Public Health Insights into Diabetes and COVID 19

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Introduction

- Initial work looking at risk of COVID-19 using the National Diabetes Audit
- Implications of COVID-19 for people with diabetes
- Implications of COVID-19 restrictions and changes
- Future implications – in a post 2020 world
- My personal thoughts

First wave

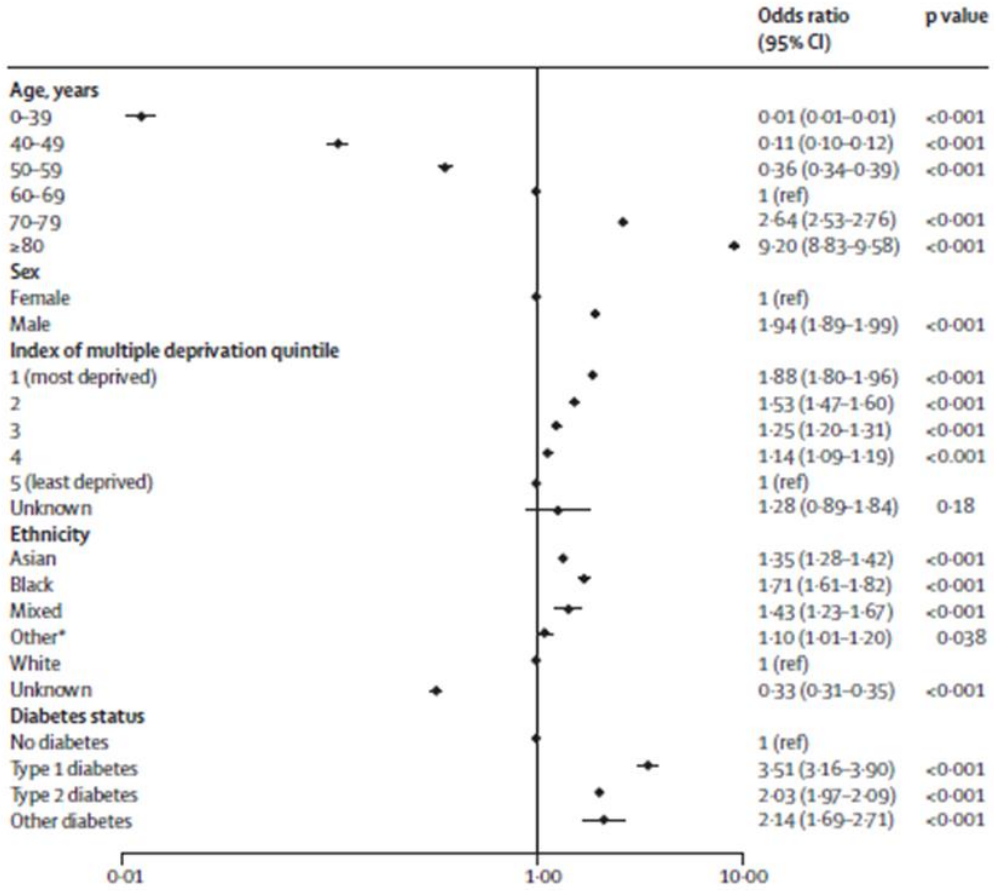
First stages of the pandemic

- Little evidence of risk for people with diabetes
  - Mainly small studies of people hospitalised with COVID-19
  - No population based assessment of risk

National Diabetes Audit

- Linked to weekly death registrations (approx. 10 day time lag)
- Identified a cohort alive on 16th Feb 2020 and deaths up to 11th May 2020
  - 464 deaths related to COVID-19 in 264,390 people with Type 1 diabetes
  - 10,525 deaths related to COVID-19 in 2,874,020 people with Type 2 diabetes

Risk compared to those without diabetes



- Adjusted for age, sex, deprivation, ethnicity and region, the odds for in-hospital death with COVID-19 compared to the population without diabetes were:
  - 3.51 (95% CI: 3.16-3.90) in people with type 1 diabetes and
  - 2.03 (95% CI: 1.97-2.09) in people with type 2 diabetes

