# COVID-19: The secondary harms Excess weight and COVID-19

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Local Government Association: Tackling obesity during the COVID-19 pandemic        20th  July 2020

# Association between BMI and all-cause mortality

Association between BMI and all-cause mortality among never-smokers, by sex (A) and age (B)

5-year exclusion period applied for person-time and events after a BMI record; estimates adjusted for age, deprivation, calendar year, diabetes, and alcohol status (all as defined at date of BMI measure) and stratified by sex. HR=hazard ratio.
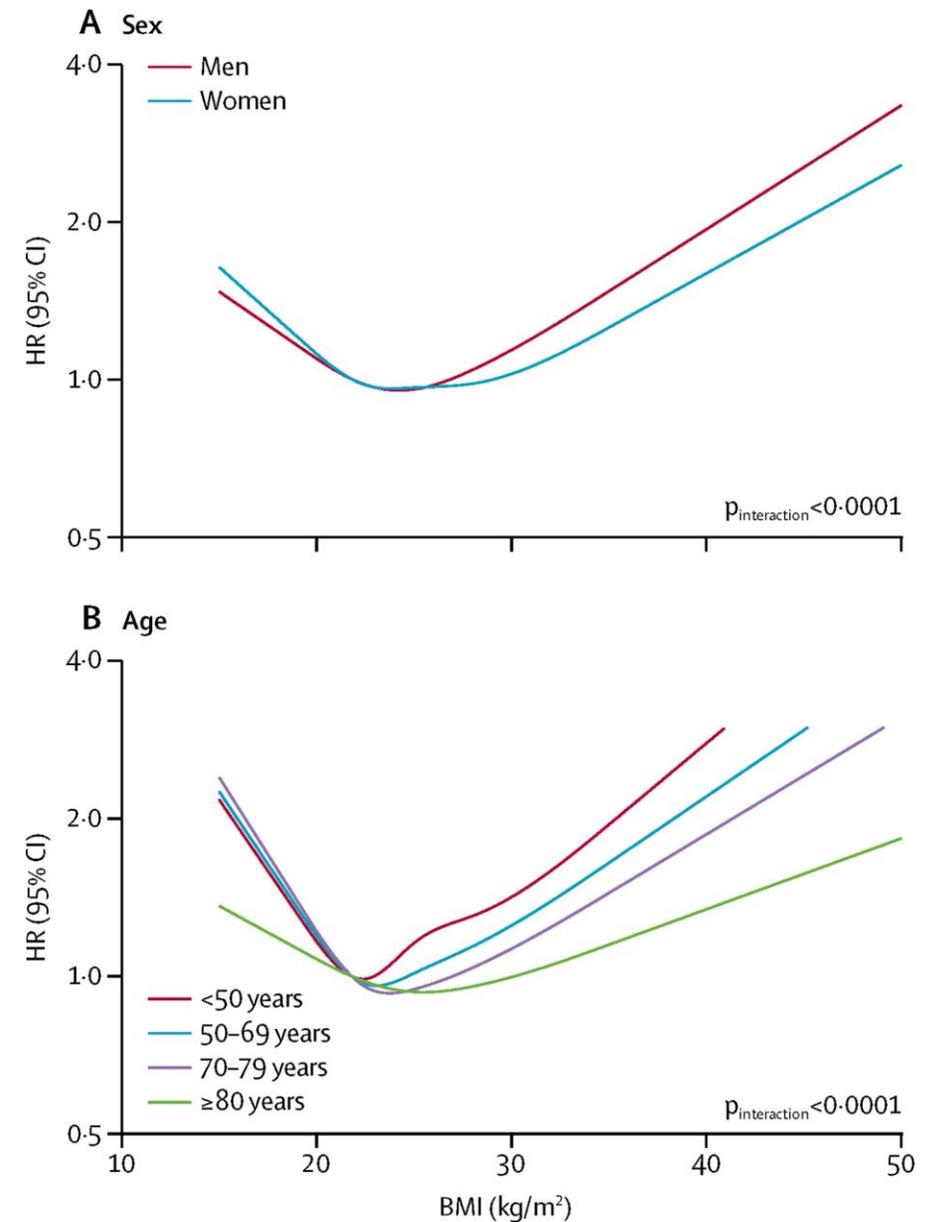
# Adult obesity prevalence by deprivation

