

Whitepaper:

Utilising real-world data to uncover health inequities in type 2 diabetes

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Background

Addressing healthcare inequities is becoming increasingly important for healthcare providers, regulators, and pharmaceutical companies. The pandemic has highlighted disparities in disease risk and outcomes between different ethnic groups and levels of socioeconomic status (SES).

Pharmaceutical companies are now increasingly enrolling more diverse trial populations to partly address this. Additionally, real-world evidence may be used to quantify these disparities and inform particular populations with high unmet need to optimize enrolment and subsequent market access.

The Vantage® RWD platform allows these disparities between different ethnic and socioeconomic groups to be investigated in terms of identifying the origins of these disparities and the resulting healthcare resource use (HCRU). This study shows how this can be done in five charts for the case of type 2 diabetes mellitus (T2D) using the English Hospital Episode Statistics dataset within the Vantage platform and measuring HCRU in terms of hospital admissions.

T2D is a good example to demonstrate this approach, since it is well established as having both a strong association with SES and ethnicity and a large disease burden, particularly in terms of healthcare and societal cost. Specifically, results from the Health Survey for England¹ and other studies (for example, Nagar et al., 2021²) consistently show a much higher prevalence among Asian people (in particular, those with south Asian ancestry), than White people and those with Afro-Caribbean ancestry.

Method

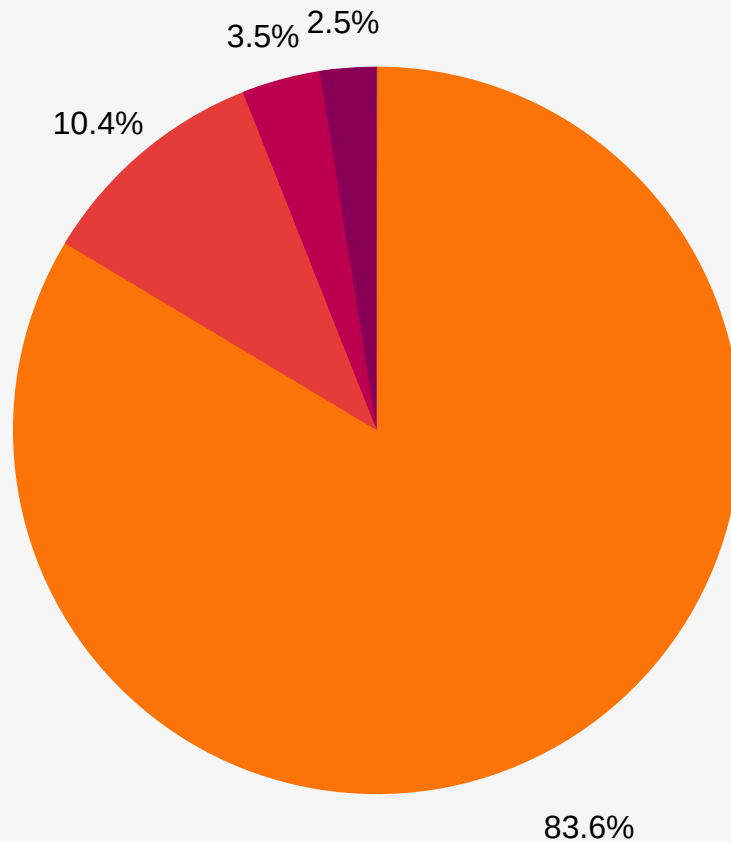
All those inpatient episodes that had an ICD-10 code for T2D (E11) were pulled from Vantage for the year 2019, stratified by the following:

- Ethnicity (grouped as White, Black, Asian, Other/Mixed).
- Socioeconomic status (grouped as either in the lower five deciles of Index of Multiple Deprivation (IMD) or the upper five deciles, representing the most deprived and the least deprived, respectively).
- Sex and age, grouped into 10-year age groups.

