

Birmingham Local Outbreak Engagement Board

Excess Mortality and Factors associated with Covid-19 Deaths in Birmingham

Birmingham Public Health Division

06/10/2021



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Overview



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Background: Why the pandemic hit some communities harder than others in Birmingham?

- There have been concerns about variations in excess mortality from Covid-19 among different communities in Birmingham following ONS publication on excess deaths.
- This informed the need to investigate possible factors/drivers associated with Covid-19 deaths and determine how these factors may have contributed to differences in the patterns of death in the communities.

Excess Mortality in Birmingham

Objectives:

- Determine the excess mortality at ward level within Birmingham.
- Investigate the possible factors/drivers associated with excess mortality from Covid-19 deaths.
- Explain the differences in Covid-19 mortality between the wards.

Methods

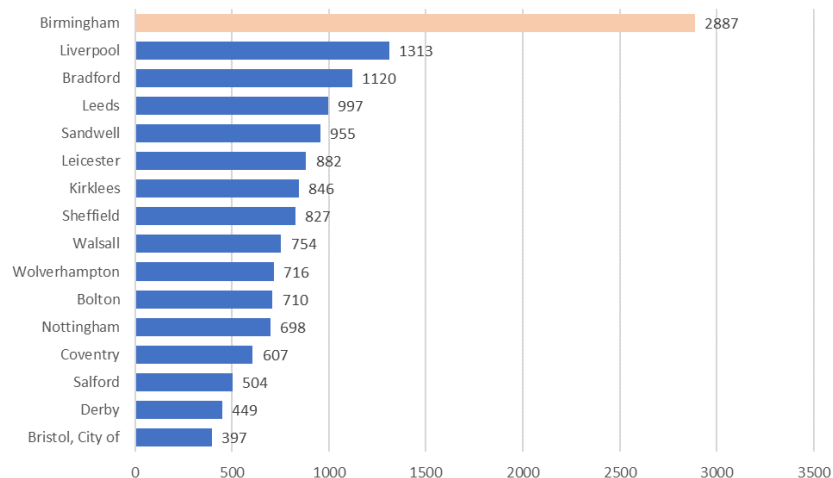
- Period of analysis (April 2020 to Mar 2021).
- Sources of Data: ONS, CSU,PHE Local Health, NOMIS, NIMS, Census Data.
- In this study,

Excess mortality is defined as the number of registered deaths during pandemic (Apr 2020- Mar 2021) compared to expected numbers based on the average deaths of previous 5 years (2015-2019).

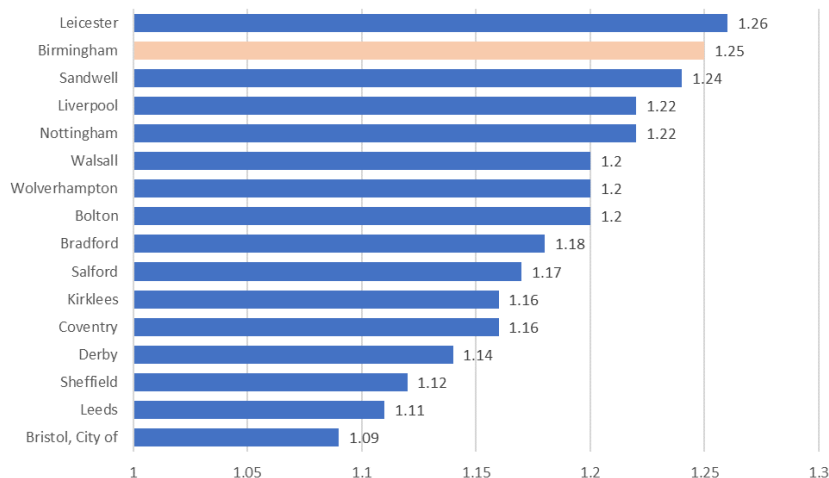
- Factors associated with Covid-19 deaths were investigated by evaluating the impact of these factors among Covid-19 deaths and/or at ward level.
- The factors investigated were:
 - **Personal** : Age, Gender, Ethnicity, Comorbidities & Occupation.
 - **Socio-economic**: Deprivation, Population Density.
 - **Health Services**: Uptake of Health Interventions, Place of Death.

Excess Mortality Mar 2020 to August 2021 showing Birmingham highest amongst peer/comparator areas

Excess deaths (Registered – Expected deaths)



