Respiratory Disease

Summary points

- More than 100 Bristol residents die prematurely each year from respiratory disease and it is the cause of 1 in 11 premature deaths in the city (deaths before 75 years of age).

- The risk of premature mortality from respiratory disease in Bristol is higher than the national average and has been for the majority of the past 23 years. Over that entire period there was a slight decline in this risk, but with some considerable volatility in rates year to year, and an increase during the most recent years since 2020 – 2022. This recent increase has been seen nationally also.

- The risk of premature mortality from respiratory disease in Bristol over the past 23 years, has been significantly higher for men than women for most of that time. The gap may have slightly narrowed over the period with more improvement for men than women over that entire timeframe, but this difference remains at present and is statistically significant for 2022 – 2024. The apparent gender disparity locally is similar to that seen nationally also.

- During the years most affected by the Covid-19 pandemic (2020-2022) premature mortality from respiratory illness appears to have declined noticeably. This is likely to be related at least in part to aspects of the pandemic and the response to it. Since 2022 premature mortality related to respiratory disease has largely returned to pre-pandemic levels.

- More than half of the premature mortality reported due to respiratory illness in Bristol is the result of COPD more specifically, and the latest data indicates that nearly 10,400 residents are recorded on their GP practice's COPD disease register with the condition diagnosed. 1 in 5 of the emergency admissions for respiratory illness in the city was due to COPD 2022/23 to 2024/25.

- The latest data indicates that nearly 34,000 residents (aged 6 years or over) are recorded on their GP practice's asthma disease register with the condition diagnosed. 1 in 11 of the emergency admissions for respiratory illness in the city was due to asthma 2022/23 to 2024/25, and an emergency admission related to asthma is much more common for women than men in the city.

- There are clear social gradients in the risk of emergency admission due to respiratory illness, COPD and asthma in Bristol, where those living in the most deprived areas of the city are at a markedly higher risk of admission to hospital due to these illnesses.

- Respiratory disease mortality, the incidence of respiratory disease in general, and chronic obstructive pulmonary disease (COPD) and asthma more specifically when analysed by ward of residence within Bristol appears to be greatest in more deprived areas where smoking rates tend to be higher on average. Historical patterns of smoking in the city, influenced in part by the presence of the tobacco industry as well as the varying effects of poor air quality across the city, are also likely contributors to the apparent variation we find across the city.

Respiratory disease

An average of 109 Bristol residents die prematurely (under 75yrs old) each year from respiratory disease (2015 to 2024). This represents around 9% of all premature deaths in the city during this period.

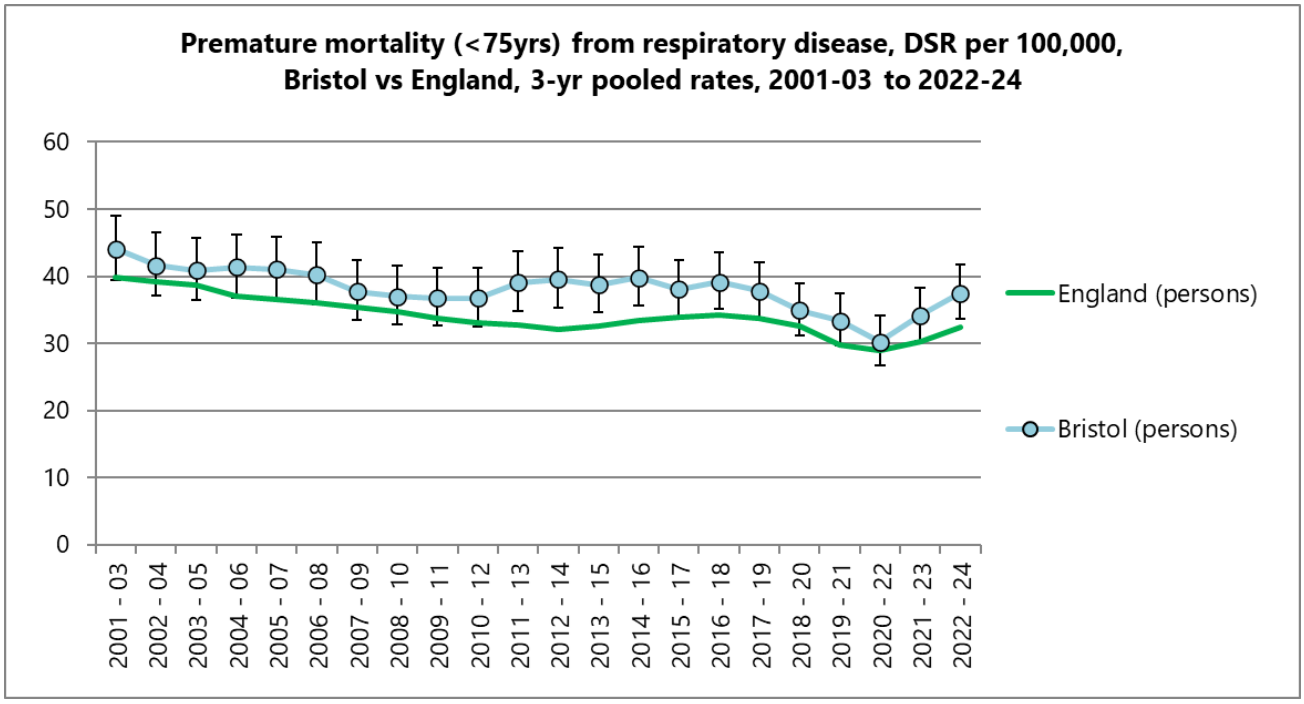

Figure 1: Premature mortality (<75yrs) from respiratory disease, DSR per 100,000, Bristol vs England, 3-year pooled rates, 2001-03 to 2022-24. Source: Office for Health Improvement & Disparities Fingertips tool.

