MTPConnect
MedTech and Pharma Growth Centre

MTPConnect COVID-19 Impact Report 2nd edition

Sector impacts, the road to recovery and future pandemic preparedness

October 2020

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Acknowledgments

This *COVID-19 Impact Report* was developed with input from over 100 senior sector executives, through an online survey and targeted stakeholder consultations. The perspectives shared by these senior stakeholders from industry associations, companies, regulatory bodies, research organisations, government representatives and funders have informed key insights, case studies and recommendations within this report. MTPConnect would like to thank all those who shared their time and insights through the online survey and stakeholder consultations.

Senior sector stakeholders consulted through in-depth interviews

Name	Organisation	Name	Organisation
Dr Peter Thomas	AAMRI	Mandie Lammens	Grey Innovation
Katie O'Connell	AMGC	Cheryl Kut	Group of Eight
Kelly Godeau	AMGC	Emily Bogue	IFAM
Bronwyn Le Grice	ANDHealth	Air Vice-Marshal Margaret Staib AM CSC	IFAM
Liz Chatwin	AstraZeneca	Andrew Stevens	Innovation and Science Australia
Lorraine Chiroiu	AusBiotech	Sean Nunan	John Laing
Abdul Ekram	Austrade	Elizabeth De Somer	Medicines Australia
David Langsam	Biotech Daily	Mark Stewart	Medicines Australia
Dr Chris Nave	Brandon Capital Partners	Peter Komocki	Medicines Australia
Dr Craig Rayner	Certara	Petrina Keogh	Medicines Australia
Brooke O'Rourke	Cochlear	Sara Pantzer	Medicines Australia
Dr Rob Grenfell	CSIRO	Mark Sullivan	Medicines Development for Global Health
Dr Charmaine Gittleson	CSL	Ian Burgess	MTAA
Dr Masha Somi	Department of Health	Alex Fowkes	MTPConnect
Adjunct Professor John Skerritt	Department of Health (TGA)	Dr Douglas Robertson	MTPConnect
Dr Jane Cook	Department of Health (TGA)	Dr Nicholas Cerneaz	MTPConnect
Tracey Duffy	Department of Health (TGA)	Julie Phillips	MTPConnect
Linda Christine	Department of Jobs, Precincts and Regions, Victoria	Sue MacLeman	MTPConnect
Glenys Beauchamp P.S.M.	Department of Industry, Science, Energy and Resources (DISER)	Dr Paul Kelly	OneVentures
Kath Rowley	DISER, COVID Response Taskforce	Dean Whiting	Pathology Technology Australia
Mark Weaver	DISER, COVID Response Taskforce	Sam Lanyon	Planet Innovation
Dr Felicia Pradera	DMTC	Carrie Bloomfield	R&D Taskforce
Dr Leigh Farrell	DMTC	Helen Aunedi	R&D Taskforce
Madeleine Walters	DMTC	James Doyle	Stryker, MTAA Working Group
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The views and opinions expressed in this report are those of the authors and do not necessarily reflect those of the Australian Government or the Portfolio Ministers for the Department of Industry, Science, Energy and Resources.

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Executive Summary

The COVID-19 pandemic caused significant negative impacts to the MTP sector in the period March to May 2020, as covered in detail in our first *COVID-19 Impact Report*.[1] Up to 90% of clinical trials were put on hold, elective surgeries were banned and supply chain integrity for many companies was compromised as international borders were closed and air traffic ground to a halt. The market capitalisation of ASX-listed companies, a measure of commercial activity across the sector, fell by $11 billion (5%). Many MTP sector companies and organisations suffered from a severe decline in revenue and margins.

Since May, the sector has begun its recovery from the pandemic slump as case numbers reduced and restrictions across most of Australia began to ease, enabling the resumption of many activities across the MTP sector including clinical trials, pre-clinical R&D activity and elective surgeries. However, MTP sector companies have continued to face challenges. The "second wave" of infections sent Melbourne into strict lockdowns in August, creating challenges for the organisations that are either based in, or dependent on Victoria for revenue. Nationally, supply chain challenges have persisted as international borders have remained closed and consequently air freight capacity available for import and export of goods has remained limited and costly. The closure of international borders has also put universities under enormous financial pressure, with an estimated $2 billion lost in revenue from international student fees resulting in substantial job losses and the slowing down or stopping of research activities. Pre-revenue companies and universities continue to be ineligible for JobKeeper and so face the prospect of having to cut more jobs in the near term to maintain financial viability.

Despite the challenges, Australia's MTP sector has played a key role in response to the pandemic. MTP sector organisations have worked closely with federal, state and territory governments to develop local manufacturing capabilities for essential medical equipment and supplies such as ventilators and Personal Protective Equipment (PPE). While battling severe revenue contraction, universities have stepped-up to maintain vital health and medical research efforts. Of the 33 COVID-19 vaccine assets in clinical development at the time of writing this report, two were Australian innovations (the University of Queensland/CSL/CSIRO and Vaxine). The University of Melbourne's Doherty Institute/ MIPS/Seqirus as well as Technovalia (and its international partner BioNet) also have candidates in development. Service providers such as Nucleus Network have commenced clinical trials for several global vaccine candidates demonstrating Australia's capabilities in conducting high quality clinical trials. Through its Biomedical Translation Bridge program, MTPConnect has specifically targeted COVID-19 projects, awarding $4.1m to five projects that will achieve an impact in less than 12-months.

On the policy front, flexible regulatory and reimbursement pathways were created to enable rapid innovation and adoption of technologies. Industry and the research sector worked collaboratively with government to develop solutions to urgent, complex issues such as rapid scale-up of diagnostic testing and supply of essential medical equipment and components.

Australia is still in the midst of its most significant recession since the 1930s. The journey to recovery will take time and the MTP sector faces a number of key challenges in the near term, as outlined below.

Need for a suitable therapeutic / vaccine for COVID-19	An effective treatment / vaccine for COVID-19 is required to safely open the Australian economy without the threat of further infections, deaths and social restrictions.
Need for a better framework to manage returning to work	There is a need for a better framework to support a COVIDSafe return to work for Australians and Australian businesses.

[1] MTPConnect, COVID-19 Impact Report, June 2020.

Increase in healthcare system burden	The healthcare system is likely to be challenged by a surge in the volume of patient consultations as patients have delayed diagnoses and treatments during the pandemic. Additionally, the large number of healthcare workers who have contracted COVID-19 in the past three months has reduced the healthcare workforce available.
Increase in MTP sector unemployment	More than two thousand jobs[2] have been lost so far at universities that have not been eligible for JobKeeper. Many more jobs are at risk of being lost if further waves of infection emerge and in the absence of financial support.
Continued shipping and supply chain inefficiencies and disruptions	MTP companies will continue to face difficulty in securing reliable and cost-effective international freight to ensure the integrity of their supply chains.
Ongoing funding gap for research, development and innovation	Non-government funding sources for R&D such as industry partners, philanthropic sources and international student fees typically cover 80% of the full cost of R&D activities. Funding from these sources has decreased because of COVID-19. Therefore, research institutions are facing significant financial deficits due to their R&D activities.

While Australia has dealt with the COVID-19 pandemic better than most countries, it is important to reflect on the experience and identify opportunities to better prepare for future pandemics. Consultations with senior sector executives have highlighted three key actions for Australia to consider, as summarised below.

Actions	Description
1. Codify lessons learned, embed and enhance what worked well during COVID-19	Although there was good collaboration between governments and industry during COVID-19, it took some time for the model of collaboration to materialise. Better processes and mechanisms, along with clearer articulation of roles and responsibilities, can be developed in order to achieve a more efficient pandemic response in the future.
	The processes that enabled the TGA to develop flexible regulatory pathways that enabled rapid innovation in response to COVID-19 should be codified so that they are easier to roll out in a future pandemic scenario.
	A more comprehensive framework for pandemic recovery that builds on the federal government's COVIDSafe framework needs to be developed. This should include trigger points for restarting the economy and enabling technologies / infrastructure required to safely restart the economy after a pandemic.
2. Improve supply chain resilience and enhance sovereign supply / manufacturing capabilities	Australia needs to identify and prioritise areas where sovereign capabilities are required to most effectively respond to a pandemic scenario. Existing infrastructure and capabilities in the identified areas then need to be mapped to ascertain key gaps. Long-term investment and support through strategic government procurement models and public / private partnerships will then be required to build the required infrastructure and / or capabilities.

[2] Conor Duffy, University of Melbourne reveals 450 job losses as COVID-19 creates revenue hit, drop in international students, ABC news, 5 August 2020, Eric Ludlow, Thousands of sackings at Australian universities, International committee of the fourth international, 17 July 2020 and Richard Ferguson, Group of Eight warns of 'brain drain' with 7000 jobs set to go, The Australian, 17 July 2020

		Australia should look to improve the quality standards of the manufacturing capabilities that exist in and around the MTP sector. Doing so will enable a more effective pivoting of local manufacturing capabilities in response to future pandemics. There is also an opportunity for Australia to more broadly consider building strategic advanced manufacturing capabilities in areas such as production of novel therapeutics / vaccines, development of medical devices for diagnostic testing and digital technologies.
		MTP sector organisations should seek to intimately understand their supply chains and potential weaknesses. This will enable organisations to put in place strategies to address these weaknesses, including diversifying, where possible, in terms of countries and / or channel (e.g. sea vs. freight) in order to mitigate against future disruptions to supply chains.
3.	**Invest in R&D and next generation technologies related to pandemics**	There needs to be greater, sustained long-term investment into areas such as infectious diseases, platform technologies such as messenger RNA platforms for vaccine development and novel diagnostic testing approaches. This is critical because of the long and complex development pathways for developing medicines and medical devices.
		Australia has emerging capabilities in next generation technologies such as digital health, AI, robotics and automation that have proved to be useful in enabling an effective response to COVID-19. Encouraging greater R&D in these areas will enable Australia to be better positioned to deploy these technologies in a future pandemic scenario

While COVID-19 has had devastating health and economic impacts in Australia and around the world, it has also driven innovation, the adoption of new technologies and behavioural changes at an unprecedented rate. Many of these changes will persist and present opportunities for post-pandemic growth for the MTP sector. For example, virtual consultations and remote monitoring have been adopted rapidly by policymakers, care providers and patients during the pandemic. There is an opportunity for the MTP sector to leverage this step change and continue developing new telehealth and remote monitoring products and services to provide benefits for patients in remote areas and to those who have accessibility challenges.

Another key trend to emerge in response to the lockdown restrictions has been the rapid growth in home deliveries of medical supplies and medicines to patients by services such as MedAdvisor and Uber Eats. There is an opportunity for the sector to build new services and adapt their supply chains to provide greater convenience for patients.

There is also an opportunity for the sector to leverage the domestic manufacturing capability that has come to the fore during the pandemic to build new products and services that emphasise quality and reliability over cost. Enhanced sovereign capabilities will help guard against trade, freight and supply chain restrictions from future pandemics and can be facilitated, in part, through strategic government procurements models and public / private partnerships. The increased use of digital technologies such as artificial intelligence, big data and analytics and robotics is a trend that will be critical to maintain to build global competitive advantage and deliver economic growth and jobs to Australia, post-pandemic.

MTPConnect would like to thank all sector stakeholders who provided invaluable insights in the drafting of this report. MTPConnect will continue to work with industry participants and government to ensure the MTP sector remains at the forefront of delivering innovative health solutions and restoring jobs and economic growth to Australia.

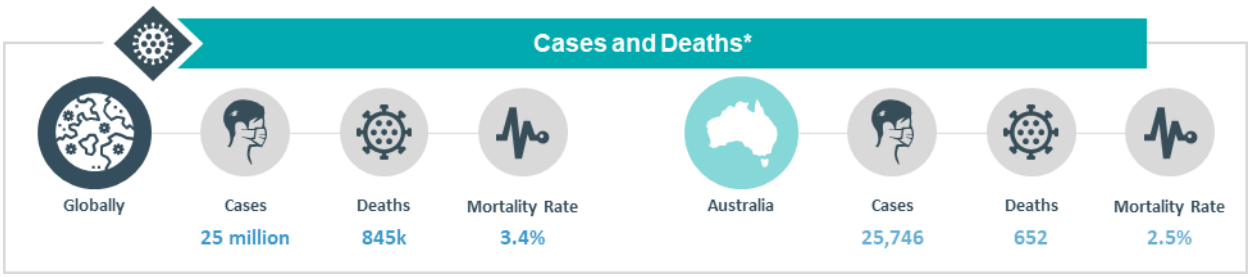
1. Introduction

As the Growth Centre for Australia's medical technology, biotechnology and pharmaceutical (MTP) sector, MTPConnect is closely monitoring the impacts of the COVID-19 pandemic on the sector. In June 2020, MTPConnect published the *COVID-19 Impact Report*,[3] assessing the impact of the "first wave" of the pandemic on the Australian MTP sector from February to May 2020. The report also highlighted how companies have responded to the COVID-19 crisis; it included an initial discussion on the path to recovery and emerging lessons learned from the collective experience of the sector to date.

This second report provides further discussion of the road to recovery, the post-pandemic outlook for the sector and strategic actions required to prepare for future pandemics. In developing the two reports, input was gathered from over 100 senior executives (CEOs, COOs, Department Heads and other leaders) across the MTP sector. This included direct interviews with senior executives alongside a targeted online survey. A more detailed description of the methodology used to develop this report can be found in Appendix 2.

Status of COVID-19 infections

From May to August 2020, the world saw a threefold increase in COVID-19 cases and a doubling of COVID-19-related deaths. By the end of August, there were more than 25 million cases and 845,000 deaths worldwide.[4] Total active cases were the highest in the United States of America (5.9 million), Brazil (3.8 million) and India (3.5 million).[2] The period from June 2020 has been marked by the easing of restrictions in many countries such as New Zealand, the UK, Italy, USA and South Korea, as well as a resurgence in new cases.