Ratio of registered to expected deaths

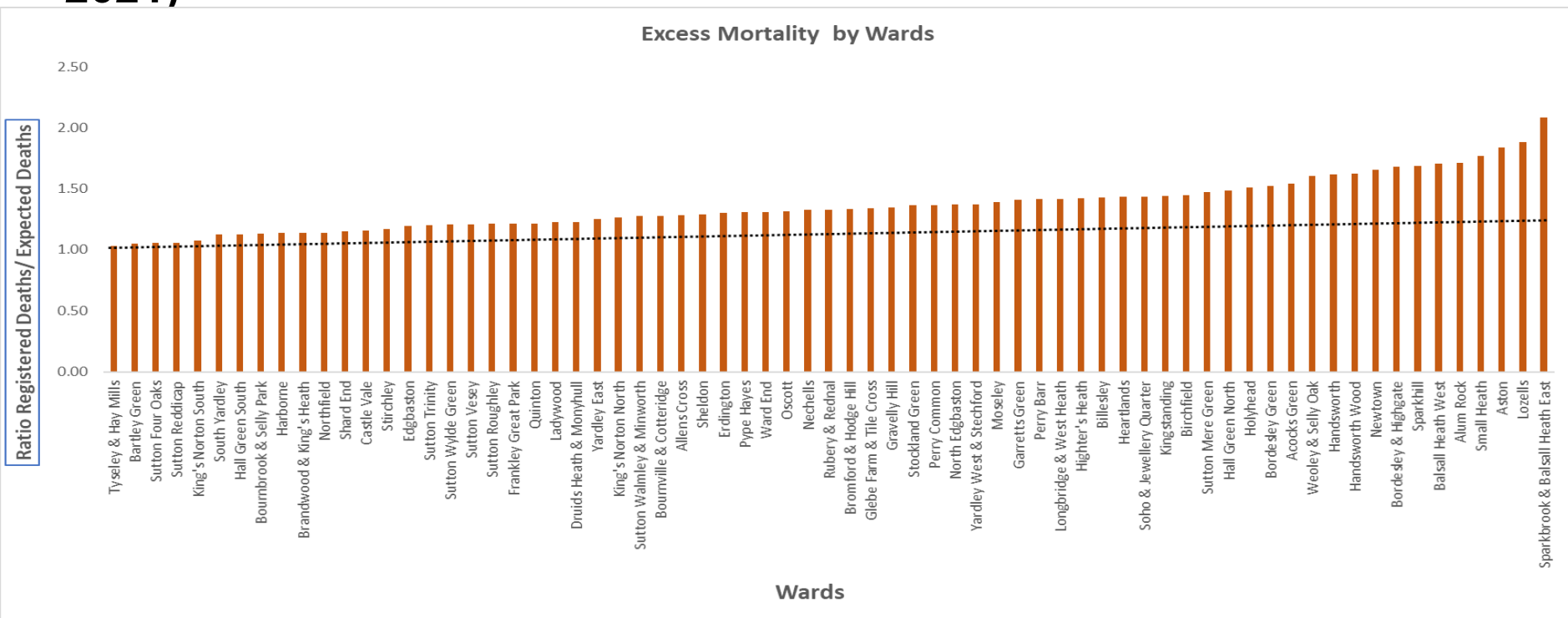


Excess deaths (a measure of excess mortality) from Covid-19 is limited in making comparisons between areas because it does not take into account the background populations. The ratio of registered to expected deaths allows for a more objective comparison between areas.

Source : ONS

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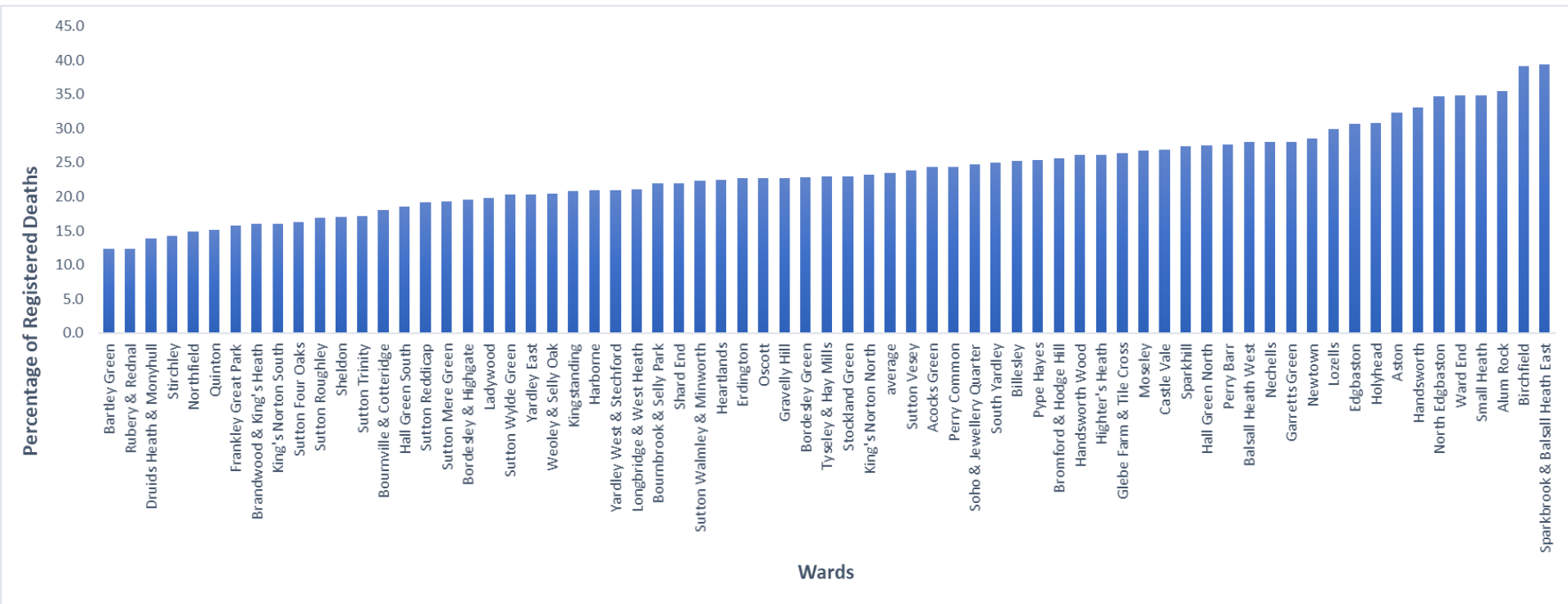
Ratio of Registered Deaths/Expected Deaths by Wards (Apr 2020 – Mar 2021)



Registered deaths increased between 3% to 100% above the expected deaths across wards in Birmingham. The average increase was 35%.

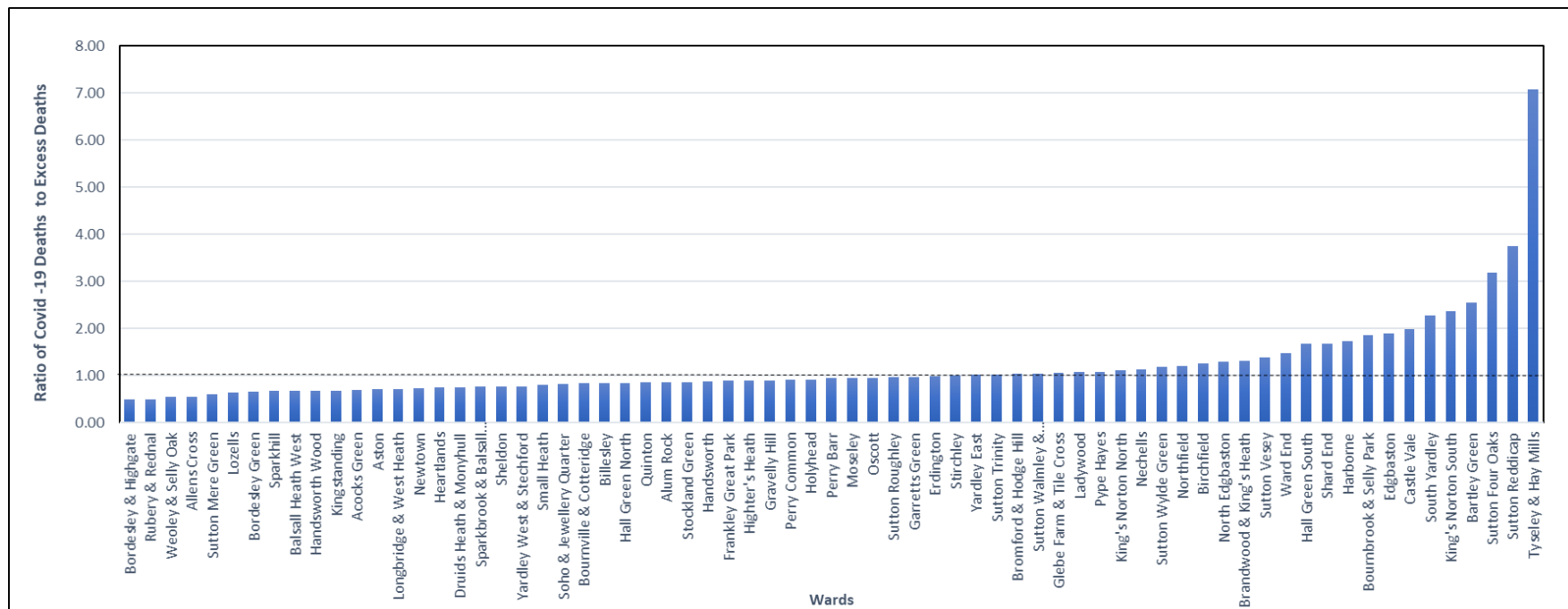
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Proportion of Covid-19 Deaths in Relation to All Registered Deaths