- **Women and men living in the most deprived areas are more likely to be obese than those living in the least deprived areas; >34% vs 20% for both genders respectively.**
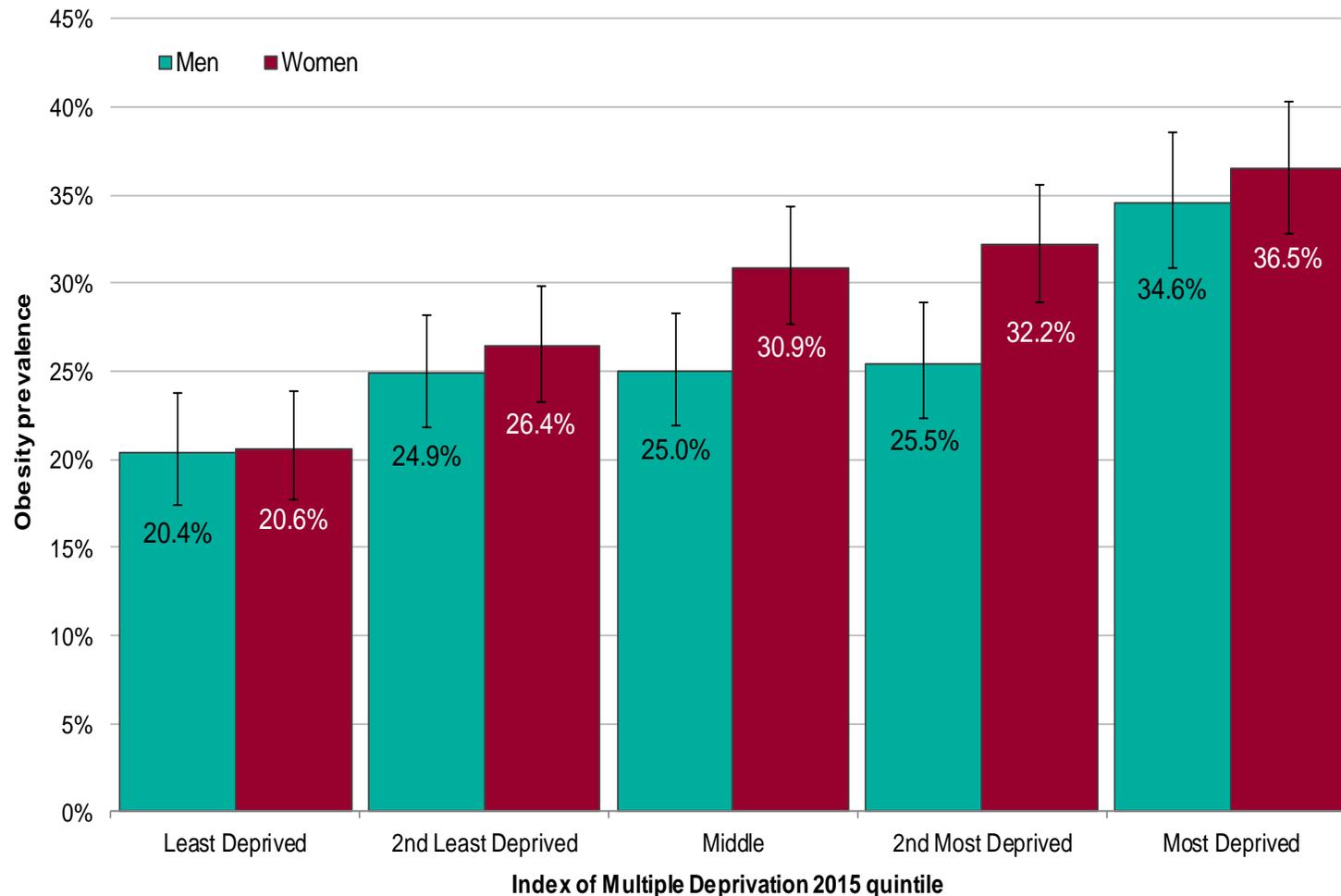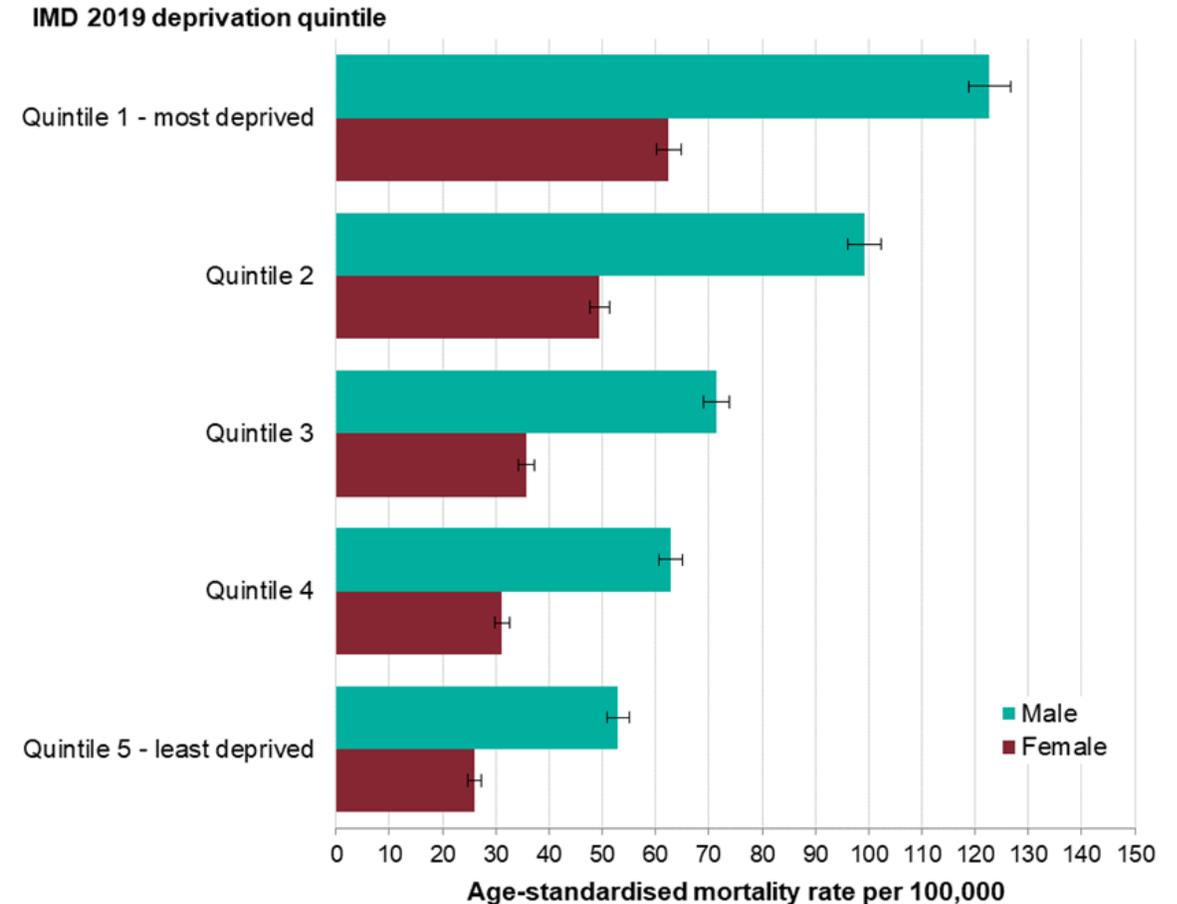