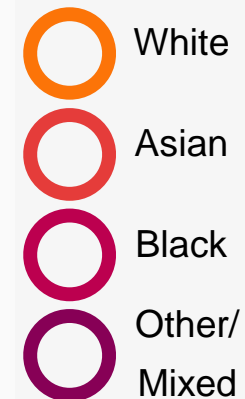
Additionally, from the Office of National Statistics³, corresponding ethnicity-stratified population estimates for England and Wales were used as the denominator population to estimate the annual hospitalization rate within each ethnic group.

The number of admissions and hospitalization rate were then compared between different SES groups and ethnic groups - before and after adjusting for differences in the demographic profile between different groups. This adjustment is important because both T2D risk and ethnicity differs markedly by age group. Namely, Whites tend to be older than other ethnic groups on average, and T2D risk increases with age.

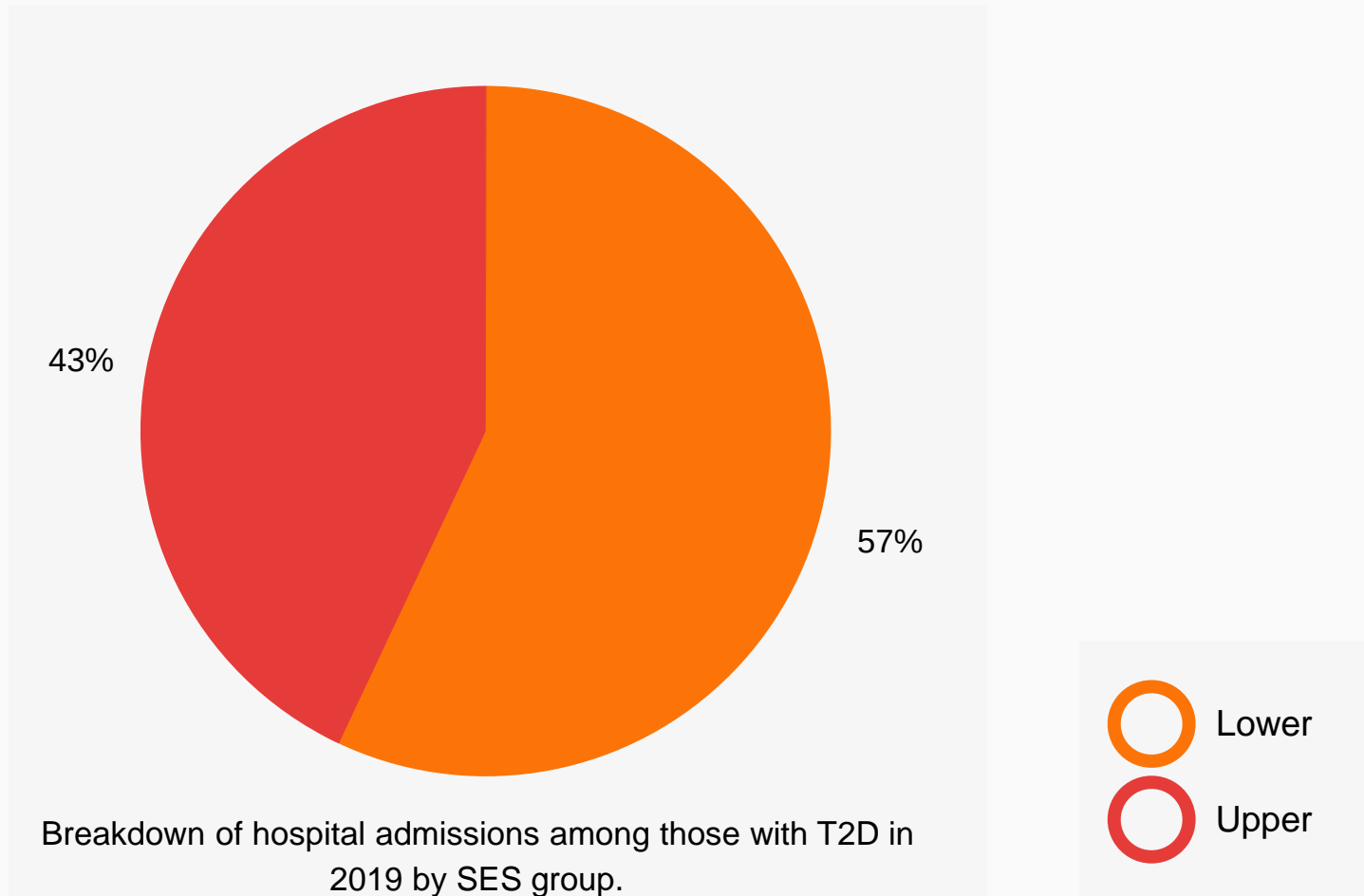
In 2019 there were 1.7 million hospital admissions among those with T2D, the vast majority of which were white.



