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# The Australian response to the COVID-19 pandemic and diabetes – Lessons learned



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## ABSTRACT

The COVID-19 pandemic has had a significant impact on the economy and health system of most countries in the world and this is also true of Australia. Australia has not seen the huge surge of COVID-19 positive cases and subsequent hospitalisations and deaths experienced in other parts of the world. However there have been important social and health strategies to “flatten” the curve, to reduce infections and to manage those infected. These have included closure of international and interstate borders, local lockdown measures, physical distancing, shift to work from home, closure of non-essential businesses and full or partial closure of all schools and tertiary education facilities. From the diabetes care perspective, there was a significant and concerted diversion of hospital resources and staff to COVID-19 specific activities. Reduced access to primary care, diagnostic and hospital services for diabetes, combined with fear of exposure to the virus in these settings, led to a significant drop in access to usual diabetes care. Provision of outpatient and private sector diabetes services via telehealth was encouraged and supported by expanded and new government subsidies. Importantly, for the first time, there was government funded subsidy for care delivered via the telephone and inclusion of credentialled diabetes educators in funded telephone/telehealth support. The Australian health professional and consumer organisations worked cooperatively producing guidelines, position statements and other educational resources specific for the COVID-19 setting. Once the COVID-19 pandemic is over, review of all the changes will be important, determining which should be permanently implemented. The learnings from COVID-19 should help prepare Australia for future pandemics or other major health crises.

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## 1. Introduction

The COVID-19 pandemic caused by the SARS-CoV-2 virus has had an enormous impact around the world. Whilst every country has been negatively impacted regarding

socioeconomic and health outcomes, countries that have been most impacted based on infection and death rates include (as at 24 May 2020): the United States with over 1.56 million confirmed cases and 94,000 deaths, Spain with 235,290 cases and more than 28,000 deaths, Italy with over

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229,000 and more than 32,000 deaths and the United Kingdom with 257,158 cases and more than 36,000 deaths (<https://covid19.who.int/>). It is clear that the health systems of even these relatively affluent countries have been stretched beyond their capacity. For example, a study in Italy showed a large proportion of critically-ill patients admitted to the intensive care unit (ICU) required mechanical ventilation and higher levels of positive end expiratory pressure, with a mortality rate of 26% [1].

In Australia, as at 24 May 2020, there have been 7109 positive cases and 102 deaths. (<https://www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert/coronavirus-covid-19-current-situation-and-case-numbers>). To put this in a comparative manner, in Australia there have been 4 deaths per million, compared with 541 deaths per million in Italy and 284 deaths per million in the United States (<https://covid19.who.int/>).

Early information from China indicated that people most affected with COVID-19 and requiring hospitalisation frequently had other co-morbidities, including diabetes, hypertension, coronary heart disease, cerebrovascular disease, obesity and chronic kidney disease [2,3]. Moreover, progression to acute respiratory distress syndrome and death was more likely to occur in people with type 2 diabetes [4,5] and this appears to be associated with obesity [6]. Adverse health outcomes such as respiratory and cardiac failure and death are thought to be mediated by a cytokine storm [7].

Similar data are emerging from other countries that have been significantly impacted by COVID-19, including Italy [8]. Of note, a recent article reported an association of lower mortality and better clinical outcomes in people with type 2 diabetes and COVID-19 with well-controlled blood glucose levels [3]. Thus, glycaemic control appears to be an important factor for people with diabetes with COVID-19 and their likely outcomes.

The first COVID-19 positive case in Australia was confirmed on January 25th 2020 in a person returning from Wuhan China [9]. This was followed by a lag phase with a doubling of positive cases approximately every 7–10 days. However, by March 21st 2020, when COVID-19 positive cases in Australia exceeded 1000 with 7 deaths, Australia was clearly on the exponential part of the curve (<https://www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert>). Australia's success in flattening the curve is illustrated in Fig. 1.