The proportion of Covid-19 deaths in relation to all registered deaths across all wards ranged from 12.2% -39.4%. On average, Covid-19 deaths contributed 23.5% to all registered deaths.

Covid-19 Deaths as a Proportion of Excess Deaths by Wards



Excess deaths were due to Covid-19 and other causes of deaths. A ratio above 1 as observed in 28 out of the 69 wards suggests that Covid-19 contributed more than other causes of death. This suggests a reduction in the cause of death from other causes. As the ratio decreases below 1 (41 out of 69 wards), this suggests an increasing contribution to excess deaths from causes other than Covid-19.

Relationship between all Covid-19 Deaths and Age Groups

Age Group (years)	All Covid-19 Deaths
15- 64	416
> 65	2117
Total	2533

- There were more deaths in those over 65 years and this was statistically significant.

$\chi^2 = 642.71$ $df=1$, $p < 0.001$ (statistically significant)

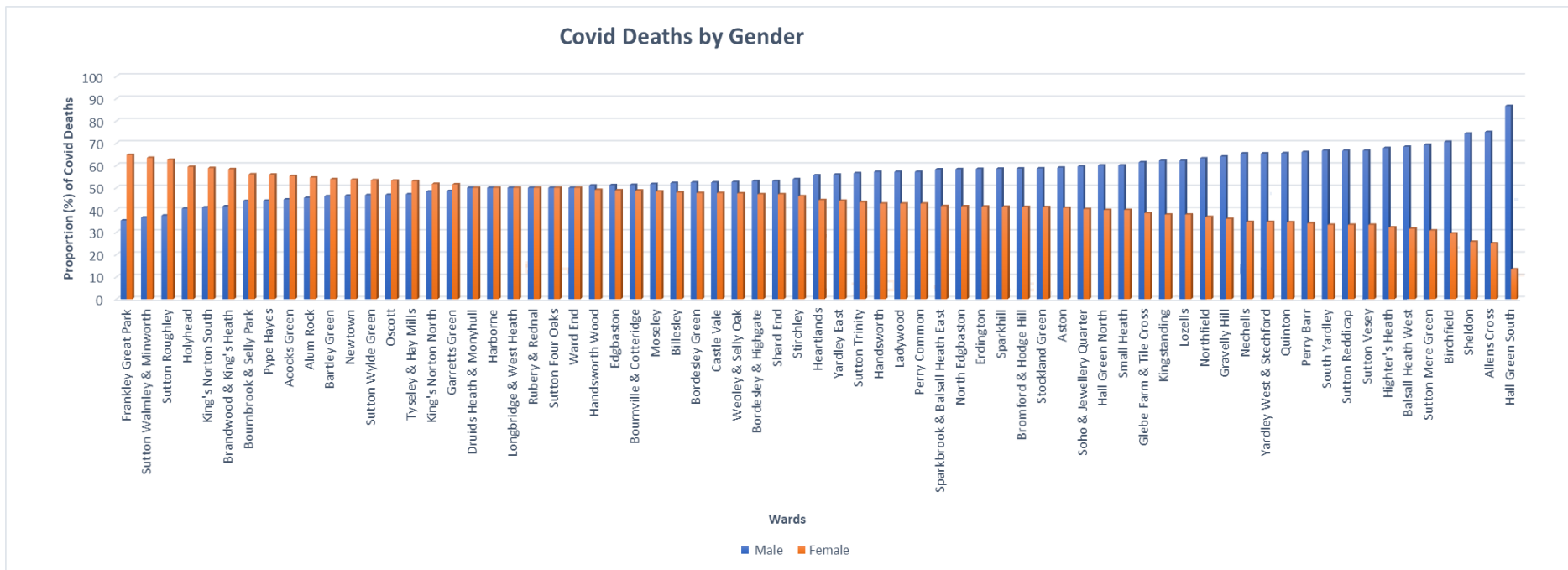
Relationship between All Covid-19 Deaths and Gender

Gender	All Covid-19 Deaths
Male	1405
Female	1128
Total	2533

- There were significantly more deaths in the male population than female population in Birmingham.