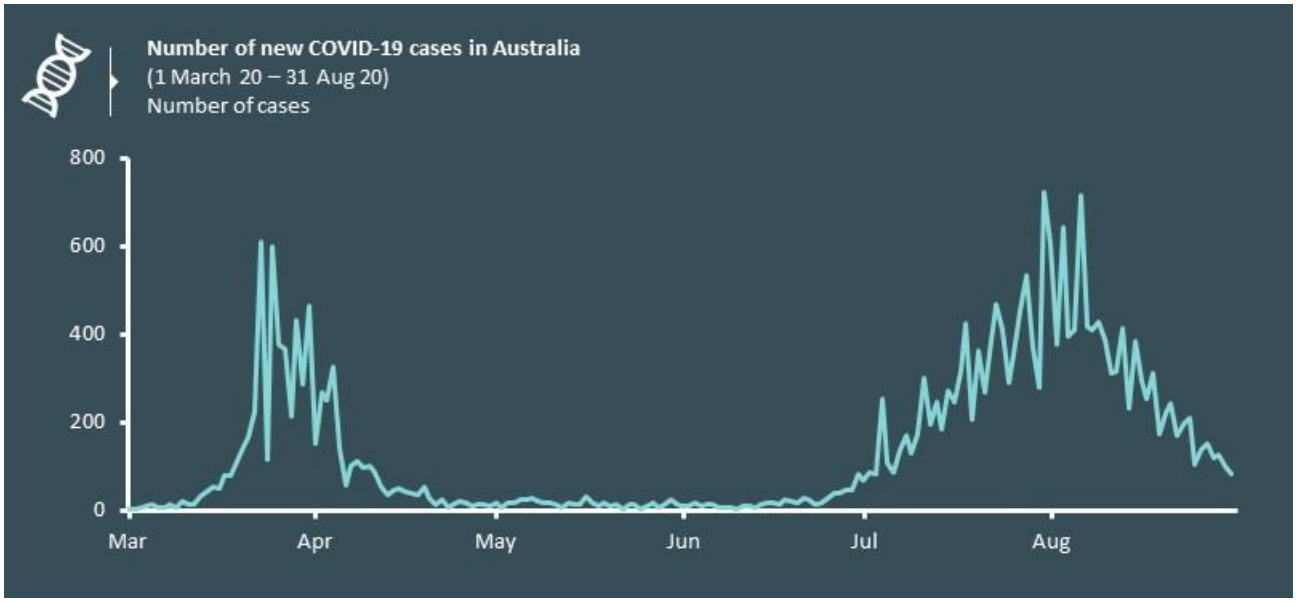


Note: * Numbers reported as at 31 August 2020
Source: Department of Health, ECDC

At the end of May, Australia had successfully "flattened the curve", with a very low and stable number of new cases in all states and territories allowing for the easing of restrictions around public gatherings, businesses operations and regional travel throughout June. In Victoria, however, June was marked by the emergence of a second wave and by 29 June, a number of Melbourne suburbs where infection hotspots had emerged were returned to lockdown. On 2 August, greater Melbourne moved to stage 4 restrictions which included an overnight curfew and mandatory wearing of masks in public, while regional Victoria moved to stage 3 restrictions. From zero new infections on 9 June, daily new case numbers reported in Victoria peaked at 725 on 4 August.[5] They dropped below 100 by the end of August.[6]

The overall trajectory of new case numbers in Australia is shown in the figure below. At the time of publishing this report, NSW and Queensland were dealing with comparatively small but persistent clusters.

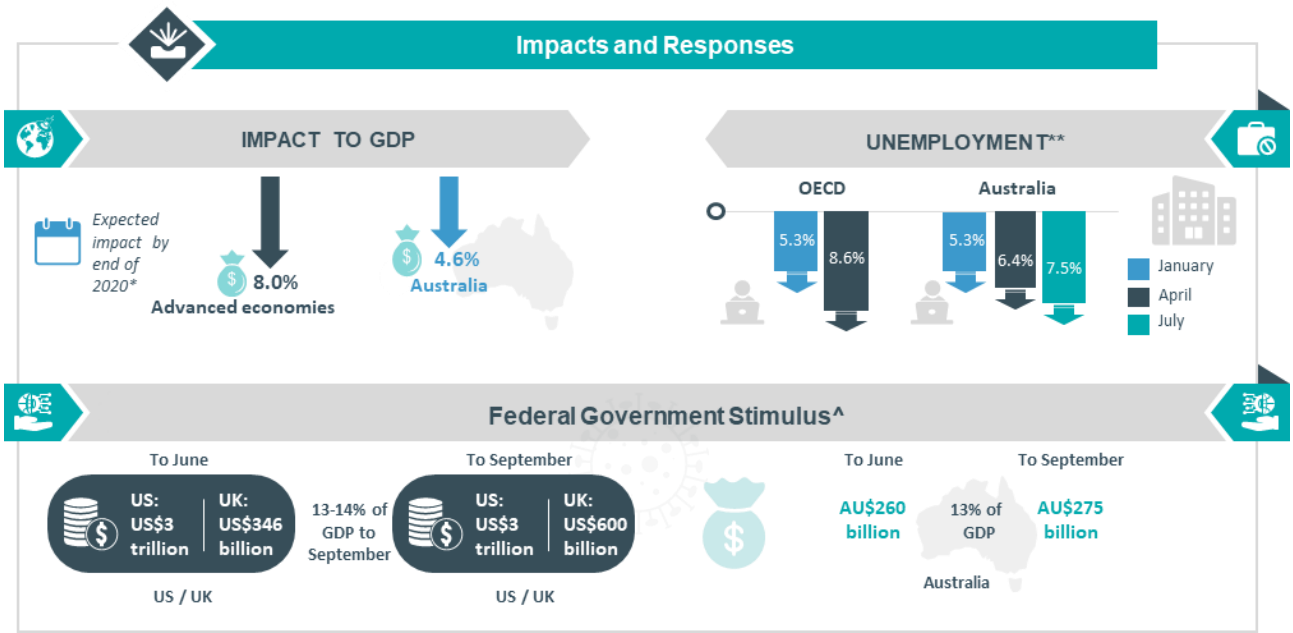
[3] MTPConnect, COVID-19 Impact Report, June 2020.
[4] European Centre for Disease Prevention and Control, November 2019 to 31 August 2020
[5] Coronavirus update for Victoria – 5 August 2020, Department of Health and Human Services Victoria, 5 August 2020
[6] Victorian coronavirus (COVID-19) data, Department of Health and Human Services Victoria, updated 31 August 2020



Source: ECDC

The potential for ongoing outbreaks and ensuing restrictive measures remains a risk and it is likely that Australia will continue to see an ebb and flow of restrictions as states and territories continue to battle the virus. As evidenced by the surge in new cases in Victoria, subsequent waves of infection are likely. The future remains highly uncertain for organisations across Australia.

Macroeconomic impacts and responses



Note: * Impact to GDP based on June 2020 projections for the CY20, by IMF.
** Unemployment figures based from OECD statistics for January and April and ABS 6202.0 Labour Force reports across January, April and July
^ Federal Government stimulus was calculated by Center for Strategic & International Studies given country-specific reports. Though since June the US has deployed more stimulus mechanisms, the total rounds to US$3 trillion. Australia's stimulus largely is impacted by the extension of JobKeeper through to 28 March 2021. % of stimulus to GDP is calculated based on figures to September 2020
Source: OECD, ABS, IMF, Center for Strategic and International Studies, Australian Treasury, Prime Minister of Australia

The economic impacts of the pandemic and lockdowns have pushed the Australian economy into recession, the deepest since the 1930s. [7] Reported unemployment reached 7.5% in July, though Treasury estimates suggest effective unemployment reached 9.9% at that time and is set to climb to 13% by early 2021.[8] Gross Domestic Product (GDP) is expected to fall by 4.6% in 2020 to $1.31 trillion. GDP for the June quarter fell by 7%, following a 0.3% drop in the prior quarter, marking Australia's first recession in 30 years.[9] The impact of the Victorian restrictions is expected to be severe, with preliminary estimates from Treasury suggesting that real GDP would shrink by between $7 billion and $9 billion in the quarter ending in September.[10]

Australia has entered a recession despite significant stimulus from the Commonwealth and State and Territory governments. The federal government responded early to mitigate the impact of the COVID-19 pandemic on the economy with a mixture of fiscal stimulus, employer, employee and sector-specific support packages. JobKeeper, asset write-offs, SME cash flow assistance and payment deferrals are some of the support mechanisms that have been implemented. Since May, new mechanisms have been announced and some support packages have been amended, including the JobKeeper Payment which has been extended until 28 March 2021 (the rate will reduce from $1,500 to $1,200 a fortnight at the end of September 2020 and then to $1,000 from January to March 2021 and eligibility for JobKeeper continues to exclude universities and pre-revenue start-ups). Further details of government stimulus efforts can be found in Appendix 3.

Overall, the Australian government's stimulus efforts have added up to approximately 13% of overall GDP, which is comparable to the efforts of the US and UK governments. With the recent surge in case numbers in Victoria and the risk that other states follow the same path, additional or prolonged government support is expected to be required going forward.

With detrimental health and economic impacts being felt around the world, the global race for a vaccine continues. Over 170 potential vaccine assets are in development at the time of writing this report and of these candidates, 33 are in clinical evaluation. Two of the candidates in clinical evaluation are Australian technologies being developed by the University of Queensland / CSL and South Australian biotechnology firm Vaxine.[11] In addition, Australia is also playing a key role in Phase 1 / 2 clinical trials for COVID-19 vaccines. Melbourne-based Nucleus Network is conducting trials of candidates being developed by the University of Queensland, India's Serum Institute and US-based Novavax.[12]

Through its Biomedical Translation Bridge program, MTPConnect specifically targeted COVID-19 projects (medical devices, diagnostics, prophylactic or therapeutic approaches) that will achieve an impact in less than 12-months. $4.1 million has been awarded to five projects covering vaccine development, a new treatment for respiratory complications, a preventive nasal spray developed from an approved antiviral, a rapid response test to predict severity of disease progression and a ventilated hood to better care for patients and protect healthcare staff.

While significant efforts have been made globally towards the development of COVID-19 treatments and vaccines, there is no guarantee of success. The early September pause on phase III clinical trials for the Oxford University / AstraZeneca vaccine candidate showed that significant challenges remain for the fair and equitable mass distribution of safe and effective vaccines.

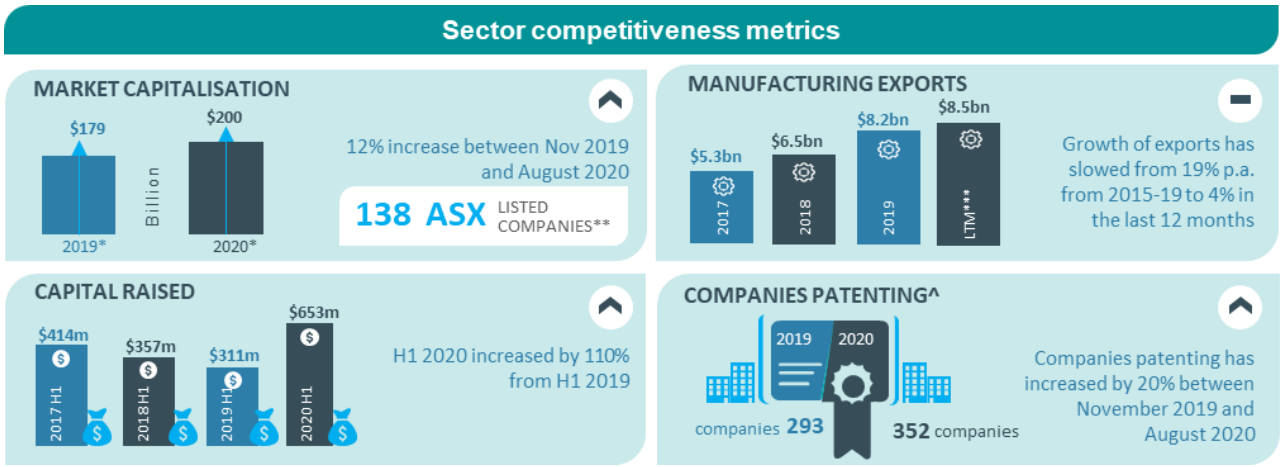
The pandemic has had a range of impacts on the MTP sector, propelling future trends and shaping how organisations operate. The MTP sector is playing a vital role in Australia's recovery; driving future economic growth and ensuring Australia is better prepared to deal with future pandemics and other global biosecurity threats.

[7] Shane Wright, Australia in recession: Biggest economic contraction since Great Depression, ABS confirms, Sydney Morning Herald, 2 September 2020
[8] Samantha Maiden, Australia's unemployment rate: State virus border closures hurting jobs, News.com.au, 24 August 2020
[9] Matthew Cranston, GDP falls 7pc, worst on record, Australian Financial Review, 2 September 2020
[10] The Hon Scott Morrison, Stage 4 coronavirus restrictions in Melbourne could cost the economy $9 billion, ABC News, 6 August 2020
[11] Christine Spiteri, Has Aust found the Covid vax?, 13 August 2020.
[12] Joshua Eddy and Mari Ericksen, Nucleus Network begins dosing for third COVID-19 vaccine trial, Nucleus Network, 1 September 2020

2. MTP sector impacts and responses

Sector metrics

In 2019, the sector experienced strong growth of 16-29% p.a.[13] across a number of key metrics tracked including manufacturing exports, market capitalisation of ASX-listed MTP sector companies and capital raised. In the first eight months of 2020, performance against these key metrics continued to follow an upward trajectory. However, the rate of growth for manufacturing exports and market capitalisation has slowed to 4% and 12% respectively. $653 million of capital was raised by listed MTP companies in the first half of 2020, an increase of 110% from H1 2019. MTP companies were able to raise much needed liquidity to strengthen their balance sheets, taking advantage of the positive investor sentiment towards the sector during the COVID-19 pandemic.[14] The number of companies patenting has also risen 20% between November 2019 and August 2020, likely due to efforts to find products and solutions in response to COVID-19.



Notes: * 2020 market cap as at 31 August 2020, 2019 market cap as at 30 November 2019.
** The list of ASX-listed MTP companies was updated to reflect five new listings, one new inclusion to the MTP sector list and three de-listed since November 2019.
*** LTM is the last 12 months to June 2020
^ Data provided by Clarivate Analytics.
Source: Thomson Reuters, ABS, Bioshares, Clarivate, L.E.K. analysis

The MTP sector has made some progress towards pre-COVID levels of activity, with restrictions lessoning, elective surgeries resuming and demand for medicines returning to more regular levels.