The crude case fatality rate and the proportion of cases requiring hospitalisation in Australia both remain substantially lower than the corresponding values reported from many other comparable high-income countries. Of the total cases of COVID-19 notified in Australia, 13% were admitted to hospital compared to 42% of cases reported requiring hospitalisation in the EU/EEA. It is noted that the higher proportion reported by EU/EEA is affected by each country's testing strategies, with some European countries only testing hospitalised individuals for COVID-19. The highest rate of hospitalised cases in Australia was among the 70–79 age group (10.7 per 100,000 populations), followed by the 80–89 years

age group (9.4 per 100,000). The most commonly reported comorbid conditions among hospitalised cases were cardiac disease (19%), diabetes (18%) and chronic respiratory conditions (13%). Of the hospitalised COVID-19 cases, 19% were admitted to an intensive care unit (ICU), with 50 cases receiving ventilation. The most commonly-reported comorbid conditions among cases admitted to an ICU were diabetes (26%) and cardiac disease (21%).

As at May 24, 2020, the median age of cases who died was 80 years (IQR: 74–86 years) with 57 of the cases being male and 45 female. The most commonly reported comorbid conditions among COVID-19 deaths were cardiac disease (34%), diabetes (26%) and chronic respiratory disease (22%).

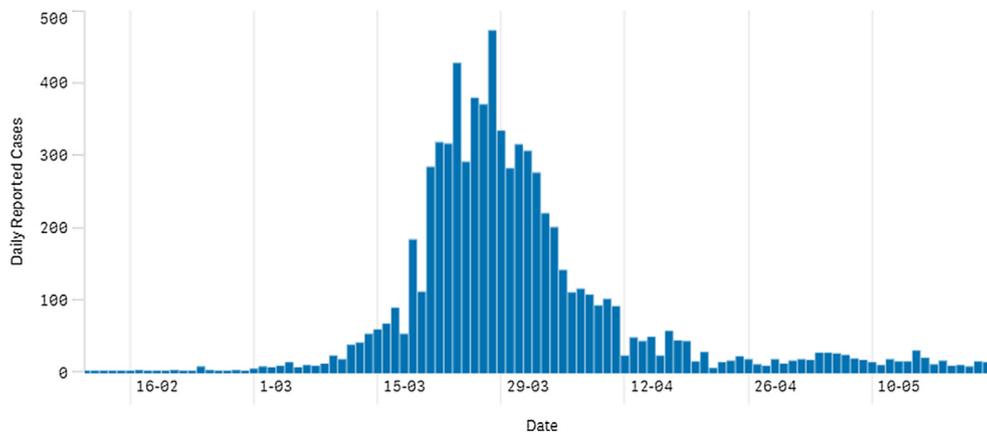
## 2. The Australian Government response

The Australian (Federal) government took the unprecedented step of forming a “national cabinet” including the leaders of all State and Territory Governments to coordinate the response to COVID-19. This included physical distancing and lockdown restrictions to reduce the spread of COVID-19 infections. The Australian lockdown restrictions listed only 4 reasons people should leave their house: shopping for essential items; receiving medical care and provision of health care and support; exercising with no more than one other person; if undertaking work or study were not possible from home. Other measures included closing borders and curbing incoming international flights. In addition, there was closure of non-essential services, including cafes and restaurants, except takeaway services. Travel between states and territories was halted or severely restricted. People who tested positive, returned from overseas trips or who were in contact with a known positive case, were encouraged to voluntarily self-quarantine for 14 days, though this subsequently progressed to mandatory supervised quarantine in hotels for all travellers returning from overseas irrespective of COVID-19 status.

The implementation of lockdown rules in Australia caused panic buying (exemplified by a shortage of toilet paper and pantry staples such as flour, pasta and rice) resulting in strict limits on individual purchases of these products. Stockpiling and localised short-term shortages of medicines occurred, including insulin and diabetes-related products (blood glucose and ketone test strips, insulin pump consumables and CGM consumables). These were resolved by restrictions to dispensing limits of certain medications and diabetes-related products, and positive communication to people with diabetes to maintain their normal purchases and not “stockpile”.

Schools were closed to all students, other than for students of essential workers. As schools in Australia are under the jurisdiction of State and Territory Governments, there was a varied response across the country to these measures and there was considerable confusion and concern.

