



# New Zealand's COVID-19 research response

## July 2020

The global research response to the COVID-19 pandemic has been swift and cross-disciplinary. The pandemic has spurred researchers to create new collaborations, publish rapidly, and take up technologies like open access and publishing to preprint in order to rapidly disseminate information and encourage use.

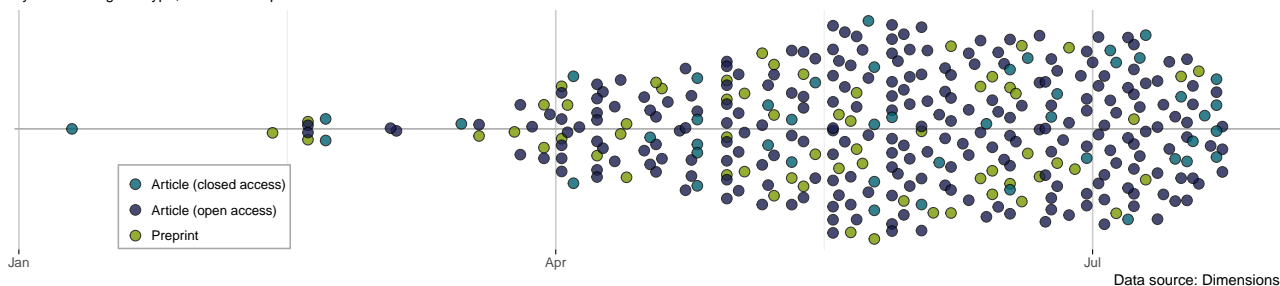
Existing reports have examined the global research community's response to COVID-19, but no analysis has yet examined New Zealand's research response. Using data on peer-reviewed publications provided by the Dimensions bibliometric database, alongside COVID-19 research funding and activity data provided by the New Zealand Research Information System (NZRIS), this report investigates the character of New Zealand's research and researchers as they contribute to this global effort. While it is difficult at this stage to judge the impact and uptake of our work, these sources allow us insight into the activity and publication patterns of New Zealand's researchers in response to the pandemic.

While most of our research focusses on public health and clinical sciences, we have produced significant work on the social and economic impact of the pandemic. This is supported by a strong programme of social science research, as reported to NZRIS. Universities lead New Zealand's publication effort, with outputs spanning multiple fields, while hospitals and district health boards focus strongly on the health impacts of COVID-19. Our research workforce has showed great agility, with 10 per cent of established researchers publishing in fields of research completely new to them in response to the pandemic. These publications are backed up by rapidly-deployed funding mechanisms from a number of organisations.

### COVID-19 HAS SPURRED THE USE OF PREPRINT SERVERS AND OPEN ACCESS

Of the 92,688 global publications on COVID-19<sup>1</sup>, New Zealand has contributed to **358 publications**, or approximately 0.4 per cent of the global research literature. While this makes up a fraction of global research, New Zealand is a relatively small player on the global research stage, generally contributing to around 0.3 per cent of research literature.

New Zealand's COVID-19 publications  
by date of filing and type; each dot = 1 publication



Data source: Dimensions

In the wake of the pandemic, New Zealand researchers have ensured their research is widely and rapidly accessible by using preprint servers and publishing under open access, mirroring trends in the global research community. Preprint servers allow researchers to share their work prior to formal peer review, and are generally freely available to the public. Open access publications are peer-reviewed publications that are freely accessible by the public.

87 per cent of New Zealand's COVID-19 publications were published under open access, compared to 41 per cent of all New Zealand-affiliated publications in 2019. While we have not embraced preprint servers as much as the global

research community, our use of this technology has still increased greatly in response to COVID-19.

#### Publications using preprint servers or open access licences

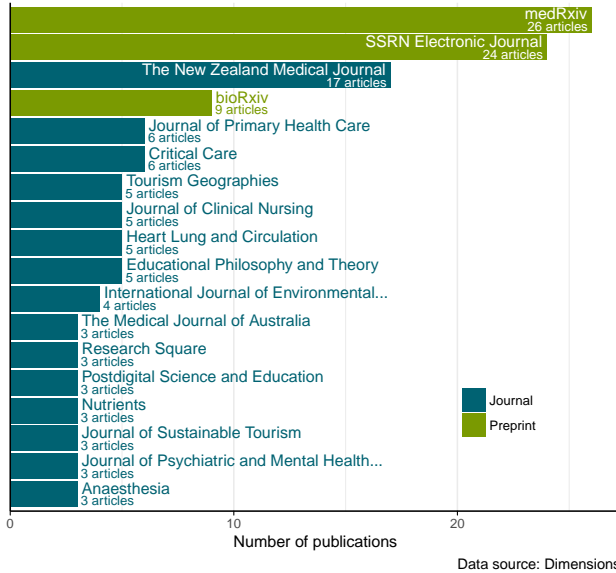
	Preprints	Open Access
Global 2019	5%	48%
Global COVID-19	22%	84%
New Zealand 2019	3%	41%
<b>New Zealand COVID-19</b>	<b>18%</b>	<b>87%</b>

