

# **Expert Report for the UK Covid-19 Public Inquiry**

## **Module 4 – Vaccines and therapeutics**

### **Vaccine hesitancy and confidence during the Covid-19 pandemic**

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Author statement

*"We confirm that this is our own work and that the facts stated in the report are within our own knowledge. We understand our duty to provide independent evidence and have complied with that duty. We confirm that we have made clear which facts and matters referred to in this report are within our own knowledge and which are not. Those that are within our own knowledge we confirm to be true. The opinions we have expressed represent our true and complete professional opinions on the matters to which they refer."*

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# Preamble

## Relevant qualifications and experience

1. **Heidi J. Larson (HJL)**, PhD, Professor of Anthropology, Risk and Decision Science, London School of Hygiene & Tropical Medicine; Clinical Professor, Institute for Health Metrics & Evaluation, University of Washington, Seattle; and Visiting Professor, Centre for Evaluation of Vaccines, University of Antwerp Belgium
  - 1.1. HJL is the Founding Director of the Vaccine Confidence Project<sup>1</sup> since 2010 and established the Vaccine Confidence Index in 2015 which has been used globally to monitor vaccine confidence at regional and national levels. Her research focuses on managing risk and building public trust and cooperation in the context of pandemics and other crises. In 2021, Prof Larson founded the Global Listening Project<sup>2</sup> to investigate ecosystems of trust and public experiences and trust relations during the COVID-19 pandemic
  - 1.2. HJL previously led vaccine strategy and communication at UNICEF and served on the WHO SAGE Working Group on vaccine hesitancy. She is author of *STUCK: How Vaccine Rumors Start – and Why They Don't Go Away*. In 2021 she was named by BBC as one of the 100 most influential women in the world and was awarded the 2021 Edinburgh Medal.
2. **Alexandre de Figueiredo (AdF)**, PhD MSc MSci. Assistant Professor, Department of Infectious Disease Epidemiology, London School of Hygiene & Tropical Medicine.
  - 2.1. AdF obtained his PhD from Imperial College London in 2018, with a thesis titled “A mathematical assessment of the global state of vaccine hesitancy and coverage.” This was preceded by an EPSRC Prize Fellowship at Imperial College London and a position as Assistant Professor in the Department of Infectious Disease Epidemiology at the London School of Hygiene & Tropical Medicine. AdF also holds an MSc in Mathematical Modelling and Scientific Computing from the University of Oxford, and an MSci in Physics with Theoretical Physics from Imperial College London.
  - 2.2. AdF has worked in the field of vaccine hesitancy for over a decade and has authored several high-impact peer-reviewed articles as well as reports for policymakers. AdF has consulted on themes relevant to this Expert Group with both public- and private-sector organisations including the World Health Organization, the European Commission, as well as industry partners. AdF’s research focuses on using large-scale quantitative surveys and statistical methods to solve problems at the intersection of public health and vaccine acceptance. Over the past few years, AdF has modelled vaccine confidence at varying spatial levels. AdF’s research has included: predictions of Covid-19 vaccine uptake in the UK before vaccine rollout, measuring the impact of Covid-19 vaccination policies, and estimating the

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<sup>1</sup> <https://www.vaccineconfidence.org>

<sup>2</sup> <https://global-listening.org>

socio-demographic determinants of Covid-19 uptake in the UK and internationally. AdF has held membership of several expert committees and advisory panels, including the Technical Steering Group on Vaccine Coverage Estimates (WHO), Steering Group on Influenza Vaccination (Vaccines Europe), and Strengthening Childhood Immunization Pathways (Pfizer).

3. **Caitlin Jarrett** (CJ), MPH, BSc/PGDip (Psych), BA (Social Anthropology). Research Fellow, Department of Infectious Disease Epidemiology, London School of Hygiene & Tropical Medicine

- 3.1. CJ completed her MPH at Imperial College London in 2011, with a thesis on tracking online vaccine sentiments undertaken with The *Vaccine Confidence Project* (VCP). Continuing with the VCP at LSHTM, from 2012 to 2016, CJ was part of the WHO SAGE Working Group on dealing with vaccine hesitancy, co-leading the development of systematic reviews on the determinants of vaccine hesitancy, as well as strategies to address hesitancy globally.

- 3.2. CJ has contributed to several research papers and high-level reports relating to trust in vaccination and implementation research on strategies to help address issues of vaccine hesitancy (UNICEF). CJ is currently engaged with the *Global Listening Project*, conducting formative research on public experiences and trust relations during the Covid-19 pandemic.

4. **Ed Pertwee** (EP), PhD, Research Fellow, Department of Infectious Disease Epidemiology, London School of Hygiene & Tropical Medicine

- 4.1. EP obtained his PhD from the London School of Economics and Political Science (LSE) in 2018. He was subsequently an Economic and Social Research Council Postdoctoral Fellow at LSE between 2018 and 2019, before joining LSHTM as a Research Fellow in 2020

- 4.2. A key focus of EP's research is how new information and communication technologies, such as social media and AI, are affecting the democratic public sphere. This is reflected in recent research projects and publications on topics such as: COVID-19 conspiracy theories; far-right social media platforms; the relationship between social media use and vaccine hesitancy; the role of podcasts in spreading vaccine misinformation; and uses and ethics of AI in the vaccine field.

5. **Rachel L. Eagan** (RLE), MSc, Research Assistant, Department of Infectious Disease Epidemiology, London School of Hygiene & Tropical Medicine.

- 5.1. RLE holds an MSc in Demography and Health from the London School of Hygiene & Tropical Medicine. Her mixed-methods research focuses on migrant health and how gender, race, and ethnicity influence decision-making, health seeking behaviour, and receipt of care to deliver more equitable health outcomes.

- 5.2. RLE has over a decade of experiencing working at the intersection of health, housing, economic opportunity, and community connection—as a research project manager for the Department of Global Health at the University of Washington

overseeing a multi-country collaborative consortium measuring incidence of Shigella to support future vaccine trials; as a consultant for the UN assessing healthcare systems across Asia and The Pacific; as a research assistant for Washington Healthcare Access Alliance conducting primary care needs assessments for the state of Washington; and as a data analyst for HomeSight supporting community-led planning processes and equitable development initiatives to address health disparities in Southeast Seattle.

# I. Understanding vaccine hesitancy

## I.1. Defining vaccine hesitancy

1. Vaccine hesitancy is a state of indecision about whether to get vaccinated. One can be hesitant about one vaccine and not others or, in some cases, hesitant about all vaccines. The nature of vaccine hesitancy is complex and context-specific and varies across time and place. It is influenced by factors such as those coined as the “3Cs” by the SAGE Working Group on Vaccine Hesitancy to the World Health Organization’s (WHO) Strategic Advisory Group of Experts on Immunization (SAGE) (World Health Organization, 2014). The 3Cs include **complacency** (do I really need this vaccine?), **convenience** (is it easy to get at times that work for me and is it affordable?) and **confidence** (do I trust the vaccine, the health service, and the vaccine producer? And the government that regulates it and sets the policies?). This “3C” definition has since been expanded to a “5C” definition, which includes **calculation** (the extent to which individuals engage in information-seeking behaviour and weigh the risks of vaccination against the perceived risks of infection) and **collective responsibility** (willingness to protect others through vaccination, contributing to herd immunity and the community’s overall health) (Betsch *et al.*, 2018). “7C” and “8C” definitions have also been proposed (Howe and Dearnley, 2023; Oudin Doglioni *et al.*, 2023). In 2014, the SAGE Working Group on Vaccine Hesitancy broadly defined vaccine hesitancy as “a delay in acceptance or refusal of vaccines despite availability of vaccine services,” but over the past decade that definition has been debated, recognising that hesitancy is not a behaviour: refusing a vaccine is a decision and a behaviour, whereas hesitancy is a state of mind (Larson, 2022).
2. Vaccine hesitancy is influenced by multiple factors including broader socio-cultural and political influences, trust (or distrust) in healthcare systems and providers, past experiences with vaccines or healthcare encounters, perceived risks of diseases versus vaccine side effects, recommendations from healthcare institutions, societal norms and pressures, and personal beliefs. Recognising the complexity of these factors is crucial for designing effective interventions to address vaccine hesitancy and promote vaccination uptake.

### **Related concepts**

- 2.1. *Vaccine confidence*: Although often mistakenly confused and used inter-changeably, vaccine confidence is not the same as vaccine hesitancy. Vaccine confidence can be defined as the trust individuals have in the importance, effectiveness, and safety of vaccines, as well as in the systems and institutions that deliver them (BeSD Working Group, 2021). As noted above, people may hesitate to get vaccinated because services are too far away, not open at convenient times, or in some settings, prohibitively expensive. Additionally, the perceived importance or necessity of the vaccine may not be compelling enough for some individuals. These factors can also affect confidence in health and delivery systems, and in turn affect vaccine decisions when there is a sense that systems are not making sufficient efforts to engage with and meet the needs of a population or community.

- 2.2. *Practical barriers to vaccination:* In accounting for an individual's decision whether to vaccinate or not, it is important to distinguish between attitudes, state of mind, and practical barriers, which may be beyond an individual's control. For instance, while individuals may be hesitant to receive vaccines due to concerns about safety or its importance, practical barriers such as lack of access to healthcare services or vaccines themselves can ultimately influence whether somebody receives a vaccination. High levels of vaccine hesitancy may also be caused by factors unrelated to vaccines themselves, such as structural discrimination and previous negative experiences with the healthcare system or authorities recommending vaccination.
3. While vaccine confidence and practical access issues can be intertwined – with access often impacting vaccine hesitancy – it is important to identify specific practical barriers that can be addressed separately. These barriers often require different interventions compared to hesitancy. Some communities, notably migrants, ethnic and religious minorities, non-English speakers, and people with disabilities (including physical impairments, mental health conditions, hearing difficulties, visual impairments, learning difficulties, and neurodiversity) may face additional, structural or societal barriers to vaccination (Race Equality Foundation, 2023; Refugee Action, 2022; Swenor *et al.*, 2022; Disability Rights UK, 2024). These barriers can stem from governmental policies and treatment of certain groups (Joint Council for the Welfare of Immigrants, 2024). The resulting obstacles may include information and language barriers, a lack of familiarity with the UK's health system (Bell *et al.*, 2019), as well as financial barriers to the UK's healthcare system or concerns surrounding sharing personal data, as is often the case for many migrants in the UK, including undocumented migrants (New Economics Foundation, 2020). There may also be fears around being shamed or mistreated by healthcare professionals, stemming from previous experiences or past injustices inflicted on minority groups (Dolezal, 2022; Woodhead *et al.*, 2022). People with disabilities may face barriers related to transportation or service provision. The barriers above require specific interventions that range from local-level support in the form, for example, of home visits, mobile clinics, or community transport to systemic operational or legislative change in how certain groups are viewed and treated by authorities. For example, barriers related to immigration status would require more targeted policy interventions to overcome. These practical barriers, experienced and perceived, require catered interventions, without which people can become vaccine hesitant.
4. In addressing vaccine hesitancy, it is also essential to recognise that hesitancy is not a static phenomenon but rather one that evolves over time and varies across populations, specific vaccines, and contexts. Given this volatility of sentiment, monitoring and measuring vaccine hesitancy are critical components of public health surveillance efforts.

## **I.2. How vaccine hesitancy is measured and monitored**

5. Monitoring vaccine hesitancy can involve a range of methodologies, including representative surveys, in-depth interviews, and real-time social media analyses. These methodologies may reveal the need for trust-building or other interventions, depending on the issues identified. By continuously assessing vaccine hesitancy levels, and by identifying emerging trends and issues, policymakers and healthcare practitioners can tailor interventions to address specific concerns in relevant populations.

6. Monitoring and measuring vaccine hesitancy and related concepts are essential components of public health surveillance efforts, enabling timely identification of trends and targeted interventions. Ongoing monitoring can also help assess the effectiveness of interventions – for example, did the communication intervention to build confidence in vaccine safety build trust and reduce hesitancy? Did the health service intervention make a difference? These interventions should not be assumed to have permanently “fixed” a hesitancy problem but need ongoing vigilance. Not addressing detected vaccine hesitancy and concerns early risks longer term drops in vaccine uptake.
7. Surveys provide valuable insights into public attitudes towards vaccination and the prevalence of vaccine hesitancy within different demographic groups. One of the earliest vaccine hesitancy survey tools – the parental attitudes about childhood vaccines survey (PACV) – was developed by Opel and colleagues (Opel et al., 2013). This was followed by a survey tool developed by the WHO SAGE Working Group on Vaccine Hesitancy, published in 2015 (Larson et al., 2015). The UKHSA also conducts parental attitude surveys in England exploring vaccination opinions, (UK Health Security Agency, 2024c). These surveys extend previous surveying efforts conducted by its predecessor, Public Health England (PHE), that date back to 1991 (Public Health England, 2018) and permit the evaluation of some pre-pandemic trends in parental perceptions and experiences towards vaccinating children including, for example, awareness and safety perceptions of specific vaccines (limited to the period 1991 to 2001) (Ramsay et al., 2002; Yarwood et al., 2005), sources of trust (Campbell et al., 2017), and encountering information that may dissuade from vaccinating (Yarwood et al., 2005; Campbell et al., 2017, 2023). Devolved public health agencies have also conducted ad-hoc surveys to understand public attitudes to vaccines (Public Health Wales, 2020; Scottish Government, 2022).
8. A review by the BeSD Working Group in 2021 examined survey tools for measuring confidence in childhood vaccines (BeSD Working Group, 2021). There were at least 14 tools identified, although few were specifically measuring either confidence or hesitancy. Overall, the different tools identified were deployed in a range of contexts with the authors highlighting the need for “a childhood vaccination measure validated for use in diverse global contexts.” A review by Dyda et al in 2020 came to a similar conclusion to the array of different metrics for measuring vaccine confidence, noting that “methods to measure parental attitudes and beliefs about vaccination could be improved with validated and standardised yet flexible instruments” and that “the use of a standard set of questions should be encouraged in this area of study.” (Dyda et al., 2020)
9. The World Health Organization and UNICEF recently developed a framework called the Behavioural and Social Drivers (BeSD) toolkit for investigating a comprehensive array of barriers and facilitators to vaccination. Given its recent development, and still evolving state, research is ongoing through the gathering of data using this toolkit, to test its validity (World Health Organization, 2022). The BeSD tool collects data on both vaccine confidence/hesitancy as well as examining a broader set of drivers and facilitators of vaccination.
10. Thus, there is currently no universally accepted metric or survey tool for assessing vaccine hesitancy or confidence, especially on a global scale, or which routinely collects vaccine hesitancy levels.



11. The most widely deployed tool is the Vaccine Confidence Index (VCI), developed by the Vaccine Confidence Project.<sup>3</sup> As discussed earlier, though, confidence is only one, albeit a significant, determinant of vaccine hesitancy.
12. The VCI comprises a brief four-item questionnaire that gauges individuals' attitudes toward the importance, safety, and effectiveness of vaccines, as well as their compatibility with religious beliefs. While the VCI has not undergone psychometric testing, it has provided valuable insights into the evolving landscape of vaccine confidence worldwide (de Figueiredo et al., 2020).
13. Additionally, the two core VCI items on perception towards the importance of vaccines are priority indicators in the new BeSD framework (World Health Organization, 2022). The VCI was also used in the 2018 Wellcome Global Monitor (Wellcome Trust, 2019) and run every two years since 2018 by the European Commission to monitor vaccine confidence across EU countries (de Figueiredo et al., 2022).
14. In addition to surveys, qualitative research methods such as focus groups and in-depth interviews offer a deeper understanding of the underlying reasons for vaccine hesitancy, including cultural, social, and personal factors that shape individuals' perceptions of vaccines and vaccination.
15. Social media analysis has also emerged as a valuable tool for monitoring vaccine hesitancy in real-time. Platforms like X (formerly Twitter), Facebook, and Instagram provide a wealth of data on public conversations and sentiments related to vaccines (Radzikowski et al., 2016; Deiner et al., 2019; Kummervold et al., 2021), however samples obtained via data collection on social media will often not be representative of target populations. By employing natural language processing and sentiment analysis techniques, researchers can track discussions, identify misinformation – commonly defined as false or misleading information (Southwell et al., 2019a) – or vaccine-related concerns, and assess the impact of online narratives on vaccine acceptance (Radzikowski et al., 2016; Luo et al., 2019). Online control trials have been another means to measure the impact of, for instance, misinformation on people's sentiments and intention to get a vaccination (Loomba et al., 2021).
16. In addition to these various measures, the monitoring of vaccination rates and refusal rates (World Health Organization, 2024), while not a measure of vaccine hesitancy *per se*, can indicate underlying hesitancy concerns. By tracking vaccination coverage over time and comparing it with target goals, public health authorities can identify regions or communities with low vaccination uptake and implement targeted interventions to address barriers to vaccination and improve access to immunisation services. Monitoring refusal rates, particularly among specific demographic groups, allows for the identification of populations at higher risk of vaccine hesitancy, guiding the development of tailored communication strategies and outreach efforts to address their concerns and promote vaccine acceptance.

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<sup>3</sup> [www.vaccineconfidence.org](http://www.vaccineconfidence.org)

### I.3. A brief overview of pre-pandemic vaccine hesitancy in the UK

17. Vaccination in the UK over the decades preceding the pandemic reveals a largely positive picture in which high vaccine coverage rates have been maintained across childhood vaccination programmes, although current coverage levels remain below pre-pandemic values (NHS Digital, 2023). High coverage rates of routine immunisations have been achieved, in part, due to robust surveillance of disease prevalence and vaccine coverage (UK Health Security Agency, 2023; UK Health Security Agency, 2024).

#### ***Vaccine controversies***

18. Two notable vaccine controversies in the UK in the past few decades have prompted vaccine hesitancy, leading to subsequent declines in associated vaccine uptake rates as well as re-emergence of epidemics of the vaccine-preventable disease.
  - 18.1. *Pertussis controversy:* In the 1970s and 1980s, significant hesitancy emerged towards the pertussis vaccine in the UK precipitating substantial declines in vaccination rates among children. The pertussis vaccine protects against whooping cough. In England and Wales, coverage fell from 78.5% in 1971 to 37% in 1974 (Millward, 2019). The proximal causes and drivers of the controversy have been outlined in a historical essay by Baker in 2003 (Baker, 2003). In brief, the controversy began with case reports linking the pertussis vaccine with neurological and brain disorders (Kulenkampff et al., 1974). These reports received a lot of negative media publicity and dissenting views from a minority of medical practitioners (Baker, 2003). However, although the Joint Committee on Vaccination and Immunisation (JCVI) continued to recommend the vaccine, a 1977 survey of general practitioners found many unwilling to recommend the vaccine (Baker, 2003). The consequences were widespread hesitancy and a rapid decline in vaccine coverage rates, followed by a series of whooping cough epidemics and associated child deaths (Millward, 2017). In 1977, George Dick, a medical professor, published another series of encephalopathy case reports linking the disease to the pertussis vaccine (Baker, 2003). The UK Government and JCVI then launched a series of investigations to establish the potential link between the pertussis vaccine and neurological disorders. While the Government's findings were inconclusive, the JCVI concluded that the associated risk of vaccine-associated serious neurological disease was small (Miller and Ross, 1978).
  - 18.2. *MMR controversy:* The MMR controversy in the UK emerged in the late 1990s and persisted into the 2000s. Andrew Wakefield – a British former gastroenterologist – sparked the controversy with a now discredited study published in *The Lancet* medical journal in 1998 (Wakefield et al., 1998). The retracted paper's findings suggested a link between the MMR vaccine and the development of autism spectrum disorders in children. These claims have since been resoundingly repudiated (Elliman and Bedford, 2007), yet the initial publication triggered extensive and sustained media reporting, which damaged trust in the vaccine across the UK, and led many parents to seek alternatives to the combined vaccine (Millward, 2019). Outbreaks of measles occurred in communities with low

vaccination rates, immediately highlighting the real-world consequences of vaccine scares, consequent vaccine hesitancy and risk to declining uptake of the vaccine in question. The UK government and healthcare authorities launched public awareness campaigns in response to negative public perceptions around the vaccine to reassure parents about the safety and efficacy of the MMR jab and to counter misinformation (Millward, 2019). Legal and ethical repercussions followed Wakefield's study. The General Medical Council (GMC) conducted investigations into Wakefield's research conduct and professional ethics. In 2010, the GMC found Wakefield guilty of serious professional misconduct and revoked his medical licence (Kmietowicz, 2010). Despite these developments, the MMR controversy left a legacy that is still felt in many communities today. Trust in vaccines and public health was eroded: MMR1 vaccine coverage (the first dose in a series of two) fell from 91.5% in 1996-97 to 80% in 2003-04 (NHS England, 2005), before recovering to pre-controversy levels only a full decade after Wakefield's retracted paper. As with the pertussis controversy, the MMR controversy sparked significant media sensationalism that has been cited as contributing to wavering parental perceptions (Hackett, 2008).