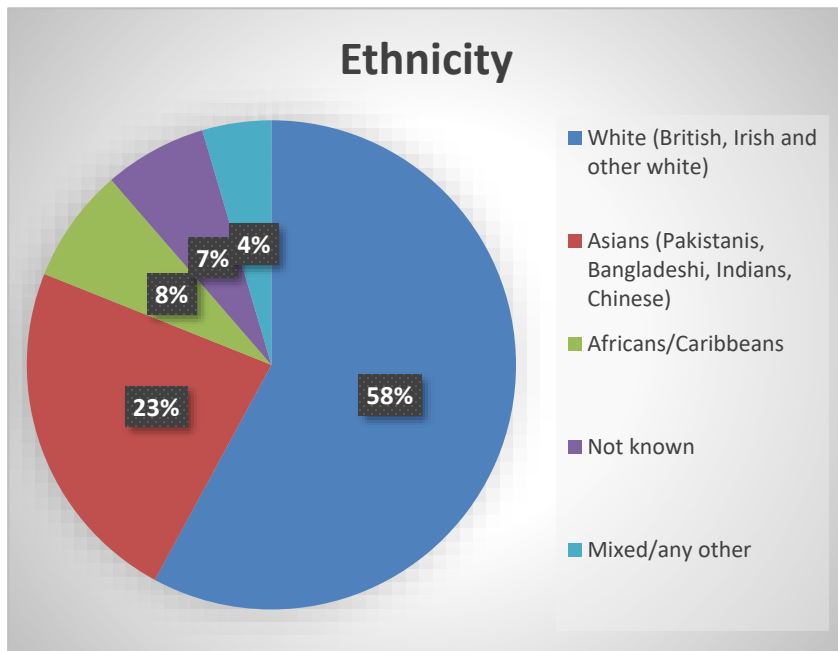
$\chi^2 = 15.19$ $df=1$, $p < 0.001$ (statistically significant)

Proportion of Covid-19 Deaths by Gender in Birmingham Wards



In the majority of wards (46 out of 69; 66.7%), there were more male than female deaths. However, in 17 out of 69 wards (24.6%), there were more female than male deaths.

Relationship between Covid-19 Deaths and Ethnicity

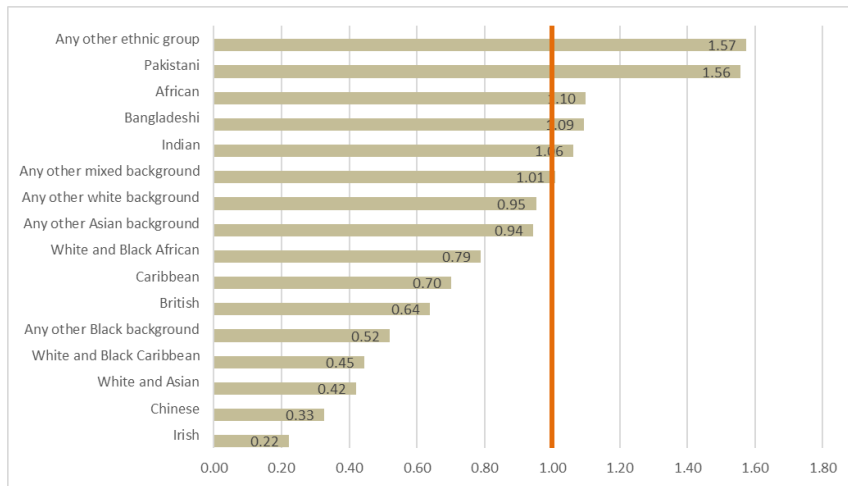


Ethnic Groups	Number (%)
White(British, Irish and other white)	1611 (58%)
Asians (Pakistanis, Bangladeshi, Indians, Chinese)	644 (23%)
African/Caribbean	211 (8%)
Not Known	189 (7%)
Mixed/Any other	127 (4%)

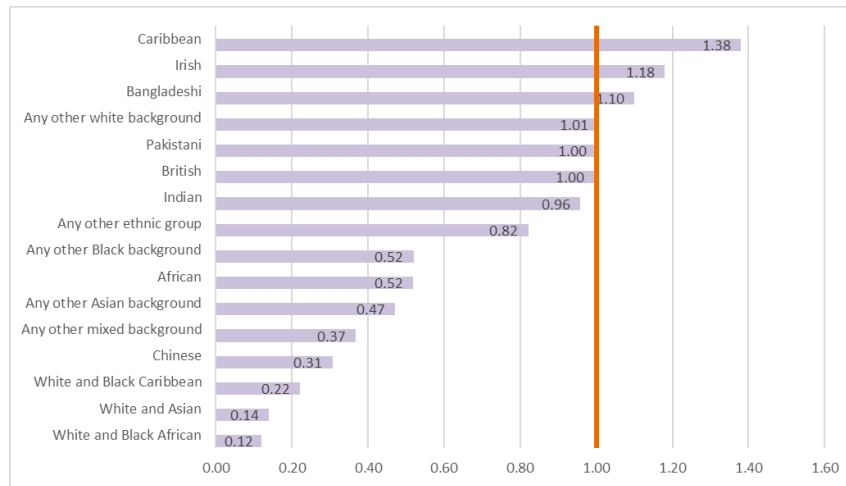
The majority of those who died from Covid-19 were from the white ethnic groups (58%), followed by the Asian ethnic groups (23%).

Covid-19 cases and deaths in Birmingham (by ethnicity)

