinated Global Research Roadmap](#) with a focus on low-and-middle-income countries.

Developing the Seven Funder Principles for High Quality research in Epidemics and pandemics

The Seven Funder Principles were created as part of the development of the GECO call and were inspired by the EDCTP [emergency COVID-19 response call](#) specifications published in April, 2020. The UK DHSC initiated this work and further refinement and linkage to best practice guidance was undertaken by the UK Collaborative on Development Research (UKCDR) and the Global Research Collaboration for Infectious Disease Preparedness (GloPID-R) between May and June 2020. In the interim, the EDCTP call specifications were incorporated into the GECO call requirements of grantees with the subsequent linkage made to the Seven Funder Principles in the [GECO Call Specification](#) once they were formally adopted. Given the scope of the GECO call, the Principles are of particular relevance to LMICs although they are globally applicable to research funding practice, aimed at improving an effective research response to this and future epidemics and pandemics. The major UK funders of development research and GloPID-R funders have agreed to align to the Principles which were published in the [Lancet](#) in July, 2020. Continuing engagement and further endorsement is being sought from other research funding organisations, researchers and other actors in the international development research sector.

PRINCIPLES IN PRACTICE

The GECO call was aligned to all Seven Principles as outlined in the [GECO call specifications](#).



Activities of the call to meet three of the Principles are outlined here in detail.

Alignment to global research agendas and locally identified priorities

The GECO call was aligned to the research priorities outlined in the [WHO Coordinated Global Research Roadmap](#) with a focus on addressing the research gaps relevant to low and middle income settings, in particular: ‘epidemiological studies’; ‘infection prevention and control’; ‘clinical management’ and ‘social sciences in the outbreak response’. The call also aligned to the [research priorities of relevance to LMICs](#) identified in the collaborative study undertaken by the Africa Academy of Sciences (AAS), the Global Health Network (TGHN) and UKCDR².

The remaining research priorities which were of global relevance were covered by early investments of UK funders (including MRC and DHSC) in large clinical trials for vaccines, diagnostics and drug treatments. Noteworthy among these is the [RECOVERY trial](#) which demonstrated that dexamethasone (a cheap and readily available drug) improves the prognosis of severe COVID-19 infections and this has significantly influenced treatment practice globally including in LMICs³.

Equitable, inclusive, cross-sectoral and interdisciplinary partnerships

The call particularly encouraged applications from LMIC-based researchers and at least 6 of the funded research projects are led by research organisations in LMICs. Several of the remaining projects involved research partnerships between LMIC and UK-based institutions.

Collaboration and learning enhanced through coordination

Funder co-ordination and collaboration

The DHSC through NIHR and UKRI/MRC collaborated to fund the GECO call building on a previous model of co-funding other domestic and international research projects.

This model improved efficiency and scale by:

- bringing in expertise from both organisations to co-develop the call specification
- coordinating staff from both funding agencies to deliver specific elements of the call; and
- increasing the budget available for the call as each funder contributed an equal budget.

Ultimately, one funder administers and manages the on-grants on behalf of the co-funders. This approach ensured the successful and rapid delivery of the first and second rounds of the GECO call. Further updates on the round 3 call are pending following UK ODA budget reductions which were introduced following the [December 2020 funding committee](#). By working flexibly together the two funders have ensured that all on-going research funded under rounds 1 & 2 have been maintained.

Researcher support and coordination

These two funders also worked together to ensure researchers funded by the GECO call are supported throughout their awards to undertake high quality research which results in useful outputs. DHSC provided £50,000 with MRC and Wellcome contributing additional funds to support UKCDR to develop a researcher and coordination platform. This became part of the activities of the COVID-19 Research Coordination and learning (COVID CIRCLE) initiative. The support is planned to run for the duration of the GECO funded projects.

The [COVID CIRCLE Researcher Platform](#) has two parts:

- a public facing website which collates relevant resources and events and links to epidemic research networks to enable coordination and collaboration

— a closed networking platform for the GECO funded grantees for enhancing interaction between researchers, engaging with funders, providing access to guidance and resources and promoting exchange of ideas. This platform has also been opened to grantees of some of the main UK-funded rapid response calls including FCDO/Wellcome Joint Initiative on Research in [Epidemic Preparedness and Response \(JIREP\)](#), UKRI/GCRF Newton Agile Response call to address COVID and R2HC.

SUMMARY OF LEARNING

1. A new rapid research funding response mechanism has been established between UK funders working together to address WHO research gaps for COVID-19 relevant to low and middle-income settings.
2. Funder collaboration through established funding models maximised speed and efficiency to deliver a new rapid research funding process.
3. Researcher support promotes the networking and sharing of ideas for undertaking high-quality research and application of the Seven funder Principles.

RECOMMENDATIONS

1. Development of a well-established rapid response mechanism based on learnings from domestic research funding and the development of the GECO call.
2. Utilization of funder coordination initiatives including COVID CIRCLE, a partnership between UKCDR and GLoPID-R funders with the aim of coordinating funding efforts.
3. The development of a mechanism for rapid prioritization of funded research to yield definitive answers to pertinent questions in the pandemic with consideration of context specific research.

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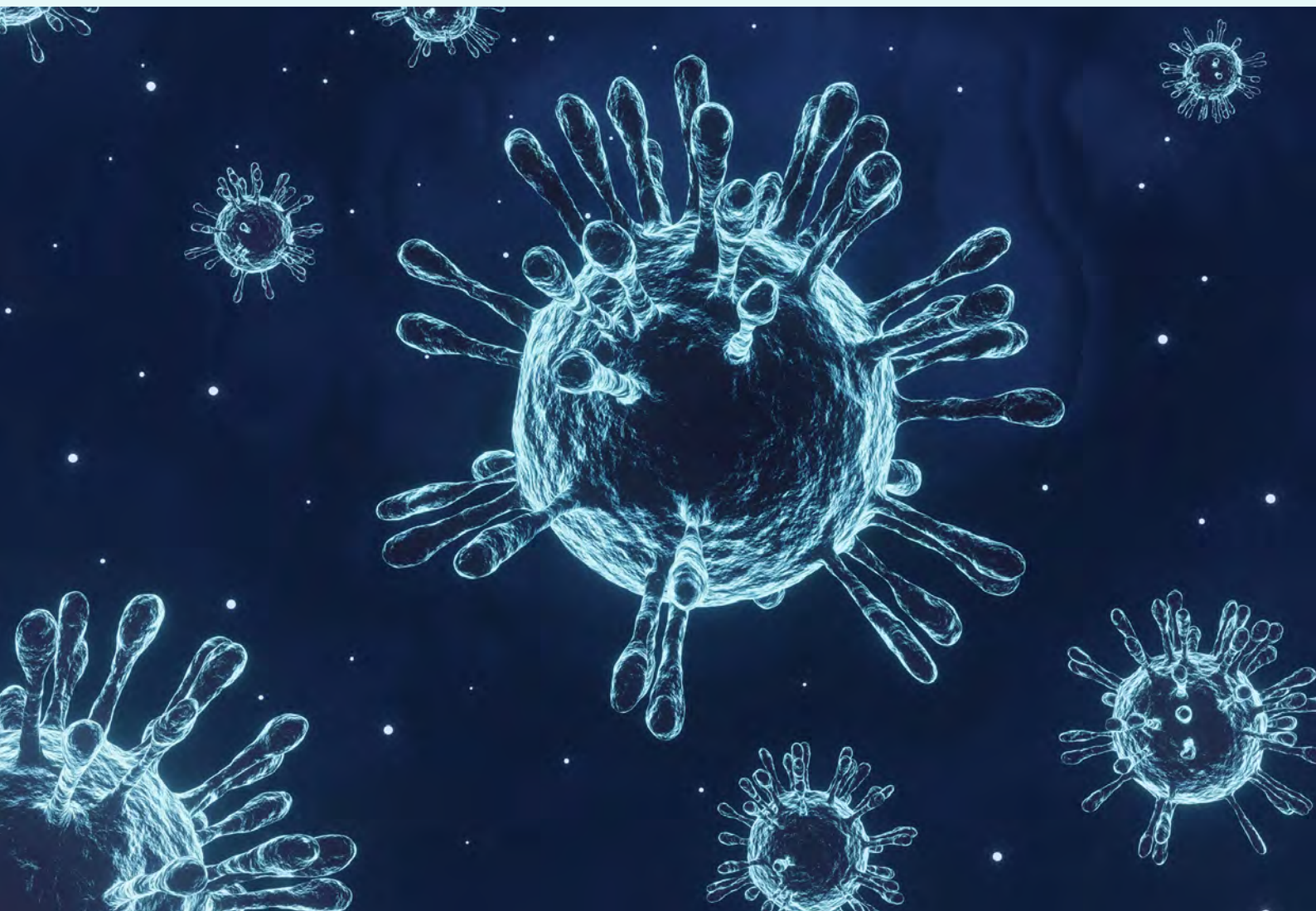
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Available from:

<http://www.nejm.org/doi/10.1056/NEJMoa2021436>

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This case study was developed by Emilia Antonio, Alice Norton and the COVID CIRCLE Team in collaboration with Val Snewin, UK Department of Health and Social Care (DHSC).





International COVID-19 Data Alliance (ICODA)

ICODA aims to promote open science and data sharing in research by developing a different way of securely sharing data for analysis. ICODA has created a secure platform – [‘The Workbench’](#)¹ – through which data partners and researchers can securely access and analyse data, and collaborate throughout the process. The Workbench is not a data repository but a bridge between data partners and researchers, where both can generate insights that will be left behind on the platform for others to build on.

KEY INFORMATION

Funders: COVID-19 Therapeutics Accelerator

Investment: \$5m USD initial

Total investments: Project underway and seeking additional funding

Project Dates: July 2020 – present

Convening partner: Health Data Research UK

Partner Institutions: African Academy of Sciences, Aridhia, BREATHE, CAIAC, Certara, Cytel, DNASTack, Generation Scotland, Genomics England, Global Alliance for Genomic Health, HDR Network Canada, Infectious Diseases Data Laboratory, ISARIC, NICE, Novartis, Preva Group, RDA Research Data Alliance, SAIL Databank, UK Secure e-Research Platform, Shivrom

Countries of focus: Global, Low and Middle Income Countries

BACKGROUND

The impetus for ICODA came from the COVID-19 pandemic, but the issues it addresses in data access and use are long-standing. Researchers, especially in lower resource settings, face barriers to accessing data due to handling and storage requirements of biomedical data. ICODA has created a platform, the Workbench, which can support the administrative and logistical aspects of access to datasets by acting as a bridge between researchers and data partners. It allows researchers to securely access and analyze data held by a data partner (or via a third party), without having to store the data themselves. ICODA also aims to build trust in and strengthen governance of this process, to enable better collaboration and confidence for funders to disburse funding to projects that would use the platform. This will be achieved through a governance board that will oversee activities across multiple groups and committees focused on specific aspects of the initiatives, including public and patient involvement and feedback.



PRINCIPLES IN PRACTICE

Alignment to global research agendas and locally identified priorities

Acting as a bridge between researchers and data partners, the platform can be easily leveraged to facilitate research shifting to emerging priorities. By facilitating the creation of relationships between partners and researchers, ICODA and its workbench are creating trust in their process that will make future investments in the program, for example through targeted projects, that can address emerging and local needs.

Research capacity for rapid research

With an emphasis on collaborative research across projects, the ICODA platform is a space where researchers can document the analyses they have done and the data they have accessed. Though ICODA arose from the rapid response surrounding the COVID-19 pandemic, its intention is to serve as a foundation for preparedness for future pandemics and global health issues by collecting this documentation and strengthening governance in a non-crisis period. In future demands for research during crises, this repository of documentation will speed future research with replicable steps that researchers can learn from.

Equitable, inclusive, cross-sectoral and interdisciplinary partnerships

By working to remove the barrier of data storage, ICODA could leverage more equitable partnerships between researchers and organizations. To increase awareness and uptake, and to support researchers, a Grand Challenges call was launched for projects to use the Workbench. To date, 10 projects have been selected for a Challenges Award, 7 of which have a majority of team members from low- and middle-income countries (LMICs).

Open science and data sharing

ICODEA was built to facilitate data sharing in a secure manner, and to provide a repository of methodologies that others can use in further work. The Workbench was created with needs of data partners and researchers in mind, with flexibility for partners in sharing their data, and researchers in how to access and analyze. ICODA seeks to build trust in its platform and process, which will hopefully encourage more partners to join the platform.

The Workbench's capabilities are a key component around which collaborative data science projects are organized, as demonstrated by the two existing Driver Projects. A meta-analysis of clinical trials for COVID-19 treatments and an assessment of the impact of the pandemic on global preterm birth rates and infant and maternal mortality, these projects both demonstrate these capabilities and offer a chance to further develop and test new tools. The new Grand Challenge projects will also be Driver projects, creating a broad range of questions being addressed by researchers using the platform.

Protection from harm

A governance board has been installed to oversee ICODA's actions, along with several steering groups and committees for specific foci of the platform. Guided by the board, the platform adheres to the GDPR's concepts of the 'five safes' - safe people, projects, data, settings, and outputs.

Appropriate ethical consideration

By aligning to the five safes, ICODA acts as a partner in ensuring good governance of the ethical acquisition and use of the data. The Ethics Advisory Council, comprised of external experts, assisted ICODA in creating an [Ethics and Governance framework](#)² for ICODA, and will monitor ICODA's adherence to its principles.

Collaboration and learning enhanced through coordination

ICODEA fosters collaboration through a shared platform that emphasizes sharing of queries, data outputs, and results. Through the Workbench, it is possible to work with several data sets from different sources,

encouraging possibilities for collaboration between multiple countries, researchers, and organisations.

SUMMARY OF LEARNING

Platforms such as ICODA are not easily set up, and require extensive funding, effort, and continued vision to succeed. As a new initiative, large impacts were not anticipated within the first year of funding. However, there are promising results emerging from the initiative, particularly through the researchers in LMICs participating in the Grand Challenge projects. ICODA's vision to be a bridge between data partners and researchers could catalyse long-term changes in the ways researchers collaborate with data partners.

1. Continued feedback loops ensure that the platform can respond to changing needs and reflect requirements of data partners and users.
2. Strong partnerships between funders have been a key strength so far in the establishment of the platform. This was a key lesson learned from the experiences of its convening partner, HDR UK, from whose [Innovation Gateway](#)³ initiative ICODA drew inspiration.
3. Long-term funding is needed to ensure stability for the program, which will enable it to strengthen its governance and build trust in the platform among partners. In the next time of need, it could then be a key player in the fast scaling up of research to address emerging priorities and access to data to accomplish this.

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Research for Health in Humanitarian Crises (R2HC) COVID-19 Response

In response to the COVID-19 pandemic, Elrha's Research for Health in Humanitarian Crises (R2HC) programme triggered its "responsive funding mechanism" to generate rapid evidence for the control of infections in humanitarian settings. The emphasis on strong partnerships and extensive experience in funding research in often very challenging contexts were key factors of success of the response. Lessons learnt from funding research in the West Africa Ebola outbreak (2014-2016) and food security crisis in the horn of Africa (2017) were also key in facilitating an effective response.

KEY INFORMATION

Funders: Elrha's R2HC programme is co-funded by the UK Foreign, Commonwealth and Development Office (FCDO), Wellcome, and the Department of Health and Social Care (DHSC) through the National Institute for Health Research (NIHR)

Total investment: Up to £2.44m invested

Number of projects funded: 15 projects

Countries of focus: Colombia, Turkey, Burkina Faso, Mali, Zimbabwe, DRC, Kenya, Uganda, Somalia, Lebanon, Ethiopia, Ukraine, Afghanistan, Gaza, Jordan and Bangladesh



Research for health
in humanitarian crises

elrha



NIHR | National Institute
for Health Research



BACKGROUND

Research for Health in Humanitarian Crises (R2HC) was launched in 2013 by Elrha, an global charity that finds solutions to complex humanitarian problems through research and innovation. It seeks to improve health outcomes for people affected by humanitarian crises, including refugees and internally displaced persons (IDPs) in camps or urban humanitarian settings, by strengthening the evidence base for public health interventions.

Targeting people affected by humanitarian crises, ensures the inclusion of often marginalised vulnerable groups in research and promotes the identification of unique context-relevant solutions to health challenges. Research projects are funded through annual “open” funding calls to yield evidence around specific health issues or themes to improve health outcomes of populations involved. Up to £4.5m was invested in the 2020 open funding call and an additional responsive funding call was triggered at the onset of the COVID-19 pandemic.

PRINCIPLES IN PRACTICE

Grantee requirements for best practice are outlined in the rapid responsive call specifications and some innovative applications are highlighted below.

Alignment to global research agendas and locally identified priorities

The call was geared at generating rapid evidence to respond to on-the-ground needs and address research gaps. Hence, there was engagement of reviewers and experts with operational background with deep contextual knowledge of research priorities in funding processes. The call was also aligned to the WHO Coordinated Global Research Roadmap priorities.

Research capacity for rapid research

The majority of projects were funded through the rapid responsive call and only a few existing projects pivoted to COVID-19. The R2HC Strategic Advisory Group - comprising representatives from key UN and humanitarian agencies and public health research institutions - and subsequently the funders, approved the launch of the responsive mechanism following an assessment of the COVID-19 crisis against the trigger criteria (Table 1) which assess the need for research, feasibility of research and research scope for alignment with R2HC funding.



