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4. Institution/Organization

Australian Academy of Science

5. Institution/Organization type

Not-for-profit

6. Link to organization

www.science.org.au

7. To help us better understand your perspective please provide a brief description of the work your organisation does

The Australian Academy of Science (the Academy) was founded 1954 by Australian Fellows of the Royal Society of London with the distinguished physicist Sir Mark Oliphant as its founding President. Today, the Academy is comprised of 556 Fellows, who are the nation's most eminent scientific practitioners elected for their outstanding contributions to science and research. The Academy is extensively networked and is well balanced within and between the disciplines of science.

The Academy provides independent, authoritative and influential scientific advice, promotes international scientific engagement, builds public awareness and understanding of science, and champions celebrates and supports excellence in Australian science. It supports and plays a leading role in Australian Science, Technology, Engineering and Mathematics (STEM) education, communication, policy and international engagement.

8. Please provide a brief description of your role within the organisation

The Academy's Science Policy Team focuses its work on developing and establishing the Academy as an influential voice and the go-to organisation for independent scientific advice. The Science Policy Team achieve this mission by developing policy submissions, delivering science-policy reports and projects and

participating in government engagement events. These activities position the Academy to be profoundly influential in setting Australia's science agenda.

Impact of COVID-19 on your work and the role of evidence

We would like to understand the ways in which COVID-19 has impacted the local and/or global challenges that you and your organization are involved in addressing. We would also like to know more about whether and how research has supported your work in addressing COVID-19 up to now

As a reminder, we are most interested in learning about your perspective given your everyday work.

9. In what ways has COVID-19 (and related government/economic responses) impacted the work that your organization focuses on? Please provide details related to the type of challenges you focus on

The Academy has pivoted its resources to focus on addressing COVID-19-related matters, in addition to maintaining its standard operations.

Examples of the Academy's COVID-19 work include:

- The **Rapid Research Information Forum** (RRIF) was established to respond to questions posed by Australian Ministers (https://www.science.org.au/covid19/rapid-research-information-forum). RRIF provides a mechanism to rapidly share the most current and relevant research and expertise with Australia's ministers and decision-makers to inform their policy practices. It is convened by Australia's Chief Scientist, Dr Alan Finkel AO FTSE FAA FAHMS, its operations are led by the Australian Academy of Science and involves collaboration with Australia's other learned academies, including the Academy of the Social Science in Australia, Australian Academy of Health and Medical Sciences, Australian Academy of the Humanities and Australian Academy of Technology and Engineering. The RRIF process has also demonstrated the value of science to the community. In addition to RRIF, the Academy's science-policy team have also engaged with the National COVID-19 Commission, the National COVID-19 Health and Research Advisory Committee and the Chief Scientist in his role representing Australia in the International Chief Scientific Advisers group convened by the US Office of Science and Technology Policy. Through this work, the Academy has highlighted its strength in convening diverse expertise, via the distinguished fellowship of each academy, to facilitate evidence-based information synthesis.
- Launch of the **COVID-19 News and Resources Hub** (https://www.science.org.au/covid19/news-and-resources). This is a hub for the Academy's COVID-19 resources, which include an expert database, resources for schools and teachers, COVID-19 facts and RRIF reports.
- **'COVID-19: The facts'** (https://www.science.org.au/curious/people-medicine/covid-19-facts) was developed by the Communications and Outreach team to provide authoritative and accurate

information to the public. The platform also has a mechanism for the public to ask specific questions.

- **Global Science TV** (https://www.youtube.com/globalsciencetelevision) is a YouTube channel developed in collaboration with the International Science Council where scientific experts discuss pressing events of our times.
- The Academy's Early- and Mid-Career Researcher Forum (EMCR) conducted a **survey on how COVID-19 has disrupted the work of Australia's EMCRs** (https://www.science.org.au/news-and-events/news-and-media-releases/early-and-mid-career-researchers-fear-their-careers-are-risk). Results from this survey highlight the negative impact on research productivity, with 57% of respondents noting that their ability to do research has been hindered. The adverse effects of COVID-19 on EMCRs in Australia will have a long-lasting impact now and into the future (https://www.science.org.au/news-and-events/news-and-media-releases/early-and-mid-career-researchers-fear-their-careers-are-risk).
- The Academy's Education Team have adapted their **programs and resources to be delivered in alternative settings**. It is offering support, advice and resources to schools, teachers and education coordinators to enable at-home learning. The customisation is done in consultation with teachers, state and territory education departments, as well as national agencies. The Education Team has strongly engaged with complementary organisations to maximise the reach and impact of their freely available resources and to show how these can be adapted and utilised for alteranative education settings.