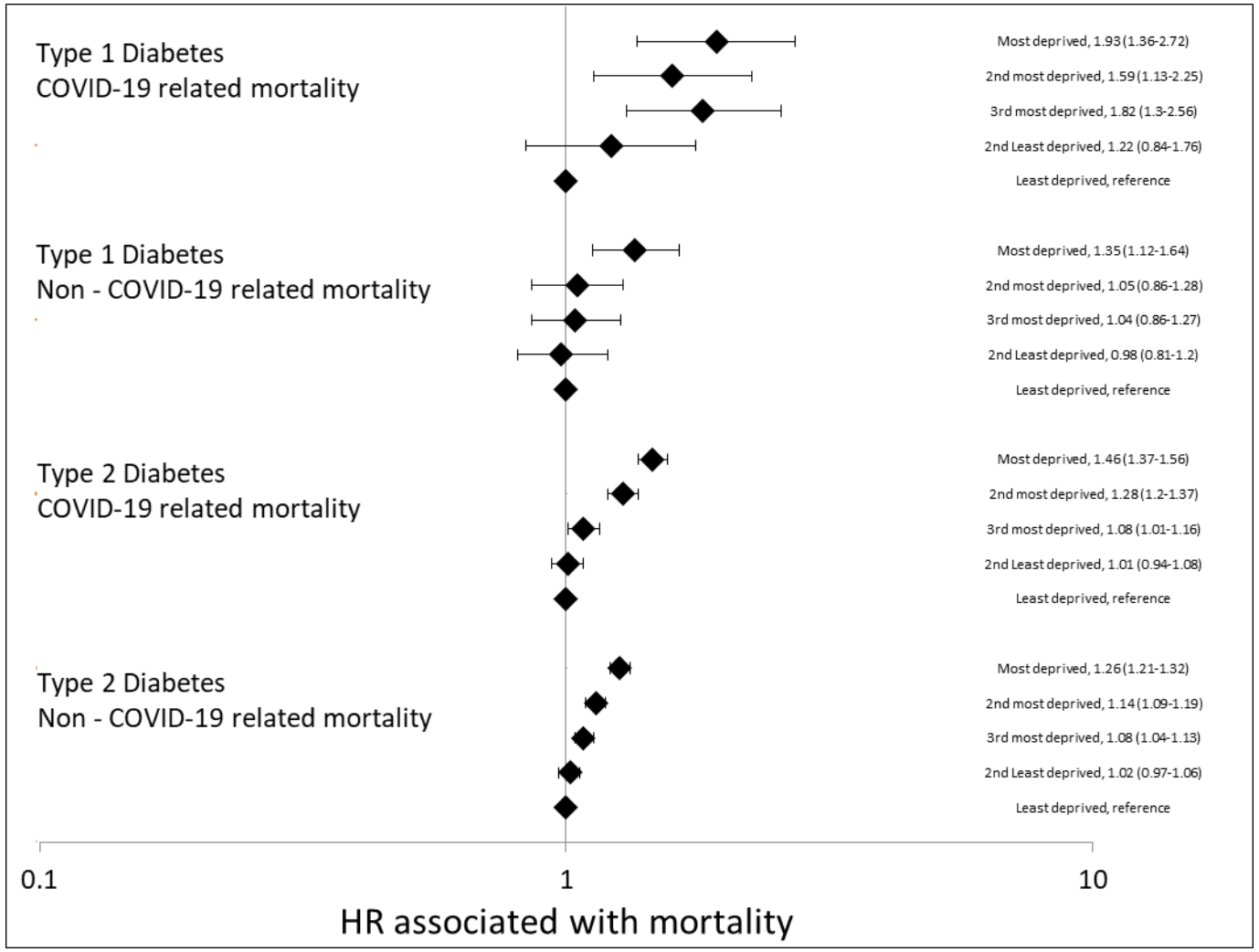
Associations of type 1 and type 2 diabetes with COVID-19-related mortality in England: a whole-population study - PubMed (nih.gov)

Risks within those with diabetes

- Male sex was associated with a higher hazard of death
  - HR for males 1.61 (1.32-1.91) in Type 1, 1.61 (1.54-1.67) in Type 2
  - Higher than found in non-COVID-19 related deaths
- Mortality increased as age increased
  - HR compared to aged 60-69 for 70-79 was 1.89 (1.42-2.52) in Type 1, 1.94 (1.81-2.08) in Type 2
  - HR compared to aged 60-69 for 50-59 was 0.52 (0.37-0.73) in Type 1, 0.52(0.47-0.58) in Type 2
  - Similar to non-COVID-19 related deaths

Risk factors for COVID-19-related mortality in people with type 1 and type 2 diabetes in England: a population-based cohort study - PubMed (nih.gov)