The rapid call built on review processes for the regular (annual) funding calls with the following modifications, as shown in Figure 1:

1. Shortening of proposal submission and review processes (from a two-staged process to a single stage)
2. Expedited review processes. This was facilitated by:
 - a. Directing existing capacity to the COVID-19 funding call
 - b. Reviewing proposals at multiple designated timepoints as they were received (3 rounds of proposal review were employed)
 - c. Drawing on an existing network of technical reviewers and a [Funding Committee](#) with expertise across multiple thematic areas and humanitarian settings
3. Expedited contracting and due diligence. This was facilitated by:
 - a. Releasing grant agreement template and due diligence requirements as part of the application process and requiring them to be accepted in full (non-negotiable)
 - b. Having different tiers of due diligence requirements relative to the perceived risk of grantees
 - c. Enabling existing Elrha grantees to carry forward their previous due diligence
4. Initiation of research in advance of contracting
 - a. This was facilitated by ensuring award letters indicating the funding agreement were available in advance of the contract

These processes enabled rapid funding of research without compromising on quality of funded projects. Further, rapid research was facilitated by pre-existing research relationships and building on the annual funding call networks. This enabled attraction of large numbers of diverse proposals (over 450) and positioned humanitarian researchers to rapidly produce and submit research proposals. Another factor of success was the commitment of R2HC to fund applicants located in any country based on quality of their proposals.

Table 1: Some elements of the trigger criteria for the responsive funding mechanism

1.	A significant emergency event e.g. PHEIC
2.	Context of emergency response <div> a. Humanitarian LMICs or fragile States b. Protracted or sudden onset crisis c. Conflict d. Refugee situation e. Natural disaster </div>
3.	The need for research <div> a. Significant gaps in research identified b. The potential for research outputs to have real impact/ contribute to existing evidence </div>
4.	Feasibility of research <div> a. Considering the security situation b. Timely research c. Ethical considerations in an emergency context d. Accessibility of research sites </div>

Equitable, inclusive, cross-sectoral and interdisciplinary partnerships

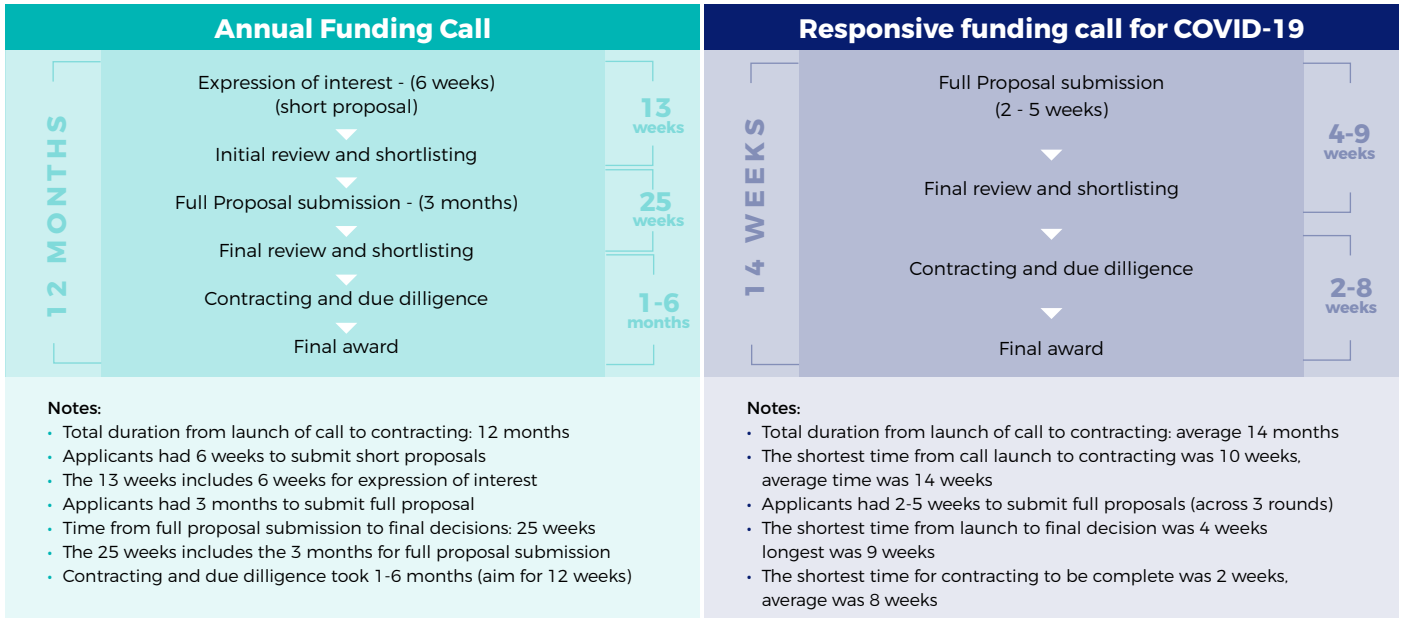
Partnerships between academic institutions and humanitarian organisations are a requirement for applying for R2HC funding as these promote research relevance, rigor and uptake into policy and practice. Partnerships were even more relevant during the COVID-19 pandemic where travel restrictions required strong local involvement to undertake research successfully. In most cases, research teams included academic institutions from the country or region where the study was conducted, as well as the local operational partners – including host governments - who were key audiences for research findings.

R2HC’s innovative activities for promoting equitable partnerships in normal times (open funding call) include:

1. Provision of seed money (up to £10k) to support development of partnerships for selected proposals in the review process
2. Provision of bespoke partnership support
3. Provision of written guidance materials and tools on effective partnerships

On account of the speed with which the research processes were initiated, activities to support gradual building of partnerships could not be undertaken. Rather, existing relationships between researchers working together prior to the pandemic were harnessed leading to rapid mobilization for response. Of the 15 projects funded in the responsive mechanism 14 were led by organisations R2HC had not previously funded.

Figure 1: Schematic showing modification of annual funding call process for the responsive funding call for COVID-19



For this cohort of grantees, partnerships were supported by rapidly bringing grantees (including in-country partners) together as a cohort to regularly discuss challenges faced in conducting rapid research. Learning and best practice was shared across the cohort on topics including operational challenges, research uptake and working with communities affected by crises. Further, regular formal and informal follow-ups to assess adherence to the principles and address any difficulties faced in ensuring equity in partnerships were also done.

Open Science and data sharing

R2HC requires research outputs to be open access and allows for flexibility around funding to support this. For instance, providing support for publications resulting from grants even after grant closure.

Protection from harm and appropriate ethical consideration

R2HC has developed an [ethics tool](#) to offer practical ethical guidance to researchers to address ethical challenges related to the design, implementation of research and dissemination of research outputs.

Collaboration and learning enhanced through coordination

Researcher support

Grantees were brought together into a learning cohort which promotes exchanging ideas, collaboration and addressing potential challenges with adherence to the principles.

Evaluation and learning

A process evaluation of the COVID-19 rapid response has been undertaken to gain insights into ways of improving funding processes for rapid research. Lessons learnt from this will improve preparedness for future pandemics.

SUMMARY OF LEARNING

1. Support provided by funders to research teams promotes adherence to the seven funder principles.
2. Harnessing existing rapid research funding mechanisms promotes the initiation of rapid research.
3. Running an open funding call, rather than working only through pre-existing partnerships, enables a diversity of research teams to apply for funding (including from LMIC settings), and encourages a diverse range of research topics that address locally identified research needs, and where there is greatest potential for real-time uptake of findings.
4. Research funding processes can be adapted/modified in acute crises to address research needs without compromising research quality.

RECOMMENDATIONS

1. Evaluation and learning from the response to COVID-19 to:
 - a. Identify characteristics of studies that succeeded in influencing emergency response in real-time to guide prioritisation of research during future epidemics and pandemics.
 - b. To inform funders' approach to funding research in future epidemics and pandemics.
2. Further review of rapid funding mechanisms to develop innovative ways of further expediting funding processes.

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ACKNOWLEDGEMENTS

This case study was developed by Emilia Antonio, Alice Norton and the COVID CIRCLE Team in collaboration with Simon Pickard, Research for Health in Humanitarian Crises (R2HC), Elrha.

ANNEX B. COVID CIRCLE ONE YEAR COVID-19 FUNDING ANALYSIS

INTRODUCTION

As part of the COVID CIRCLE initiative, the COVID-19 Research Project Tracker by UKCDR and GloPID-R is a live database of research projects funded in response to the global pandemic. By providing an overview of research projects mapped against the priorities identified by the WHO in their Coordinated Global Research Roadmap on COVID-19 published in February 2020, the tracker has supported funders and researchers to deliver a more effective and coherent global research response. Since its launch in April 2020, the tracker contains more than 10 thousand projects worth more than \$4.7 billion from over 200 funders around the world and has been viewed close to 30 thousand times.

As part of the ongoing efforts by COVID CIRCLE to enhance the effectiveness and coherence of the global research response to the pandemic, this analysis makes use of the April 2021 version of the tracker to understand how the research response has evolved in the year since the launch of the tracker, thereby providing key insights to funders that may be used to inform the next phase of the research response.

To further COVID CIRCLE's mission this analysis places particular emphasis on research focusing on low- and middle-income countries (LMICs) – defined as any research project that is taking place in at least one LMIC¹. This includes any project where the research may be taking place in a high-income country, as long as that research is also partially taking part in at least one LMIC (based on the information provided).

It should be noted that this analysis should be considered as an extension to the open-access, peer-reviewed paper produced by COVID CIRCLE (ref) that provides an in-depth analysis of the breadth of funding, remaining gaps, opportunities, and trends – which is updated on a quarterly basis. Therefore, this analysis will not duplicate that of the quarterly-updated paper.

DATA LIMITATIONS

The over-arching limitation of the data in the tracker is the varying levels of completeness – which is unsurprising in light of the multiple sources of data from the more than 200 funders around the world. Most notably, data on financial information was only available for 119 of 201 funders included in this version of the tracker – translating to 59.2% of all projects. This figure is reduced to 45.1% when only considering LMIC-focused projects. With less than half of the LMIC-focused projects having financial information, this analysis avoids presenting any key findings based on amounts of funding – focusing instead on the number of projects.

Another key consequence of the varied levels of data completeness is the potential implication that a lack of qualitative data (e.g. abstracts) has on the accuracy of any coding that was performed on research projects – most notably when categorising projects against the priority areas outlined in the WHO Research Roadmap. To offset the impact of this, all coded projects performed by a member of the COVID CIRCLE Team were validated by an independent reviewer not involved with the initial screening and coding process.

¹ LMICs are, in turn, defined as being any country on the OECD Development Action Committee list of Official Development Assistance Recipients.

Lastly, the comprehensiveness of the tracker database is limited to those funders that either provided data to the COVID CIRCLE team or who have made their awards data publicly (and freely) available online.

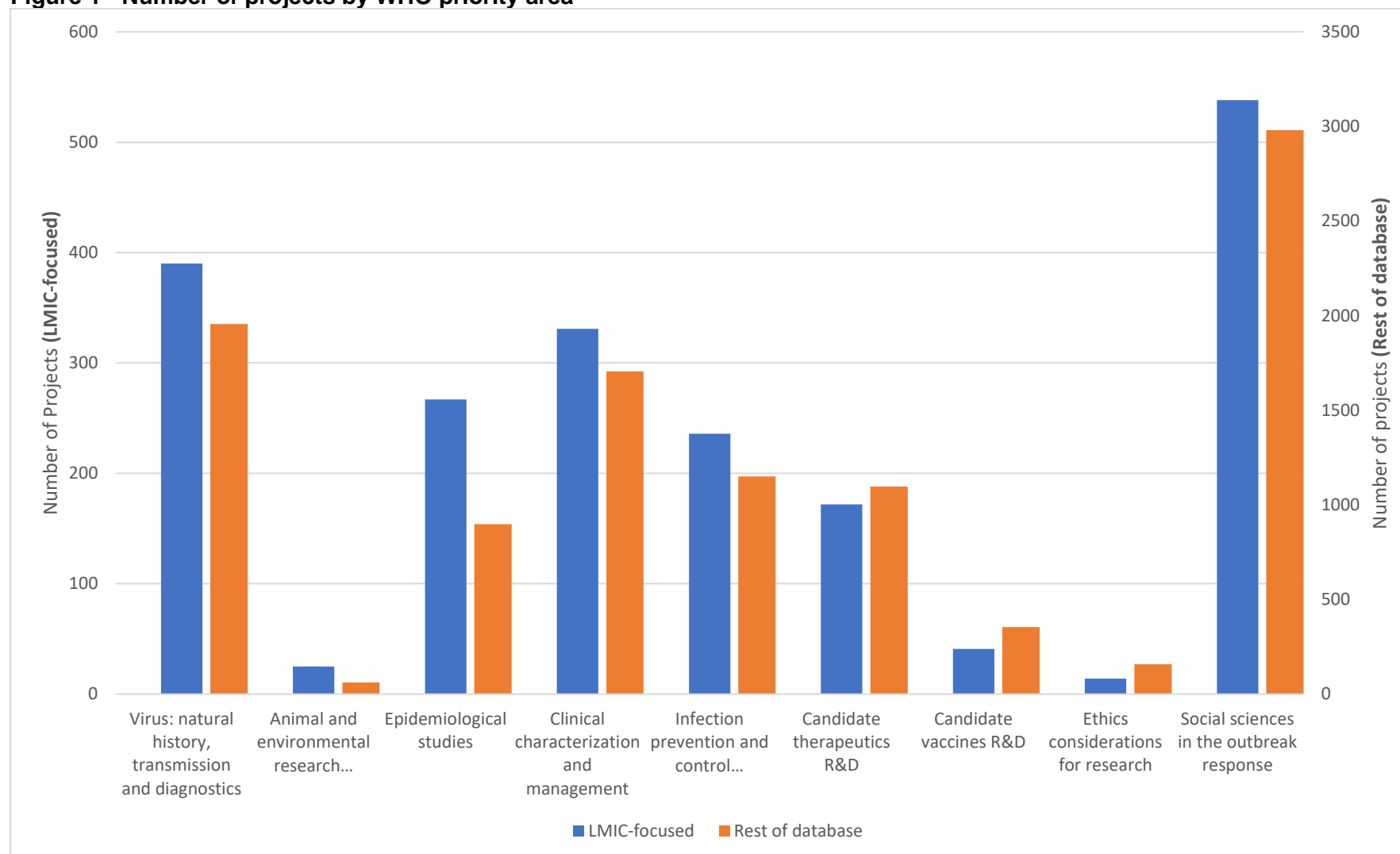
WHO PRIORITY AREAS

When comparing the portfolio of LMIC-focused projects on the tracker (1,706 projects) to the rest of the database (8,902 projects), in terms of the priority areas outlined in the WHO Research Roadmap, it can be seen from Figure 1 that, though the distribution of the LMIC-focused projects across the priority areas largely reflect that of the rest of the (non-LMIC-focused) portfolio, there are some key differences to consider. Firstly, the data on the tracker suggests that COVID-19 research relevant to LMICs focus more on epidemiological studies than the research from the rest of the database being conducted elsewhere. Not only does the 'Epidemiological Studies' priority area rank higher for LMIC-focused research (with an upper-middle ranking of fourth out of nine priority areas) than for the rest of the database (lower-middle at sixth), the proportion of projects under this priority area is significantly greater for LMIC-focused research (15.7%) than for the rest of the database (10.1%).

When looking deeper into the priority areas, much of this emphasis on epidemiology can be thought of as being driven by the large number of projects examining transmission dynamics – the second-most commonly-funded of the 44 sub-priority areas for LMIC-focused research, constituting 9.0% of the 1,706 projects under consideration (compared to just 5.7% of projects on the rest of the database).

Key differences also emerge when examining the opposite end of the priority area rankings. Interestingly, while the 'Animal and Environmental Research' and 'Ethics Considerations for Research' are the two bottom-ranked priority areas for both the LMIC-focused research and research being conducted elsewhere, their rankings differ between the two different subsets of data ('Ethics Considerations for Research' ranking last for LMIC-focused data and 'Animal and Environmental Research' ranking last for the rest of the database). Furthermore, for either sets of data, the number of projects relevant to the bottom-ranked priority area (14 projects under the 'Ethics' priority area for LMIC-focused data and 62 under the 'Animal and Environmental Research' priority area for the rest of the database) is significantly smaller than the number of projects under the corresponding eighth-ranked priority area (56% and 39.2%, respectively).

Figure 1 - Number of projects by WHO priority area



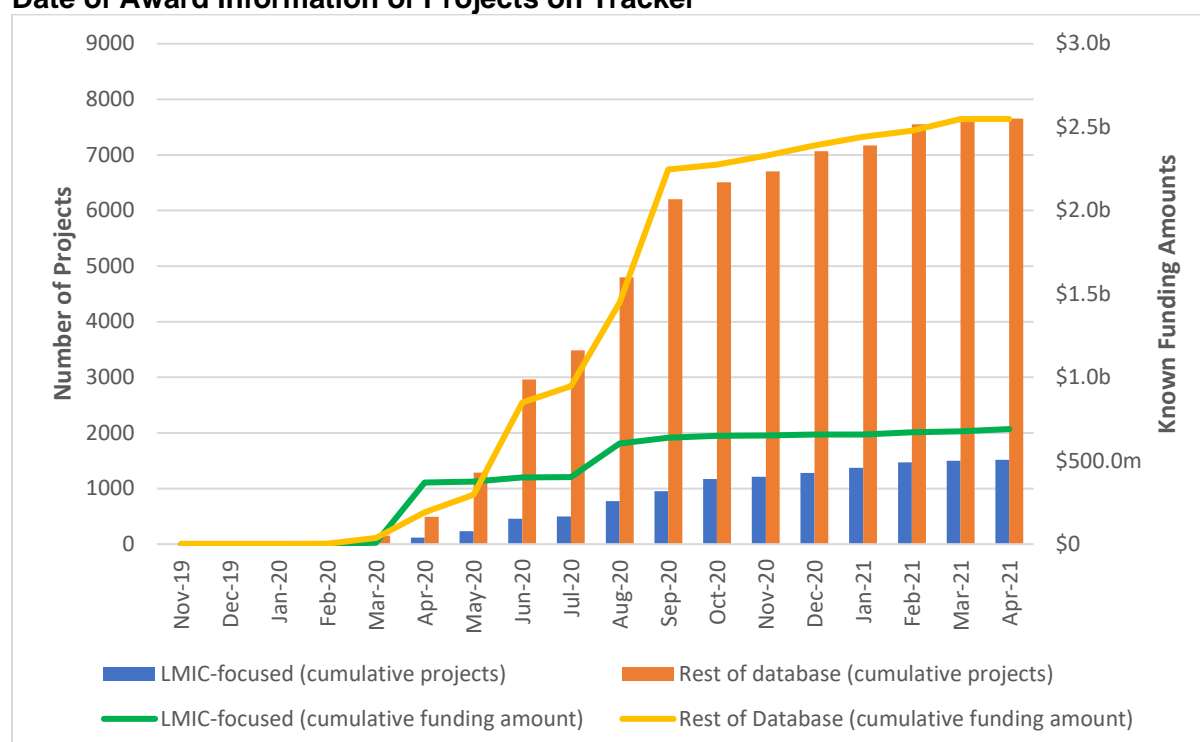
Note for Figure 1: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

OVERALL TIMELINE OF LMIC-FOCUSED FUNDING

Analysing how the size of both sets of data have evolved over time again reveals broad similarities with some key differences. By plotting the number of projects for both sets of data according to the publication date of award information by funders (where available), Figure 2 can be used as an approximate timeline to understand when projects were funded during the pandemic response. Generally speaking, while both sets of data see their largest increases over the summer of 2020, the increase in the number of LMIC-focused data was at its greatest in August 2020 (276 projects) – two months after the peak increase for the rest of the database (1,678 projects in June 2020). Figure 2 also shows that a greater proportion of LMIC-focused data were added to the tracker in the past six months (between November 2020 and April 2021) than the rest of the (non-LMIC-focused) database.