As a consequence of COVID-19, the Academy Secretariat has been adapting to working remotely and are also working reduced hours – due to the negative financial impact of COVID-19 on the Academy's revenue. Notably, the Academy has also been eligible for Australia's COVID-19 job subsidy scheme, JobKeeper (https://www.business.gov.au/Risk-management/Emergency-management/Coronavirus-information-and-support-for-business/JobKeeper-Payment), which was implemented to assist entities that are negatively impact by the COVID-19 pandemic.

Examples of how the Academy's Teams have been impacted:

- **Communications and Outreach**: The Academy's communications team is responsible for the Academy's events and for producing content that informs and builds public awareness of Australian science. COVID-19 has prevented in person filming of videos and conducting physical events. The Academy addressed this by conducting virtual events and taking advantage of people's in-house video facilities to record and produce videos. Notably, a consequence of the

high demand for subject matter expertise, there is a risk of experts becoming fatigued from requests to assist and advise.

- **Policy**: Physical distancing restrictions have impacted many of the government engagement activities of the Science Policy Team. For example, parliamentary sitting weeks of the federal parliament have been changed or cancelled. Consultations and hearings have also been changed or postponed and the team are expecting an influx of work, in addition to their COVID-19 specific work, as the government resumes these activities
- **Education**: Notably, the Academy's teaching resources have been successfully used, long before the pandemic, to deliver online learning lessons. However, the Academy's education programs were further customised to support new alternative teaching methods. This included the development of learning and teaching resources that give teachers flexibility and agency to deliver schooling at home and to support parents and carers to implement learning at home.
- **International**: Travel restrictions have had a significant impact on the Academy's international activities that aim to strengthen scientific links between Australia, its neighbouring countries and other nations. The Academy also manages a number of international programs on behalf of the Australian Government. Due to the impact of the COVID-19 pandemic, many of the Academy's international events have not taken place in 2020 and EMCRs have been particularly impacted by this. Furthermore, voting delegates to meetings of the international scientific unions of the International Science Council are likewise unable to travel overseas. Despite these setbacks, a number of international events, such as the Lindau Nobel Laureates Meetings and the Falling Walls Labs, have been able to be organised virtually.
- Although not directly impact the Academy Secretariat, **cancelled scientific meetings** have impacted Australia's science sector. Two important scientific meetings that would have taken place in Australia in 2020 have been postponed: COSPAR (Scientific Committee on Space Research) and SCAR (Scientific Committee on Antarctic Research). These events would have been attended by thousands of scientists. There has been a substantial economic impact to Australia by the loss of these and other scientific meetings, as well as the ability for researchers to meet face-to-face with counterparts and the ability to network and hear about each other's work.

10. What kinds of evidence (if any) have been useful thus far in responding to the impacts you describe above?

Scientific research is the main form of evidence that the Academy uses to achieve its work. Scientific research has been accessed through preprint servers, published research articles and through direct contact with the Academy's Fellowship and other researchers active in COVID-19-related work.

Examples of how this evidence has been used include the production of RRIF reports and the development of communication strategies to counter misinformation and reach diverse audiences.

Notably, during the COVID-19 pandemic, many publishers and news subscription services have agreed to make COVID-19-related content openly available. Not only has this been crucial to the speed of scientific advancement, but it has also been an essential resource for the Academy to conduct its work.

Knowledge gaps and the UN Pillars

Please tick the following that describe the area of your experience or expertise.

☐ Health Services and Systems
☐ Social Protection and Basic Services
☐ Jobs, Small and Medium-Sized Enterprises and Informal Sector Workers
☐ Macroeconomic Response and Multilateral Collaboration
☐ Social Cohesion and Community Resilience
☒ Other. Please state your area of expertise in few than 5 words

Scientific evidence synthesis and dissemination

Health Services and Systems

The Health Services and Systems pillar of the UN Framework for the Immediate Socio-Economic Response to COVID-19 includes a focus on the following:

- Maintaining essential health service delivery
- Responding to COVID-19
- Health system strengthening
- Procurement and distribution of essential health supplies
- Mitigating financial barriers around accessing essential services
- Access to emerging technologies (e.g. diagnostics, vaccines and treatments)

As a reminder, we are most interested in learning about your perspective given your everyday work.