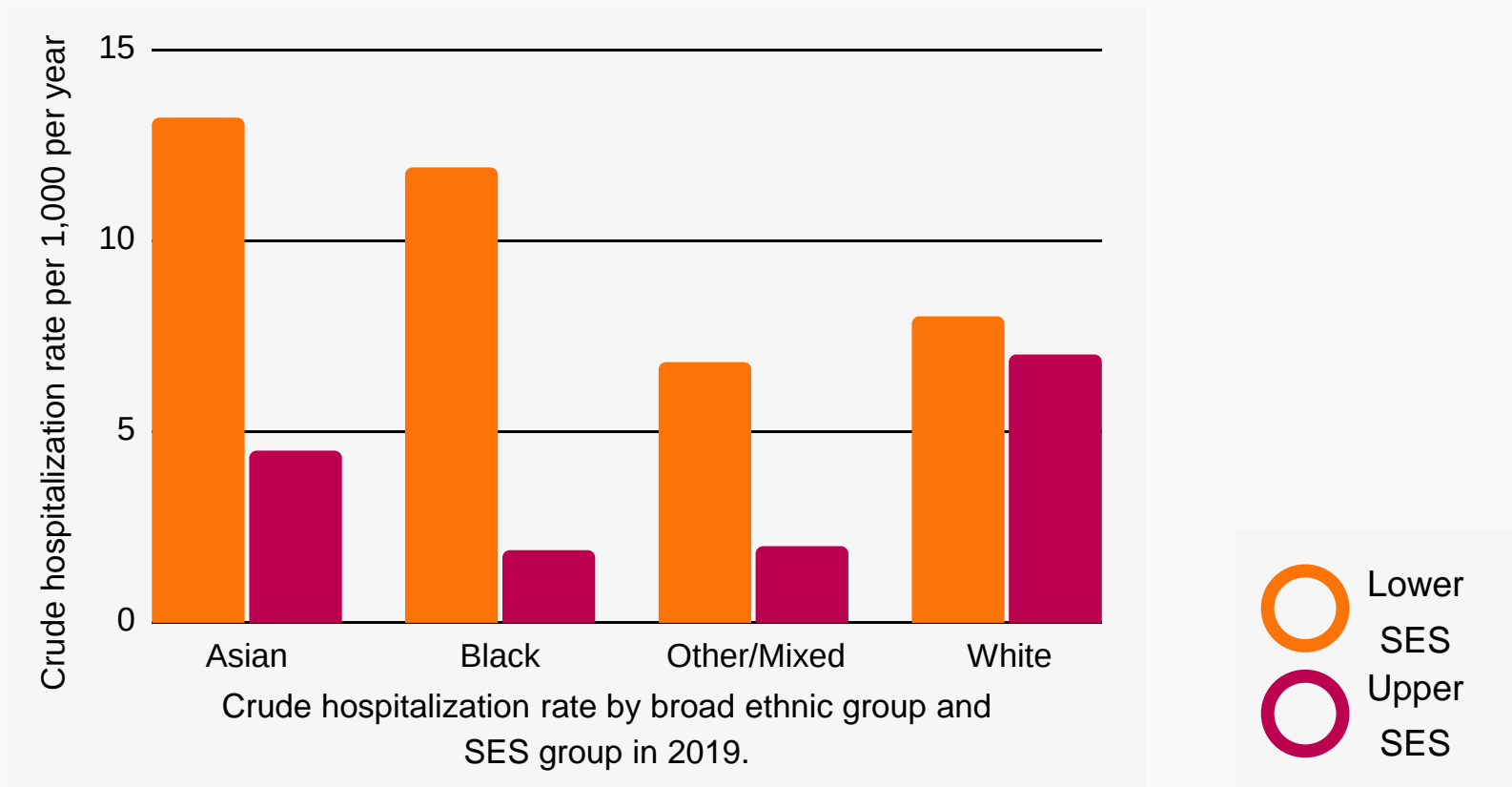
Breakdown of hospital admissions among those with T2D in 2019 by broad ethnic group, excluding those reported as unknown ethnicity.