In terms of funding amounts, while Figure 2 shows that the greatest increase for LMIC-focused projects took place in April 2020 (\$28.2m), five months prior to the greatest increase experienced for the rest of the database (\$841.3m in September 2020), it is worth reiterating the issues with the completeness of the financial information. Specifically, financial information could only be obtained for 59.2% of the projects in the entire database. This figure is reduced to 45.1% when only considering LMIC-focused projects. With less than half of the LMIC-focused projects having financial information, greater emphasis in this analysis is therefore placed on the number of projects.

Figure 2 - Cumulative Number of Projects and Known Funding Amounts by Publication Date of Award Information of Projects on Tracker



Note for Figure 2: Financial information available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects). Publication date available for 86.5% of projects in entire database (88.9% for LMIC-focused projects).

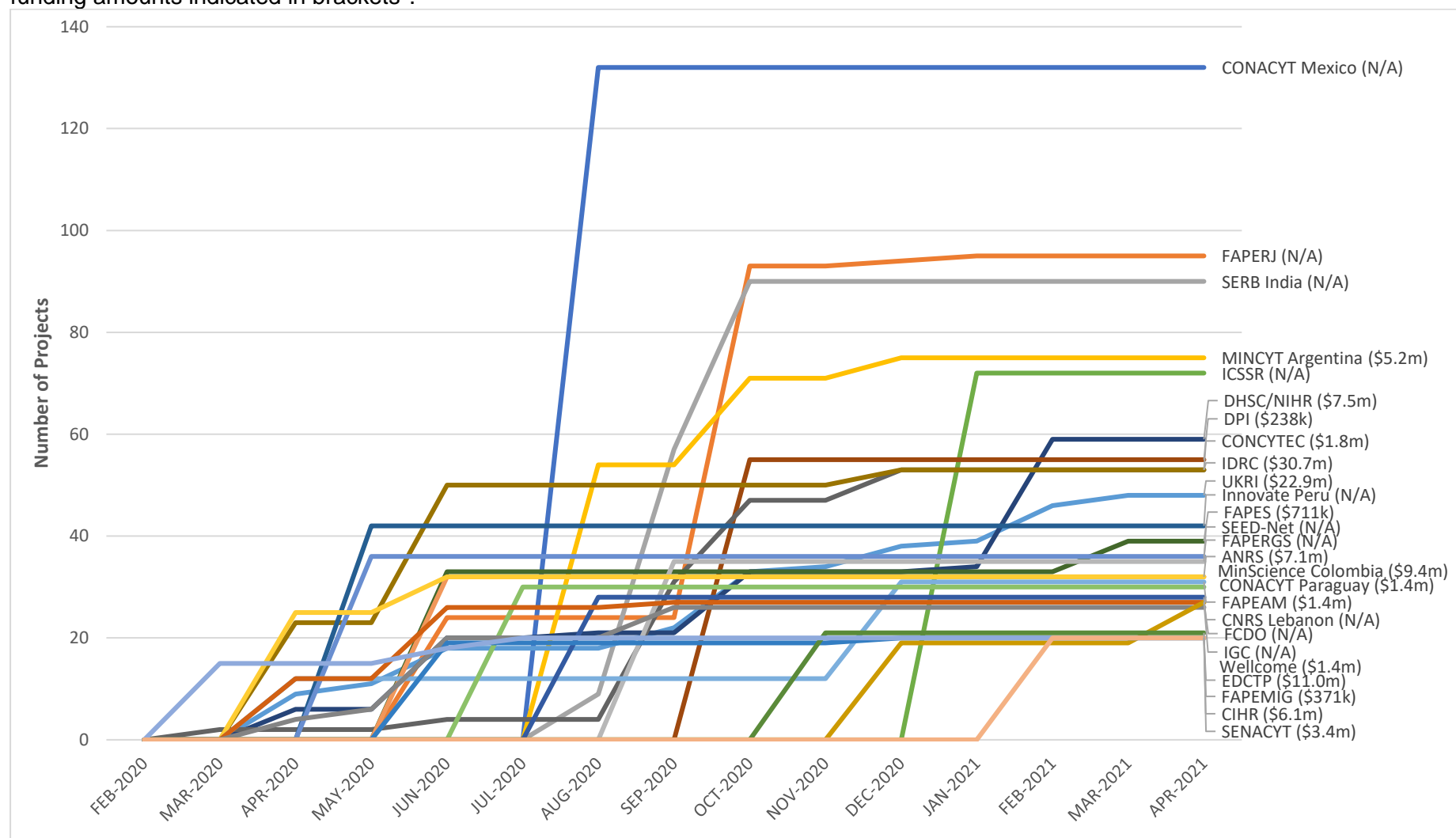
Funders of LMIC Research

However, rather than the peak in the number of LMIC-focused COVID-19 research funding being indicative of a general trend among research funders, this peak in August 2020 is largely

a result of the presence of data from the National Council of Science and Technology of Mexico (CONACYT) – the funder with the greatest number of LMIC-focused projects on the tracker (132) - who published all of their award information during this month (accounting for 47.8% of the projects funded in August 2020).

In total, 102 funders based in 35 countries have funded COVID-19 research taking place in at least one LMIC. Along with CONACYT, the timeline of the funders awarding the greatest number of LMIC-focused COVID-19 research (funding at least 20 research projects taking place in at least one LMIC with database date information) is presented in Figure 3. From Figure 3, it can be seen that Canadian research funders, specifically the Canadian Institutes of Health Research (CIHR) and the International Development Research Centre (IDRC), were the first to fund COVID-19 research relevant to LMICs early on in the pandemic. According to the data included in the latest version of the tracker, by March 2020, CIHR and IDRC had funded 19 projects taking place in LMICs – representing more than two-thirds (67.9%) of the number of LMIC-focused projects that had been funded up to this point.

Figure 3 - Timeline of funders awarding the greatest number of LMIC-focused research projects by date of publication of award information. funding amounts indicated in brackets*.



Minimum 20 LMIC-focused research projects with database date information.

Note for Figure 3: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects). Publication date available for 86.5% of projects in entire database (88.9% for LMIC-focused projects).

*Funding amounts for individual organisations **do not** account for co-funding between multiple organisations as no information was provided on how funding amounts were divided between the co-funding organisations.

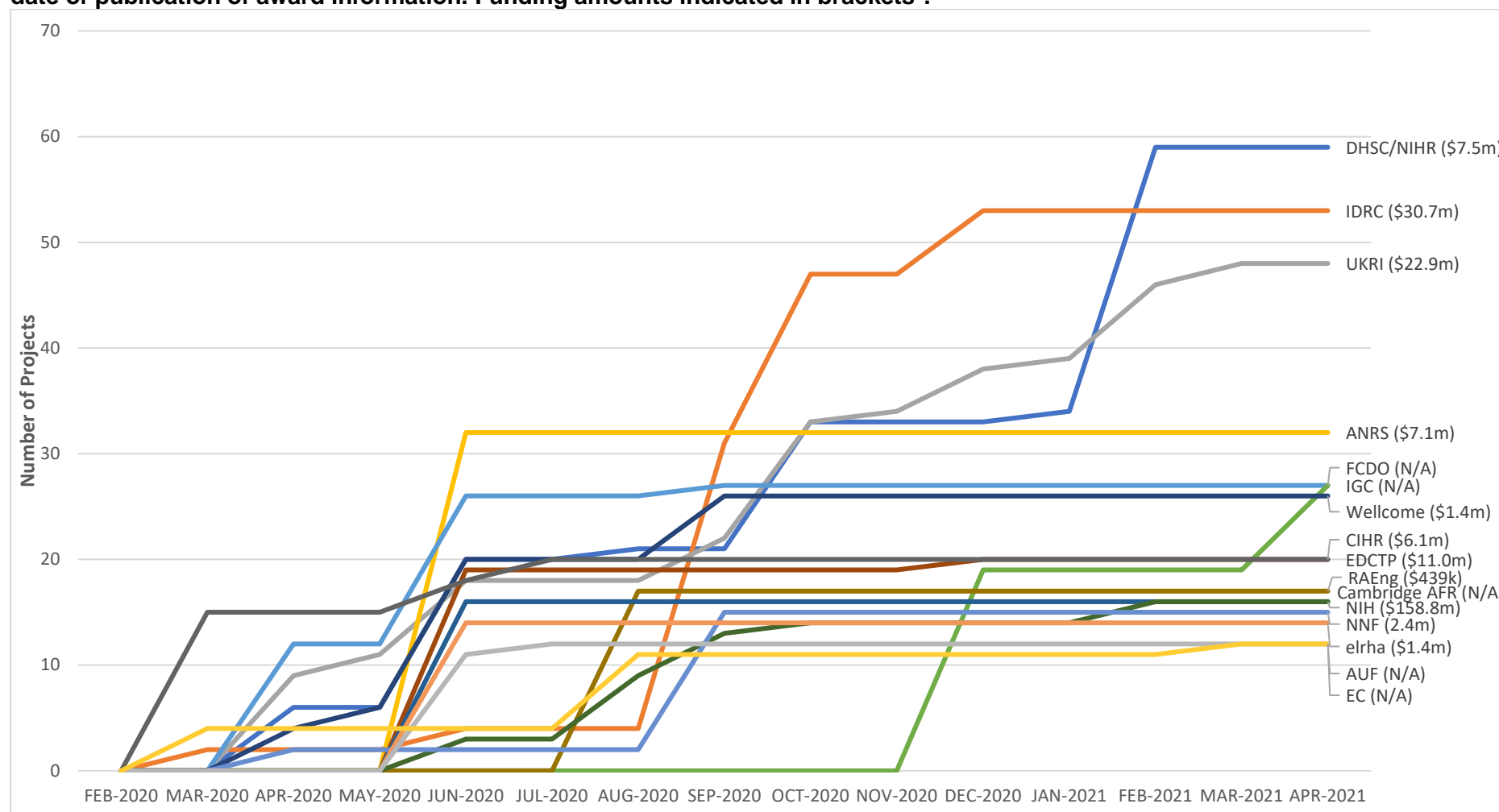
Table 1 - Portfolio by WHO priority area of top 10 funders of LMIC-focused research

	Virus: natural history, transmission and diagnostics	Animal and environmental research...	Epidemiological studies	Clinical characterization and management	Infection prevention and control...	Candidate therapeutics R&D	Candidate vaccines R&D	Ethics considerations for research	Social sciences in the outbreak response	TOTAL LMIC-Focused Projects
CONACYT Mexico	38	1	14	17	15	12	4	2	42	132
FAPERJ	34	2	14	38	4	17	3	0	6	95
SERB India	28	0	30	9	11	24	2	0	2	90
FAPESP	34	0	7	45	3	22	6	0	10	78
MINCYT Argentina	21	2	11	17	17	7	0	0	15	75
UKRI	17	2	15	7	10	3	1	2	42	74
ICSSR	0	0	0	3	8	0	0	2	59	72
DHSC/NIHR	8	0	10	3	15	2	0	2	42	59
DPI - Universidade de Brasilia	5	0	6	5	6	4	0	1	25	55
IDRC	1	0	6	5	5	1	0	0	48	55

Note for Table 1: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

Abbreviations and acronyms: **CONACYT** - Consejo Nacional de Ciencia y Tecnología (Mexico National Council of Science and Technology); **DHSC** - Department of Health and Social Care (UK); **DPI** - Decanato de Pesquisa e Inovação (Dean of Research and Innovation); **FAPERJ** - Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (Research Foundation of the State of Rio de Janeiro); **ICSSR** - Indian Council of Social Science Research; **IDRC** - International Development Research Centre; **MINCYT** - Ministerio de Ciencia, Tecnología e Innovación (Argentina Ministry of Science, Technology and Innovation); **NIHR** - National Institute for Health Research; **SERB** - Science and Engineering Research Board; **UKRI** - UK Research and Innovation.

Figure 4 - Timeline of funders based in high-income countries awarding the greatest number of LMIC-focused Research projects by date of publication of award information. Funding amounts indicated in brackets*.



Minimum 10 LMIC-focused research projects with database date information.

Note for Figure 4: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects). Publication date available for 86.5% of projects in entire database (88.9% for LMIC-focused projects).

*Funding amounts for individual organisations **do not** account for co-funding between multiple organisations as no information was provided on how funding amounts were divided between the co-funding organisations.

Table 2 - Portfolio by WHO priority area of top 10 funders based in high-income countries of LMIC-focused research

	Virus: natural history, transmission and diagnostics	Animal and environmental research...	Epidemiological studies	Clinical characterization and management	Infection prevention and control...	Candidate therapeutics R&D	Candidate vaccines R&D	Ethics considerations for research	Social sciences in the outbreak response	TOTAL LMIC-focused Projects
UKRI	17	2	15	7	10	3	1	2	42	74
DHSC/NIHR	8	0	10	3	15	2	0	2	42	59
IDRC	1	0	6	5	5	1	0	0	48	55
ANRS	4	4	12	5	2	2	0	0	11	35
FCDO	2	0	5	1	7	0	0	1	20	28
Wellcome	4	0	8	2	6	5	1	3	14	28
IGC	0	0	1	0	1	0	0	0	27	27
EDCTP	12	0	11	7	1	1	2	0	1	23
CIHR	3	1	5	4	1	1	0	0	10	20
Institut Pasteur	7	2	8	4	1	0	0	0	0	17
RAEng	2	0	0	4	6	0	1	0	6	17

Note for Table 2: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

Abbreviations and acronyms: **ANRS** - Agence nationale de recherche sur le sida et les hépatites virale (National Agency for AIDS Research); **CIHR** - Canadian Institutes of Health Research; **DHSC** - Department of Health and Social Care (UK); **EDCTP** - European & Developing Countries Clinical Trials Partnership; **FCDO** - Foreign, Commonwealth and Development Office; **IDRC** – International Development Research Centre; **IGC** - International Growth Centre; **NIHR** - National Institute for Health Research; **RAEng** - Royal Academy of Engineering; **UKRI** - UK Research and Innovation.

This figure for Canadian-based funders is increased to 82.1% when considering all funders not depicted in the figure that had funded LMIC-focused projects by March 2020 (namely the Social Sciences and Humanities Research Council with four projects, and Alberta Innovates with two).

Interestingly, five organisations (CIHR; the Colombian Ministry of Science, Technology and Innovation; Innovate Peru; Peruvian National Council of Science, Technology and Technological Innovation; and CONACYT) have at one point held the position of having funded the greatest number of LMIC-focused projects over the course of the time period in question, as depicted in Figure 3 – with all five based in the Americas (including four from Latin America). On a related note, each of the top five funders in the figure that have funded the most LMIC-focused projects overall (CONACYT, FAPERJ, SERB India, MINCYT Argentina and ICSSR) are all based in middle-income countries.

To understand the thematic nature of the research funded by the ten funders with the greatest number of LMIC-focused research, Table 1 summarises their portfolios, respectively, against the WHO priority areas.^[2] Notably, the top two priority areas for each of the ten funders included in Table 1 were either the priority area of ‘Social sciences in the outbreak response’ (top priority area for six funders) or ‘Virus: natural history, transmission and diagnostics’ (top priority area for one funder and second most populous priority area for five funders). Interestingly, the four funders in the top ten where the social sciences priority area was not the most populous priority area are based in an LMIC.

In addition to the findings presented in Figure 1, Table 1 provides further insight into the three priority areas with the fewest LMIC-focused projects. Specifically, less than half of the top funders of LMIC-focused research have funded any projects under the ‘Animal and environmental research on the virus origin, and management measures at the human-animal interface’ (four funders in the top ten with any projects), ‘Candidate vaccines R&D’ (five funders), and ‘Ethics considerations for research’ (five funders) priority areas.

However, rather than just thinking about the overall research response to COVID-19, Figure 4 restricts the analysis by displaying which funders based in high-income countries (HICs) awarded the greatest number of LMIC-focused research to understand the international research response to the challenges of the pandemic faced by LMICs (funding at least 10 research projects taking place in at least one LMIC with database date information).

Of the 16 funders based in high-income countries included in Figure 4, four have demonstrated an active and significant commitment to funding research addressing challenges relating to COVID-19 in LMICs throughout the time period under consideration, having awarded projects in at least 5 different months (as indicated by the publication date of award information, where available). Of these four funders, UKRI demonstrated the most sustained funding activity, funding LMIC-focused projects across 10 months (at least - due to the fact that approximately one-third of projects funded by UKRI on the tracker database lack information on the database date). This is followed by the UK’s National Institute for Health Research (6 months), IDRC (5) and the United States’ National Institutes of Health (5).