### ***Vaccine safety, risk, and information***

19. A range of studies have examined the drivers and facilitators of vaccine hesitancy in the UK prior to the Covid-19 pandemic. In 2019, Luyten *et al.*, found that a substantial section of a large representative sample of 1,402 respondents from the British population held hesitant views about vaccination in general, particularly around aversion to risks of side effects (Luyten *et al.*, 2019). Across 10 survey questions designed to measure vaccine hesitancy, Luyten *et al.* found hesitancy towards at least one hesitancy question among 90% of respondents, but only 4% of respondents expressed vaccine hesitancy to each of the 10 questions. The highest level of hesitancy was reported to the questions "new vaccines carry more risks than older vaccines" and "I am worried about serious adverse effects about vaccines", suggesting vaccine side-effect perception as an important driver for hesitancy in the UK. As with many other studies exploring socio-demographic characteristics of vaccine hesitancy in the UK (Chaudhuri *et al.*, 2022) and Europe (de Figueiredo *et al.*, 2022) among the adult population, age was found to be among the strongest predictors of vaccine hesitancy, with a gradual reduction in hesitancy levels among older adults, notably those over 65. It is likely that lower levels of hesitancy observed in older adults in the UK may be influenced by heightened awareness of disease risks as well as past experiences with outbreaks.
20. A meta-synthesis of qualitative studies in 2020 examined childhood vaccine hesitancy globally and identified four relevant UK studies (Evans *et al.*, 2001; Sporton and Francis, 2001; Smailbegovic *et al.*, 2003; Henderson *et al.*, 2008). All four studies noted vaccine safety/side effects as a primary concern to vaccination. Further, three of the studies indicated a lack of confidence in the information being given by health providers and/or authorities, perceiving it as poor or unbalanced, and affecting parental decision making (Evans *et al.*, 2001; Sporton and Francis, 2001; Smailbegovic *et al.*, 2003). Evans and colleagues found a number of barriers to acceptance of the MMR vaccine, including beliefs about the risks and benefits of the vaccine compared with contracting the disease; information from the media and other sources about the vaccine's safety; confidence and trust in the advice of health

professionals and attitudes towards compliance with this advice (many did not have confidence in the recommendations because of awareness of links to GP targets); and, views on the importance of individual choice within Government policy on immunisation (Evans et al., 2001). However, it is noted that the significance of these studies in the recent pre-pandemic period is limited, given that these studies were all performed before 2010.

21. In 2016, a qualitative systematic review looked at factors influencing parents' vaccination decision making in the UK, offering some insights on how different factors interlock with decision-making mechanics. The review discerned two types of decision-making among parents: non-deliberative and deliberative. The first parent type felt they had little to no choice in their decision-making but were happy to comply and/or relied on social norms; whereas the second type engaged in more active decision-making that involved weighing up risks and benefits, considering others' advice/experiences and social judgement. Emotions were also found to affect deliberative decision-making. Trust in information and vaccine stakeholders was integral to all decision-making (Forster et al., 2016).

#### ***Vaccine hesitancy and minority groups***

22. Lower rates of childhood immunisation have been consistently observed amongst certain minority communities in the UK including Black British and other minority groups (Baker, 2003), British Jewish (Loewenthal and Bradley, 1996; Henderson et al., 2008; Gordon et al., 2011), Traveller, Gypsy and Roma (Feder et al., 1993; Jackson et al., 2017), and migrant (Gorman et al., 2019; Bielecki et al., 2019; Bell et al., 2019; Bielecki et al., 2020; Carter et al., 2022) communities.
23. Reasons for lower immunisation uptake in these groups are diverse and range from risk perceptions, misinformation, socio-cultural norms, as well as trust and relationships with healthcare providers to practical barriers. For example, a 2016 systematic qualitative review (Forster et al., 2017) found that two ethnicity-related factors affected immunisation decisions among some Black and Asian groups in the UK. First, factors related to ethnicity itself including religion (e.g., relative importance of immunisation against anti-preventive medicine beliefs and perceived risk of disease in context of religious practices), upbringing and migration (e.g., knowledge about immunisation and exposure to disease in other countries), and language (e.g., concerns about children not getting the right immunisation because of communication issues); and second, beliefs about biological ethnic differences (i.e., perceived susceptibility to disease and vaccine side effects such as developmental issues, immunisation research not being ethnically heterogeneous) affected decision-making and demand for more tailored information (e.g., feel it is limited because it did not acknowledge these differences).
24. Across other minority groups in the UK, related concerns have been identified but there are few studies available. For example, a 2008 study with a British Orthodox Jewish community in North London (Henderson et al., 2008) found that low uptake of different immunisations arose from enhanced feelings of both safety (e.g., such as from tuberculosis due to support available from close community cohesion) and danger (e.g., picking up on rumours about vaccination dangers from wider media through word-of-mouth). Notably, low uptake was not found to be due to the practical difficulties associated with large families, or to perceived insensitive cultural practices of health care providers, and it was highlighted that the views and practices of community members were not homogeneous and may change over time. A

later study in 2018 among a Charedi Orthodox Jewish community in London noted that while there was no evidence of community resistance against vaccination despite the lower-than-average coverage rates within the community, local service providers experienced challenges to deliver immunisation services to the relatively large numbers of children within this community (Letley *et al.*, 2018).

25. Further, a 2017 study amongst Gypsies, Travellers and Roma (Jackson *et al.*, 2017), looking at child and adult immunization uptake, found that whilst acceptance of vaccines was generally high, low uptake was self-reported to stem primarily from access issues such as language barriers, illiteracy, lack of housing, or a lack of established, trusting relationships with healthcare providers.
26. A clear picture of what sits behind the historical differences in vaccine uptake across ethnicities in the UK is limited, in part because of how data are structured and what information has been sought. For example, in an older UK study (Myers and Goodwin, 2011) looking at adult intentions to vaccinate against the 2009 pandemic swine flu, only around one third of the participants reported their ethnicity (n = 121 / 362) and because of the small numbers, the originally specified groups, which included Indian, Pakistani, Bangladeshi, and Chinese responses, were combined into a single group (variable) “Asian” and similarly for “Black”. Further, when reporting on the results – that Black participants were significantly less likely to intend to have the vaccination versus Asian and White participants – specific reasons for this were not reported, and the authors sought to contextualise their findings based on a US-study where lower uptake was possibly related to a historical distrust of the health care and public health systems amongst Black or African Americans. A more recent (2021), and much larger, study (international systematic review including seven out of 28 studies from the UK) further highlights this persistent limitation.
27. A lack of systematic inclusion of ethnicity data variables (e.g., surveys), as well as inconsistencies and inaccuracies in how ethnicity is categorised and recorded in UK health data have significant real-world consequences. For example, during the Covid-19 pandemic, research by OpenSAFELY and the Office for National Statistics (ONS) diverged on data interpretation, arriving at differing conclusions about how ethnicity affected mortality risk. While methodological differences played a role, much of the discrepancy stemmed from inconsistencies in the datasets used (Wellcome, 2023). Such data limitations are not uncommon, occurring across different sectors (e.g., health, government), which can then further complicate cross-sectoral connectivity. For example, while an individual may be recorded in the UK Census as part of a specific ethnic group, they may be categorised as something else (e.g., ‘Other’) in the health records depending on the coding framework in place. Such discrepancies hinder the ability to produce reliable and consistent population and health data, which is crucial for identifying and addressing disparities (Wellcome, 2023). Evidently, there is a need for improvement but in practice, resolving the challenge of how best to capture and code ethnicity data is not straightforward. Ethnicity encompasses a range of dimensions, including nationality, heritage, geographical region, and religious group, and these often do not align neatly with predefined categories. Further, identifying categories that people can relate to is inherently difficult because the terms individuals use to describe themselves, how others perceive them, and how institutions define them are fluid and context-dependent (Wellcome, 2023). Similar challenges exist for data collection around disability, impacting the extent to which this group is included in research, including research

on vaccine hesitancy and participation in clinical trials (Swenor *et al.*, 2022; Camanni *et al.*, 2023; Humanity & Inclusion, 2018). Moreover, when data on disability are included, there can be issues of homogenisation whereby ‘disability’ is treated as a single, undifferentiated category. This approach fails to account for the diverse experiences and challenges faced by individuals with different types and severities of disabilities (Mont D *et al.*, 2023).

28. Another significant barrier to accurate data collection is the willingness of individuals to report sensitive information, such as ethnicity and race, but also migrant status, religion, disability or sexual orientation. This hesitancy often stems from mistrust of institutions and uncertainty about how data will be used or shared. (Sedacca, 2024; New Economic Foundation, 2019) For example, among migrant communities, this mistrust is in part owing to the ‘Hostile Environment’ policies which aim to make life difficult for migrants living in the UK (Joint Council for the Welfare of Immigrants, 2024). Introduced by the UK government in 2012, this set of policies included a provision granting the Home Office access to some data used by public sector organisations, including some requirements for the NHS to report to the Home Office on immigration status and unpaid debt arising from charging provisions applied to patients with non-ordinary residence status for some types of care. Although Covid-19 treatment and vaccinations were exempted from the charging provisions, this practice has fostered a pervasive sense of mistrust and suspicion toward the NHS which intensified during the pandemic because the sharing of data from the NHS to the Home Office presented as a serious risk and fear of perceived or actual immigration consequences, thereby acting as a disincentive and causing many to avoid accessing the vaccine or therapeutics (MPCAG INQ000474407\_0029).
29. Curating relevant data is an important part of establishing or re-building trust with communities and organisations have a clear opportunity to position themselves as reliable stewards of privileged information. Transparent communication about the purpose of data collection and active community involvement in designing data processes are vital steps toward overcoming this challenge (Wellcome, 2023). The pandemic rapidly exposed the extent of health disparities experienced in the UK and highlighted the data limitations that hindered a suitably informed and targeted response. These realities certainly spurred some immediate efforts to improve data collection including improvements through initiatives such as the “Standards for ethnicity data” (Race Disparity Unit, 2023) and the ONS refinement of ethnicity categories in the 2021 census. These developments signal progress and the establishment of some fundamental basic infrastructure but further work across sectors will be needed to ensure that new and revised systems are adequately sensitive and aligned so that they are intentionally sound and operationally useful in terms of trust building and directing action.

### ***Vaccination requirements***

30. Notwithstanding vaccine scares and evidence of hesitancy in the UK, vaccine coverage rates have remained high in the UK in the decade preceding the pandemic by both European and global standards (World Health Organization, 2024).
31. This high coverage has also been achieved in the UK without the implementation of vaccination requirements (such as mandates), that are increasingly commonplace in other parts of the world, such as requirements for school entry (Kuznetsova *et al.*, 2021). The reluctance towards vaccine mandates in the UK appears to have been strongly motivated by

past experiences with the imposition of smallpox vaccination mandates implemented in the 19<sup>th</sup> century via the Compulsory Vaccination Act (1853). Anti-vaccination movements formed in opposition to the Act (Wolfe and Sharp, 2002), which sought to imprison or impose fines for those who refused the smallpox vaccine. The imposition of mandates was met with opposition from the public as well as many politicians and medical professionals with opposition ranging from infringements on personal liberties (including on religious freedoms) to viewing the associated non-compliance fines as a “tax on the working class.” (Durbach, 2000). In 1898, a new Vaccination Act was approved that allowed parents to apply for “certificates of conscientious objection” and over 200,000 certificates were granted the same year (Durbach, 2002). In 1907, the exemption process became easier leading to 25 percent of all births claiming exemption from the smallpox vaccination.

32. These types of exemptions – particularly for medical or religious reasons – are still available in several countries where there are school entry vaccination requirements, allowing people some choice but requiring a process to make sure they are aware of the risks of not vaccinating. Despite the availability of exemptions in the UK, though, mandatory vaccination was repealed in 1946 and 1947 by the National Health Service Acts.
33. In general, national guidance in the UK strongly recommends, rather than requires, certain vaccinations for healthcare workers with patient-facing roles, such as the hepatitis B vaccine for those exposed to blood (BMA, 2018). Such requirements potentially undermine autonomy among healthcare workers (NICE, 2018), and risk discriminatory effects on paid HCWs who have made a principled decision to not get vaccinated or have medical reasons for exemptions (Stead *et al.*, 2019).

#### **I.4. Pre-pandemic vaccine hesitancy and vaccine uptake trends in the UK**

34. Understanding the changing landscape of vaccine hesitancy worldwide poses a formidable challenge given the absence of global monitoring systems for hesitancy and the complexities of deducing it from routinely gathered data on vaccination coverage. Additionally, individuals can exhibit hesitancy toward one or more vaccines, but not to others, further complicating the process of obtaining an interpretable metric of vaccine hesitancy through which trends can be assessed.

##### ***Trends in vaccine attitudes***

35. Routine data systems are in place for regular reporting of uptake of childhood and adult vaccinations (UK Health Security Agency, 2023; NHS England, 2024b) and the UKHSA and PHE have conducted parental attitude surveys exploring vaccination opinions leading up to the pandemic (UK Health Security Agency, 2024c). These surveys have tracked some key indicators of parental perceptions and experiences surrounding the vaccination of children.
36. An associated publication by Campbell and colleagues reveals changing parental attitudes to childhood immunisation between 2000 and 2015 in England, such as encountering information that may dissuade from vaccination, automatic decision-making surrounding vaccination of children (as opposed to weighing up pros and cons), as well as sources of trusted advice (Campbell *et al.*, 2017). The study found that the proportion of parents who

seen, heard, or read anything that might dissuade from immunisation steadily fell between 2000 and 2010 (from 88% to 72%), with a further substantial fall to 53% in 2015 (although a change in question in 2015 is noted). Moreover, the proportion of parents who weighed up pros and cons of vaccinating their child before deciding whether to vaccinate was in sharp decline since 2010, falling from 41% in 2003 to 7% in 2015, indicating a substantial increase in parents who automatically vaccinated their children when vaccines were due. In 2021, however, 21% of parents weighed up the pros and cons of vaccination (UKHSA, 2024). Trusting immunisation advice from GPs and the NHS also increased since 2003, from 44% and 24% to 60% and 56% in 2015 (all values respective). A more recent study from 2023, shows that the percentage of parents who reported being confident in the immunisation programme in England increased from 94% in 2016 to 95% in 2019.

37. While these trends from Campbell and colleagues paint a positive picture of automatic decision making regarding the vaccination of children and increases in trust in key institutions in the 15 years leading up to 2015, England has seen declines in uptake of many childhood immunisation programmes in the decade before the pandemic (NHS England, 2023). The extent to which attitudinal versus practical barriers and access to vaccination are causing these declines is currently unclear, and warrants further attention. Furthermore, the information landscape has changed dramatically over the past decade, with hyper-connected social media and increasingly AI-generated messages, images and video with potential for positive sharing of information, but increased risks of fuelling the spread of misinformation.

#### ***Trends in vaccine uptake***

38. When there are declines in vaccine uptake, it flags an underlying problem which may be preceded by hesitancy, but also may be due to access issues, despite a willingness to get vaccinated.
39. In England in 2017-18, coverage declined in nine of the 12 routine childhood immunisations compared to the previous year (APPG, 2019). In the last decade, London had the lowest uptake of routine immunisations for all 13 routine immunisations and, according to Public Health England's Health Equity Audit in 2019, some avoidable inequalities in vaccination rates existed within some population groups. However, there was limited available data and evidence to describe and monitor the situation and explain why these inequalities were occurring (Public Health England, 2021a). Trends in vaccine coverage in the UK in the decade preceding the pandemic varied according to vaccine, dose and region (Edelstein et al., 2020) (**Table 1**). London persists with low uptake of routine childhood immunisations with rates significantly below other regions of England (Table 1). At the level of local authority, the 20 local authorities with the lowest rates of first-dose MMR (MMR1) coverage in 2018-19 are all in London, with the single exception of Luton, another highly diverse region. Hackney reports the lowest rate of MMR1 coverage in 2018-19 (74.3%) with neighbouring Haringey (77.8%) and Islington (80.9%) also reporting rates substantially below the national average (94.5%) (NHS Digital, 2019). Other diverse urban centres in England, such as Birmingham (86.8%) and Manchester (87.8%) also report MMR1 coverage levels below the national average, with similar trends observed for other vaccines.
40. No single factor likely explains the decline in routine childhood immunisation coverage levels across various routine immunisation programmes in the UK between 2010 and 2019. Rather, these declines in coverage are likely caused by several, often interrelated, factors. Vaccine



hesitancy has been fuelled by the spread of misinformation, particularly through social media platforms, which can distort perceptions of risks and benefits. Complacency also drives vaccine hesitancy, as some individuals perceive vaccination as unnecessary in the absence of recent outbreaks or visible threats of vaccine-preventable disease. Issues around accessibility may further compound the problem.

41. While vaccines for HPV, meningitis, and the 3-in-1 teenage booster for tetanus, diphtheria, and polio are typically offered in schools as part of the adolescent vaccination programme (UK Health Security Agency, 2024b), vaccination in the UK generally requires multiple interactions with the health system. The requirement of multiple interactions with the health system will also induce some practical barriers including accessibility as well as sufficient familiarity with the NHS and GP services in the UK, which may disproportionately impact recent migrant groups. These multiple interactions also require high levels of trust in vaccines being recommended and the health and governance systems more broadly to motivate engagement.

**Table 1: Regional trends in vaccine uptake of selected antigens:**

Vaccination coverage rates for regions of England, Northern Ireland, Scotland, and Wales in 2011-12 and 2018-19 for the diphtheria tetanus and pertussis, inactivated polio, and influenza (DTaP/IPV/Hib), measles, mumps, and rubella (MMR), and influenza and meningitis-C (Hib/MenC) vaccines. Scotland's data values are from September 2014 and September 2019, while Northern Ireland's values are from quarter 1 2012 and quarter 1 2019. Values represent the percentage of children immunised by their second birthday.

Region	DTaP/IPV/Hib (primary)		MMR (1 <sup>st</sup> dose)		Hib/MenC (booster)	
	2011-12	2018-19	2011-12	2018-19	2011-12	2018-19
North East England	97.5	96.7	93.0	94.5	95.3	94.7
North West England	97.1	94.5	93.4	92.4	94.3	92.8
Yorkshire and the Humber	97.1	95.5	93.1	92.8	94.6	93.0
East Midlands	97.4	95.5	92.9	92.0	94.8	91.9
West Midlands	96.8	94.9	92.0	90.6	92.5	90.5
East of England	96.5	94.9	91.8	91.3	94.4	91.8
London	93.3	90.6	86.1	83.0	86.8	83.2
South East Coast	95.3	-	90.6	-	91.7	
South Central	96.8	-	93.5	-	93.4	
South East England	-	94.2	-	91.4	-	91.3
South West England	97.0	95.9	91.7	93.0	92.2	93.0
Northern Ireland	98.5	96.5	93.7	91.2	95.9	91.7
Scotland*	98.3	96.9	95.7	93.6	96.0	94.4
Wales	96.4	95.4	92.7	94.5	93.7	94.2

Source: UK Government. Cover of vaccination evaluated rapidly (COVER) programme: annual data (2011-12 and 2018-19) (UK Health Security Agency, 2023), Public Health Wales (Public Health Wales, 2024), Public Health Scotland (Public Health Scotland, 2023a), and Public Health Agency Northern Ireland (Public Health Agency, 2024).

### **Global comparisons**

42. Only one publication could be identified that explores the changing attitudes to vaccines at a global scale in the period preceding the Covid-19 pandemic. In 2020, de Figueiredo and colleagues examined global levels and changes in individuals' perceptions towards the importance, safety, and effectiveness of vaccines between 2015 and 2020 using large-scale survey data, finding that these confidence measures also were strongly associated with respondents' self-reported uptake of childhood vaccines (de Figueiredo *et al.*, 2020). High levels of education – including science education – were also found to be strong predictors of uptake, as was income, with higher levels of income associated with increased uptake. The same study found the UK to rank relatively low by global standards on these confidence measures (about 100<sup>th</sup> out of 149 countries); yet the vaccination coverage rate of childhood vaccines (see **Table 1**) is high in the UK, emphasising the role of non-confidence barriers to vaccine uptake.
43. Levels of firm agreement that vaccines are important, safe, and effective were generally found to be highest in Africa and the Indian sub-continent, and lowest in Europe and North America. The UK ranked roughly 100<sup>th</sup> in overall level of confidence in vaccines out of 149 countries.
44. While the UK's performance on a global scale may not be as strong as is desirable in public health terms, perceptions towards vaccines compare relatively favourably to most European counterparts as revealed by multiple nationally representative industry-standard surveys.
  - 44.1. **State of Vaccine Confidence in the EU 2018:** In 2018, the first State of Vaccine Confidence in the European Union (SVC-EU) report found that the UK had stronger beliefs in the importance, safety, and effectiveness of vaccines than the EU average (Larson *et al.*, 2018). The UK also had among the highest levels of confidence that the seasonal influenza vaccine was safe (85.4% of the public surveyed agreeing, ranking 1<sup>st</sup> out of 28) and important (80.7%, 2<sup>nd</sup>) and relatively strong confidence that the MMR vaccine was both important (11<sup>th</sup>, 88.6%) and safe (85.4%, 10<sup>th</sup>). Portugal had the highest level of agreement that the MMR vaccine was both important (96.2%) and safe (95.8%).
  - 44.2. **State of Vaccine Confidence in the EU 2020:** In 2020 the second SVC-EU report unveiled how perceptions towards vaccines throughout the EU had changed from 2018 to 2020 (de Figueiredo, A; Karafillakis, E; Larson, 2020). While a substantial majority of member states reported significant upticks in agreement regarding the safety and importance of the seasonal influenza vaccine since 2018, the UK reported no significant change over this period. Nonetheless, the UK maintained a very high ranking in overall perceptions towards the seasonal influenza vaccine. The noteworthy increases observed in other countries likely stemmed from the timing of survey fieldwork in March and April 2020, when many countries were experiencing an initial burden from SARS-CoV-2 and the media were calling

attention to the risk of a ‘twin-demic’ of influenza and SARS-CoV-2. Moreover, the frequent description of SARS-CoV-2 as a ‘flu-like illness’ in early 2020, likely also contributed to improved perceptions surrounding the seasonal influenza vaccine. The UK also reported no change in perceptions towards the MMR vaccine (in line with 16 other member states who also reported no shift), while 11 countries reported gains.