Ratio of covid-19 cases and resident population by ethnicity

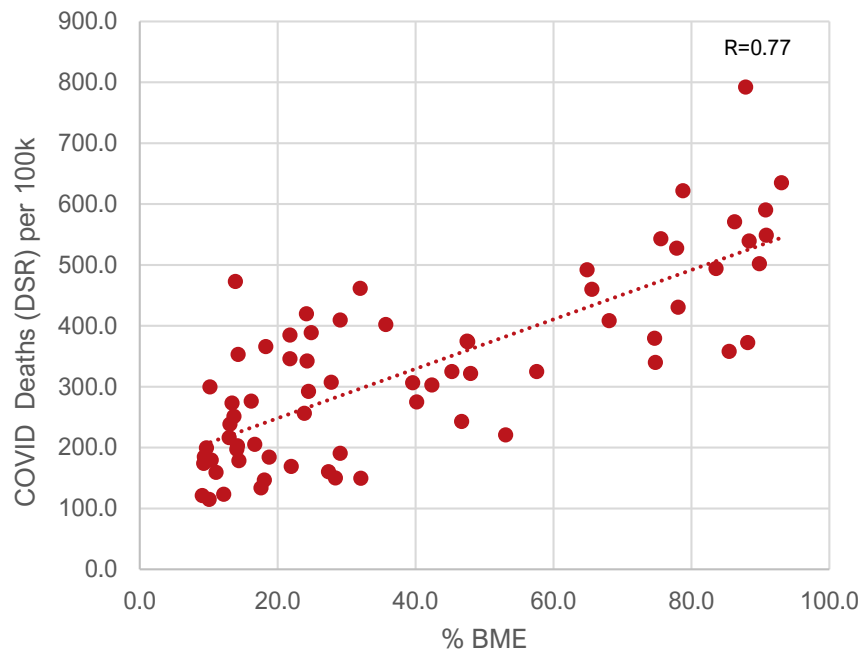


Ratio of covid-19 deaths and resident population by ethnicity



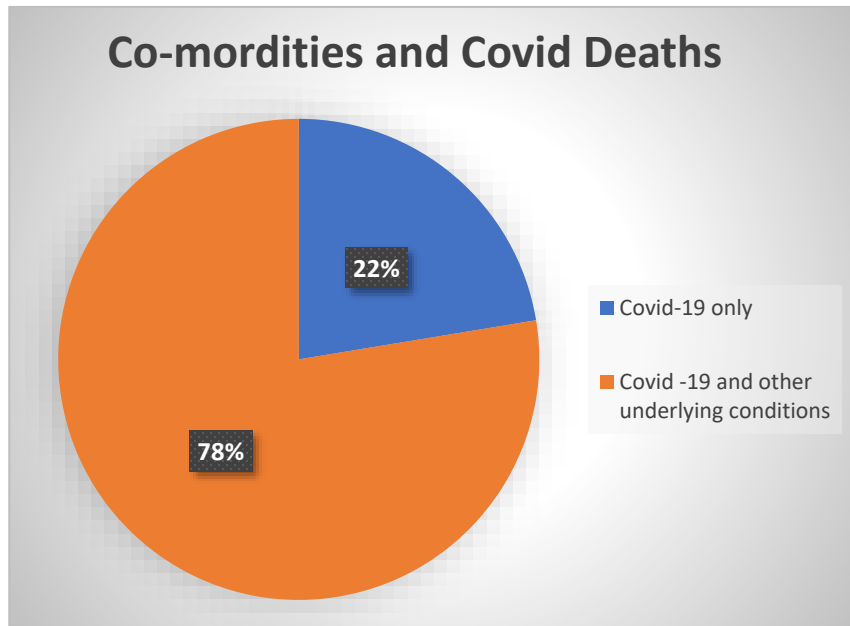
This chart highlights the disparity between cases and deaths in different ethnic groups. As illustrated above, while some ethnic groups (Caribbean, Irish) had a low number of cases for their population, they recorded a higher number of deaths. The converse was also true for some ethnic groups (African). Some groups had both high number of cases and high number of deaths for their population (Bangladeshi). Among the white ethnic group (British), there was an increase in Covid-19 deaths when compared to the number of cases, although this fell within the expected number of deaths for that population.

Relationship between Proportion of BME Population by Ward and Covid-19 Deaths.



- There is a strong positive correlation between Covid-19 deaths and the proportion of BME across the wards.
- The age adjusted death rate due to Covid-19 increases with the proportion of the BME group in the wards.

Relationship between Co-morbidities and Covid-19 Deaths



- The majority of those who died from Covid-19 (78%) had other underlying conditions.

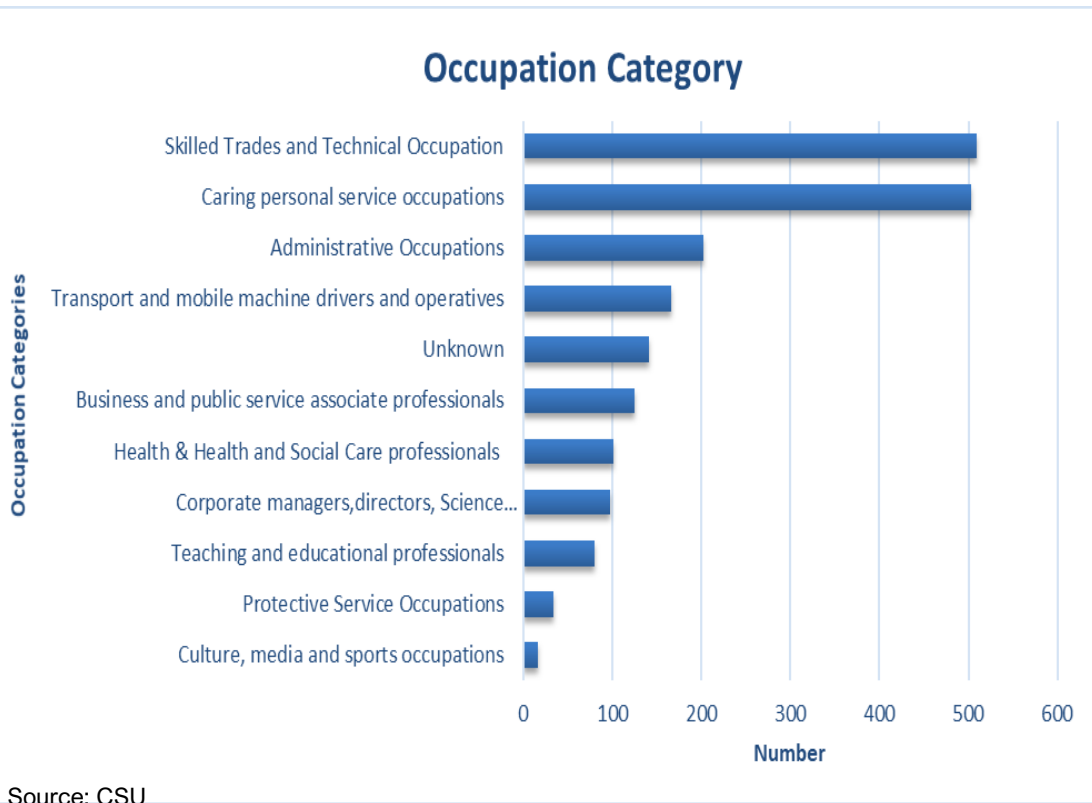
$\chi^2 = 462.98$ $df=1$, $p < 0.0001$ (statistically significant)

Co-morbidities Associated with Covid-19 Deaths

Co-morbidities (Top 7)	%
Pneumonia	71.9
Essential Hypertension	31.4
Other Specified General Symptoms & Signs	26.0
Non-Insulin Diabetes Mellitus without complication	25.8
Chronic Ischaemic Heart Disease	19.8
Unspecified Diabetes Mellitus	14.0
Dementia	12.2

- The top three co-morbidities were:
 - Pneumonia
 - Diabetes Mellitus (all types)
 - Hypertension