Over most of the last 23 years the rates of premature mortality due to respiratory illness in Bristol have been close to or above 40 per 100,000, with a period of slightly lower rates 2007-2009 to 2010-2012, and a steady decline from 2016-2018 to 2020-2022 (ending with the Covid-19 pandemic) before a period of increasing rates again to 20212-2024. During the entire period the premature mortality rate due to respiratory illness in Bristol has been higher than the national average, to a statistically significant extent from 2011-2013 to 2014-2016, in 2016-2018 and the most recent 3-year period, 2022 – 2024.

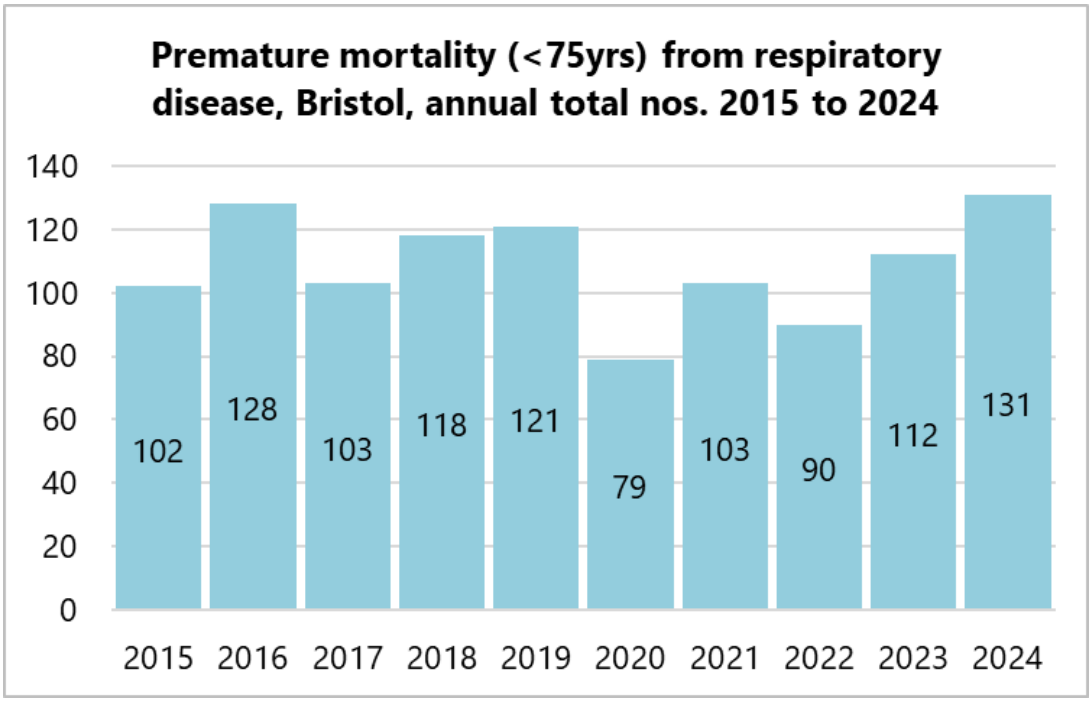

Figure 2: Premature mortality (<75yrs) from respiratory disease, Bristol residents, annual total numbers. Source: Primary Care Mortality Dataset (PCMD), NHS England – Data collated by Public Health, Bristol City Council

The Covid-19 pandemic appears to have some impact on mortality rates from respiratory illness in Bristol between 2020 and 2022 particularly. Covid-19 infection can express itself in terms of damaging the respiratory system, but just a very small number of those included in this measure since 2020 (5 out of 515 deaths) also had Covid-19 at the time of death; the vast majority of these deaths were unrelated to Covid-19 and the vast majority of Covid-19 deaths are not counted within the respiratory illness total.

In the three years 2017 to 2019 there were 342 (average of 114 per year) premature deaths of Bristol residents caused by respiratory disease. During the three years subsequent to that and including the main impacts of the Covid-19 pandemic; 2020 to 2022, there were 272 (average of 91 per year) of these deaths, a decline of 20% in numbers. It is possible that the apparent reduction in mortality risk from respiratory illness 2020 to 2022 relates to the reduction in social contact and mixing associated with Covid-19 mitigation and behavioural changes in the population during this time.

In 2023 and 2024 the numbers appear to have returned to around the pre-pandemic level and this effect has diminished considerably.