At a national level across the entirety of the period, funders based in the UK awarded 222 COVID-19 projects relevant to LMICs – the most of any high-income country (which accounts for 13% of all LMIC-focused projects). This is followed by funders based in Canada (with 89

² The total number of LMIC-focused research projects funded by an individual funder (such as UKRI) may vary between figure 3 and table 1 as data on the publication date of awards was not always made available for all projects – including projects funded by the same funder.

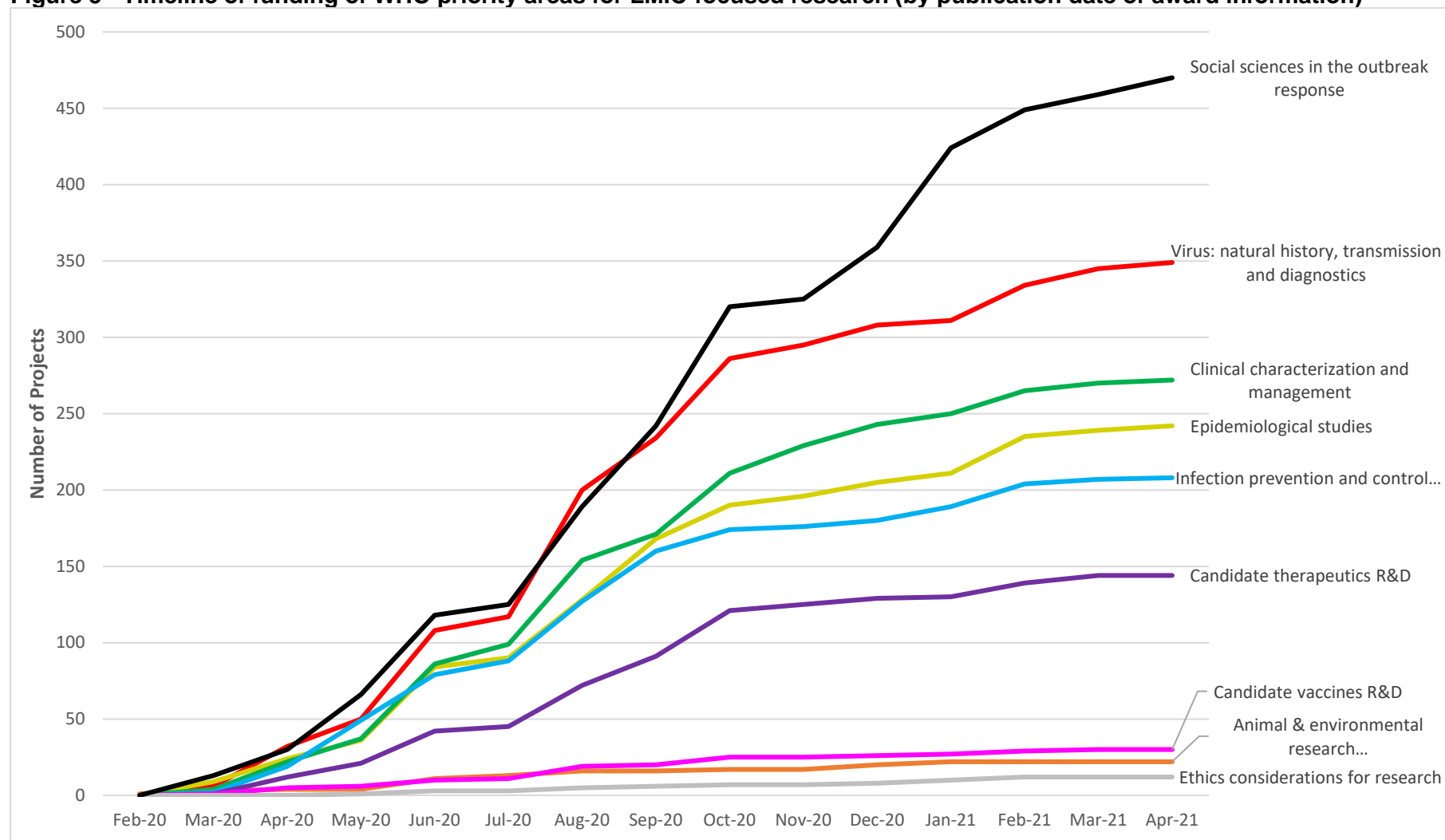
projects accounting for 5.2% of all LMIC-focused projects), France (85 projects translating to 5.0%) and the United States (59 projects translating to 3.5%).

Interestingly, when looking at the distribution of research projects funded by the top funders of LMIC -focused research based in high-income countries across the WHO priority areas (Table 2), the portfolios of these funders are typically more concentrated on a smaller number of priority areas compared to the portfolio of funders based in LMICs included in Table 1. Furthermore, of all the funders presented in Table 2, only one (UKRI) has funded LMIC-focused projects across all nine priority areas.

PRIORITY AREAS OVER TIME

The publication date of award information by funders can also be used to explore changes to the allocation of funding across the WHO priority areas over time for LMIC-focused funding (Figure 5). When considering Figure 5, it is not surprising to see the priority area on 'Social Sciences in the Outbreak Response' being consistently ranked among the priority areas with the most LMIC-focused projects throughout the time period due to how broad social sciences are as a discipline. Additionally, it is worth noting that more than half of all LMIC-focused social sciences projects (56.7%) could not be classified against any of the six corresponding sub-priority areas outlined by the WHO – despite falling under the 'Social Sciences in the Outbreak Response' priority area (this figure reduces to 55.7% when only considering projects with information on the publication date of awards). Should those projects be excluded from Figure 5, the social sciences priority would rank joint-fourth over the course of the time period being examined (along with the priority area examining 'Infection Prevention and Control').

Figure 5 - Timeline of funding of WHO priority areas for LMIC-focused research (by publication date of award information)



Note for Figure 5: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

When viewing the entire timeline, it is interesting to note the similarity in the number of projects funded under the priority areas on 'Social Sciences in the Outbreak Response' and 'Virus: Natural History, Transmission and Diagnostics' up to September 2020 before the rate of new projects being funded under the latter priority area decreased relative to the former. The drop off in projects funded under the 'Virus: Natural History, Transmission and Diagnostics' priority area can be partially explained by the sharp decline in the number of projects funded under the sub-priority area to 'support development of diagnostic products to improve clinical processes' after October 2020.

Taken together with the fact that this sub-priority area ranks first among all of the 44 sub-priority areas in terms of number of projects (being the only sub-priority area to account for more than 10% of the total number of LMIC-focused projects with 12%), and that by October 2020, 83.4% of the projects that fall under this sub-priority area had already been funded, it comes as little surprise that the rate of increase in the number of LMIC-focused projects funded under the 'Virus: Natural History, Transmission and Diagnostics' priority area was outpaced by the (broadly-defined) social sciences priority area before the end of 2020.

It is also interesting to see that, early on in the pandemic response, comparatively more emphasis was placed on research that addressed challenges under the 'Infection Prevention and Control' priority area in LMICs – ranking as high as third in May 2020 (only a single project less than the 'Virus: Natural History, Transmission and Diagnostics' priority area) before eventually being ranked fifth a year later (based on available data on the publication date of awards).

DIFFERENCES IN PRIORITY AREAS ACROSS COUNTRY GROUPS

Significant insights emerge when examining differences in the distribution of research projects across the WHO priority areas over time between different groups of countries. Figures 6 and 7 contrasts the evolution of the priority areas of research taking place in the least developed and low-income countries, with those taking place in middle-income countries.

Among the main differences in the distribution of priority areas between the two country income groupings is the rapid proliferation of the number of research projects taking place among the least developed and low-income countries under the social sciences priority area from after August 2020. By the end of the period under consideration, projects under the social sciences priority area accounted for 44.1% of all research projects taking place in at least one of the least developed and low-income countries – far outnumbering the number of projects under 'Epidemiological Studies' (17.2%) – the priority area with the second-greatest number of projects.

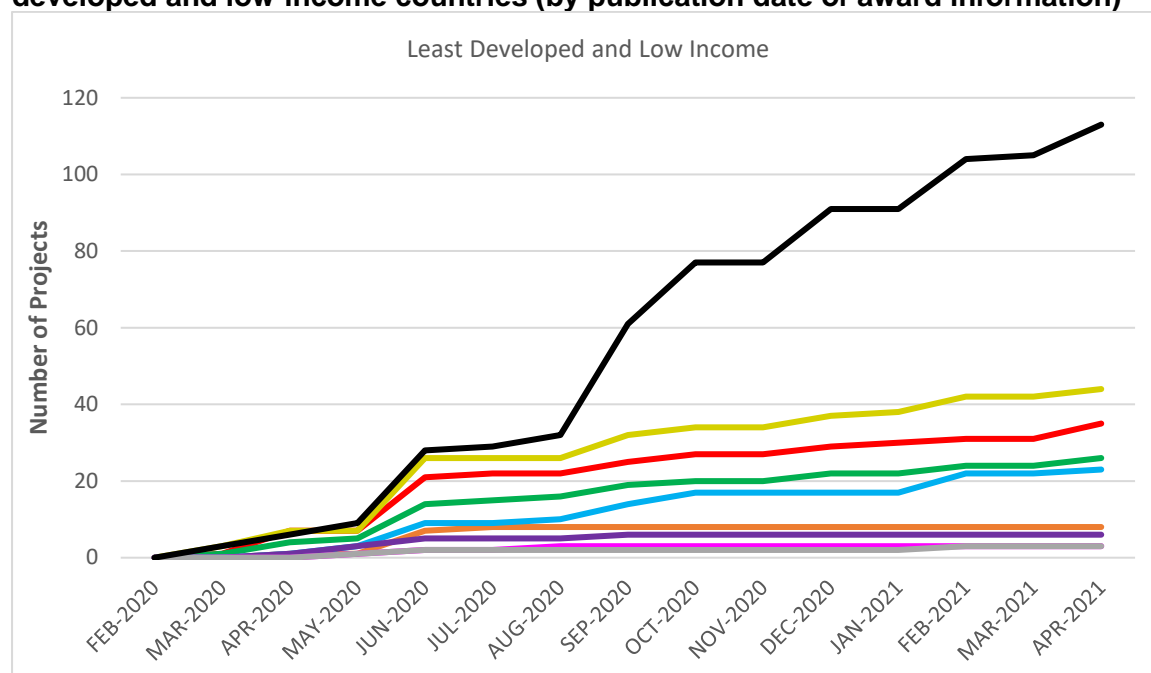
As was mentioned earlier, there is a greater emphasis on research under the priority area of 'Epidemiological Studies' for LMIC-focused projects (Figure 1) – and this is particularly pronounced for research being conducted among the least developed and low-income countries where it has consistently outranked research under the (otherwise popular) 'Virus: Natural History, Transmission and Diagnostics' priority area (Figure 6).

Furthermore, when dividing the data on the tracker according to where the research is taking place (Figures 8 to 13), it is only for COVID-19 research that is being conducted in Africa that the 'Epidemiological Studies' priority area ranks highly (second) among the nine WHO priority areas – ranking either fifth (Europe; Latin America and the Caribbean; and North America) or sixth (Asia and Oceania) for all other regions.

Continuing to examine the data along regional lines, the distribution of research projects being conducted in Asia across the WHO priority areas (Figure 9) stands out as being far more volatile than other regions. Over the course of the period under consideration, the overall rankings of the priority areas changed on 10 occasions – more than any other region (and twice as many times as the changes experienced by research being conducted in Europe – the region with fewest ranking changes). Additionally, in terms of ranking, the priority area on ‘Clinical Characterization and Management’ was highest for projects taking place in Asia (second).

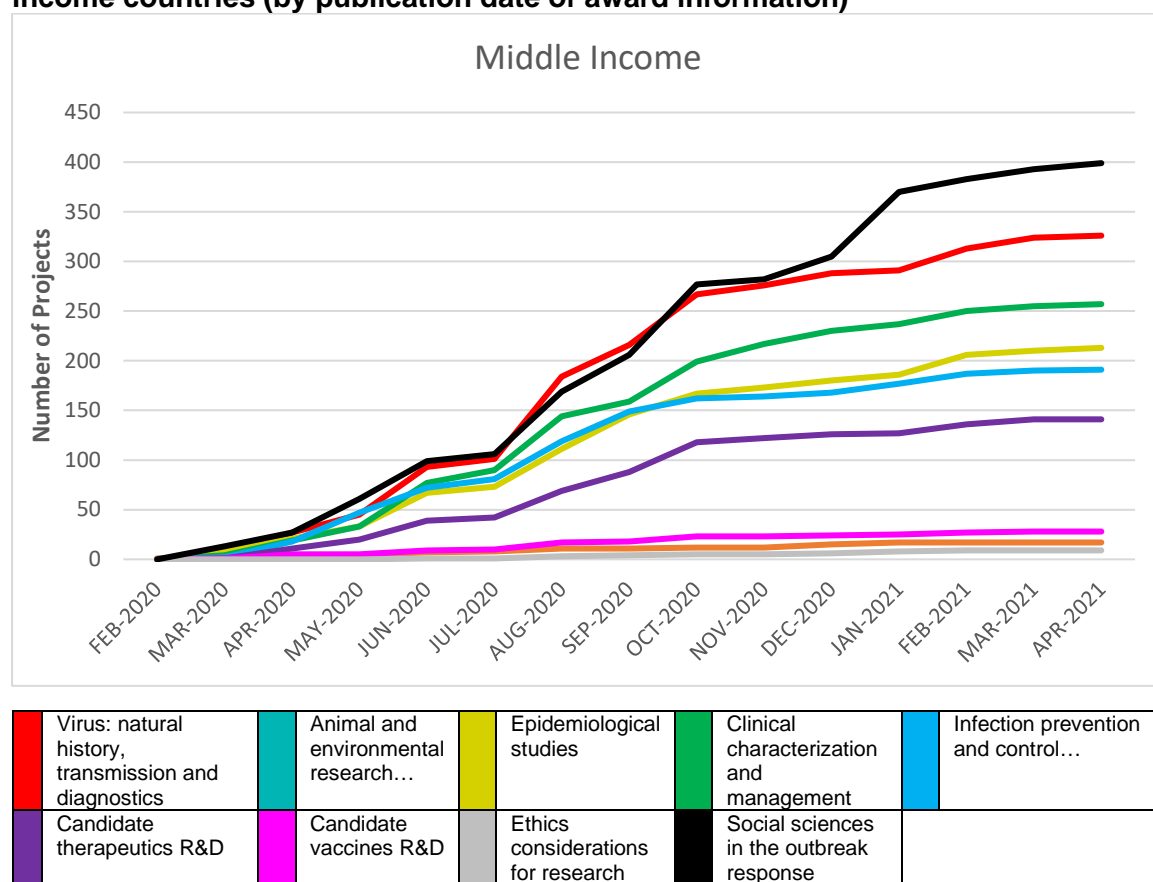
For research projects taking place in Latin America and the Caribbean (LAC), key findings emerge when looking at the distribution of priority areas across the timeline. Firstly, LAC is the only region where ‘Social Sciences in the Outbreak Response’ was not ranked first among all priority areas by the end of the time period under examination (being ranked behind ‘Virus: Natural History, Transmission and Diagnostics’). Secondly, for at least two months early in the pandemic (April and May of 2020), there was more emphasis on research under the ‘Infection Prevention and Control’ priority area than any other priority area – making this the only time that this priority area ranked first in any region.

Figure 6 - Timeline of funding of WHO priority areas for research relevant to the least developed and low-income countries (by publication date of award information)



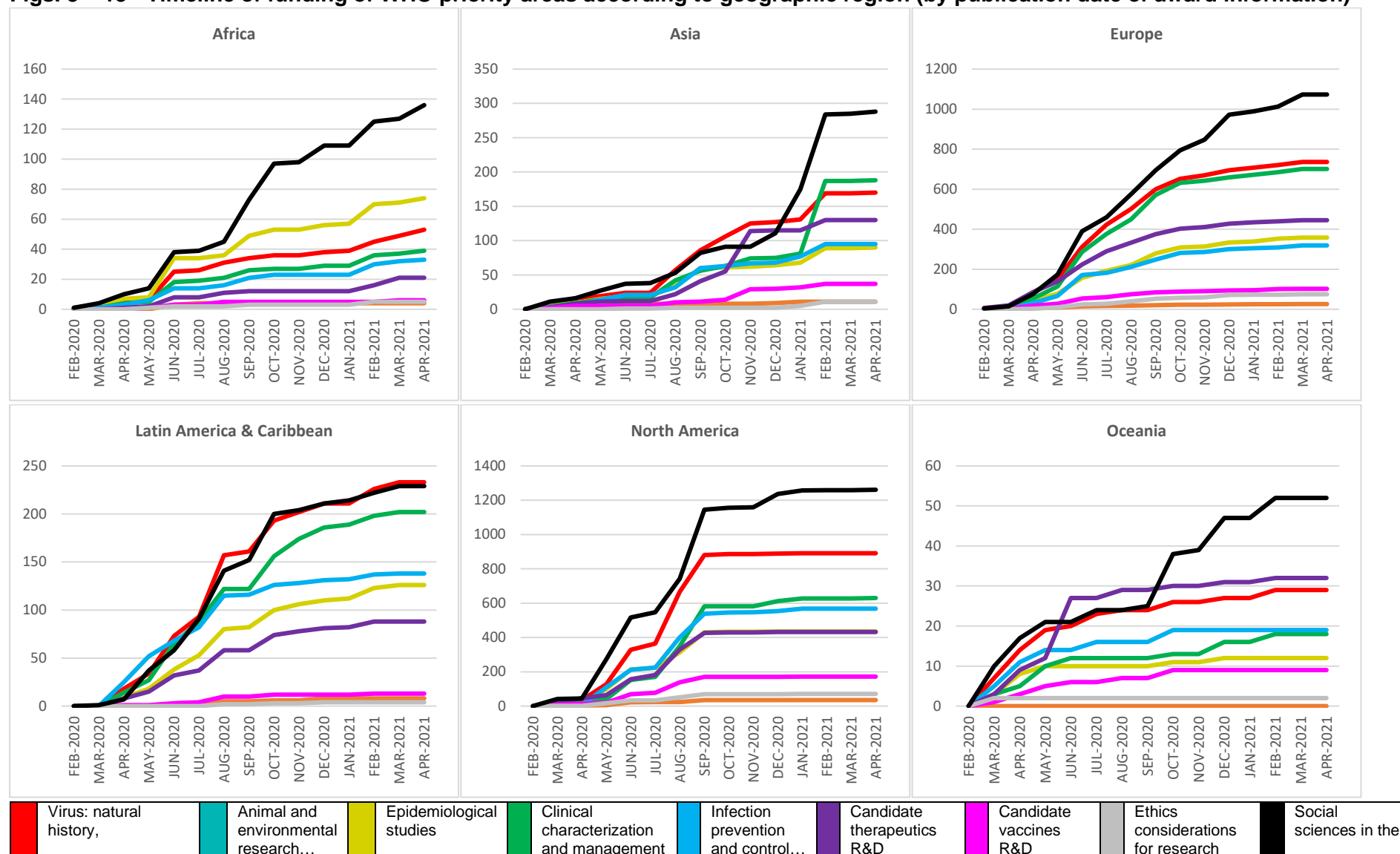
Note for Figure 6: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

Figure 7 - Timeline of funding of WHO priority areas for research relevant to middle-income countries (by publication date of award information)



Note for Figure 7: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

Figs. 8 – 13 - Timeline of funding of WHO priority areas according to geographic region (by publication date of award information)





Note for Figures 8-13: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

INTERNATIONAL COLLABORATION

Despite the more than 10,500 projects on the tracker being conducted in 142 countries across the world, available data suggests that only 425 projects (4.0% of projects on the latest version of the tracker) take place across multiple countries. However, the data also suggests that projects taking place across multiple countries mostly involve at least one LMIC (62.8% of projects taking place across multiple countries), as indicated in Table 3.