Obesity prevalence is age standardised

95% confidence intervals are shown
Adult (aged 16+) obesity: BMI ≥ 30kg/m$^2$

# COVID-19 and Deprivation

**PHE review of disparities in risks and outcomes**

- Among people of working age (20 to 64), people living in the most deprived areas of the country were almost twice as likely to die than those living in the least deprived.

- Men and women in the most deprived quintile are 2.3 times and 2.4 times more likely to die compared to least deprived.

**IMD 2019 deprivation quintile**



Age standardised death rates in laboratory confirmed COVID-19 cases by deprivation quintile and sex, as of 13 May 2020, England
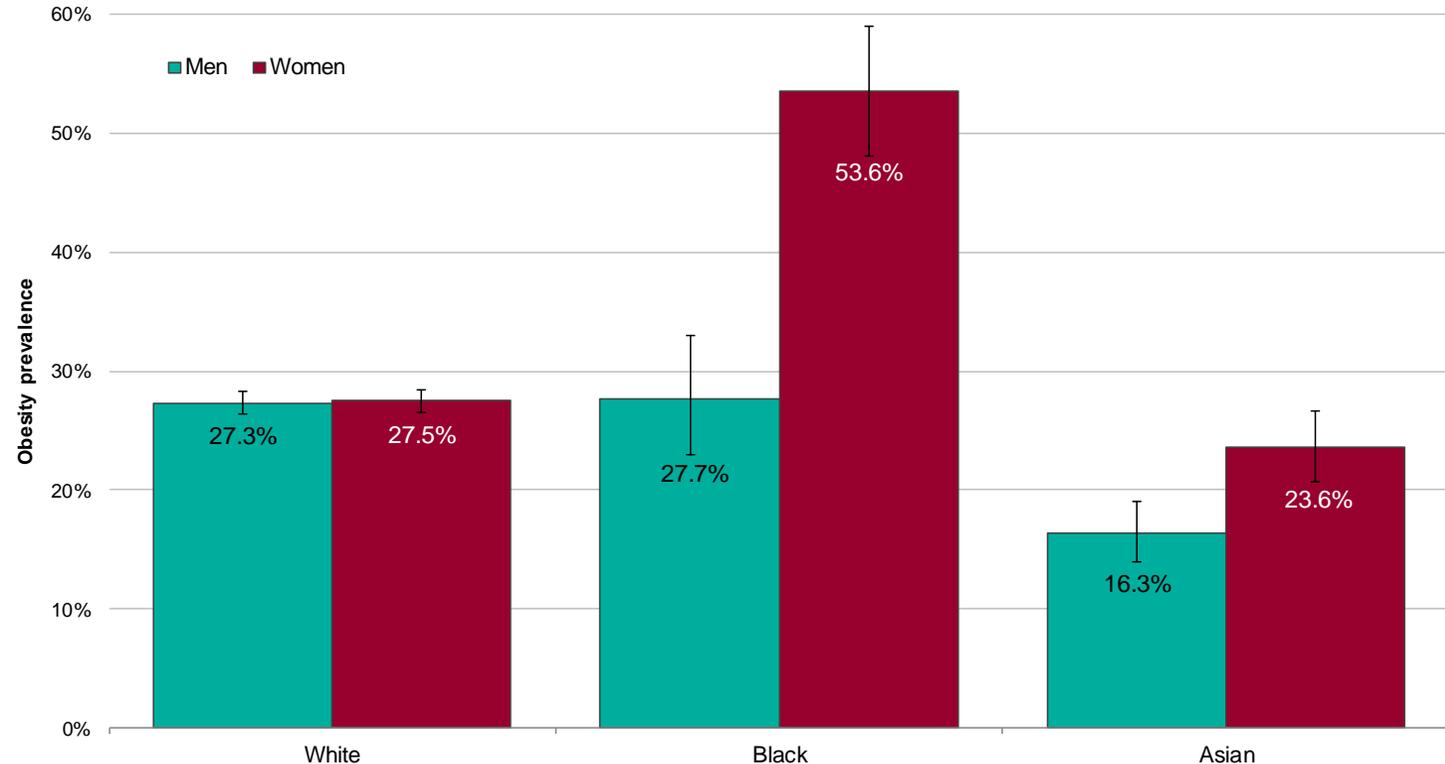
Source: Public Health England COVID-19 Specific Mortality Surveillance System

# Adult obesity prevalence by ethnic group

Health Survey for England 2017

**BAME groups are at an equivalent risk of type 2 diabetes, other health conditions or mortality, at a lower BMI than the white European population.**

NICE guidance indicates that using lower thresholds (23 kg/m$^2$ to indicate increased risk and 27.5 kg/m$^2$ to indicate high risk) for BMI to trigger action to prevent type 2 diabetes among Asian (South Asian and Chinese) populations.



Obesity prevalence is age standardised

95% confidence intervals are shown
Adult (aged 16+) obesity: BMI ≥ 30kg/m$^2$

Health Survey for England 2017; National Institute for Health and Care Excellence. (2013). BMI: preventing ill health and premature death in black, Asian and other minority ethnic groups. Public Health Guideline 46. https://www.nice.org.uk/guidance/ph46/chapter/1-recommendations

# Covid-19 and Ethnicity

**PHE review of disparities in risks and outcomes**

- The highest age standardised death rates in confirmed cases were in people in the Other and Black ethnic groups, and were lowest in the White ethnic groups.