12. What are the major knowledge gaps around health services and systems that should be prioritised in order to improve socioeconomic recovery from COVID-19 and progress toward the Sustainable Development Goals (SDGs)? Put another way, what are the key questions that need answering in order to accelerate recovery and progress towards the SDGs?

Science and the work of researchers are crucial in responding to and recovering from COVID-19 and progress towards the SDGs. This is applicable to both the immediate and long term recovery process, for example, in the development of a COVID-19 vaccine or treatment or the development of alternative fuel sources. COVID-19 has demonstrated that the global scientific workforce is capable of mobilising to solve

global-scale problems. However, the present risk is that the economic recession as a result of the pandemic may put this at risk. Therefore, the maintenance of a skilled research workforce that can be mobilised to address current problems and plan for a sustainable future is of utmost importance.

Significant to scientific research is continual investment in research infrastructure and future technologies. These resources are essential to support immediate COVID-19-related work and future work, as we move towards exiting recession and recovering from the pandemic.

13. What are some of the major knowledge gaps in this area when considering issues of gender equity?

With respect to the research workforce, recent advances in achieving a more diverse and inclusive research workforce must be maintained and continually developed. In our attempt to address the challenges arising from COVID-19, we should not let slide the advances already achieved.

14. What are some of the major knowledge gaps in this area when considering issues of vulnerable groups (e.g. Indigenous/Aboriginal groups, racialised populations, disabled populations, LGBTQ+ populations, etc.)?

In addition to research, equitable access to education resources, treatments or a vaccine must be considered in planning for COVID-19 recovery and progress towards to SDGs.

Regarding mental health, in a report by the LGBT Foundation, UK, experts highlight that LGBTQ+ people are especially in need of mental health support services as they may be disproportionately impacted by the pandemic. (https://s3-eu-west-1.amazonaws.com/lgbt-website-media/Files/7a01b983-b54b-4dd3-84b2-0f2ecd72be52/Hidden%2520Figures-%2520The%2520Impact%2520of%2520the%2520Covid-19%2520Pandemic%2520on%2520LGBT%2520Communities.pdf)

Regarding education, students from vulnerable groups have been disproportionately disadvantaged by disruption to education. Students from low socio-economic backgrounds, those with English as an additional language, with special learning needs or reside in rural and remote areas may experience poorer learning outcomes due to the requirement for remote learning during the COVID-19 pandemic. Aboriginal and Torres Strait Islander students are likely to face particular challenges with remote learning related to lack of internet service and device availability, reduced opportunities for interaction with Indigenous teacher assistants, and the challenge of incorporating culturally appropriate pedagogies into online resources. This topic is discussed in further detail in the RRIF report on 'Learning outcomes for online versus in-class education' (https://www.science.org.au/covid19/learning-outcomes-online-vs-inclass-education).

15. What are some of the major knowledge gaps in this area when considering issues of climate change and environmental sustainability?

It is expected that the COVID-19 pandemic will result in a pronounced reduction in global greenhouse gas (GHG) emissions due to less energy use for transport, and a recession that in mid-2020 is beginning to be reflected in lower industrial and manufacturing output (https://www.nature.com/articles/s41558-020-0797-x). Accordingly, there have also been reductions in urban air pollution in cities that implemented travel restrictions (https://www.nature.com/articles/s41893-020-0581-y). However, these decreases are unlikely to result in permanent reductions in emissions, so the direct effect of COVID-19 on long term climate change objectives is likely limited. This underscores the need to support and accelerate the removal of GHG emissions from the global economy and a global green recovery.

Jobs, Small- and Medium-Sized Enterprises and Informal Sector Workers

The Jobs, Small and Medium-Sized Enterprises and Informal Sector Workers pillar of the UN Framework for the Immediate Socio-Economic Response to COVID-19 includes a focus on the following:

- Vulnerable workers in the informal economy
- Support for women in finding new jobs and entrepreneurship opportunities
- Protection of productive assets, productive units and productive networks
- Mitigation of adverse policy effects to avoid disruption and permanent job losses
- Stimulus packages to support the transition to a healthier, resource efficient green and circular economy

As a reminder, we are most interested in learning about your perspective given your everyday work.