*"New Zealand 2019" and "Global 2019" indicate the proportion of publications produced in 2019 which used these methods.*

<sup>1</sup>Current as at 27 July 2020. This report only examines peer-reviewed scientific publications, and does not cover other forms of information sharing.



Sources in which New Zealand's COVID-19 research is published  
Only showing sources with three or more New Zealand COVID-19 publications

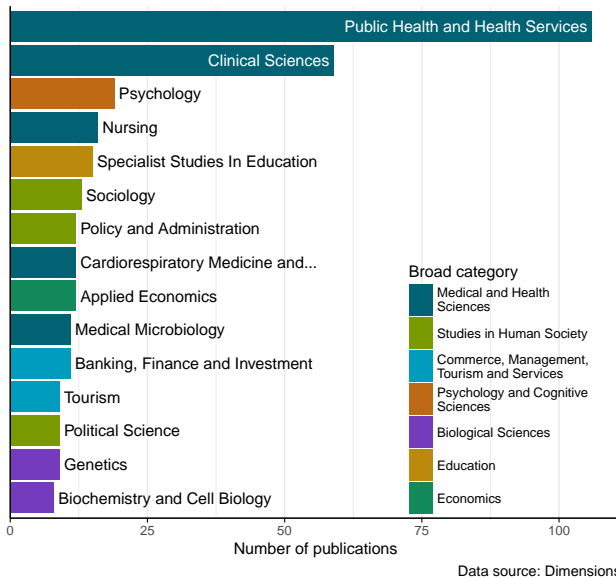


The New Zealand Medical Journal has played a central role in publishing New Zealand's research on COVID-19, reflecting its role as the official journal of the New Zealand Medical Association. Other publications are spread evenly between various specialist medical and non-medical journals: medical publications tend toward journals focussed on nursing and critical care, while non-medical publications are published widely across a number of journals, reflecting a broad range of research on the indirect effects of the pandemic. In contrast, preprint publications have generally been concentrated on a few servers.

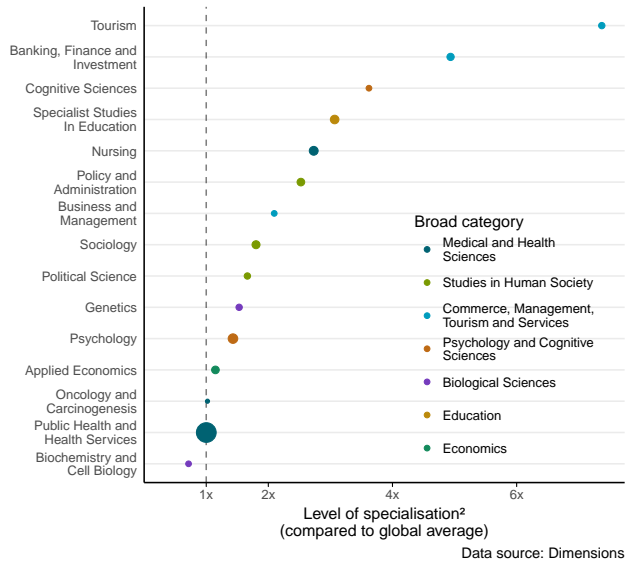
## NON-MEDICAL RESEARCH FOCUSES ON TOURISM, PSYCHOLOGY, AND POLICY

The majority of New Zealand's research focusses on the public health and clinical science aspects of the COVID-19 pandemic, mirroring global trends. We also see a strong emphasis on the wellbeing and societal and, to a lesser extent, economic impacts of the pandemic. In comparison with global research trends<sup>2</sup>, we find that New Zealand's publications concentrate on tourism and financial research, specialist education, psychology and cognitive sciences, and policy.