Age standardised mortality rates in laboratory confirmed COVID-19 cases by ethnicity and sex, as of 13 May, England
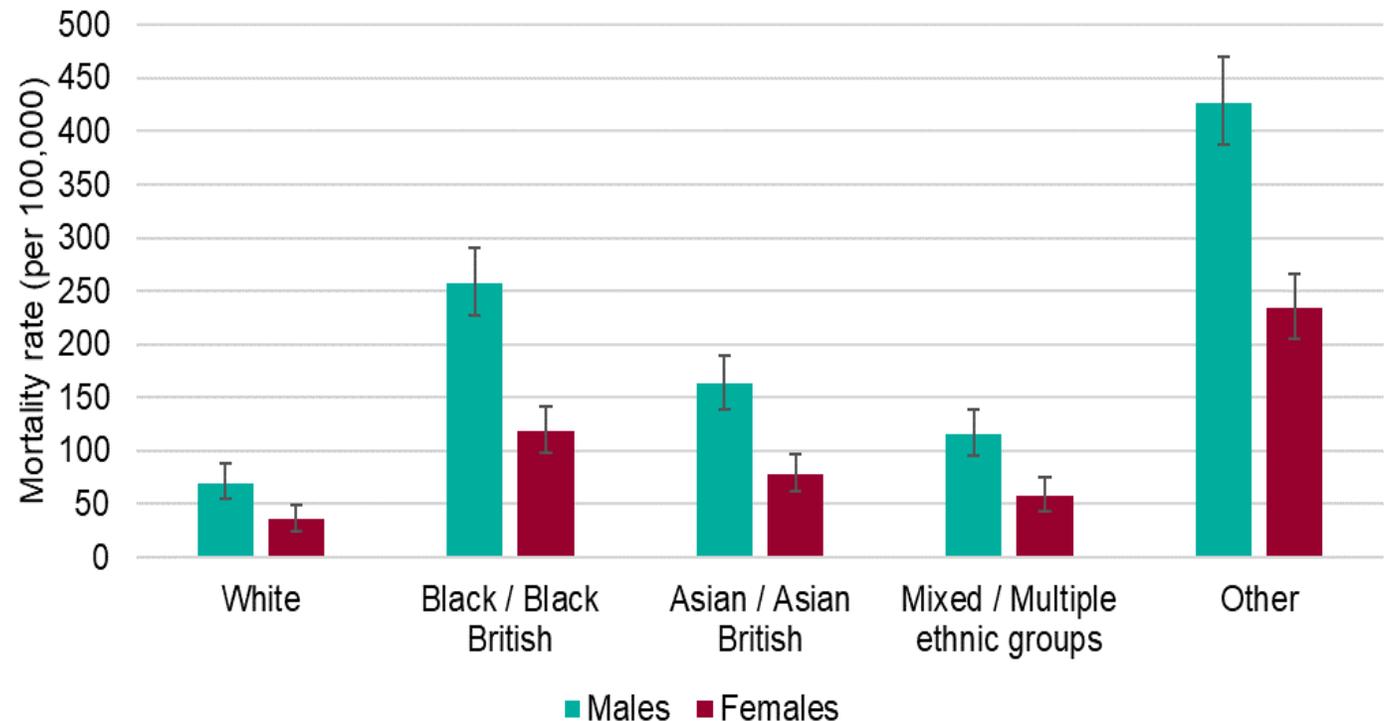


Source: Public Health England COVID-19 Specific Mortality Surveillance System

# Covid-19, Comorbidity and death

**PHE review of disparities in risks and outcomes**

- All of these conditions were more likely to be mentioned on a death certificate when COVID-19 was also mentioned, than they were for deaths overall. However, for cardiovascular disease, the difference was very small.

Percentage of all deaths, and percentage of COVID-19 deaths where one of the conditions were mentioned, 21 March to 1 May 2020, England