Table 3 - Summary of types of multi-country collaborations

TYPE OF MULTI-COUNTRY COLLABORATION	NUMBER OF PROJECTS
Any multi-country collaboration	425
At least one LMIC	267
At least one LMIC and at least one high-income country	153
At least one least developed and/or low-income country and at least one high-income country	42 <i>(21 when excluding projects that also focus on a middle-income country)</i>
At least one middle-income country and at least one high-income country	132 <i>(111 when excluding projects that also focus on a least developed and/or low-income country)</i>
At least one least developed and/or low-income country and at least one middle-income country	81 <i>(60 when excluding projects that also focus on a high-income country)</i>

Note for Table 3: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

The figures presented in Table 3 suggest that projects designated as taking place across multiple countries largely involve collaboration between high-income and middle-income countries – accounting for 86.3% of all projects taking place in at least one LMIC and at least one high-income country, and just under half of all multi-country research projects involving at least one LMIC (49.4%).

Significantly, Table 3 also shows that, in terms of collaboration across income groups, collaborations with the least developed and low-income countries comes more frequently from middle-income countries as opposed to high-income countries (almost three-times more frequently when not taking into account collaborations that occur across all three income groups).

Looking at the funders of these 425 multi-country projects, Tables 4 (number of projects) and 5 (known funding amounts) summarise the top funders of this type of research – both in terms of overall multi-country projects as well as those taking place in at least one LMIC. Overall, 70 organisations have funded multi-country projects – which is reduced to 46 when only considering LMIC-focused projects taking place across multiple countries. Additionally, across those funders with at least one project taking place across multiple countries, on average, 52.7% of the portfolio is taking place in at least one LMIC. However, should only funders that have funded projects taking place across multiple countries *and* at least one LMIC, the average proportion of the portfolio taking place in at least one LMIC increases to 80.1%.

Furthermore, of the 70 funders with multi-country projects, only 7 are not (at least partially based) in high-income countries (including research funded under the BRICS-STI Framework Programme – the only non-high-income country-based funder in either Tables 4 or 5).

Table 4 - Top-10 funders of multi-country projects and LMIC-focused multi-country projects by number of projects

Funder	Number of International Projects
European Commission	59
UK Research and Innovation (UKRI)	51
International Development Research Centre (IDRC)	39
Canadian Institutes of Health Research (CIHR)	25
National Institute for Health Research (NIHR)	24
Sino-German Center for Research Promotion	20
Wellcome	16
Agence Nationale de Recherche sur le Sida et les Hépatites Virale (ANRS)	15
Volkswagen Stiftung	14
National Institutes of Health (NIH)	13
Research Council of Norway	13
Funder	Number of LMIC-Relevant International Projects
International Development Research Centre (IDRC)	38
UK Research and Innovation (UKRI)	33
National Institute for Health Research (NIHR)	20
Canadian Institutes of Health Research (CIHR)	19
Sino-German Center for Research Promotion	19
Agence Nationale de Recherche sur le Sida et les Hépatites Virale (ANRS)	15
Wellcome	15
BRICS-STI	12
European Commission	12
European & Developing Countries Clinical Trials Partnership (EDCTP)	11

Table 5 - Top-10 funders of multi-country projects and LMIC-focused multi-country projects by known funding amounts

Funder(s)	Known Funding Amount Awarded to Multi-Country Projects
National Institutes of Health (NIH)	\$259.8m
European Commission	\$82.8m
International Development Research Centre (IDRC)	\$25.8m
UK Research and Innovation (UKRI)	\$10.7m
Agence Française de Développement (AFD)	\$10.5m
COVID-19 Therapeutics Accelerator (Wellcome / Bill & Melinda Gates Foundation)*	\$9.1m
Canadian Institutes of Health Research (CIHR)	\$8.7m
UKRI / Dept. Health and Social Care / National Institute for Health Research*	\$8.7m
Dept. Health and Social Care / National Institute for Health Research (DHSC/NIHR)	\$7.4m
Research Council of Norway (RCN)	\$5.6m
Funder(s)	Known Funding Amount Awarded to LMIC-Focused Multi-Country Projects
National Institutes of Health (NIH)	\$157.5m
European Commission	\$45.4m
International Development Research Centre (IDRC)	\$25.0m
Agence Française de Développement (AFD)	\$10.5m
COVID-19 Therapeutics Accelerator (Wellcome / Bill & Melinda Gates Foundation)*	\$9.1m
UK Research and Innovation (UKRI)	\$8.8m
Dept. Health and Social Care / National Institute for Health Research (DHSC/NIHR)	\$7.4m
Canadian Institutes of Health Research (CIHR)	\$5.9m
European & Developing Countries Clinical Trials Partnership (EDCTP)	\$5.2m
UKRI / Dept. Health and Social Care / National Institute for Health Research*	\$4.6m

Note for Table 5: Financial information available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

*Indicates co-funding between multiple organisations listed.

Looking at the multi-country collaboration from the perspective of global coverage, Table 5 presents the funders that have funded research taking place across the greatest number of countries throughout their portfolios.

Taking Tables 4 and 6 together, it can be seen that, not only does the International Development Research Centre fund the greatest number of LMIC-focused COVID-19 research projects that take place across multiple countries (Table 4), they also fund projects taking place across the greatest number of countries (Table 6) – both in terms of overall countries (67, averaging 3.3 countries per project) and LMICs (60, averaging 3 LMICs per project).

Table 6 - Top-10 funders with the greatest numbers of different (named) countries where research is being conducted (total number of different countries indicated in brackets)

Entire Portfolio	LMICs Only (Entire Portfolio)	Portfolio of Projects Taking Place Across Multiple Countries	Portfolio of Projects Taking Place Across Multiple Countries AND at least one LMIC
IDRC (67)	IDRC (60)	IDRC (66)	IDRC (66)
EC (51)	NIHR (40)	EC (51)	EC (49)
CIHR (49)	UKRI (35)	CIHR (49)	CIHR (49)
UKRI (49)	ANRS (32)	UKRI (45)	UKRI (39)
NIHR (46)	Wellcome (29)	NIHR (41)	NIHR (39)
ANRS (33)	FCDO (27)	Wellcome (30)	Wellcome (30)
Wellcome (33)	CIHR (24)	ANRS (28)	ANRS (28)
FCDO (30)	EDCTP (21)	Alberta Innovates (25)	Alberta Innovates (25)
Alberta Innovates (25)	elrha (19)	FCDO (23)	FCDO (23)
EDCTP (24)	RAEng (18)	EDCTP (22)	EDCTP (22)

Note for Table 6: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

Abbreviations and acronyms: ANRS - Agence nationale de recherche sur le sida et les hépatites virale; CIHR - Canadian Institutes of Health Research; EC - European Commission; EDCTP - European & Developing Countries Clinical Trials Partnership; FCDO - Foreign, Commonwealth and Development Office; IDRC - International Development Research Centre; NIHR - National Institute for Health Research; RAEng - Royal Academy of Engineering; UKRI - UK Research and Innovation

At a higher funding level, a total of 630 out of the 10,608 projects on the tracker (5.9%) were funded as a result of co-funding – either from multiple organisations directly or from membership-based organisations. Of this, 191 projects (30.3%) are being conducted in at least one LMIC, with the top 10 co-funders of these projects presented in Figure 14). At the individual level, the UK's National Institute for Health Research co-funded 40 LMIC-focused projects – the most out of any organisation that co-funded such research. This is reflective of data at a national level whereby 66 of the 630 co-funded projects were co-funded by at least one organisation based in the UK – the most out of any of the more than 30 relevant countries, followed by China (36) and the United States (31).

Figure 14 - Top co-funding organisations awarding the greatest number of LMIC-focused projects



Note for Figure 14: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

Abbreviations and Acronyms: **AUN/SEED-Net** - JICA Technical Cooperation Project for ASEAN University Network/Southeast Asia Engineering Education Development Network; **BRICS-STI** - Brazil, Russia, India, China, and South Africa Science, Technology, and Innovation Framework Programme; **e-Asia JRP** - East Asia Science and Innovation Area Joint Research Program; **EC** - European Commission; **FCDO** - Foreign, Commonwealth and Development Office; **IPA** - Innovations for Poverty Action; **NIHR** - National Institute for Health Research; **PEP** - Partnership for Economic Policy; **SGC** - Sino-German Center for Research Promotion; **UKRI** - UK Research and Innovation

INTERDISCIPLINARITY

Another way to understand the extent of the collaboration associated with the research projects included in the tracker is to examine how many are interdisciplinary in nature. To assess this, a project was deemed interdisciplinary if either of the following conditions were met:

1. The WHO priority area assigned to a project included one of the seven medical science-oriented priority areas AND either one of the two non-medical science priority areas (namely 'Ethics considerations for research' and 'Social Sciences in the Outbreak Response');
2. The abstract of a given project (where available) makes reference to the project being inter-/cross-/multi- disciplinary.

Overall, 1,112 projects (10.5%) of the projects on the tracker were considered to be interdisciplinary using either method – 148 of which are LMIC-focused (13.3% of all interdisciplinary projects).

Outside of the non-medical science priority areas, projects deemed interdisciplinary were most-commonly categorised against the priority area on 'Infection Prevention and Control' – accounting for 43.2% of the interdisciplinary LMIC-focused projects and 34.9% of interdisciplinary projects overall (Table 7).

Table 7 - Interdisciplinary projects by medical science-oriented WHO priority area

WHO Priority Area	Total number of Interdisciplinary Projects (percentage indicated in brackets)	Total number of LMIC-focused Interdisciplinary Projects (percentage indicated in brackets)
Virus: natural history, transmission and diagnostics	140 (12.6%)	15 (10.1%)
Animal and environmental research...	13 (1.2%)	6 (4.1%)
Epidemiological studies	223 (20.1%)	29 (19.6%)
Clinical characterization and management	230 (20.7%)	29 (19.6%)
Infection prevention and control...	388 (34.9%)	64 (43.2%)
Candidate therapeutics R&D	58 (5.2%)	8 (5.4%)
Candidate vaccines R&D	23 (2.1%)	2 (1.4%)

Note for Table 7: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

In both cases, this can be considered largely a result of one of this priority area's sub-priorities that examines '*factors and methods influencing compliance with evidence-based IPC interventions during outbreak response*' which, conceptually, has natural linkages to social sciences. It is thus unsurprising to learn that, not only was this the most common sub-priority area for all interdisciplinary projects (accounting for 29.1% of all LMIC-focused interdisciplinary projects and 21.5% of interdisciplinary projects overall), but that the number of projects categorised against this sub-priority area greatly outnumbers the sub-priority area with the second greatest number of projects. For LMIC-focused projects, this was the sub-priority looking at the '*effectiveness of restriction of movement of healthy exposed and infected persons to prevent secondary transmission*' (12.8% of LMIC-focused interdisciplinary projects), and for all interdisciplinary projects, this was the sub-priority area examining '*transmission dynamics*' under the 'Epidemiological Studies' priority area (7.8% of all interdisciplinary projects).

Table 8 presents the top-10 funders of interdisciplinary research (both for LMIC-focused research and overall). With respect to all interdisciplinary projects, funders based in the United States collectively funded 528 interdisciplinary projects (47.5%) – the most out of any country, followed by funders based in the UK (173 projects totalling 15.6%) and Canada (111 projects totalling 10.0%). When considering LMIC-focused projects, funders based in the UK are ranked first (44 projects worth 29.8% of all interdisciplinary research relevant to LMICs) followed by funders based in Brazil (21 projects totalling 14.2%) and Canada (18 projects totalling 12.2%).

Interestingly, while funders based in high-income countries collectively funded 94.5% of all interdisciplinary projects, this figure is reduced to 59.5% when only considering research taking place in at least one LMIC.

Table 8 - Top-10 funders of interdisciplinary projects

Rank	Top Funders of Interdisciplinary Projects (1,112 total)	Top Funders of Interdisciplinary LMIC- focused Projects (148 total)
1	NSF (294 projects; 36.4%)	NIHR (22 projects; 14.9%)
2	NIH (180 projects; 16.2%)	UKRI (20 projects; 13.5%)
3	UKRI (118 projects; 10.6%)	FAPESP (10 projects; 6.8%)
4	CIHR (39 projects; 3.5%)	IDRC (10 projects; 6.8%)
5	NIHR (32 projects; 2.9%)	Innovate Peru (9 projects; 6.1%)
6	PCORI (21 projects; 1.9%)	CONACYT Mexico (8 projects; 5.4%)
7	SNF (19 projects; 1.7%)	FCDO (7 projects; 4.7%)
8	NWO Netherlands (17 projects; 1.5%)	ICSSR (7 projects; 4.7%)
9	BMBF (16 projects; 1.4%)	Wellcome (7 projects; 4.7%)
10	ZonMw Netherlands (15 projects; 1.3%)	elrha (6 projects; 4.1%)

Note for Table 8: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

INSTITUTIONS

The 10,608 COVID-19 research projects under consideration for this analysis was awarded to 3,995 institutions based in 101 countries (Figure 8) – though institutional data was missing for 578 projects, or 5.4% of the database).

Figure 8 - Location of institutions leading on COVID-19 research

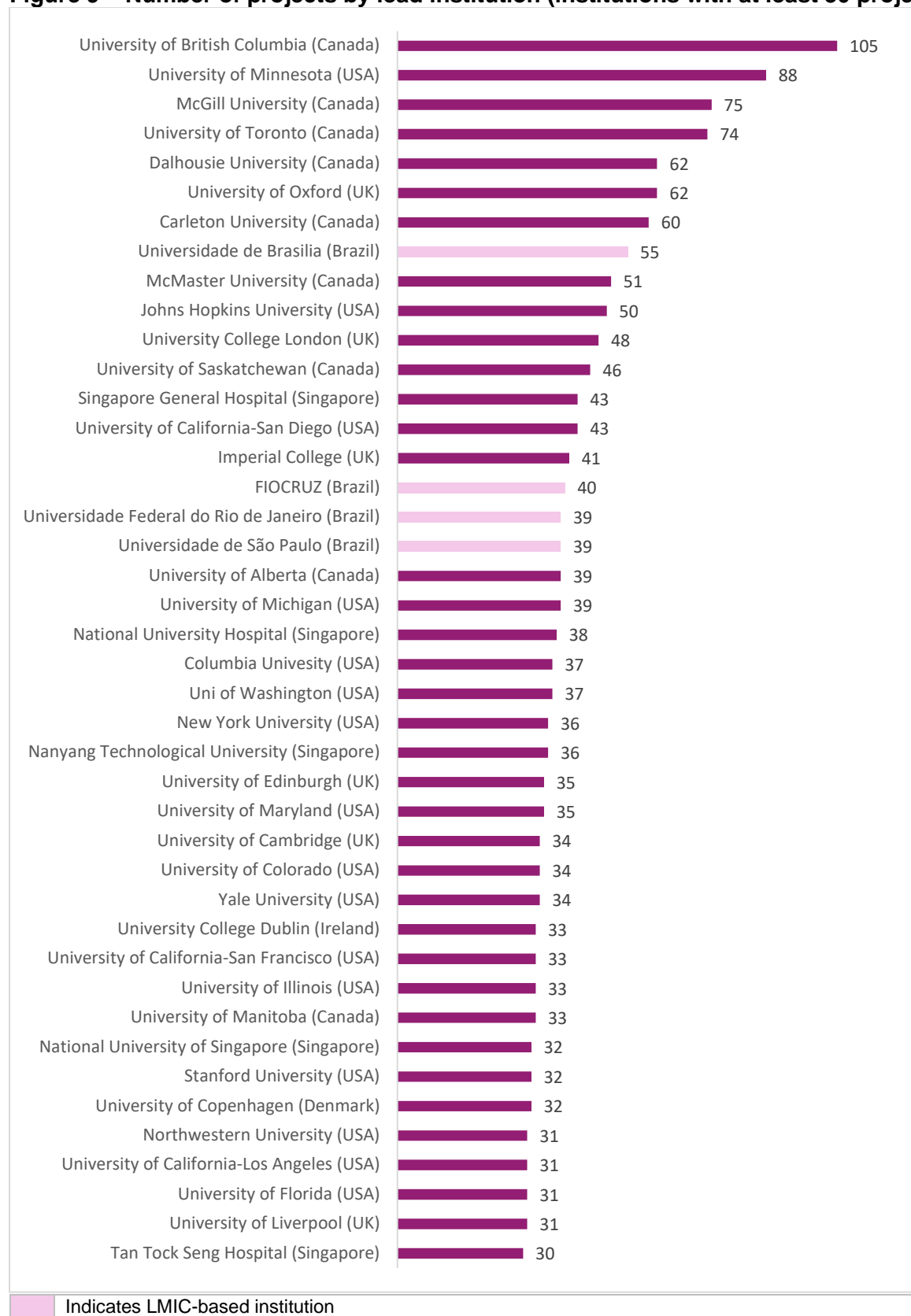


Figure 9 summarises the institutions that were designated as the ‘lead’ institution for the greatest number of projects. From figure 9, it can be seen that the institutions leading on the greatest number of COVID-19-related research (according to data on the tracker) are largely based in Canada – with six Canadian-based institutions ranking in the top ten.