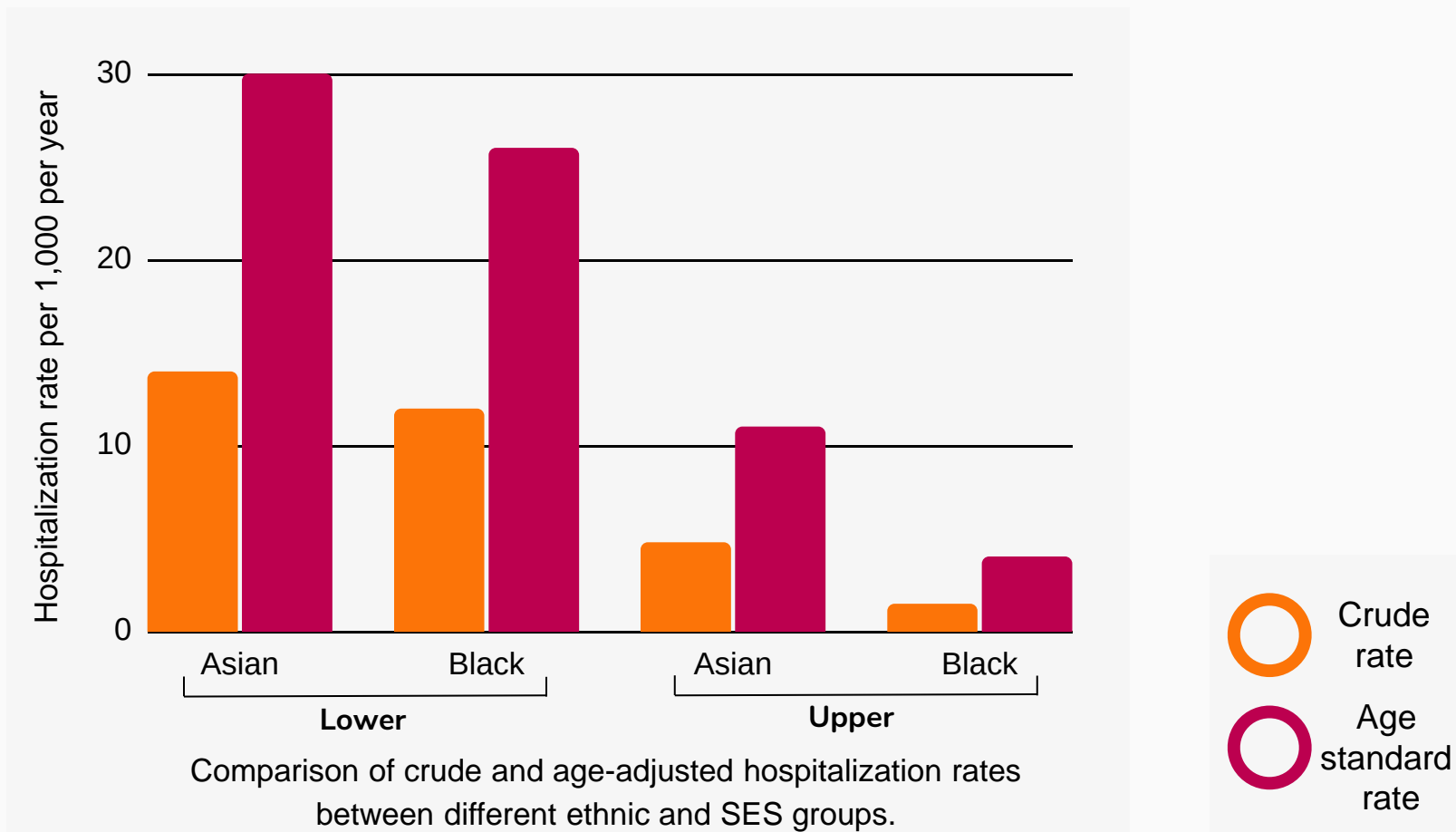
57% of hospital admissions among those with T2D were from lower SES groups. If there was no association between hospitalization risk and SES, the figure would be 50%.