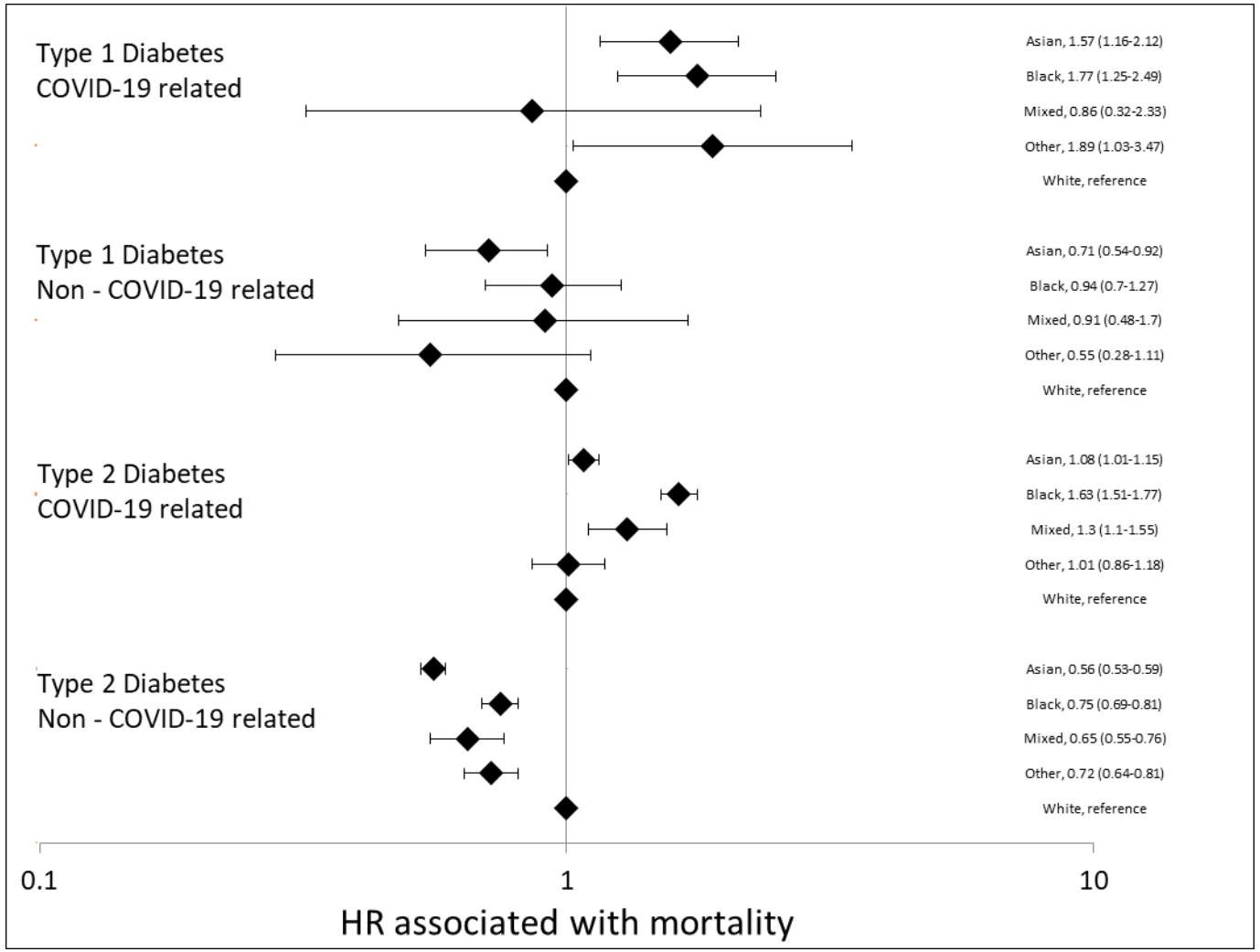
Deprivation



- Clear deprivation gradient in risk of COVID-19 related mortality
- Steeper than found in non-COVID-19 related deaths

[Risk factors for COVID-19-related mortality in people with type 1 and type 2 diabetes in England: a population-based cohort study - PubMed (nih.gov)]