Staff have begun returning to offices and just over half of sales representatives have resumed in-person interactions with Healthcare Professionals (HCPs).[15] Supply chains continue to experience disruptions and uncertainty, but organisations and governments have actively worked to problem-solve to avoid significant delays and shortages.

The cost of freight continues to be at levels well above pre-COVID expenses. Patients have gradually resumed their visits to specialist healthcare providers, as evidenced by an increase in in-person attendances from 1.2 million consultations in April to 1.8 million in June. This is still slightly below the 2019 average of 2.0 million consultations per month.[16]

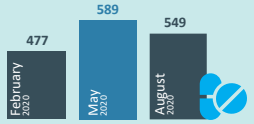
The number of medicines in shortage fell from 589 in May to 549 in July[17] due to a decline in consumer stockpiling behaviour (which drove the shortages at the start of the pandemic) and the partial resolution of supply chain disruptions.

[13] MTPConnect 2020 Sector Competitiveness Plan, April 2020
[14] Bioshares Edition 850, 6 July 2020
[15] Yajun Ma, Rep do return to road dance, Pharma in Focus, 1 July 2020
[16] The University of Queensland, Centre for Online Health; MBS
[17] Therapeutic Goods Administration, Medicines Shortage, January to August 2020

Impacts of COVID

MEDICINE AVAILABILITY

Number of medicines in shortage



The number of shortages has fallen 7% from its high of 589 in May

It previously increased 23% from February to May 2020

IN-PERSON SALES

50%+

Sales representatives who have resumed in-person interactions with healthcare professionals since May 2020*

Note: * As restrictions have been lifted, over 50% of sales representatives of the pharmaceutical and biotech companies surveyed have gone back into the field for in-person sales consultations between the beginning of May and 1 July 2020
Source: TGA, Pharma in Focus, L.E.K. analysis

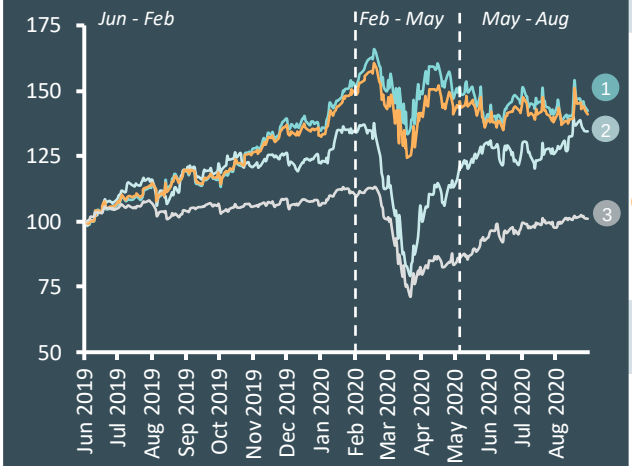
In Australia's equity markets, the MTP sector has continued its recovery since May, albeit at a slower pace than the broader market.

The market capitalisation of ASX-listed MTP sector companies (in aggregate) on 31 August 2020 was 12% higher than at 30 November 2019 (see figure on page 7 above). In comparison, the ASX All Ordinaries index remained 11% lower in August 2020 compared to November 2019.

The market capitalisations of CSL and Resmed, two companies that played significant roles in responding to COVID-19, fell by $5.3 billion (3.1%) between May and August. The rest of the sector experienced an increase of 19% in the same period, as shown in the figure below. In comparison, the S&P / ASX All Ordinaries index rose by 21% over the same period.[18]

MTP and ASX Market Capitalisation

Aggregate MTP market capitalisations against ASX (3 Jun '19 – 31 August '20)
Percent (indexed to 100)^



Since the first report, CSL and Resmed have cumulatively lost a further **$5.3 billion**, while the remaining MTP sector has **gained $5.6 billion.** The ASX All Ordinaries index has recovered stronger than the sector, gaining **21%, or $337 billion** in value

		CHANGE %		
		3 Jun 19 – 3 Feb 20	3 Feb 20 – 1 May 20	1 May 20 – 31 Aug 20
1	CSL and ResMed	51.6	(3.0)	**(3.1)**
2	All other MTP companies	34.1	(15.7)	**19.0**
1+2	All MTP companies	48.4	(5.0)	**0.1**
3	Index: All Ords ASX	9.6	(23.8)	**20.9**

While CSL and Resmed have declined since May, it should be noted that they experienced less of a decline from the initial crash in February, nearing November 2019 value

Note: ^ Each segment in the chart has been indexed to 100 for their relevant market capitalisation as at 3 June 2019
Source: Thomson Reuters Datastream, L.E.K. analysis

> *"The market caps of ASX-listed biotechnology companies have recovered from COVID-19 pandemic blues. But we need to be careful interpreting what the ASX does because Resmed has lost market cap despite reporting 13% revenue increase and profit increase of 32% in August.*
>
> - David Langsam, Editor, Biotech Daily

[18] Thomson Reuters Datastream, March 2019 to August 2020

Although the overall market capitalisation of listed MTP sector companies has recovered from the pandemic slump, it is important to consider the impacts across the different sub-segments of the sector.

Impacts on organisations based in, or dependent on, Victoria for operations and / or revenue

As outlined in Chapter 1, Victoria experienced a "second wave" of COVID-19 infections in the period from June to August and implemented additional restrictions that have significantly impacted business activity in the state. Organisations based in, or dependent on, Victoria for operations and / or revenue have faced five key challenges as summarised in the table below.

Impacts affecting Victorian organisations

Challenge to access appropriate PPE quantities	Elective surgeries suspended	Clinical trials moving to virtual	Research productivity constrained	Strained logistics with reduced capacity*
The onset of mandatory face coverings and requirements for high-risk COVIDSafe plans has led to Victoria competing with the rest of the world for PPE.	All category three surgeries suspended with remaining critical elective surgeries capped at 50% and 70% (public and private respectively). This will impact many medical device and to a lesser extent pharmaceutical companies.	Capacity has been disrupted to maintain the safety of clinical trial patients. However clinical trial operators are accelerating their efforts to promote virtual recruitment and monitoring, alongside a manager subjective risk / value assessment for any in-person procedure.	Operating capacity is at approximately 20% of pre-COVID levels due to the need to meet COVID-19 workplace restrictions and limitations in the size of research facilities.	Reduced capacity at distribution centres has caused significant delay to Australia Post and other delivery services, while restrictions are increasing the demand for at-home delivery of goods.

Note: * Logistics constraints described do not apply to distribution of medicines to pharmacies
Sources: Royal Australasian College of Surgeons (elective surgery), senior stakeholder consultations (PPE, clinical trials, research and logistics)

Outside Victoria, the sub-sectors within the MTP sector have been impacted by COVID-19 to varying degrees over the last three months. The following section provides a summary of the evolution of these impacts by sub-sector over the past seven months.

Evolution of impacts on MTP sub-sectors

The figure below highlights the major impacts discussed in the *COVID-19 Impact Report*, the changes that have occurred across the sub-sectors since May 2020 and how these impacts compare to pre-COVID conditions.

Sub-sector	Area of impact	Initial impact (March to May)	Impact since May	Condition compared to pre-COVID
Pharma and Biotech	Clinical trials	Inability to conduct existing clinical trials and source participants for new trials	Easing of restrictions has led to some clinical trials resumptions across the country	
	Funding	Delays to / lack of funding for new and on-going R&D efforts (typically smaller biotech orgs)	Although capital has flowed to public biotechs, small companies are struggling to finance operations	
	Supply chain	Challenges in sourcing critical input materials and facilities for R&D as well as commercial operations	Continued high air freight costs while supply chains rebound / adapt to some states removing restrictions	
Medtech and Digital Health	Product demand	Elective surgeries put on hold, reducing product demand	Gradual resumption of elective surgery has increased demand	
	Reduced cash flow	Reduction in operating cash flow, impacting the business sustainability	Increased demand for products has allowed a recovery in cash flow	
	Supply chain	Challenges in sourcing critical input materials and facilities for R&D as well as commercial operations	Continued high air freight costs while supply chains rebound / adapt to some states removing restrictions	
Research Institutes	Clinical trials	Inability to conduct research and clinical trials, as well as source participants for new clinical trials	Easing of restrictions has led to clinical trials opening throughout the country	
	Staff	Reduced staff significantly across casual, contract and full-time positions	Large number of job losses in Universities	
	Reduced funding	Reduced access to funding for new and ongoing R&D efforts	Funding gap from loss of international students revenue and lack of philanthropy causing a compounding impact over time	
Other	Funding organisations	Met with market uncertainty, having to change priorities	Volatility in the market has calmed, allowing funding organisations to better allocate capital and manage investments	
	Government	Significant increase in activity levels to respond to COVID	Continued high demand on time and resources. Focus has shifted from response to recovery	

Legend: Improved Neutral Worsened

Pharma and biotech companies

Large pharmaceutical and biotechnology companies have experienced a gradual improvement in activities in the period June to August versus the earlier months of the pandemic. The easing of restrictions has led to some clinical trials starting or resuming and the ability for sales representatives to engage in in-person services with customers. Some companies have adjusted their sales and marketing delivery during the height of the crisis, moving more onto digital channels and have embraced these new ways of working for the better.[19] Several biotechnology firms, such as

[19] Pharma in Focus, The future is a hybrid rep, 2 June 2020

Mesoblast, have taken advantage of favourable market sentiment and successfully sought funding in equity capital markets.[20]

Pharmaceutical and biotechnology companies have also seen demand for medicines stabilise over the period May to August 2020. Consumers' stockpiling behaviour observed from March to May 2020 has subsided. Supply chains have continued to experience disruptions and uncertainty as air freight remains limited and schedules uncertain. Whilst the considerable efforts of the Australian Government through the International Freight Assistance Mechanism (IFAM) has helped organisations find solutions, capacity remains limited due to closure of international borders. In addition, the cost of air freight continues to be 2 to 8 times higher compared to pre-COVID costs. Costs are not expected to stabilise until 2024[21] which should spur companies to explore alternative logistics models and approaches. These increased costs are typically being borne by MTP organisations.

> *"Many of the pharmaceutical products used in anaesthesia are genericised and provided in the hospital setting under contracts. The increased costs of distribution and air freight during COVID, impact the viability of these products, as the cost of importation and distribution may now be higher than the value of the products. As these added costs are not passed on to the hospitals, they are being borne by the supplier. This situation creates a reluctance to increase supplies to meet exaggerated demand forecasts, particularly, as we have seen, when the products may not be required."*
>
> - Elizabeth de Somer, CEO, Medicines Australia

The uncertainty of freight schedules also poses an operational issue for organisations needing to move products and therapies that have a limited shelf life, such as cell therapies.

Private, early-stage companies are in a more difficult position compared to the larger companies. These companies have continued to struggle to raise capital as Australia's geographic isolation has limited access to the broader, international investor network.[22] Several of these early-stage organisations have also not been eligible for JobKeeper, meaning that they have not had any relief for staff costs throughout the pandemic, despite facing constraints on conducting research.

> *"The lack of JobKeeper for pre-revenue companies and uncertainty around the Research and Development Tax Incentive has been a great disappointment for the sector."*
>
> - Lorraine Chiroiu, CEO, AusBiotech

Medtech and digital health companies

Similar to pharmaceutical and biotechnology companies, medical technology firms continue to experience supply chain disruptions and increased cost of freight. Many early-stage medical technology and digital health companies have been ineligible for JobKeeper, which has caused continued financial stress as the pandemic persists.

> *"80% of medtech products are imported and with air freight continuing to cost five to eight times pre-COVID costs, I don't see any way of that improving anytime this year."*
>
> - Ian Burgess, CEO, MTAA

However, the resumption of elective surgery has been positive for medical technology companies, creating a gradual recovery in demand for products. Continued restrictions to the volume of surgeries, particularly in Victoria, will limit the rebound in demand for medtech products. Additionally, clinical trials have resumed, albeit with a nearly six-month delay. These developments have improved the operating cash-flow and business sustainability of organisations that were severely affected during March and April.

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[20] Bioshares Edition 850, 6 July 2020
[21] IATA press release no. 63, 28 July 2020
[22] Senior stakeholder interview

The digital health industry has seen a significant uptick in activities during the period from March to July due to the dramatic increase in telehealth consultations. As shown in the figure, telehealth consultations accounted for 34% of all GP consultations from April to June, compared to just 0.4% in 2019.[23] The surge in telehealth use and adoption has led to an abundance of opportunities to disrupt traditional models of care delivery for the digital health sector. These opportunities have also been enhanced by the federal government's strategic investment of over $600 million in additional federal funding for bulk billed telehealth consultations.[24]

Impacts of COVID

TELEHEALTH

# of GP telehealth consultations between April and end of June 2020

12.7m

34% proportion of GP consultations that were telehealth

Compared to 0.4% of GP consultations in 2019

Source: UQ Centre for Online Health, MBS

The case study below illustrates how Cochlear, as an example of an Australian based medtech company, has been impacted by the COVID-19 pandemic and how it has responded with ongoing R&D and introduction of a remote care solution utilising telehealth.

Cochlear®

Case study: Cochlear

The leading manufacturer in implantable hearing devices designed to assist people with moderate to profound hearing loss

MARKET REACTION

Market capitalisation of Cochlear
(3 Jun '19 – 31 Aug '20)
Billions of AU$

Source: Cochlear FY20 Annual Report

Impacts and responses

Return of elective surgeries

Cochlear initially experienced significant and rapid decline in revenue from mid-March to early-May, due to the banning of elective surgeries and other social distancing restrictions. Since then, restrictions have eased in many jurisdictions and demand is beginning to return, with June/July cochlear implant revenue at 85% of 2019 levels. Surgery volumes are recovering quickly in China, the US and Australia, while more slowly in the UK, Spain and Italy. In emerging markets such as India and Latin America, surgeries still remain very low as COVID-19 cases continue to grow.