Occupation Categories of all Covid-19 Deaths

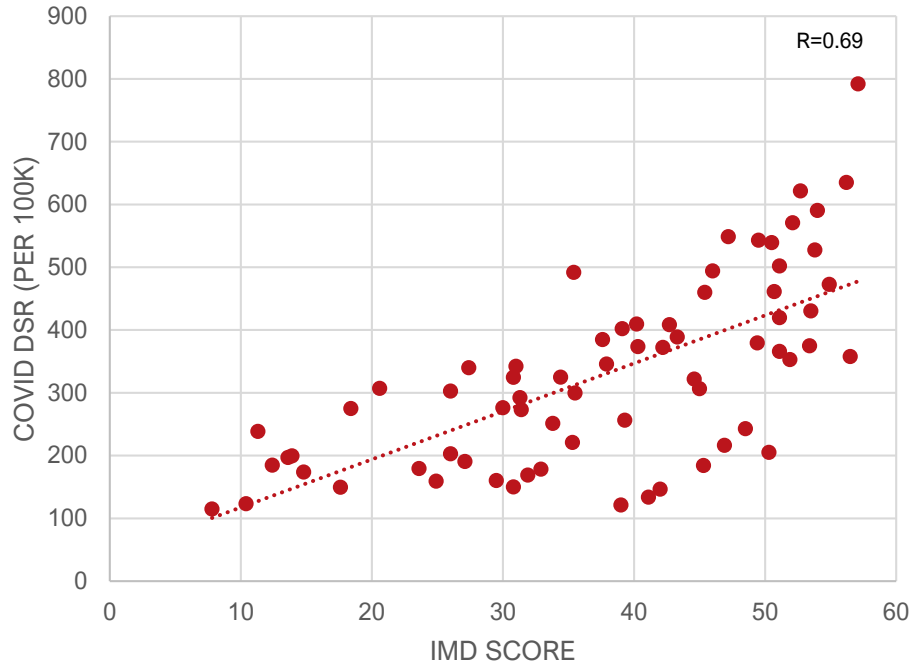


Occupation Categories Top 2	Examples	Number (%)
Skilled Trades & Technical Occupations	Warehouse operative, Machinist, Factory worker, car production worker, Electrician, welder, foundry worker, carpenter, seamstress, painter and decorator, labourer, plumber, mechanic, maintenance engineer, computer programmer, builder, assembly worker, gardener, florist	509 (20%)
Caring personal service occupations	Housewife, care assistant, cleaner, home help	503 (20%)

370 (73.6%) of the 503 in the caring personal service occupations were housewives

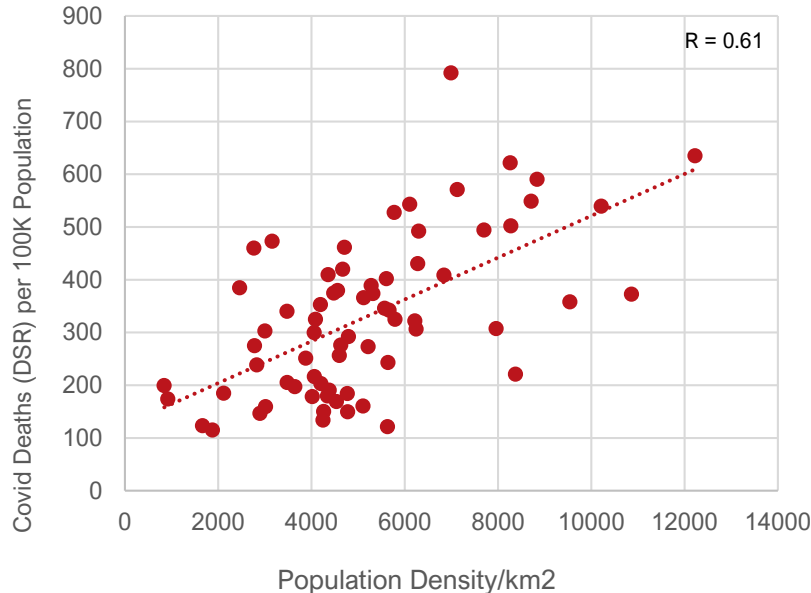
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Relationship between Ward Deprivation and Covid-19 Death Rates.



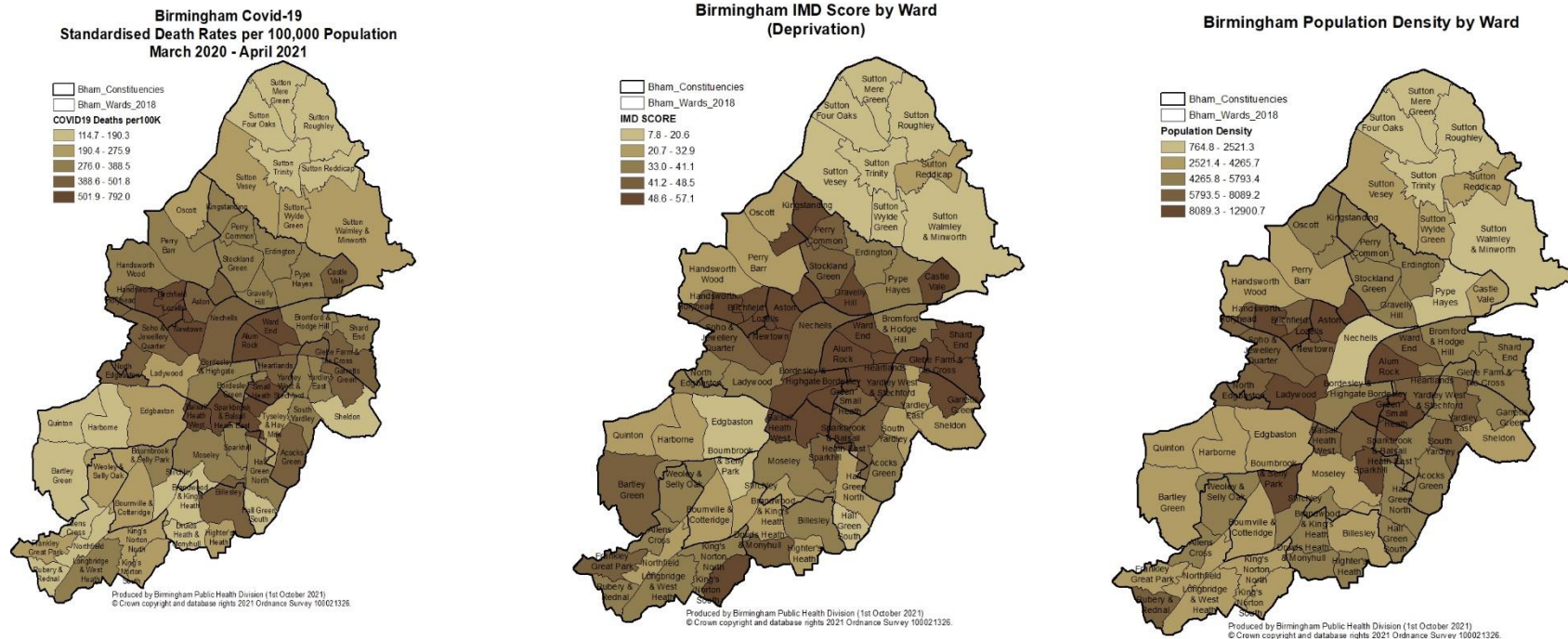
- There is a strong positive correlation between Covid-19 deaths and ward deprivation.
- The age adjusted death rate due to Covid-19 increases with increase in ward deprivation.