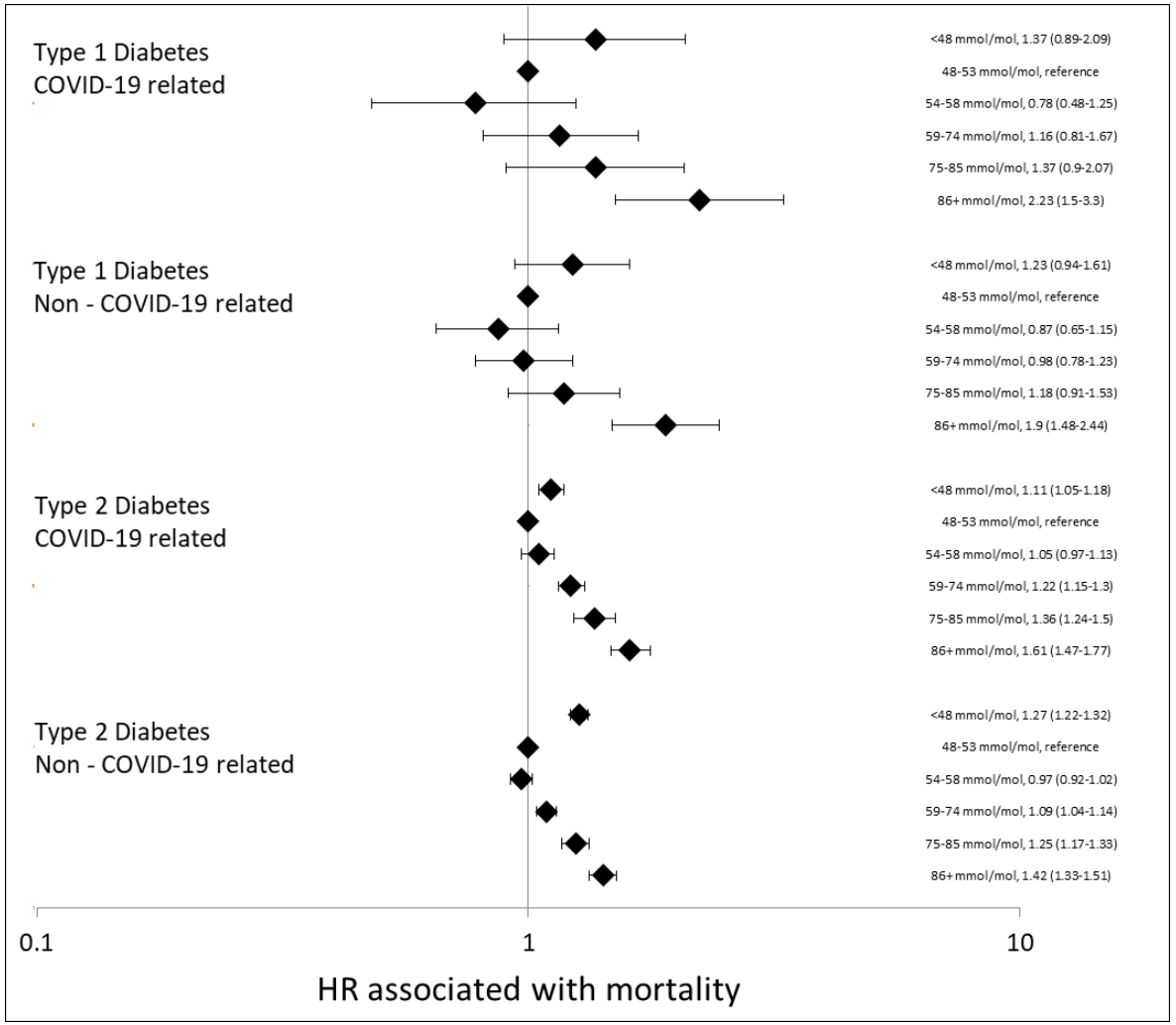
Ethnicity



- Higher risk of COVID-19 mortality in people from Asian and Black ethnic groups
- In contrast to the lower mortality for non-COVID-19 related mortality in these groups
- Difference in more pronounced in those aged <70
  - HR for Asian 1.48 (1.30-1.69) for Asian and 2.25 (1.93-2.64) for Black ethnicity in those with Type 2 diabetes

[Risk factors for COVID-19-related mortality in people with type 1 and type 2 diabetes in England: a population-based cohort study - PubMed (nih.gov)]

