Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Overall, the SURPASS-4 trial widens the indications for tirzepatide to include the treatment of type 2 diabetes in a population who have had diabetes for longer, and who are taking multiple diabetes medications including sulfonylureas. The prospect of a weekly injectable treatment with demonstrably better glycaemic control, clinically significant weight loss, and reduced hypoglycaemia risk makes tirzepatide a compelling alternative to the tried-and-trusted insulin glargine, and a worthy competitor to weekly GLP-1 analogues in this context.

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Nowcasting towards sustainable SARS-CoV-2 endemicity

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Unlike vetting pharmaceuticals, for which there are well defined requirements of laboratory investigations and animal studies followed by clinical trials, public health policies are much less routinely pretested by table-top simulations or pilot runs. This divergence in evidentiary burden between drugs and policies is particularly jarring because policies almost always affect entire populations, whereas the target patients for pharmaceuticals are usually a small subset of the population. The gravity of this paradox is especially acute during the exigency of a pandemic. However, it would be unrealistic to expect overwhelmingly robust evidence before the proposed policy intervention must be enacted, usually to avert a set of irreversibly bad outcomes. Thus, models can have a useful role by nowcasting what is the situation and forecasting what might become the situation given certain decisions.

Nowcasting and forecasting assess pathogenic, epidemiological, clinical, and sociobehavioural characteristics of an ongoing outbreak, providing situational assessment to inform decisions on responses for disease control.[1] For example, within 4 weeks of the initial report of the Wuhan cluster by the end of January, 2020, using a simple metapopulation transmission model, Wu and colleagues[2] provided the first evidence demonstrating the pandemic potential of SARS-CoV-2, before WHO declared it a public health emergency of international concern or even before the pandemic was named COVID-19. Soon after the first COVID-19 wave started to hit Europe and then the USA, Kissler and colleagues[3]

Hollie Adams/Stringer/Getty Images

built a deterministic model of multiyear interactions between existing coronaviruses to forecast the potential epidemic dynamics in the ensuing 5 years, projecting endemicity as the most likely equilibrium state.

The UK Government has been exemplar by putting in place a technical advisory structure—the Scientific Advisory Group for Emergencies (SAGE)—to provide timely and coordinated scientific advice in support of UK cross-government decisions in the Cabinet Office Briefing Rooms. The Scientific Pandemic Influenza Group on Modelling (SPI-M) under SAGE commissioned assessments by modelling groups, including by Raphael Sonabend and colleagues, to inform and assess the roadmap out of lockdown in England. In their mathematical modelling study in *The Lancet*, Sonabend and colleagues[4] retrospectively assessed the incremental impact of steps one to three of the roadmap (reopening of schools; outdoor hospitality and non-essential retail reopening; and indoor hospitality reopening) and prospectively explored the effect of step four (ie, lifting all remaining restrictions). They also assessed the effect of the SARS-CoV-2 delta variant (B.1.617.2) and potential future epidemic trajectories.

Sonabend and colleagues[4] found that England's high vaccination coverage proved a successful offset against increased transmission and severe outcomes from the lifting of public health and social measures of steps one to three. In particular, the unpopular 1-month delay in implementing step four probably resulted in two-thirds fewer deaths at the peak according to the study's counterfactual analysis. These findings show that the risk of a large number of COVID-19 hospital admissions resulting from lifting non-pharmaceutical interventions can be substantially mitigated if the timing of non-pharmaceutical intervention relaxation is carefully balanced against vaccination coverage. But they also report that with the emergence of the delta variant, fully lifting non-pharmaceutical interventions on June 21, 2021, as originally planned, might have led to 3900 (95% credible interval [CrI] 1500–5700) peak daily hospital admissions under their baseline parameter scenario. Delaying until July 19 reduced peak hospital admissions by three fold to 1400 (95% CrI 700–1700) per day.

Modelling is always fraught with uncertainties, arising from data availability and quality, stochasticity, parameter estimation, model specification, and dynamic change.[5] Failure to explore and explicate any one of these uncertainties explains why models are often discredited as unreliable or biased. By accounting for the major drivers of uncertainty—ie, vaccination coverage and multiple SARS-CoV-2 variants in this case—the research team was able to capture real-life fidelity. However, Sonabend and colleagues also acknowledged large residual uncertainty about their forecast for the upcoming autumn and winter wave mostly in relation to vaccine deployment strategy (eg, additional doses and expanding coverage to younger groups) and effectiveness against delta or other variants that might replace it.

