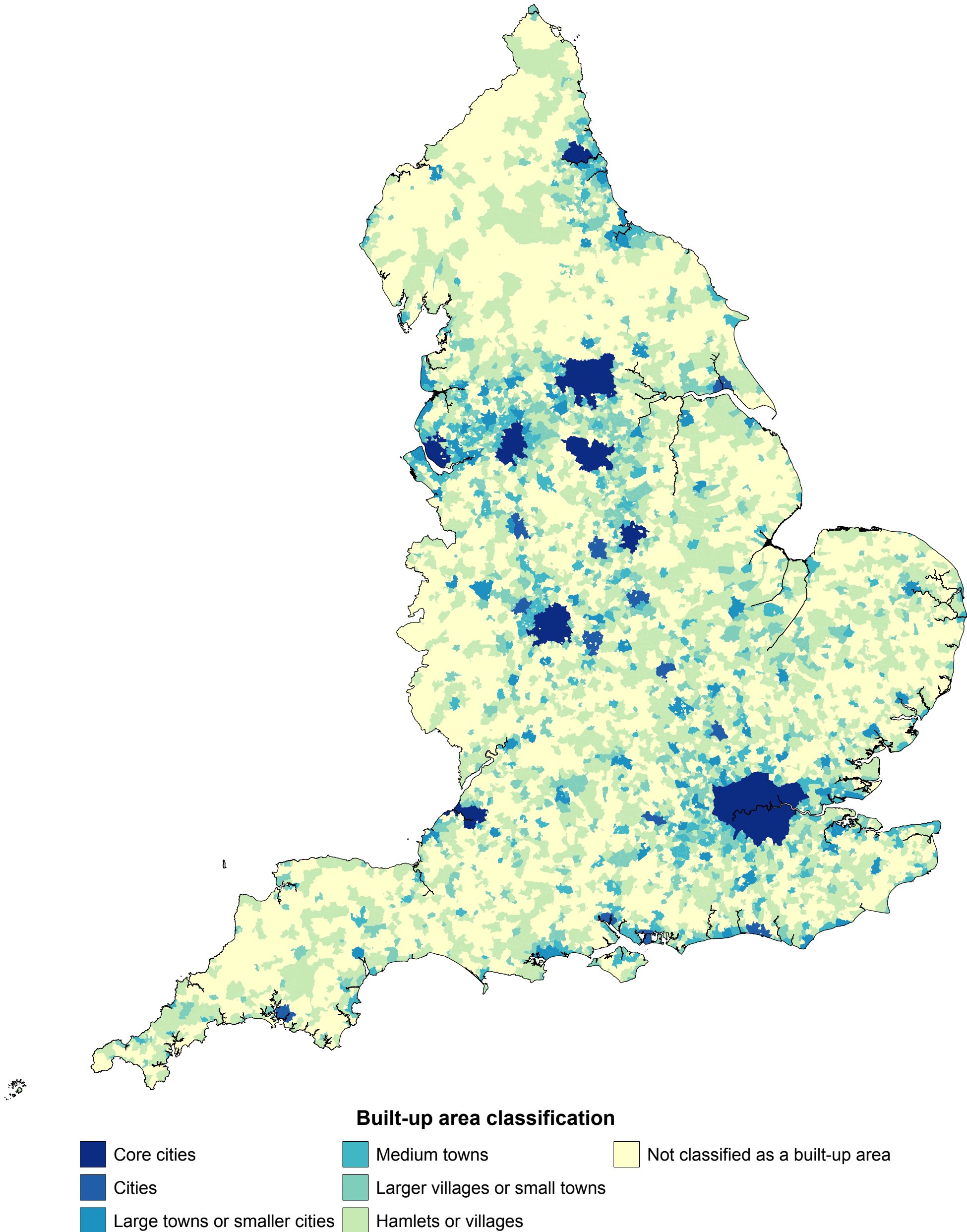
Chief Medical Officer's Annual Report 2024

Health in Cities

Executive summary and recommendations



Front cover image: Map of England by built-up area classification, based on the mid-2022 lower super output area (LSOA) population. Core cities consist of London, Birmingham, Bristol, Leeds-Bradford, Liverpool, Manchester, Newcastle upon Tyne, Nottingham and Sheffield.

Image source: Department of Health and Social Care (based on data from the Office for National Statistics)

Foreword

Cities provide remarkable places for people to live, work, enjoy cultural and leisure activities and study. A high proportion of the English population live in cities throughout their lives whilst others come to cities early in their adult lives for work or study before moving out, often after they start a family. The health of our cities is therefore very important for the health of the nation.

Cities have a number of unique qualities from a health perspective. They are home to an extensive variety of often distinct communities living very close together. This includes wide ranges of poverty and affluence, ethnic mix, and cultural experience all living within short distances. Populations are generally younger than rural areas with favourable old-age support ratios stretching into the predictable future. They tend to be home to the large teaching hospitals and other areas of health and scientific specialisation. Distances between families and healthcare are often short, at least geographically, making provision of health and social care services practically easier. It is possible to find almost every interest catered for in a large city within easy access at least for those with limited disabilities; it is also possible to be very alone with no one noticing. It was striking in getting evidence for this report that many cities feel like a conglomeration of multiple villages next door to one another and with each community often not engaged in the health challenges of the neighbouring communities.

Although affluence and poverty are more likely to be side by side in cities than in other environments, deprivation is often concentrated in specific areas within our great cities with the inevitable concentration of diseases of poverty. Ethnic minority populations, and in particular new arrivals, are much more likely to be in cities than in the country as a whole and their needs must be anticipated. Some risks to health, such as outdoor air pollution, are especially problematic in cities, and space for physical exercise and mental relaxation can be difficult to find relative to less crowded areas where the cost of land is lower, and must be protected, especially in areas of deprivation.

This Chief Medical Officer (CMO) annual report examines the health of our major cities. It looks at the issues affecting the largest cities in the UK and addresses some specific challenges for health seen in cities. Cities provide some of the biggest challenges to health; they also provide some of the widest variety of potential opportunities.

For **individual citizens** living in cities there is a challenge both to optimise our own and our families' health, and the health of our neighbours. While cities provide multiple opportunities they also make it easy, and often the default, to live a life that is almost entirely sedentary with a diet that is guaranteed to reduce the period living in good health. It is arguably easier to forget the negative effects of our actions on our neighbours, for example in increasing air pollution, in the relative anonymity of a city.

