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## COVID-19 and diabetes: a co-conspiracy?

Patients with diabetes have been in the spotlight since the early stages of the pandemic, as growing epidemiological data have revealed they are at higher risk of severe clinical outcomes of COVID-19.

In light of these findings, several diabetes federations around the world have issued statements and provided resources to help patients with diabetes to better understand their risk of COVID-19 and how to more efficiently manage their condition. In May, 2020, with the understanding that the evidence base was still a moving target but that guidance for clinicians was urgently needed, an international panel of experts in the field of diabetes and endocrinology published in *The Lancet Diabetes & Endocrinology* practical recommendations for the management of diabetes during the pandemic.

However, epidemiological data and guidance on COVID-19 and diabetes have focused almost exclusively on type 2 diabetes. In this issue of *The Lancet Diabetes & Endocrinology*, we publish research assessing the absolute and relative risks of COVID-19 related mortality by type of diabetes in more than 61 000 000 individuals in England. After adjusting for key confounders, such as age, sex, ethnicity, index of multiple deprivation, and geographical region, the odds for in-hospital deaths with COVID-19 were 3.51 (95% CI 3.16–3.90) for people with type 1 diabetes and 2.03 (1.97–2.09) for people with type 2 diabetes compared with people without diabetes. Understanding which risk factors might have a role in the increased severity of COVID-19 in patients with diabetes is a priority for clinical practice and public health. A companion paper published in the same issue used a national dataset linked to national civil death registrations covering 98% of general practices in England to investigate the associations between various risk factors and COVID-19-related mortality in people with both types of diabetes. The authors confirmed the independent associations of several risk factors, such as age, sex, ethnicity, and socioeconomic deprivation, with COVID-19-related death. Importantly, the study also shows that the risk of COVID-19-related mortality is significantly and independently related to hyperglycaemia in people with either type of diabetes.

Hyperglycaemia can impair host defences, and poor glycaemic control has been associated with infections. Given that glycaemic control is a modifiable factor

and can be achieved and sustained by health-care interventions, these results emphasise the importance of supporting people with diabetes in effective self-management.

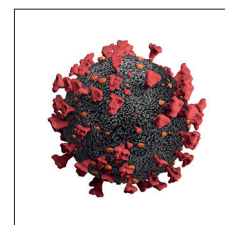
As the global COVID-19 pandemic continues to evolve, it has also become clear that the interplay between COVID-19 and diabetes entails a complex pathophysiology. Not only are COVID-19 outcomes more severe in people with diabetes and metabolic dysfunction, but recent data also suggest that COVID-19 could precipitate acute metabolic complications of diabetes, such as diabetic ketoacidosis and hyperglycaemia. The mechanisms underlying these links remain unclear, but are likely to involve the angiotensin converting enzyme 2 (ACE2) receptor, a binding site for the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is expressed in key metabolic organs, such as the pancreas, and in  $\beta$  cells in particular. Potentially, the SARS-CoV-2 tropism for  $\beta$  cells could lead to cell damage and an impairment in insulin secretion, triggering hyperglycaemia and ketoacidosis.

It has also been postulated that SARS-CoV-2 exposure can precipitate type 1 diabetes onset. Data collected between March and June, 2020, from five paediatric inpatient units from four National Health Service Trusts in London, UK, indicate an increase in the number of new type 1 diabetes cases in children compared with a typical year, although causality cannot be established at this stage. Important information is likely to emerge from much larger and comprehensive datasets. To this end, in June, 2020, an international group of diabetes experts announced the launch of CoviDIAB, a global registry of COVID-19-related diabetes. This registry aims to investigate the extent and pathogenesis of new-onset diabetes and metabolic dysfunction in pre-existing patients with diabetes to help uncover novel mechanisms of disease and define the best interventions.

Understanding the bidirectional interactions between diabetes and COVID-19 will be crucial to help to protect and manage people with diabetes or at high risk of metabolic dysfunction. As rates of diabetes and other non-communicable diseases (NCDs) continue to increase worldwide, now more than ever, NCD prevention and control must be a priority. ■ *The Lancet Diabetes & Endocrinology*



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For more on COVID-19 clinical outcomes and mechanisms in people with diabetes see [Review Lancet Diabetes Endocrinol 2020; 8: 782–92](#)

For management of diabetes in patients with COVID-19 see [Personal View Lancet Diabetes Endocrinol 2020; 8: 546–50](#)

For association of severe COVID-19 outcomes by diabetes type see [Articles](#) page 813

For risk factors and COVID-19 mortality by diabetes type see [Articles](#) page 823

For metabolic complications of diabetes in COVID-19 patients see <https://dom-pubs.onlinelibrary.wiley.com/doi/full/10.1111/dom.14057>

For new-onset type 1 diabetes in children see [Diabetes Care 2020; published online Aug 17. https://doi.org/10.2337/dc20-1551](#)

For the CoviDIAB registry see <http://covidiab.e-dendrite.com>