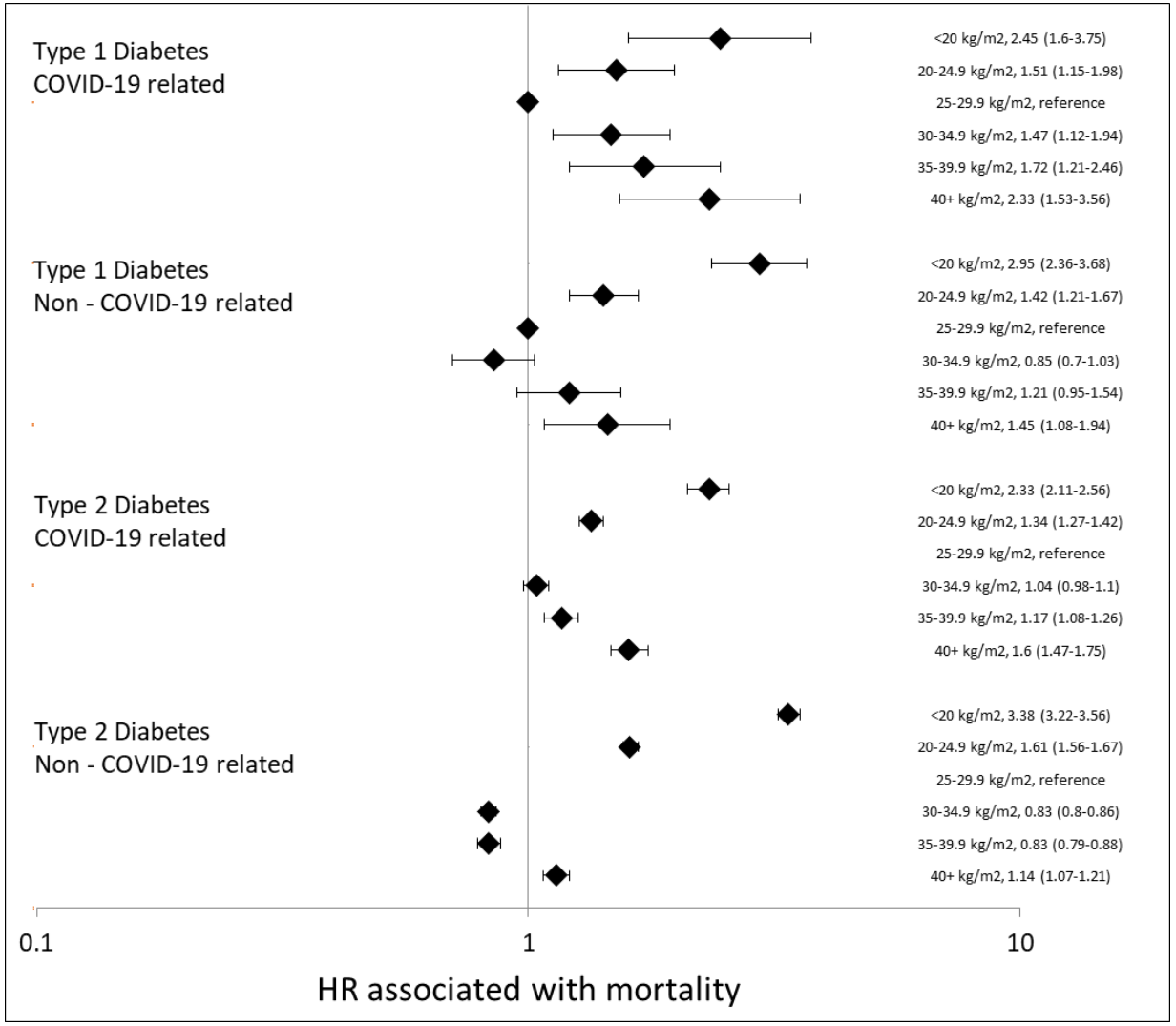
HbA1c



- J-shaped relationship between COVID-19 related mortality and HbA1c
- Similar to non-COVID-19 related mortality but HR lower for HbA1c <48 mmol/mol and higher for 86+mmol/mol
- Steeper curve in those aged <70 years
  - HR for 86+mmol vs 48-53mmol/mol 1.98 (1.65-2.37) for aged <70 compared to 1.48 (1.32-1.65) aged 70+ in people with Type 2 diabetes

Risk factors for COVID-19-related mortality in people with type 1 and type 2 diabetes in England: a population-based cohort study - PubMed (nih.gov)