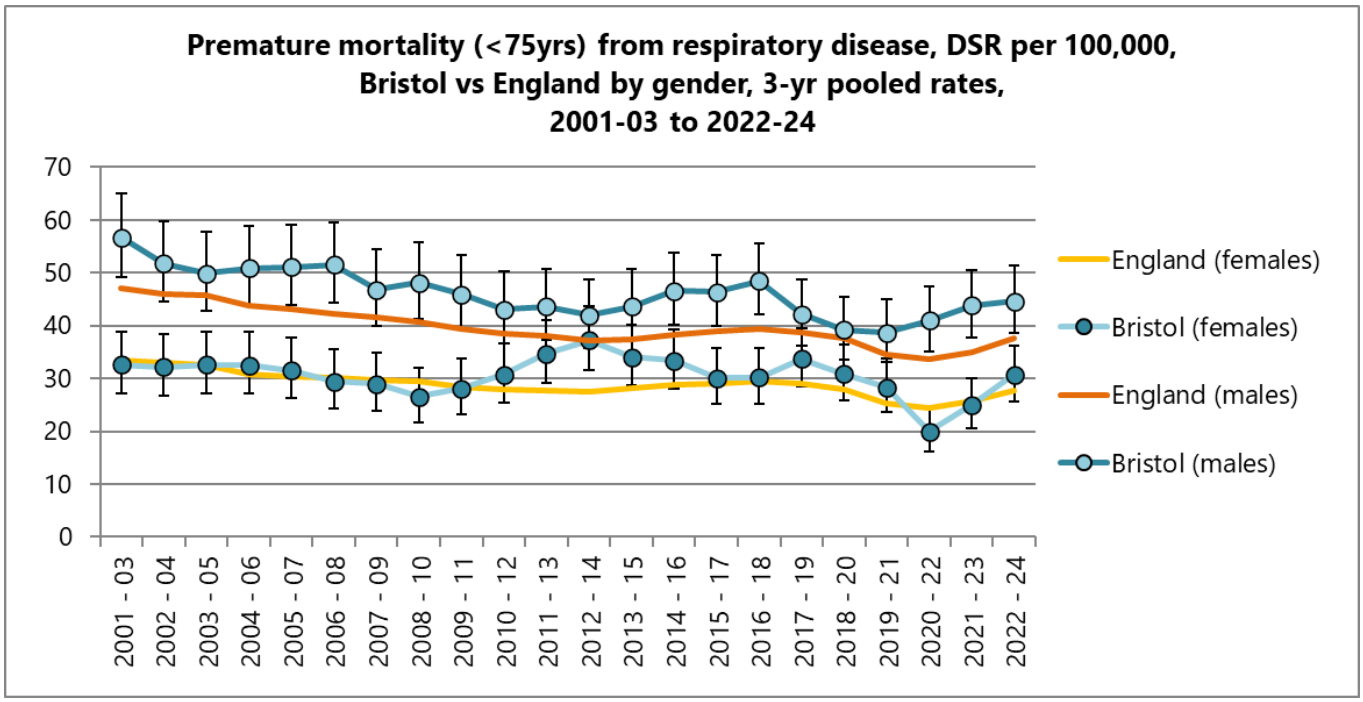

Figure 3: Premature mortality (<75yrs) from respiratory disease, DSR per 100,000, Bristol vs England, annual rates, 2001-03 to 2022-24. Source: Office for Health Improvement & Disparities Fingertips tool.
*DSR – Directly Standardised Rate

Gender: Over the last 23 years in Bristol and nationally, men have been at more risk of premature death from respiratory disease, significantly so for the majority of that period. That gap has narrowed slightly over the course of that entire period, but has seen considerable fluctuation over time also. The premature mortality rates related to respiratory illness for men in Bristol appear to have declined more significantly than they have for women in the city, hence the apparent closing of the gap between men and women's rates.

After many years of decline to 2012-2014, both the national and Bristol premature mortality rates for men from respiratory illness started to rise again for around 4 years to 2016-2018. There followed three years of decline to 2019-2021 but since then the premature mortality rate for men seems to have risen once more, with the Bristol male premature mortality rate significantly higher than the national male average between 2020-2022 and 2022-2024.

The premature mortality rates for females from respiratory illness in Bristol and nationally declined (as did the rate for males) from 2001-2003 to 2008-2010, but for a lengthy subsequent period to 2017-2019 (effectively until the onset of the Covid-19 pandemic) the trends in female premature mortality from respiratory illness in Bristol were almost a mirror image of those for males; rising to almost match the male rate in 2012-2014, but then mainly declining since then and especially so with the onset of the Covid-19 pandemic, albeit with a rebound during the most recent period to 2022-2024. For all but a period around 10-years ago (2011 to 2015) the premature mortality rate for females in Bristol has been statistically similar to the national average, and the latest value is a little above the national average.

Deprivation: An analysis of emergency hospital admissions related to respiratory illness in Bristol in 2022/23 to 2024/25 showed that 29% of these admissions were for residents living in the most deprived 20% of the city. Those living in the least deprived 20% were responsible for just 12% of admissions. Figure four below shows that the risk of admission for respiratory illness during that period appears to be closely associated with deprivation in Bristol. This is likely to be the result from variation in the underlying prevalence of respiratory illness and its risk factors, as well as the effectiveness of the management of patients to avoid hospital admissions.