While individual institutions are prominent, the 161 institutions based in Canada ranks fifth in terms of the total number of institutions at the national level – behind the United Kingdom (1,157 institutions), the United States (663), Germany (182), and Spain (162). This suggests that research being conducted in Canada is concentrated in a relatively smaller number of institutions. Looking at the projects-per-institution ratio (PPIR), Canada’s PPIR of 7.07 ranks third among all countries – which is significantly greater than the only other countries whose

institutions are also leading in excess of 1,000 projects, namely the United States (PIR of 4.09 – ranking sixth) and the United Kingdom (PIR of 1.83 – ranking 34th).

Figure 9 – Number of projects by lead institution (institutions with at least 30 projects)

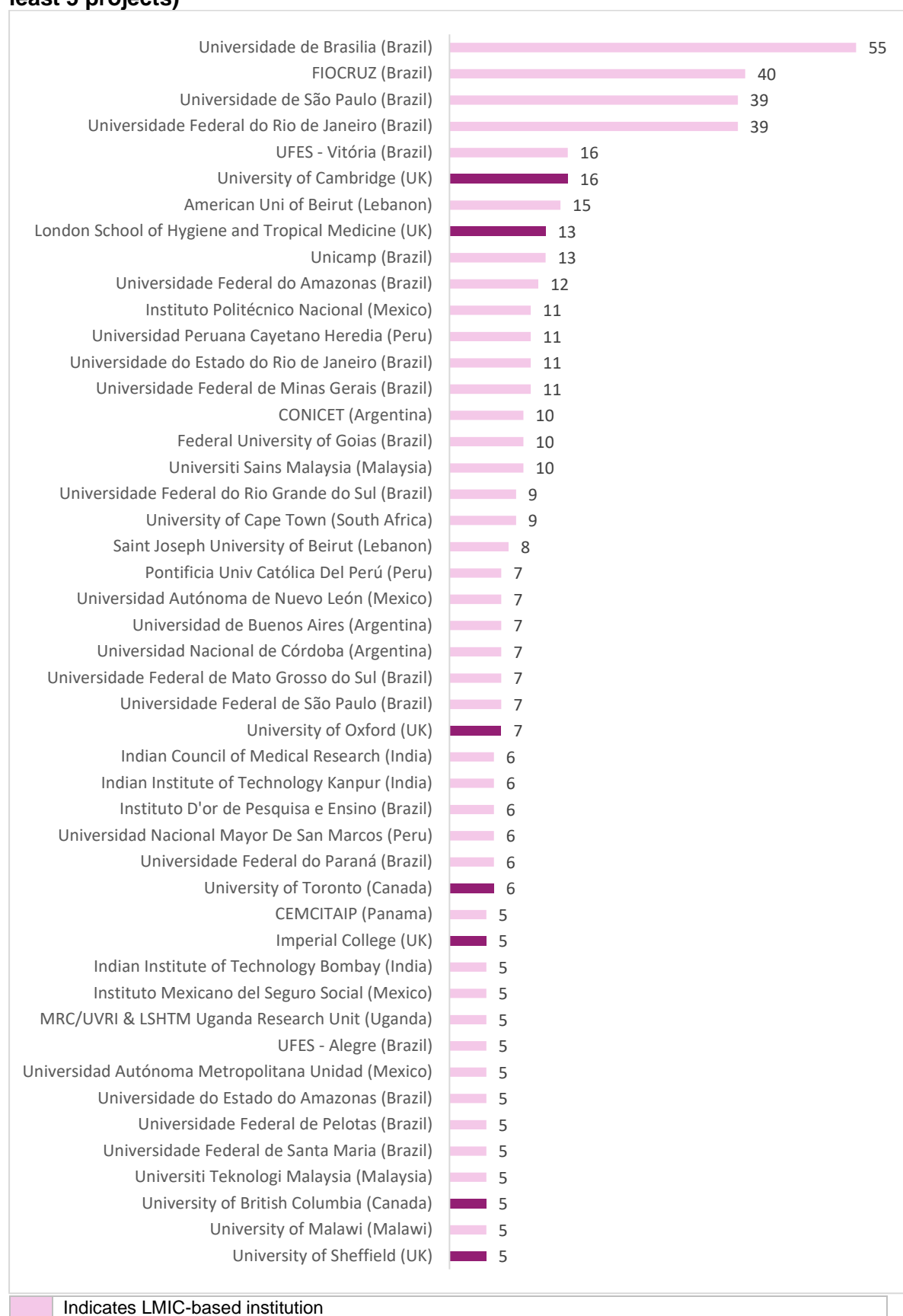


Note for Figure 9: *Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).*

Significantly, of the 42 institutions presented in Figure 9, only four LMIC-based institutions are the lead on at least 30 projects – all of which are based in Brazil. Overall, of the 3,995 institutions leading on COVID-19 research, 720 (18.0%) are based in LMICs.

To get a better understanding of the research response to COVID-19 as it pertains to LMICs, Figure 10 presents the institutions that were designated as the lead for the greatest number of LMIC-focused research projects. Continuing on the initial findings that were suggested in Figure 9, it can be seen from Figure 10 that Brazilian-based institutions led on the greatest number of LMIC-focused COVID-19 research projects – with seven institutions listed among the top ten. Furthermore, the large difference in the number of LMIC-focused research projects between the institutions ranked fourth and fifth in Figure 10 further underlines the prominence of Brazilian institutions for LMIC-focused research.

Figure 10 - Number of LMIC-focused projects by lead institution (institutions with at least 5 projects)



Note for Figure 10: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

Despite there being 118 institutions leading on LMIC-focused research based in Brazil, the total number of Brazilian institutions still ranks second to India's 132. However, due in large part to the large difference in the total number of projects being led by institutions based in Brazil (444 ranking first) and India (191 ranking second), the PPIR for Brazilian institutions as a whole (3.8 ranking third) is far greater than that of Indian institutions as a whole (1.4 ranking 27th).

In addition to Brazil, it can also be seen from Figure 10 more widely that there is a heavy presence of institutions based in LAC. Out of the 910 institutions leading on LMIC-focused COVID-19 research, 372 (40.9%) are based in the LAC region – the first among all regions followed by Southern Asia (142 institutions), Northern Europe (86), and Eastern Africa (57). The distribution of all 910 institutions leading on LMIC-focused research is presented in Figure 11.

Figure 11 - Location of institutions leading on LMIC-focused COVID-19 research



Despite their relatively low numbers in Figure 11, there are a total of 214 institutions based in high-income countries leading LMIC-focused research – second only to institutions based in upper-middle income countries (Table 9). However, only approximately one quarter of these institutions (24.8%) have led on more than one LMIC-focused project. On average, LMIC-focused research constituted 49.7% of the portfolio of a lead institution based in a high-income country that has led on at least one LMIC relevant project. This figure is reduced to 32.2% when only considering the 53 institutions based in high-income countries that have led on at least two LMIC-focused projects.

Table 9 - Number of lead institutions of LMIC-focused research by OECD DAC income group

	Number of Institutions	Number of Institutions with more than one LMIC-focused project
Least Developed and Low Income	61	11
Lower-Middle Income	199	49
Upper-Middle Income	436	123
High Income	214	53

Looking more closely at the portfolios of the lead institutions, table 10 presents the institutions leading on the greatest number of projects under each of the WHO priority areas for both the overall and LMIC-focused portfolios. Taken together with the large number of institutions and corresponding number of projects of institutions based in Brazil (Figure 10), it comes as little surprise to see that Brazilian-based institutions led on the greatest amount of LMIC-focused research under each of the WHO priority areas (Table 10). Furthermore, the top two institutions (in terms of the number of LMIC-focused research) under seven of the nine priority areas are based in Brazil (with the exceptions being the priority areas on 'Infection Prevention and Control'; and 'Social Sciences in Outbreak Response') – further highlighting the heavy concentration of Brazilian institutions with respect to LMIC-focused research.

Table 10 - Lead institutions with the greatest number of projects by WHO priority area. Number of projects indicated in brackets.

WHO Priority Area	Overall	LMIC-focused
Virus: natural history, transmission and diagnostics	Uni Minnesota (38)	FIOCRUZ (18)
Animal and environmental research...	City Uni New York (4)	FIOCRUZ (3)
Epidemiological studies	Uni British Columbia (20)	Uni Federal Rio de Janeiro (7)
Clinical characterization and management	Uni British Columbia (26)	Uni São Paulo (24)
Infection prevention and control...	Uni British Columbia (19)	Uni Brasília (6)
Candidate therapeutics R&D	Uni British Columbia (23)	Uni São Paulo (11)
Candidate vaccines R&D	Imperial College (7)	Uni São Paulo (4)
Ethics considerations for research	Nanyang Technological Uni (4)	{16 institutions} (1)
Social sciences in the outbreak response	Carleton Uni (35)	Uni Brasília (9)

Note for Table 10: Emphasis has been placed on presenting the number of projects as opposed to amounts awarded by funders as financial information was only available for 59.2% of all projects in entire database (45.1% for LMIC-focused projects).

ANNEX C. COVID CIRCLE FUNDERS SURVEY REPORT

COVID CIRCLE FUNDER CONSULTATION

INTRODUCTION

The COVID CIRCLE initiative, a joint initiative between UKCDR and GloPID-R aims to collate learnings from the funding and research response to the COVID-19 pandemic to inform the response to this and future epidemics and pandemics. The learning is framed around the [Seven Principles](#) for supporting high quality research for the most pressing needs in epidemics and pandemics and will have a global view with a low- and middle-income country focus.

AIM

To facilitate learning for both funders and researchers to improve future response to epidemics and pandemics.

OBJECTIVES

- a. Explore barriers and enablers to COVID-19 research funders fulfilling the Seven Principles for funding high quality research for the most pressing global needs in epidemics and pandemics.
- b. Identify potential enablers or windows of opportunity for the translation of the Seven Principles into practice within the ongoing research response for the COVID-19 pandemic in LMICs.

METHODS

COVID CIRCLE undertook a funder consultation between 1st February, 2021 and 21st April, 2021. This consultation involved a survey of research funders involved in the COVID-19 response, funder interviews and consultations with UKCDR funders groups.

The survey was developed and internally piloted, before opening between 1st February, 2021 and 15th March, 2021, using *SurveyMonkey*.

Both open and closed-ended questions were included in the survey's three sections which focused on: defining respondents, proposal of case studies and specific questions pertaining to the application of the seven funder principles respectively. Funders were offered the option of presenting a consolidated response from their organisations or individual contributions and could also contribute through an interview (survey questions provided in Annex A).

In addition, four UKCDR funders groups (Disasters Research Group, Capacity Strengthening Group, Epidemics Funders Group and Equitable Partnerships Taskforce) were consulted, between 21st February 2021 and 22nd April, 2021, to facilitate cross-sectoral learning, gain expert insights into specific funder principles and

increase the breadth of responses, as these groups have representation from multiple funding organisations including LMIC funders.

Proposed case studies were reviewed by a selection panel and shortlisted cases were developed through further in-depth funder interviews to identify key learnings and innovative funder practice in response to COVID-19. Cross cutting themes and recommendations from these interviews are also incorporated in the results section here.

All responses were anonymised and data was managed in accordance with Wellcome policies.

FINDINGS/ RESULTS

SURVEY AND FUNDER CONSULTATION

Survey responses were received from 10 funding organisations (global, LMIC-based and UK-based) and included private, public, non-governmental and philanthropic organisations. Four UKCDR funders groups were consulted: Disasters Research Group, Capacity Strengthening Group, Epidemics Funders Group and Equitable Partnerships Taskforce.

Each of the seven principles was ranked between 3 – 5 (out of 5) by the majority of funders in an assessment of the extent to which their application was prioritised in the development of research funding responses to COVID-19 in LMICs. This is an indication of the high level of importance funders attach to the application of the seven principles for an effective pandemic response.

ENABLERS TO APPLYING THE SEVEN FUNDER PRINCIPLES

Cross cutting enablers

Funders can play a vital role in setting the standards for the adherence to best practice in research during epidemics and pandemics. Several approaches were taken to embed the principles in pre and post award activities including:

- a. Embedding the seven principles in the design of projects and programmes.
- b. Specific requirements of grantees (which were considered by peer reviewers) in funding call specifications.
- c. Requiring grantees to demonstrate application of the principles in submitted research proposals. Where there were doubts of successful projects meeting specific principles, written contingencies or changes of the project plan were requested prior to funding being approved.

Enablers of the application of specific principles:

1. Alignment to global research agendas and locally identified priorities

- a. Funders highlighted the importance of the timely availability of the WHO Research Roadmap for setting their research agenda. Further, the availability of regional research goals e.g. Research for Development goals for Africa Report and LMIC research priorities identified by AAS/TGHN/UKCDR

collaborative study was appreciated by funders. COVID CIRCLE activities complemented these efforts by providing regular analyses of funded projects (mapped against research priorities) and enabled identification of potential gaps in research funding, which some funders considered in prioritising research activities.

- b. Engagement and coordination with local/regional research and policy organisations particularly in Africa gave funders insights into the evolving local/regional research needs and promoted the support of projects with high potential for influencing policy and practice. Key partners mentioned by funders include Africa CDC, WHO Afro and the African Academy of Sciences.

2. Research capacity for rapid research

- a. Rapid funding was most easily facilitated through supplementing existing funded research activities and harnessing existing research partnerships.
- b. Amending research funding processes for new grantees - Several funders initiated “rapid funding mechanisms” to address the urgent need for research evidence during the pandemic. Funders highlighted introducing fast track processes or simplified grant application processes as key enablers for rapid funding and initiation of research, particularly where these mechanisms were in place prior to the pandemic.

3. Appropriate ethical consideration

- a. Rapid ethical approval was easier for projects with existing Institutional Review Board (IRB) /Ethics Review Board (ERB) certification
- b. Engaging local partners - Obtaining ethical approval was easier where in- country partners with an understanding of how to navigate local approval systems facilitated review processes

4. Collaboration and learning enhanced through coordination

- a. Monitoring and evaluation for learning for the future - Several funders plan to or have undertaken monitoring and evaluation activities to assess the alignment of their COVID-19 response to the seven principles to learn lessons for the future. Funders either incorporated these into their routine M&E activities (e.g. annual reviews) or created bespoke processes for learning from their COVID-19 responses.
- b. Data sharing and engagement of partners - *“I think Africa did well in terms of coordination between major decision-making institutions”*.
A high degree of coordination and interaction within regional research and policy organisations and strong networks in the African sub-region was identified by funders as important for collaboration and information sharing.
- c. COVID CIRCLE activities- Several funders used the COVID CIRCLE Tracker and analyses to inform their decision making.

BARRIERS TO APPLYING THE SEVEN FUNDER PRINCIPLES

Cross cutting Barriers

The following barriers cut across several of the seven principles and limited funders’ application of the principles in their research responses.

- a. Time – *“Anything new e.g. commissioning research and new calls/rapid funding mechanisms, takes additional time as it requires new staff resource and processes to be developed”*. Time was a significant limiting factor to applying the principles given the urgent need for rapid initiation of research in response to the pandemic.
- b. Cost - Funders identified additional cost of supporting researchers to align their activities to the seven principles and additional operational costs as significant barriers to aligning with the principles. In LMICs partnerships this was further exacerbated by the relative lack of funding available through local organizations.
- c. Difficulty monitoring compliance of grantees with the principles post award- Some funders attributed this to the lack universal metrics to monitor progress on applying some of the principles such as equity in partnerships.
- d. Limited application of the principles in proposal review processes. It is difficult to assess the degree to which the principles are understood and factored into review panel processes.

Barriers of application of specific principles are highlighted below:

1. **Alignment to global research agendas and locally identified priorities:**
 - a. Delayed development of and in some case absence of local and regional priorities hindered funders alignment of research agenda to these.
2. **Research capacity for rapid research**
 - a. Grant review process- Funders identified the following barriers to rapid grant review processes. These include:
 - i. Shortage of appropriate reviewers – inadequate numbers or reviewers of high expertise leads to delays in reviewing grant proposals.
 - ii. Delays in funding processes- *“I think a big barrier is us ourselves, the review process even though we wanted them to be rapid...There are a lot of in-built breaks in reviewing and contracting”*.
 - b. Financial administration made it challenging for funders to fund LMIC partners directly without going through northern universities/ partners.
 - c. Delayed ethical approvals hindered rapid initiation of research.
3. **Equitable, inclusive, cross-sectoral and interdisciplinary partnerships:**
 - a. Insufficient funding to adequately support and sustain partnerships.
 - b. Rapid research could potentially compromise the ability to ensure the strength and equity of research partnerships.
4. **Open science and data sharing:**
 - a. Lack of clear guidelines on the optimal data sharing requirements (for the different types of research).
5. **Appropriate ethical consideration**
 - a. “How fit for purpose are the ethical review processes for rapid research?”
Rapid research could potentially compromise ethical considerations

including limiting the time to fully engage communities in setting research agenda, defining methods, and sharing findings.