For **policymakers** in local and central government it is important to support your first instinct to be brave in support of the health of children and vulnerable people now and in the future. It is possible to design cities in such a way that they enhance health through decisions on

transport, housing, schooling, food policy, licencing and pollution. The evidence base is there to achieve this. None of these come without some cost in money or political capital but given the density of the population and the degree of need, the impact of pro-health decisions can be substantial and usually long lasting. Those who oppose specific evidence-based solutions should feel a responsibility to say what they would do instead to preserve the health of their fellow citizens.

For the **NHS and delivery of public health interventions** we may fail because the variety of communities and the very marked concentration of deprivation and consequent ill heath in specific parts of cities is not sufficiently reflected in planning. Spreading the jam evenly (often the easiest way to deliver services) will not get the most effective or efficient outcomes when the potentially avoidable ill health in cities is so heavily concentrated in particular localities and communities.

Cities provide more varied problems, and a wider range of potential solutions because of their scale, size and degree of specialisation. This report explores both, with examples from many of England's cities. I am very grateful to the many authors from around the country and those who contributed to this report, and in particular, Dr. Hannes Hagson and Dr. Nileema Patel.

Prof. Chris Whitty,
Chief Medical Officer for England

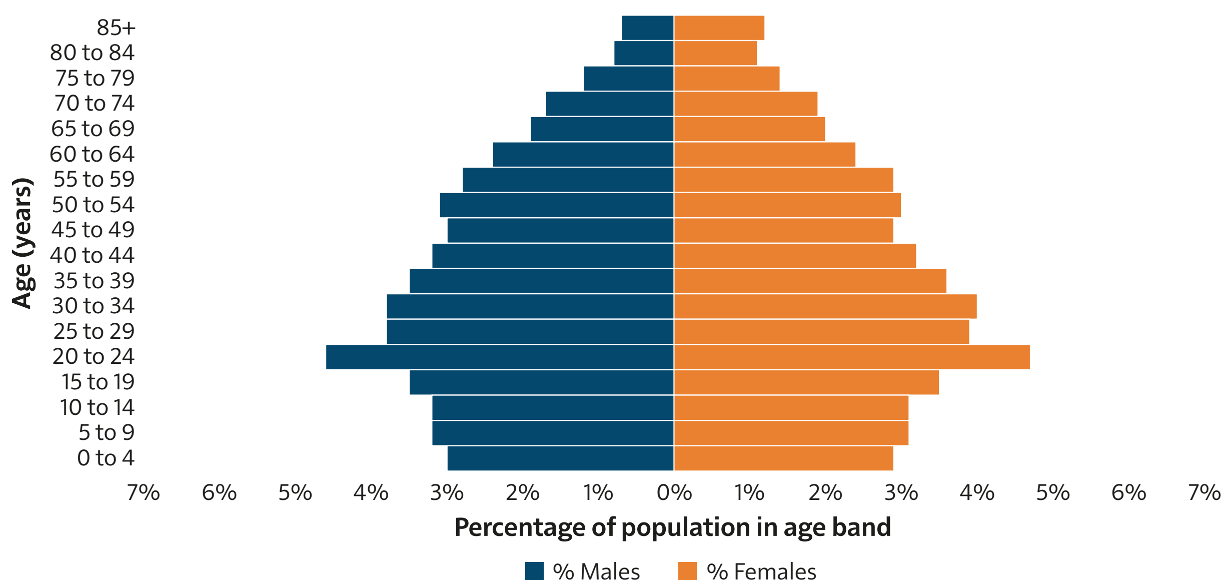
Executive summary

Health in cities in England

This report is on the health of cities in England. Cities have no exact definition for health purposes, but there are distinct patterns of populations and health in our large built-up areas which differ from those of smaller towns and more rural areas. Cities are younger, more diverse and offer a wealth of resources, from culture to commerce to specialist healthcare, which can promote good health and wellbeing. They can also have high concentrations of deprivation and poverty, often very close to areas of affluence, with the health effects of deprivation being very apparent.

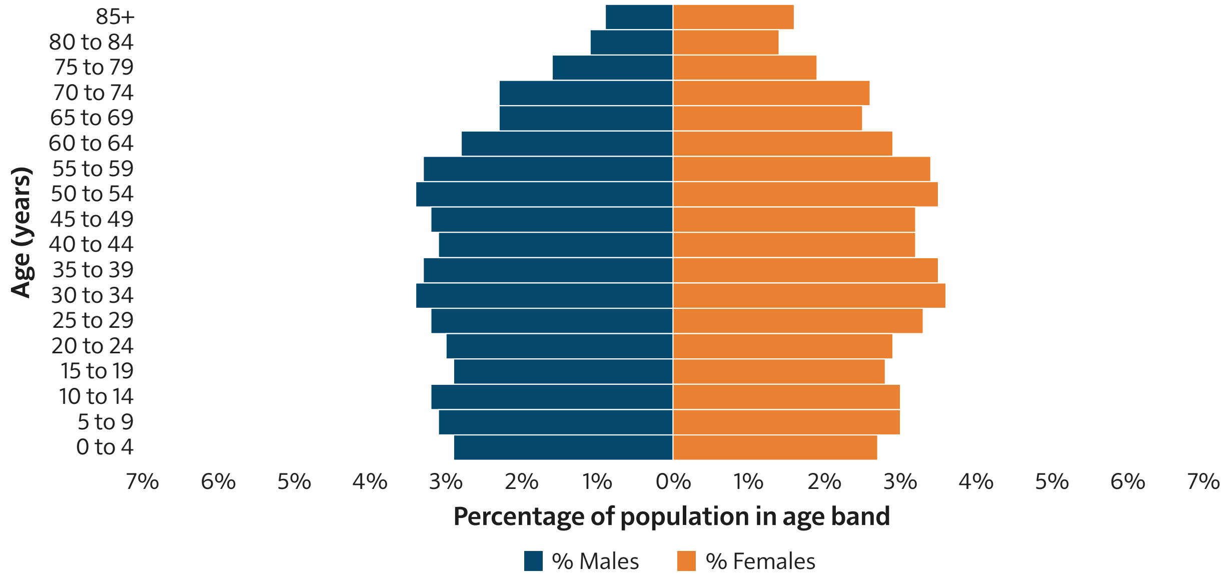
1. **Cities are younger than rural areas and smaller towns**. This was explored in part in last year's CMO annual report on Health in an Ageing Society. This means that cities have an advantage in terms of having a large working-age population, and should be better placed to support the ageing population as old age-support ratios are favourable and likely to remain so for the foreseeable future. However, the population of cities is ageing too, although at a slower rate than rural areas, and maintaining and improving health as we age presents different challenges and opportunities for older people in cities compared to more peripheral areas. A high proportion of the ageing population lives in cities given the large number living there so this needs policy focus.