More recently, the Australian Government released a COVIDSafe tracing mobile phone app and has encouraged all Australians to download this app and linked this to relaxation of social distancing and shutdown measures. Interestingly,



**Fig. 1 – This graph shows the total number of new confirmed COVID-19 cases reported each day up to and including May 24, 2020 by Australian states and territories. The first cases of COVID-19 were identified in late January in Australia. The number of new cases rapidly increased through March. Since April there has been a reduction in daily reported cases.**

there were some reports that this app may have interfered with some diabetes apps and devices.

### 3. The health system response

There was a strong and well-coordinated response to COVID-19 in the Australian health system to prepare for the expected COVID-19 patient influx into hospitals by:

- Reconfiguring wards - expanding or establishing new ICUs, with separate facilities for those with and without COVID-19.
- Setting up separate inpatient COVID-19 screening “hot” wards that were separate from “cold” wards.
- Setting up special “fever” clinics, initially attached to the hospital but separate from other services and particularly separated from emergency departments [10].
- Innovative ways of screening people, such as the implementation of an on-line self-registration and self-screening tool [10], drive through screening and rapid through-put screening, to allow hospital workers with mild symptoms to be screened and get back to work in 24 h.
- Securing adequate personal protective equipment (PPE), including from pre-existing national medical resources stockpiles and providing training on specialised techniques for urgent/safe gowning up.
- Suspension of non-urgent surgery and procedures in both public and private hospitals.
- Arrangements between State governments and private hospitals for the latter to take COVID and non-COVID patients, if and when required.
- Upskilling and education of appropriate staff in best practice in procedures such as intubation to minimise risk to health professionals.
- Call-up of, and short-term registration of, recently retired healthcare professionals and senior medical students.
- Limitation or suspension of all non-urgent medical ambulatory or outpatient services (including outpatient endocrinology/diabetes services), with a focus on provision of services that would prevent emergency department presentations/admissions.
- Contact tracing those exposed to a person diagnosed with COVID-19, and planning, and currently implementing the COVIDSafe contact tracing app.
- Fast-tracking of approval and implementation of COVID-19 related research studies, with additional specific funding being made available by our national research funding agencies.
- Implementing telephone/telehealth consultations for most endocrinology/diabetes services (including paediatric endocrinology).
- The provision of inpatient diabetes education and medical review by telephone where possible for patients admitted with COVID-19 to reduce exposure to essential diabetes staff.

Other changes in hospital services included redeployment of some staff to COVID-19 screening and service areas, depending on local needs and staff skill-sets (e.g. relative recency in ICU or respiratory skills). Screening all staff, patients and visitors entering (through minimised access points) with temperature measurements and questions regarding overseas travel, fever, any symptoms of being unwell, and any contact with known COVID-19 patients. In many hospitals, ward rounds were limited to two health professionals. There were limitations to numbers of visitor to one, or occasionally two, including outpatient areas, wards and delivery suites. Importantly, as people in residential aged-care facilities are among the highest risk groups to COVID-19, no visitors to those facilities were permitted.

Changes were required for the management and education of patients with newly diagnosed diabetes and their families, particularly when children were affected. This included insulin stabilisation to avoid diabetic ketoacidosis (DKA) and

hyperosmolar hyperglycaemia state (HHS), active high-risk diabetes foot disease, diabetes and pregnancy as well as inpatient diabetes care. Children newly diagnosed with type 1 diabetes, particularly those in DKA and with fever, were often treated as having COVID-19, until swabs proved they were negative. As indicated there has been a rapid adoption of telephone/telehealth diabetes services to ensure continued diabetes outpatient care provided by the public hospital system. It is important to note the major disruption and changes to the business processes of many allied health services, including primary care, optometry, dentistry, podiatry and dietetic services.