Recommendations for future practice

Cross cutting Recommendations

- a. Embed the application of the seven principles in the entire funding process including in the processes, proposal scoring and awarding of grants.
- b. Develop guidance for applying (“operationalising”) the seven principles
- c. Funder collaboration to facilitate:
 - agreement on guidance for applying the principles
 - development of agreed mechanisms for tracking progress on applying the principles. For instance, research capacity strengthening, equitable partnerships, data sharing etc
- d. Preparedness:
 - Application of the principles should be included in funders’ epidemic/ pandemic preparedness activities. Here, funders can invest in partnerships, engage with relevant regional/ local stakeholders, develop rapid funding mechanisms and pilot these prior to disease outbreaks.
 - Increase awareness of funder and researcher coordination initiatives such as GLoPID-R and UKCDR and plans made to resource when required.
 - Increase awareness of existing research mechanisms for funding research during acute crises. Many funders developed responsive mechanisms for research following the West Africa Ebola (2014-2016) outbreaks and these, together with mechanisms developed during this current pandemic, will be useful for preparedness for future pandemics.

Recommendations for the application of specific principles are highlighted below:

1. **Alignment to global research agendas and locally identified priorities:**
Establish partnerships/groups of expert consultants in advance of future pandemics to facilitate rapid consultation for regional and local research priority setting.
2. **Research capacity for rapid research** – Funder coordination to prevent shortage of reviewers through joint funding calls with well-coordinated review processes where reviewer lists are shared “*We can do better at coordinating the databases, so you don’t for instance send several applications to one reviewer*”.
3. **Open science and data sharing:**
 - a. Development of clear and consistent policy expectations and guidance for openness across funders
 - b. Make clear what the optimal requirements and guidelines are for sharing data for different kinds of research i.e. for biomedical research (which perhaps can be fully anonymised) versus social sciences research where information/ interviews on cultures and detailed accounts are used.
 - c. Develop community infrastructure and practices for data sharing.
 - d. To address ethical, legal and political constraints to data sharing. This will ensure trustworthy and equitable approaches which have the buy-in and support of LMICs.

- e. Establish appropriate incentives for researchers that recognise and reward the rapid sharing of high-quality data and findings.

SUMMARY TABLE OF FINDINGS

Table 1: Crosscutting enablers and barriers to and recommendations for applying the seven funder principles

Enablers
▪ Embedding principles in the design of projects and programmes
▪ Including grantee requirements in funding call specifications
▪ Grantees demonstrating application of the principles in submitted proposals
Barriers
▪ Time
▪ Cost
▪ Difficulty monitoring compliance with principles post award
▪ Limited application of the principles in the proposal review process
Recommendations
▪ Embed application of the principles in the entire funding process
▪ Develop guidance for “operationalising” the principles
▪ Funder collaboration to agree on guidance for applying the principles
▪ Funder collaboration to agree on mechanisms to track progress on the principles
▪ Application of principles in funders’ pandemic preparedness activities
▪ Increase awareness of existing funder and researcher coordination initiatives
▪ Increase awareness of existing responsive funding mechanisms which are important for pandemic preparedness

Table 2: Enablers to applying the seven funder principles

Principles	Enabler(s)
Alignment to global research agendas and locally identified priorities	<ul style="list-style-type: none"> ▪ Timely availability of the WHO Research Roadmap for setting research agenda ▪ Engagement with local/regional research and policy organisations to gain insights into evolving priorities
Research capacity for rapid research	<ul style="list-style-type: none"> ▪ Supplementing existing funded research activities and funding research through existing partnerships ▪ Expediting research funding processes through rapid funding mechanisms
Appropriate ethical consideration	<ul style="list-style-type: none"> ▪ Projects with existing IRB/ERB certification ▪ Engaging local partners knowledgeable in navigating local ethics review processes
Collaboration and learning enhanced through coordination	<ul style="list-style-type: none"> ▪ Monitoring and evaluation for learning for future response ▪ Data sharing and engagement of partners ▪ COVID CIRCLE tracker and analysis for informing decision making

Table 3: Barriers to applying the seven funder principles

Principles	Barrier(s)
Alignment to global research agendas and locally identified priorities	<ul style="list-style-type: none"> ▪ Delayed development or absence of regional or local priorities
Research capacity for rapid research	<ul style="list-style-type: none"> ▪ Shortage of appropriate reviewers ▪ In-built delays in funding processes ▪ Financial administration especially in funding LMIC processes ▪ Delayed ethical approvals
Equitable, inclusive, cross-sectoral and interdisciplinary partnerships	<ul style="list-style-type: none"> ▪ Insufficient funding to adequately support and sustain partnerships ▪ Rapid research could potentially compromise the ability to ensure the strength and equity of research partnerships
Open science and data sharing	<ul style="list-style-type: none"> ▪ Lack of clear guidelines on the optimal data sharing requirements (for the different types of research).
Appropriate ethical consideration	<ul style="list-style-type: none"> ▪ Rapid research could potentially compromise ethical considerations in research

Table 4: Recommendations for applying the seven funder principles

Principles	Recommendation(s)
Alignment to global research agendas and locally identified priorities	<ul style="list-style-type: none"> ▪ Establish partnerships/groups of expert consultants in advance of future pandemics to facilitate rapid consultation for regional and local research priority setting.
Research capacity for rapid research	<ul style="list-style-type: none"> ▪ Funder coordination to prevent shortage of reviewers through joint funding calls with well-coordinated review processes where reviewer lists are shared.
Open science and data sharing	<ul style="list-style-type: none"> ▪ Development of clear and consistent policy and guidance expectations for openness across funders ▪ Make clear what the optimal requirements and guidelines are for sharing data for different kinds of research i.e. for biomedical research versus social sciences research. ▪ Develop community infrastructure and practices for data sharing. ▪ To address ethical, legal and political constraints to data sharing in LMICs.

SURVEY QUESTIONS

COVID CIRCLE FUNDER CONSULTATION

Page 1: Introduction

This survey forms part of the [COVID CIRCLE](#) funder consultation for the learning element of our work. If you would prefer to contribute to this consultation through an interview (especially the proposals for case studies), please contact Rachel Miles at R.Miles@ukcdr.org.uk to arrange a time.

The consultation aims to:

1. Explore barriers and enablers to COVID-19 research funders fulfilling the [Seven Principles](#) for funding high quality research for the most pressing global needs in epidemics and pandemics. [\(link to PDF\)](#)
2. Identify potential enablers or windows of opportunity for the translation of the Seven Principles into practice within the ongoing research response for the COVID-19 pandemic in LMICs.
3. Identify any new lessons learnt from the first year's research response to COVID-19 to inform funder practice for future epidemics or pandemics in LMICs.

The survey takes approximately **20 – 30 minutes** to complete. You may wish to seek input from colleagues within your organisation to provide a consolidated response. To facilitate this, a text version of the survey questions is available [here](#).

COVID CIRCLE Initiative Learning Project

The COVID CIRCLE Initiative is a learning and coordination partnership between [UKCDR](#) and [GloPID-R](#) aimed at supporting funders and researchers to deliver a more effective and coherent global research response during the COVID-19 pandemic.

This survey is part of the COVID CIRCLE initiative to facilitate learning for funders and researchers to improve research responses to pandemics and epidemics in LMICs.

Page 2: Consent form

The information/data you provide may be used in a publication on learning from the COVID-19 research response and will feed into discussions at various UKCDR Funders Groups, GloPID-R Working Groups and the COVID CIRCLE Steering Group. Any quotes used will be anonymised and refer only to your high-level type of organisation (for example, a public research funder). The original data forms collected will not be shared with any other third parties. In line with Wellcome policies, under which UKCDR operates, data generated in the course of the project will be kept securely in electronic form for a period of nine months in accordance with Wellcome policy.

- I agree to complete the questionnaire

- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason
- I agree to the use of anonymised quotes in the COVID CIRCLE Learning publication.
- I agree to the use of anonymised quotes in other COVID CIRCLE public communications e.g., blogs, annual report
- I agree to be contacted by COVID CIRCLE for further information

-----**Section A: Defining respondents**-----

Q1)

- What funding organisation are you responding on behalf of?
- Name & position of respondent in organisation
- Email address
- Name & country of organisation
- Type of organisation (public, private, non- governmental, Other)
- What proportion of your COVID-19 research funding has been focussed on research undertaken in LMICs? (please include amounts and period of investment and whether the funding is ODA)
- How are you planning to learn from or evaluate your own COVID-19 research investments?

-----**Section B: Proposals for case-studies**-----

As part of the COVID CIRCLE learning element, we will be developing case studies with research projects or programmes which have demonstrated innovative best practice in research in epidemics. These case-studies will identify the factors of success that might inform future funding and research practice in epidemics and will be selected by the COVID CIRCLE Steering Group from any recommendations provided.

Q2) Please propose any of your funded projects or programmes as examples that demonstrate innovative practice for research in epidemics for LMICs against any of these [seven principles](#)? (up to 5 projects or programmes)

- Project name & funder reference
- Additional details
- Principal Investigator name
- Please confirm whether you can facilitate an introduction if selected as a case study (Y/N)
- Please summarise why this would make a good case study?
- Which of the [Seven COVID CIRCLE Funders Principles](#) does it address?

Alignment to global research agendas and locally identified priorities	
Research capacity for rapid research	
Equitable, inclusive, cross-sectoral and interdisciplinary partnerships	
Open science and data sharing	
Protection from harm	
Appropriate ethical consideration	
Collaboration and learning enhanced through coordination	

-----**Section C: Enablers, barriers and recommendations for applying the Seven Funders Principles for Supporting High-Quality Research for the Most Pressing Needs in Epidemics and Pandemics**-----

Principle 1. Alignment to global research agendas and locally identified priorities.

To consider global research priorities, such as proposed by the World Health Organisation (WHO) and other multilateral entities or regional bodies such as the African Union, as well as local research priorities, in addition to funder strategic priorities, when funding research for global benefit.

Q3) To what extent has “**Alignment to global research agendas and locally identified priorities**” been a priority in developing your research funding response to the COVID-19 pandemic in LMICs?

1	2	3	4	5
---	---	---	---	---

<rank score: 1 = not at all, 5 = to a great extent>

a. Which research priorities have you aligned your funding to?

i. [WHO Research Roadmap for COVID-19](#)

iii. [LMIC priorities](#)

ii. [African Academy of Sciences priorities](#)

iv. [UN Recovery Roadmap](#)

v. Other [please specify]

b. What are the additional specific enablers to applying this principle (including any changes you made to funding practice in response to this pandemic)? <open ended>

c. What are the specific barriers to applying this principle and how can these be overcome? <open ended>

Principle 2. Research Capacity for Rapid Research

a. To build upon existing research capacity and systems, where available.

b. To support capacity strengthening necessary for the research.

Q4) To what extent has “**Research capacity for rapid research**” been a priority in developing your research funding response to the COVID-19 pandemic in LMICs?

<rank score: 1 = not at all, 5 = to a great extent>

1	2	3	4	5
---	---	---	---	---

a. Have you leveraged prior funded research programmes to respond to COVID-19? (Y/N)

If yes, what type of programmes were these?

i. Clinical research networks

ii. Cohorts

iii. Other- please specify

b. Have you used any flexible or rapid funding mechanisms to support research on COVID-19? (Y/N)

If yes, how did you achieve this?

i. Supplementing existing grantees

ii. Approving pivoting of already funded research projects

- iii. Commissioning research
- iv. Closed research calls to existing grantees
- v. Rapid open funding call mechanisms
- vi. Others

Please comment on the success of these mechanisms in expediting

- i. decision making <open ended>
- ii. research being undertaken <open ended>
- iii. Funding flowing to grantees <open ended>

- c. Have you explicitly supported capacity strengthening as part of the research response? (Y/N)
If yes, please provide details <open ended>
- d. What are the additional specific enablers to applying this principle (include any changes made to funding practice in response to this pandemic)? <open ended>
- e. What are the specific barriers to applying this principle and how can these be overcome? <open ended>

Principle 3. Equitable, inclusive, cross-sectoral and interdisciplinary partnerships

a. To support equitable partnership throughout the research process.

b. To promote inclusive and cross-sectoral partnerships to ensure that research is most likely to impact policy and practice.

c. To promote interdisciplinary research

Q5) To what extent have “Equitable, inclusive, cross-sectoral and interdisciplinary partnerships” been a priority in developing your research funding response to the COVID-19 pandemic in LMICs?

<rank score: 1 = not at all, 5 = to a great extent>

1	2	3	4	5
---	---	---	---	---

- a. Have you given or referred to any specific guidance for your researchers on partnerships? (Y/N)
If yes, which of these partnership aspects did it address (You can link to the guidance)?
 - i. [KFPE](#)
 - ii. [COHRED Research Fairness Initiative](#)
 - iii. [TRUST Global Code of Conduct](#)
 - iv. [UKCDR building a partnership of equals](#)
 - v. Other [Please specify]
- b. Has the research approach to COVID-19 catalysed your organisation forming new, equitable partnerships or hindered it? <open ended>
- c. What are the additional specific enablers to applying this principle? <open ended>
- d. What are the specific barriers to applying this principle and how can these be overcome? <open ended>

Principle 4. Open Science and Data Sharing

To require that research findings and data relevant to the epidemic are shared rapidly and openly to inform the public health response.

Q6) To what extent has “**Open Science and Data Sharing**” been a priority in developing your research funding response to the COVID-19 pandemic in LMICs?
<rank score: 1 = not at all, 5 = to a great extent>

1	2	3	4	5
---	---	---	---	---

- a. Have you given or referred to any specific guidance for your researchers on **open science** (e.g., that outputs arising from grants should be publicly available or shareable)? (Y/N)
If yes, what is the requirement (you can link to the guidance) and was this updated in response to the COVID 19 funding? <open ended>
- b. Have you given or referred to any specific guidance for your researchers on **data sharing**? (Y/N)
If yes, what is the requirement (you can link to the guidance)? <open ended>
- c. Please list any specific repositories mentioned in your guidance. <open ended>
- d. What are the additional specific enablers to applying this principle? <open ended>
- e. What are the specific barriers to applying this principle and how can these be overcome? <open ended>

Principle 5. Protection from harm.

To take all reasonable steps to anticipate, mitigate and address harm to those involved with research funded.

Q7) To what extent has “**Protection from harm**” been a priority in developing your research funding response to the COVID-19 pandemic in LMICs?
<rank score: 1 = not at all, 5 = to a great extent>

1	2	3	4	5
---	---	---	---	---

- a. Have you given or referred to any specific guidance for your researchers on protection from harm? (Y/N)
If yes, what is the guidance?
 - i. [UKCDR Guidance on Safeguarding in International Development Research COVID addendum](#)
 - ii. [UK Research and Innovation \(UKRI\) Preventing harm in research](#)
 - iii. [National Institute of Health Research \(NIHR\) Safeguarding Guidance](#)
 - iv. [DFID Enhanced Due Diligence: Safeguarding for external partners](#)
 - v. Other [Please specify]
- b. What are the specific enablers to applying this principle? <open ended>
- c. What are the specific barriers to applying this principle and how can these be overcome? <open ended>

Principle 6. Appropriate ethical consideration.

To ensure appropriate ethical consideration is embedded throughout research conducted, in particular regarding access to the products of research.

Q8) To what extent has “**Appropriate ethical consideration**” been a priority in developing your research funding response to the COVID-19 pandemic in LMICs?
<rank score: 1 = not at all, 5 = to a great extent>

1	2	3	4	5
---	---	---	---	---

- a. Have you given or referred to any specific guidance for your researchers on ethical consideration? (Y/N)
if yes, what is the guidance?

- | | |
|---|---|
| <p>i. Declaration of Helsinki – ethical principles for medical research involving human subjects</p> <p>ii. Nuffield Council on Bioethics – Research in Global Health Emergencies: Ethical Issues</p> <p>iii. CIOMS and WHO International Ethical Guidelines for Health Related Research involving humans</p> | <p>iv. WHO Ethical Standards for research During Public Health emergencies: Distilling Existing Guidance to Support COVID-19 R&D</p> <p>v. TRUST Global Ethics Code of Conduct for research in resource poor settings</p> <p>vi. San Code of Research Ethics</p> <p>vii. Other [Please specify]</p> |
|---|---|

- b. What are the specific enablers to applying this principle? <open ended>
c. What are the specific barriers to applying this principle and how can these be overcome? <open ended>

Principle 7. Collaboration and learning through enhanced coordination. Coordination to ensure maximum impact of investments for research on the most pressing global needs for epidemics through cross- funder and cross-researcher collaboration learning and evaluation.

a. To map research funded, use these data to enhance coordination, and ensure it is publicly available.

b. To foster collaboration between studies funded in epidemics and facilitate shared development of research protocols, data collection tools, data sharing and exchange of knowledge.

c. To where relevant to embed operational research and support impact evaluation across funded projects to learn from and improve future funder and researcher responses for epidemics.

Q9) To what extent has “***Collaboration and learning through enhanced coordination***” been a priority in developing your research funding response to the COVID-19 pandemic in LMICs?

<rank score: 1 = not at all, 5 = to a great extent>

1	2	3	4	5
---	---	---	---	---

- a. Have you co-funded or collaborated with any other funding organisations for COVID-19 research funding? (Y/N)
b. If yes, please provide details.
c. Have any funders collaboration groups facilitated your funding response?