- 44.3. **Special Eurobarometer 488:** In 2019, a special edition of the EU’s Eurobarometer explored wide-ranging determinants that contribute to vaccine hesitancy (Kantar, 2019). These factors included perceived risk of vaccine-preventable diseases, experiences with vaccination, and attitudes surrounding the importance and effectiveness of vaccines. Overall, the UK mostly reported higher levels of faith in vaccines than the EU average, though there were some exceptions. 90% of the UK public surveyed agreed that vaccines were effective in preventing disease (in agreement with the 2018 SVC-EU report) and 83% agreed that vaccines are rigorously tested before use, both above respective EU averages. A majority of the UK public surveyed (54%) believed that vaccines can often produce serious side-effects, which was above the EU average of 48%. Only 49% of the UK public surveyed knew that vaccines cannot cause the disease against which they are designed to protect, which was equal to the EU average. A total of 92% agreed that vaccines are important to protect yourself and others and 85% agreed that it is important for everybody to have routine immunisations, both above respective EU averages.

## **I.5. Changes in vaccine hesitancy and vaccine uptake during the Covid-19 pandemic**

### ***Attitudes to vaccines***

45. There is limited available evidence on how attitudes to (non-Covid) vaccines have changed in the UK since the beginning of the pandemic. (Although Covid-19 vaccine hesitancy has been extensively covered and these trends are further discussed in Chapter III.)
46. Data from 2018 and 2020 revealed high vaccine confidence in the UK, whilst more recent data from 2023 suggested large declines in confidence (**Table 2**). In 2023, only 73% of the UK population agreed that vaccines were important, with 72% and 70% agreeing that they were effective and safe, respectively. Research by Siani and Tranter has echoed these findings, with a decline in vaccine confidence found between 2019 to 2022 and 23.8% of those surveyed reported that their confidence had declined since the start of the pandemic (Siani and Tranter, 2022). While this study did not explore the reasons for these losses, Asian respondents reported a significant reduction in confidence over the study period.
47. Findings from the 2019, 2022, and 2023 UKHSA parental attitude surveys reveal changes in barriers to vaccination over the pandemic across multiple items for respondents in England (UK Health Security Agency, 2024c). In the 2019 survey, 1,735 face-to-face interviews were conducted among parents with children aged 0 to 4 years (UK Health Security Agency, 2024c). In the 2022 and 2023 surveys, online interviews were conducted among parents who had children aged between two months and five years and comprised sample sizes of 1,485

and about 1,000, respectively. The available comparable data across these years are presented in **Table 3** and **Table 4**. Particularly concerning is the finding that trust in key official sources of information and guidance has decreased in 2023, with trust in the NHS at 85% (down from 91% in 2022) with increased levels of trust in the internet and social media in 2023 (5% compared to <1% in 2022) (**Table 3**). Moreover, there was a substantial reduction in the percentage of parents reporting that they had not seen or heard anything that would be concerning about any childhood vaccines (**Table 4**). Satisfaction with vaccination experiences, including making an appointment and the information provided by a nurse at the vaccination visit have also experienced falls greater than 10 percentage points since before the pandemic (**Table 4**). There was also a decline of eight percentage points between 2019 and 2023 in the percentage of parents and caregivers who trust vaccines (**Table 4**).

48. A recent pre-print article explored the changing acceptance levels towards the seasonal influenza vaccine over the pandemic (de Figueiredo *et al.*, 2024). The study found a slight decrease in the adult population who were willing to accept a flu vaccine in the next 12 months in the 2020 and 2022 surveys (from 58.5% to 57.5%), but an increase among individuals aged 65 and over (from 80.2% to 84.4%). Asian / Asian British, Punjabi, and Hindu respondents reported notable declines in willingness to accept a flu vaccine, perhaps reflecting an early-warning signal of pandemic-induced confidence losses that warrants further attention. While intention to accept a flu vaccine in the next 12 months had not decreased among Black / Black British participants, they were less willing to accept a seasonal influenza vaccine in both 2020 and 2022 compared to White respondents.

**Table 2 Pandemic trends in vaccine confidence between 2018 and 2023 in the UK**

The UK adult population responding to three questions on the importance, safety, and effectiveness of vaccines. Samples are nationally representative according to gender, age, and sub-national region and sample sizes are approximately 1,000 in each year.

Question	2018	2020	2023
I think vaccines are important for children (% agreeing)	93%	92%	72%
I think vaccines are safe (% agreeing)	90%	90%	70%
I think vaccines are effective (% agreeing)	90%	90%	72%

Source: Vaccine Confidence Project<sup>4</sup>

**Table 3 Level of trust in different sources for vaccine information from the UKHSA parental attitude surveys**

Each row represents the percentage of parents surveyed who ranked a given source in first to third place for the level of trust in vaccine information. Data has been extracted from available data from surveys conducted in 2022, and 2023. Missing data is denoted with a hyphen.

Trust source	2022	2023
NHS	93%	86%
GP, practice nurse, midwife, or health visitor	91%	85%

<sup>4</sup> <https://www.vaccineconfidence.org/vci/map/>

Pharmacists	84%	66%
Internet	<3%	10%
Newspapers, magazine, television, or radio	1%	4%
Social media	<1%	5%

Source: UKHSA. Parental attitudes to vaccination in 2022 and 2023 (UK Health Security Agency, 2024c)

**Table 4 Trends in vaccine attitudes and experiences from the UKHSA parental attitude survey**

Data has been extracted from available data from surveys conducted in 2019, 2022, and 2023. Missing data is denoted with a hyphen. (\*) The 2019 datum represents responses to 'satisfied with information provided by nurse at the visit', while the 2022 datum represents responses to 'satisfied with information provided at the vaccine visit'. (\*\*) The 2019 datum captures responses to 'satisfied with making an appointment', while the 2022 datum represents responses to 'found it easy to get a convenient appointment'. (\*\*\*) In 2022, the cohort of children was under 40 months of age, while in 2023, the cohort was under 39 months.

Question	2019	2022	2023
Satisfied with vaccination experience	92%	-	80%
Satisfied with information provided by nurse at the visit (*)	95%	82%	-
Satisfied with getting information before the visit	95%	63%	-
Satisfied with making the appointment (**)	91%	84%	-
Trust vaccines: agree	90%	90%	82%
Vaccines work: agree	-	95%	89%
Vaccines safe: agree	-	-	-
Had enough information to make informed decision about vaccinating child	-	81%	86%
Spoke to health professional about vaccines (***)	-	89%	86%
Seen or heard anything about vaccines in the last 12 months that was in favour of vaccines	-	80%	72%
Not seen or heard anything that would [be concerning] about any childhood vaccines	-	79%	59%

Source: UKHSA. Parental attitudes to vaccination surveys in 2019, 2022, and 2023 (UK Health Security Agency, 2024c).

### ***Vaccine uptake***

49. Routine childhood immunisation uptake as well as uptake for adolescent vaccines such as the HPV vaccine underwent pre-pandemic declines that have worsened since the Covid-19 pandemic in the UK. The annual seasonal influenza vaccine also underwent slight declines during the pre-pandemic period but encountered a strong recovery during the pandemic due to public health campaigns – including an expanded rollout to over 50s – to tackle the 'twin-demic' of influenza and SARS-CoV-2. Trends in uptake for a range of vaccines are cited below in 49.1 to 49.5 which are taken from NHS Digital (NHS Digital, 2023) for childhood vaccines and UKHSA for seasonal influenza (UKHSA, 2023) unless otherwise stated.

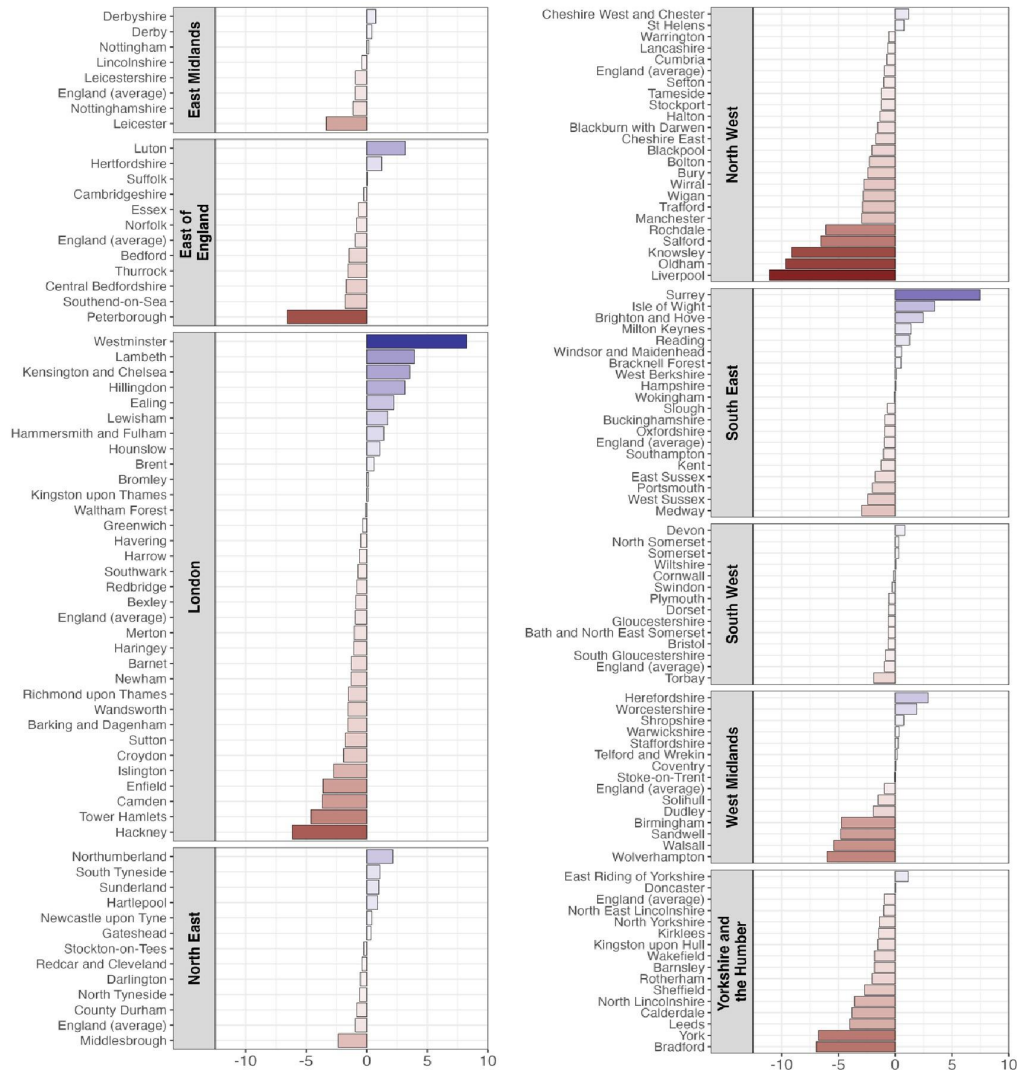
- 49.1. **MMR:** In 2018, the UK lost elimination status for measles due to a marked increase in measles cases (Wise, 2019). In 2009-10, 82.7% of children under five had received both doses of the MMR (MMR2 coverage), increasing to a peak of 88.6% in 2014-15, before falling slightly to 86.4% in 2018-19. In 2022-23, MMR2 coverage declined again to 84.5 – its lowest in a decade. This low represents a fall in 4.1 percentage points since the 2014-15 peak. The relative extent to which this recent fall is driven by vaccine hesitancy versus pandemic-related factors is currently unclear, though changes in service delivery and other practical barriers have doubtlessly played a significant role (Skirrow *et al.*, 2021). In **Figure 1**, percentage point changes in MMR1 uptake are shown for each local authority (LA) in England. Since 2018-19, MMR1 coverage rates have fallen in a large majority of local authorities. Across England, on average, MMR1 coverage is 1 percentage point lower in 2022-23 compared to 2018-19, but with substantial sub-national variability. LAs in London (Hackney, Tower Hamlets), East of England (Peterborough), West Midlands (Wolverhampton, Walsall, Sandwell, Birmingham), and Yorkshire and the Humber (Bradford, York) have pronounced falls. Falls in coverage were also particularly large in North West England where almost every LA reported. While the picture is mixed in London, catch-up immunisation campaigns have reduced the extent of the post-pandemic loss in uptake (NHS England, 2022b). In 2024, an ongoing public health drive (NHS England, 2024a) is reaching out to millions of parents and caregivers in response to rising measles cases that has prompted UKHSA to declare a national incident (UK Health Security Agency, 2024e). In Northern Ireland, MMR1 coverage fell to 89.4% in the first quarter of 2023, compared to 91.2% in the corresponding quarter in 2019. In Scotland, MMR1 coverage has fallen to 93.9% in the second quarter of 2023, compared to 96.1% in the first quarter of 2019 (Public Health Scotland, 2023a). In Wales, MMR1 coverage has fallen to 92.9% in 2022-23 from 94.5% in 2018-19 with falls across all regions of Wales except Bridgend (Public Health Wales, 2024).
- 49.2. **DTaP-CV:** In 2017, the pentavalent DTaP-CV vaccine (combining antigens for diphtheria, tetanus, acellular pertussis, as well as polio and Haemophilus influenza type b), was replaced by the hexavalent DTaP-CV vaccine, which includes hepatitis B antigen. In 2009-10 in England, 84.8% of children under five received all three doses of DTaP-CV, increasing to 88.9% in 2012-13 before falling to 84.8% in 2018-19. In 2022-23 in England, coverage stood at 83.3%, a reduction of 1.5 percentage points since 2009-10. In Northern Ireland and Scotland, DTaP-CV has also fallen gradually over the past decade. Coverage in Northern Ireland stood at 98.9% at the beginning of 2011 for children aged under 24 months, 96.0% in late 2019, and 94.0% at the beginning of 2023 (Public Health Agency, 2024). In Scotland, coverage among children under 24 months has fallen from 98.3% in late 2014 to 97.1% in December 2019, before falling to 96.6% in June 2023 (Public Health Scotland, 2023a). In Wales, DTaP-CV coverage for children under 24 months has remained relatively stable over the past decade but has also experienced a slight fall over the pandemic from 95.9 in 2019-20 to 94.5 in 2022-23 (Public Health Wales, 2024).
- 49.3. **Hib/MenC:** Coverage of the bivalent meningitis C and Haemophilus influenza type b vaccine follows a similar trend to MMR and DTaP-CV in all home nations. In

2011-12 in England (the first year for which Hib/MenC coverage data is reported), 82.7% of children under five received the Hib/MenC vaccine, increasing to 88.6% in 2014-15, and again falling before the beginning of the pandemic, in this case to 86.4%. In 2022-23, Hib/MenC coverage was 84.5%. In Scotland, Northern Ireland, and Wales, coverage has also fallen slightly over the decade preceding the pandemic, with further losses continuing into 2023 (Public Health Scotland, 2023a; Public Health Agency, 2024; Public Health Wales, 2024).

- 49.4. **HPV:** The human papillomavirus vaccine was launched in the UK in 2008. Since its inception, the vaccination programme has administered millions of HPV vaccines to adolescent females at school. In 2019, the programme was extended to adolescent males. In 2013-14 coverage for at least one dose (HPV1) among year 8 females in England stood at 89.5% (Public Health England, 2014), falling slightly to 88.0% in 2018-19 (Public Health England, 2019). In 2022-23, HPV1 coverage for year 8 females in England was 71.3%, 16.9 percentage points lower than pre-pandemic coverage (UK Health Security Agency, 2024d). In 2022-23, HPV1 coverage among year 8 males in England was 69.2%: an increase compared to 2019-20 coverage (54.4%) when the vaccine was first introduced for males (UK Health Security Agency, 2024d). Scotland experienced slightly larger falls in HPV1 coverage in females than England over the period 2014-15 to 2018-19 (from 89.0% in 2014-15 to 85.1% in 2018-19) but has recovered more robustly than England since the pandemic with current coverage standing at 76.3% (Public Health Scotland, 2023b). Wales and Northern Ireland both reported HPV1 coverage levels of about 85% in 2013-14 among females, with both slight falls leading into the pandemic, before precipitous falls in 2020-21, which was also observed in Northern Ireland (Public Health Wales, 2014; Public Health Agency, 2021).
- 49.5. **Seasonal influenza:** Annual seasonal influenza coverage among adults aged 65 and over has remained relatively consistent since the 2008-09 flu season. Although there was a slight decrease in coverage between 2009-10 to 2018-19 (from 72.4% to 72.0%) for those aged 65 years and over (the largest target group), coverage increased over the pandemic to 82.3% in 2021-22, before falling slightly to 79.9% in the most recent flu season (2022-23).
50. Supply-side disruptions and practical barriers to obtaining childhood vaccines have also taken their toll on immunisation programmes across the world during the pandemic (Shet et al., 2021). In England, social distancing measures impacted uptake of childhood immunisations (McDonald et al., 2020), while school closures impacted delivery and uptake of the HPV vaccine (BDJ in Practice, 2024). Whether pandemic factors have induced vaccine hesitancy in childhood, adolescent, or adult vaccines in the UK is still an ongoing enquiry; however, the lack of quantitative data on attitudes to specific vaccines across target groups limits our understanding of post-pandemic vaccine hesitancy in the UK. It is unclear whether the recent trends in attitude to vaccines and uptake data above represent a short-term fluctuation or the beginning of a longer-term trend. Whether short or longer term, there is a clear need for targeted efforts to improve confidence and monitor change over time.

**Figure 1 Change in MMR uptake between 2018-19 and 2022-23 for local authorities in England**

Changes in first-dose MMR uptake is shown for each English local authority between 2018-19 and 2022-23. Red values denote post-pandemic falls in MMR1 coverage, while blue values denote increases. Changes are only presented for local authorities with the same geographic definition across both years. Three local authorities are not shown below. Northamptonshire reported 91.3% MMR1 uptake in 2018-19 while North Northamptonshire and West Northamptonshire reported 90.9% and 88.6% MMR1 in 2022-23. Poole reported 95.3% MMR1 in 2018-19 while Bournemouth reported 90.8%. In 2022-23, Bournemouth, Christchurch and Poole reported 92.0% in 2022-23



**Percentage point change in MMR uptake between 2018-19 and 2022-23**



### **Global comparisons**

51. Evidence from outside the UK yields mixed pictures on the impact of the pandemic on vaccine hesitancy. In the 2022 State of Vaccine Confidence in the European Union report, most EU member states reported a decline in the perceived importance and safety of vaccines, including the MMR vaccine specifically (de Figueiredo *et al.*, 2022). A vaccine confidence 'age gap' was apparent in which younger age groups appear to have suffered large losses in confidence towards vaccines, while those aged over 65 maintained high levels of trust.
52. UNICEF's 2023 State of World's Children report also revealed a decline in vaccine confidence across much of the world with younger groups particularly affected (UNICEF, 2023).
53. In their qualitative investigation into the repercussions of the pandemic on parental perspectives regarding adolescent vaccines in Australia, Bolsewicz and colleagues revealed a phenomenon of pandemic-induced polarisation, observing that parents previously inclined towards vaccination had their convictions reinforced, whereas those who were hesitant exhibited heightened distrust towards both health and vaccination systems (Bolsewicz *et al.*, 2023). Similarly, in the United States, Higgins *et al.* documented a comparable polarisation in vaccination beliefs (Higgins *et al.*, 2023). There is evidence of a spill-over effect from Covid-19 vaccine hesitancy onto childhood immunisations in both US and Turkish populations (Grills and Wagner, 2023; Duran *et al.*, 2023).
54. It is currently unclear whether proof-of-vaccination requirements such as vaccine passports and mandates impacted vaccine hesitancy over the pandemic. In France, the health pass confirming proof of Covid-19 vaccination was required to enter several public spaces. While the overall number of people getting vaccinated after the health pass was introduced, its introduction coincided with increased anger within a non-negligible portion of the French population (Ward *et al.*, 2022). In the USA, Eshun-Wilson and colleagues suggest that "vaccine mandates can [...] promote anti-vaccine sentiment in the most hesitant." (Eshun-Wilson *et al.*, 2021).
55. In short, vaccine uptake does not necessarily correlate with vaccine hesitancy or confidence. In this case, many people got vaccinated to attend restaurants and other public spaces, but seemingly bore some resentment about having to get vaccinated, possibly hardening their views about vaccines. Although proof-of-vaccination requirements are discussed later in this report in the UK context, de Figueiredo *et al.* predicted a potential polarisation effect due to the introduction of vaccine passports before they were deployed in the UK: "Passports make those who already intend to get vaccinated ... even more positive. But passports have the converse effect upon those who have concerns about the vaccine." (de Figueiredo, Alexandre; Larson, Heidi J; Reicher, 2021)

## II. Vaccine hesitancy and the UK Covid-19 vaccines

### II.1. Key dates in the development and deployment of the UK Covid-19 vaccines

56. The Pfizer-BioNTech mRNA vaccine (BNT162b2) was the first Covid-19 vaccine to receive regulatory approval by the Medicines and Healthcare products Regulatory Agency (MHRA). Approval for BNT162b2 was granted on 2 December 2020, with the first vaccine being administered on 8 December 2020 to Margaret Keenan: the first person in the world to receive the Pfizer-BioNTech vaccine (Ryan and Nanda, 2022). The UK was the first country to approve the Pfizer-BioNTech vaccine, with the USA and EU following suit on 11 and 20 December, respectively. A summary of other Covid-19 vaccines approved by MHRA in 2020 and 2021 are provided in **Table 5**.
57. In December 2020, the UK government published a list of priority groups for Covid-19 vaccination. Vaccination began with four priority groups identified by the JCVI: care home residents and carers; individuals aged 80 and over and frontline health and social care workers; all individuals aged 75 years of age and over; and all individuals aged 70 and older as well as clinically extremely vulnerable individuals (Department of Health & Social Care, 2021f; Department of Health & Social Care, 2021d). Subsequent high priority groups included all individuals 50 years of age and older, as well as individuals aged 16 to 64 with underlying health conditions that placed them at higher morbidity and mortality risk from Covid-19 (Department of Health & Social Care, 2021d). Rollout then progressed age-wise down the remaining age groups.
58. Since the introduction of Covid-19 vaccines in late 2020, the MHRA has granted several approvals for Covid-19 vaccine boosters, with rollout to the public following shortly thereafter. On September 9, 2021, the MHRA approved the use of Pfizer-BioNTech and Oxford-AstraZeneca vaccines as booster doses based on a review of available safety and effectiveness data (Medicines and Healthcare products Regulatory Agency, 2021a). In late 2022, the MHRA approved the use of the Pfizer-BioNTech bivalent Covid-19 booster vaccine for new variants (Medicines and Healthcare products Regulatory Agency, 2022a). The MHRA also approved the Moderna bivalent booster on August 15, 2022 (Medicines and Healthcare products Regulatory Agency, 2022b).