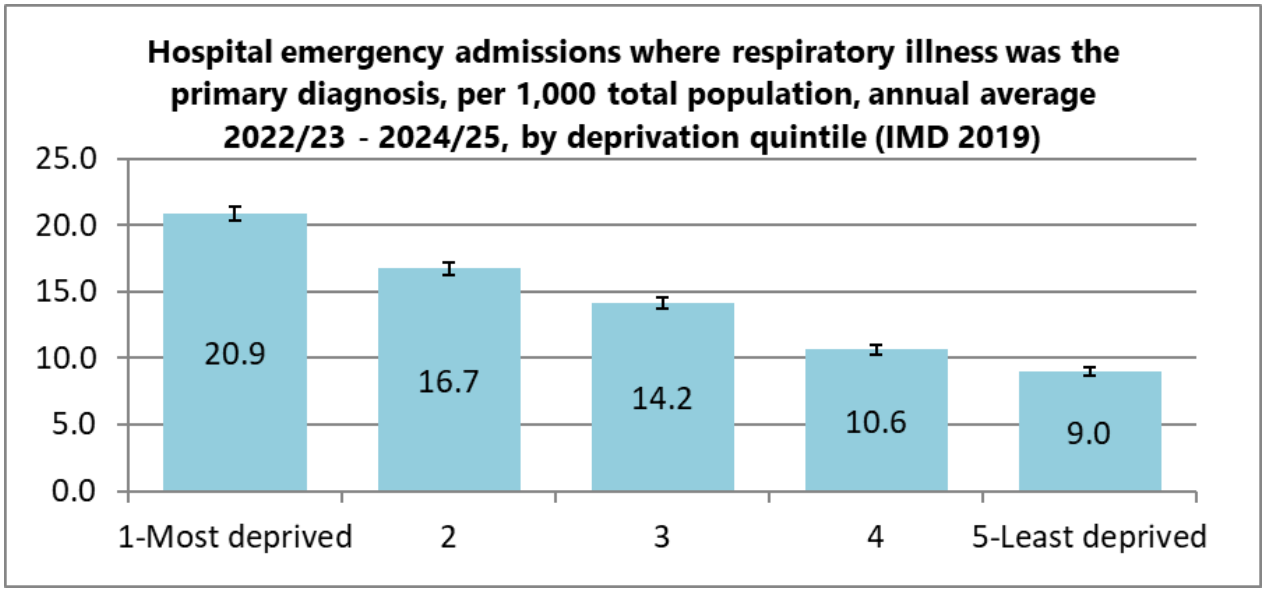

Figure 4: Rate of emergency hospital admission for respiratory illness, per 1,000 residents (all ages), 2022/23 – 2024/25, by deprivation quintile (IMD 2019). Source: Hospital Episode Statistics (NHS Digital) collated by Public Health, Bristol City Council.

Chronic obstructive pulmonary disease (COPD) is one of the main causes of respiratory disease deaths, and is strongly associated with the prevalence of smoking, as is the case with the incidence and severity of many other respiratory illnesses. Figure five below shows the percentage contribution of respiratory disease to the overall burden of premature mortality in Bristol wards. This contribution appears to be greatest in more deprived areas (where smoking rates tend to be higher on average) and also parts of the city where smoking has historically been more prevalent, in the south of the city particularly where the tobacco industry was once a major employer. During 2020 to 2024, 10% of premature mortality in the most deprived 20% of the city was caused by respiratory illness, compared to 6% in the least deprived 20%.