- i. [UKCDR](#)
 - ii. [GloPID-R](#)
 - iii. [COVID CIRCLE](#) activities
 - iv. Other
- d. Have you used the [UKCDR & GloPID-R COVID-19 funding tracker](#) to inform your activities? (Y/N)
 - If yes, how?
 - i. For informing funding decisions
 - ii. For briefing strategy panels
 - iii. For identifying opportunities for collaboration
 - iv. Other [please specify]
- e. Have you used the COVID CIRCLE Living Mapping Review? (Y/N)
 - If yes, how? <open ended>
- f. What are the additional specific enablers to applying this principle (including any changes you made to funding practice in response to this pandemic)? <open ended>
- g. What are the specific barriers to applying this principle and how can these be overcome? <open ended>
- Q10)** Is there anything further that you would like to share regarding the research funding response to COVID-19 in LMICs (after considering the entire survey)?
 - a) If yes, please provide details <open ended>

RESEARCHER SURVEY FINDINGS

Introduction

The COVID CIRCLE initiative, a joint initiative between UKCDR and GloPID-R aims to collate learnings from the funding and research response to the COVID-19 pandemic in and for low resource settings, to inform future epidemics and pandemics. To capture this learning, surveys were undertaken with funders and researchers of COVID-19 research in low- and middle-income countries (LMICs). This researcher survey analysis complements a separate analysis of a funder consultation survey undertaken as part of the COVID CIRCLE initiative.

Aim

To capture researchers' perspectives on barriers and enablers to an effective funding and research response to the COVID-19 pandemic.

Objectives

- Highlight specific barriers and enablers to an effective funding and research response to COVID-19 in alignment with the [7 funder principles for supporting high quality research](#) for the most pressing global needs in epidemics and pandemics.
- Identify recommendations on how funders could support researchers to fulfil the relevant 7 funder principles, and highlight broader research system needs to ensure an effective research response to future epidemics and pandemics.

Methods

The COVID CIRCLE researcher survey was developed and distributed using the Survey Monkey tool, and open between 3rd March 2021 and 23rd April 2021. The survey was shared through an event invitation for the COVID-19 Research in LMICs meeting, which brought together researchers and funders from across the world working on COVID-19 research focussed on LMICs, and attended by over 500 researchers. The survey was re-shared during the meeting, to capture perspectives from the researchers present at the meeting, and interim findings were shared during the meeting to facilitate discussion. To ensure inclusion of non-English speakers, the survey was also translated into French, Spanish and Portuguese and responses translated using DeepL. Informed consent was sought from all survey respondents. The questions were a mix of ranked quantitative and open text response qualitative options, and qualitative analysis was undertaken using inductive qualitative research methodology to explore and identify key themes emerging from the data.

Results

The survey was completed by 70 researchers from across the world, with the majority of respondents from East Africa, Western Europe, South Africa and South-East Asia followed closely by South Asia and West Africa. Other respondents were based in Central Africa, Central America, South America, South-East Asia and Northern Europe.

Barriers to effective and high-quality research during epidemics and pandemics

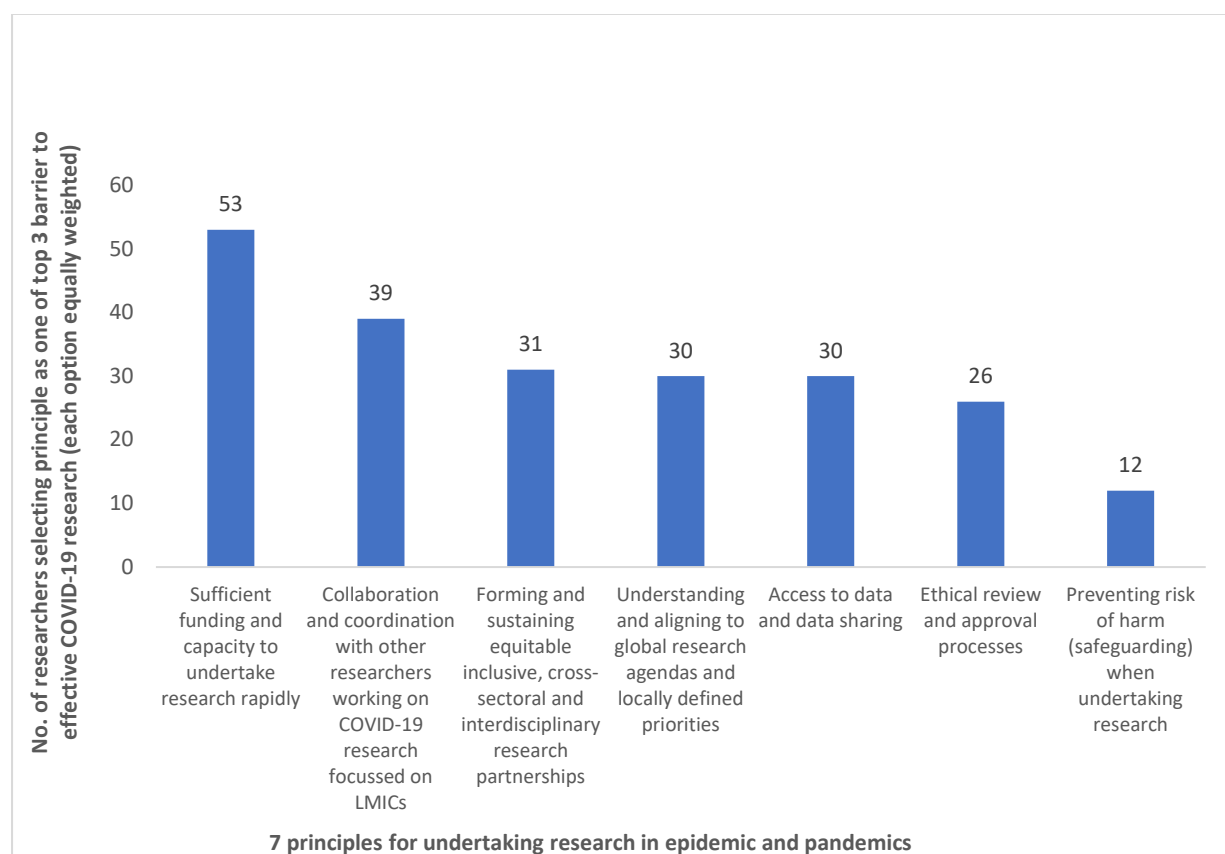
The survey explored researchers' perspectives on barriers to effective research for epidemics and pandemics, framed around the 7 funder principles. Respondents were asked

to identify the greatest barriers to research, and asked to select up to 3 top key barriers to undertaking research aligned to the 7 funder principles.

Top 3 barriers identified by researchers were (represented as percentage of researchers who ranked principle as top 3 barrier to effective COVID-19 research):

- Sufficient funding and capacity to undertake rapid research (76% of researchers ranked this one as of the top 3 barriers to effective COVID-19 research)
- Collaboration and coordination with other researchers working on COVID-19 research (56% of researchers ranked is this one as of the top 3 barriers to effective COVID-19 research)
- Forming and sustaining equitable, inclusive, cross-sectoral and interdisciplinary partnerships (44% of researchers ranked is this one as of the top 3 barriers to effective COVID-19 research)

Fig 1: Barriers to effective COVID-19 research focussed on low- and middle-income countries



Whilst majority of the data on barriers was collected through multiple choice options, respondents were asked to provide any additional comments at the end of the survey. This additional feedback provided further detail about some of the barriers selected aligned to the 7 funder principles which are detailed below.

Principle	Barriers
Alignment to global research agendas and locally identified priorities	Whilst this was highlighted as a key barrier to undertaking effective COVID-19 research, respondents did not provide much further detail about this barrier. Some barriers highlighted by individual respondents were:

	<ul style="list-style-type: none"> • Sometimes difficult to identify locally defined research priorities. • Lack of collaboration and negative competition between national entities/countries
Research capacity for rapid research	<ul style="list-style-type: none"> • Demand for researchers with specific expertise (e.g. epidemiology, disease modelling and health economics) in LMICs outstripped supply. • Regular funding calls and grant application processes took a long time and huge competition for relatively small amounts of funding. • Limited funding for policy-oriented research. • Challenges in obtaining funding, with some researchers or institutions highlighting need to rely on local funding, which was sometimes insufficient to address local priorities or build capacity, and put a strain on the institution and impeded delivery of existing projects. • Limited funding for early career researchers to participate in COVID-19 research. • Some funding focussed more on high income country priorities rather than LMIC priorities.
Equitable, inclusive, cross-sectoral and interdisciplinary partnerships	<p>Barriers highlighted by some respondents were:</p> <ul style="list-style-type: none"> • Limited funding to support partnerships. • Difficulty connecting with some partners. • Limited pool of researchers in LMICs with expertise relevant to epidemics and pandemics (e.g. mathematical modelling and epidemiology, health economics) research for partnership with Northern partners. One respondent indicated there was some competition between global North researchers for the same research teams in the Global South.
Open science and data sharing	<p>Access to data and data sharing was highlighted as a key barrier. Specific issues identified included:</p> <ul style="list-style-type: none"> • Issues with data quality for research (for example poor quality data in health information systems to monitor or detect an emerging epidemic). • Hesitance in sharing clinical data – sometimes difficult to obtain from public hospitals or institutions. Local collaborators also hesitant to share data due to concerns it reflects poorly on clinical practice. • Some institutions hesitant to share data to enable them to apply for their own research grants or use for publications. • Single centre data bias • Competition and conflict of interest hindering data sharing – particularly data used for vaccine development. • Limited funding available to access available data or hire data analysts. • Data secrecy • Poor infrastructure and limited internet connectivity.

Protection from harm (safeguarding)	<ul style="list-style-type: none"> There was limited feedback about barriers to safeguarding. However, one researcher highlighted cross-infection and adverse outcomes thought to be due to PPE shortage.
Appropriate ethical consideration	<ul style="list-style-type: none"> Slow ethics review was highlighted as a key barrier to research, and respondents highlighted number of different reasons including bureaucracy, need for ethical approval from multiple countries, slow national ethics committee review, delayed national ethics review processes, institutional review board delays and dependency on busy clinicians. One researcher highlighted lack of transparency of ethics review board.
Collaboration and learning enhanced through coordination	<p>There was limited expansion of barriers relating to collaboration and coordination. Some barriers highlighted were:</p> <ul style="list-style-type: none"> Lack of funding for sustaining collaboration Lack of networks in key regions similar to Africa CDC or ALERRT networks in other regions such as South East Asia Lack of fora for enhancing and sustaining collaboration Difficulties establishing contact with other researchers. Funding of small underpowered studies whose data could not be pooled was highlighted as a barrier as it limits coordination and potential research impact.
Cross-cutting barriers	<p>A number of cross-cutting barriers were highlighted which included:</p> <ul style="list-style-type: none"> Bureaucracy, administrative delays and slow processes were key barriers to undertaking research rapidly (e.g. ethics approval). Governance and political issues

Enablers of effective and high-quality research during epidemics and pandemics

This survey also identified factors which enabled researchers to effectively undertake COVID-19 research focussed on low- and middle-income countries, framed around how they enabled researchers to fulfil the 7 funder principles. The identified enablers associated with the individual principles, and cross-cutting enablers are highlighted below:

Principle	Enablers
Alignment to global research agendas and locally identified priorities	<ul style="list-style-type: none"> International webinars, conferences and online literature and resources. For example, whilst the first WHO COVID-19 Global Research and Innovation Forum to identify global COVID-19 research priorities was initially hosted in person, subsequent meetings including WHO COVID-19 research working groups, have been held virtually and greater numbers of researchers have been able to participate, in particular those from low- and middle-income country researchers.

	<ul style="list-style-type: none"> • Availability of global research agendas was identified as a key enabler to understanding and aligning to global research agendas. • Existing relationships, networks and partnerships between and with local researchers, key stakeholders, organisations supported alignment with aligning to locally defined research priorities. However, one researcher highlighted the challenge of identifying locally defined research priorities.
Research capacity for rapid research	<p>Enablers to supporting research capacity for rapid research were:</p> <ul style="list-style-type: none"> • Launch of rapid research calls during the COVID-19 outbreak such as the Wellcome/FCDO Joint Initiative on Research in Epidemics Preparedness and Response, UKRI GCRF-Newton rapid response calls and the Institute Pasteur Network. • Availability of previous or existing local or institutional sources of research funding facilitated research to be undertaken rapidly. • Other enablers mentioned included small grants from some funders to undertake fieldwork and collaboration with projects e.g. REMAP-CAP, ISARIC, CCP.
Equitable, inclusive, cross-sectoral and interdisciplinary partnerships	<p>Enablers to building and sustaining partnerships were:</p> <ul style="list-style-type: none"> • Pre-existing and previous partnerships (e.g. ISARIC, MORU's Critical Care Asia Network), and the trust built through these partnerships was identified as a key enabler to equitable research partnerships. • Networking, webinars and opportunities for researchers to communicate and engage. • Agreeing principles on equity with partners, and also changing the perspective to equity rather than Northern partners such as the UK being there "to help".
Open science and data sharing	<p>A number of enablers to open science and data sharing were identified including:</p> <ul style="list-style-type: none"> • Availability of public data and existing public databases (e.g. NCBI databases) and access to national and government data (E.g. ministry of health database). • Internet access – particularly in LMICs. • Partnerships and collaborations with other researchers, both local and international which facilitated data collection, data sharing, and data sharing agreements, shared cross-country protocols and databases.
Protection from harm (safeguarding)	<p>Researchers highlighted enablers for safety/prevention of risk and harm such as:</p> <ul style="list-style-type: none"> • The use and availability of PPE, and the availability of standard operating procedures and protocols (such as safety protocols). • The use or provision of research ethics guidance to prevent risk of harm, such as the Canadian Tri-Council Policy statement, as well as ethics review

	<p>by national ethics committee and institutional review boards (IRBs).</p> <ul style="list-style-type: none"> • The ability to work remotely online and minimise face-to-face contact and PCR testing prior to undertaking field work. • The availability of safeguarding policies, risk assessment, COVID specific research guidelines, training in infection control and relevant safety information provided to participants.
Appropriate ethical consideration	<p>Whilst ethics review was highlighted as a key barrier, some enablers of appropriate ethics review were:</p> <ul style="list-style-type: none"> • Rapid/expedited ethics review processes were identified as a key enabler to effective research in epidemics and pandemics - particularly through specific activities such as the establishment of COVID specific ethics review committees or boards, online/remote ethics review and prioritised ethics review for COVID-19 research projects. • Standardisation of processes, the value of well-established ethics review mechanisms and working with local partners to quickly address IRB concerns.
Collaboration and learning enhanced through coordination	<p>During an epidemic or pandemic, collaboration and coordination between researchers to identify potential research gaps, understand ongoing research activities and explore potential synergies or collaborations is particularly important. The following enablers to this identified by researchers were:</p> <ul style="list-style-type: none"> • The value of existing partnerships and research networks (such as ISARIC, CCA, ALERRT) for supporting collaboration and coordination. • Webinars, virtual communication and online platforms (such as the Health Systems Global platform) to facilitate greater engagement and collaboration between researchers. • Willingness amongst researchers to share, engage and connect. The COVID-19 Research in LMICs meeting was highlighted as a space which could open up collaborative opportunities. • One respondent from the South East Asia region highlighted that it might be valuable to explore network/models such as the African Coalition for Epidemic Research, Response and Training (ALERRT) and replicate in other regions to facilitate greater research coordination and collaboration.
Cross-cutting enablers	<ul style="list-style-type: none"> • Established networks and partnerships seem to impact/enable a range of principles to ensure high quality and effective research, and therefore it may be important for funders and researchers to invest in building and sustaining networks and partnerships in between disease outbreaks to support preparedness and rapid research response in the event of another infectious disease outbreak.

KEY RECOMMENDATIONS

Researchers were also asked to identify recommendations to support fulfilment of the 7 funder principles for high-quality for the most pressing global needs in epidemics or pandemics.

Key recommendations were:

1. Ensure funding for building research capacity (including surveillance) in between epidemics and pandemics and balance this with funding emergency research during the an infectious disease outbreak.
2. Provide funding for establishment of partnerships, collaborations, networks or coordination mechanisms to support future rapid research response. There was a specific recommendation that the ASEAN region should use the Africa CDC model or the ALERRT network to coordinate response to COVID-19 (or future epidemics or pandemics) in South East Asia. Also a need for more global approaches from governments and funders to research and pandemic response.
3. Introduce small grants for epidemics/pandemic research for early career researchers.
4. Provide dedicated or direct funding to low- and middle-income countries– EDCTP rapid response funding in Africa was found to be critical, and more similar dedicated funding would be beneficial.
5. Provide funding for diverse types of research such as health systems research funding, rather than just disease specific applied research. Also provide funding for broader applied research, implementation science and cohort studies.
6. Provide funding to support with data sharing during epidemics or pandemics, including set up of data sharing platforms.
7. Remove of operational bottlenecks to expedite ethics review process.

Other relevant recommendations highlighted by individual researchers to be considered by funders to support future research response included:

- Earlier and easy access to broaden access to funding and grants.
- A “Global Fund” for preventing and dealing with emerging infectious disease.
- Follow on funding for dissemination of research results with policy makers to facilitate research uptake.
- Value and include LMIC regional leadership in agenda setting and research priorities for funding.
- One health approach to epidemics and pandemic research.
- Quicker turnaround on grant decisions, and easy to fill and focussed request for proposals.
- Review impact and quality of rapidly funded research projects to inform future research response.
- Long interdisciplinary programme-based funding involving industry partners.
- Less numerous dispersed calls and high funding amount per project available – this could address limitation of funding various, small underpowered studies of which data can't be pooled limits coordination and impact of research.
- Support human resource exchanges and clinical samples access through international agreements to simplify procedures.
- Greater flexibility at the time of grant application and more rapid grant applications.

- Creation of an international registry of researchers with COVID-19 or broader epidemics expertise and who could be immediately informed when relevant research funding is available.
- Fair remuneration for data collectors.
- Pre-approved protocols for research during epidemics – approved by all relevant stakeholders.
- Provide resources to strengthen and ensure long-term sustainability of health information systems for pandemic preparedness.