

COVID-19 FUNDED RESEARCH PROJECTS IN FOCUS



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Key findings:

Number of capacity strengthening projects:

99

Funding investments (known funding amounts):

\$43.9m

Top funder:

CIHR & NIH

New variants

To date, the world has seen nearly 600 million known cases of COVID-19 and the pandemic has claimed over six million lives [1]. All viruses, including SARS-CoV-2 (which causes COVID-19), evolve over time. Some of these changes affect the properties of a virus, including how easily it spreads, the severity of disease, effectiveness of vaccines, therapeutics and diagnostic tools, and other public health/social measures [2]. The evolution of SARS-CoV-2 was monitored by experts as of January 2020, and later in the year specific Variants of Interest (VOIs) and Variants of Concern (VOCs) were characterised, as the emergence of variants posed an increased risk to public health worldwide. Identified VOCs include: Alpha, Beta, Gamma, Delta and Omicron (the latter two are still circulating VOCs as categorised by WHO) [2]. Here, we present the scope of funded research activity focused on identified or potential variants of COVID-19, drawing on evidence from the September 2022 update of the Living Mapping Review (LMR) of COVID-19 funded research projects and the UKCDR/GLOPID-R [COVID-19 Research Project Tracker](#).

Methodology

Descriptive and thematic analyses were conducted as outlined in the LMR study protocol. Projects with some degree of focus on variants of COVID-19 were identified and coded as such. The identified projects include those investigating factors such as the natural history of the disease, phenotypic change and adaptation of COVID-19, adaptive immunity, and the related implications for vaccine effectiveness, and how to respond to variants of concern for COVID-19. As part of the analysis the following were determined: key funders; funding amounts; country distribution of projects; specific research focus; and study populations.

Findings

Locations, funders and funding amounts

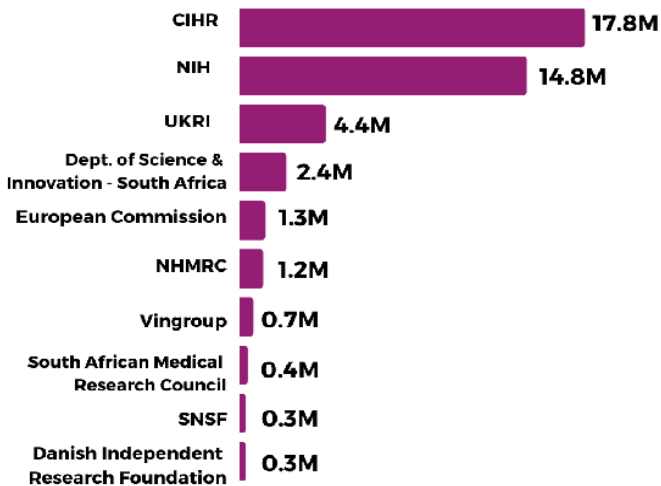
The 99 projects identified as having an identifiable focus on new variants of COVID-19 were funded by 25 funders with an investment of at least \$43.9m. The Canadian Institutes of Health Research (CIHR) and the National Institute for Health (NIH) each funded 28 projects (contributing to 57% of the total number of projects between them). The next highest was the Department of Science and Innovation in South Africa with six projects (see Table 1). CIHR invested \$17.8m in projects that investigated new variants, and NIH invested \$14.8m. UK Research and Innovation (UKRI) were the next highest contributors with \$4.4m (see Figure 1).

Table 1: Research funders investing in COVID-19 variants*

Funder	No. of projects
CIHR	28
NIH	28
Department of Science and Innovation - South Africa	6
South African Medical Research Council	5
UKRI	4
Michael Smith Foundation	3
Agence nationale de la recherche (ANR)	3
Genome BC	3
RIKEN	3
PRACE	2
DFG	2
Vingroup	2
Luxembourg National Research Fund	2

*Funders with 1 project each: Funders with 1 projects each: SNSF; Fundacion Mutua Madrilenia (Spain); Johns Hopkins University; European Commission; Danish Independent Research Foundation; University of Colorado; FAPESP; C3.ai DTI; NSF (USA); FAPEG; NHMRC; ICGB

Figure 1: Research funders investing in COVID-19 variants research: amount invested (USD)

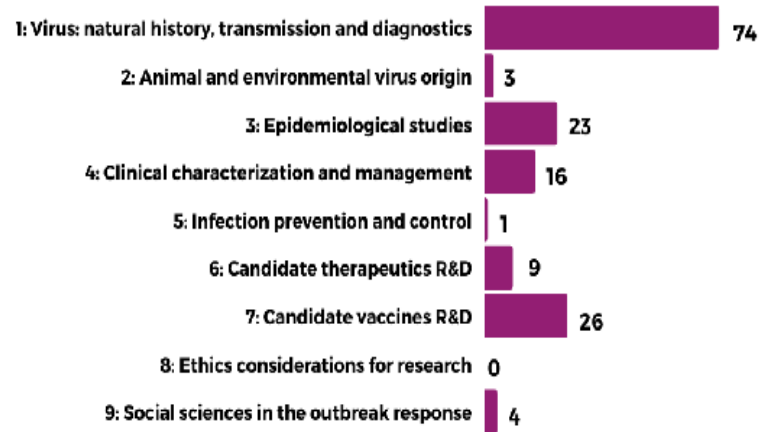


Research involved 34 countries. However, only 22 projects involved at least one low- or middle-income country (LMIC) (and only two projects involved at least one least-developed country), whereas 79 took place in at least one high-income country (HIC) as shown in Figure 2. Canada was included in 31 projects, the highest number across countries, closely followed by the USA (30). The next highest was South Africa (12).