> *"… We have been experiencing an improving trend in trading since May with the recommencement of surgeries across most markets …"*
>
> *- Cochlear Annual Report, 2020*

-60% Implant revenue fall in April › **85%** of 2019 revenue in June/July

Retaining market leadership through R&D

Through investing $185 million in R&D through FY20, representing 14% of sales revenue, Cochlear has aimed to strengthen its leadership position within implantable hearing solutions. Cochlear progressed its R&D pipeline despite COVID-19 and was able to generate approval for seven new products across all components of its product portfolio. As for FY21, Cochlear has flagged its intention to increase R&D expenditure to around $190-195 million.

> *"… The highlight for the year has been the approval of a number of important new products… with many approvals received either just before, or during, the COVID-19 shutdowns…"*
>
> *- Cochlear Annual Report, 2020*

Investment in remote care solutions

Cochlear's new "Remote Check" solution is the first telehealth patient assessment tool for cochlear implant recipients and provides convenient, at-home ability for patients to complete a series of hearing checks. Results from these tests are sent remotely to clinicians for their review. Due to the COVID-19 pandemic and the subsequent increased demand for remote care, the FDA expedited its approval. This highlights how the pandemic has helped to accelerate digital health solutions within the sector.

[23] MBS, January 2019 to June 2020

[24] Francine Crimmins, Bulk-billed telehealth consults are to receive second boost of more than $600 million, Medical Republic, 23 July 2020; and The Hon Greg Hunt MP, Media releases, March to August 2020

Research Institutes

Research institutions, including universities, are facing significant financial pressures primarily due to the loss of international student revenue, as illustrated in the figure below.

International student revenue accounted for 26% of all universities' revenue on average in 2018[25] and the Group of Eight (Go8) estimates that $2 billion in revenue from international student fees will be lost across Go8 universities. Additionally, there has been a reduction from other funding sources, including philanthropy and corporate investments as organisations focus on retaining cash.

Universities also are not eligible for the relief offered by JobKeeper. This has created a significant funding gap for universities who contribute from their own budgets roughly half of the $6 billion spent on funding research at universities each year. The consequences of the shortfall are already being realised with substantial job losses in the university sector. At the time of writing this report, more than 2,100 jobs had been lost with the Go8 forecasting another 4,600 jobs could be lost[26] and estimates from the National Tertiary Education Union of at least 11,000 job loses across all universities. [27] The impacts on, and responses of, Go8 universities are further illustrated in the case study below.

GROUP OF EIGHT AUSTRALIA

Case study: Group of Eight

The Group of Eight (Go8) comprises Australia's leading research-intensive universities

- The University of Melbourne
- Australian National University
- The University of Sydney
- The University of Queensland
- The University of Western Australia
- The University of Adelaide
- Monash University
- The University of New South Wales Sydney

The Go8 is focused on, and is a leader in, influencing the development and delivery of long-term substantial national higher education and research policy, and in developing elite international alliances and research partnerships

Impacts and responses

Realised job losses and potential further unemployment

Due to travel restrictions, international students are currently unable to commence their studies, and the universities are facing a $2 billion shortfall in revenue. Many Australian universities have begun to make employees redundant due to this reduction in revenue. As at 20 August, over 2,100 jobs have been cut at universities, including three Go8 members; the University of Melbourne, Monash University and UNSW.

"… With fewer students, the university must be smaller and we will need fewer staff…"
- Professor Duncan Maskell, Vice Chancellor, The University of Melbourne

Decreased research sustainability

The scale of the impacts on University funding has become increasingly apparent in the last few months. The Group of Eight universities spent $3.5 billion of their budgets on R&D in 2018, $2.4 billion of which was within medical and health science. With the ongoing loss of revenue from international students, universities have less capital available to fund research and continue to operate key national research infrastructure facilities.

"… We have anecdotal evidence from the universities that some industry partners are withdrawing funding from R&D, which is quite concerning …"
- Cheryl Kut, Director – Research Policy, Group of Eight

Slow down of the innovation pipeline

If left unaddressed, the continuation of job cuts and slow down in R&D activity at universities due to COVID-19 will significantly slow down the innovation pipeline for the MTP sector in years to come. The size of the future workforce could also be impacted. Many students conducting research have been forced to defer or extend their studies while it is still unclear how these extensions will be funded.

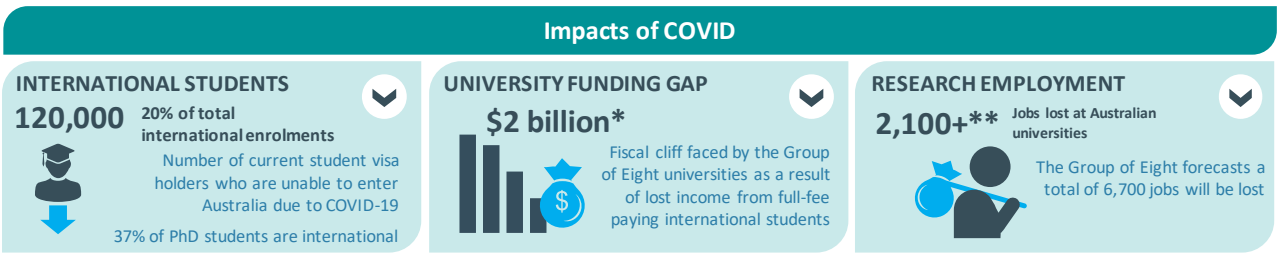
"… This is the workforce who are working across the priority areas of research that will underpin our economic recovery…"
- Vicki Thomson, Chief Executive, Group of Eight

Source: Australian Chief Scientist, International Committee of the Fourth International, The Australian, ABC News

[25] Julia Horne, How universities came to rely on international students, The Conversation, 22 May 2020
[26] Conor Duffy, University of Melbourne reveals 450 job losses as COVID-19 creates revenue hit, drop in international students, ABC news, 5 August 2020 and Richard Ferguson, Group of Eight warns of 'brain drain' with 7000 jobs set to go, The Australian, 17 July 2020
[27] Paul Karp, Almost 500 more university jobs to go at ANU and UNSW as Covid cuts bite, The Guardian, 16 September 2020

In addition, there has been a considerable interruption to R&D activity due to COVID-19 for early-stage MTP companies and researchers. A recent report by Research Australia found that 39% of health and medical researchers claimed they had interrupted or halted research activity[28] due to COVID-19. This has been driven by two factors; the need to adhere to COVID-19 workplace restrictions and the reduction in the international student research workforce. An estimated 120,000 international students, or 20% of total international students enrolled in Australia, have been stranded offshore due to COVID-19 border restrictions. [29]

Research institutions involved in clinical trials have benefitted from their ability to commence recruitment and restart in-person activities for clinical trials in regions around Australia.



Note: * This number is an estimate across all Go8 universities
** Total jobs lost at Australian universities as a calculation from publicised terminations across major universities since May 2020
Source: Australian Chief Scientist, International Committee of the Fourth International, Sydney Morning Herald, Department of Home Affairs

Other sub-sectors

Activity levels at government agencies have broadly remained elevated from May to August. Activities have shifted from responding to the immediate needs of the crisis towards the management of the ongoing response efforts such as border restrictions and contact tracing.

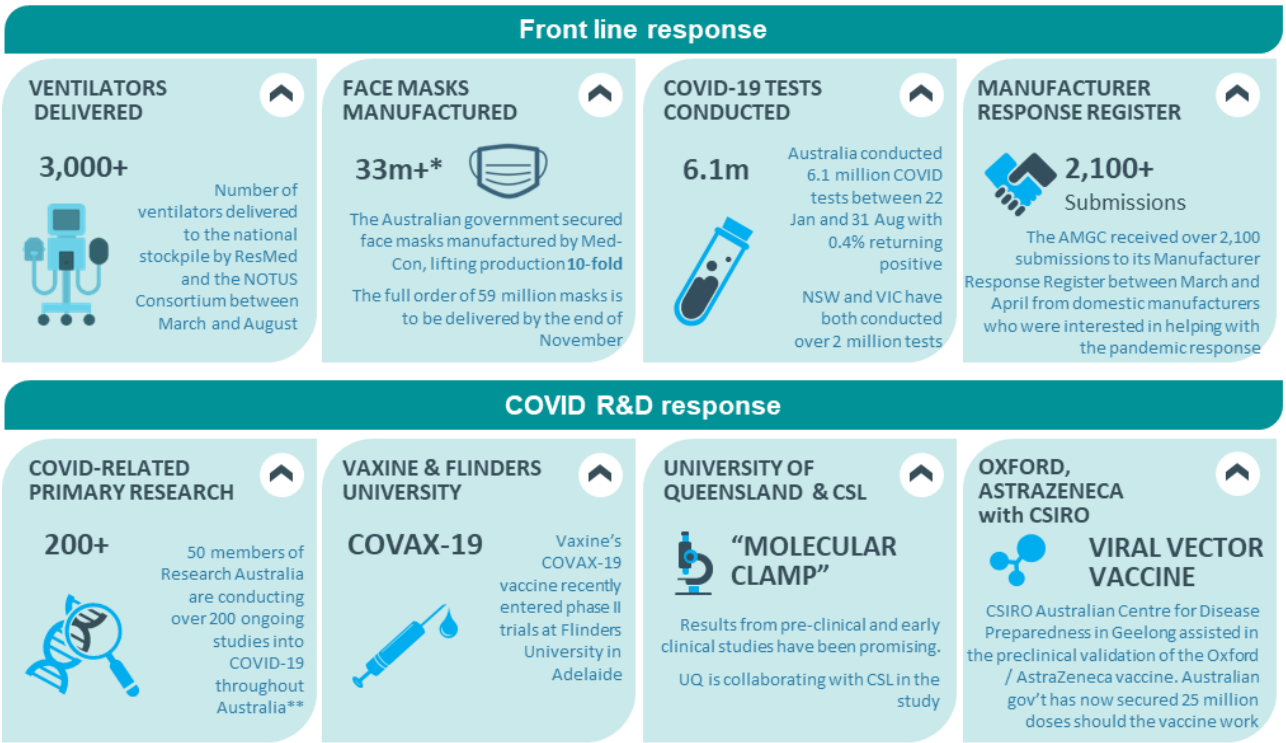
Meanwhile, private sector funders such as venture capital firms have seen a rise in activity since May, helping businesses access capital after several months of volatility and market uncertainty. However, access to capital from foreign investors is currently limited because of the absence of international travel.

> *"It is tricky at the moment with US funds not able to come across and do their diligence, meet the team, etc., and vice versa for our team and portfolio company management. Australia is suffering from its geographic isolation and we need to figure out how to maintain exposure and engagement with the global business and investment community."*
>
> - Paul Kelly, CEO, OneVentures

Assessment of key responses since May

Despite suffering from the impacts of the pandemic as outlined above, MTP sector organisations have contributed significantly to the pandemic response as highlighted in the figure below. For example, more than 3,000 ventilators and 33 million face masks were manufactured locally and delivered to the government. Over 6 million COVID-19 diagnostic tests were conducted between 22 January and 31 August[30] and more than 2,100 manufacturers registered their interest to assist with Australia's COVID-19 response via the AMGC's Manufacturer Response Register.

[28] Christine Spiteri, OZ R&D on Covid scrapheap, Pharma in Focus, 11 August 2020
[29] Fergus Hunter, Universities propose 'secure corridor' rules for international students, Sydney Morning Herald, 21 May 2020
[30] Australian Government, Total COVID-19 tests conducted and results, 31 August 2020



Note: * Total production based on estimates and production speed published in media at the end of August 2020
** Publication detailing these research projects was dated 8 June 2020
Source: AFR, DoH, Business Insider, AMGC, Research Australia, RACGP, UQ, CSIRO

Australia's research community has moved with agility to support COVID-19 medical research, driving over 200 research projects across the country that are addressing COVID-19 related issues. These projects include exploring the use of nanotechnology to deliver COVID-19 therapies, using biomarkers to predict virus severity and deploying telehealth as a tool to support remote physical rehabilitation.[31] In addition, as outlined in Chapter 1, Australia is also playing a key role in the development of vaccines and in conducting clinical trials for some of the leading vaccine candidates.

In summary, the COVID-19 pandemic has had a varied impact on the MTP sector since May, with some organisations moving towards pre-COVID levels of activity. On the other hand, others, typically SMEs and research institutes, have continued to suffer from financial pressures due to ongoing issues with the cost of freight, reduced revenue from international students, border closures, the reintroduction of restrictions in Victoria and limited options for financial support. The following chapter outlines the mechanisms and initiatives that have been identified by MTPConnect and leading sector participants that could assist the MTP sector on its road to recovery.

[31] COVID-19 – How Australia's health and medical research sector is responding, Research Australia, 28 June 2020

3. Road to recovery and post-pandemic growth opportunities

Road to recovery

As outlined in Chapter 2, while parts of the sector have begun to recover from the initial impacts of the pandemic, some sub-sectors are still facing challenges. Many MTP organisations have leveraged JobKeeper in order to maintain their staffing levels. Other cash grants and tax relief measures from the various state governments have provided much needed financial assistance. Flexibility around grant funding deadlines and milestones from funding organisations have helped ensure the ongoing viability of R&D projects. However, some MTP organisations such as early-stage MTP companies and research institutions that have not qualified for JobKeeper are under increasing financial stress.

The road to recovery for the MTP sector over the next 12 to 18 months is going to be difficult and filled with uncertainty as the risk of further waves of infection remains. There are six key issues that need to be addressed as the sector recovers from the pandemic as outlined below. These issues build on the themes identified in the *COVID-19 Impact Report* published earlier this year.[32]

Issues	Description	Strategic needs for the short to medium term recovery
Need for a suitable therapeutic / vaccine for COVID-19	An effective treatment / vaccine for COVID-19 is required to safely open the Australian economy without the threat of further infections, deaths and social restrictions.	The government has already taken steps to identify and invest in potential therapeutics / vaccines with the $5 million grant to UQ's innovation 'molecular clamp' vaccine and the recently announced Oxford University vaccine deal to secure 25 million doses for Australians.[33] The government has created the new COVID-19 Vaccines and Treatments for Australia, Science and Industry Technical Advisory Group to advise on the safety and effectiveness of potential vaccine options, as well as purchasing, distribution and logistics. In finding a suitable therapeutic, drug repurposing, one of the MRFF's pillars of investment, should be considered as part of a broad, diversified approach.
Need for a better framework to manage returning to work	There is a need for a better framework to support a COVIDSafe return to work for Australians and Australian businesses.	As the Victorian experience over the last two months has shown, further waves of infection can result in a return to lockdown and cause significant negative impacts on businesses and Australians. The federal government has developed a high level three-step framework for COVIDSafe Australia[34] that involves: - Step 1: The important first small steps – connect with friends and family – allowing groups of people to be together in their homes and in the community. Businesses reopen and more people return to work; - Step 2: Building on slightly larger gatherings and more businesses reopening. Higher risk activities may have tighter restrictions; and - Step 3: A commitment to reopening of business and the community with minimal restrictions but underpinned by COVIDSafe ways of living. States and territories will determine when to implement these changes.