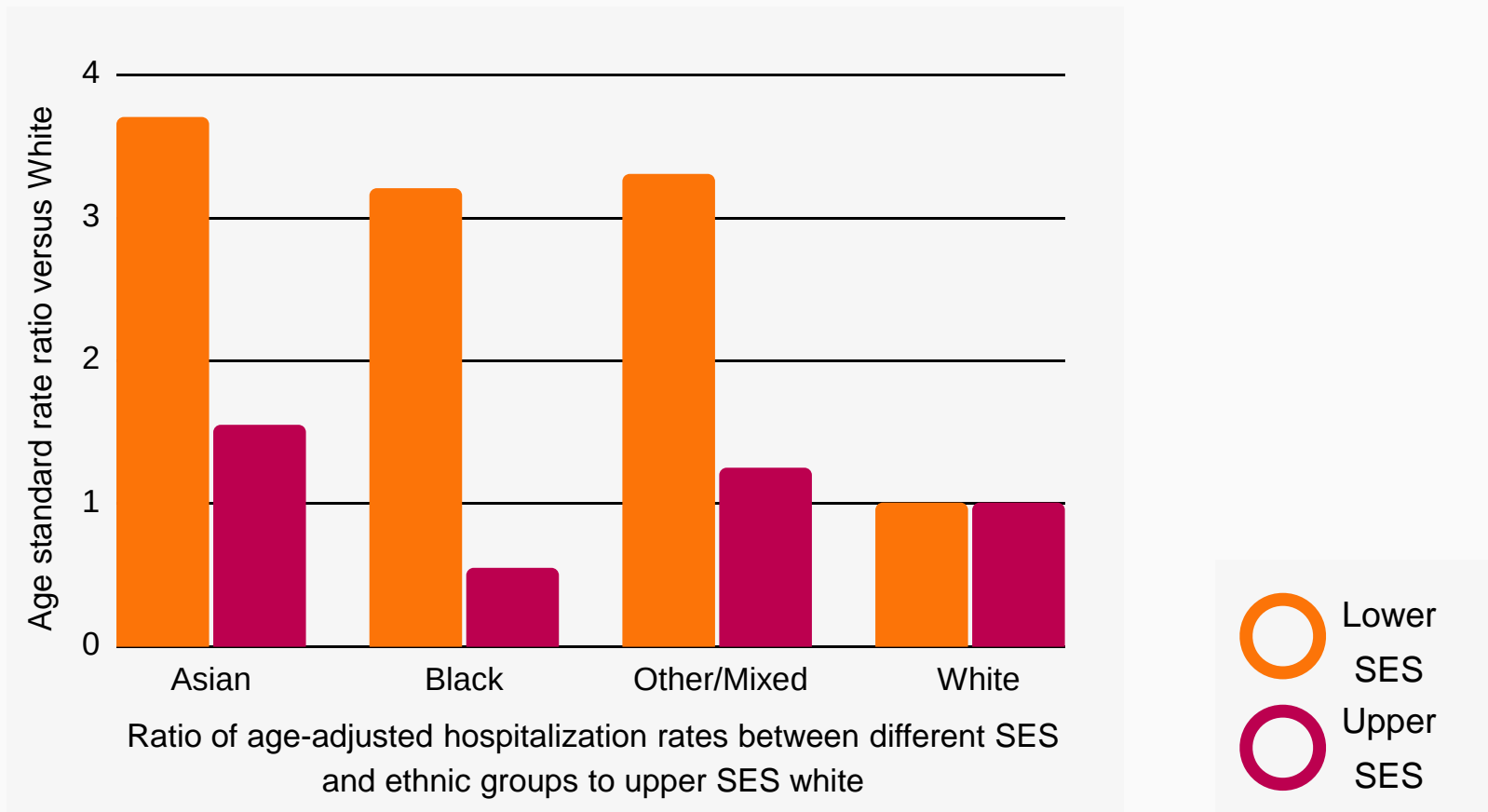
When measuring HCRU in terms of crude hospitalization rate, Asian people with T2D have a disproportionate healthcare burden than White people, although this relationship was only for those with lower SES. For all ethnic groups, except White people, lower SES was associated with much higher HCRU than those with higher SES.



