

Diabetes Australia submission to *the Inquiry into Long COVID and Repeated COVID Infections*

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Sent by email - Committee, Health (REPS) health.reps@aph.gov.au

Diabetes Australia provides this submission to the Committee following consultation with health professionals, researchers and people living with diabetes in Australia.

Australian data on the impact of COVID infections for people with diabetes is limited to ICU admission rates (34 percent for the period December 2021 – July 2022¹) and deaths due to COVID-19 (diabetes was listed as pre-existing condition in 20.6% of deaths with a chronic condition mentioned as at January 2022²). Other small studies in hospital settings have looked at characteristics of diabetes patients with COVID infections³.

There is a need for more detailed investigation into the overrepresentation of people with diabetes impacted by COVID and to develop suitable early intervention programs. This is particularly important given international literature suggests people with diabetes are more susceptible to re-infection and vaccine breakthrough infections. Preventing COVID infection and re-infection for people living with diabetes in Australia will become more challenging as we transition from pandemic to endemic.

International literature – Long COVID experience for people with diabetes

Analysis published earlier this year in Germany, stated that the presence of diabetes may further influence Long COVID via various pathophysiological mechanisms. First investigations have shown that people with metabolic diseases may have a higher risk of developing Long COVID symptoms⁴. Patients with type 2 diabetes and a COVID-19 infection had significantly more symptoms of fatigue after the acute illness as compared to those without diabetes⁵. Another review published in 2021, examined studies on “Long COVID”, “Post COVID-19 Syndrome” and diabetes, and found COVID-19 could add to, or exacerbate, tachycardia, sarcopenia (and muscle fatigue), and microvascular dysfunction in patients with diabetes⁶. It further recommended strict management of diabetes and other comorbidities, supervised rehabilitation and physical exercise, and optimal nutrition could

¹ COVID-19 National Incident Room Surveillance Team 2022 Vol 46. COVID-19 Australia: Epidemiology Report 64 – Reporting period ending 31 July 2022. Available at <https://doi.org/10.33321/cdi.2022.46.58>

² Australian Bureau of Statistics (15 February 2022), COVID-19 Mortality in Australia, Deaths registered to 31 January 2022, ABS Website, accessed 21 November 2022.

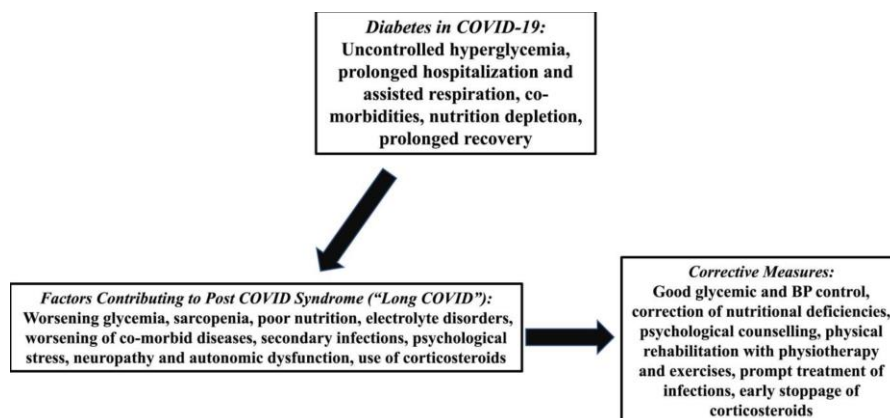
³ Lin M, Ho K. Characteristics of diabetes patients with COVID-19 infection in a general acute hospital following statewide vaccination. Australian Diabetes Congress August 2022; [ePoster](#)

⁴ Steenblock C, Hassanein M, Khan EG, Yaman M, Kamel M, Barbir M, Lorke DE, Rock JA, Everett D, Bejtullah S, Heimerer A, Tahirukaj E, Beqiri P, Bornstein SR. Diabetes and COVID-19: Short- and Long-Term Consequences. *Horm Metab Res.* 2022 Aug;54(8):503-509. doi: 10.1055/a-1878-9566. Epub 2022 Jun 20.