New Zealand's COVID-19 research: fields of research  
Showing top 15 fields of research by number of publications



New Zealand's COVID-19 research specialisations  
Showing top fifteen fields of research with at least seven publications  
Size corresponds to number of publications

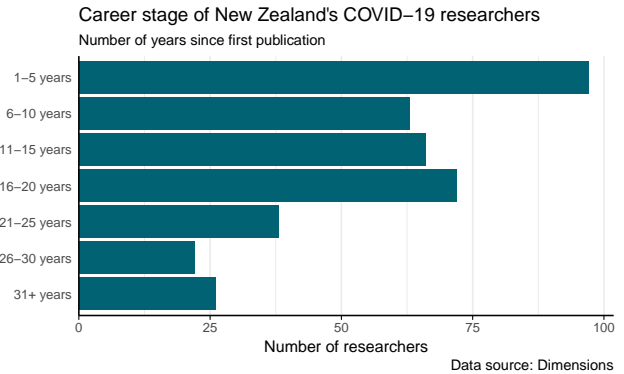


<sup>2</sup>Measured by Revealed Comparative Advantage; see methodology for details.



## NEW ZEALAND'S COVID-19 RESEARCH WORKFORCE IS VARIED AND AGILE

Of the 384 COVID-19 researchers (ie. researchers who have authored or co-authored at least one COVID-19 publication) affiliated with New Zealand institutes, 18 have only published on COVID-19 research, while 366 have previously published on subjects other than COVID-19. While 25 per cent of COVID-19 researchers have been publishing for five years or less, they are supported by a strong cohort of researchers with considerable research experience. A significant portion (22 per cent) of New Zealand's COVID-19 researchers are experienced academics with more than twenty years' publishing experience.



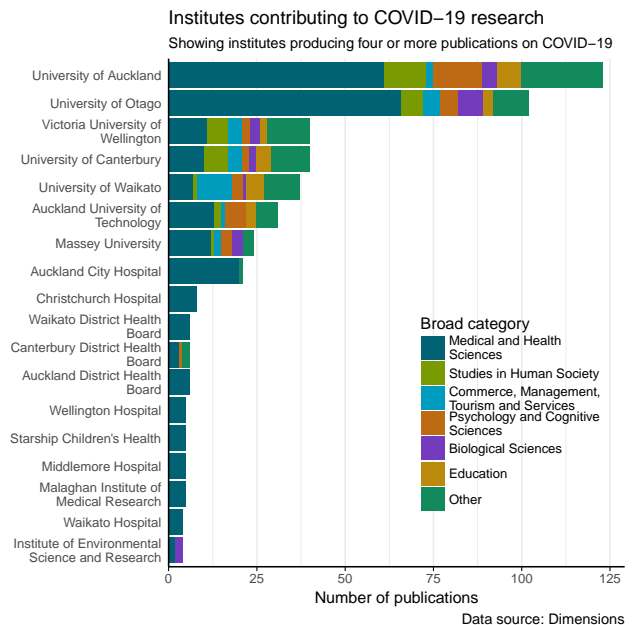
The COVID-19 pandemic has required researchers to cross traditional research discipline boundaries in their response, and this is reflected in their publishing behaviour. Approximately 10 per cent of researchers produced publications in research fields **completely new to them** as a result of COVID-19 (note that this does not consider researchers whose publications are all COVID-19-related). This is chiefly due to either:

- Medical and health researchers publishing outside their field (eg. in mathematics or psychology)
- Other researchers (eg. biologists or earth scientists) publishing in the medical and health sciences.

At this early stage, data on COVID-19 publications is sparse, preventing us from performing a more detailed analysis of this data. We anticipate that as New Zealand's researchers publish more of their work, we will be able to draw more solid insights on how the research community has had to adapt to the COVID-19 pandemic.

## UNIVERSITIES HAVE LED NEW ZEALAND'S PUBLISHED COVID-19 RESEARCH

This reflects their position as sources of scientific publishing. In particular, the Universities of Auckland and Otago have built on their strong capabilities in the health sciences to publish extensively on the pandemic. The University of Auckland's response has been more broad, with significant research in psychology, sociology, and education supporting its strong output in the health sciences. While the University of Otago has not been as prolific, it has focussed more strongly on its traditional area of medicine and health sciences.