**Table 5 Covid-19 vaccines approved in 2020/21 by the MHRA in the UK**

Covid-19 vaccine	Reports of efficacy	MHRA approval date	Date first administered
Pfizer-BioNTech	Pfizer-BioNTech reported preliminary efficacy reports on 9 November 2020 with confirmed 95% efficacy on 18 November 2020 (Pfizer, 2020)	2 December 2020 (Medicines and Healthcare products Regulatory Agency, 2020b)	8 December 2020 (NHS England, 2020)
Moderna	Moderna reported preliminary results showing 95% efficacy	8 January 2021 (Medicines and Healthcare products	13 April 2021 (NHS England, 2021a)

	(Oliaro, 2021)	Regulatory Agency, 2021b)	
Oxford-AstraZeneca	AZ reported an average efficacy of 70% across different dosing regimens (AstraZeneca, 2020)	30 December 2020 (Medicines and Healthcare products Regulatory Agency, 2020a)	4 January 2021 (Department of Health & Social Care, 2021h)
Janssen	76% efficacy reported (Sadoff et al., 2021)	28 May 2021 (Department of Health & Social Care, 2021i)	Not used in the UK

Source: see table.

59. In addition to key dates linked to vaccine authorisations and delivery, there were several other key dates in the rollout of Covid-19 vaccines relating to the use of Covid-status certification and requirements. Key dates in the development and deployment of these policies are described in **Table 6** below. Ethical and practical considerations of Covid-status requirements have been deliberated at length (Osama *et al.*, 2021; Gur-Arie *et al.*, 2021; Gostin *et al.*, 2021; Williams, 2022), including specifically in a UK context (Mills and Dye, 2021; Stead *et al.*, 2022).

**Table 6 Timeline for the implementation of Covid-status certification and mandates in the UK**

Date	Event	Discussion
2020	Early discussions on the use of Covid-19 vaccine-based requirements.	In April 2020, the WHO cautioned against the use of vaccine [immunity] passports "...at this point in the pandemic, there is not enough evidence about the effectiveness of antibody-mediated immunity to guarantee the accuracy of an 'immunity passport' or 'risk-free certificate.' People who assume that they are immune to second infection because they have received a positive test result may ignore public health advice. The use of such certificates may therefore increase the risks of continued transmission."  In late 2020, discussions and debates about the potential use of vaccine passports for international travel (BBC News, 2020b; The Guardian, 2020) and vaccine mandates for healthcare workers (Savulescu, 2021) were increasingly commonplace in the media and academic literature.
December 2020	Ministers' plans on vaccine-based requirements before the first Covid-19 vaccine was administered.	On December 1, 2020, Michael Gove MP, stated that there were no plans to introduce a vaccine passport in the UK, seemingly contradicting prior statements from the Health Secretary, Matt Hancock, and the Minister for Covid Vaccine Deployment, Nadhim Zahawi (BBC News, 2020a). The former not ruling out making the Covid vaccine mandatory in November 2020 (ITV News, 2020).

April 2021	UK Government interim report for Covid-status certification (HM Government, 2021c)	<p>In early 2021, Prime Minister Boris Johnson, announced the establishment of a review to consider the role of Covid-19 status certification (vaccine passports) in reopening the economy and international travel. An interim report published in April 2021 reported that Covid-status certification “could have an important role to play both domestically and internationally, as a temporary measure...We will continue to gather evidence on the extent to which Covid-status certification is an effective measure to control the epidemic and reduce hospitalisations and deaths.” The Government also considered required standards for Covid-status certification for domestic settings and expected that certification would be demonstrated by an up-to-date vaccine status, a negative lateral flow or PCR test, or by proof of natural immunity (though, unlike vaccine-derived immunity, this would be limited to 180 days from the date of a positive test). The report also provided information that the NHS is working on providing a means for individuals to demonstrate their Covid status through digital and non-digital routes. A public consultation was held from 14 April to 26 May 2021 on a proposal to make proof of Covid-19 vaccination a condition of employment in care homes (Department of Health &amp; Social Care, 2021i).</p>
May to July, 2021	NHS Covid Pass introduced in England and Wales	<p>The NHS COVID Pass was available to people on the NHS App on 17 May 2021 in England who had completed the primary course of Covid-19 for international travel (HM Government, 2021b). On 19 May, residents of Scotland could also download a Covid-19 vaccine certificate (BBC News, 2021a). On 25 June 2021, the NHS Covid Pass was available digitally to people in Wales (Wales Statutory Instruments, 2022). In July 2021, the NHS App enabled individuals to demonstrate their Covid status through proof of vaccination status, test results or natural immunity. ‘High-risk’ venues were encouraged to use the pass to limit entrance to individuals who had been vaccinated or who could show proof of recent infection, with the Government reserving the right to mandate the NHS Covid Pass in certain venues at a later date, if sufficient measures were not taken to limit infection (HM Government, 2021b).</p>
June 2021	Mandatory Covid-19 vaccination for care home staff announced.	<p>On 16 June, the UK Government confirmed Covid-19 vaccination would be mandatory for staff working in care homes in England with the legislation coming into effect in October 2021 (Department of Health &amp; Social Care, 2021j). The law applied to all workers employed by the care home directly or by a care home provider or agency, as well as volunteers.</p> <p>On 9 July, the Welsh Government indicated that they were not consulting on this issue in Wales, stating that “The Social Care Working Group of SAGE has advised that an uptake rate of 80% in staff and 90% in residents in each individual care home setting would be needed to provide a minimum level of protection against outbreaks of COVID-19. Vaccination rates in care homes are above these levels in Wales at the present time” (Welsh Government, 2021)</p>
July 2021	Covid-Status Certification Review (HM Government, 2021a)	<p>The Covid-Status Certification Review report was published in July 2021. The report’s main conclusion was that the Government would not mandate the use of Covid-19 status certification as a condition of entry for visitors to any setting in England at the time. This finding was based on there being a large burden on individuals who had not yet been offered a full course of a Covid-19 vaccine. However, the wider application of certification was kept under consideration. The Government reported that they will develop the NHS Covid Pass, accessed via the NHS app, to allow individuals to demonstrate their vaccination status. The review also considered ethical and equalities concerns: “Many ethicists saw a clear case for certification due to the potential to help safeguard the health and wellbeing of people and enable them to feel safer in accessing settings. Some issues were raised, including the potential for certification to exacerbate existing divisions and inequalities issues – for example in groups where there is vaccine hesitancy, groups for whom it could be difficult to access or administer tests, or groups who may face higher levels of digital exclusion.” Most responses to the Report’s call for evidence were strongly opposed to Covid-19 vaccine certification and these were “largely based on an</p>

		assumption that certification would be based only on vaccination status.”
July 2021	Mandatory certification announced in England	<p>On 19 July, shortly after the publication of the Covid-Status Certification Review, the Prime Minister announced that by 30 September 2021, full vaccination <i>only</i> would be a condition of entry to nightclubs and other crowded venues. Negative test results or natural immunity would no longer be sufficient (HM Government, 2021b; BBC News, 2021b).</p> <p>Wales, Scotland, and Northern Ireland also announced similar mandatory certification in Autumn 2021 (Institute for Government, 2021a).</p>
September 2021	Consultation for mandatory vaccination for healthcare staff in England (Department of Health & Social Care and The Rt Hon Sajid Javid, 2021) and proposals for mandatory domestic Covid-19 vaccine certificates in Scotland.	<p>On 9 September 2021, a consultation was launched on mandatory vaccination for healthcare staff and related professionals in England. At the time of the consultation, 92% of NHS staff had their first dose and 88% had had two doses. On 9 November 2021, a response to the consultation noted that 65% of respondents did not support the proposal on mandating staff to have both doses of a Covid-19 vaccine as a condition of employment (Department of Health &amp; Social Care, 2021e). The British Medical Association, Royal College of Nursing, and Royal College of Midwives provided separate statements highlighting concerns over mandatory vaccination, including around the loss of NHS staff (Royal College of Nursing, 2022; Royal College of Midwives, 2022; BMA, 2022).</p> <p>On the same date, the Scottish Government set out proposals for a mandatory domestic Covid-19 vaccination certificate scheme in advance of a parliamentary vote. This proposal would see people seeking entry to certain venues (such as nightclubs and live events) to show that they had been fully vaccinated. The Scottish Government voted to approve the scheme on the same day, coming into force on 1 October 2021.</p>
September 2021	Plans for vaccine certification scrapped in England	Plans to introduce mandatory vaccine certification for nightclubs and other crowded events in England were scrapped on 12 September 2021 (BBC News, 2021c).
October 2021	Mandatory Covid-19 vaccination certification came into effect in Scotland and Wales	On 1 October 2021 (but with a grace period until 18 October 2021) mandatory Covid-19 certification came into effect in Scotland for certain events including nightclubs and large indoor events (Scottish Government, 2021). Four days later on 5 October, mandatory Covid-19 certification came into effect in Wales.
November 2021	Vaccination as a Condition of Deployment for frontline health and social care workers announced in England	On 9 November 2021, the UK Government announced that frontline healthcare workers in England would be required to be fully vaccinated against Covid-19 (Department of Health & Social Care, 2021c) and amended the Health and Social Care Act 2008 (Institute for Government, 2021a). This vaccine mandate would apply to the 10% of NHS staff who had not received two doses of a Covid-19 vaccine and would include health and social care workers, including frontline volunteers. A deadline for care home workers to be fully vaccinated was set for 11 November 2021.
November 2021	Introduction of Covid status certification in Northern Ireland	The Northern Ireland Executive announced the introduction of a Covid-19 status certification scheme on 17 November 2021. The scheme required individuals to provide proof of full vaccination, a recent negative test, or evidence of recovery from Covid-19 to access certain venues and events (Northern Ireland Executive, 2021).
December 2021	Vaccine certification re-introduced in England	On 8 December 2021, the Prime Minister announced that, from 15 December 2021, the Government would be re-introducing mandatory Covid-status certification in England for nightclubs, unseated indoor events with 500 or more attendees, unseated outdoor events with 4,000 or more

		attendees and any event with 10,000 or more attendees. This plan was announced to address the rise in Omicron cases reported across the UK (Prime Minister's Office, 2021).
January and February 2022	Vaccine certification scrapped in England and Covid-19 status certification scrapped in Northern Ireland	The mandatory use of the NHS Covid Pass for nightclubs and large events was scrapped in England on 27 January 2022 (Department of Health & Social Care, 2022a) and Covid-19 status certification was scrapped in Northern Ireland on 26 January 2022 (BBC News, 2022c). Mandatory Covid certifications were scrapped in Wales and Scotland shortly after, on 17 and 28 February 2022, respectively (BBC News, 2022b; BBC News, 2022a) (Public Health Wales, 2022).
March 2022	Mandatory vaccination for frontline health and social care workers in England scrapped	Following a consultation in February 2022, mandatory vaccination for frontline healthcare workers in England was scrapped on 1 March 2022. It has been estimated that the mandatory vaccination for care home workers led to between 28,000 to 41,000 fewer unvaccinated staff, but at the cost of 14,000 to 18,000 staff and no evidence that the vaccine mandate was successful in reducing care home deaths was found (Girma and Paton, 2024).

Source: see table.

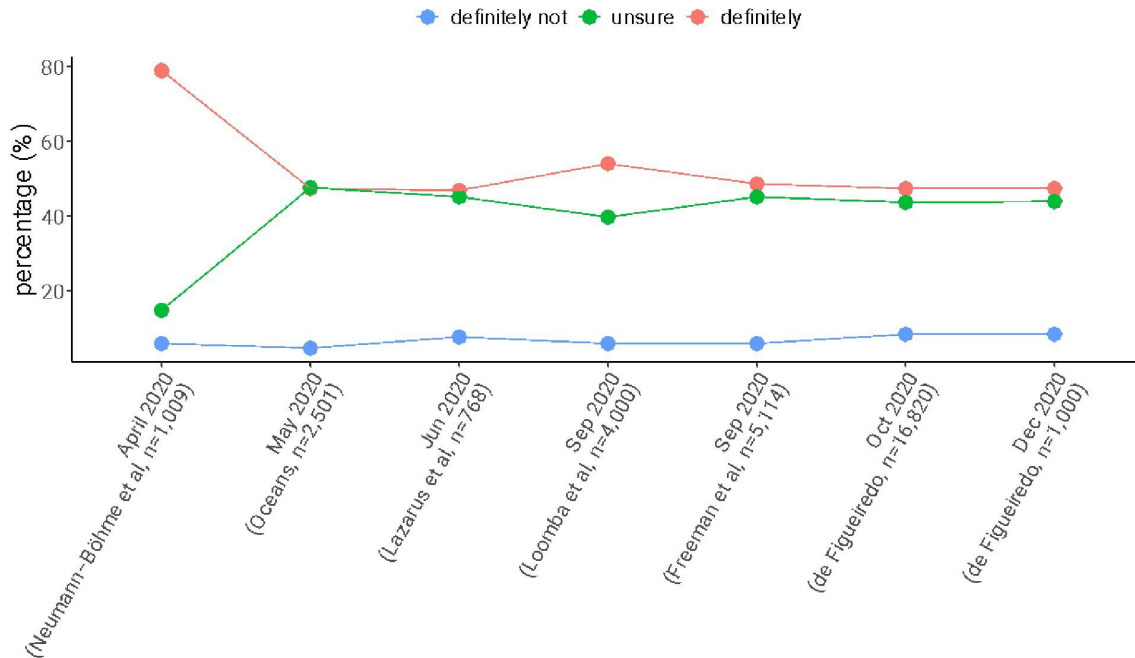
## II.2. Vaccine hesitancy towards UK Covid-19 vaccines

60. In the period before the rollout of the Covid-19 vaccine on 8 December, many surveys investigated intentions to receive a Covid-19 vaccine in the UK among the adult population (Lazarus *et al.*, 2020; de Figueiredo and Larson, 2021; Loomba *et al.*, 2021; Freeman *et al.*, 2022; de Figueiredo, 2022). The results of pre-rollout surveys have been combined and are shown in **Figure 2**.
61. Among the first to explore intention to vaccinate was the Oxford Coronavirus Explanations, Attitudes, and Narratives Survey (Oceans) (Freeman *et al.*, 2022). In April 2020, Neuman-Bohme and colleagues found that about 80% of the UK public would “definitely” accept a Covid-19 vaccine. In May 2020, this value had decreased to 47.5% of the population, while 40.5% of respondents indicated that they would ‘probably’ or ‘possibly’ take the vaccine, and 7.3% and 4.8% reported that they would ‘probably not’ or ‘definitely not’ take the vaccine, respectively (Neumann-Böhme *et al.*, 2020) (**Figure 2**). Trends in pre-rollout hesitancy showed that the proportion of the adult population who would ‘definitely’ accept a Covid-19 vaccine remained relatively stable at around 47.5%. However, a slight increase was detected in the adult population reporting that they would refuse a Covid-19 vaccine between May 2020 to December 2020 from 4.8% to 8.4%.
62. It is important to note that the adult uptake of Covid-19 vaccines in the UK greatly exceeded the levels of vaccine acceptance indicated in population surveys conducted in advance of the actual vaccine rollout. All adults in the UK were offered a Covid-19 vaccine by 19 July 2021 (Department of Health & Social Care, 2021b):
- By 1 August 2021, 87.6% of adults in England had received at least one Covid-19 dose, while 71.3% had received two doses (figures derived from Covid-19 monthly announced vaccinations 12 August 2021 (NHS England, 2022a);
  - By 1 September in Scotland, 95% of people aged 40 and over had completed the primary series, as well as 71% of 30- to 39-year-olds, and 51% of 18- to 29-year-olds (First Minister Nicola Sturgeon, 2021);

- By 2 August 2021, 85.4% of adults had received the first dose in Northern Ireland, compared to 74.4% who had received the second dose (figures estimated from doses administered (Department of Health, 2024) and population estimates (NISRA, 2021));
  - By 24 July 2021, 87% of people aged 16 and over in Wales had received a first dose and 76% had received a second dose.
63. In pre-rollout surveys of Covid-19 vaccination intent, only roughly half of the UK population stated a definite intention to receive the Covid-19 vaccine, with roughly 40% unsure about their intentions (**Figure 2**). Observed uptake data above reveal that a majority of those unsure about whether to vaccinate had gone on to vaccinate, indicating a reduction in hesitancy during the early stages of vaccine rollout. This finding is further supported by an analysis by the Office of National Statistics (ONS) which found that during the first half of 2021, adults across each of the four nations were increasingly likely to report intending to accept the Covid-19 vaccine (Office for National Statistics, 2021c). In June 2021, NHS England reported on these decreases in hesitancy and associated increases in vaccine uptake, including among many minority groups (NHS England, 2021c). Dr Nikki Kanani, NHS national medical director for primary care and Farzana Hussain, GP at The Project Surgery, both highlighted the role of the NHS to encourage vaccine uptake, including through local healthcare workers and NHS community teams, public outreach including targeted engagement with faith leaders, pop-up clinics (including in places of worship, sports stadiums and community centres), as well as support from high-profile public figures.

**Figure 2 Pre-rollout intent to accept a Covid-19 vaccine in the UK**

Several surveys measured Covid-19 vaccination intent in the UK before the vaccine rollout on 8 December 2020. Surveys with comparable response options have been used; individuals who provide a non-definitive response are grouped into an 'unsure' category. There are three other surveys that capture pre-rollout vaccination intent; however, the response options used differ substantively and have not been included in this figure (Roozenbeek *et al.*, 2020; Sherman *et al.*, 2020; Murphy *et al.*, 2021).



Source: Various pre-pandemic surveys in the UK (Neumann-Böhme *et al.*, 2020; Lazarus *et al.*, 2020; de Figueiredo and Larson, 2021; Loomba *et al.*, 2021; Freeman *et al.*, 2022; de Figueiredo, 2022).

64. As rollout continued in early 2021, vaccine hesitancy continued to decline in the UK. The Imperial College Global Behaviours and Attitudes report found an increase in trust in Covid-19 vaccines between December 2020 and April 2021 and a corresponding decrease in worries about Covid-19 vaccine side effects (Institute of Global Health Innovation, 2022), a finding subsequently replicated in a global meta-analysis (Wang *et al.*, 2022). While hesitancy was found to have reduced across each nation, it persisted in some regions and increased in Outer London (East) (Office for National Statistics, 2021c), which was identified as a major Covid-19 vaccine hesitancy hotspot prior to vaccine rollout (de Figueiredo, 2022).
65. From April 2021 to April 2022, however, the Imperial College report found a gradual decline in trust of Covid-19 vaccines in the UK with declines also found in the percentage of UK respondents holding “a lot” or “a fair amount” of confidence in the UK’s health system (Institute of Global Health Innovation, 2022). Among unvaccinated people surveyed in all countries, the primary reasons for not receiving a Covid-19 vaccine were concerns about side effects, and concerns about lack of vaccine testing. These Imperial College data align with observed vaccination behaviours by June 2022: a study by the HDR UK Coalesce consortium examined under-vaccination (the receipt of fewer than the recommended number



of Covid-19 vaccines) across the UK, finding 45.8% of under-vaccinated people in England, 49.8% in Northern Ireland, 34.2% in Scotland, and 32.8% in Wales on June 1, 2022 (Kerr *et al.*, 2024). There are a lack of detailed insights in a UK context about specific reasons for Covid-19 vaccine dropout, though two studies investigate some predictor. Paul and Fancourt examined predictors of unwillingness to receive a Covid-19 vaccine booster among a large sample of fully vaccinated adults in the UK and found that 8% of this cohort were either uncertain or unwilling about receiving a booster vaccine, with low risk perception, low compliance with government Covid-19 restrictions, younger age groups, and those with lower levels of education or from a lower socio-economic position all associated with increased uncertainty and unwillingness (Paul and Fancourt, 2022). In Scotland, vaccine fatigue was cited as a cause for dropout rates, with higher rates of dropout in younger age groups and among males, as well as in Glasgow City (Muegge *et al.*, 2024).