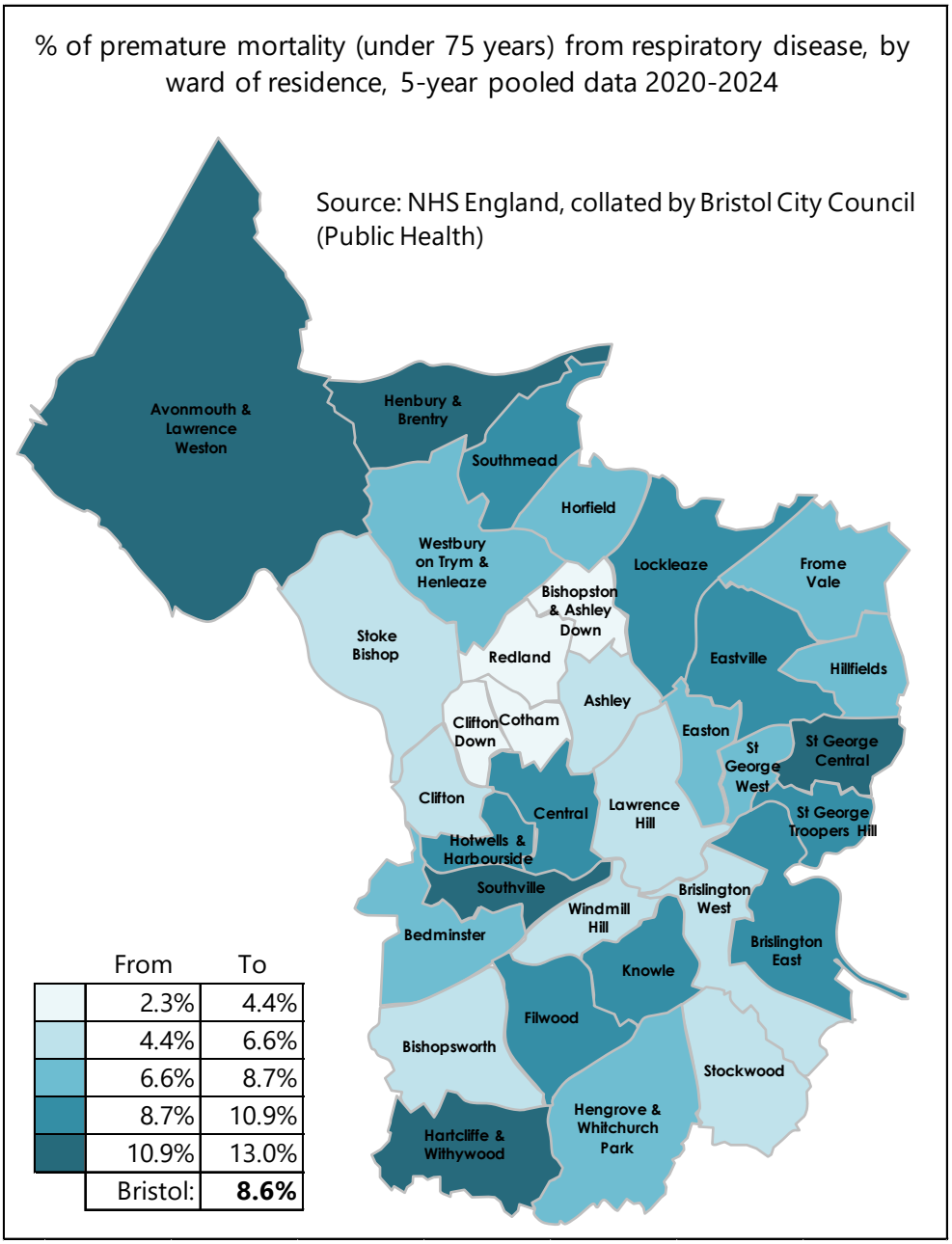

Figure 5: % of Premature mortality (<75yrs) from respiratory disease, by ward of residence, 5-yr pooled data, 2020-2024. Source: Primary Care Mortality Dataset (PCMD), NHS England – Data collated by Public Health, Bristol City Council

Chronic obstructive pulmonary disease (COPD)

During 2015 to 2024, 56% of premature mortality from respiratory disease in Bristol resulted from chronic pulmonary obstructive disease, around 1 in 19 of all premature deaths in the city.

In 2024/25, 10,397 patients at Bristol GP practices were registered on their practice's COPD register[1]. The percentage of registered patients (1.8%) was significantly lower than the national average (1.9%) for the latest year of QOF data (2024/25). Within Bristol, the percentage is highest in the south of the city (2.4% 2024/25). Higher levels of cigarette smoking associated

[1] Quality and Outcomes Framework (QOF) data, accessed via NHS Digital

with higher levels of deprivation and the legacy of the tobacco industry in the south of the city historically, may contribute to this variation across the city.

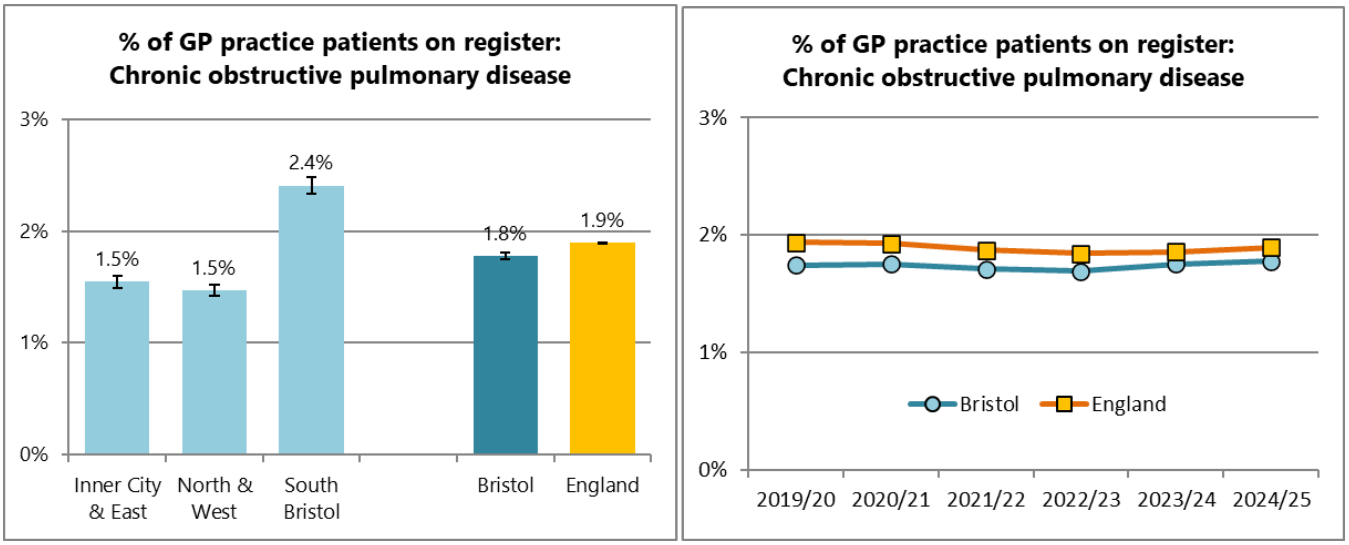

Figure 6: % of GP practice patients on register: COPD. Bristol and Bristol GP localities vs England average 2024/25. Bristol and England average trends 2019/20 to 2024/25. Source: NHS Quality and Outcomes Framework (QOF) 2024/25.