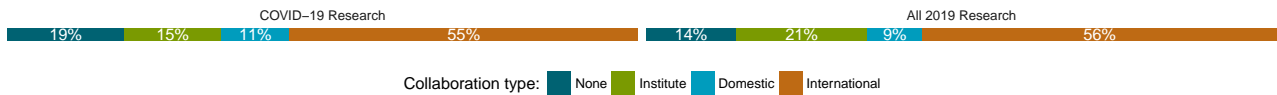


The universities have been supported by health boards and hospitals, who have focussed on health research and have often worked in collaboration with their local university.



New Zealand’s research community has had to react rapidly to the rise of COVID-19. Even as researchers have been under pressure to publish their research, institutes have locked down and conferences have been cancelled in response to the pandemic. It is likely this has had an impact on collaboration as researchers have lost the opportunity to meet others and discuss their results.

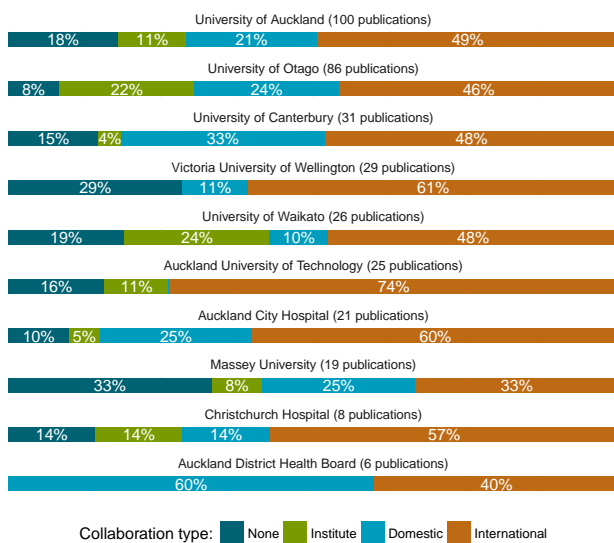
Collaboration rates for New Zealand's COVID-19 research



Data source: Dimensions  
See methodology for definition of collaboration types

**Collaboration rates by research institute**

Showing New Zealand's ten most prolific research institutes



Data source: Dimensions

Among the universities, Victoria University of Wellington has fostered the greatest degree of international collaboration. Smaller universities have relied either on domestic or within-university collaboration. Those hospitals and health boards which have published, have collaborated heavily with other institutes either within New Zealand or internationally.

Domestic collaboration is dominated by the Universities of Auckland, Otago, and Canterbury, with the University of Auckland proving the central link for a good deal of New Zealand’s domestic COVID-19 research collaboration. Both the University of Auckland and the University of Otago have also collaborated heavily with health boards and hospitals (coloured green in the tables below).

While the University of Auckland is dominant in domestic collaboration, the University of Otago appears to have fostered international ties, with strong collaborative links to Australian, Canadian, and American universities. The vast majority of our international collaboration is with Universities rather than hospitals or health institutes.

**Domestic partnerships**

Institutes		# pubs	# cits
University of Auckland	University of Otago	12	25
University of Auckland	University of Canterbury	9	22
Auckland City Hospital	University of Auckland	9	13
University of Canterbury	University of Otago	5	5
University of Auckland	Wellington Hospital	4	25
University of Auckland	Waikato District Health Board	4	19
University of Otago	Waikato District Health Board	4	19
University of Auckland	University of Waikato	4	8
Auckland District Health Board	University of Auckland	4	2
Capital and Coast District Health Board	University of Auckland	3	19

**International partnerships**

NZ institute	Overseas institute	# pubs	# cits
University of Otago	University of Melbourne	8	27
University of Otago	McMaster University	7	130
University of Auckland	Monash University	7	42
University of Otago	University of Sydney	7	8
University of Otago	University of Queensland	6	88
University of Auckland	University of Melbourne	6	23
University of Otago	University of California, San Francisco	5	71
University of Otago	UNSW Sydney	5	11
University of Auckland	University of Edinburgh	5	1
University of Otago	Canadian Arthritis Patient Alliance	4	73

Showing top ten partnerships in each category. Partnerships sorted by number of publications total, then by number of citations. Universities and educational institutes are coloured teal, hospitals and health boards are coloured green.