Research focus and WHO research priorities

The majority of “new variant” projects were coded against the priority area of ‘Virus: natural history, transmission and diagnostics’ (74 projects, representing 75% of projects in this analysis). This would be expected due to the nature of the topic, which concerns human knowledge about the virus and how it adapts, and the implications for vaccines and therapeutics. The next highest priority areas covered were: ‘Candidate vaccines research and development’ (26 projects), ‘Epidemiological studies’ (23) and ‘Clinical characterization and management’ (16) (see Figure 3).

Figure 3: COVID-19 variants research projects categorised by WHO



When analysing the projects further, the five sub-priority areas of most interest were:

- 1c: Development of tools and conduct studies to monitor phenotypic change and potential adaptation (45 projects);
- 1d: Characterization of immunity (26);
- 1b: Understanding virus compartments, shedding and natural history of disease (18);
- 4b: Understand pathophysiology of COVID-19 infection (14); and
- 7a: Identification of vaccine candidates (10).

Study populations

44 of the projects in this analysis were conducted with the human population. Of those involving human subjects, the focus was the virus’s natural history, transmission and diagnostics (30 projects) and/or vaccines research and development (15 projects). 42 projects studied the virus itself (39 the virus’s natural history, transmission and diagnostics, and 8 vaccines). And 14 studies specified research with animal populations, which focused on factors including transmission, pathogenesis, immune escape and implications for vaccines. (Figure 6 shows more details on this).

Figure 2: Locations of projects investigating COVID-19 variants

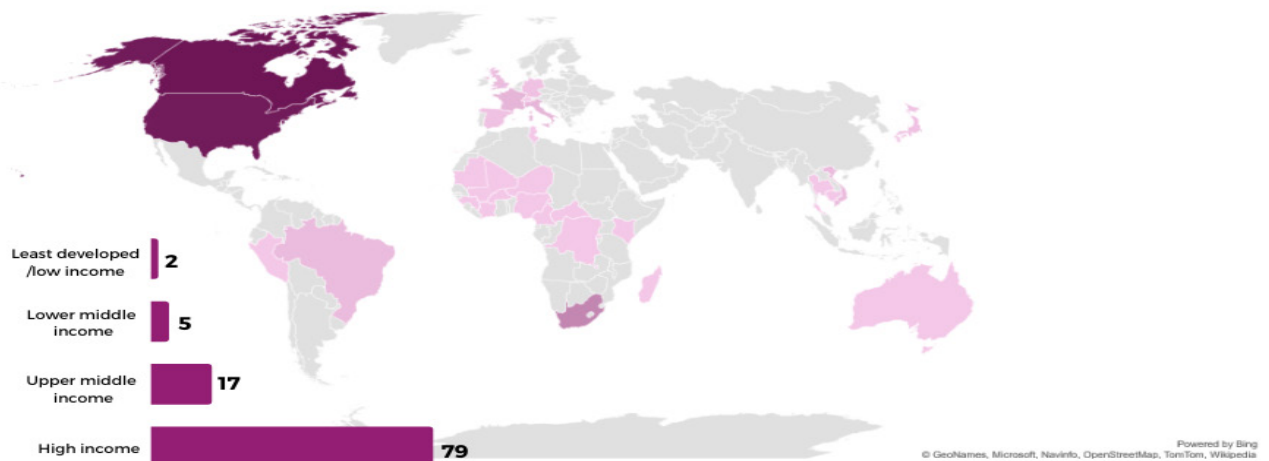
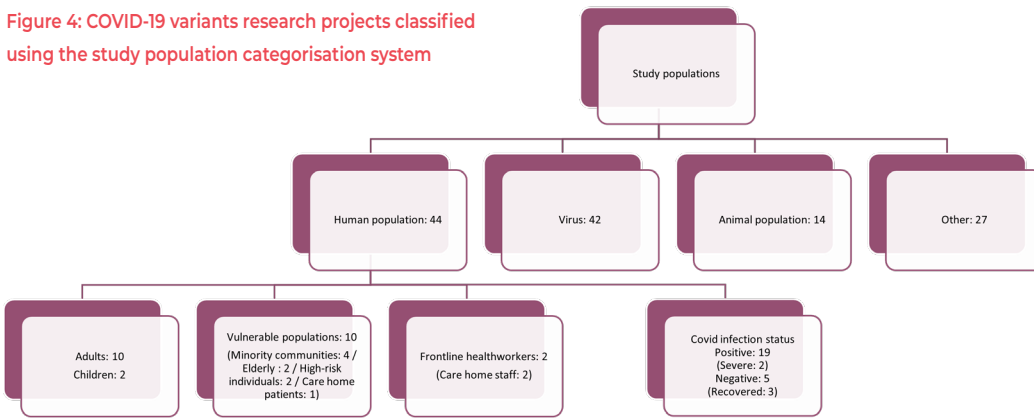


Figure 4: COVID-19 variants research projects classified using the study population categorisation system



Discussion and conclusion

This tracker highlight is only the second iteration focusing on new variants and the number of known projects investigating new variants is still relatively low compared to other areas of interest. As more data is acquired from funders and coded as part of the team’s coding process, more projects are expected to be recognised as being in this area; an increase has already been noticed between the first iteration and this one. It is also likely that much of this research may be being undertaken within existing COVID funded projects.