As was previously noted, COPD is a significant contributor to overall respiratory illness in the city; 19%, or around 1 in 5 emergency admissions for Bristol residents during 2022/23 to 2024/25 for respiratory illness were due to COPD in particular.

Due largely to the considerable role of smoking as a risk factor for COPD, this contribution was greatest in the south of the city, particularly in some of the more deprived wards (Filwood, Hartcliffe & Withywood and Stockwood), but also in less deprived Southville and Brislington East. In the most deprived 20% of Bristol, the contribution of COPD admissions was more than twice that seen in the least deprived 20% (23% vs 10%). The rate of emergency admissions due to COPD was also very strongly associated with deprivation. During 2022/23 to 2024/25 it was more than four times higher in the most deprived 20% of Bristol than the least deprived 20%.

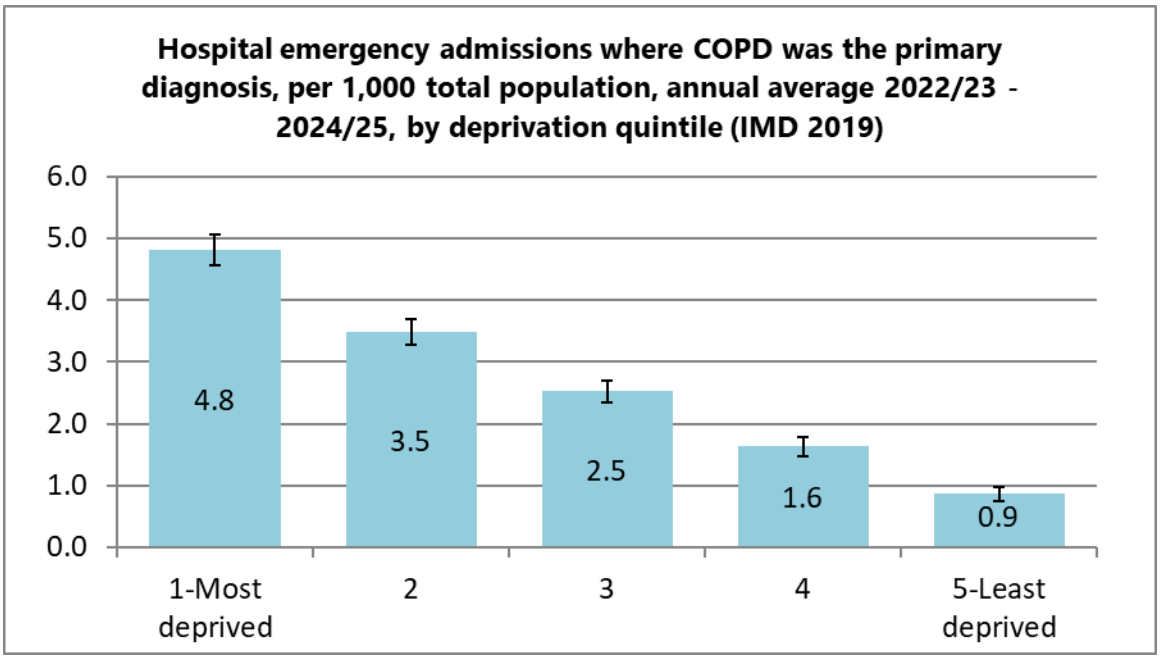

Figure 7: Rate of emergency hospital admission for Chronic Obstructive Pulmonary Disease (COPD), per 1,000 residents (all ages), 2022/23 - 2024/25, by deprivation quintile (IMD 2019). Source: Hospital Episode Statistics (NHS Digital) collated by Public Health, Bristol City Council.

Asthma

In 2024/25, 33,946 patients (aged 6 or over) at Bristol GP practices were registered on their practice's asthma register[2]. The percentage of registered patients (6.1%) was significantly lower than the national average (6.6%) for the latest year of QOF data (2024/25). Within Bristol, the percentage is highest in the south of the city (6.8% 2024/25). Higher levels of cigarette smoking in the south of the city historically, may help to explain this variation across the city.