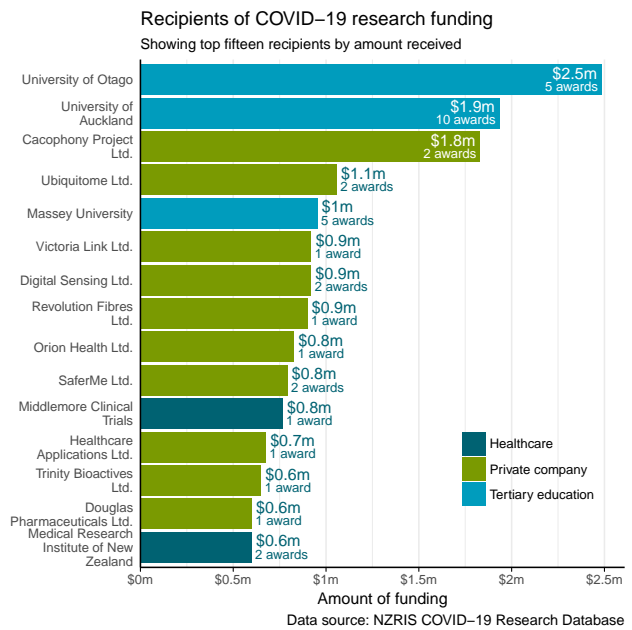
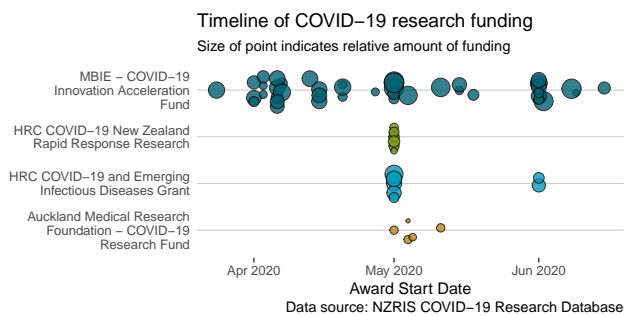


## NZRIS gives us a view of the research pipeline

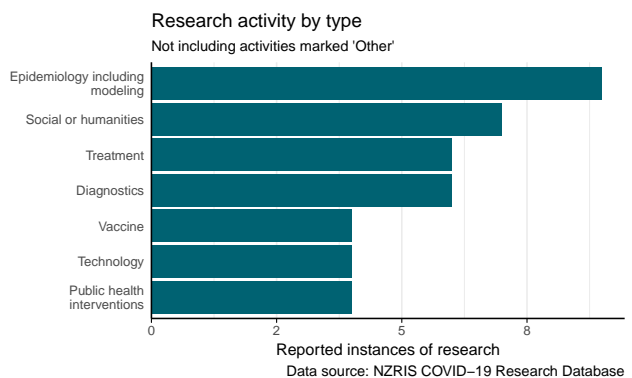
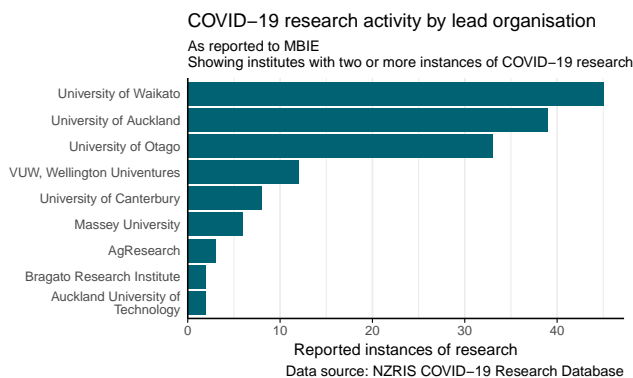
The New Zealand Research Information System (NZRIS) team at MBIE are coordinating a central database of COVID-19 research and funding. As data provision to this database is voluntary, the below data is incomplete, and we have no guarantee that it is representative of the research sector as a whole. However, it does give an indication of the trends occurring in New Zealand’s research and funding, and provides a vital lens into research activity before the publication stage.

At the time of publication, the team are collating data from three funders — MBIE, the Auckland Medical Research Foundation, and the Health Research Council — and research activities from universities, Crown Research Institutes, and independent research organisations.

As at 08 July, MBIE has awarded \$18.3 million, the Auckland Medical Research Foundation \$0.5 million, and the Health Research Council \$3.8 million for COVID-19 research.



Based on reported research activity, the Universities of Auckland, Otago, and Waikato lead New Zealand’s COVID-19 research. The University of Auckland has a strong focus on public health interventions, epidemiology, technology, and treatment, while the University of Waikato’s work leans heavily towards investigation of the social impact. The University of Waikato’s activity is not yet reflected in its scholarly outputs, where it ranks fifth out of New Zealand institutes.