Three further caveats bear mention. First, even if SPI-M could always produce models that give robust and timely scientific input for decision making, whether, when, and how that advice is translated, or not, into policy intervention is where science ends and realpolitik begins. The advice SAGE provides does not necessarily represent or end up as official government policy, as is evident from Jeremy Farrar's authoritative insider's account[6] and the UK Parliament's House of Commons Health and Social Care and Science and Technology Committees' recent inquiry and report *Coronavirus: Lessons Learned to Date*.[7]

Second, the nature of pandemics dictates that a population will only be safe when every population is safe. The two residual uncertainties highlighted by the authors share major dependencies with the rest of the world. Every additional COVID-19 vaccine dose administered in England is a dose that would not be available for another recipient, mostly in low-income and middle-income countries, which are still dangerously undervaccinated. New SARS-CoV-2 variants emerge when transmission is widespread and treatment is suboptimal. Delta first emerged in India. Moreover, we still do not have sufficient COVID-19 vaccine effectiveness data to properly define an adequate primary vaccine schedule for different population groups, let alone work out how best to deploy second-generation or third-generation vaccines to bring about sustainable endemicity for the entire world in the long term.

Furthermore, the differing rates of the shift toward endemicity between countries will continue to challenge pandemic policy making by individual governments, complicate optimal vaccine distribution, and exacerbate global supply chain disruption, from energy to goods to services.

For **Our World in Data COVID-19 vaccine doses administered per 100 people** see https://ourworldindata.org/grapher/covid-vaccination-doses-per-capita?tab=map&country=Europe~Africa~North+America~South+America~Asia~Oceania~Low+income~High+income~Lower+middle+income~Upper+middle+income

Modelling, when executed well like the present study by Sonabend and colleagues and deployed judiciously, can have a positive impact on population health protection. Modelling has already made an enormous contribution to the COVID-19 response. However, much work lies ahead still.

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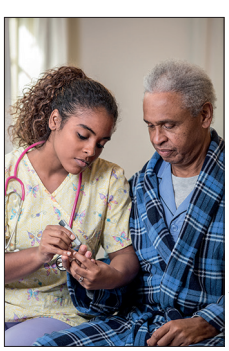
By any means necessary: why lowering insulin prices is relevant to racial health equity

When young revolutionaries in the 1960s sought to free Black people in the USA from lives of structured racism (ie, the differential access to opportunity, goods, and services by race) "by any means necessary",[1] few people imagined this movement might one day include efforts to overcome exorbitant insulin prices. Yet organisations such as the Black Panther Party (BPP) understood long ago how poverty and other structural inequities lead to worse health, and were instrumental in creating a framework for cross-sector collaboration to address health disparities in low-income Black communities.[2] Former BPP member and long-time US Representative Bobby L Rush introduced the Insulin Access for All Act of 2019, currently active under the Affordable Insulin for the COVID-19 Emergency Act (US House of Representatives Bill number 2179), to "address the appalling issue plaguing Americans who have one of the most devastating and debilitating diseases of modern times: diabetes".[3] The legislation would prohibit out-of-pocket costs (eg, copays and deductibles) for insulin for people with diabetes.[3]

This legislation is part of a surge of activity at the state and federal level in the past several years to address the substantial increase in insulin prices within the USA in the past decade, in contrast to the stable prices in other high-income countries. Between 2002 and 2013, the mean price per mL of insulin in the USA increased by 197%, outpacing oral medications for diabetes, including DPP-4 inhibitors.[4] The price of metformin for type 2 diabetes decreased by 93% during the same interval.[4] In an extreme case, one vial of the rapid-acting insulin analogue lispro increased more than 1000% in price between 1999 ($21) and 2019 ($332) in the USA.[5]

Medicare, which provides insurance coverage to older or disabled people in the USA, launched a pilot programme to limit insulin costs to $35 per month.[6] Pending legislation under the Affordable Insulin for the COVID-19 Emergency Act would ensure that insulin-dependent Medicare beneficiaries would receive insulin and associated supplies without any out-of-pocket expenses for the duration of the COVID-19 emergency.[7] Eight states have already passed laws limiting insulin copayments to $100 or less per month, some with associated legislation to report on insulin pricing practices and with recommendations to increase affordability.[8] Many other states have active legislation underway to cap insulin copayments.[8]

These efforts are beginning to help a substantial portion of people with diabetes in the USA, as 30% of people with type 2 diabetes take insulin and all people with type 1 diabetes require it to live.[9] One in four Americans who take insulin report reducing their dose or stopping it altogether because of cost.[10]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