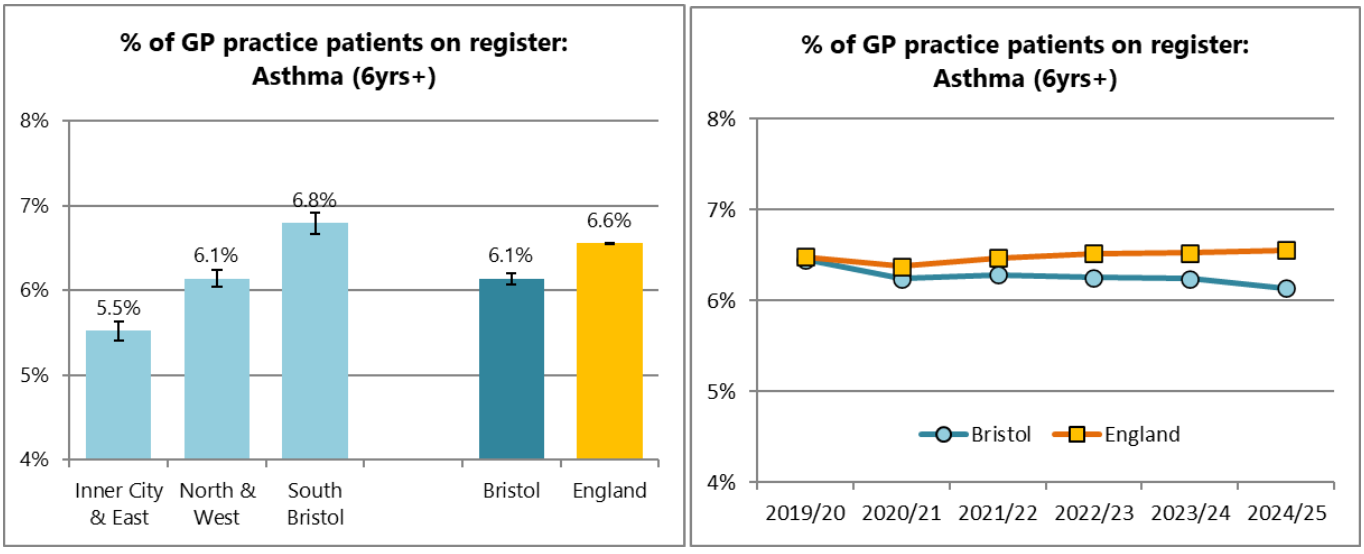

Figure 8: % of GP practice patients on register: Asthma (6 years of age or older). Bristol and Bristol GP localities vs England average 2023/24. Bristol and England average trends 2019/20 to 2024/25. Source: NHS Quality and Outcomes Framework (QOF) 2024/25.

Approximately 1 in 11 of all emergency hospital admissions relating to respiratory illness for Bristol residents, 2022/23 to 2024/25, were caused by asthma[2]. Figure 9 shows that as is the case for COPD, the risk of emergency hospital admission due to asthma (2022/23 to 2024/25) is associated with deprivation, again likely to a large extent to be due to the variation in smoking prevalence and other environmental triggers across the city, e.g., air quality. The rate of emergency admissions due to asthma during 2022/23 to 2024/25 was more than three times higher for the most deprived 20% of Bristol compared to the least deprived 20%.

Figure 10 presents the variation in asthma emergency admission rates across the city, by ward of residence. There are some similarities between this map and figure five, the map of the contribution of respiratory illness to premature mortality by ward. Rates are highest in some of the more deprived wards and wards where smoking rates are highest, currently and historically. The variation in smoking rates across the city will explain much of this distribution, but air quality is also likely to play its part and will help to explain where there are differences potentially between the maps.

Female Bristol residents are significantly more likely to have an emergency hospital admission due to asthma than male residents. From 2022/23 to 2024/25 they were 76% more likely than men in the city to be admitted to hospital with this diagnosis. As female life expectancy in the city is significantly higher than male life expectancy, this may be explained partly by a larger population of elderly female residents at greater risk of admission due to their age and other health issues.

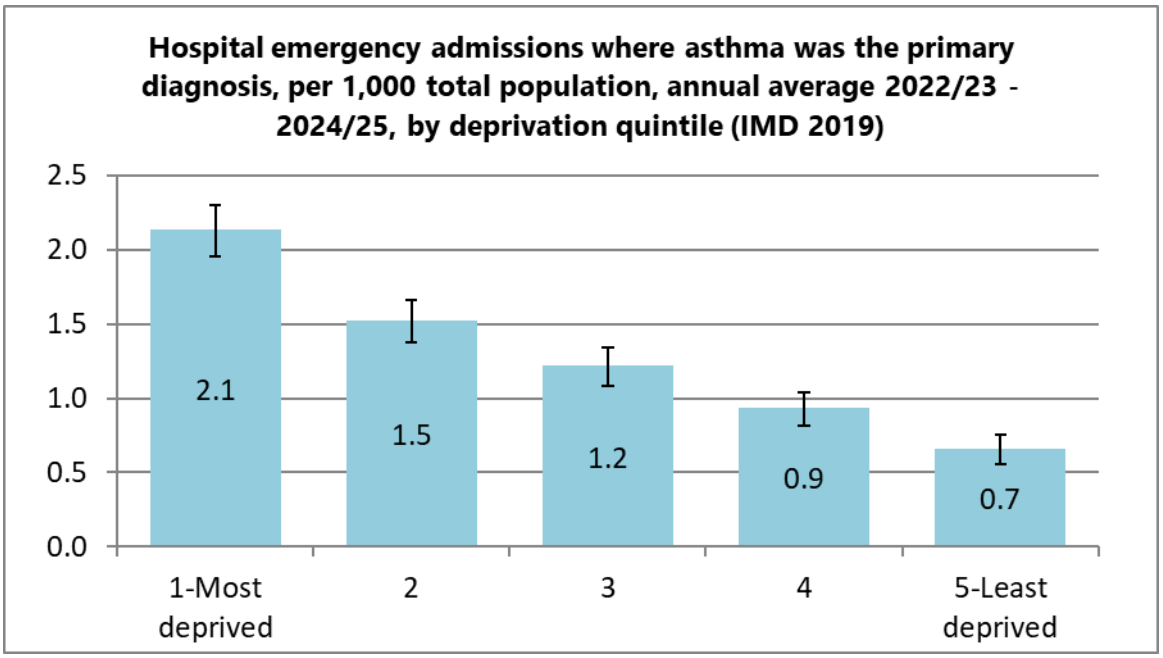

Figure 9: Rate of emergency hospital admission for asthma, per 1,000 residents (all ages), 2022/23 - 2024/25, by deprivation quintile (IMD 2019). Source: Hospital Episode Statistics (NHS Digital) collated by Public Health, Bristol City Council.