[32] MTPConnect, COVID-19 Impact Report, June 2020
[33] The Hon Scott Morrison MP, New deal secures potential COVID-19 vaccine for every Australian, 19 August 2020
[34] Australian Government, 3-step framework for a COVIDSafe Australia, Department of Health, 8 May 2020

Issues	Description	Strategic needs for the short to medium term recovery
		Further details of this three-step plan can be found in Appendix 4. A more detailed roadmap for a COVIDSafe Australia that builds on the above framework will be required to restart the economy while ensuring the safety and health of the workforce. For example, the experiences in South East Asian countries such as South Korea, Japan and Singapore have used digital enabling technologies to better enforce quarantine for those who test positive and to improve the efficiency of contact tracing. This has typically been achieved by either utilising existing mobile apps such as WhatsApp as in the case of Hong Kong or through customised apps developed by government as in the case of South Korea.[35] The COVIDSafe app developed by Australia in April could be better leveraged to enable a safe reopening of the economy.
Increase in healthcare system burden	The healthcare system is likely to be challenged by a surge in the volume of patient consultations as patients have delayed diagnoses and treatments during the pandemic. Additionally, the large number of healthcare workers who have contracted COVID-19 in the past three months has reduced the healthcare workforce available.	Australians need to be further encouraged and reassured that it is safe to receive care. The Continuity of Care Collaboration, a collective of over 35 leading industry and healthcare organisations, has been working together since April to highlight the importance of consumers monitoring and maintaining their health and medical needs. They have shared survey findings, created and published an array of communication material and conducted webinars to spread their message.[36] Industry and government should expand upon this work to ensure continuity of care and to avoid a future burden of late diagnoses and untreated illness. The repercussions associated with avoiding care can be significant. The reclassification of telehealth and remote healthcare MBS codes as permanent fixtures in the Australian healthcare system could alleviate some of this burden and the high costs of in-person care.
Increase in unemployment	More than two thousand jobs[37] have been lost so far at universities that have not been eligible for JobKeeper. Many more jobs are at risk of being lost if further waves of infection emerge and in the absence of financial support.	There is a need to expand JobKeeper eligibility or provide catered support mechanisms for those such as pre-revenue / early-stage companies and Universities, who still need help to weather the continued impact of COVID-19 to their organisations. Those cities or States affected by further waves of the virus will also need targeted aid. Given the importance of international students to research and the broader ecosystem around universities, a pathway to establish safe travel for international students to return to Australia and complete their educational studies is needed. Though strides have been made on chartering flights for South Australian and Northern Territory Universities, this only represents a small portion of international students who are abroad.

[35] The Economist, Countries are using apps and data networks to keep tabs on the pandemic, 26 March 2020
[36] Continuity of Care Collaboration Forum, 24 July 2020
[37] Conor Duffy, University of Melbourne reveals 450 job losses as COVID-19 creates revenue hit, drop in international students, ABC news, 5 August 2020, Eric Ludlow, Thousands of sackings at Australian universities, International committee of the fourth international, 17 July 2020 and Richard Ferguson, Group of Eight warns of 'brain drain' with 7000 jobs set to go, The Australian, 17 July 2020

Issues	Description	Strategic needs for the short to medium term recovery
Continued shipping and supply chain inefficiencies and disruptions	MTP companies will continue to face difficulty in securing reliable and cost-effective international freight to ensure the integrity of their supply chains.	Businesses have found workarounds in the past few months to secure freight options and therefore supply chains for essential materials, medicines and equipment. MTP sector organisations have the capability to import and export via air freight, but it comes at a high price.[38] Though IFAM mechanisms fund a proportion of air freight, the grant application process has been recently changed. Until passenger air traffic returns to pre-COVID levels, industry and government need to work together to develop a more cost-effective supply chain solution. Organisations will need to consider sea freight as a lower cost option and adapt their supply chains to cope with the longer lead times compared to air freight.
Ongoing funding gap for research, development and innovation	Non-government funding sources for R&D such as industry partners, philanthropic sources and international student fees typically cover 80% of the full cost of R&D activities. Funding from these sources has decreased because of COVID-19. Therefore, research institutions are facing significant financial deficits due to their R&D activities.	The Research Sustainability working group, set up by the Australian Government in June, is reviewing the research funding model in Australia. Whilst such a review has been on the national agenda for many years, the pandemic has made it vital for a solution to be developed. The government and research institutions, including Universities and Medical Research Institutes (MRIs) need to collaborate to develop a fully-funded model for research that will allow research and innovation aligned with national priorities to thrive. In the near term, Universities Australia has called for government funding "…to support Australia's university researchers and ensure the investments already made in projects and facilities are not wasted". [39] A range of policy options, including the R&D tax incentive, should be considered to incentivise industry and foreign investment in R&D and to help boost investment and growth in the sector post COVID-19. Industry associations such as MA, MTAA and AusBiotech have indicated their support for the continuation of the current R&D tax incentive scheme recently. [40]

Left unaddressed, these issues could lead to a significant loss of employment across parts of the sector and a generational loss of research, innovation and talent.

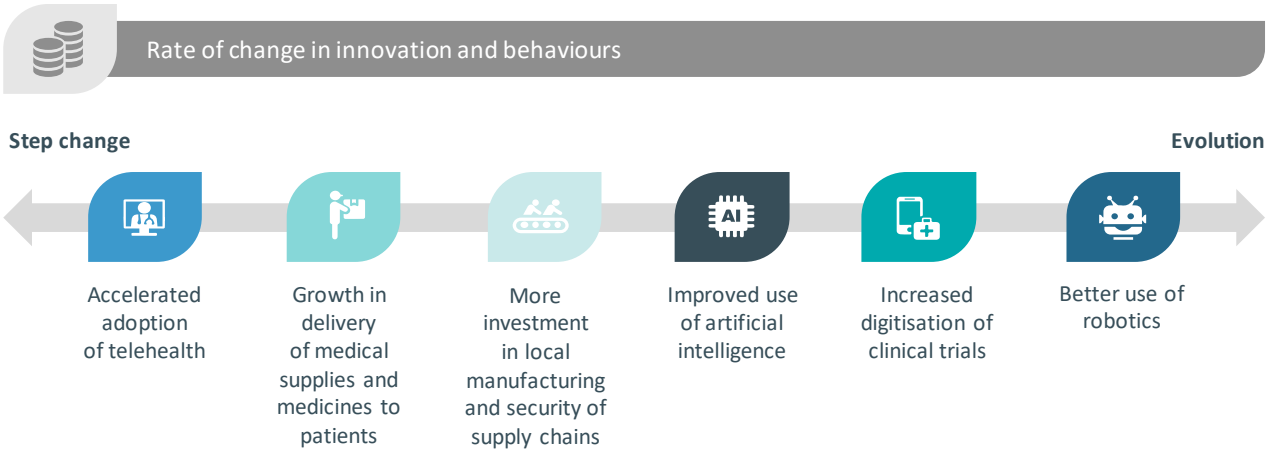
Key trends and opportunities for growth arising from the pandemic

The COVID-19 pandemic has driven innovation, the adoption of new technologies and behavioural changes at an unprecedented rate. Patients, governments, MTP sector participants and healthcare providers have all had to adapt and, in doing, so have pushed the boundaries on the pace of change. Many of these changes will persist and create a new baseline from which ongoing innovation will occur. Properly harnessed, these rapid changes present exciting opportunities for the MTP sector to deliver better outcomes for patients and strengthen the global position and reputation of Australia's MTP sector.

Six key trends have emerged during the pandemic and present opportunities for post-pandemic growth. Some of these trends have experienced a step change, delivering outcomes in three months that would have previously taken

[38] Senior stakeholder interview
[39] Universities Australia FY2020/21 pre-budget submission
[40] MA, MTAA, AusBiotech FY2020/21 pre-budget submissions

years. At the same time, other innovations have found broader application in the pandemic response and there has been an increased appreciation for their relevance and value, reflecting an evolutionary change.



Developments during the pandemic

Policymakers and care providers have embraced virtual consultations as a way to protect both healthcare workers and patients during COVID-19. [41] The MBS has established 141 temporary reimbursable codes for telehealth services since March.[42] And the Federal Minister for Health, Hon Greg Hunt MP, recently accepted the 'Don't Hang Up on Telehealth' petition, declaring that he wants telehealth reform to become the "abiding legacy" of the COVID-19 response.[43] Within Australia, there have been 12.7 million GP telehealth consultations between April and June, representing 34% of all MBS GP consultations.[44] Start-ups such as Coviu, which provides a secure, online delivery platform for healthcare providers to deliver care to patients while satisfying security and privacy requirements, have benefitted from the growth of telehealth. Other remote services, like Cochlear's hearing aid remote testing and programming abilities discussed in the previous report, have been developed and released.[45, 46]

Opportunities for Australia

There is an opportunity for the Australian MTP sector to optimise and create new telehealth and remote monitoring products and services to provide benefits to patients in remote areas and to those who have accessibility challenges. By boosting in-home care, these products and services have the potential to reduce cost and resource pressure on the healthcare system. The Australian healthcare system has the opportunity to adopt a patient-driven view and support appropriate virtual care options by making telehealth and remote healthcare MBS codes permanent fixtures in the Australian healthcare system.

[41] ANDHealth, Digital Health: The Sleeping Giant of Australia's Health Technology Industry, ANDHealth, 3 July 2020
[42] MBS Changes Factsheet, 20 July 2020
[43] Paul Smith, Greg Hunt welcomes AusDoc's GP petition for telehealth, 19 August 2020
[44] C.L. Snoswell, L.J. Caffery, G. Hobson, M.L. Taylor, H.M. Haydon, E. Thomas, A.C. Smith, Centre for Online Health, The University of Queensland. Telehealth and coronavirus: Medicare Benefits Schedule (MBS) activity in Australia, March to June, 18 August 2020
[45] MTPConnect COVID-19 Impact Report, June 2020
[46] Cochlear FY20 Annual Report, 18 August 2020

Growth in delivery of medical supplies and medicines to patients

Developments during the pandemic

Home deliveries of medicines and medical devices have expanded significantly in response to the lockdown restrictions. The industry has also rapidly implemented a range of services:

- The Department of Health[47] stood up home medicines services for vulnerable and isolated people to deliver their Pharmaceutical Benefits Scheme (PBS) prescriptions, using Australia Post[48];
- MedAdvisor, a medication management platform that connects patients with pharmacists reported over 12,000 deliveries and 34,000 items delivered between late-March and June 2020 following the launch of their domestic services.[49] This represents 0.05% of PBS items dispensed[50] over the same period, highlighting that there is still significant upside for growth in adoption of medicine deliveries;
- Large pharmacy chains are now offering same-day delivery;
- Tonic Health Media, Australia's largest health media network, launched in partnership with local pharmacies in Brisbane, a new pharmacy prescription and over the counter medicine delivery service in Brisbane called Chemist2U[51]; and
- Uber Eats and Deliveroo started delivering basic over the counter drugs such as paracetamol in partnership with convenience stores like Caltex and BP in early August.[52,53]

Opportunities for Australia

While the adoption of e-commerce and delivery of medical products to consumers is in its infancy, there is significant opportunity to increase the number of users and uses across Australia. For supply chains, there is the ability to simplify ordering and ensure reliable timeframes for delivery or pick up. There are many benefits that will flow from increasing e-commerce of medical supplies, including convenience for patients, increased access to care for remote communities and immobile individuals and improved medicines compliance by avoiding delay in prescription refills.

More investment in local manufacturing and security of supply chains

Developments during the pandemic

As highlighted in the MTPConnect *COVID-19 Impact Report* in June, in response to the pandemic, Australia leveraged domestic capabilities to manufacture essential equipment, including PPE, ICU beds, ventilators and testing kits.[54] The local manufacture of essential medical equipment reduced Australia's reliance on global supply chains that were severely impacted during COVID-19 and ensured we had sufficient supplies at a time of significant need.

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[47] COVID-19 National Health Plan – Home medicines Services information for consumers, Department of Health, 22 May 2020
[48] Australia Post, Pharmacy home delivery
[49] MedAdvisor June 2020 Quarterly Activities Report, 27 July 2020, and Imedla Cotton, MedAdvisor launches home delivery service for pharmacy needs, Small Caps, 26 March 2020
[50] PBS statistics, Prescriptions supplied from July 2008 to June 2019 and L.E.K. Analysis
[51] Tonic Health media launches new pharmacy home delivery service amid coronavirus crisis, B&T Magazine, 16 March 2020
[52] Tiffany Walker, Uber goes into drugs, Pharma in Focus, 5 August 2020
[53] Patrick Durkin, Deliveroo, Uber Eats push into basic food and drug delivery, Australian Financial Review, 10 August 2020
[54] MTPConnect COVID-19 Impact Report, June 2020

Opportunities for Australia

Over the past few decades, Australia's manufacturing sector has gradually been moved offshore and outsourced to other economies, often developing economies that can produce at a lower cost. In response to the pandemic, Australia demonstrated it could manufacture some essential medical devices and equipment quickly and collaboratively, creatively drawing on domestic capabilities to create surge capacity. This response appears to be creating a shift in thinking relating to Australia's manufacturing sector. Firstly, it has placed a greater importance on quality and reliability, instead of lowest cost. Secondly, it has emphasised the importance of local capability and being able to rely on local capacity in times of crisis. These two factors may create the right environment to invest in growing and developing Australia's MTP manufacturing sector. It will be critical to identify capability gaps in essential MTP manufacturing, identify those areas of manufacturing where Australia can rebuild to become a global leader and develop business models that enable Australia to be competitive.