66. The surveys conducted before vaccine rollout in the UK revealed large differences in Covid-19 vaccination intent between socio-demographic groups. Age was consistently among the strongest predictors of Covid-19 vaccination intent (Sherman *et al.*, 2020; de Figueiredo and Larson, 2021; Robertson *et al.*, 2021; Daniel Freeman *et al.*, 2021; de Figueiredo, 2022). In a global study of Covid-19 vaccination intent, being aged 65 or over was most strongly associated with vaccination intent in the UK compared to other countries (de Figueiredo and Larson, 2021).
67. Ethnicity and education also played a major role in predicting vaccination intent in the UK. Several pre-rollout studies found that Black or Black British groups had the highest rates of vaccine hesitancy among all ethnic groups and that higher levels of education were associated with lower hesitancy (Robertson *et al.*, 2021; Daniel Freeman *et al.*, 2021; de Figueiredo, 2022). Strikingly, in the evaluation of hesitancy by Robertson and colleagues, 71.8% of Black or Black British respondents reported that they were unlikely or very unlikely to receive a Covid-19 vaccine; yet in late 2021 about three quarters of Black or Black British people in the UK had received at least one Covid-19 vaccine (Gaughan *et al.*, 2023).
68. As regards religion, while Muslims were shown to express higher levels of hesitancy than atheists or agnostics, Hindu and Jewish people were found to have lower levels of hesitancy than atheists or agnostics (de Figueiredo, 2022). Further, findings from a YouGov survey in England found that people adhering to the Pentecostal Evangelical and Islamic faiths had significantly fewer COVID-19 vaccinations and those identifying as part of the Church of England had significantly more (Hansen and Pickering, 2024). However, another study found that all major religious groups within England were negatively associated with COVID-19 vaccination rates (Martens, 2024). It is difficult to comment further on any specific influence of religion on the observed differences in Covid-19 vaccine uptake as knowledge is limited and likely hidden or confounded with elements of race, ethnicity or culture.
69. Females were also consistently found to have higher levels of Covid-19 vaccine hesitancy than males (Daniel Freeman *et al.*, 2021; Robertson *et al.*, 2021; de Figueiredo, 2022), linked to perceptions surrounding side-effects allegedly leading to infertility (Halvorsrud *et al.*, 2023).
70. The differences in hesitancy between socio-demographic groups established before vaccine rollout were largely consistent with corresponding differences found within the first year of vaccine rollout. NHS England data published on 12 August 2021 reveal considerably lower

first and second dose uptake among younger age groups as well as individuals identifying with a Black African or Black Caribbean background (compared to White British and Irish groups (NHS England, 2022a). These data also reveal that those from a Pakistani background had considerably lower uptake than White British and Irish groups.

71. Trend data from this same source reveal that between 8 December 2020 and 11 March 2021, the percentage of English residents aged 70 years and over receiving at least one dose of a Covid-19 vaccine also showed strong variation with respect to socio-demographic status.
72. All ethnic minority groups had lower first dose uptake compared with the White British population, with the lowest vaccination rates among Black African (58.8%) and Black Caribbean groups (68.7%) followed by Bangladeshi (72.7%) and Pakistani (74.0%) groups.
73. Christians and those without a religion reported the highest first dose vaccination rate among adults aged 70 and over, however, coverage was higher for Hindu (87.1%) and Jewish people (88.8%) than Muslims, who reported the lowest first dose uptake of any religious group (72.3%). These gaps in coverage – which do not control for the effect of ethnicity – persisted across all age groups throughout the primary series. Vaccination status by socio-demographic group in 2023, however, indicates that the proportion of people continuing to a fourth dose (that is, a second booster) is highest among Jewish groups (83.3%) followed by Christians (81.7%) and lowest among Muslims (38.4%) (Emerson *et al.*, 2021). A study by Hansen and Pickering in 2024 examined the relationship between religion and Covid-19 vaccine status further, finding higher rates of vaccine uptake among those identifying with the Church of England with those following Pentecostal Evangelical and Islamic faiths holding lower Covid-19 acceptance even when controlling for several confounders including age, gender, education, trust, trust in government, and political ideology (Hansen and Pickering, 2024).
74. Among children and adolescents, a study in students aged 9-18 years (n=27,910) in England (non-representative) conducted between May and July 2021 found that younger students were less likely to report 'opting in' (accepting vaccination) than older students (35.7% of 9-year-olds and 51.3% of 13-year-olds compared to 77.8% of 17-year-olds) (Fazel *et al.*, 2021). Factors associated with the 'vaccine hesitant' group ('opt-out' or 'undecided') included: coming from deprived socioeconomic contexts; school locations more likely to be in areas of greater deprivation; smoking or vaping; spending longer on social media; and feeling that they did not belong in their school community (lack of community cohesion) – but with lower levels of anxiety and depression than comparative groups. There were also indications that the 'opt-out' group had higher levels of marginalisation and mistrust.
75. However, the prediction that males would have higher vaccination uptake than females was not borne out by observed Covid-19 uptake data. In June 2021, first dose uptake was higher for females than males across every single age category, with a large gender-gap emerging among younger groups (Public Health England, 2021b). As of 1 June 2022, females continued to have lower rates of under-vaccination than males – in the region of 5 percentage points – across all four UK nations (Kerr *et al.*, 2024). This discrepancy may be attributed to several factors, including differences in reported intent versus actual behaviour between the sexes, variations in healthcare utilisation patterns (with women having consistently higher levels of primary healthcare use than men) (Wang *et al.*, 2013), and a

reduction in vaccine hesitancy among women after concerns about side effects related to fertility and pregnancy were addressed. Throughout vaccine rollout, the NHS, UK Government and local authorities, and healthcare providers worked to alleviate these concerns, providing specific guidance and feedback (NHS Fife, 2021; NHS England, 2021b; NHS, 2022). In coverage data from March 2023, however, males (78.1%) are more likely than females (77.3%) to have continued to a fourth vaccination (Emerson et al., 2021).

76. Identifying the impact of vaccine side-effects on attitudes to specific Covid-19 vaccines in the UK has not been extensively studied. There is some evidence for differences in hesitancy between the Oxford-AstraZeneca and Pfizer-BioNTech vaccines, however. In March 2022, a slight increase in willingness to accept the Oxford-AstraZeneca vaccine compared to the Pfizer-BioNTech vaccine was reported (Bullock et al., 2022), though this difference was unlikely to be significant. In April 2021 a decrease in preference for the Oxford-AstraZeneca vaccine was reported among the 18-75 age group (Kings College London and University of Bristol, 2021). Higher frequency trends tracked by Imperial College's Covid Data Hub found a substantial increase in perceptions towards the Pfizer vaccine from April 2021 onwards, with a corresponding decrease in perceptions towards the Oxford-AstraZeneca vaccine among 18- to 65-year-olds (Institute of Global Health Innovation, 2021). A study conducted around the same time, found vaccine-specific concerns centring on blood clotting (Williams *et al.*, 2023). The increased hesitancy in the Oxford-AstraZeneca vaccine aligned with increases in reports that the Oxford-AstraZeneca vaccine caused rare cases of blood clots, a concern that received wide publicity (Wellcome, 2021). The Pfizer-BioNTech vaccine also received media attention surrounding rare cases of myocarditis and pericarditis following vaccination (Husby *et al.*, 2021; Heidecker *et al.*, 2022), but no evidence can be found on its impact on hesitancy.
77. Notably, countries that decided to suspend the Oxford-AstraZeneca vaccine experienced a subsequent increase in vaccine hesitancy (Agosti *et al.*, 2022). Several authors have commented on the value that offering a choice of Covid-19 vaccines may have on reducing vaccine hesitancy (Hughes et al., 2021; Kutasi *et al.*, 2022; Sprengholz *et al.*, 2021b). In Hungary, for example, vaccine choice was introduced in response to significant hesitancy during early stages of vaccine rollout.

### II.3. Differences in Covid-19 vaccine hesitancy between the four nations

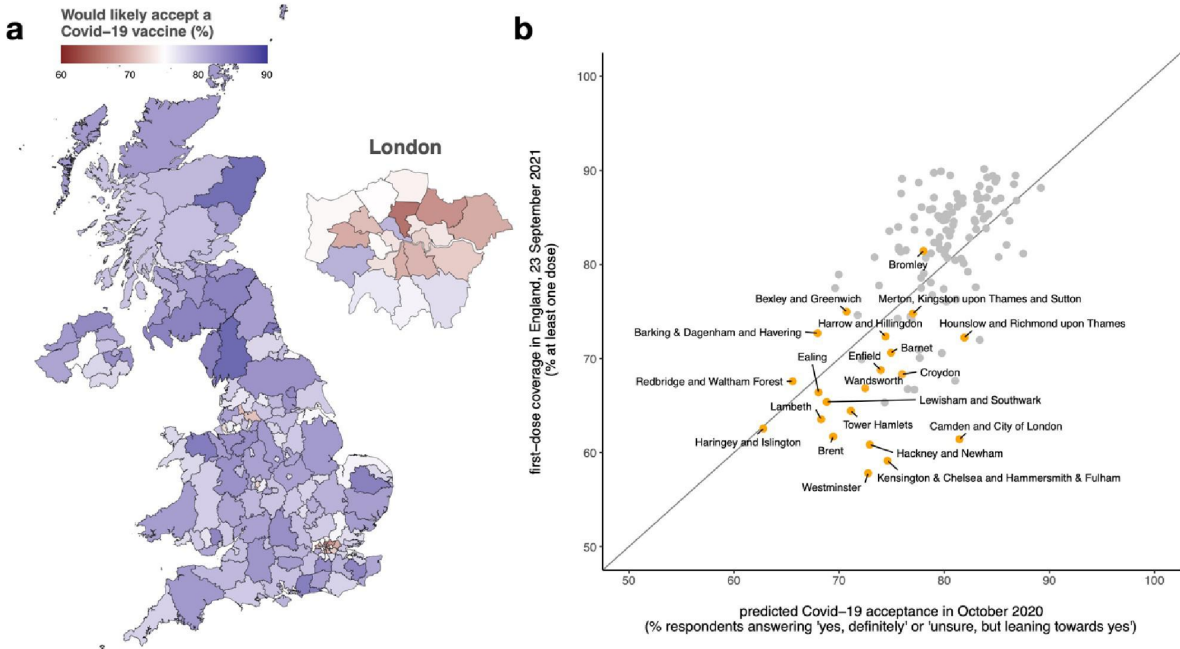
78. Before the introduction of the Covid-19 vaccine in December, hesitancy towards the Covid vaccine was found to be highest in London (particularly inner and outer East and West London), Birmingham, Manchester, and Liverpool. London had 13 of the 20 highest hesitancy regions in the UK while North West England had four. Scotland, Wales, and Northern Ireland had overall lower levels of hesitancy and had no region in the top 34 worst performing areas of the UK (**Figure 3a**). The higher rates of hesitancy in London are associated with its relative population (de Figueiredo, 2022).
79. A strong correlation was found between these pre-vaccine rollout predictions and observed first dose uptake in England (**Figure 3b**). Interestingly, while most regions of England recorded higher Covid-19 vaccination rates than expected (in agreement with an overall

lowering of vaccine hesitancy found during the early stages of rollout (Office for National Statistics, 2021c)), 17 of 21 regions in London performed worse than predicted (**Figure 3b**). This result is in part-agreement with vaccine hesitancy trends between April and July 2021 that find an increase in hesitancy in Outer London (East and North East) and stagnating hesitancy in Outer London South (Office for National Statistics, 2021c).

80. It is unclear why Covid-19 vaccine uptake in London was lower than anticipated, while most other regions out-performed predictions in line with data suggesting broad reductions in hesitancy across the country. Covid-19 vaccine policies, notably Covid-status certification, which was introduced in July 2021 (**Table 6**), may provide some explanation via backlash effects, which may have lowered vaccination intentions among many socio-demographic groups from July 2021 (Porat *et al.*, 2021; de Figueiredo, Alexandre; Larson, Heidi J; Reicher, 2021), although more research is required to fully determine the size – if any – of this effect. The impact of these proof-of-vaccination requirements are further discussed in Chapter III.
81. Other studies have examined differences in Covid-19 vaccine uptake between the four nations. Kerr and colleagues from the HDR UK Coalesce consortium used electronic health records to investigate under-vaccination (receiving fewer than the recommended number of Covid-19 vaccine doses) across the four nations as of July 2022 (de Figueiredo, 2022; Kerr *et al.*, 2024). Under-vaccination by nation and age group in this study is shown in **Figure 4**. Northern Ireland had the highest rates of under-vaccination across all age groups (except for 75- to 79-year-olds), while Scotland and Wales had the lowest. England had the second highest rate of under-vaccination in all age groups, except for adults between 75 and 79, where it had the highest.

**Figure 3 Predicted and observed Covid-19 uptake in the UK**

Predicted values of Covid-19 vaccine uptake across 174 sub-national regions of the UK (a) as measured through survey respondents stating that they would 'definitely' take a Covid-19 vaccine or were 'unsure, but leaning towards yes'. (b) Observed first-dose coverage (obtained in September 2021) versus predictions, highlighting under-performing regions in London.



Source: figures adapted from (de Figueiredo, 2022).

**Figure 4 Differences in rates of under-vaccination between the four UK nations.**

Rates of under-vaccination in all four UK nations and all age groups as of July 2022. Under-vaccination is defined as receiving fewer than the recommended number of Covid-19 vaccine doses.



Source: figure adapted from table 1 in Kerr *et al* (Kerr *et al.*, 2024).

# III. Causes of vaccine hesitancy in the UK Covid-19 vaccines

## III.1. Safety concerns and risk-benefit perceptions

82. Safety and risk-benefit perceptions of the Covid-19 vaccine have been widely established as key drivers to Covid-19 vaccine uptake in the UK. Many studies have identified perceptions around vaccine safety and the risk of Covid-19 as key predictors of Covid-19 vaccination intentions in both the general population (Daniel Freeman *et al.*, 2021; Sherman *et al.*, 2022; Abba-Aji *et al.*, 2022) and among healthcare workers (Martin *et al.*, 2022). Low Covid-19 vaccine uptake among pregnant women (Bhattacharya *et al.*, 2022) had also been attributed to fears around side-effects as well as initial advice from the JCVI against vaccination (Iacobucci, 2021). A systematic review of vaccine hesitancy among ethnic minorities in the UK found lower levels of vaccination intent and higher levels of vaccine distrust, which held across both the public (Hussain *et al.*, 2022) and health and social care workers (Bell *et al.*, 2022).
83. A rapid appraisal of vaccine hesitancy among 24 healthcare workers in the UK conducted between December 2020 and March 2021 revealed some safety concerns especially regarding the long-term, unknown side-effects of the vaccines, though overall healthcare professionals felt positive around the short-term safety of the vaccines (Manby *et al.*, 2022). These were reassuring findings, given the perception among the UK public that healthcare workers are one of the most reliable sources of vaccine-related advice (Yaqub *et al.*, 2014; UK Health Security Agency, 2024a).

## III.2. Age

84. Data from the UK reveal higher levels of vaccine confidence among older age groups for the Covid-19 vaccine (Office for National Statistics, 2023), the seasonal influenza vaccine (de Figueiredo *et al.*, 2024), as well as childhood immunisations (de Figueiredo, A; Karafillakis, E; Larson, 2020). There are many plausible reasons why this is likely to be the case. Firstly, and regarding the Covid-19 and seasonal influenza vaccines, older age groups along with other at-risk groups (e.g., those with immune deficiencies, diabetes, obesity, etc) were widely acknowledged as being the highest risk of serious disease consequences and death from Covid-19 infection. Given that these groups have significantly higher disease risk than younger groups, UK officials prioritised older age groups for vaccination, sending a clear message to the public that they were the most vulnerable. This message would have been very different had the 2009 H1N1 become as global and acute as the Covid-19 pandemic, as young people were more vulnerable to serious consequences of H1N1 than Covid-19 (Kant *et al.*, 2021). While all ages are at some level of risk, including transmitting to others, these differences should remind us that these higher risk categories need to be carefully assessed with each pandemic or disease control situation

### III.3. Inequalities and structural discrimination

85. In 2016, a National Institute for Health and Care Excellence (NICE) briefing paper identified factors for under-immunisation among children, including missed vaccinations, being in foster care, disabilities, ethnic minority groups, non-English speaking families, and vulnerable groups such as travellers, asylum seekers, and the homeless (NICE, 2016). Addressing these barriers has been challenging. While recommendations have been regularly issued to bridge vaccination gaps, disparities persist among minority and vulnerable groups. The pandemic has further highlighted these disparities. A 2022 NICE report emphasises the need for identifying tailored interventions to increase vaccine uptake among populations with low routine vaccine uptake as a priority as well as building a deeper understanding about underlying drivers of low vaccine uptake to inform and tailor interventions for specific vaccines and target groups (NICE, 2022).
86. Perceptions of racism and structural discrimination influenced Covid-19 decision-making within some communities. In a study of UK healthcare workers from ethnic minorities, perceived institutional and structural discrimination weighted risk-benefit decision making more heavily towards vaccine hesitancy (Woodhead *et al.*, 2022). Vaccination attitudes among these groups were influenced by suspicions around institutional pressures to be vaccinated and racial injustices in vaccine development and testing. A systematic review that included 10 UK-based studies conducted by Abba-Aji *et al* found that low confidence among Black ethnic minority groups was driven by mistrust and safety concerns (Abba-Aji *et al.*, 2022). Additionally, vaccine Covid-19 vaccine perceptions are lower among other disadvantaged groups in the UK, such as within historic coal-mining communities in Wales: a 2022 report by Saville and colleagues found higher rates of Covid-19 vaccine hesitancy among residents of coalfield areas compared to those in non-coalfield areas, with a lack of trust in government a key underlying theme in those displaying vaccine hesitancy (Saville *et al.*, 2023).
87. There is clear evidence that some ethnic minority groups experienced disproportionate Covid-19 morbidity and mortality burdens, largely linked to pre-existing inequalities (Nazroo and Becares, 2020). Despite this amplified disease burden, vaccine hesitancy remained an issue within ethnic minority groups, with an ONS report in May 2021 revealing that vaccine hesitancy had not significantly fallen among Black British people since the start of 2021 (Office for National Statistics, 2021a). At the same time, a UK Government Race Disparity Unit report on Covid-19 recognised that:

*“The Black Lives Matter movement increased solidarity within and between Black African and Black Caribbean groups. Additionally, culturally appropriate approaches to delivering health education may have increased knowledge of Covid-19 in Black communities in the UK. By contrast, British Pakistani and Bangladeshi communities have been stigmatised by media narratives around multigenerational households and religious festivals, which can result in barriers to seeking help and contribute to more severe health problem”* (GOV.UK,2022)
88. Attempting to provide a more nuanced view of factors influencing Covid-19 vaccine hesitancy between minority ethnic groups in the UK, a rapid systematic review (covering the period January 2020 to May 2021) ultimately found that stated reasons for vaccine hesitancy were



often similar across ethnic groups (Kamal et al., 2021). However, the authors also noted difficulties in exploring variations beyond broad categories (i.e., Black, Asian, White, Other etc) and were only able to offer a couple of different observations between these groups, namely, that compared with the White British group, Black or Black British participants were more likely to state that they “Don’t trust vaccines” while the Pakistani and Bangladeshi group cited worries about side effects, possibly due to inaccessible communications.