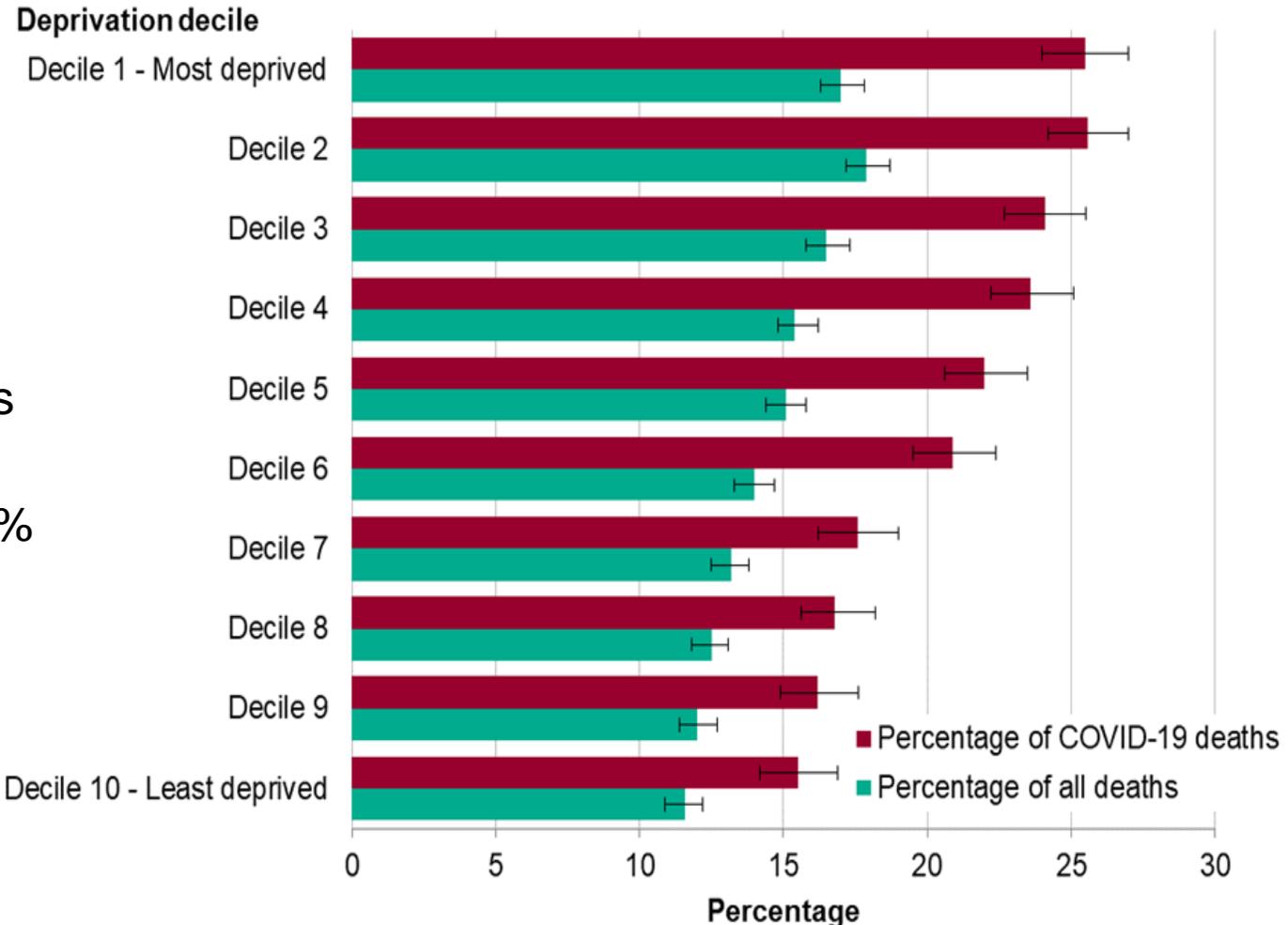| Condition | Percentage of all deaths where condition is mentioned | Percentage of COVID-19 deaths where condition is mentioned |
|---|---|---|
| Cardiovascular disease | 44.1 | 44.5 |
| Diabetes | 14.6 | 21.1 |
| Hypertensive diseases | 14.5 | 19.6 |
| Chronic Kidney Disease | 8.5 | 10.8 |
| Chronic Obstructive Pulmonary Disease | 10.6 | 11.5 |
| Dementia | 23.8 | 25.7 |

Source: Public Health England analysis of ONS death registration data

# Covid-19 and diabetes

**PHE review of disparities in risks and outcomes**

- In the most deprived areas, 26% of COVID-19 deaths also mentioned diabetes

- This is significantly higher than in the least deprived areas (16%)

- Proportion of COVID-19 deaths where diabetes was mentioned ranged from 18% in the White ethnic group to 43% in the Asian group and 45% in the Black group

- **Modifiable factor for T2D is weight, which implies role for weight loss, healthier diet and increased activity**

Source: Public Health England analysis of ONS death registration data

Percentage of COVID-19 deaths where diabetes was also mentioned on the death certificate, by deprivation decile, 21 March and 1 May 2020 England



**Deprivation decile**

Legend:
- Percentage of COVID-19 deaths
- Percentage of all deaths

X-axis: Percentage (0, 5, 10, 15, 20, 25, 30)

Deciles: Decile 1 - Most deprived, Decile 2, Decile 3, Decile 4, Decile 5, Decile 6, Decile 7, Decile 8, Decile 9, Decile 10 - Least deprived

# Covid-19 and diabetes

**Barron et al. (2020) Type 1 and Type 2 diabetes and COVID-19 related mortality in England: a whole population study (*in press*)**

- Analysed data from National Diabetes Audit (98% of GP practices in England) and information on COVID-19 infection for people with Type 1 diabetes and people with Type 2 diabetes, over the period from 1st March 2020 to 11th May 2020

- One third of all deaths in-hospital with COVID-19 occurred in people with diabetes

- People with Type 1 and Type 2 diabetes had 3.50 and 2.03 times the odds respectively of dying in hospital with COVID-19 compared to those without diabetes (adjusted for age, sex, deprivation, ethnicity and geographical region)

- These relative odds were attenuated to 2.86 and 1.81 respectively when also adjusted for previous hospital admissions with cardiovascular comorbidities

# Data from the Intensive Care National Audit and Research Centre (ICNARC)

- 7.9% of patients critically ill in intensive care units were morbidly obese, compared with 2.9% of the general population (after adjusting for age and sex - uses data up to 10th July 2020).