Improved use of artificial intelligence

Developments during the pandemic

Artificial Intelligence (AI) is a key growth area for the MTP sector but is still in the early stages of adoption and application.[55] The pandemic response has resulted in the accelerated use of AI to detect cases and support R&D. Globally, AI has detected outbreaks, traced infected / at-risk contacts and mapped pandemic spread using Natural Language Processing (NLP) to scan the news, social media and government reports. AI and deep learning algorithms have been used to detect COVID-19 on swabs and with lung-focused medical imaging from Computed Tomography (CT) and X-rays. Within Australia, AI has been leveraged for R&D purposes and to monitor body temperatures in crowds in some private hospitals.[56] DetectED-X, from the University of Sydney, has also used AI to analyse CT scans for COVID-19 markers and University of Queensland's vaccine researchers have partnered with the Gadi supercomputer to fast-track compound testing using their large pre-calculated molecular structures and parameter database to predict which compounds have the best potential to interact with SARS-CoV-2.[57]

Opportunities for Australia

Australia has developed some AI capabilities across the MTP sector, but there is plenty of runway for growth. According to an ANDHealth survey, only 14% of digital health companies currently leverage AI as their primary technology set.[58] Further investment, R&D and innovation in AI technologies can drive post-pandemic growth for the MTP sector in Australia. The recent $19 million Australian Government investment in AI health research projects through the MRFF is a positive sign and may be the catalyst to drive more investment and activity in this area in the near future.[59]

[55] MTPConnect 2020 Sector Competitiveness Plan, April 2020
[56] Ian Scott and Enrico Coiera, Can AI help in the fight against COVID-19, Medical Journal of Australia, 19 June 2020
[57] Tiffany Walker, Supercomputers in virus fight, Pharma in Focus, 13 July 2020
[58] ANDHealth, Digital Health: The sleeping giant of Australia's health technology industry, July 2020
[59] The Hon Greg Hunt MP, $19 million for Artificial Intelligence health research projects, Department of Health media, 29 June 2020

Increased digitisation of clinical trials

Developments during the pandemic

COVID-19 clinical trial programs, such as the global COPCOV trial aimed at understanding preventative treatments for COVID-19, are utilising purpose-built digital tools to collect and analyse vast volumes of patient data. This is helping to rapidly speed up data collection and sharing from the 40,000 trial participants involved across four continents.[60] Clinical trials are using technology to facilitate patient consultation, consent and remote monitoring[61] while ensuring continuity of study conduct, data quality and compliance.[62] Australia has only begun using these clinical trial technologies.[63]

Opportunities for Australia

While steps have been taken to reduce onsite monitoring, conduct visits via teleconference and utilise remote monitoring where possible in Australia, many roadblocks still exist.[64] Policy should be established to enable fundamental infrastructure for e-signatures / e-consent and remote access to electronic medical records and patient data to reduce the need to be onsite. Furthering investment into digital technologies and simplifying policies will also improve equitable access to clinical trials for Australia's remote and regional communities. Doing so has the potential to attract more trials to Australia and grow the economic contribution to the economy.

Better use of robotics

Developments during the pandemic

Globally, robotics and automation in software or physical form, have greatly aided in tasks such as data collation, diagnostic analysis and package deliveries to high-risk COVID-19 regions.[65] Robotics has also been used for quarantine enforcement and disinfecting, delivery of goods to those quarantined, or within laboratory supply chains.[56] Although the development and adoption of robotics in the MTP sector in Australia has been slow, there are recent developments that illustrate progress is being made. The Victorian Government has launched the Australian Medical Robotics Academy in Melbourne, which aims to train surgeons on the use of robotics and virtual reality simulators for minimally invasive surgery.[66] Additionally, robots have been deployed within hospitals to carry around supplies, sterilise medical instruments and direct visitors and patients arriving into the hospital.[67]

Opportunities for Australia

Utilising robotics and automation can unlock opportunities for the MTP sector to more efficiently collate and process information, conduct diagnostic tests and complete simple, labour intensive tasks faster. With the reduction of in-person interactions due to COVID-19, robots pose an automated solution to complete tasks that would otherwise be

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[60] University of Oxford selects eClinical suite for Covid-19 trial, Clinical trial arena, 8 July 2020
[61] Ben Faircloth and Andre Valente, Covid-19 and Clinical trials: Accelerating the adoption of eClinical Technology, L.E.K. Insights, 2 April 2020
[62] Gemma Telfer, Over 300 clinical studies benefit from CluePoints' COVID-19 risk management support, CluePoints press, 4 August 2020
[63] Senior stakeholder interview
[64] Research & Development Taskforce, Supporting clinical trials during the COVID-19 pandemic, March 2020
[65] Robin Murphy, Justin Adams and Vignesh Babu Manjunath Gandudi, Robots are playing many roles in the coronavirus crisis – and offering lessons for future disasters, The Conversation, 22 April 2020
[66] Professor Tony Costello, The Australian Medical Robotics Academy in Melbourne will train surgeons on robots, 11 May 2020
[67] Sharon O'Keeffe, Humanoid robot trialled in NSW Hospital, Farm Online National, 25 March 2020; Judy Barouch, New Royal Adelaide hospital: futuristic and state-of-the-art, Total Facilities, 1 March 2018; and Emily Jarvie, Royal Hobart Hospital home to Australian-first sterilising robot, Examiner, 17 June 2020

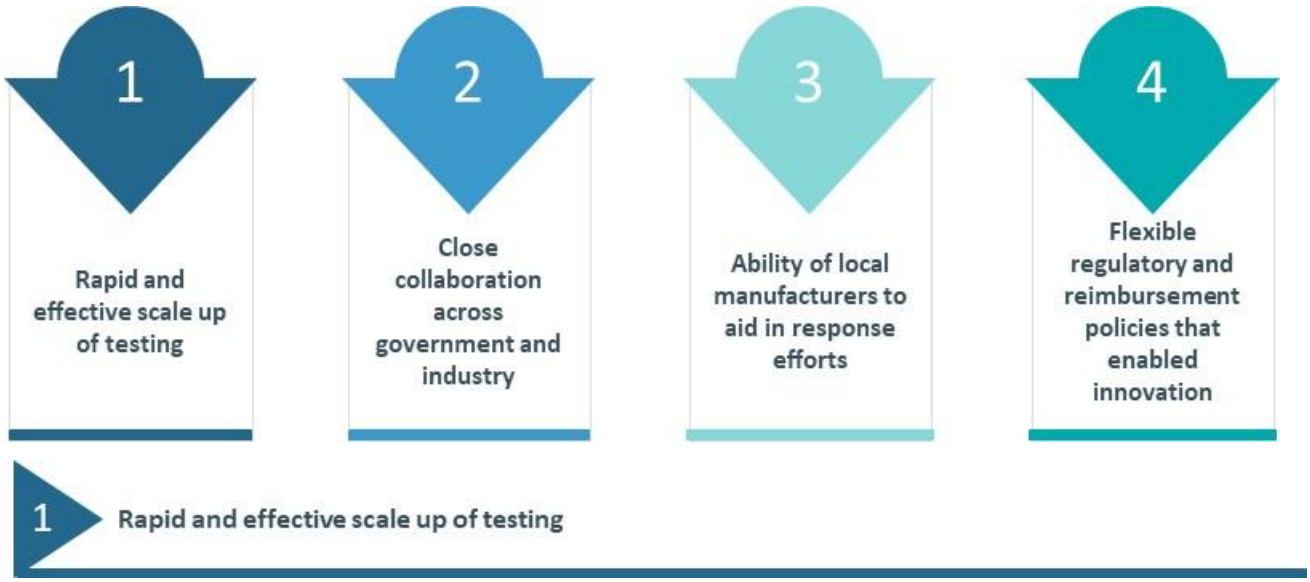
done in person. Investments such as the triage robot trialled in NSW Hospitals and the Medical Robotics Academy can help develop hubs for robotics innovation that can spark partnerships between technology developers, healthcare professionals and investors.

The above six trends and technologies have seen an enhanced relevance during the pandemic. While Australia has some capabilities in these areas, there are opportunities for the Australian MTP sector to further develop in these areas to drive growth beyond the pandemic.

4. Strategic actions to prepare for future pandemics

Success factors in managing Australia's COVID-19 pandemic

Australia has been more successful than many countries in managing the impact of COVID-19 on the health and wellbeing of Australians. The overall number of cases and mortality rate per capita remains among the lowest in the world. The MTP sector in Australia has played a critical role in responding to the pandemic as outlined in Chapter 2 and in the *COVID-19 Impact Report*. The success of Australia's response to the pandemic can be attributed to four key factors.



Australia has had among the highest test rates for COVID-19 in the world[68] which has been facilitated by the early and effective securing of testing equipment. In the early stages of the pandemic, the Therapeutic Goods Administration (TGA), the Department of Industry, Science, Energy and Resources (DISER) and Pathology Technology Australia (PTA) vetted the devices for COVID-19 testing across both types of testing kits (PCR and RNA) and ensured the national capacity to meet the requisite demand for testing.

The Public Health Laboratory Network (PHLN), PTA, state and federal health departments and epidemiologists worked together to ramp-up access to COVID-19 testing clinics and processing of tests within a short period of time. As highlighted in Chapter 2, these efforts have enabled 6.1 million tests to be conducted across Australia in seven months, nearly six times the average number of annual pathology tests.[69] Testing volumes have also flexed across state borders to address the varying extent of infections across Australia. For example, swabs taken in Victoria have been processed and analysed in other states with logistics help from the Australian Defence Force.[70]

> *"Testing moved quickly in Australia and within an astounding six weeks, diagnostics companies had produced kits to detect SARS-CoV-2 RNA. Within another few weeks, Australia had multiple probes and primers directed at very specific parts of the viral genome."*
>
> - Dean Whiting, CEO, Pathology Technology Australia

Australia has also been successful in undertaking genomic sequencing of COVID-19 strains found in patients to support contact tracing efforts to understand and manage the spread of the virus.

[68] Adam Kamradt-Scott, Australia's coronavirus testing rates are some of the best in the world, The Conversation, 8 July 2020
[69] Australian Government, Total COVID-19 tests conducted and results, Department of Health, as at 26 August 2020
[70] ABC News, Victoria's coronavirus 'testing blitz' will enlist the help of ADF and other states, 25 June 2020

2 Close collaboration across government and industry

Australia's response to the COVID-19 pandemic involved close collaboration between federal, state and territory governments and with a broad range of industry participants. As highlighted in the *COVID-19 Impact Supplementary Report*,[71] several working groups and taskforces were set up early in the pandemic to ensure an adequate supply of essential medical supplies such as PPE, ventilators and ICU beds. While there were some barriers regarding visibility of stock across the country, the industry / government collaboration ensured that appropriate solutions were developed in a timely manner. The value of Australia's global network of embassies, consulates and trade offices was underscored with Austrade staff and Department of Foreign Affairs and Trade officials able to leverage their in-market connections to enable Australia to source inputs such as raw materials for manufacturing PPE from offshore locations.

3 Ability of local manufacturers to aid in response efforts

Domestic manufacturers across Australia demonstrated an ability to pivot their infrastructure and resources to aid the pandemic response. Notable successes of domestic manufacturing include the production of 2,000 ventilators by the NOTUS Consortium that included 30 different manufacturers and the ten-fold expansion in the production of face masks by Med-Con.[72] Numerous manufacturers outside the traditional MTP sector pivoted their operations, including distilleries such as Archie Rose Distilling Co. which leveraged its facilities and expertise to produce hand sanitisers. The ingenuity and willingness demonstrated by domestic manufacturers to contribute to the national COVID-19 response was a critical factor in Australia being able to minimise the negative impact of the pandemic. An efficient and coordinated approach to the domestic production of medical equipment and supplies by industry was supported by the COVID-19 Manufacturer Response Register developed by DISER and the Advanced Manufacturing Growth Centre.

4 Flexible regulatory and reimbursement policies that enabled innovation

The Australian government adopted flexible regulatory and reimbursement policies that enabled an effective response to the pandemic. The TGA created regulatory exemptions or pathways for PPE and essential medical equipment and supplies such as ventilators and hand sanitisers. These exemptions enabled innovative manufacturing approaches to reach market rapidly while still ensuring an appropriate level of safety and quality.

In addition, temporary reimbursement for telehealth services was established at the start of the pandemic and since then has expanded through the creation of 141 MBS codes. This has accelerated innovation in the development of technologies and services for telehealth and remote monitoring. The reimbursement policy has driven the rapid adoption of these services resulting in a high level of care provided to patients throughout the pandemic that would have otherwise been impossible.

The Australian government has also supported the medtech sector by pausing planned pricing reforms for medical devices on the Prostheses List used in the private sector from 1 April 2020 up to March 2021 and providing a 50% reduction in annual charges for certain medical devices listed on the Prostheses List.[73,74]

As Australia recovers from this pandemic, it is crucial that the four successes outlined in this section are captured to ensure better preparation for future pandemics. The next section outlines some key strategies and lessons learned for future pandemic responses.

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[71] MTPConnect and MTAA, Collaborating in the Public Interest: How Australia's medical technology sector joined with Government to fight COVID-19, June 2020
[72] James Fernyhough, Angus Grigg and Andrew Tillett, Army deployed as manufacturers ramp up production, Financial Review, 24 March 2020
[73] Department of Health, Supporting the sustainability of the medical devices sector, last updated 9 July 2020
[74] TGA, Reduced annual charges for medical devices listed on the prostheses list, 1 October 2020

Actions for improved pandemic preparedness

COVID-19 revealed that many countries were not well prepared to respond to a pandemic of this scale. While there are many positives about Australia's response, it is also widely accepted that an opportunity exists to learn from this experience and undertake actions to be better prepared for future pandemics. Through our research and consultations, three key actions have been identified for federal, state and territory governments and MTP sector organisations to embrace, as outlined below.