Figure 1: Population pyramid of all major built-up areas (BUAs) in England (population 200,000+, excluding London)



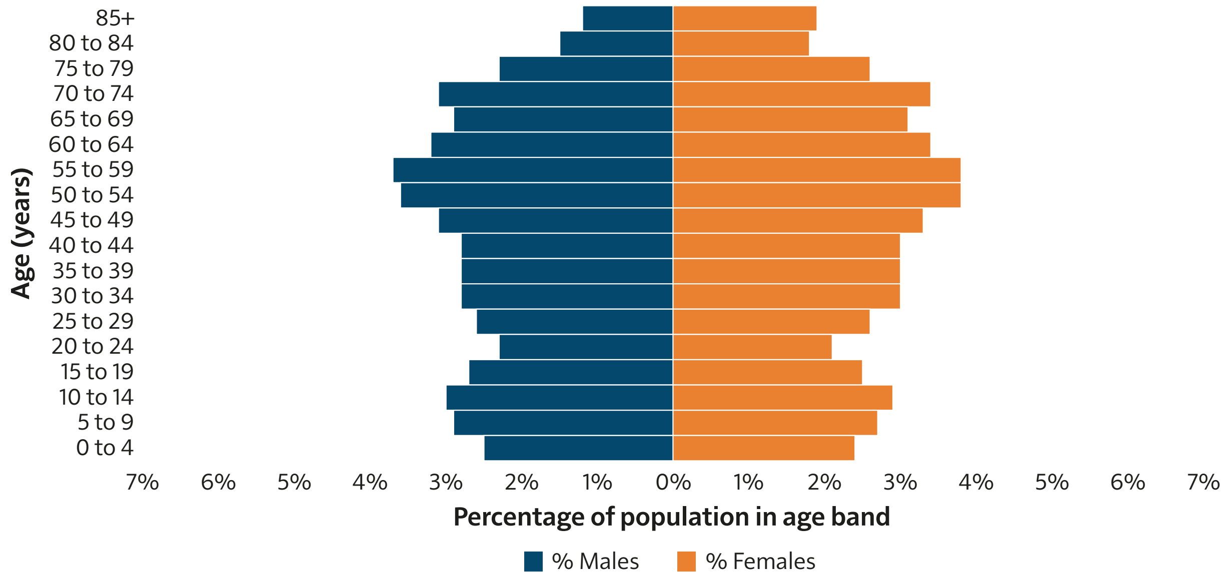
Data source: ONS, 'Towns and cities, characteristics of built-up areas, England and Wales: Census 2021'[1] and "Coastal communities, characteristics of built-up areas, England and Wales: Census 2021'[2]

Figure 2: Population pyramid of all large and medium BUAs in England (population 20,000 to 199,999)



Data source: ONS, 'Towns and cities, characteristics of built-up areas, England and Wales: Census 2021'[1] and 'Coastal communities, characteristics of built-up areas, England and Wales: Census 2021'[2]

Figure 3: Population pyramid of all small and minor BUAs in England (population 0 to 19,999)

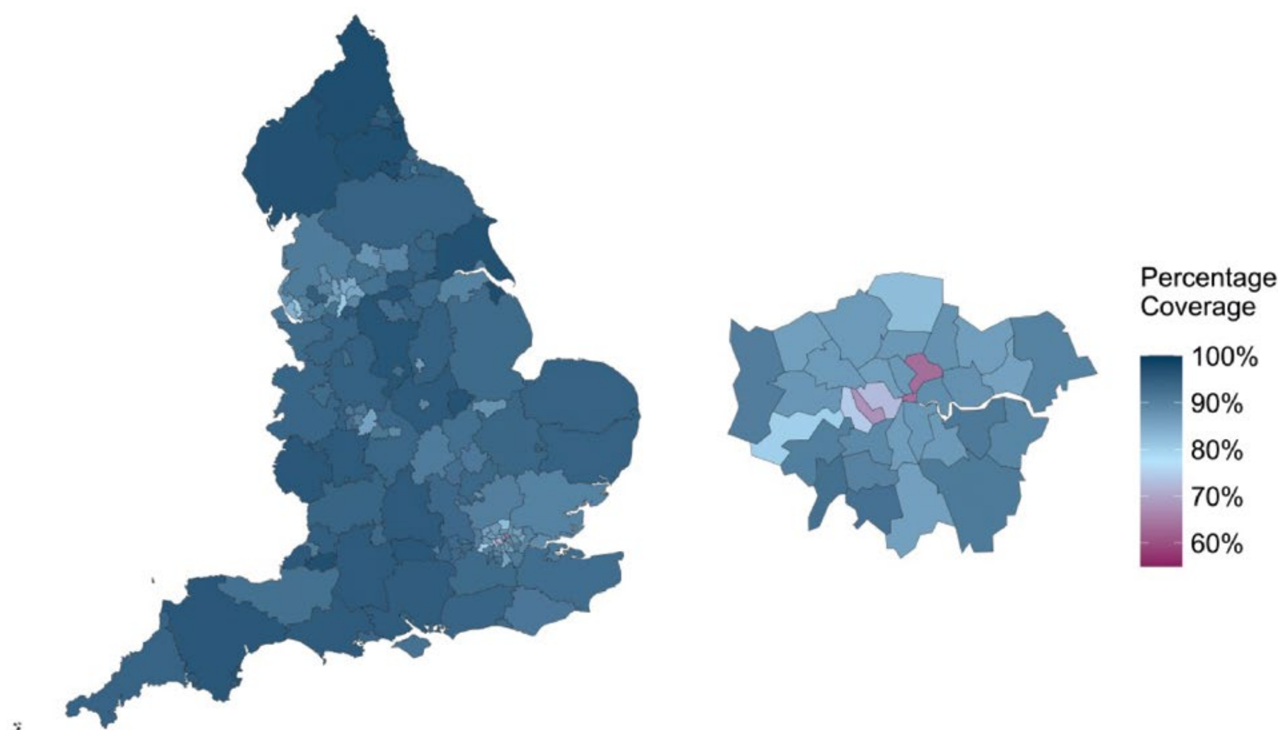


Data source: ONS, 'Towns and cities, characteristics of built-up areas, England and Wales: Census 2021'[1] and 'Coastal communities, characteristics of built-up areas, England and Wales: Census 2021'[2]

2. **Cities are often places of high degrees of mixing and churn.** They are often areas where people migrate to as young adults, for work or study or other reasons, and subsequently may move out of in later life. People living in cities may move several times within cities, especially in their early adult lives. Many interventions such as screening or immunisation are harder to maintain in such mobile populations and rates of take-up of immunisation,

screening and other public health interventions are often lower than in the rest of the country.