Relationship between Population Density of Wards and Covid-19 Death Rates.



- The close proximity of populations is important in the spread of infectious diseases like Covid-19.
- Birmingham population density ranges between 2 to 28 times that for England (432 person/km²).
- The age adjusted death rates from Covid-19 increases with increase in population density.

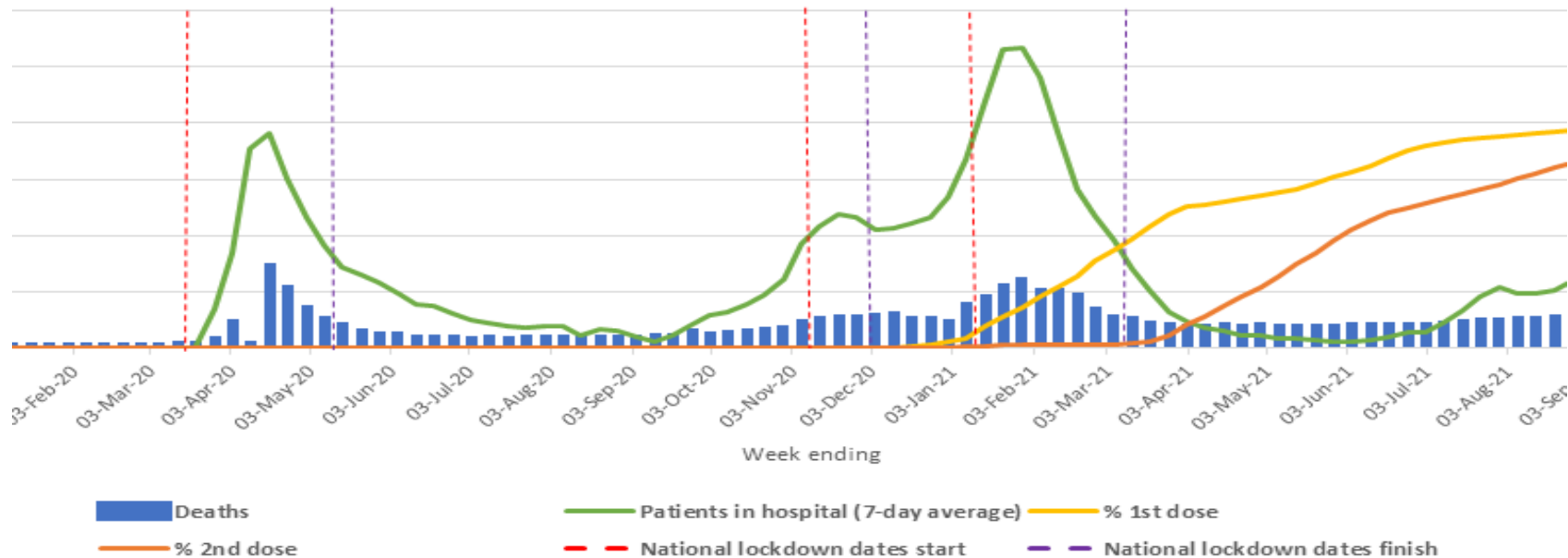
Map of Birmingham illustrating Covid-19 Death Rates, Deprivation and Population Density



The maps almost mirror one another highlighting the link between the three parameters.

Health Interventions and Impact on Hospital Admissions and Deaths in Birmingham

Weekly deaths, 7-day average of confirmed patients with Covid-19 in hospitals and first and second dose % in Birmingham

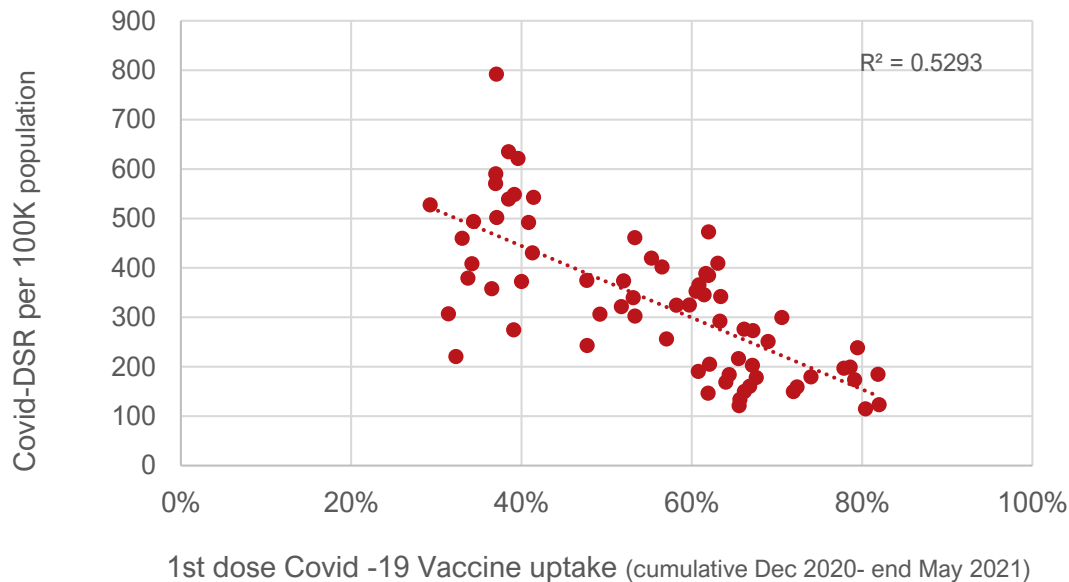


Source: ONS, Gov.UK, NIMS

Health interventions such as lockdowns, social distancing, face mask, hand washing and vaccines have all played a key role in reducing hospital admissions and deaths.