[2] Hospital Episode Statistics (NHS Digital) collated by Public Health, Bristol City Council.

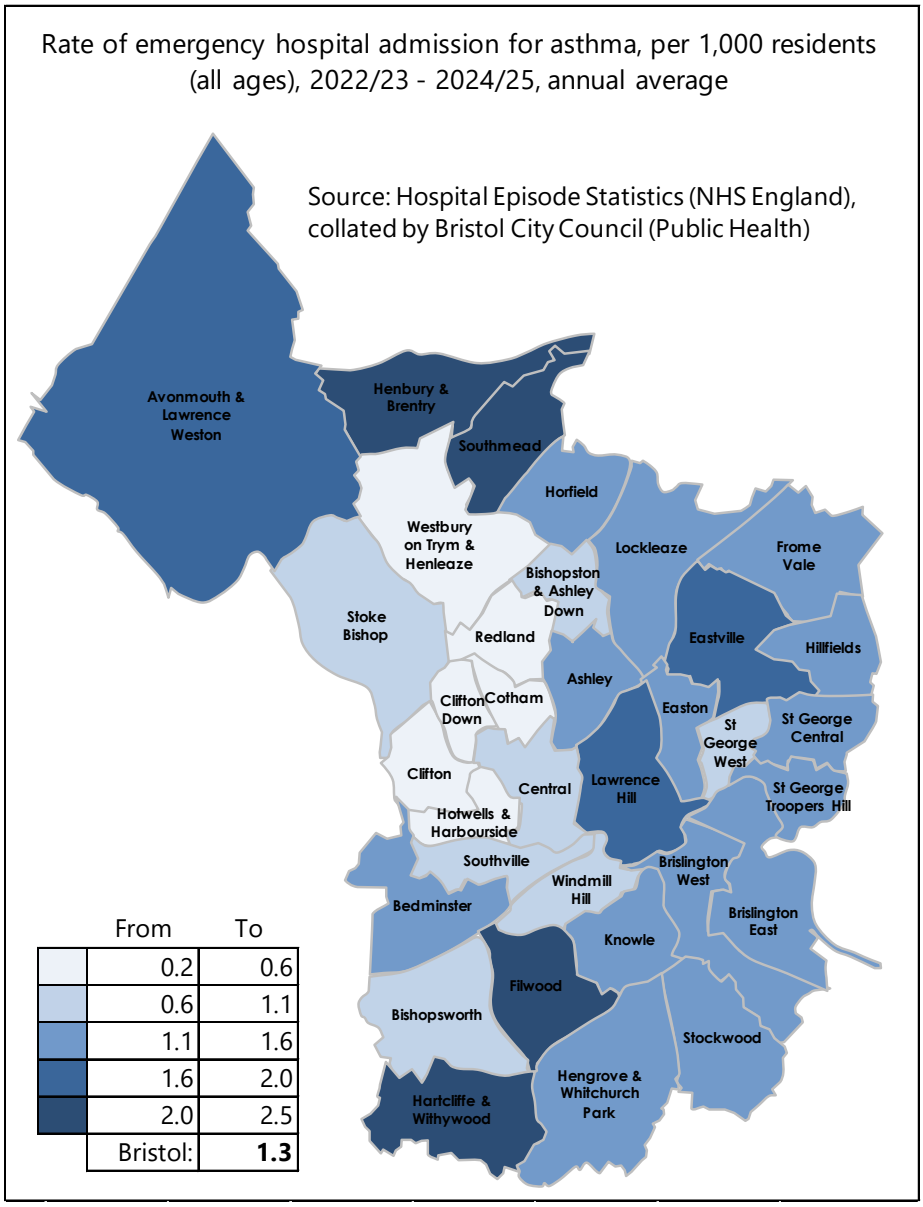

Figure 10: Rate of emergency hospital admission for asthma, per 1,000 residents (all ages), 2022/23 - 2024/25, by ward of residence. Source: Hospital Episode Statistics (NHS Digital/NHS England) collated by Public Health, Bristol City Council.

Further data / links / consultations:

- Public Health Outcomes Framework (PHOF) data https://fingertips.phe.org.uk/
- Quality and Outcomes Framework (QOF) data, accessed via NHS Digital:
- Adult Respiratory Diseases (Chronic Obstructive Pulmonary Disease) in Bristol, North Somerset and South Gloucestershire (BNSSG) 2017. JSNA website
- Air Quality – JSNA section: JSNA Data Profiles (bristol.gov.uk)

Covid-19 impact: Described throughout the report where relevant.

Date updated: November 2025 **Date of next update**: November 2026

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