For more information on this database, see the NZRIS COVID-19 research database page<sup>3</sup> on MBIE’s website.

<sup>3</sup><https://www.mbie.govt.nz/science-and-technology/science-and-innovation/research-and-data/nzris/covid-19-research-database/>



## Methodology

### RESEARCH OUTPUTS

This paper was written using data obtained on 27 July 2020, from Digital Science’s Dimensions platform, available at <https://app.dimensions.ai>. Access was granted to subscription-only data sources under licence agreement. Note that there may be some delay between a publication being published, and its appearing in Dimensions.

COVID-19-related publications were identified using a technique developed by Dimensions in cooperation with immunologists and virologists<sup>4</sup>. First, publications are classified as “COVID-19 publications” if they contain the following boolean search string in the title, abstract, or full text:

“2019-nCoV” OR “COVID-19” OR “SARS-CoV-2” OR “HCoV-2019” OR “hcov” OR “NCOVID-19” OR “severe acute respiratory syndrome coronavirus 2” OR “severe acute respiratory syndrome corona virus 2” OR (“coronavirus” OR “corona virus”) AND (Wuhan OR China OR novel)

Second, publications are not considered to be “COVID-19 publications” unless they were published in 2020. Publications matching these criteria can also be viewed on the Dimensions platform<sup>5</sup>.

Publications are considered to be affiliated with New Zealand if they contain at least one author who is affiliated with a New Zealand institute.

#### Fields of research

Publications are classified using the Australian and New Zealand Standard Research Classification (ANZSRC) 2008 system. They are generally classified at the four-digit level, based on the text of the publication itself<sup>6</sup>.

There are 157 four-digit ANZSRC fields of research, which are in turn aggregated into 22 two-digit ANZSRC fields of research. We have generally reported on publications at the four-digit ANZSRC field of research level. In places we have aggregated these figures to the two-digit level, and in these cases we have referred to this as the publication’s “Broad Category”.

#### Specialisation

Research specialisation is calculated using the Revealed Comparative Advantage, which for these purposes is equal to the proportion of publications in a given cohort that fall within a given field of research, divided by the proportion of all publications that fall within the field of research. This index provides a measure of the relative focus given to a specific field of research, centred around one.

This report has been produced by the Science and Innovation team, part of the Evidence and Insights branch at the Ministry of Business, Innovation and Employment. For more information, please contact us: [E&IScienceandInnovationRequests@mbie.govt.nz](mailto:E&IScienceandInnovationRequests@mbie.govt.nz).

<sup>4</sup>S. J. Porter and D. W. Hook, *Responding to COVID-19: Cultural changes and landscape trends in the global research system*, 2020: <https://doi.org/10.6084/m9.figshare.12383267>

<sup>5</sup><https://covid-19.dimensions.ai>

<sup>6</sup><https://plus.dimensions.ai/support/solutions/articles/23000018826-what-is-the-background-behind-the-fields-of-research-for-classification-system->

<sup>7</sup><https://grid.ac>

#### Field switching

A researcher is considered to have “switched fields” for COVID-19 research if:

- The researcher has previously produced at least one publication that we do not believe to be COVID-19 related.
- The researcher has produced at least one COVID-19 related publication in a given two-digit field of research.
- The researcher has published no non-COVID-19 related publications in this field of research.

#### Institutes

Publications are assigned to institutes using affiliation string matching, performed by Dimensions using the GRID.ac<sup>7</sup> database. Institute names, countries, and types are determined based on GRID data.

#### Collaboration

A publication may not be the result of collaboration, or it may be the result of **institute**, **domestic**, or **international** collaboration. We make this distinction based on the table below:

researchers	Number of...		Collaboration type
	institutes	countries	
1	Any	Any	None
> 1	1	Any	Institute
> 1	> 1	1	Country
> 1	> 1	> 1	International

## FUNDING AND RESEARCH ACTIVITIES

Funding and research activity information was collected by the New Zealand Research Information System (NZRIS) team at MBIE. Funding data was collected from MBIE, the Health Research Council, and the Auckland Medical Research Foundation, and does not cover other sources of funding for COVID-19 research. Research activity data was self-reported by research institutes around New Zealand.

This data is not comprehensive or holistic: it contains information provided voluntarily by organisations and researchers willing to share details on their work. As such MBIE cannot be held responsible for the accuracy of the data, and we will direct enquiries about specific research activities to the organisation or researcher that provided the data.