⁵ Mittal J, Ghosh A, Bhatt SP, Anoop S, Ansari IA, Misra A. High prevalence of post COVID-19 fatigue in patients with type 2 diabetes: A case-control study. *Diabetes Metab Syndr.* 2021 Nov-Dec;15(6):102302. doi: 10.1016/j.dsx.2021.102302. Epub 2021 Sep 24. PMID: 34626924; PMCID: PMC8462068.

⁶ Raveendran AV, Misra A. Post COVID-19 Syndrome (“Long COVID”) and Diabetes: Challenges in Diagnosis and Management. *Diabetes Metab Syndr.* 2021 Sep-Oct;15(5):102235. doi: 10.1016/j.dsx.2021.102235. Epub 2021 Jul 28. PMID: 34384972; PMCID: PMC8317446.

help in reducing and managing Long COVID. The authors explain the relationship between Long COVID and diabetes with suggested corrective measures in the below diagram.



Source Raveendran AV, Misra A. Post COVID-19 Syndrome ("Long COVID") and Diabetes: Challenges in Diagnosis and Management. *Diabetes Metab Syndr*. 2021 Sep-Oct;15(5):102235

Diabetes Australia is not aware of any data on the incidence of Long COVID in people with diabetes living in Australia however a real case study is shared below:

Sarah lives with type 2 diabetes and in the weeks that followed her COVID infection she experienced a severe case of tachycardia, or a heart rate over 100 beats a minute, and fainted. She was diagnosed with COVID pneumonia and when her chest was x-rayed, she was told she had "ground glass, opaque lungs". Sarah was administered with antibiotics and put on oxygen to help her breathe because her vital statistics were low. She stayed in hospital for four days, gave herself a month to get over it, and then tried to go back to work. The lethargy and chest pain were still extreme after a month. Sarah was experiencing such severe pain that she worried she was having a stroke or a heart attack. She took herself back to hospital, where tests showed she wasn't having an urgent medical episode but was experiencing Long COVID. A year later, Sarah is still not fully recovered and experiences the "sort of lethargy that sleep doesn't ease", as well as ongoing gastro symptoms.

International literature – new onset diabetes

There is growing evidence that SARS-CoV-2 may induce diabetes⁷. However, it is not yet clear whether this might be a fulminant-type diabetes (type 1), autoimmune diabetes (type 1), or a new-onset transient hyperglycaemia⁸. In patients that were hospitalised due to COVID-19, glycaemic abnormalities were observed up to 2 months later⁹. However, other long-term studies reported that the prevalence of dysglycaemia reverted to pre-

⁷ Steenblock C, et al.

⁸ Catriona C, Paolo P. SARS-CoV-2 induced post-translational protein modifications: A trigger for developing autoimmune diabetes? *Diabetes Metab Res Rev*. 2022 Jan;38(1):e3508. doi: 10.1002/dmrr.3508. PMID: 34990520; PMCID: PMC9015335.

⁹ Montefusco L, Ben Nasr M, D'Addio F, Loretelli C, Rossi A, Pastore I, Daniele G, Abdelsalam A, Maestroni A, Dell'Acqua M, Ippolito E, Assi E, Usuelli V, Seelam AJ, Fiorina RM, Chebat E, Morpurgo P, Lunati ME, Bolla AM, Finzi G, Abdi R, Bonventre JV, Rusconi S, Riva A, Corradi D, Santus P, Nebuloni M, Folli F, Zuccotti GV, Galli M, Fiorina P. Acute and long-term disruption of glycometabolic control after SARS-CoV-2 infection. *Nat Metab*. 2021 Jun;3(6):774-785. doi: 10.1038/s42255-021-00407-6. Epub 2021 May 25. PMID: 34035524

admission frequencies in most recovered patients and that claims on the diabetes risk after COVID-19 infections should be interpreted with caution¹⁰.