The Australian Government provided COVID-19 specific support to primary and specialist care services by establishing a national call centre, supporting general practice-led respiratory clinics and providing online infection prevention and control training [11]. With respect to telehealth consultations and to ensure continuity of care, the Australian Government broadened access to its universal access scheme, the Medicare Benefits Scheme (MBS), by creating telephone/telehealth item numbers for health professionals, including general practitioners and consultant endocrinologists. There was also removal of the previous requirement that the patient lived at least 15 km distance from the health professional's practice to access telehealth reimbursement. Importantly, and for the first time, MBS item numbers for telephone (in addition to video conferencing) consultations were made available to more allied health professionals including Credentialled Diabetes Educators. In order to limit the need for patients in isolation to contact their doctor or pharmacy, the doctor was able to issue a medication prescription without physically seeing the patient and send that through to the patient's pharmacy which could then courier the medication to the patient's home. Home delivery of medications by pharmacies was also made available for vulnerable people, for example the elderly and those with disabilities.

#### 4. The response from Australia's national diabetes Organisations

The National Diabetes Services Scheme (NDSS) is an initiative of the Australian Government that commenced in 1987 and is administered by Diabetes Australia. The NDSS provides universal access for Australian residents with diabetes to subsidised products, including blood glucose test strips, urine test strips, insulin pump consumables and for an eligible subset continuous/flash glucose monitoring systems. The NDSS also provides useful statistical data on the numbers of people with diabetes/type of diabetes and areas in which they reside.

The NDSS provides information, education and support services for diabetes self-management, a dedicated national helpline and online information, as well as face-to-face group education activities across the nation. The NDSS has wide reach and supports over 90% of all Australians diagnosed with diabetes and includes all types of diabetes. Given the events unfolding overseas it was anticipated by many in Australia that we were on the verge of a huge increase in COVID-19 cases, which would stretch our hospital and health care system.

The response to the pandemic in Australia was swift, positive and proactive, to ensure that all people with diabetes had

access to the medications, products and services that they required and were aware of their greater risk of serious illness, or death, from COVID-19. This was achieved by strong collaboration among the national diabetes organisations, including Diabetes Australia, Australian Diabetes Society (ADS), Australian Diabetes Educators Association (ADEA), Australasian Diabetes In Pregnancy Society (ADIPS), the Australasian Paediatric Endocrine Group (APEG) and the Juvenile Diabetes Research Foundation of Australia (JDRFA), with the Australian Government Department of Health leading the provision of coordinated and consistent information, advice and communication about the COVID-19 pandemic.

The NDSS ([www.ndss.com.au](http://www.ndss.com.au)) has become a critical component of this response, with the implementation of the following measures:

- Enhancement of the NDSS website to provide regularly updated and specific information and resources relevant to diabetes and COVID-19.
- Extension of the contact hours of the NDSS National Helpline.
- Supporting appropriate levels of access to medication supplies through the Pharmaceutical Benefits Scheme (including insulin) and diabetes products (insulin pump consumables, reservoirs, blood glucose and urine test strips) through the NDSS. While there was no shortage of diabetes medicines/products in Australia, limitations were implemented to prevent stockpiling and localised shortages.
- A six-month extension for access to subsidised blood glucose test strips (BGTS) was granted to eligible people with non-insulin treated type 2 diabetes. This is instead of the usual requirement to consult with an eligible health professional to determine the need for an extension to the subsidy.
- Simplification of the usual processes to register and gain access to subsidised diabetes products including insulin pen needles, BGTS, continuous/flash glucose monitoring systems, NDSS Registration and the National Gestational Diabetes Register.
- Continuous glucose monitoring starter kits sent, if requested, to the residential address of the person with diabetes rather than to the health professional.

The Australian diabetes health professional organisations proactively responded to the COVID-19 pandemic by establishing COVID-19 specific web-pages to house educational resources for health professionals. Furthermore, each organisation provided communication and updates to their respective membership via electronic messaging as well as social media platforms, including Twitter and Facebook. COVID-19 specific guidelines and resources that were developed and disseminated include:

- Guide for the management of diabetes during the COVID-19 pandemic.