89. Overall, the identified barriers to vaccination included: pre-existing mistrust of formal services (e.g., vaccine hesitancy was reportedly the consequence of negative past experiences that individuals, their family and friends have experienced with formal services); lack of information about the vaccine’s safety (e.g., speed of vaccine approval raised suspicions about regulatory standards, under-representation of individuals from ethnic minority backgrounds in vaccine trials); misinformation (e.g., people from minority ethnic backgrounds were more likely than White British groups to have received misinformation encouraging them not to have the vaccine; negative vaccine attitudes resulting from various non-mainstream information sources such as social media, family-based vaccine decision-making practices, and obtaining information from country of origin); inaccessible communications (e.g., barriers due to low health literacy, poor other language provision, and increased digitalisation of communications – the latter a particular issue for migrant groups due to a lack of access to, or knowledge of, technology); and logistical issues (e.g., location of vaccine centres and having to use public transport).
90. Similar results were mirrored in work by Kadambari *et al*, who consulted with over 200 community organisations that support vaccination in minority ethnic groups and found two broad hesitancy themes; first, historical marginalisation, linking to distrust of government and public health bodies as a result of previous unethical research (for example, the US Tuskegee syphilis study) as well as fears about being misled about vaccines; and second, concerns relating to safety and potential long-term effects on health, in which it was felt there was no clear guidance and advice (Kadambari and Vanderslott, 2021). Related to these concerns was the under-representation of minority ethnic groups in clinical trials (Murali *et al.*, 2023) as well as negative experiences within a healthcare system that is often viewed as culturally insensitive (Razai *et al.*, 2021).
91. In short, there exists a legacy of mistrust among ethnic minorities in the UK (and the US) and ongoing discrimination which shapes their perspective on the health and wider governance systems (Abba-Aji, 2022). And clearly, a continuation of underrepresentation of ethnic minority groups in medical research will perpetuate historical distrust in healthcare processes and presents a risk of unknown differences in efficacy and safety of vaccines (and any other clinical trials) (Pepperrell *et al.*, 2021; Sethi *et al.*, 2021). A closer look at the Covid-19 vaccine trials is eye-opening with evidence that trials did not adequately represent a diverse participant population in terms of age, ethnicity and comorbidities and at one point, only six out of 1,518 UK Covid-19 studies were collecting data on ethnicity (Sethi *et al.*, 2021). Further, ethnic minorities constitute only 9.26% of participants in UK Covid-19 studies, below their representation in the general population (13.8%) (Etti *et al.*, 2021).
92. Clinical trial recruitment is never easy, but there is some clear direction on areas for improvement as regards less represented groups. First, at a structural level, there is currently no requirement for clinical trial investigators to report enrolment strategies or to

ensure diverse recruitment (Pepperrell *et al.*, 2021): improvements are needed in terms of setting out terms of agreement on what constitutes appropriate representation (Jaklevic, 2020) and ensuring adequate (i.e., mandatory) and transparent reporting (Pepperrell *et al.*, 2021). And second, recognising the systemic neglect of ethnic diversity in medical research and the related key factors that influence lower trial participation amongst minority groups and committing to addressing these issues (Sethi *et al.*, 2021). In the UK, a leading example is the NIHR's INCLUDE initiative which exists to ensure there is adequate representation of under-served groups (e.g., using funding and regulatory approval mechanisms) (NIHR, 2020) as well as a specific role for the NHS Race & Health Observatory to ensure equitable inclusion (Etti *et al.*, 2021). Addressing under-representation in clinical trials marks one entry point to help break a complex cycle.

93. Notably, in a thematic synthesis of studies exploring initial COVID-10 vaccine hesitancy across a different set of minority groups including refugee, asylum seeker and migrant populations, almost identical key themes as for other minority ethnic groups are identified. These were divided into three main themes including: "institutional mistrust", "lack of confidence in vaccine and vaccine development process", and "lack of reliable information or messengers" as well as two minor themes of "complacency / perceived lack of need" and "structural barriers to vaccine access." (Shearn and Krockow, 2023).
94. Migrants represent a significant part of the UK population, comprising roughly 14.5% of the population. Migrants also contribute a large proportion of the frontline workforce, including 21% in health and social work and 28% in hospitality (Vargas-Silva, 2022). These lines of work as well as other related socio-demographic factors linked to lower professional wages, including a greater reliance on public transportation and overcrowded accommodation, place migrants at an increased risk of severe outcomes and fatalities (INQ000474407, page 3, para 7). For example, the South Asian communities comprise 1 in 13 of the UK population yet accounted for 1 out of 10 Covid-19 deaths (Race Equality Foundation, 2023) and of Covid-19 deaths amongst NHS nurses, 22% were Filipino (Filipino UK Nurses Association, 2020). Further, despite their critical contributions to British society, migrants encountered significant barriers to accessing healthcare and vaccines due to 'Hostile Environment' policies, creating and sustaining issues of structural racism, and concomitant socio-economic inequalities. These factors continue to foster additional layers of deep mistrust in authorities, further deterring many from seeking healthcare.
95. For migrants attempting to seek care and information during the pandemic, language and communication issues were persistent barriers and often served to compound fear and hesitancy. Two UK qualitative studies explored migrants' perspectives on COVID-19 vaccine access (Knights *et al.*, 2021) found that the digitisation of healthcare services, combined with language barriers, limited access for migrants to healthcare information, worsened existing inequalities and hindered vaccine access. The lack of accessible information in an appropriate language was echoed in a qualitative study by Deal *et al.* (2021) where many participants reported insufficient access to clear, understandable information about the pandemic and Covid-19 vaccines, often citing language barriers. Notably, those who felt abandoned or fearful due to a lack of reliable information early on were more likely to rely on word-of-mouth or social media platforms, such as WhatsApp and Facebook, for updates on the pandemic and vaccination programs (Deal *et al.*, 2021). However, these default information seeking behaviours – contributed to by insufficient (e.g., too slow) translation and

dissemination (e.g., inaccessible formats) – heightened user exposure to, and the significant spread of misinformation, within migrant communities, further fuelling hesitancy in accessing the vaccine or health services (INQ000474407, page 7-8, para 9)

96. Findings from the UK-REACH study conducted between December 2020 and February 2021 revealed increased hesitancy in Black Caribbean, Black African, Mixed White and Black Caribbean, Chinese, and Pakistani healthcare workers compared to White British workers as well as in Muslim healthcare workers and those living in more deprived areas of the UK (Woolf *et al.*, 2021).
97. In relation to disability, a comparison of 2023 ONS vaccination status data among adults in England with a disability revealed that a higher proportion of individuals with a disability—regardless of the extent of activity limitation—received four or more doses of the Covid-19 vaccine compared to those without disabilities (Office for National Statistics, 2023). Additionally, individuals with disabilities were less likely to be unvaccinated than their non-disabled counterparts. A study by Emerson *et al.* (2021) found no significant overall difference in vaccine hesitancy among working-age adults with and without disabilities in the UK, though it did show lower hesitancy among Disabled adults from ethnic minority backgrounds (Emerson *et al.*, 2021).
98. There are approximately 14 million disabled people in the UK, accounting for 22% of the population (KM/1 INQ000489460, page 24). This group includes individuals with a wide range of impairments and long-term health conditions, such as autistic people, individuals with learning disabilities, and those with sensory, cognitive, mobility, and energy-limiting impairments, as well as those experiencing mental distress. The severity of impairments varies widely and influences how individuals access and engage with health services. Like ethnic minority groups and migrant communities, disabled people were disproportionately affected by the pandemic. Despite reportedly high vaccination rates, disabled people accounted for six out of every 10 Covid-19-related deaths in the UK, according to the Office for National Statistics (KM/3 INQ000089756, page 4). Beyond the heightened mortality risk, disabled people suffered uniquely from the physical and mental harm associated with lockdowns and non-pharmaceutical interventions, such as isolation. For example, many who depended on well-established care systems lost access overnight, leaving them without essential resources like food, medicine, hygiene, information, or human contact (INQ000474256, page 3, para 8).
99. It is crucial to recognise that the inequalities and discrimination faced by racial and ethnic minority groups, migrants, and disabled people are not experienced in isolation. Many individuals belong to multiple marginalised groups and face intersecting forms of discrimination based on disability, race, migration status, age, sexual orientation, and other protected characteristics. These overlapping inequities not only exacerbate health disparities but also foster hesitancy — not only in accepting vaccines but also in trusting the people and systems responsible for designing and delivering them. Addressing these compounded impacts requires an intersectional approach that prioritises inclusive, equitable policies and actively works to rebuild trust in public health systems.

### III.4. Misinformation and disinformation around Covid-19 vaccines and the pandemic

100. Misinformation can be defined as false or misleading information (Southwell *et al.*, 2019b). This definition is sometimes extended to encapsulate information that is true, but that has been altered to distort facts, stripped of relevant context (Roozenbeek *et al.*, 2023). Misinformation can be shared and spread widely without bad intention if it seems plausible, particularly in the absence of better information, or when people distrust official sources. Disinformation, on the other hand, can be defined as “false or inaccurate information that is deliberately distributed, despite its inaccuracy.” (Persily *et al.*, 2020) In practice, the distinction between mis- and disinformation is not often clear-cut: it can be difficult to ascertain the motivations behind those distributing information.
101. Throughout the pandemic, many mis- and disinformation narratives emerged. The primary themes of Covid-19 misinformation on social media encompassed conspiracy claims (Pulido *et al.*, 2020), medical misinformation, and misconceptions about vaccine development (Loomba *et al.*, 2021). Each of these overarching themes included various specific narratives, including: effectiveness of Covid-19 vaccines (for example, that the vaccines do not work, or do not work as well as claimed); chemical components of Covid-19 vaccines; vaccine safety and side-effects (for instance, rumours around insufficient testing, that vaccine-related deaths were being concealed by authorities, or that they could cause infertility or change your DNA); and conspiracy theories, often centring on that Covid-19 was deliberately caused (a ‘planned pandemic’ or ‘plandemic’) to create a pretext for mass vaccination (Loomba *et al.*, 2021; Nazar and Pieters, 2021; Skafle *et al.*, 2022).
102. It can be difficult to ascertain the specific motives of actors involved in the distribution of false or misleading information. Nonetheless, broad motivating factors for promoting false information about vaccines, whether on social media or via other channels, may involve one or more of the following aspects.
  - 102.1. ***Coping with uncertainty and intuitive thinking.*** Rumours and misinformation narratives typically emerge in contexts of acute uncertainty, such as the Covid-19 pandemic, where a lack of information and an inability to accurately predict even the near-term future can be a serious source of anxiety for individuals and communities (Pertwee *et al.*, 2022). In the absence of hard information, there can be a tendency to go with ‘gut instincts’ (which may involve a lack of critical thinking) or fall back on informal sources of information such as peer networks (Ecker *et al.*, 2022). Higher feelings of depression have also been associated with a higher tendency to hold conspiratorial beliefs (De Coninck *et al.*, 2021). Attempts to impose a narrative coherence on frightening or bewildering events may create a sense of identity and solidarity among their members.
  - 102.2. ***Believing the information to be true.*** In some cases, people promote false information about vaccines simply because they believe it to be true. For example, people may take information out of context or draw invalid inferences. People may share information about vaccines with their friends or families in the belief that it is true, but without having checked the source, accuracy or recency of the information. Insofar as the spread of false information is attributable to an inability to evaluate or

interpret information, it may be addressed through information literacy initiatives, and there are several countries such as Finland that offer useful models in this regard (Lessenski, 2022).

- 102.3. **Material gain.** In other cases, people promote false information about vaccines because they stand to gain materially from doing so. A good example is vendors promoting “alternative” or unproven Covid-19 remedies online, such as herbal teas, essential oils, tinctures, and colloidal silver. These ‘alternative’ remedies appeal to people who distrust official public health advice, and those promoting these products seek to appeal to this market by casting doubt on public health recommendations, including in relation to vaccines, and by promoting their products as more effective.
- 102.4. **Psychological rewards.** People may also promote false information about vaccines because they stand to gain psychologically rather than materially. During the pandemic, attitudes towards vaccines became markers of broader social and political identities (e.g. ‘pro-science’, ‘civil libertarian’, ‘Left’, ‘Right’, etc.), and declaring one’s vaccine intentions or vaccination status publicly became a way of signalling one’s allegiance to – and gaining approval from – these broader publics. This is especially the case on social media, where network effects and feedback mechanisms mean that content can sometimes attract hundreds, thousands or even millions of “likes”, “shares” and “comments” – a potentially potent source of emotional validation in a context of widespread social isolation
103. One of the most challenging questions in relation to vaccine misinformation is determining its influence on vaccine acceptance. Several approaches have been used to examine the impact of Covid vaccine misinformation on vaccine acceptance. In late 2020, a randomised control study design attempted to quantify how exposure to online Covid-19 misinformation affected vaccine intent. As part of the trial, conducted in the UK and US, participants were exposed to examples of misinformation circulating on Twitter, including posts falsely claiming that a Covid-19 vaccine would alter DNA in humans and that a Covid-19 vaccine would cause 97% of recipients to become infertile (Loomba *et al.*, 2021). This study by Loomba *et al* found that, relative to information, misinformation induced a decline in intent to vaccinate by 6.2 percentage points in respondents who stated a firm intent to receive the vaccine.
104. Experimental studies, however, cannot accurately mimic the real-world contexts in which misinformation is produced and consumed, leading to questions about the generalisability of these findings.
105. Observational studies have also examined whether individuals’ ability to detect fake news is related to uptake of a Covid-19 vaccine (Montagni *et al.*, 2021; Loomba *et al.*, 2023) with general ability to detect misinformation positively predictive of regional Covid-19 vaccine uptake rates in the UK (Loomba *et al.*, 2023).
106. Trust and coronavirus information source have also been found to be predictors of vaccine hesitancy in the UK, with low trust in the government, scientists and medics and high reliance on social media as an information source associated with higher levels of vaccine hesitancy (Allington *et al.*, 2023).

107. A recently developed and psychometrically validated misinformation test has revealed that young people are more susceptible to misinformation than older groups both in the UK (Loomba *et al.*, 2023) and internationally (Maertens *et al.*, 2021; University of Cambridge, 2023). Recent studies have commented on the vulnerability of young people to mis- and disinformation online given, for example, their increased exposure to social media (Diepeveen and Pinet, 2022; Shtulman, 2023). The Online Safety Act (2023), has been introduced, in part, to enforce large social media companies to adhere to their terms and conditions regarding mis- and disinformation for example, by removing such content that meets associated thresholds set out in their terms (House of Commons Library, 2024).
108. In a rapid qualitative appraisal of 24 healthcare workers' perceptions to the Covid-19 vaccination programme conducted by Manby and colleagues (Manby *et al.*, 2022) and using semi structured telephone interviews, healthcare workers found it difficult to ascertain the relative risks and benefits of Covid-19 vaccination, with some feeling that government decisions on rollout had not been supported by evidence-based research. Manby *et al.* concluded that "we found that concerns about vaccine safety [...] appeared to be fuelled, in part, by the spread of misinformation on social media.
109. Neither pandemics nor misinformation are new but this is the first pandemic to occur in this technological age and era of global communication where media coverage is constant and highly divergent information is available – and amplified – in an instant (Nelson, *et al.*, 2020). In terms of the UK's high-level response to the threat of misinformation there were several layers of action: special reports were undertaken by the Digital, Culture, Media and Sport Committee to consider tech company and public sector positions (DCMS, 2020); a partnership with WHO in May-June 2020 to create and roll out the 'Stop the Spread' campaign on BBC World television followed by the 'Reporting Misinformation' campaign in August 2020 (World Health Organization, 2021); and a partnership with academia (Cambridge University) to develop an online game 'Go Viral!' to help educate people how to spot fake news and help protect them against Covid-19 misinformation (University of Cambridge, 2024). At the same time many others across academia (Skaffle *et al.*, 2022), journalism (e.g., BBC Trusted News Initiative) (BBC Trusted News Initiative, 2021), other professional and special interest groups (News Literacy Project, 2021, The Strategy Unit, 2021) and technology sectors engaged with – and continue to work on – how to build media, digital, science and health literacy (Paakkari *et al.*, 2020; Bray *et al.*, 2021) as well as define and implement adequate legal frameworks to mitigate and manage the challenges of misinformation that affect all of us in different ways.

### **III.5. Practical barriers**

110. Between 2020 and 2022, the UK's Covid-19 vaccination campaign encountered various practical barriers, primarily related to logistics and the complexities of vaccine administration. The Pfizer-BioNTech vaccine, for instance, required storage at ultra-low temperatures, necessitating a robust cold chain infrastructure that posed significant logistical challenges, especially in rural and remote areas (UK Health Security Agency, 2020; The Royal Society, 2020). Additionally, the two-dose regimen of most vaccines added complexity to scheduling and follow-up processes, straining the healthcare system and complicating vaccination efforts (Department of Health & Social Care, 2021g). These challenges were further exacerbated by the need to rapidly scale up vaccination sites and ensure sufficient staffing to

manage the unprecedented demand (National Audit Office, 2022), as well as to maintain existing vaccine supply and uptake for the seasonal influenza vaccine to avoid a ‘twindemic’ (Stowe *et al.*, 2021).

111. Some communities may have faced access barriers to vaccine uptake, despite widespread vaccine availability in familiar locations such as GP practices, hospital hubs, and pharmacies. The extent to which vaccine accessibility played a role in vaccine uptake is uncertain: Duffy and colleagues conclude that “We find little evidence that accessibility to COVID-19 vaccination sites is related to underlying area-based deprivation”, while Bucyibaruta and colleagues found that areas with lower vaccine accessibility had lower rates of vaccine uptake (Bucyibaruta *et al.*, 2022). Survey data on barriers to Covid-19 vaccine from March 2021 reveals that about 8% of the UK population who had already received a Covid-19 vaccine faced some form of barrier, while 16% of the unvaccinated population at this time expected to face a barrier (Office for National Statistics, 2021e). Fear of catching Covid-19 while going to receive the vaccine was the highest cited concern among those who had already received a dose, followed by difficulty travelling to receive the vaccine and a long wait at the vaccination centre. A possible long wait at the vaccination centre was the most frequently cited concern among those unvaccinated at the time of the survey, followed by difficulty travelling to receive the vaccine, fear of catching Covid-19, and difficulty in getting time off work. Individuals encountering difficulties travelling (including individuals with mobility issues) may have therefore faced increased barriers to vaccination, however, there appears to be a lack of data on vaccination barriers faced, stratified by relevant socio-demographic markers to comment further on this point.
112. Efforts to mitigate these barriers, such as deploying mobile vaccination units and setting up community-based clinics, were implemented across several regions of the UK (Newham Health Collaborative, no date; Local Government Association, 2021).
113. Language barriers presented significant challenges, particularly among ethnic minority communities. The UK’s diverse population includes many individuals who speak English as a second language or not at all, making it difficult for them to understand public health messages and vaccination information disseminated primarily in English (Katikireddi *et al.*, 2021; Razai *et al.*, 2021). While this was true for these populations before the Covid-19 pandemic, given the newness of the vaccines and the epidemic, getting timely information was crucial and even more of a challenge for those already challenged pre-Covid. Targeted information, including translations into relevant languages, helped to improve uptake and engagement of local communities was perceived to be “effective in getting the message out generally and provided a forum for communities, using trusted leaders.” (Halvorsrud *et al.*, 2023)

## III.6. Covid-19 vaccination policies

### ***Vaccine passports***

114. The introduction of Covid-vaccination and infection status certification policies in the UK has been a subject of considerable debate and scrutiny (Liberty, 2021; Institute for Government, 2021b; UK Parliament, 2021; Bardosh *et al.*, 2022) with a significant focus on the potential for stigmatisation as well as their impact on marginalised groups (Mills and Dye, 2021).

115. While proponents argued that such measures are necessary for safely reopening the economy and restoring normalcy (Brown *et al.*, 2020), critics raised concerns about equity, discrimination, and privacy (Lewandowsky *et al.*, 2021), as well as that natural immunity should not have been discriminated against in Covid-status requirements (Pugh *et al.*, 2022).
116. Additionally, the perception of coercion or discrimination associated with vaccine certificates can exacerbate existing vaccine hesitancy, particularly among marginalised communities. Studies by de Figueiredo *et al* and Porat *et al* before the introduction of Covid-status certification examined the impact of vaccine passports on public attitudes towards acceptance of Covid-19 vaccines in the UK (Porat *et al.*, 2021; de Figueiredo, Alexandre; Larson, Heidi J; Reicher, 2021). Both studies concluded that there could be backlash effects and a lower intent to vaccinate among some communities which may arise from frustrating individuals' autonomy. These findings were echoed in a contemporaneous study in the US (Eshun-Wilson *et al.*, 2021).
117. The large sample size in de Figueiredo *et al* permitted an investigation of the socio-demographic groups least favourable of vaccine passports, as well as the groups more likely to experience lower vaccine intentions after their introduction (de Figueiredo, Alexandre; Larson, Heidi J; Reicher, 2021). While those aged over 55 and Christian respondents were strongly supportive of vaccine passports, Black and Black British respondents as well as Polish speakers and housemakers were strongly opposed. While vaccine passports received net public support, they were found to have a strongly polarising effect, leading the study authors to write “We find a polarizing effect of passports. Passports make those who already intend to get vaccinated (who comprise 80% of our participants) even more positive. But passports have the converse effect upon those who have concerns about the vaccine. Thus, when we remove those participants who express certainty (they either definitely will or definitely will not get a job) and focus on the remaining doubters, we find lower intentions to get vaccinated when vaccine passports are mentioned, especially when [passports] cover domestic activities as opposed to international travel.”
118. Imperial College London's Covid-19 Data Hub evaluated attitudes to vaccine certification in the UK as well as several peer countries (Australia, Canada, Denmark, France, Germany, Italy, Japan, and Spain) (Institute of Global Health Innovation, 2022). Vaccine certification received majority public support in the UK and several peer countries for international travel, however much less support for domestic travel. In the UK, the level of support for domestic travel was particularly low (only Denmark had lower support).
119. Moreover, support for mandatory vaccinations in the UK was low, with only 24% of people believing that all adults should be subject to mandatory Covid-19 vaccination, compared to 41% in Australia and Canada, and 46% in Spain and Italy. Only Denmark (17%) had a lower proportion of respondents who did not think vaccinations should be mandatory for anyone.
120. The impact of vaccine certifications on increasing vaccination rates and reducing infections in the UK remains unclear. While evidence from Italy and France suggest that mandatory certification resulted in large increases to vaccination rates, especially among young people, Mills and colleagues found no effect on vaccination rates in Germany and Denmark, two countries with higher Covid-19 vaccine uptake than Italy and France (Mills and Rüttenauer, 2022; Mills, M. C., & Rüttenauer, 2022). By Sunday 18 July, a day before mandatory Covid-status certification was announced in the UK (**Table 6**), about 87% of adults in the UK



had received their first dose, with rollout continuing for the youngest age cohort (NHS, 2021). This vaccination rate was extremely high by European standards (Mathieu *et al.*, 2021). Moreover, data from 19 August 2021 suggest that over 9 in 10 adults in every UK nation (and 94.2% in England) except Northern Ireland would have tested positive for SARS-CoV-2 antibodies (Office for National Statistics, 2021b). These figures suggest that many individuals – notably younger and ethnic minority groups – would have been discriminated against based on their vaccination – rather than immunity – status, given the durability of immunity to SARS-CoV-2 provided by past infection (Siggins *et al.*, 2021; De Giorgi *et al.*, 2021; Gazit *et al.*, 2022).