Figure 4: Coverage of MMR1 vaccine measured at 24 months of age in England for quarter 1 2024 to 2025 by Upper Tier Local Authority



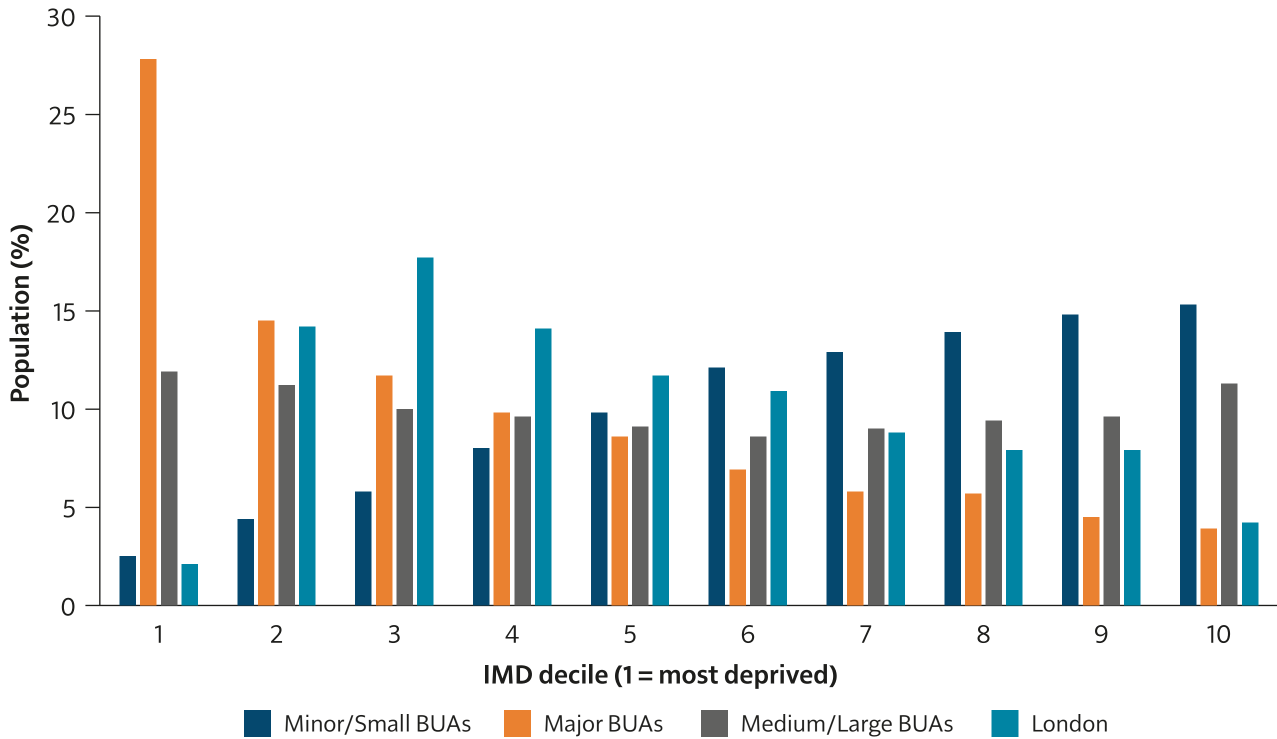
Source: ONS licensed under the Open Government Licence c.3.0

Contains OS data © Crown copyright and database right 2024

Image via UKHSA, "Quarterly vaccination coverage statistics for children aged up to 5 years in the UK (COVER programme): April to June 2024"[3]

3. **Deprivation and poverty, while existing across both rural and urban areas, is highly concentrated in cities.** This means that there are neighbourhoods and areas of cities with entrenched and longstanding deprivation where tens of thousands of residents live with limited access to those things which make us healthy, such as good housing, education and work. The risk factors for ill health, such as smoking and living with obesity, are also often concentrated in urban deprived areas. These combine to reduce life expectancy and years lived in good health in those neighbourhoods. While this is true in deprived rural areas, the concentration of people in our large cities means that the absolute numbers of people living in the most deprived areas of the country can be in the tens of thousands in just one small neighbourhood. Figure 5 demonstrates just how concentrated deprivation is in our large cities, with over a quarter of residents in major BUAs in England living in the 10% most deprived areas. This concentration brings challenges for health improvement and health protection, but also opportunities as the areas to concentrate most on because they have the worst health outcomes in high density.