Despite the relatively small sample set, it is still important to highlight that research projects in this area were concentrated in HICs and upper-middle income countries. Only seven projects took place in a lower-middle or low-income country (7%). This is an important gap to highlight, as it is people in

the world’s poorest countries who continue to be most affected by COVID-19 [3] and several variants of COVID-19 were identified in lower- and middle-

income countries first, including Delta (India), Omicron and Beta (South Africa), and Gamma (Brazil) [2, 5].

The world’s poorest countries are the least likely to have good vaccination coverage, which means they are more vulnerable to severe illness and variations of the virus. Scientists have warned this in the past [6], yet vaccine coverage remains an issue. Whereas more than two-thirds of the world population have received at least one dose of a COVID-19 vaccine, this is the case for only 20 percent of people in low-income countries [7]. If vaccination coverage stays so unequal, it will be of high importance to develop and build the research body investigating COVID-19 variants to include more of these low-income countries.

As new variants continue to be a problem at a global scale, it will be important for further research to be undertaken in this field. This will be investigated in future iterations of the LMR and related tracker highlights.

About the UKCDR/ GloPID-R Tracker

The UKCDR/GLOPID-R COVID-19 Research Project Tracker (the Tracker) is a live open access database which categorises COVID-19 research activity funded around the world against the WHO research priorities outlined in the WHO Coordinated Research Roadmap. COVID CIRCLE has initiated a Living Mapping Review of these projects, published in Wellcome Open Research, to support funders and researchers in the achievement of a coherent response to this pandemic.

For more on the Tracker and our work on COVID-19, visit: ukcdr.org.uk/covid-circle

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Footnote

1c: Develop tools and conduct studies to monitor phenotypic change and potential adaptation (32 projects); 1d: Characterize immunity (naturally acquired, population and vaccine-induced, including mucosal immunity) (21); 1b: Understand virus compartments, shedding and natural history of disease (13); 4b: Understand pathophysiology of COVID-19 infection (11); 3a: Transmission dynamics (9); 7a: Identification of vaccine candidates (9); 1a: Support development of diagnostic products to improve clinical processes (8); 6a: Develop in vitro and in vivo testing to identify therapeutic candidates (4); 2a: Investigation of animal source and route of transmission (2); 3b: Disease severity (groups at high risk of severe infection and role of age groups in transmission) (2); 4d: Improve processes of care (early diagnosis, discharge criteria and interventions that improve the clinical outcome of infected patients) (2); 6d: Evaluate efficacy and safety of therapeutics through randomised clinical trials (2); 1e: Develop disease models (1); 1f: Virus stability in the environment (1); 3d: Control and mitigation measures (1); 5d: Factors and methods influencing compliance with evidence-based IPC interventions during outbreak response (1); 9c: Media and communication (making sense of COVID-19, addressing fear, anxieties and stigma, improving public knowledge and trust) (1)

Notes

Limitations of data and findings: Study protocol is outlined in Living Mapping Review of COVID-19 funded research projects. Analysis was limited by:

- o A lack of completeness of funding and/or qualitative data for some projects.
- o Tracker data is more likely to be derived from UKCDR and/or GloPID-R funders.
- o The absence of commercial research.

References

- [1] World Health Organisation, WHO Coronavirus (COVID-19) Dashboard. [online] Available at: <<https://covid19.who.int/>> [Accessed 09 August 2022].
- [2] World Health Organisation, Tracking SARS-CoV-2 variants. [online] Available at: <<https://www.who.int/en/activities/tracking-SARS-CoV-2-variants/>> [Accessed 09 August 2022].
- [3] World Bank Blogs (2021) COVID-19 is hitting poor countries the hardest. Here’s how World Bank’s IDA is stepping up support. [online] Available at: <<https://blogs.worldbank.org/voices/covid-19-hitting-poor-countries-hardest-heres-how-world-banks-ida-stepping-support>> [Accessed 13 April 2022].
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- [5] Grover, N. (2021) Covid: new vaccines needed globally within a year, say scientists. [online] Available at: <<https://www.theguardian.com/world/2021/mar/30/new-covid-vaccines-needed-within-year-say-scientists>> [Accessed 13 April 2022].
- [6] Our World in Data, Coronavirus (COVID-19) Vaccinations. [online] Available at: <https://ourworldindata.org/covid-vaccinations> [Accessed 09 August 2022].