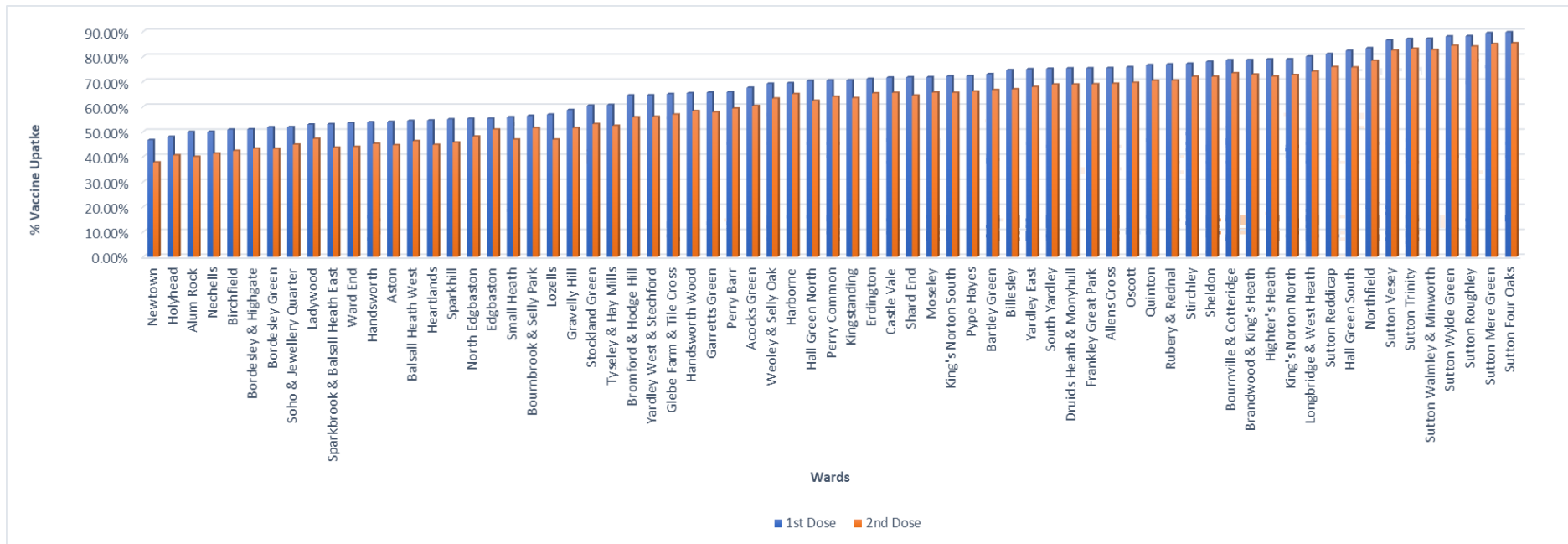
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Uptake of Covid-19 Health interventions and Covid-19 Death Rates.



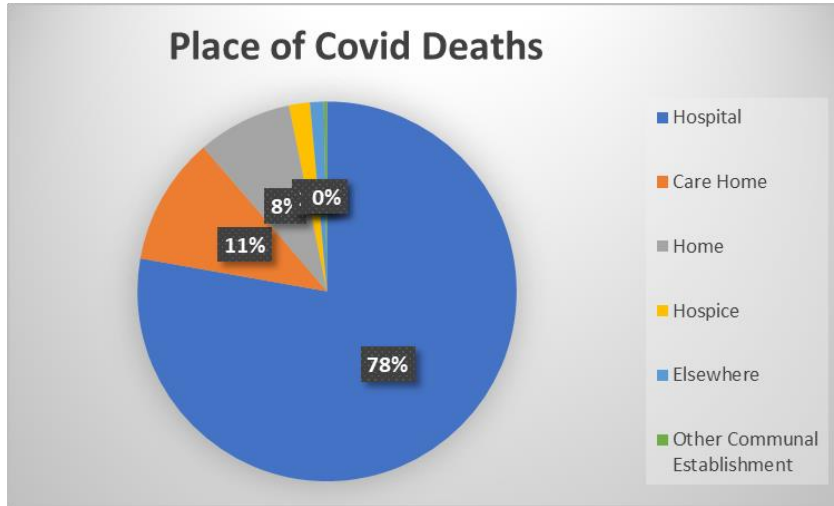
- Health interventions have played a key role in reducing hospital admissions and deaths.
- This chart illustrates the use of Covid-19 vaccine uptake as a proxy measure for compliance with the uptake of health interventions against Covid-19.
- The age adjusted death rates from Covid-19 decreases with increase in the uptake of 1st dose vaccine, suggesting an association between the uptake of interventions and death rates at ward level.

Covid-19 Vaccine Uptake 1st and 2nd Dose by Wards



Wide variation in vaccine uptake across the wards. 1st dose 46.6% - 89.7%, 2nd dose 37.7% – 85.3%.

Place of Covid -19 Deaths



Place of Deaths	Number (%)
Hospital	2314 (78%)
Care Home	325 (11%)
Home	240 (8%)
Hospice	53 (2%)
Elsewhere	35 (1%)
Other Communal Establishment	8 (<1%)

- The Majority (91%) of deaths occurred in a health institution, suggesting that most severely ill patients had access to a health facility at some stage in their illness.

Summary

- There was an increase in mortality across all the wards, with an average increase of 35%.
 - On average Covid-19 deaths contributed 23.5% to all registered deaths.
 - Factors associated with increase in Covid-19 deaths include:
 - Personal (age >65 years, male gender, BME ethnic groups, co-morbidities, skilled trades & caring personal service occupations).
 - Socio-economic (deprivation and population density).
 - Health interventions such as lockdowns, social distancing, face masks, hand hygiene and vaccines were associated with a decrease in hospital admissions and deaths.
 - Compliance with uptake of health interventions appears to vary across wards using vaccine uptake as a proxy measure.
 - There is a wide variation in vaccine uptake across the wards.
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Recommendations

- There is need to continue with the improvement of the uptake of the Covid-19 vaccines and compliance with other non pharmaceutical interventions whenever these are introduced to break the chain of Covid-19 transmission.
- Continued engagement with at-risk groups in the uptake of health interventions. These include the BME group, people with underlying health conditions and those in the skilled trades and caring personal service occupations.

Acknowledgements

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