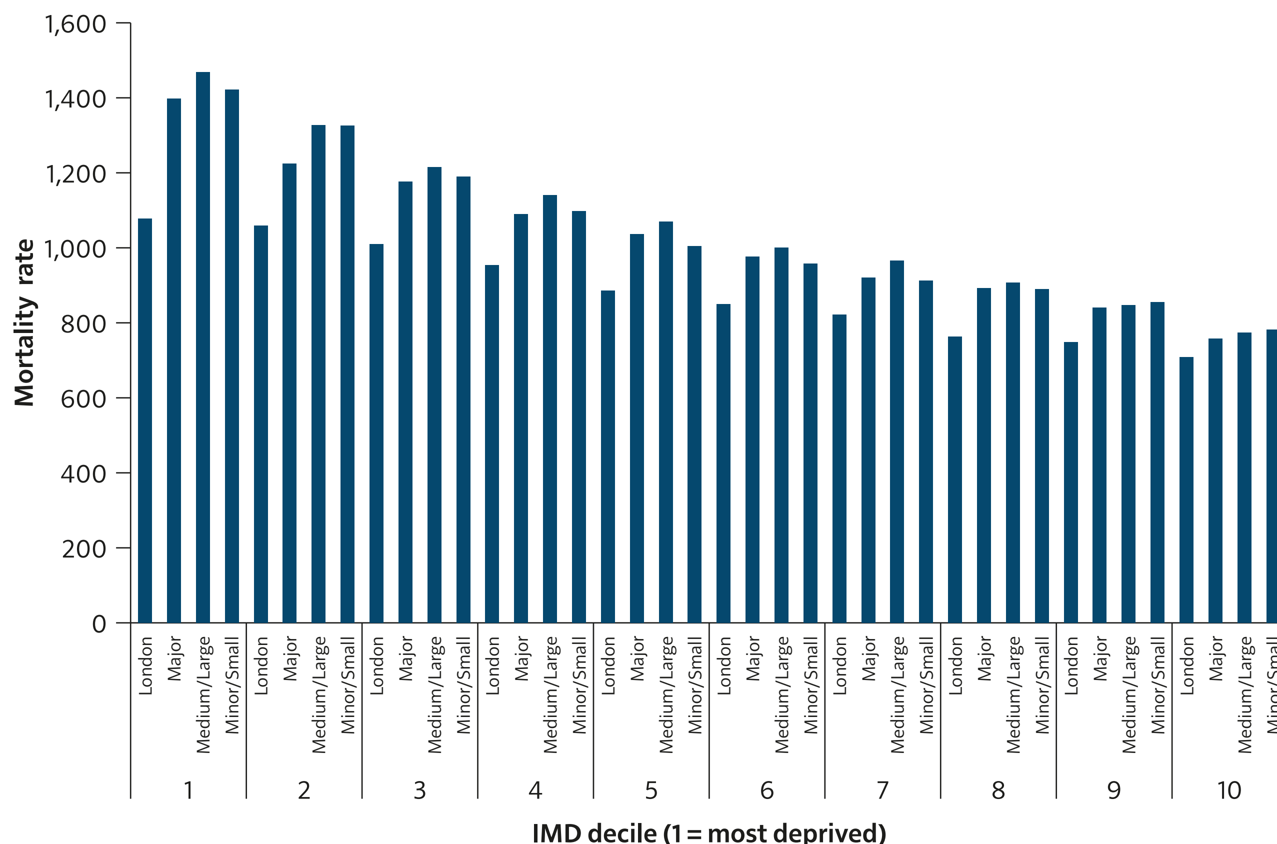
Figure 5: Percentage of population by BUA category and Indices of Multiple Deprivation (IMD) decile



Data source: ONS, "Health Inequalities by built-up area and ethnic group, England: March 2021 to May 2023"[4]

The association between deprivation and poorer health outcomes can be seen in Figure 6. This demonstrates the gains in health which could be made by reducing the health effects of city deprivation. It is noteworthy that London, the UK's wealthiest city, shows significantly lower mortality rates than the other built-up areas, particularly in the more deprived deciles.

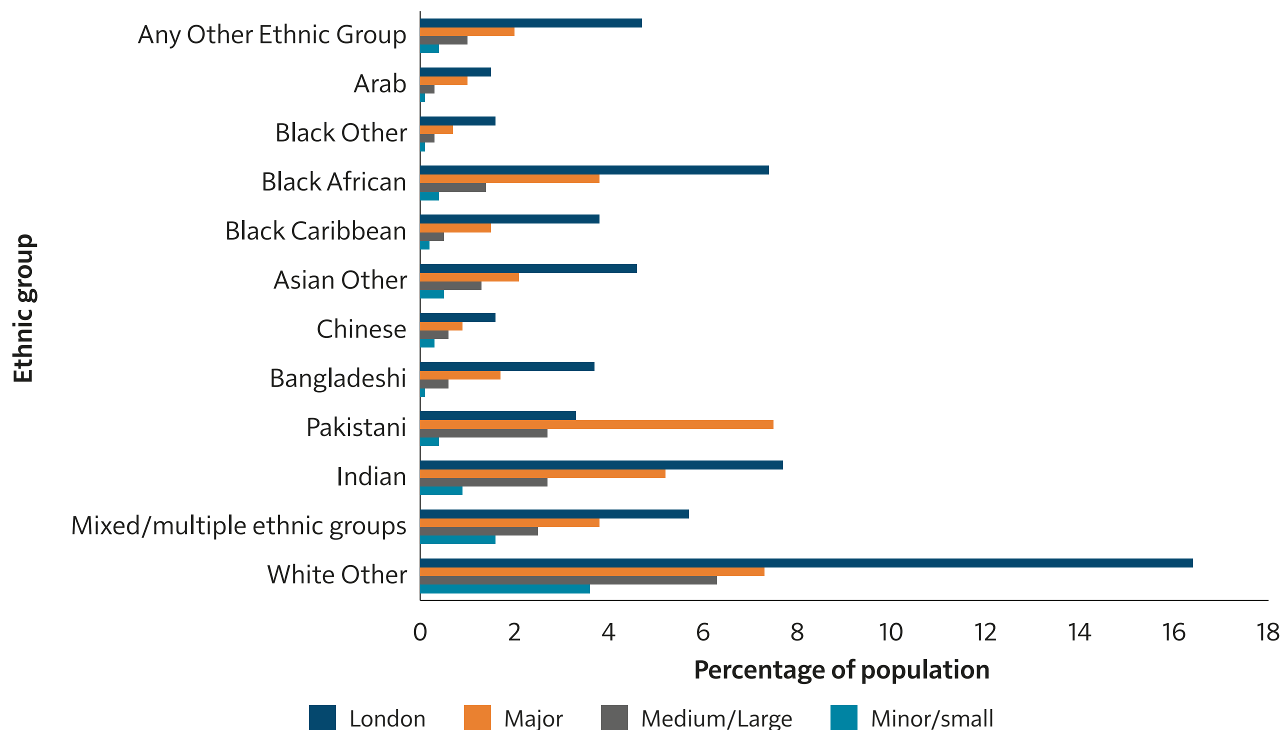
Figure 6: Age standardised all-cause mortality rates by IMD decile and BUA category (per 100,000 person years)



Data source: ONS, 'Health Inequalities by built-up area and ethnic group, England: March 2021 to May 2023'

4. **Cities benefit by having highly ethnically diverse populations.** Ethnic diversity in England is country-wide but is much more highly concentrated in cities. People from ethnic minority backgrounds often experience particular health inequalities. Most, but not all, ethnic minority groups suffer on average less good health than the white majority population. This can have many causes including genetic pre-disposition (for example, sickle cell disease) and societal factors, but it can often be largely caused by the relatively higher concentration of deprivation in which many ethnic minority citizens in cities live. Some major diseases more common in some ethnic minority groups have genetic, social and deprivation components – an example might be Type 2 diabetes. Teasing these apart can be difficult but is important for planning public health interventions and NHS services in cities, which need to serve the many communities cities contain.