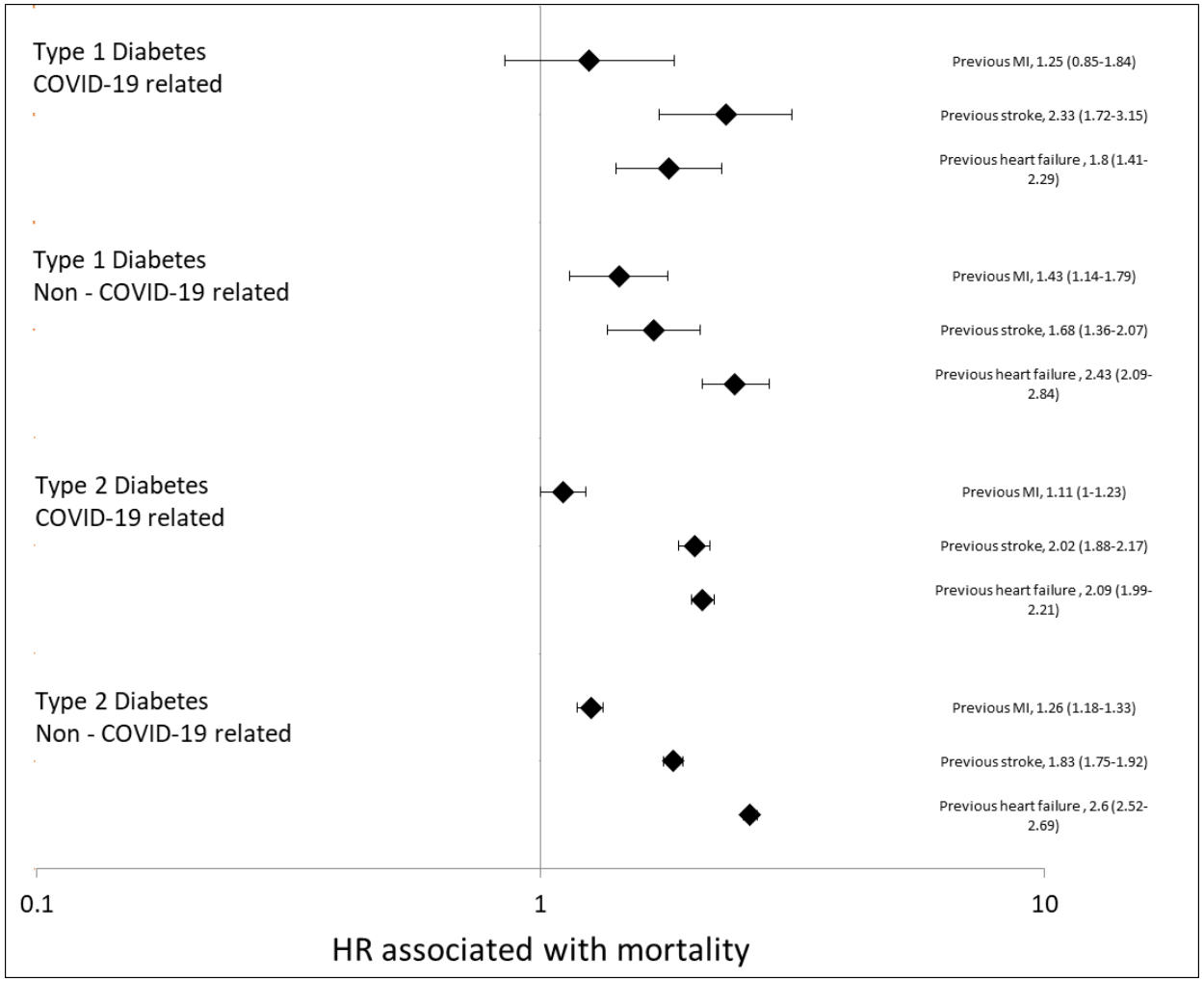
Body mass index



- Familiar U shaped relationship with COVID-19 mortality and BMI
- But clear increase in risk as BMI rises above 30 kg/m^2 in those with Type 2 diabetes
- In those aged <70 HR associated with a BMI of 40+ kg/m^2 rises to 4.44(2.44-8.1) in Type 1 and 2.30 (1.97-2.68) in Type 2

Risk factors for COVID-19-related mortality in people with type 1 and type 2 diabetes in England: a population-based cohort study - PubMed (nih.gov)

Previous cardiovascular disease

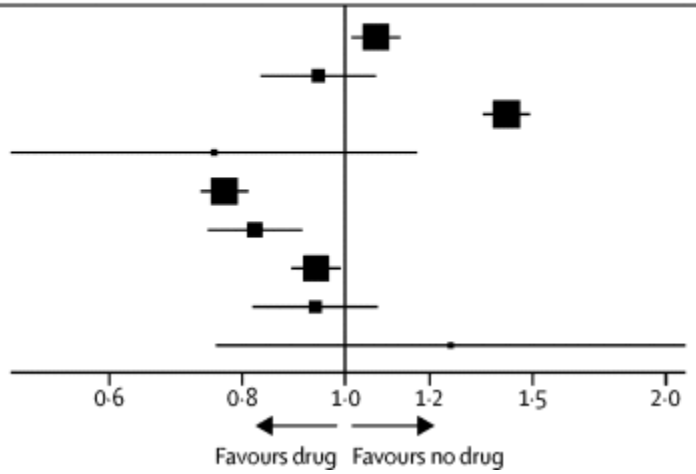


- Previous cardiovascular disease was associated with higher COVID-19 related mortality
- But association is weaker than found in non-COVID-19 related mortality
- Statin prescription and systolic blood pressure >140 mmHg associated with lower COVID-19 mortality
- Prescription for anti-hypertensive drugs associated with slightly higher COVID-19 mortality