When adjusting for differences in age distribution between different ethnic groups by standardizing to the White population, differences in HCRU were amplified beyond the crude estimates.



The age-adjusted hospitalization rate for all lower Non-White SES groups is at least three times greater than those higher SES White. Among those with higher SES, much of the differences in age-adjusted hospitalization rate between ethnic groups disappears. In fact, Black people have a lower rate than White people.



Discussion

This study has shown that well established differences in T2D prevalence between different ethnic and SES groups is broadly consistent with differences in HCRU when measured in terms of hospitalization rate.

Importantly however, when adjusting for differences in the age distribution between different ethnic groups, these differences are amplified with Asian and Black people having a far higher hospitalization rate than White people. Also of particular note, is that almost all of these differences disappear - or are even reversed - when considering only those with higher SES.

Using the HES dataset in Vantage and very simple analytical techniques, disparities in HCRU measured as hospitalization rate can be quantified and investigated in terms of potential causal relationships to age, ethnicity and SES group.

This study has used T2D as an example simply because differences in prevalence - which we would expect to be reflected in terms of HCRU - between different ethnic and SES groups is well established. However, the same study can be performed for any ICD-10 coded disease and extended to consider other possible confounders such as obesity or smoking status.

Health Inequity Dashboard

The Health Inequity Dashboard, part of the Vantage® RWD platform, interrogates Hospital Episode Statistics (HES) data, to provide powerful analysis of patient cohorts.

The dashboard's rigorous health inequity analysis helps you to quantify health inequities for a specific disease, identify the groups disproportionately affected and understand the local challenges. In doing so, you can support your national and local healthcare stakeholders to provide quality, evidence-based care equal to the patient population they serve.



References

¹NatCen Social Research and UCL, 2020. Health Survey for England, 2019. Accessed via NHS Digital (<https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2019>).

²Nagar SD, Nápoles AM, Jordan IK, Mariño-Ramírez L. Socioeconomic deprivation and genetic ancestry interact to modify type 2 diabetes ethnic disparities in the United Kingdom. *EClinicalMedicine*. 2021 Jun 14;37:100960. doi: 10.1016/j.eclinm.2021.100960. PMID: 34386746; PMCID: PMC8343245.

³Office for National Statistics. Experimental statistics: Population estimates by ethnic group, England and Wales: 2019. (<https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/datasets/population-estimates-by-ethnic-group-england-and-wales>).

About Vantage

Vantage provides on demand access to real world data across primary and secondary care for the UK market including: up to 6 years of hospital episode statistics (HES) across inpatients, outpatients and A&E, as well as secondary care medicines, primary prescribing and quality outcomes framework (QOF) datasets. Data is accessible in various formats, from tools that enable flexible cross-sectional analysis and longitudinal tracking, to highly visualised dashboards and simulation models where additional external datasets can also be integrated. Ad-hoc reports are also available.

About the author




Mike is an experienced epidemiologist, with over 25 years' experience spanning academia, NICE, the pharmaceutical industry and the pharma consulting and data industry. He has a PhD in Measurement and Information in Medicine and a second PhD in the foundations of probability theory and quantum mechanics. He joined the CorEvitas Specialty EMR Data Team in 2022, having previously worked in private consulting helping clients conceive and source real-world evidence studies.

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