Figure 7: Percentage of total population in different BUA categories by ethnic group (excluding White British)



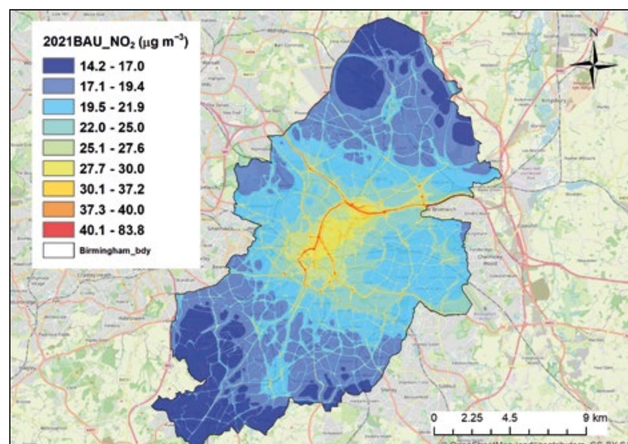
Data source: Office for National Statistics, 'Health Inequalities by built-up area and ethnic group, England: March 2021 to May 2023'

5. **Cities are unique in their high concentration of buildings, including for accommodation.** This presents challenges in terms of access to good housing, green spaces, and a pollution-free environment. Improving the built environment in cities presents an opportunity to significantly improve health for millions of people.

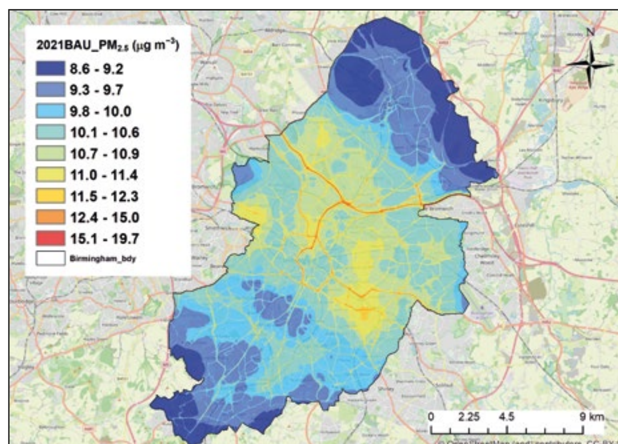
6. **The effects of air pollution are mostly faced in large urban areas, in particular, cities.** Transport and space heating are areas that need particular action to reduce air pollution.

Figure 8: a) Annual air quality map of mean NO_2 over Birmingham for 2021 b) Annual air quality map of mean $PM_{2.5}$ over Birmingham for 2021

a) Annual air quality map of mean NO_2 over Birmingham for 2021



b) Annual air quality map of mean $PM_{2.5}$ over Birmingham for 2021



Source: Zhong et al.[5] as part of the West Midlands Air Quality Improvement (WM-Air) programme[6]

7. **Physical activity is one of the best ways to preserve health.** Cities provide both difficulties and opportunities for citizens to build exercise and physical activity into their daily lives. Cities should be ideal places for enabling active travel with shorter distances to the things we need or want on a regular basis, including supermarkets, places of leisure, work or healthcare. Making walking and cycling more practical and safer, and access to green space easier and more equitable, would go a long way toward removing barriers to improving physical activity levels and could significantly improve the health of England's increasingly urban population. Green space and sporting facilities are at a premium, but transport to them is usually good in comparison to rural areas. Areas of deprivation are often poorly served both for active transport and for sporting facilities.

8. **The food and outdoor leisure environment in cities varies between areas of affluence and deprivation.** It is often varied and exciting in areas of affluence, but frequently detrimental to public health in areas of deprivation, with a heavy concentration of fast food outlets concentrating on a limited range of products high in fat, sugar and salt, a high density of advertising of unhealthy foods and limited shopping opportunities. While the food system in cities is very complex, this provides an opportunity to improve the health of city populations by enabling better access to healthy food.

Figure 9: The food system

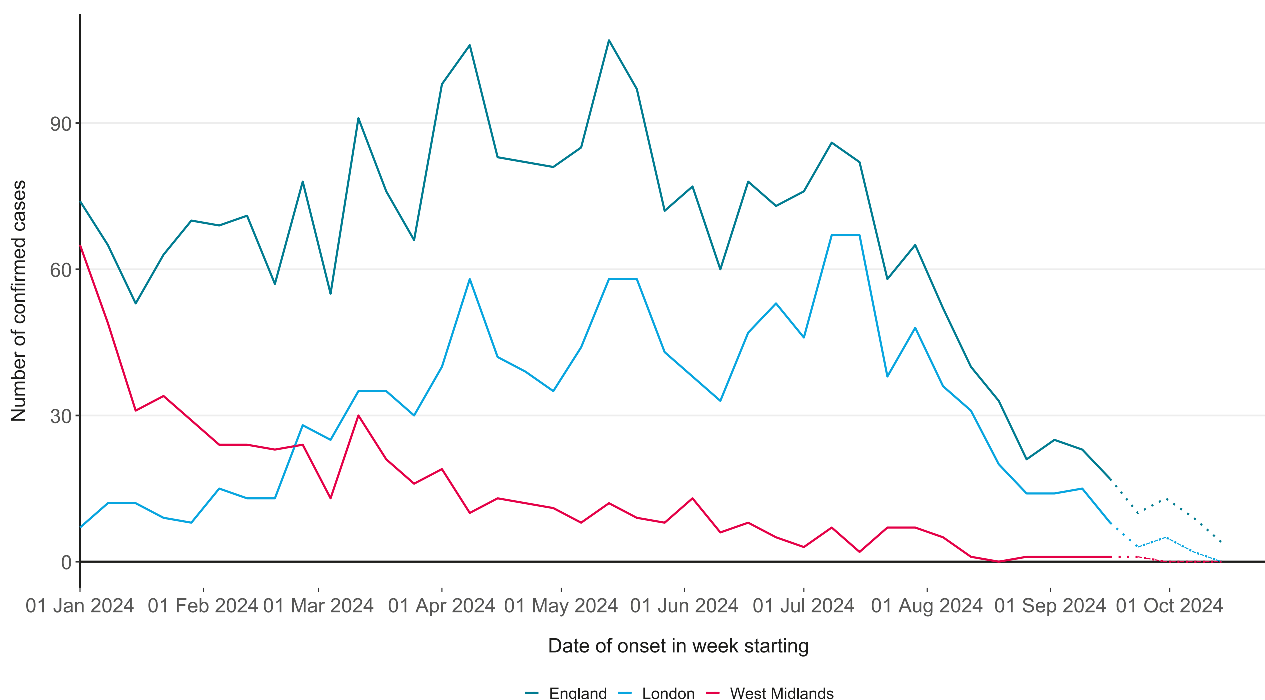
Source: Birmingham City Council Public Health. Birmingham Food Systems Strategy 2022-2030. 2023.[7]

9. **Higher and further education students are largely based in cities.** This population needs specific consideration in preserving physical and mental health, due to their transient nature in the area and in some cases relative social isolation.