Patients with COVID-19, without any pre-existing history or diagnosis of diabetes, are reported to have a greater prevalence of hyperglycaemia¹¹. However, stress hyperglycaemia and insulin resistance are also characteristics of other acute critical illnesses¹².

Recent studies from the USA¹³ and Germany¹⁴ show that people who have had even mild COVID-19 infection are also at increased future high risk of developing type 2 diabetes.

This month, a further analysis was published in Germany highlighting the need for more comprehensive data beyond the current studies. It was suggested that current studies are limited by cohort and heterogeneity, and largely focussed on hospitalised patients, neglecting the vast majority of 'mild' COVID cases. The German analysis noted the bi-directional relationship between COVID-19 and diabetes, where diabetes is comorbidity associated with more severe outcomes, as well as a consequence of the COVID infection itself, and identified it is important to better understand the underlying mechanisms, to enable more targeted interventions and reduce the impact in the ongoing pandemic. The study posed seven specific questions that require a combination of population-level clinical cohort studies with long-term and comprehensive follow-up data, and detailed mechanistic research in vitro research and in animal models¹⁵.

The analysis noted that for type 1 diabetes, epidemiological data is inconsistent— German and Scottish registries identified an increase in type 1 diabetes diagnosis in children and adolescents after a peak in infection numbers. However, a larger population-based, repeated, cross-sectional study from Canada did not. The authors suggest that delayed diagnoses of naturally occurring type 1 diabetes as an indirect result of the pandemic could be confounding these results, while the challenge to verify past COVID-19 infection in children with new-onset diabetes further complicates association studies.

Local studies – impact of COVID illness on people with diabetes

Westmead Hospital conducted a retrospective cohort study of 1515 patients (21 percent with diabetes and a further 15 percent with newly diagnosed diabetes) admitted with a primary diagnosis of COVID-19 from June to November 2021. It found that patients with diabetes had a higher death rate than those without diabetes (8 percent versus 2 percent), were more likely to be admitted to ICU (20 percent versus 12 percent) and have longer length of stay¹⁶.

¹⁰ Laurenzi A, Caretto A, Molinari C, Mercalli A, Melzi R, Nano R, Tresoldi C, Rovere Querini P, Ciceri F, Lampasona V, Bosi E, Scavini M, Piemonti L. No Evidence of Long-Term Disruption of Glycometabolic Control After SARS-CoV-2 Infection. *J Clin Endocrinol Metab*. 2022 Feb 17;107(3):e1009-e1019. doi: 10.1210/clinem/dgab792. PMID: 34718627; PMCID: PMC8691144.

¹¹ Montefusco L, et al.

¹² Langouche L, Van den Berghe G, Gunst J. Hyperglycemia and insulin resistance in COVID-19 versus non-COVID critical illness: are they really different? *Crit Care* 2021; 25: 437

¹³ Xie Y, Al-Aly Z. Risks and burdens of incident diabetes in long COVID: a cohort study. *Lancet Diabetes Endocrinol* 2022;10(5):311-321. DOI: 10.1016/S2213-8587(22)00044-4.

¹⁴ Rathmann W, Kuss O, Kostev K. Incidence of newly diagnosed diabetes after Covid-19. *Diabetologia*. 2022 Jun;65(6):949-954. doi: 10.1007/s00125-022-05670-0. Epub 2022 Mar 16. PMID: 35292829; PMCID: PMC8923743.

¹⁵ Groß, R., Kleger, A. COVID-19 and diabetes — where are we now?. *Nat Metab* (2022). <https://doi.org/10.1038/s42255-022-00691-w>

¹⁶ Cheung W, Gilroy N, Hor A, Jose S, Kairaitis K, Nayyar V, O'Sullivan M, Wheatley J, Chipps D. The Impact of Diabetes and Hyperglycaemia amongst Hospitalised Patients with COVID-19; Australian Diabetes Congress August 2022; [ADS Rapid-Fire Clinical Orals: Diabetes Management](#)

A local retrospective review of COVID positive patients with diabetes in Western Sydney found that patients who experienced a worsening COVID status at home and required hospital admission, had a significantly higher blood glucose level (hyperglycemia) on the day of admission compared to the first day of recording at home. Conversely, the patients that did not require hospitalisation for their COVID illness experience a decrease in the average daily blood glucose level from the beginning of illness until discharge from the service¹⁷.