  - (HR 1.10 (0.81-1.49 in Type 1, 1.09 (1.02-1.16) in Type 2)

[Risk factors for COVID-19-related mortality in people with type 1 and type 2 diabetes in England: a population-based cohort study - PubMed (nih.gov)]

Glucose lowering drugs

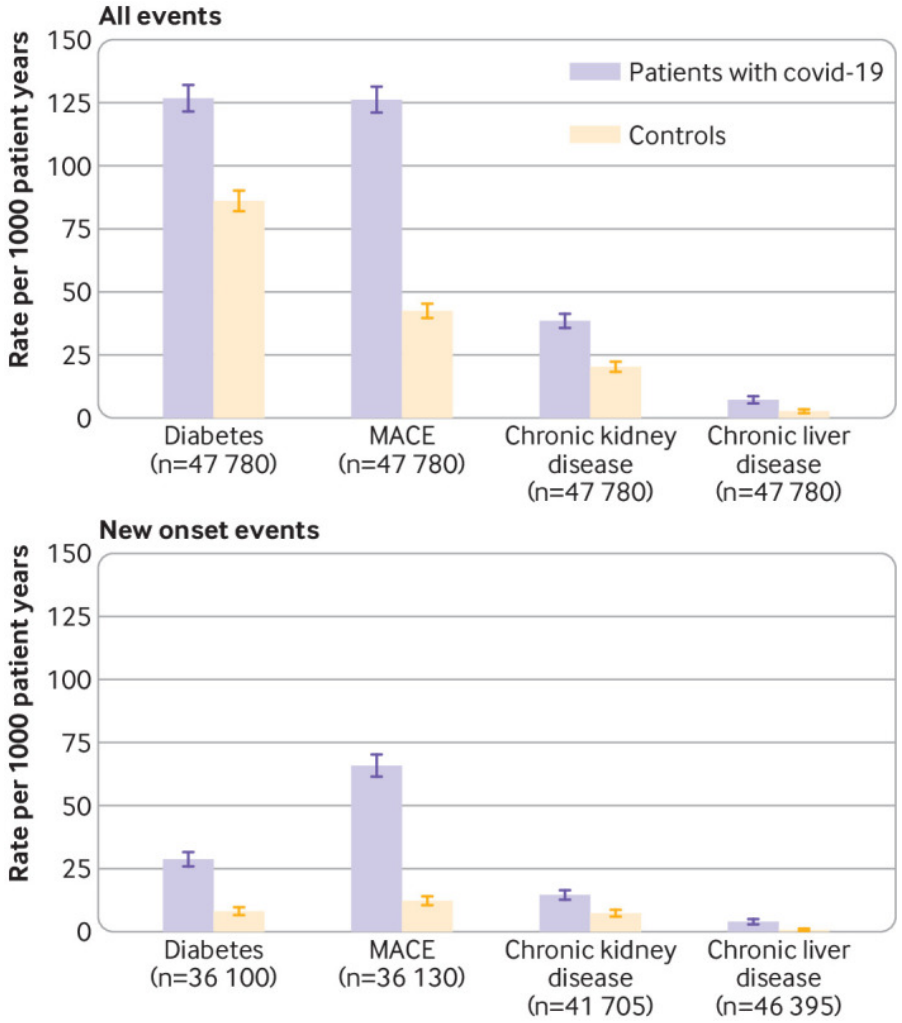
	n/N	Mortality rate per 1000 person-years		Adjusted hazard ratio (95% CI)
		No drug	Drug	
DPP-4 inhibitors	2733/479555	8·5	9·1	1·07 (1·01–1·13)
GLP-1 receptor agonists	279/100820	9·1	8·6	0·94 (0·83–1·07)
Insulin	2825/350960	8·0	11·3	1·42 (1·35–1·49)
Meglitinides	20/4440	8·9	6·7	0·75 (0·48–1·17)
Metformin	6295/1800005	12·9	9·9	0·77 (0·73–0·81)
SGLT2 inhibitors	458/266505	9·5	7·8	0·82 (0·74–0·91)
Sulfonylureas	2628/561290	8·9	8·4	0·94 (0·89–0·99)
Thiazolidinediones	226/60085	8·9	8·3	0·94 (0·82–1·07)
α-Glucosidase inhibitors	15/1665	8·9	11·2	1·26 (0·76–2·09)