10. **Rough sleeping numbers are highest in cities, especially London.** Though absolute numbers are small, people who have to sleep rough face specific challenges in terms of their complex health and social needs.

11. **The infectious disease risks in cities are different from those in less highly concentrated areas.** The close nature of city living makes respiratory infections and other infections of more crowded environments more likely. The high concentration of young adults leads to a concentration of sexually transmitted infections. As mentioned earlier, vaccination rates are also lower in city populations.

Figure 10: Laboratory confirmed cases of measles by week of onset of rash or symptoms reported, London, West Midlands and England: 1 January 2024 to 21 October 2024



Source: UKHSA, "Confirmed cases of measles in England by month, age, region and upper-tier local authority: 2024"[8]

12. **Cities are often a patchwork of much smaller, distinct communities with strong internal links and support but relatively little interaction with other communities in quite close proximity.** This is both a strength because social movements, services and the voluntary sector are often highly engaged in these communities, and a weakness because provision of health and social care services can often feel fragmented and less than the sum of its parts. Health services need to adapt to this reality and not treat a city as a single entity, though still need to function as a cohesive whole.

13. **The way the NHS operates in cities is often quite different to smaller towns and rural areas.** There may be easier access to specialist services in major hospitals and A&E may more frequently be the first port of call rather than general practice, especially for newer and more transient individuals in certain circumstances.

Recommendations

Overall recommendations

Breaking entrenched deprivation in cities will take a long time, but well-evidenced actions can be taken now to improve health and wellbeing for people living, working and studying in cities. Deprivation is highly concentrated in specific parts of cities. This affects millions of people in England and can lead to worse health and wellbeing. This impacts individuals and society as a whole, with higher health and care costs and lower productivity. National and local government should undertake co-ordinated and concerted efforts to break the cycle of ill health in those areas of cities where it has become entrenched. Concentrating prevention efforts and resources in these areas and adapting to their local communities is likely to be both more efficient and more effective than spreading a uniform service thinly over entire cities.

High smoking rates, obesity prevalence, air pollution, excess alcohol and lack of access to physical activity are more common in areas of high deprivation. Government, both national and local, as well as the NHS, should consider further targeted interventions to improve these well-known risk factors in concentrated urban areas and direct resources in order to do so. Tackling these risk factors is not alone sufficient to remove the stark inequalities in health seen in our cities, but failing to do so because the choices seem difficult is to condemn many people living in deprivation to shorter lives constrained by ill health.

Maintaining good health for the longest possible time can be harder in cities and should be seen as a major priority. In contrast to more rural areas the age-support ratio will remain reasonably stable in cities over coming decades, but the barriers to maintaining health of those ageing in cities can be high. Cities are better at providing curative than preventive services for older citizens. Action to remove barriers and maintain good health for older people in cities can include having age-friendly accommodation and ensuring practical access to places maintaining physical activity and social engagement for those with predictable mobility and sensory impairment of older age.

Cities are areas of high ethnic diversity. Both prevention and curative services need to reflect that. Measures to improve the sustained involvement of local communities in finding culturally competent solutions to local issues are essential. Steady, prolonged engagement rather than stop-start initiatives is key to maximising the chances of effective health improvement.

Specific recommendations

There are specific recommendations throughout this report, but here I highlight 4 important areas that can and should be improved.

The food environment in parts of cities entrenches inequalities in health and promotes obesity. Healthy food deserts combine with junk food advertising to set children and adults up to live a shorter and unhealthier life through obesity and the diseases it causes, particularly in the more deprived areas of our cities. Changes will need to be tailored to local needs and food choices.

To reduce air pollution, transport emissions, including from public transport and space heating (especially solid fuel burners), need particular action specific to cities. Air pollution is a particular risk in cities where the greatest levels of pollution are combined with the highest concentrations of people. It causes significant lung and cardiovascular disease. Many mayors and city authorities have proposed sensible steps to reduce them; those who oppose these should say what they would do to improve air quality instead.

Healthcare service planning and delivery should consider the needs of young adults in cities. The health needs of young adults are concentrated in cities and are often overlooked. Mental health issues generally emerge by or in early adulthood, and current increases in mental health needs for already stretched mental health services therefore fall disproportionately in cities. Similarly, increasing rates of sexually transmitted infections (STIs) and the weakened provision of STI services is particularly a city problem.

We need to account for, and explore solutions to, the itinerant nature of city populations in providing routine immunisation and screening services. Steady engagement with communities with historically lower uptake is also essential. The relatively poor, and falling, rates of routine immunisation and screening in our cities deprive their citizens of effective tools which could prevent major diseases. This needs action.