Ongoing impact of the pandemic on delayed diabetes diagnoses and deferred care

In addition to data in published studies, diabetes health professionals have advised they are concerned with the effects of delayed diagnosis and deferred care. Some delayed diagnoses have been observed to result in first presentations with acute diabetes complications.

There is also concern that people with diagnosed diabetes, who have disengaged in routine healthcare, are at risk of developing diabetes- related complications

These issues have been examined through an audit at the high-risk foot service at Liverpool Hospital in South Western Sydney. The health service compared 2018-19 pre-pandemic presentations (severity of disease upon initial presentation) and outcomes (proportion that completely healed) with 2020-2022 presentations. The results showed poorer outcomes (fewer ulcers being fully healed) during the pandemic period compared to pre-pandemic¹⁸.

Analysis of pre-pandemic attendance of people with diabetes to hospitals and emergency departments at Blacktown and Mount Druitt hospitals in Western Sydney has also shown a significant decline in the number of people with diabetes presenting for care during waves and outbreaks of COVID that resulted in additional restrictions¹⁹. A survey conducted by Baker Heart and Diabetes Institute of nearly 500 people with diabetes living in Melbourne found that two in five people reported cancelling medical appointments and avoiding making new appointments in primary care and hospital settings²⁰.

¹⁷ Lloyd K, Cheung W, Payk M, O'Neill A, Hng T. Changes in glucose levels among COVID-19 patients prior to hospital admission. Australian Diabetes Congress August 2022; [ePosters](#)

¹⁸ Xie M, Namson L, Malone M, Charlotte W. Measuring the impact of the Covid-19 pandemic on diabetic foot care in a large metropolitan teaching hospital. Australian Diabetes Congress August 2022; [ePosters](#)

¹⁹ Meyerowitz-Katz G, Ferdousi S, Hng T, Maberly G. Tracking diabetes during the pandemic: how have Covid-19 waves influenced the attendance of people with diabetes to hospitals? Australian Diabetes Congress August 2022; [ePoster](#) 4

²⁰ Sacre, JW, Holmes-Truscott, E, Salim, A, et al. Impact of the COVID-19 pandemic and lockdown restrictions on psychosocial and behavioural outcomes among Australian adults with type 2 diabetes: findings from the PREDICT cohort study. *Diabet Med.* 2021; 38:e14611. <https://doi.org/10.1111/dme.14611>

RECOMENDATIONS:

People living with diabetes in Australia report that they are experiencing Long COVID, despite no whole of population data to demonstrate prevalence and whether these result from severe or mild infections

A nationally consistent approach to data reporting is required to assist in better understanding the impact of Long COVID infections on individuals including those with specific chronic conditions particularly diabetes.

Research funding should be made available to further investigate; COVID related new onset diabetes, diabetes related COVID risks, prevention of complications and long COVID and the role of antiviral therapy in prevention of long COVID.

Noting the ongoing risk of the COVID pandemic and endemic phases, strategies are required to reduce the potential future burden on people with diabetes.

The Australian National Diabetes Strategy 2021-2030 makes specific recommendations about the management of diabetes and COVID infections²¹.

Diabetes Australia also advocates for all people with diabetes to have access to antiviral COVID-19 treatments. Extending access to all people with diabetes may also have a demonstrable impact on reducing the high prevalence of ICU admissions for people with diabetes with a COVID infection and Long COVID (34 percent as at 31 July 2022).

²¹ www.health.gov.au/resources/publications/australian-national-diabetes-strategy-2021-2030