- This disparity was also seen when looking at white and non-white patients separately.

- Once admitted to ICU, analysis indicates an increasing risk of death as BMI increases compared to BMI 30.
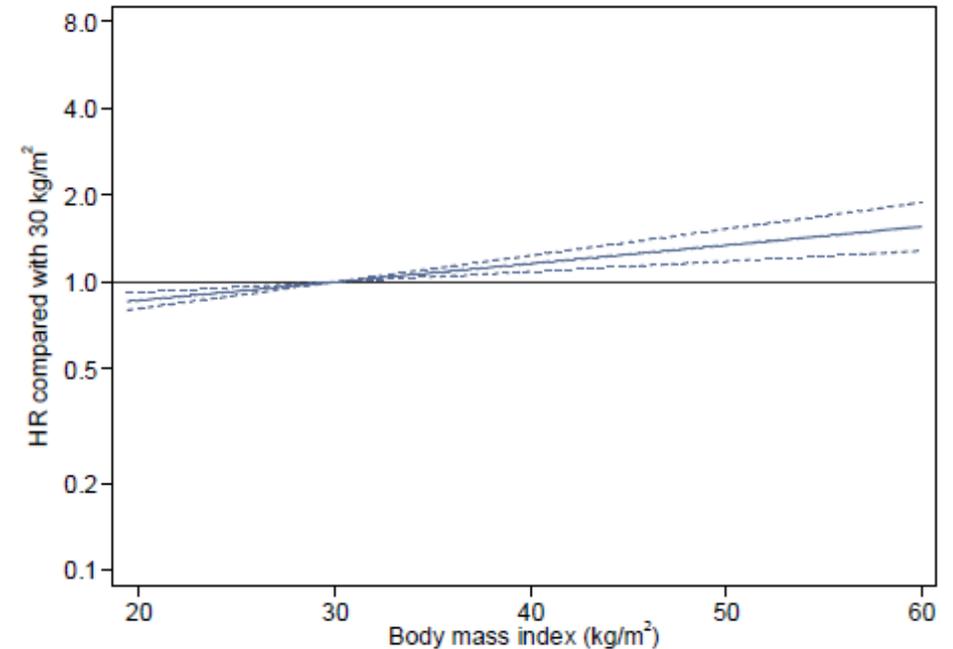


Chart presents hazard ratios and 95% confidence intervals from multi-variate analysis looking at risk for death within 30 days following start of critical care.

# Obesity and Covid-19

The OpenSAFELY Collaborative (2020). Factors associated with COVID-19-related hospital death in the linked electronic health records of 17.3 million adult NHS patients, of which 10,926 Covid-19 deaths

- The analyses reported increased risk and hazard ratios of 1.05 (CI: 1.00-1.11), 1.40 (CI: 1.30-1.52) and 1.92 (CI: 1.72-2.13) for people with a BMI between 30-34.9kg/m$^2$; ≥35-39.9kg/m$^2$ and ≥40kg/m$^2$ respectively (fully adjusted)

- COVID-19-related death was associated with: being male (hazard ratio (HR) 1.59, 95% confidence interval (CI) 1.53–1.65); older age and deprivation (both with a strong gradient); diabetes; severe asthma; and various other medical conditions.

Williamson EJ, Walker AJ, Bhaskaran K, Bacon S, Bates C, Morton CE, Curtis HJ, Mehrkar A, Evans D, Inglesby P, Cockburn J, McDonald HI, MacKenna B, Tomlinson L, Douglas IJ, Rentsch CT, Mathur R, Wong AYS, Grieve R, Harrison D, Forbes H, Schultze A, Croker R, Parry J, Hester F, Harper S, Perera R, Evans SJW, Smeeth L, Goldacre B. OpenSAFELY: factors associated with COVID-19 death in 17 million patients. Nature. 2020 Jul 8. doi: 10.1038/s41586-020-2521-4. Epub ahead of print. PMID: 32640463.Available at: https://pubmed.ncbi.nlm.nih.gov/32640463/ [accessed 16 July]

# Linked dataset of COVID-19 test data with Biobank (Hamer et al).

- Not published when Disparities report was written

- Uses test data at a time when testing was mainly taking place in hospitals. Tests between 16th March and 26th April 2020.