### ***Vaccination as a condition of deployment (VCOD)***

#### *Care Home Workers*

121. The UK Government announced the Vaccination as a Condition of Deployment (VCOD) policy for care home workers in England on 16 June 2021. This policy required frontline social care workers working in Care Quality Commission (CQC) -regulated care homes in England to be fully vaccinated against Covid-19 unless medically exempt. This announcement followed a consultation with stakeholders, during which a large majority of healthcare providers, members of the public, and service users or relatives of service users were opposed to the policy (Department of Health & Social Care, 2021k). However, care home providers were overall strongly supportive of the policy, while adult social care representatives and other adult social care providers were broadly supportive. Following a 16-week grace period, these VCOD requirements came into effect on 11 November 2021 (Department of Health & Social Care, 2021a). VCOD was not implemented in the other home nations, with Mark Drakeford – the First Minister of Wales – preferring an alternative approach of “argument and persuasion.” (BBC News, 2021d)
122. This policy aimed to protect vulnerable residents by reducing the transmission of Covid-19 within care homes. However, the mandate’s impact extended beyond its health objectives. Research by Girma and Paton in 2024 indicated that many workers chose to leave their roles rather than comply with the mandate, intensifying pressure on the already strained workforce: while the policy resulted in 28,000 to 41,000 fewer unvaccinated care home workers, this came at a cost of losing 14,000 to 18,000 staff (Girma and Paton, 2024). Other academic researchers were strongly opposed to the policy, with Hayes and Pollock noting that the policy was a profound departure from public health norms in the UK and that ‘Official claims that ‘we are not forcing anyone to take the vaccine’ are disingenuous’ (Hayes and Pollock, 2021). In the same article, Hayes and Pollock, make the case for immunity from previous infection, for which the evidence at the time revealed protection comparable to protection from vaccination (Block, 2021), with the duration of protection – especially with regards to new variants – unknown after either vaccination or infection. Moreover, the authors point out that the government’s decision to implement this policy was partly based on claims of low vaccine uptake in some care homes yet reveal that uptake among care workers was only below 80% in three English local authorities.
123. Many trade unions, as well as the National Care Forum and the Chief Executive of Care England, expressed concern about the policy (Care England, 2021; GMB Union, 2021; National Care Forum, 2021) and a survey by UNISON revealed that care home workers were more likely to decline vaccination if they felt threatened by employers (UNISON, 2021), in

agreement with other survey data exploring behavioural responses to proof-of-vaccination policies in the UK (Porat *et al.*, 2021; de Figueiredo, Alexandre; Larson, Heidi J; Reicher, 2021; Bell *et al.*, 2022).

#### Frontline health and social care workers

124. On 9 November 2021, the UK Government announced that the VCOD policy for care home staff would be extended to all frontline healthcare and social care workers in England who would be required to be fully vaccinated against Covid-19 by April 2022, unless medically exempt or in a non-patient facing role (**Table 6**) (Department of Health & Social Care, 2021c). At the time of the Vaccination as a Condition of Deployment (VCOD) announcement, 103,000 NHS trust workers and 105,000 domiciliary workers had not been reported as fully vaccinated (Department of Health & Social Care, 2021c). The primary stated objectives of this policy were to protect vulnerable patients and ensure the safety of healthcare environments by reducing the risk of Covid-19 transmission among staff and patients. This policy received mixed reactions among healthcare professionals (Maneze *et al.*, 2023). Research from Bell and colleagues on perceptions among health staff in 2021 indicated that health and social care workers who felt pressure to get vaccinated reported exacerbated vaccine concerns (Bell *et al.*, 2022). Later, Woolfe *et al.* found that only 18% of healthcare workers supported mandatory vaccination, with most preferring education and support to improve vaccination rates (Woolf *et al.*, 2022). Support for the mandate was found to be higher among older workers and those who were already vaccinated against influenza, while female and Black healthcare workers were less likely to favor the mandate. The UK Government's impact assessment (Department of Health & Social Care, 2021e) estimated that, even with mandatory vaccination, only a minority of healthcare workers would comply, potentially resulting in almost 90,000 healthcare workers facing unemployment or redeployment.
125. This policy announcement was again met with concern by unions, including the British Medical Association (BMA, 2022) and the Royal College of Midwives (Royal College of Midwives, 2022) who felt that while Covid-19 vaccination should be strongly encouraged and readily available, mandating Covid-19 vaccination raised complicated ethical and practical issues. Chaand Nagpaul, council chair of the British Medical Association (BMA), and Andrew Goddard, president of the Royal College of Physicians also raised concerns about the impact on NHS staffing issues (Lacobucci, 2022). The announcement of the policy led to almost 130,000 staff coming forward to be vaccinated, but – as of February 2022 – a total of 5% of NHS staff were set to miss the deadline (McKee and van Schalkwyk, 2022). The policy's broader fallout included increased anxiety among some unions (Waters, 2022), who feared the loss of staff due to mandated non-compliance. UNISON argued that while they supported vaccination, mandating it could drive workers away, thereby putting additional pressure on an already strained NHS system (UNISON, 2022). In March 2022, a month before the deadline for full vaccination for patient-facing healthcare and social care workers came into place, the UK Government announced that the policy was to be revoked, citing a decreased disease severity of the new Omicron variant, equity concerns, and large numbers of healthcare and social workers who remained unvaccinated despite the 9 November mandate announcement (Department of Health & Social Care, 2022b). Many organisations, such as the BMA, welcomed this U-turn (Lacobucci, 2022). A systematic review and meta-analysis of healthcare workers' attitudes to mandatory Covid-19 vaccines by Politis and colleagues found that "mandatory vaccination against Covid-19 is a highly controversial issue among

[healthcare workers]”, with a pooled estimate across eligible quantitative studies of 64% of healthcare workers supporting mandates for healthcare workers, and only half supporting mandates for the general population. The sole UK study in this systematic review, by Woolf and colleagues, found that only 17% (of 5,633 respondents) of healthcare workers advocated for mandatory vaccination for healthcare workers, while only 12% supported mandatory vaccination for the general population and/or imposing sanctions on individuals who chose not to be vaccinated (Woolf *et al.*, 2022).

## IV. Addressing vaccine hesitancy

### IV.1. The extent to which Covid-19 vaccine hesitancy in the UK was foreseeable

126. Prior to the Covid-19 pandemic, many studies explored vaccine hesitancy in the UK with respect to specific vaccines (Karafillakis *et al.*, 2019; Torracinta *et al.*, 2021), regions (Tiley *et al.*, 2018), and socio-demographic groups (Campbell *et al.*, 2015; Bedford *et al.*, 2021). It was well known that hesitancy to routine immunisation, for example, was higher in specific geographies (notably London and the East Midlands) as well as among some ethnic minority and migrant communities (Forster *et al.*, 2017; Tiley *et al.*, 2018; Bell *et al.*, 2019; Bielecki *et al.*, 2019), those in lower socio-economic brackets (Luyten *et al.*, 2019), and among younger age groups (Larson *et al.*, 2018; Luyten *et al.*, 2019). A recent systematic review and meta-analysis by Kafadar and colleagues summarised 50 articles examining interventions to boost vaccine uptake for a range of vaccines in the UK, with vaccination reminders and clear found to be consistently associated with increased demand (Kafadar *et al.*, 2024). At the organisational level, Kafadar *et al.* found that providing increased accessibility to vaccines, including flexibility around vaccination time and location, can improve uptake outcomes.

### IV.2. Steps taken to address Covid-19 vaccine hesitancy in the UK

127. Following the June 2020 Public Health England (PHE) report on how different factors affected Covid-19 risks and outcomes (Public Health England, 2020), the UK Government tasked the Minister for Equalities, working with support from the Cabinet Office Race Disparity Unit (RDU), to lead cross-government work to address the disparities highlighted. Research was subsequently commissioned (published December 2020) to address Covid-19 health inequalities, including vaccination uptake (Scientific Advisory Group for Emergencies, 2021).
128. Based on this updated evidence, several recommendations were put forward from national advisors (including SAGE) and policy think tanks to better protect ethnic minorities (NHS England & NHS Improvement, 2021). In summary, these recommendations pointed to the need to: 1) improve data collection (including an increased transparency and granularity of data); 2) regularly monitor and evaluate policy interventions; 3) create dedicated communications strategy for ethnic minorities, including outreach strategies and community engagement based on the reasons for vaccine hesitancy for the targeted population; and 4) avoid stigmatisation of vaccine-hesitant individuals to avoid an erosion of trust in medical professionals.
129. These recommendations, along with others, were incorporated into the Covid-19 Vaccine Uptake Plan published on 13 February 2021 (Department of Health & Social Care, 2021g). The comprehensive strategy aimed to bolster vaccine acceptance through four key enablers spanning national, regional, and local domains: working in partnership, removing barriers to access, data and information, and conversations and engagement.

130. Four quarterly reports were published between October 2020 and December 2021 detailing the different strategies undertaken to promote vaccine uptake and address vaccine hesitancy (Race Disparity Unit, 2021). The reports summarised work across government and through national and local partnerships to improve uptake among ethnic minorities using a data-informed approach, targeted communication and engagement, and flexible deployment models. A collection of example strategies initiated to address differences in vaccine uptake amongst different population groups has also since been collated by *The Strategy Unit* (a specialist NHS team) (The Strategy Unit, 2021). The final report states “through these combined efforts we have seen increases in both positive vaccine sentiment and vaccine uptake across all ethnic groups since vaccine deployment began.” Across the review reports, vaccine confidence was reported to have increased in every ethnic minority group during the period December 2020 to January 2021 and June to July 2021 (Race Disparity Unit, 2021). Among adults aged 50 and over, notable gains in vaccine coverage were observed among Pakistani and Bangladeshi individuals. The final report also provided public health lessons in specific relation to ethnic groups, which are reproduced and expanded upon below:
- 130.1. ensuring the success of vaccination deployment is carried over to other public health programmes, such as winter flu and Covid-19 booster vaccinations – this includes continuing to use respected local voices to build trust within ethnic minority groups and to help tackle misinformation
  - 130.2. not treating ethnic minorities as a homogenous group – Covid-19 has affected different ethnic groups in different ways throughout the pandemic and a ‘one size fits all’ approach is not an effective way of tackling public health issues. As referenced above, there were many local examples of initiatives to increase vaccine uptake amongst specific groups (e.g., place of residence, ethnicity, faith communities, health status) by responding to contexts and needs. Certainly, this capacity for diversity is of value but it is also worth noting here findings on shared features considered key for working with minority ethnic communities.
  - 130.3. avoiding stigmatising ethnic minorities by singling them out for special treatment, which could be taken to imply that they are vulnerable or, in the case of Covid-19, were somehow at fault for the spread of the virus
  - 130.4. improving the quality of health ethnicity data so that patterns and trends can be spotted quicker in future. The pandemic highlighted methodological and data gap issues (e.g., different data sources using different classifications and/or missing ethnicity data). In the immediate term, improvements in the collection of ethnicity data were sought and delivered through the COVID-19 Health Inequalities Monitoring for England (CHIME) tool (OHID, 2023) with the addition of a longer-term view taken by the Race Disparity Unit (RDU) to engage with the ONS and work to improve the quality of ethnicity data more broadly (e.g., harmonisation, robustness and reliability). Collaborative efforts are ongoing to develop an Index of Multiple Ethnic Disparity (IMED) to enable clear sight of issues at a more granular (i.e., local) level (Office for Statistics Regulation, 2024). Further, the NHS Race and Health Observatory (RHO) (NHS Race & Health Observatory, 2024) was launched in England to identify and tackle ethnic inequalities in health and care through research and policy work. Aligning with this, to build confidence in future

vaccination schemes and other health interventions, the NIHR have developed the INCLUDE Ethnicity Framework to promote ethnic minority participation in clinical trials and research (NIHR, 2020).

131. Despite consistent and continuing patterns of sub-optimal vaccine uptake within certain demographic groups, some strategies were successful in lowering vaccine hesitancy. The Community Vaccine Champions, introduced by the Department for Levelling Up, Housing and Communities (now the Ministry of Housing, Communities, and Local Government), allocated approximately £23 million in funding to 60 local councils in England to support the communities most at risk of Covid-19 in 2021 (Department for Levelling Up, 2021). This scheme funded Community Vaccine Champions (CVCs) to promote vaccination through established community networks, aiming to foster trust and overcome vaccine hesitancy by tailoring outreach to each community's needs. The programme evaluation highlighted several successes in vaccine uptake and community engagement (Department for Levelling Up, 2023). Areas with active CVC programmes saw an increase in booster vaccination rates, particularly among religious minority groups, who responded positively to community-led initiatives. Survey data, collected to evaluate the success of the scheme, indicated that areas with CVC awareness achieved higher uptake than matched comparison areas without such support.
132. A systematic review by UKHSA examined the effectiveness of interventions in increasing Covid-19 uptake, focussing on studies that reported primary quantitative or qualitative evidence on interventions aimed at increasing uptake (Batteux, Mills, *et al.*, 2022). Nine of the 33 studies considered interventions in the UK and a range of interventions were found to improve intentions or observed uptake.
133. The findings demonstrated that health communication (including providing clear and transparent information about vaccine safety that reflects uncertainty and that addressed concerns), personalised communication (such as booking reminders), flexible appointment times, and improving the accessibility of vaccination sites were all positively associated with improved outcomes. The findings from the systematic review as they pertain to the UK are presented in **Table 7**. Concerningly though, the review found that while vaccine perceptions and intentions changed in some studies, few of the studies measured actual behavioural outcomes. In addition to results reported by Batteux *et al.*, several studies have considered the impact of pharmacy-based interventions on improving Covid-19 vaccine acceptance (Maidment *et al.*, 2021; Micallef *et al.*, 2022; Garland and Jacklin, 2023). Micallef and colleagues reported on the impact of pharmacists as Covid vaccine champions in South East London – a partnership between the South East London Clinical Commissioning Group and local pharmacy communities – and found that 1,630 individuals went on to vaccinate despite being initially hesitant, from a total of 4,464 initially hesitant individuals (Micallef *et al.*, 2022).

**Table 7 Effectiveness of interventions to improve Covid-19 vaccine acceptance in the UK**

The impact of various communication and policy interventions on vaccine intent and uptake in the UK from Batteux et al and studies therein. Bias refers to the risk of bias performed by Batteux and colleagues and is graded from poor (lowest quality) to good (highest quality).

Citation	Design	Effectiveness	Bias
(Bateman <i>et al.</i> , 2021)	Online cross-sectional  ( <i>n</i> = 661, patients)	Participants reported they were more likely to receive the vaccine after watching an interactive web-based educational video designed for mobile phones that included information on currently licensed vaccines, vaccine scheduling, safety concerns, frequently asked questions, and links to established resources.	Poor
(Batteux, Bilovich, <i>et al.</i> , 2022)	Online RCT  ( <i>n</i> = 328, general population)	Participants who first received uncertain communication (that is communication expressing some uncertainty about the Covid-19 vaccine) were less likely to report losses in vaccination intent than those who first received more certain Covid-19 vaccine information.	Fair
(Behavioural Insights Team, 2021)	Online experiment  ( <i>n</i> = 4,085, general population)	More people chose to be vaccinated later, rather than sooner. Other barriers included larger travel times, not having a choice of vaccination time, and were not able to get a vaccine at a GP practice (versus making new logistical arrangements to go to a vaccination site).	Fair
(Davis <i>et al.</i> , 2022)	Online RCT  ( <i>n</i> = 481 vaccine-hesitant individuals)	Compared to receiving no information, individuals reported stronger Covid-19 vaccination intent when receiving information about Covid-19 vaccines. Compared to just receiving Covid-19 information, individuals who also received information describing 40% flu vaccine efficacy reported stronger Covid-19 vaccination intention.	Good
(Freeman, Bao Sheng Loe, <i>et al.</i> , 2021)	Online RCT  ( <i>n</i> = 16,455, general population)	Participants randomly assigned to receive ten information conditions to address collective and personal benefit, pandemic severity, and safety concerns, with one control. Information conditions did not change Covid-19 vaccine hesitancy among those willing or doubtful to vaccinate, but hesitancy was reduced among those most hesitant when exposed to information highlighting personal benefit, addressing safety concerns about vaccine speed of development, as well as a combination of all interventions.	Good

(Kerr, Freeman, <i>et al.</i> , 2021)	Online RCT ( <i>n</i> = 2,488, general population)	Detailed information about Covid-19 vaccines, including results of clinical trials, did not have a significant impact on beliefs about vaccine efficacy, concerns about side effects, or intentions to receive a vaccine.	Good
	Online RCT ( <i>n</i> = 2,217, general population)	Messages aimed at stressing the need to maintain protective behaviours post-vaccinations were presented to respondents to investigate whether these would lower vaccination perceptions around efficacy. However, these messages did not reduce perceptions of vaccine efficacy (and in some cases increased efficacy perceptions).	Good
(McPhedran <i>et al.</i> , 2022)	Discrete choice experiment ( <i>n</i> = 2,012, 18–29-year-old unvaccinated adults)	Vaccinations were most preferred when vaccinations were in a nearby GP surgery and location proximity was 15–30 minutes away. Vaccinations were least preferred when: vaccinations were at a nearby pharmacy or drive-thru; appointments were after-hours in the week; invitations were forwarded from one's best friend; and location proximity was 30–45 minutes away.	Good
(Sinclair and Agerström, 2023)	Online RCT ( <i>n</i> = 654, 18–30-year-old adults)	Weak support was found for the study's main hypothesis that conveying strong social norms – that is, that the majority of people in a community support vaccination – would lead to stronger intentions to vaccinate. Moreover, norms did not produce significantly different effects compared to information from authorities about vaccination.	Good

Source: adapted from (Batteux, Mills, *et al.*, 2022).

### ***IV.3. The role of monitoring online content to detect trends in mis/disinformation***

134. The UK government monitors lawful online content to address trends in mis/disinformation (Department for Science, Innovation & Technology, 2023). There are some concerns that this may be an infringement of civil liberties. As long as the online content is lawful and shared outside of closed private groups, it is not uncommon for governments to monitor online content for a variety of reasons. The limits of this monitoring come with the level of transparency about the motivation for monitoring.
135. The process of governments requesting companies and online platforms remove content that is perceived as harmful is not uncommon internationally but – given that vaccine hesitancy is a state of indecision and is not harmful in itself – it may run counter to personal freedom of speech for such content to be taken down. Young mothers, for instance, may be concerned about vaccine side effects and expressing their concerns online, which may be misinterpreted as being "anti-vaccine", when they are merely anxious about potential harms to their child. In the context of a pandemic, where a new virus is circulating and a new vaccine under emergency approval is being used, reports of any side effects should be paid attention to and not removed as they may flag a previously unknown problem.



136. Monitoring of social media by governments is common for different reasons: to take the pulse of public sentiment on any particular topic; to inform policy or the communications around new initiatives or interventions, or as a means to detect potentially harmful information which has a different rationale and implications. A distinction can be drawn as to whether questioning of vaccine safety or effectiveness reflects genuine concerns (including some prompted by misinformation), or whether the questioning is purposely propagated for malicious reasons to polarise publics. The legitimacy of government requests to social media companies to consider removing such content is different in these circumstances.
137. It is not uncommon for the military in many countries to play a role in monitoring social media for security reasons, and in the case of Covid-19 to detect harmful mis- or disinformation that could undermine the pandemic response (Psychological Defence Agency, 2024; Goh Yan Han, 2024; Garamone, 2020). The issue is the question of whether the military is transparent about its operations and, when claiming it is focused on mis- or disinformation, does not go beyond that remit.
138. Government use of behaviour influencing techniques and/or use of behavioural science by governments to encourage vaccine uptake occurs globally, and strategies to do so are made available on the World Health Organization website (World Health Organization, 2020a).
139. Social media companies are not content experts and often rely on external experts to advise on what is un-scientific or potentially harmful information to help guide them on moderating content. What becomes problematic is when monitoring (especially by government) goes beyond identifying potentially harmful or violent content and is driven more by political persuasions or interests.
140. There is a constant tension between the limits of “free speech” and protection from harm. The United Nations sees individuals as having freedoms to the point that they do not harm others, in other words, rights come with responsibilities. While democratic governments should allow free expression and free speech, even if critical, publics should also be held accountable if that freedom is abused and harms others.
141. From a public perspective, any government intervention is sometimes perceived as a form of control. In the context of the Covid-19 pandemic, one of the widely circulating (globally) conspiracy theories was that the pandemic was created to control people. While many members of the public accepted and even welcomed government guidance and control measures in the context of an emergency response, protests erupted in multiple countries – especially when control measures were sustained or uncertain in duration and resulted in disruption to employment, education and wider health care (Wood *et al.*, 2022). To those that feel they are being disproportionately monitored by a government, the removal of material from public media will affirm their concerns and reduce trust in governing bodies.
142. While government monitoring of public media is bound to raise concerns on the part of some – and may contribute to vaccine lack of confidence – governments are allowed to monitor this, and to flag up to media companies material that may be contributing to lack of confidence, especially given that the material was placed in the public space.