- Telehealth and diabetes guideline.
- Australian clinical triage guide for people with diabetes-related foot disease during the COVID-19 pandemic, with stratification according to the level of the pandemic.
- Statement on modification to the GDM diagnostic process during the COVID-19 pandemic, with stratification according to the level of the pandemic.
- Information for families of children with type 1 diabetes regarding COVID-19.
- Information regarding the symptoms of type 1 diabetes onset, in order to prevent late presentation.
- COVID-19 and diabetes specific webinars, webchats and podcasts.

As the peak body for people with diabetes, Diabetes Australia was responsible for advocating and implementing the changes to the NDSS in response to the COVID-19 pandemic. In addition, Diabetes Australia employed social media platforms including Twitter, Facebook and LinkedIn to inform people with diabetes of the changes to the NDSS as well as positive messaging about the importance of staying healthy and active, an annual influenza vaccine (very important because Australia is entering winter and the usual influenza season) and establishing a plan to manage their diabetes during any intercurrent respiratory or other illness. Diabetes Australia also worked closely with national primary care health professional organisations such as general practitioner and optometry to support continuing access to these services for people with diabetes.

## 5. Mental health response

Addressing the mental health impacts, stress and anxiety, for both people with diabetes (and other conditions) and health professionals has been at the forefront of Australia's COVID-19 responses. People with diabetes are worried about being infected with coronavirus and what this means for their own health and well-being, and also for that of their families and loved ones. With the assistance of the Australian Centre for Behavioural Research in Diabetes (ACBRD), Diabetes Australia adapted a resource developed in Wales to address this entitled 'Managing worry about COVID-19 and diabetes' ([www.ndss.com.au](http://www.ndss.com.au)).

Health professionals are concerned about becoming infected and infecting their immediate families, not being able to perform their regular roles in patient care delivery and being seconded to COVID-19 specific activities, and about access to and use of PPE [12]. These concerns were exacerbated by reports of COVID-19 infections and deaths of overseas health care professionals. There has been considerable advocacy for support and resources dedicated to health professionals to address the mental health issues that inevitably arise.

## 6. Summary

It is clear that people with diabetes are at greater risk of serious health impacts in pandemics such as COVID-19 than people

without diabetes [13,14]. As highlighted, effective management of blood glucose in people with diabetes and COVID-19 will lead to better outcomes and lower mortality rates [15,16].

Whether the resources that were developed and measures that have been implemented had a positive effect on the health outcomes for people with diabetes is not yet known. Feedback from people with diabetes and health professionals has been positive and supportive of the proactive approach to this unprecedented pandemic. Australian healthcare professionals and researchers are also proactive in proposing and participating in national and international COVID-19 related research.

In Australia, diabetes health professionals have been supported with telephone and telehealth consultation incentives and guidance with respect to blood glucose management and medication use, including specific information around the use of metformin and sodium-glucose cotransporter 2 inhibitors (SGLT2i) as well as related cardiometabolic medication such as angiotensin converting enzyme inhibitors (ACEi)/angiotensin II receptor blockers (ARBs) for blood pressure management. People with diabetes have been discouraged from stockpiling diabetes products/medications, to continue their diabetes care and monitoring with their diabetes health professionals, to be prepared for any intercurrent illness and to optimally manage their glycaemia and health in general.

## 7. Australian learnings

Many changes have been necessary to maintain access to ongoing diabetes care and to provide effective communication to the Australian diabetes community and health professionals. Learnings in Australia from the COVID-19 pandemic suggest that swift and proactive action is required to support both people with diabetes and health professionals to safely and appropriately modify health service delivery. Interventions are required to manage diabetes medicine and product supply chains. The COVID-19 crisis continues to provide a unique opportunity for leaders in the management of diabetes to share ideas, collaborate and learn from each other.

It will be important to assess the changes made in relation to diabetes care that have resulted from the response to COVID-19 and to determine which should be permanently implemented. These changes include service delivery models, reimbursement for telephone/telehealth for credentialled diabetes educators, medical specialist services and primary care providers. Ultimately, the learnings from COVID-19 should help prepare Australia for future pandemics or other major health crises.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Sof Andrikopoulos (Australian Diabetes Society) conducted the research and wrote the initial draft of the manuscript.

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