Codify lessons learned, embed and enhance what worked well during COVID-19

- Establish better processes and mechanisms for effective collaboration between government and industry at all levels
- Embed flexible regulations that enabled rapid innovation during the pandemic
- Develop frameworks for effective pandemic recovery

Improve supply chain resilience and enhance sovereign supply / manufacturing capabilities

- Enhance sovereign supply / manufacturing capabilities
- Enhance advanced manufacturing capability to enable more effective pivoting of production during pandemics
- Diversify MTP sector supply chains

Invest in R&D and next-generation technologies related to pandemic response

- Sustain long-term investment into R&D areas related to pandemics
- Strengthen capabilities in next-generation technologies such as digital health, AI, robotics and automation

Codify lessons learned, embed and enhance what worked well during COVID-19

As outlined in the previous section, Australia has performed well in responding to and minimising the impacts of the pandemic in the last several months. The lessons from our collective experiences thus far and over the next 12 to 18 months should be captured such that we can respond even more effectively in the event of future pandemics. Three key lessons learned have already been identified thus far and are outlined below.

Establish better processes and mechanisms for effective collaboration between government and industry at all levels

Effective collaboration between government and industry drove the local manufacturing of essential medical equipment such as PPE, ventilators and ICU beds, as detailed in the *COVID-19 Impact Supplementary Report*.[75] It took some time for this model of collaboration to materialise as this was the first major pandemic crisis for Australia. While industry was involved early in the collaboration, it has been acknowledged by the government that input from industry is critical to informing future pandemic preparedness.

Better processes and mechanisms can be put in place to ensure there is effective collaboration between the Department of Health, DISER, Industry Growth Centres, relevant state and territory government departments, key industry bodies, companies and that the networks and connections established are retained.

[75] MTPConnect and MTAA, Collaborating in the Public Interest: How Australia's medical technology sector joined with Government to fight COVID-19, June 2020

More effective utilisation of existing assets, skills and resources will better position Australia for future pandemic responses and reduce the need for a new bureaucratic structure or agency to oversee pandemic preparedness.

> *"There are a lot of groups coming together and saying 'we can create a pandemic plan' or the like, trying to solve the problem. I think the government needs to ensure they are leveraging established programs like DMTC and MTPConnect, rather than supporting new initiatives, which inevitably will take time to build momentum, dilute expertise and potentially duplicate efforts."*
>
> - Felicia Pradera, Program Leader – Medical Countermeasures, DMTC Limited

Embed flexible regulations that enabled rapid innovation during the pandemic

The temporary exemption policies and sunset clauses developed by the TGA helped enable innovative, rapid development of medical equipment and PPE in response to COVID-19. For example, the TGA were able to approve a US ventilator design that had not been approved by the FDA, providing Australia with access ahead of existing US orders. Whilst enabling rapid innovation and response to pandemic needs, the TGA maintained the high safety and quality standards required throughout. The processes TGA put in place to develop these targeted exemptions and policies can be codified such that they are easier to roll out in a future pandemic scenario.

Develop a framework for effective pandemic recovery

As noted in Chapter 3, Australia needs to build a more comprehensive framework for pandemic recovery based on the Australian Government's three-step COVIDSafe framework.[76] The framework should include a clear roadmap and trigger points for restarting the economy during a pandemic whilst ensuring the safety and health of the community.

Improve supply chain resilience and enhance sovereign supply / manufacturing capabilities

Enhance sovereign supply / manufacturing capabilities

COVID-19 has highlighted that it is important for Australia to retain sovereign capability in the manufacture of essential medical equipment and supplies that are critical to Australians in times of crisis. In order to better prepare for future pandemics, there are three key steps that should be undertaken as outlined in the table below.

Key steps	Description
Identify areas where sovereign capability is required	It is critical for Australia to identify and prioritise areas where sovereign capability is required in order to facilitate better response to future pandemics. These could include (but are not limited to) essential medical equipment such as ventilators, PPE including face masks and shields, essential medications, raw materials and inputs for devices and medicines such as circuit boards and precursors. In identifying the manufacturing capability required, it is important to give due consideration to several key factors as follows: ▪ Where are there gaps in the free market that require incentives? ▪ What is the cost-benefit of domestic manufacturing versus other modes of building in resilience? ▪ Can the products be produced ahead of time and stockpiled until required? ▪ What is the local, steady-state demand for each product? ▪ What is the right scale of capability required, particularly outside of pandemic periods? ▪ Can the manufacturing capacity / capability be sustained in the long term without government incentives? For example, most medicines with active pharmaceutical ingredients (APIs), primers and probes for diagnostic tests have a short shelf life that makes it impractical to store them in a National stockpile. If these are deemed to be areas where sovereign capability is required,

[76] Australian Government, 3-step framework for a COVIDSafe Australia, Department of Health, 8 May 2020

	there should be sufficient scale of infrastructure built to satisfy expected demand outside of pandemic periods. *"The establishment of CSL is a great illustration of sovereign capability built by our government. Australia needed to produce vaccines locally during the first World War when the UK stopped supplying them to Australia. The government set up CSL in response and it has since grown to be what it is today with the help of government investment."* - Andrew Stevens, Chairman, Innovation and Science Australia
Identify key gaps in existing infrastructure and capabilities	Once areas, where sovereign capabilities are required have been identified, a thorough audit of existing infrastructure and capabilities is necessary to identify key gaps that need to be addressed. Additionally, such audits flag existing capabilities that can be pivoted for future needs. One such national capability audit is currently being carried out by DMTC, akin to the previous audit on medical countermeasure capabilities. Such an audit should focus on understanding the existing capabilities of enabling technology areas such as digital health, advanced manufacturing and big data and analytics, as well as what can be further developed.
Invest and build infrastructure and capabilities in key gap areas	Finally, specific, long-term investment and support will be required to build infrastructure and capabilities in the gap areas identified. Given the complex and capital-intensive nature of manufacturing biopharmaceuticals, in particular, a 5 to 15-year timeframe is likely to be required before significant returns on investment are realised. Strategic government procurement models and supplier networks / partnerships will ensure the long-term success of sovereign capability endeavours. Leveraging public-private partnership arrangements or incentives for focused foreign investments could be considered to drive greater efficiency in this phase and de-risk government investment required. *"Australia has an opportunity to become a regional leader and support other countries within the APAC region. There is a real opportunity to take the lead in developing sovereign solutions to infectious diseases that are endemic in our region. The skills, networks and industrial capacity that Australia develops as a result of that leadership will ensure Australia's strategic interests are addressed and will encourage international trade."* - Mark Hodge, CEO, DMTC Limited

Enhance advanced manufacturing capability to enable more effective pivoting of production during pandemics

As highlighted in Chapter 2, more than 2,100 manufacturers volunteered to help with the response to the pandemic between March and April.[77] However, many of these manufacturers lacked the quality standards and accreditation required to become approved MTP sector manufacturers.

There is an opportunity for Australia to improve the quality standards of the manufacturing capability that exists in and around the MTP sector. Doing so would enable a greater proportion of Australian manufacturers to contribute to pandemic response efforts when required in the future and help strengthen supply chain resilience within Australia. In addition, improving the quality standards of local manufacturing capabilities will also benefit other sectors requiring advanced manufacturing capabilities such as aerospace and defence.

More broadly, Australia should enhance its advanced manufacturing capabilities in areas such as production of novel therapeutics / vaccines, development of medical devices for diagnostic testing and digital technologies that can enable a more effective pandemic response. There needs to be careful consideration and strategic selection of the specific areas where Australia can sustain and grow an international advanced manufacturing capability. These areas will then need sustained investment from both public and private sector organisations to develop.

[77] AuManufacturing, COVID-19 response register for manufacturers tops 2,000 submissions, 20 April 2020

Diversify MTP sector supply chains

MTP sector organisations have experienced significant disruptions to their global supply chains and logistics operations, as mentioned in Chapters 2 and 3. Reliance on air freight, in particular, has had a significant impact on companies as the volume and frequency of global air traffic has dramatically reduced during the pandemic with 90% of air freight carried in passenger planes prior to COVID-19.[78] Australia's domestic and international flight network is potentially years from returning to pre-COVID levels, challenging the resiliency of supply chains.

> *"We don't see pre-COVID pricing returning for air freight until 2022, given current predictions. Meanwhile, passenger travel is unlikely to return until 2024. We need to ramp up our thinking on how can we diversify our supply chains and how much can we manufacture in Australia.*
>
> - Air Vice-Marshal Margaret Staib AM CSC, Freight Controller, IFAM

Going forward, organisations should seek to intimately understand their supply chains and potential weaknesses. This understanding will enable organisations to put in place strategies to address these weaknesses, including diversifying, where possible, in terms of source countries and channel (e.g. sea vs. freight). This will help organisations mitigate the impact of future disruptions to supply chains.

Invest in R&D and next-generation technologies related to pandemic response

Australian R&D and technologies have played an important role in the development of vaccine candidates for COVID-19, as highlighted in Chapter 2 and the first *COVID-19 Impact Report*. The long and complex development pathways for developing medicines and medical devices require a long-term investment approach in order to generate successful outcomes. Consequently, there needs to be greater, sustained long-term investment into R&D in areas such as infectious diseases, next-generation technologies such as messenger RNA platforms for vaccine development and novel diagnostic testing approaches.

> *"That cycle of panic and neglect is something which those of us in the sector have watched now time and time again. And it is sadly the case that many projects that had promise were defunded because priorities moved elsewhere."*[79]
>
> - Jane Halton, Chair, Coalition for Epidemic Preparedness Innovation (CEPI)

The Australian Government's $220 million investment in CSIRO's Australian Centre for Disease Preparedness in April 2020 is a good example of the type of investment required. The facility played an important role in the development pathway of two of the world's leading COVID-19 vaccine candidates – the Oxford and University of Queensland technologies. However, prior to the government's investment, the facility was limited in its capacity to play a greater role in the development of these and other technologies. Expanding investment in such R&D capabilities outside of pandemic periods will help ensure that Australia can mobilise and develop appropriate solutions to future pandemics more rapidly.

Other new technologies such as AI, robotics, automation and other digital capabilities have emerged as useful tools in response to COVID-19, as highlighted in Chapter 3. Australia has emerging capabilities and strengths in each of these areas and encouraging R&D in these areas will enhance the nation's ability to respond more effectively to future pandemics.

In summary, the MTP sector has contributed significantly to Australia's efforts to manage the impact of COVID-19 on the health and wellbeing of Australians. Rapid scale-up of diagnostic testing, close collaboration between governments and industry, the ability of local manufacturers to pivot their efforts and produce essential medical equipment and supplies and flexible regulatory policies created by the TGA were key factors that enabled a rapid and innovative response to the pandemic. Australia should leverage the experience from this pandemic to ensure that it is better placed in the future to respond even more effectively should a similar pandemic occur again.

It will be critical for Australia to codify lessons learned, embed and enhance what worked well during COVID-19. The resilience of MTP sector supply chains should be strengthened by enhancing sovereign supply or manufacturing

[78] Senior stakeholder interview
[79] Four Corners, How Australia's 'panic and neglect' funding cycle has left us vulnerable to pandemics like coronavirus, ABC News, 8 June 2020

capabilities, developing strategic advanced manufacturing capabilities and diversifying supply chains and source countries. Sustained investment into R&D areas related to pandemics such as infectious diseases and strengthening of next generation technologies will also enhance Australia's resilience in the event of future pandemics.

This report has identified six key issues that will impact the MTP sectors' road to recovery. Left unaddressed, these issues could lead to a significant loss of employment across parts of the sector and a generational loss of research, innovation and talent. The most urgent are the need for an effective treatment for COVID-19 and the ongoing funding gap for research, development and innovation.

Since the first COVID Impact Report was launched, we can now see that the COVID-19 pandemic has driven innovation, with swift adoption of new technologies and behavioural changes in the healthcare sector and beyond. The use of robotics, digitisation of clinical trials, improving the use of AI, telehealth adoption, alternative medical supply models and investment in local manufacturing are all exciting innovation opportunities.

Now is the time to harness these opportunities. MTPConnect will continue to work with industry participants and government to ensure the MTP sector remains at the forefront of researching, developing, translating and commercialising innovative health solutions.

Driving growth in our MTP sector will deliver better outcomes for patients, sustain and create new jobs and support economic growth for Australia.

Appendices

Appendix 1: Glossary of terms

AAMRI	Association of Australian Medical Research Institutes	**IFAM**	International Freight Assistance Mechanism
ABS	Australian Bureau of Statistics	**IMF**	International Monetary Fund
AI	Artificial intelligence	**LTM**	Last twelve months
AMGC	Advanced Manufacturing Growth Centre	**MA**	Medicines Australia
APAC	Asia Pacific region	**MBS**	Medicare Benefits Schedule
API	Active pharmaceutical ingredients	**MRFF**	Medical Research Future Fund
ASX	Australian Securities Exchange	**MRI**	Medical Research Institute
BTF	Biomedical Translation Fund	**MTAA**	Medical Technology Association of Australia
CCC	Continuity of Care Collaboration	**MTP**	Medical technology, biotechnology and pharmaceutical
CEO	Chief Executive Officer	**NSW**	New South Wales
CEPI	Coalition for Epidemic Preparedness Innovation	**OECD**	Organisation for Economic Co-operation and Development
COO	Chief Operating Officer	**PBS**	Pharmaceutical Benefits Scheme
COVID-19	2019 novel coronavirus illness caused by SARS-CoV-2	**PCR**	Polymerase chain reaction
CSIRO	Commonwealth Scientific and Industrial Research Organisation	**PHLN**	Public Health Laboratory Network
CSL	Commonwealth Serum Laboratories	**PPE**	Personal Protective Equipment
CT	Computed Tomography	**PTA**	Pathology Technology Australia
DISER	Department of Industry, Science, Energy and Resources	**R&D**	Research and Development
DMTC	Defence Materials Technology Centre	**RACGP**	The Royal Australian College of General Practitioners
DoH	Department of Health	**RNA**	Ribonucleic acid
ECDC	European Centre for Disease Control	**SARS-CoV-2**	Severe Acute Respiratory Syndrome Coronavirus 2
FY	Financial Year	**SCP**	Sector Competitiveness Plan
GDP	Gross Domestic Product	**SME**	Small to Mid-sized Enterprise
Go8	Group of Eight	**TGA**	Therapeutic Goods Administration
GP	General Practitioner	**UK**	United Kingdom
HCP	Healthcare Professional	**UQ**	University of Queensland
IATA	International Air Transport Association	**USA**	United States of America
ICU	Intensive Care Unit		

Appendix 2: Detailed methodology of research

The material contained in this report was developed using three main research tools – targeted stakeholder interviews with MTP sector leaders, in-depth desktop research and an online pulse survey targeted at C-suite executives at MTP sector organisations. Further details are outlined below. In total, this report was developed based on the perspectives of over 100 senior executives across various MTP sector organisations.