- Assumption is that a positive test signifies hospitalisation with COVID-19 (i.e. a severe case)

- Table showing results from model. Relative risks compared to healthy weight for model 2 were:
  - 1.32 (95% confidence interval of 1.09-1.60) for those who were overweight
  - 1.97 (1.61-2.42) for those who were obese

Link to paper
https://www.medrxiv.org/content/10.1101/2020.05.09.20096438v1.full.pdf

**Table 2. Combined and individual lifestyle behavioral risk factors in relation to COVID-19 hospitalisation (N=387,109)**

| Total lifestyle score | CASES/N | Relative Risk (95% CI) | |
|---|---|---|---|
| | | Model 1 | Model 2 |
| 0 (optimal) | 13 / 19,776 | 1.0 (ref) | 1.0 (ref) |
| 1 | 55 /52,053 | 1.58 (0.86, 2.59) | 1.48 (0.81, 2.71) |
| 2 | 142/ 77,861 | 2.73 (1.55, 4.81) | 2.43 (1.38, 4.29) |
| 3 | 163/ 87,998 | 2.76 (1.57, 4.85) | 2.41 (1.37, 4.25) |
| 4 | 160/ 75,123 | 3.12 (1.77, 5.49) | 2.70 (1.53, 4.75) |
| ≥5 (worst) | 227/74,298 | 4.41 (2.52, 7.71) | 3.73 (2.12, 6.54) |
| p-trend | | <0.001 | <0.001 |
| | | | |
| **Individual behaviours** | | | |
| *Smoking* | | | |
| Never | 354/214,828 | 1.0 (ref) | 1.0 (ref) |
| Past | 313/134,855 | 1.34 (1.15, 1.56) | 1.36 (1.15, 1.59) |
| Current | 93/37,426 | 1.45 (1.16, 1.83) | 1.36 (1.08, 1.71) |
| *Physical activity* | | | |
| Sufficient | 382/209,489 | 1.0 (ref) | 1.0 (ref) |
| Insufficient | 192/ 108,707 | 0.98 (0.83, 1.17) | 0.99 (0.84, 1.18) |
| None | 186/68,913 | 1.51 (1.27, 1.81) | 1.38 (1.15, 1.64) |
| *Alcohol consumption* | | | |
| Below guideline | 216/140,908 | 1.0 (ref) | 1.0 (ref) |
| Rarely/never | 304/116,389 | 1.88 (1.55, 2.24) | 1.57 (1.31, 1.88) |
| Above guideline | 240/129,812 | 1.23 (1.00, 1.45) | 1.24 (1.03, 1.50) |
| *Body mass index* | | | |
| Healthy weight | 166/131,162 | 1.0 (ref) | 1.0 (ref) |
| Overweight | 317/165,052 | 1.41 (1.16, 1.70) | 1.32 (1.09, 1.60) |
| Obesity | 277/90,895 | 2.28 (1.88, 2.77) | 1.97 (1.61, 2.42) |

Model 1 adjusted for age and sex

Model 2 adjusted for age, sex, education, ethnicity, diabetes, hypertension, cardiovascular disease (heart attack, angina, or stroke)

UK Biobank restricted to 40-69 year olds and over-representation of females, people from affluent areas and healthy individuals.

# Summary

- It confirms that the impact of COVID-19 has replicated existing health inequalities and, in some cases, has increased them.

- These results improve our understanding of the pandemic and will help in formulating the future public health response to it.

- Is it obesity itself, or the comorbidities associated with obesity that lead to more serious complications?

- Data limitations

- The Government's Race Disparity Unit will work with Government Departments, including PHE, to review the effectiveness and impact of current actions being undertaken to directly lessen disparities in infection and death rates of COVID-19. Factors to be considered include age and sex, occupation, obesity, comorbidities, geography, and ethnicity.

# Government Policies



HM Government

**Childhood Obesity**
A Plan for Action

HM Government

**Childhood obesity: a plan for action**
Chapter 2

June 2018

**Advancing our health: prevention in the 2020s**

Presented to Parliament
by the Parliamentary Under Secretary of State for Public Health and Primary Care
by Command of Her Majesty

Published July 2019

CP 110

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CORONAVIRUS

**Obesity is blamed for Johnson's coronavirus suffering**

...nesday April 29 2020,
...am, The Times

Today's sections ∨ | Past six days

CORONAVIRUS

**Boris Johnson to launch war on fat after coronavirus scare**

It's all right for you thinnies, PM tells staff as he accepts obesity increases risk from Covid-19

...eight and in 2018 he revealed he weighed almost 16 and a half stone

Tackling obesity during the COVID-19 pandemic

Thank you.

20th July 2020