'Our results provide evidence of associations between prescription of some glucose-lowering drugs and COVID-19-related mortality, although the differences in risk are small and these findings are likely to be due to confounding by indication, in view of the use of different drug classes at different stages of type 2 diabetes disease progression. In the context of the COVID-19 pandemic, there is no clear indication to change prescribing of glucose-lowering drugs in people with type 2 diabetes.'

Prescription of glucose-lowering therapies and risk of COVID-19 mortality in people with type 2 diabetes: a nationwide observational study in England - PubMed (nih.gov)

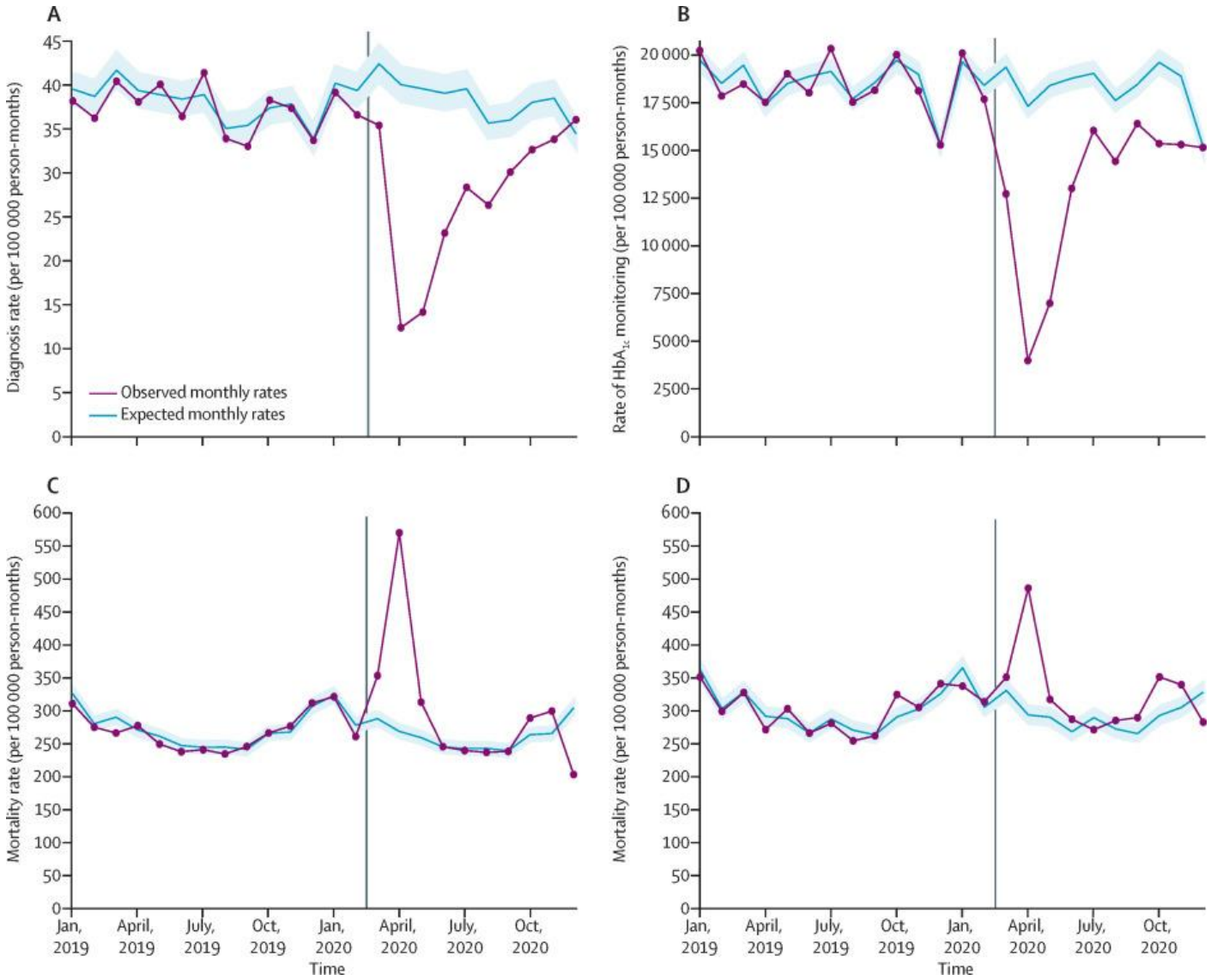
Implications of SARS-COV-2 infection



- Higher risk of multiorgan dysfunction following COVID-19
- But controls are 'general population'
  - Highlights the need to consider whether it is Covid-19 specific

[Post-covid syndrome in individuals admitted to hospital with covid-19: retrospective cohort study - PubMed (nih.gov)]

Implications of lockdown



[Impact of COVID-19 on diagnoses, monitoring, and mortality in people with type 2 diabetes in the UK - PubMed (nih.gov)]

Risk factor control

- Analysis of primary care data submitted to the NDA by calendar year

	Type 1		Type 2 and other	
	2019	2020	2019	2020
HbA1c measured	76.4%	66.5%	89.9%	79.6%
Feet examined	62.1%	42.2%	76.1%	52.0%
All 8 care processes	31.1%	19.4%	49.5%	29.3%
HbA1c<58mmol/mol	32.1%	34.1%	66.2%	63.9%
All 3 targets	19.8%	21.2%	39.0%	36.3%

  - Note – provisional data and characteristics or trends in individuals have not been explored
- Higher BMI in those referred to the Diabetes Prevention Programme

[Effect of the COVID-19 pandemic on body weight in people at high risk of type 2 diabetes referred to the English NHS Diabetes Prevention Programme - PubMed (nih.gov)]

Amputations

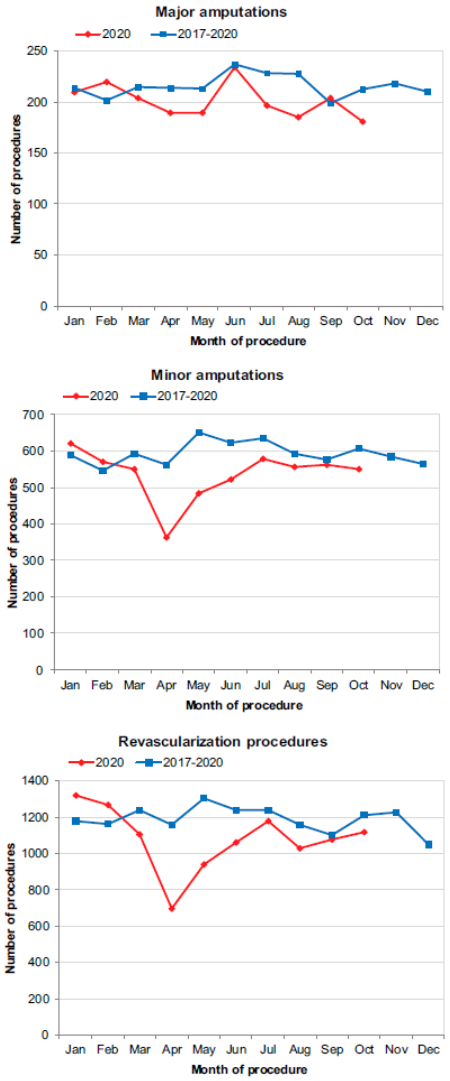


Figure 1—Number of lower-limb major and minor amputation and revascularization procedures in people with diabetes between January 2017 and October 2020 in England by month of procedure.

- Number of major amputations, minor amputations and revascularisation procedures in the first wave
  - Decline compared to mean for previous three years
  - No evidence of 'rebound'
- Need to consider
  - Clinical presentations
  - Service variation/culture

[Temporal Trends in Lower-Limb Major and Minor Amputation and Revascularization Procedures in People With Diabetes in England During the COVID-19 Pandemic - PubMed (nih.gov)]

Wider implications

- Proven that system can provide very rapid analysis when needed
- Health inequalities
  - Need to think about the interaction between social/economic policies and health
- Challenges of ‘answering’ questions
- Old problems, new perspective
- Longer term implications of
  - SARS-CoV-2 infection
  - Changes due to lockdown
  - Wider societal shifts