Methodology

Stakeholder interviews: L.E.K. Consulting and MTPConnect conducted in-depth interviews with over 50 key industry stakeholders to better understand the impacts on their organisations due to COVID-19, their responses to the crisis and lessons learned from the experience thus far. Discussions with industry organisations / membership bodies also involved understanding the impacts and responses of relevant groups and sub-sectors.

Desktop research: A broad range of sources including industry journals, media outlets and periodicals were used to document the impacts of COVID-19 on different parts of the MTP sector. Analysis of specific metrics such as ASX market capitalisations was also conducted by L.E.K. on behalf of MTPConnect.

Pulse survey: A brief 10-minute pulse survey was sent to a focused group of C-suite executives from all segments and areas of the MTP value chain. The survey asked questions relating to the impacts sustained from COVID-19 and their severity, as well as how the organisation had responded, where they required additional support and what preliminary lessons they had learned through their experiences with COVID-19.

Appendix 3: Details of Australian government support packages

There have been a number of support packages and measures introduced by the federal and state governments to support businesses through the COVID-19 pandemic. These support measures are as at 1 September 2020; refer to federal and state websites for up to date information.

Federal measures

Aid package[80]	Description	Eligibility
JobKeeper	Payment made to eligible businesses affected by COVID-19 to support them in retaining employees Eligible businesses will receive $1,500 per fortnight per eligible employee, declining to $1,200 per fortnight from 28 September 2020 and to $1,000 per fortnight from 4 January 2021 Originally available from 30/03/20 – 27/09/20; has since been extended until the end of March, 2021	If business turnover < $1 billion must demonstrate that turnover is likely to have reduced by 30% in the relevant month or three months when compared to the previous year If turnover > $1 billion must demonstrate a reduction greater than 50%
Instant asset write-off and accelerated depreciation	Accelerated depreciation: 15-month investment incentive to support business investment. Immediate deduction of 50% of the cost of an eligible asset on installation will apply, with existing rules applying to the balance of the cost	Applies from 12/03/20 to 30/06/20; business with aggregated turnover < $500 million
	Instant asset write off has increased threshold from $30,000 to $150,000	Authorised assets that can be depreciated under Income Tax Assessment Act
Other ATO COVID-19 relief measures	Deferral of payments PAYG Instalments GST Reporting Remitting interest / penalties	Varied
Cash flow assistance for SMEs	SMEs that employ workers may receive a tax-free payment of between $20 thousand and $100 thousand	Businesses aggregated annual turnover < $50 million
Support the flow of credit	'Coronavirus SME Guarantee Scheme' where the government will provide a 50% guarantee on new loans made by SMEs for working capital purposes	Businesses with aggregated annual turnover up to $50 million

[80]Note: these support packages are evolving; check with state and federal government for up to date information.
Source: AusBiotech and Deloitte, COVID-19 cash back opportunities and tax stimulus packages, Biotech Talks AusBiotech webcasts

State and Territory measures

State / Territory[81]	Description	Eligibility
Victoria	Business Support Fund	By business location
	Business mentoring and mental health support	By application
	Payroll tax waiver / deferral	Dependent on payroll spend
	Land tax deferral	By criteria
	Grants	By application
Queensland	Payroll tax refund / tax holiday / deferral	By application
	Rent relief	By application
	Grants	By application
New South Wales	Payroll tax reduced / defer	Dependent on payroll spend
	Land tax concessions and relief	Varied
	Small business support grants	By application
	Tax deferral exemptions	By criteria
Western Australia	Payroll tax waiver / threshold	Dependent on payroll spend
	One-off grant	Automatic for $1-4 million payroll
	Tax deferral interest / fee free	Automatic
	Other measures such as, waiving rent, cash-flow for tourism companies	Varied
South Australia	Payroll tax waiver / deferral	Dependent on payroll spend
	Land tax deferral	By criteria
	Emergency grants	By application
	Other measures such as new hire funding, waiving fees	Varied
Tasmania	Payroll tax waived / refunded	By application / industry
	Land tax waived	By criteria
	Small grants for apprentices	Certain industries
Australia Capital Territory	Payroll tax waiver / deferral	By criteria
	Land tax relief	By application
	Other measures such as commercial property rebate and fee waivers	Varied
Northern Territory	Central Hardship Register (CHR)	By application
	Payroll tax waiver / deferral	By criteria

[81] Note: these support packages are ever evolving; check with state and federal government for up to date information
Source: Business Victoria Website, AusBiotech and Deloitte, COVID-19 cash back opportunities and tax stimulus packages, Biotech Talks AusBiotech webcasts

State / Territory[81]	Description	Eligibility
	Lowered utilities by 50% Other measures such as Business Survival Fund, fee freezing	Registered for CHR Varied

Appendix 4: 3 Step Framework for a COVIDSafe Australia

The below presents the three-step framework developed by the Australian Government in May 2020.

STEPS	*Select allowances and restrictions per stage, further details can be found at the Department of Health's website*
STEP 1: The important first small steps – connect with friends and family – allowing groups of people to be together in their homes and in the community. Businesses reopen and more people return to work	• Non-work gatherings of up to 10 • Up to 5 visitors at home in addition to normal residents • Work from home if it works for you and your employer • Workplaces develop a COVIDSafe plan • Avoid public transport in peak hour • 2 square metre rule may apply to smaller venues • Allow local and regional travel for recreation • Refer to state and territory governments for border restrictions and biosecurity conditions
STEP 2: Building on slightly larger gatherings and more businesses reopening. Higher risk activities may have tighter restrictions	• Non-work gatherings of up to 20 • States and territories may allow larger numbers in some circumstances • Work from home if it works for you and your employer • Workplaces develop a COVIDSafe plan • Avoid public transport in peak hour • Allow local and regional travel for recreation • Consider allowing interstate recreational travel depending on the situation in each state and territory • Refer to state and territory governments for biosecurity conditions
STEP 3: A commitment to reopening of business and the community with minimal restrictions, but underpinned by COVIDSafe ways of living. States and territories will determine when to implement these changes	• All gatherings must follow 4 square metres per person, people should stay 1.5m apart when possible and people should stay home if unwell and get tested • Return to workplace • Workplaces develop a COVIDSafe plan • Avoid public transport in peak hour • Allow interstate travel • Refer to state and territory governments for biosecurity conditions

Appendix 5: References

Author(s), Organisation	Title	Month (2020)
ABC News	Victoria's coronavirus 'testing blitz' will enlist the help of ADF and other states	June
Adam Kamradt-Scott, The Conversation	Australia's coronavirus testing rates are some of the best in the world	July
ANDHealth	Digital Health: The Sleeping Giant of Australia's Health Technology Industry	July
Australia Post	Pharmacy Home Delivery	April
Australia's Chief Scientist, Alan Finkel	Impact of the pandemic on Australia's Workforce	May
Australian Bureau of Statistics	Trade Statistics	July
Australian Bureau of Statistics	Labour Force statistics	August
Australian Government, Department of Health	Total COVID-19 tests conducted and results	August
Australian Government, Department of Health	3-step framework for a COVIDSafe Australia	May
B&T Magazine	Tonic Health media launches new pharmacy home delivery service amid coronavirus crisis	March
Ben Faircloth and Andre Valente, L.E.K. Consulting	Covid-19 and Clinical trials: Accelerating the adoption of eClinical Technology	April
Bioshares	MTP Sector capital raisings data	May to July
Bioshares	Edition 850	July
Christine Spiteri, Pharma in Focus	Has Aust found the Covid vax?	August
Christine Spiteri, Pharma in Focus	OZ R&D on Covid scrapheap	August
Clarivate	Data on number of MTP sector companies patenting	September
Clinical Trial Arena	University of Oxford selects eClinical suite for Covid-19 trial	July
Cochlear	Cochlear Annual Report FY20	August
Conor Duffy, ABC News	University of Melbourne reveals 450 job losses as COVID-19 creates revenue hit, drop in international students	August
Continuity of Care Collaboration	Continuity of Care Collaboration Forum	July
Department of Health	COVID-19 National Health Plan – Home medicines services information for consumers	May
Department of Health	Supporting the sustainability of the medical devices sector	July

Author(s), Organisation	Title	Month (2020)
Department of Health and Human Services Victoria	Victorian coronavirus (COVID-19) data	updated 31 August
Department of Health and Human Services Victoria	Coronavirus update for Victoria – 5 August 2020	August
Emily Jarvie, Examiner	Royal Hobart Hospital home to Australian-first sterilising robot	June
Eric Ludlow, World Socialist Web Site	Thousands of sackings at Australian universities	July
European Centre for Disease Prevention and Control	Global COVID-19 cases	November 2019 to 31 August 2020
Fergus Hunter, Sydney Morning Herald	Universities propose 'secure corridor' rules for international students	May
Four Corners, ABC News	How Australia's 'panic and neglect' funding cycle has left us vulnerable to pandemics like coronavirus	June
Francine Crimmins, Medical Republic	Bulk-billed telehealth consults are to receive second boost of more than $600 million	July
Gemma Telfer, CluePoints	Over 300 clinical studies benefit from CluePoints' COVID-19 risk management support	August
Grey Innovation, BioMelbourne Network	First of 2,000 NOTUS emergency ventilators delivered to national medical stockpile	August
Ian Scott and Enrico Coiera, The Medical Journal of Australia	Can AI help in the fight against COVID-19	June
Imelda Cotton, Smallcaps	MedAdvisor launches home delivery service for pharmacy needs	March
International Air Transport Association	Recovery delayed as international travel remains locked down	July
International Monetary Fund	World Economic Outlook April 2020: The Great Lockdown	April
International Monetary Fund	World Economic Outlook June 2020: A Crisis like no other, an uncertain recovery	June
James Fernyhough, Angus Grigg and Andrew Tillett, Australian Financial Review	Army deployed as manufacturers ramp up production	March
Joshua Eddy and Mari Ericksen, Nucleus Network	Nucleus Network begins dosing for third COVID-19 vaccine trial	September
Judy Barouch, Total Facilities	New Royal Adelaide hospital: futuristic and state-of-the-art	March 2018
Julia Horne, The Conversation	How universities came to rely on international students	May

Author(s), Organisation	Title	Month (2020)
Matthew Hadfield, Royal Australian College of Surgeons	Update on elective surgery in Victoria	July
MBS	Changes Factsheet	July
MBS	Monthly statistics	January 2019 to June 2020
MedAdvisor	Quarterly Activities Report	July
MTPConnect	COVID-19 Impact Report	June
MTPConnect	Medical Technology, Biotechnology & Pharmaceutical Sector Competitiveness Plan	April
MTPConnect and MTAA	Collaborating in the Public Interest: How Australia's medical technology sector joined with government to fight COVID-19	June
OECD	Unemployment statistics	August
Patrick Durkin, Australian Financial Review	Deliveroo, Uber Eats push into basic food and drug delivery	August
Paul Karp, The Guardian	Almost 500 more university jobs to go at ANU and UNSW as Covid cuts bite	September
Paul Smith	Greg Hunt welcomes AusDoc's GP petition for telehealth	August
Peter Hurley, The Conversation	Interactive: international students make up more than 30% of population in some Australian suburbs	June
Pharmaceutical Benefit Scheme	Prescriptions statistics	July 2008 - June 2019
Professor Tony Costello, Australian Medical Robotics Academy	The Australian Medical Robotics Academy in Melbourne will train surgeons on robots	May
Research & Development Taskforce	Supporting clinical trials during the COVID-19 pandemic	March
Research Australia	COVID-19 - How Australia's health and medical research sector is responding	June
Richard Ferguson, The Australian	Group of Eight warns of 'brain drain' with 7000 jobs set to go	July
Robin Murphy, Justin Adams and Vignesh Babu Manjunath Gandudi, The Conversation	Robots are playing many roles in the coronavirus crisis – and offering lessons for future disasters	April
Samantha Maiden, News.com.au	Australia's unemployment rate: State virus closure hunting jobs	August
Shane Wright, Sydney Morning Herald	Biggest economic contraction since Great Depression, ABS confirms	September
Sharon O'Keeffe, Farm Online National	Humanoid robot trialled in NSW Hospital	March

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Stephanie Segal and Dyan Gerstel, Centre for Strategic & International Studies	Breaking down the G20 COVID-19 Fiscal Response: April	April
Stephanie Segal and Dyan Gerstel, Centre for Strategic & International Studies	Breaking down the G20 COVID-19 Fiscal Response: June Update	July
The Economist	Countries are using apps and data networks to keep tabs on the pandemic	March
The Hon Greg Hunt MP	$19 million for Artificial Intelligence health research projects	June
The Hon Greg Hunt MP	Continuous care with telehealth stage seven	July
The Hon Scott Morrison MP, Prime Minister of Australia	More Support for Businesses and Workers	August
The Hon Scott Morrison MP, Prime Minister of Australia	New deal secures potential COVID-19 vaccine for every Australian	August
The Hon Scott Morrison, ABC News	Stage 4 coronavirus restrictions in Melbourne could cost the economy $9 billion	August
The Treasury of the Australian Government	Economic Response to Coronavirus	May
Therapeutic Goods Administration (TGA)	Critical Medicine Shortages and other information	March 2019 to September 2020
Therapeutic Goods Administration (TGA)	Reduced annual charges for medical devices listed on the prostheses list	October
Thomson Reuters Datastream	ASX share price data	March 2019 to 31 August 2020
Tiffany Walker, Pharma in Focus	Uber goes into drugs	August
Tiffany Walker, Pharma in Focus	Supercomputers in virus fight	July
University of Queensland, Centre for Online Health	Telehealth and coronavirus: Medicare Benefits Schedule (MBS) activity in Australia, March to June	August
Yajun Ma, Pharma in Focus	Reps do return to road dance	July

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