16. What are the major knowledge gaps around social protection and basic services that should be prioritised in order to improve socioeconomic recovery from COVID-19 and progress toward the SDGs? *

Researchers and their research outputs are imperative to improve socio-economic recovery from COVID-19.

The COVID-19 pandemic has severely impacted Australia's research workforce, and the effects are likely to be felt for an extended period. A decline in innovation may limit economic growth by slowing the development of new technology, skills, and efficiency gains in service and production processes.

A majority of Australia's research is conducted at universities. There has been a sharp decline in income from international student fees, due to travel restrictions and consequently, the number of casual teaching staff is being decreased to make ends meet. A consequence of this is increased teaching workload for permanent staff, which comes at a cost to their research capacity.

A RRIF report has been prepared addressing the 'Impact of the pandemic on Australia's research workforce' (https://www.science.org.au/covid19/research-workforce).

17. What are some of the major knowledge gaps in this area when considering issues of gender equity?

With respect to Australia's research workforce, there are concerns that women, early-career researchers and recent graduates will disproportionately experience negative impacts due to the COVID-19 pandemic.

Early evidence suggests women face disproportionate increases in caring responsibilities and disruptions to working hours, job security and paid work capacity. This is most acute for those with children under 12. This can affect their productivity and their chances for promotions or contract extensions at work. Further to this, women in research positions are more likely to work part-time or to be employed on a contract basis.

Hard-won gains to increase the diversity of the research workforce are at risk.

A RRIF report has been prepared addressing 'The impact of COVID-19 on women in the STEM workforce' (https://www.science.org.au/covid19/women-stem-workforce).

18. What are some of the major knowledge gaps in this area when considering issues of vulnerable groups (e.g. Indigenous/Aboriginal groups, racialised populations, disabled populations, LGBTQ+ populations, etc.)?

19. What are some of the major knowledge gaps in this area when considering issues of climate change and environmental sustainability?

The pandemic has led to job losses. However, thousands of jobs could be created focusing on renewable energy, ecosystem restoration and processing of waste as a part of the financial recovery plan.

Crises can be an opportunity, and future stimulus packages could focus on solving long-term challenges like climate change. Government stimulus could focus on renewables and investing in technologies of the future. Investment in renewable energy or green jobs as an economic recovery pillar could address SDG 9 – Industry, Innovation and Infrastructure.

Climate change cuts across every aspect of human wellbeing, including health. Climate change also impacts on zoonotic disease epidemiology by creating new ecological niches for pathogens (https://www.acmicrob.com/microbiology/the-impact-of-climate-change-and-other-factors-on-zoonotic-diseases.php?aid=220). Some research suggests that anthropogenic land-use, particularly due to increasing demand for resources, are accelerating the risk of transmission of zoonotic pathogens

(https://onlinelibrary.wiley.com/doi/full/10.1111/mam.12201; https://www.nature.com/articles/s41586-020-2562-8).

Environmental sustainability must promote sustainable development with minimal disruption to the remaining natural systems. This would also have positive biodiversity trade-offs (ie, reduce biodiversity loss).

Other

20. What should be prioritised in order to improve socioeconomic recovery from COVID-19? *

- COVID-19 recovery efforts should not be considered in isolation; in addition to COVID-19, there are also additional and pre-existing challenges. For example, in Australia, there has been a compound effect of COVID-19 immediately following the 2019-20 bushfire season.
- Supporting COVID-19 research: As an example of how research can be supported, Australia's health funding agency, the National Health and Medical Research Council (NHMRC), has established a specific COVID-19 research response grant (https://www.nhmrc.gov.au/funding/find-funding/mrff-coronavirus-research-response-2020-covid-19-immunological-studies-grant-opportunity).
- The COVID-19 pandemic has demonstrated the need for researchers to share data. Important to this is the requirement for data standards. Dat, data standards and the subsequent analyses that can be conducted are essential for socioeconomic recovery from COVID-19 and in achieving the SDGs.
- Community trust in science needs to be improved in order to combat mis- and disinformation. Processes should be imnproved to allow scientific results to be release quickly but without compromising validation.