Editor and chapter authors

Christopher J. M. Whitty, Chief Medical Officer for England

Hannes Hagson, Editor-in-Chief

Nileema Patel, Editor

1 Introduction

2 Demographics and data

3 City case studies

3.1 Birmingham

Rebecca Howell-Jones, Aidan Hall, Alex Robinson and Justin Varney-Bennett

3.2 Bristol

Christina Gray, Toby Stone, Brianna Sloan, Tracy Matthews and Jennifer Davies

3.3 Leeds

Victoria Eaton, Dawn Bailey, Philippa Bird, Tim Fielding, Tim Taylor and Emily Wardman

3.4 Liverpool

Matthew Ashton, Elspeth Anwar and Gavin Flatt

3.5 London

Kevin Fenton, Julie Billett and Vicky Hobart

3.5.1 Haringey

Will Maimaris, Damani Goldstein, Fleur Harrison, Akudo Okereafor, Maddie Watkins, Laura Marmion, Marlene D'Aguilar, Catriona MacRae and Maria Ahmad

3.6 Manchester City

Cordelle Ofori, Sarah Griffiths, Neil Bendel, Katie McCall and Sharmila Kar

3.7 Newcastle

Alice Wiseman, Sophie Allard, Melanie Armstrong, Virginia Barbour, Louise Brennan, Paul Davison, Michelle Donnison, Justin Durham, Zoe Foster, Jessica Hamilton, Hannah Powell, Rachel Somerville and Claire Toas

3.8 Nottingham

Lucy Hubber, David Johns, Helen Johnston, Elizabeth Pierce, Tammy Coles and Nancy Cordy

3.9 Sheffield

Greg Fell, Elizabeth Shassere, Dan Spicer, Bethan Plant, Matt Dean, Emma Dickinson, Zoe Brownlie and Georgina Parkin

3.10 Milton Keynes

Sam Smith, Vicky Head, Jon Palmer, Oliver Mytton, Gabriel Kenyon and Jack Pope

4 City contexts

4.1 Urban centres, ethnicity and health: where are we now?
Cameron Razieh, Ash Routen, Caroline Hancock, Catherine Bray, Paul Niblett, Justine Fitzpatrick, Jennifer Yip, Kevin Fenton and Kamlesh Khunti

4.2 The geography of cities – deprivation and health inequalities
Jeanelle de Gruchy, Alice Stonham and Leigh Fowler-Dowd

4.3 Housing and health in cities
Michael Chang, Josephine Ozols-Riding and Anna Mavrogianni

4.4 Cities and homelessness
John Gibbons, Alice Kociejowski and Al Story

4.5 Student health in cities
Simon Royal and Libby Manktelow

4.6 The impact of urban environments on mental health
Shubulade Smith, Samuel Hunt and Rachael Haddelsey

4.7 Active travel in cities
Eleanor Roaf, Eve Holt and Jo Maher

4.8 Cities driving food systems change – The Birmingham Food Revolution
Helen Harrison, Sarah Pullen, Rosemary Jenkins and Justin Varney-Bennett

4.9 Inner city food environment
Carole Coulon, Louise Foreman, Bryony Hirsch, Leila Lawal, Matthias Lomas, Louise Luckhurst, Rachel Pidgeon, Joe Potter, Michael Rigby, Nikita Sinclair, Becky Steele and Nicki Whiteman

4.10 Health in an ageing population in cities

4.11 Cities and air pollution

4.12 Infections in cities
Thomas Waite

Acknowledgements

This report considers a wide range of topics related to health in cities, and has drawn upon research and knowledge from a wide array of sources. We hope that others may expand further on the issues raised in these pages, and thus expand the knowledge base.

We would like to thank the authors and contributors who devoted their time and expertise in order to create this report. The chapters in this report remain the views of their authors, but we would also like to thank the following organisations, departments and similar, who have been invaluable in the scoping, evidence-gathering, and completion of this report.

Birmingham City Council, Bristol City Council, Haringey Council, Leeds City Council, Liverpool City Council, Greater London Authority, Manchester City Council, Newcastle City Council, Nottingham City Council, Sheffield City Council, Milton Keynes City Council, Department of Health and Social Care, Office for Health Improvement and Disparities, Office for National Statistics, UK Health Security Agency, NHS trusts and community providers, NHS England, Faculty of Public Health, The Association of Directors of Public Health, World Health Organisation, The Health Foundation, The King's Fund, National Institute for Health and Care Excellence, Impact on Urban Health, Medical Research Council, National Institute for Health and Care Research, Royal Town Planning Institute, Greater Manchester Moving, Association of Directors of Public Health, Active Travel England, Royal College of Psychiatrists, Royal College of General Practitioners, Royal College of Physicians, universities in the UK and abroad carrying out research into cities and health, Department for Transport, and the Ministry of Housing, Communities and Local Government.

We would also like to thank the CMO's private office for their input, including:

Marc Masey, Emily Whamond, Timo Taal, Danny Duffield, Natalie Hickman, Izzy Rollason, Alison Rostron, Nicky Vousden, Maisha Syed, Amy Bleakly and Harriet Drake.

References

1 Office for National Statistics (ONS), Towns and cities, characteristics of built-up areas, England and Wales: Census 2021 (August 2023) [Internet]. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/townsandcitiescharacteristicsofbuiltupareasenglandandwales/census2021 (cited 2024 Oct 31).

2 Office for National Statistics (ONS), Coastal communities, characteristics of built-up areas, England and Wales: Census 2021 (February 2024) [Internet]. Available from: https://www.ons.gov.uk/releases/coastalcommunitiescharacteristicsofbuiltupareasenglandandwalescensus2021 (cited 2024 Oct 31).

3 UK Health Security Agency (UKHSA), Quarterly vaccination coverage statistics for children aged up to 5 years in the UK (COVER programme): April to June 2024 (September 2024) [Internet]. Available from: https://www.gov.uk/government/statistics/cover-of-vaccination-evaluated-rapidly-cover-programme-2024-to-2025-quarterly-data/quarterly-vaccination-coverage-statistics-for-children-aged-up-to-5-years-in-the-uk-cover-programme-april-to-june-2024.

4 Office for National Statistics (ONS), Health inequalities by built-up area and ethnic group, England: March 2021 to May 2023 (October 2024) [Internet]. Available from: https://www.ons.gov.uk/releases/healthinequalitiesbybuiltupareaandethnicgroupenglandmarch2021tomay2023.

5 Zhong J et al. Using task farming to optimise a street-scale resolution air quality model of the West Midlands (UK). Atmosphere 12(8): 983; 2019. https://doi.org/10.3390/atmos12080983 (This is an open access article distributed under the Creative Commons Attribution License).

6 WM-Air. Clean air science for the West Midlands; 2022. [Accessed 5 May 2022]. Available from: https://wm-air.org.uk/.

7 Birmingham City Council, Birmingham Food System Strategy (2023) [Internet]. Available from: https://www.birmingham.gov.uk/downloads/file/23651/birmingham_food_system_strategy.

8 UK Health Security Agency (UKHSA). Confirmed cases of measles in England by month, age, region and upper-tier local authority: 2024 [Internet] (July 2024). Available from: https://www.gov.uk/government/publications/measles-epidemiology-2023/confirmed-cases-of-measles-in-england-by-month-age-region-and-upper-tier-local-authority-2024 (Accessed 30/10/2024).