## IV.4. Missed opportunities

143. During the pandemic, many minority groups faced increased risk of death from Covid-19 compared to White British groups (Office for National Statistics, 2021d). Yet, vaccination rates remained lower among most ethnic minority groups compared to non-minority groups.
144. Among ethnic minority groups, there is evidence that messaging from central government (through television, social media, or written media) to address vaccine safety concerns had not reached various communities for a number of reasons, including communication only being delivered in English and by politicians or policymakers who did not appear relatable (Kadambari and Vanderslott, 2021). Historical marginalisation was also reported to play a key role in the wide trust gap between minority and non-minority ethnic groups in the government and public health bodies; moreover, minority groups often felt there was no clear guidance on vaccine safety fears and concerns over long-term effects on health (Kadambari and Vanderslott, 2021). An audit into Covid-19 vaccine rollout in Wales also identified lower uptake for some ethnic groups and in the most deprived areas (Wales, 2021).
145. In the UK Government's final report on progress to address COVID-19 health inequalities (Race Disparity Unit, 2021), 40% of respondents said their ethnic group had been more affected by racism or racist abuse during the pandemic, and while 37% said their ethnic groups had been stigmatised, 41% considered other ethnic groups to have been stigmatised.
146. As booster campaigns continue, issues with Covid-19 vaccine delivery and uptake among these communities remain, and there is a continued call for better understanding about how the government, healthcare providers, and public health teams can work alongside community leaders (Nellums *et al.*, 2022). If these vaccination gaps are not better understood – including in terms of structural racism and discrimination (Bécares *et al.*, 2022) – these inequalities risk being exacerbated (Razai *et al.*, 2021). The statement provided to the Inquiry from the Federation of Ethnic Minority Organisations (FEMHO) presented strong evidence of these failings and needs significant attention (INQ000485278).
147. Among pregnant women, differential vaccine uptake by ethnicity and areas of higher deprivation were identified. Statistics published in 2022 (UK Health Security Agency, 2022) showed that despite gradually increasing numbers of pregnant women getting vaccinated, women of Black ethnicity (30.5% vaccinated compared to 57.5% of White women) and those living in the most deprived areas of England (38.9% vaccinated compared to 71.1% in the least deprived areas) remained the least likely to be vaccinated.
148. A study including 202 women in a multi-ethnic North London maternity unit offers more nuanced insight relating to age, ethnicity, family context and information sources with factors associated with lower vaccination acceptance including: being younger (17.2% under 25 years versus 57.6% vaccinated over 25 years); mixed ethnicity (12.5%) and Black/Caribbean/African/Black-British ethnicity (27.5%) compared to White ethnicity (41.2%) and Asian ethnicity (69.4%); living in an unvaccinated household (9.7% vaccinated versus 63.7% in a vaccinated household); and relying on medical advice from social media (21.4%), news (30.4%) or family and friends (37.5%) compared to formal medical advice (59.0%) (Davies *et al.*, 2022).

149. SARS-Cov-2 infection was the leading cause of maternal deaths between 2019 and 2021 (Limb, 2023). An expert group found that “confused messaging and vaccine hesitancy” may have contributed to the deaths of 27 women during the pandemic in the UK with a lack of research cited as a contributing factor to these issues (Limb, 2023). Because pregnant women were initially excluded from clinical trials, guidance on risks and benefits (safety and efficacy) were not available during the early days of the pandemic (Golder *et al.*, 2023) and when the vaccine programme launched (8 Dec 2020) pregnant women were initially advised not to have the vaccine (Royal College of Obstetricians & Gynaecologists, 2021). Less than one month later (30 Dec 2020), the JCVI announced that some pregnant women (extremely clinically vulnerable or frontline health or social care workers) could have the vaccine after discussion with a healthcare professional and over the coming months more information became available (e.g., no impact of COVID-19 vaccine on fertility – Jan 2021, no safety concerns from substantial cohort in the US – Apr 2021, recommendation to offer vaccination to all pregnant women – April 2021).
150. The unavailability and then changing information around risks and recommendations manifested vaccine hesitancy among clinicians and pregnant and postpartum women, particularly among those from disadvantaged backgrounds and ethnic minority groups (Limb, 2023). Ongoing research is examining the main barriers and facilitators for Covid-19 vaccine uptake in pregnant women (Razai *et al.*, 2024).
151. Under-vaccination – that is, not having the recommended number of Covid-19 doses – also reflected missed opportunities. As of June 2022, rates of under-vaccination across the UK were highest in Northern Ireland and England, followed by Northern Ireland and Scotland (Kerr *et al.*, 2024). While gaps in uptake among ethnic versus non-ethnic groups emerged for primary doses, gaps in uptake between these groups also emerged for subsequent doses (Kerr *et al.*, 2024). Rates of hesitancy for booster doses among individuals who were already fully vaccinated were low, with approximately 8% of fully vaccinated individuals either unsure or unwilling to accept a subsequent dose (Paul and Fancourt, 2022). Factors associated with booster hesitancy in this study included being uncertain or unwilling to accept the first Covid-19 dose, contracting Covid-19, and having low levels of Covid-19 risk perception. However, in-depth analyses of the plausible range of factors that could be driving these high rates of under-vaccination / Covid-19 vaccine dropout remain relatively unexplored in a UK context, hindering our understanding of the precise mechanisms driving these losses, and the role of – for example – vaccination policies, vaccine side-effects, and individual risk perceptions.
152. Communication more clearly signalling that the infection from SARS-CoV-2 will likely follow vaccination, but that vaccination provides high levels of protection against severe Covid-19 may have reduced this gap; however, it may have also heightened concerns about vaccine efficacy.

## **IV.5. International comparison**

153. The UK ranks very highly by global standards for Covid-19 vaccine coverage. By 1 December 2021, only a handful of countries – including United Arab Emirates, Chile, Bahrain, Uruguay, Singapore and Qatar – had administered more Covid-19 doses per 100 population than the UK (World Health Organization, 2022). The UK also performed well with

regards to the initial booster campaign, as well as more recent annual booster vaccines for high-risk groups.

154. Many exploratory studies, surveys and polls were established throughout the pandemic to understand the levels and type of Covid-19 vaccine hesitancy globally (Lazarus *et al.*, 2020; Kerr, Schneider, *et al.*, 2021; Wollburg *et al.*, 2023). By 7 April 2021, the UK had administered more vaccine doses per 100 people than almost every other country in the world, behind only Israel, the United Arab Emirates, and Chile (Mathieu *et al.*, 2021).
155. While much of this early success was due to the early approval of Covid-19 vaccines combined with at-scale purchasing, rapid utilisation of NHS staff, services, and volunteers for rollout, acceptance of the vaccines among the groups to be the first to be vaccinated was exceptionally high.
156. By international standards, vaccine hesitancy among the UK public was low, ranking eighth least hesitant in a meta-analysis of 58 countries (and the lowest among European countries considered) (Wang *et al.*, 2022). Hesitancy was also found to be relatively low by international standards among healthcare workers by international comparison in the same study. The high confidence in the Covid-19 vaccine in the UK compared to European counterparts has also repeatedly been established in other global surveys at various stages of the pandemic, where a lack of trust in governance and in vaccine safety were common themes for hesitancy (Lazarus *et al.*, 2020; Sallam, 2021; Failla *et al.*, 2021).
157. In 2020, the Social Science in Humanitarian Action Platform (SSHAP) published a rapid review with a global lens on vaccine hesitancy and COVID-19 vaccines (SSHAP, 2020). This review identified three main challenge areas for Covid-19 vaccine confidence including: expedited development and novelty of Covid-19 vaccines (for example, common concerns around vaccine safety and effectiveness testing and novel platforms such as mRNA); information and communication environments and efforts (for example, social media and exposure to false information and communicating effectively around vaccine complexities such as there being multiple vaccines with different effectiveness and risk profiles), and the politicisation of Covid-19 vaccine development and deployment (for example, political attempts to control the Covid-19 narratives and differential experiences of marginalised communities).
158. Paired against these, the brief included a list of proposed strategies to guide policy makers, public health officials, vaccine developers, health workers, researchers, advocates, communicators, media actors and others involved in vaccine development, communication and deployment to boost confidence in Covid-19 vaccines.
159. Strategic recommendations were also forthcoming from global institutions, such as the CDC (CDC, 2021), and WHO (World Health Organization, 2020b). In January 2021, the World Bank launched a project to support countries to understand and reduce vaccine hesitancy using behavioural science, including the use of chatbot technology (World Bank, 2022). The first pilots were run in Iraq and Lebanon, extending to a total of 17 countries in 2021 to cover all World Bank regions. These are important learning journeys for countries as well as for identifying emerging global lessons on strategic approaches such as key drivers, messaging requirements and the importance of social norms and country ownership.

160. Many strategies were implemented across the world to address vaccine hesitancy and drive uptake of Covid-19 vaccines with many similarities and differences between high- and low-and-middle-income countries. Evidence on the effectiveness of interventions tackling hesitancy remained limited throughout the pandemic, however a systematic review in 2022 by UKHSA examined interventions for increasing Covid-19 vaccine uptake across high-income studies, exploring both communication and policy interventions (Batteux, Mills, et al., 2022).
161. Although only a small fraction of studies investigated actual vaccine uptake (as opposed to intention), there was reasonable evidence to suggest that communicating uncertainty about the vaccine does not increase intention, whereas making vaccination mandatory could have negative effects (Batteux, Mills, et al., 2022). Measuring observed outcomes is challenging as it requires tracking individuals' behaviours over time, which may be costly to implement and – in the context of a mass vaccination campaign – may be subject to numerous external factors (such as public health campaigns and other social dynamics), making it hard to isolate the effect of an intervention. Moreover, there was mixed evidence for the effects of messengers on vaccination intention. While reminders were shown to increase vaccine uptake and educational videos could reduce hesitancy, often the source of the message was important: for example, Republican and Republican-leaning individuals were more likely to be swayed from a Republican endorsement, and individuals in the UK preferred communication from the NHS or GPs as opposed to a best friend (Batteux, Mills, et al., 2022). While the same study also found that messages around personal benefit could improve vaccine intent, experimental evidence from a multi-country survey (Australia, Austria, France, Germany, Italy, New Zealand, Sweden, the UK and the USA) showed that messages about personal protective effects of the vaccine had no effect on vaccine intentions, but altruistic messages – emphasising protecting others – had positive effects (Galasso et al., 2023)
162. In low- and middle-income countries, many similar themes emerged (Solís Arce et al., 2021; Cooper et al., 2022), but there were some notable exceptions around the challenges associated with poverty and hardship (Cooper et al., 2022). Within this context, some people felt resentful and mistrustful being asked to vaccinate when so many of their other needs and concerns were being neglected (Cooper et al., 2022). In Papua New Guinea, which has among the lowest Covid-19 vaccination rates in the world (Our World in Data, 2022), a national survey in 2021 found that less than 20% of respondents who were aware a vaccine existed were willing to be vaccinated (Hoy *et al.*, 2021) with substantial fear over the vaccine, and perceptions over vaccine mandates contributing to high levels of hesitancy (The Guardian, 2021).
163. Since 2021, mandatory proof-of-vaccination policies have been implemented across the world. While research has pointed to increases in vaccination rates in many countries (Karaivanov et al., 2021) and there is some evidence for their impact on reducing spread of SARS-CoV-2 (Acton et al., 2024), concerns have also been raised about their “damaging effects on public trust, vaccine confidence, political polarisation, human rights, inequities and social wellbeing.” (Bardosh et al., 2022)
164. Certainly, strategies to address vaccine hesitancy / promote vaccination have been met with variable receptions across different countries. For example, in a 23-country study in 2021,

support for vaccination mandates was highest in China, Peru, and South Korea and lowest in Poland, Russia, and Germany (Lazarus et al., 2022), but highly variable across different groups and situations (e.g., old versus young and for international travel versus school children). In the US, resistance to Covid-19 vaccination mandates is markedly higher than for other vaccination mandates and, in the context of significant political polarisation, mandates carry the potential to strengthen anti-vaccine sentiment more generally (Mello et al., 2022).

165. The directionality of effect has received some support, with 'reactance' (the elicitation of anger and negative cognitions, motivating actions to regain freedom that has been limited) being stronger (that is, increased intentions to take actions against a restriction) when baseline vaccination intentions were low and a mandate was introduced (Sprengholz et al., 2021a). Proof-of-vaccination requirements have provoked considerable social and political resistance in many settings across the world with little current evidence weighing the overall benefits of the policies with their harms.

## V. Facing a future pandemic

### V.1. Summary of available evidence and lessons learned

166. If there is one overall central lesson learned around vaccine hesitancy in the context of the Covid pandemic response, it is the critical importance of trust in the government and related authorities and institutions.
167. The role of trust extended globally: a large global study of over 170 countries reported that high levels of trust in government were correlated with lower standardised infection rates and higher Covid-19 vaccine coverage (Bollyky et al., 2022). In another study conducted by the Global Listening Project, (Global Listening Project, 2024) nationally representative population surveys were conducted in 70 countries between July and September 2023. A total of 41% of respondents in the UK rated the government's handling of the pandemic as 'poor' or 'very poor', which was higher than the 70-country average of 26% (however, it is unclear whether survey respondents in the devolved administrations are referring to their devolved governments or the UK government). When, in the same study, UK respondents were asked whether they would trust the government to act in their best interest in a future crisis, 55% responded that they would trust the government, compared to a global average of 65%. Given how crucial trust in government is for populations to comply with needed measures in any crisis and, in the case of vaccines – even more routinely, these findings flag a need to build trust.
168. A separate study sponsored by UKHSA (Coleman *et al.*, 2024) conducted a segmentation analysis in January 2022 to understand the profile of different population groups regarding their trust in different communication channels. The study identified seven key population segments: “trusting complier” (14% of the population), “concerned cooperator” (14%), “fearful and overwhelmed” (13%), “informed and responsible” (13%), “nonchalant” (15%), “unconcerned and uncooperative” (21%) and “sceptical resister” (15%). Relevant to the issue of trust in government information during Covid-19, this study had particularly insightful findings. Even among the “trusting compliers” who the authors characterise as being the most likely to follow official guidance, and most likely to seek information, only 35% of this group felt that UK politicians and government have given “clear and honest information” in their official guidance around Covid-19.
169. This very low perception of honest and clear information requires trust to be built or re-built before a future crisis. Several key themes and broad trends emerge from the evidence presented in this report, highlighting the interplay between public trust, communication strategies, socio-demographic factors, and policy.
  - 169.1. **Vaccine hesitancy and trust.** One of the most significant determinants of Covid-19 vaccine acceptance in the UK has been the level of public trust in governmental institutions and health authorities. Concerns about the Covid-19 vaccine declined over the first year of vaccine introduction, signalling high levels of trust in the vaccination programme. However, trust was not universal, and a lack of trust in government and health authorities played a significant role in decisions not to vaccinate, especially among minority groups. Moreover, from 2021 onwards, there

is emerging evidence that trust as well as vaccine confidence are declining, with fewer people reporting that they trust the NHS in 2023 compared to 2022 and a higher percentage of respondents disagreeing that vaccines are important and safe. Understanding precisely why these recent trends are emerging is complicated due to the lack of recent available evidence. However, the reduced severity of Covid-19, vaccination policies, as well as a lack of trust in government handling of the pandemic may all play a role. Further research is needed to understand why these current trends exist, and if they may be consequential for uptake of other vaccines or future pandemic preparedness. Considering declining uptake rates of routine immunisations across the UK, this research should be a priority.

- 169.2. ***Socio-demographic factors:*** Vaccine hesitancy in the UK displayed significant variation across different socio-demographic groups. Hesitancy was higher among most ethnic minority groups, as well as younger age groups, those from more disadvantaged economic backgrounds, as well as those who did not speak English as a first language. Specific geographic areas, such as London and the East Midlands, also held higher levels of hesitancy than other parts of the UK. These trends underscore the need for tailored communication and outreach strategies that consider the unique concerns and circumstances of these groups.
- 169.3. ***Communication and misinformation:*** Effective communication strategies were essential in addressing vaccine hesitancy. The UK benefited from targeted efforts by NHS communication teams and community engagement initiatives that involved local leaders. However, the information environment also posed challenges. Social media and the proliferation of misinformation created barriers to vaccine acceptance, with exposure to misinformation shown to reduce vaccination intentions. Concerns about the expedited development of vaccines, safety, and effectiveness were exacerbated by exposure to false information.
- 169.4. ***Policy interventions and their impact:*** The UK implemented various policy interventions to increase vaccine uptake, ranging from public health campaigns to more controversial measures like the introduction of mandatory vaccination for care home workers and the announcement of mandatory Covid-19 vaccination for frontline health and social care workers in England. Although mandatory vaccination for all frontline healthcare workers never came into force, the effects of the announcement may have been sufficient to induce psychological reactance among healthcare staff. While mandates resulted in an increase in vaccination rates, they also faced significant resistance and raised ethical and practical concerns, such as a loss of staff. The British Medical Association and other professional bodies expressed apprehension about the potential negative impact on healthcare staffing and the broader implications for public trust. Ultimately, the government reversed the mandate policy. However, the groups least supportive of Covid-status certification and VCOD policies were often from minority backgrounds, which may have reinforced perceptions that the government and authorities do not have their interests at heart. It is again currently unclear whether Covid-status certification and VCOD policies have directly impacted vaccine confidence in the UK and whether spillover effects may emerge in other vaccination programmes, especially for marginalised communities.



- 169.5. ***Effectiveness of interventions:*** The effectiveness of interventions aimed at reducing vaccine hesitancy varied. Educational campaigns, reminders, and endorsements from trusted figures were generally effective in increasing vaccine uptake. However, the impact of these interventions was influenced by the source of the message and the perceived benefits. Messages emphasising personal benefits had mixed results. There was some evidence that messages highlighting the altruistic aspect of vaccination – protecting others – tended to increase vaccination intent. In the context of the UK, past experiences – including the MMR controversy in the 1990s – still breed distrust among many individuals and groups. The public experiences of the pandemic are unlikely to be quickly forgotten, and areas of broken trust need to be addressed.

## **V.2. Recommendations**

170. The pandemic has highlighted the importance of public trust and confidence in the government and health system as a key motivator for compliance with pandemic control measures in general, and particularly in vaccines. While vaccine confidence increased over the first six months of the COVID-19 vaccine rollout, subsequent data reveals declining levels of trust in the NHS, health professionals, and vaccines.

### ***Nurturing and sustaining trust over extended periods of time***

171. The importance of nurturing and sustaining trust over extended periods of time is an overarching recommendation, with specific actions listed below.
172. Trust-building needs to be built now, before we face another pandemic or future crisis. Local, tangible, daily gestures in clinic and hospital interactions as well as online communication that give people opportunities to ask questions either in person or via chatbots and other AI tools are valuable trust building measures. A more responsive and engaging system can deter people from looking elsewhere to alternative information sources.
173. It is essential to continuously monitor vaccine confidence to identify areas where it is recovering and where low confidence persists, allowing for targeted interventions.
174. The pandemic exposed and exacerbated some systemic weaknesses and deepened existing health and vaccine inequities, but it also spurred innovative approaches to engage communities, improve vaccine accessibility, and enhance communication. These innovations should be built upon and not forgotten.
175. Develop and implement comprehensive communication plans that are clear, consistent, and with transparent communication. The perceived lack of transparency in decision-making was a key issue in the minority ethnic communities highlighted in the FEHMO witness statement. Different platforms, including social media, traditional media, and community channels, can be harnessed to both be as means through which publics can ask questions (e.g. chatbots) as well as disseminate accurate information. Messaging should be culturally sensitive, tailored to address the concerns of diverse demographic audiences, and be available in multiple languages.

176. In the context of the growing challenges of misinformation, consider educational initiatives on misinformation such as ‘pre-bunking’ (Roozenbeek, Van Der Linden and Nygren, 2020) that can help reduce the public’s susceptibility to misinformation and more reliably discern reliable sources of information. These efforts can start in school programmes but extend to adult populations through mainstream or targeted media.
177. To effectively strengthen vaccine confidence, address vaccine hesitancy, and prepare for future health crises across the UK, enhanced routine data collection, monitoring, and evaluation systems are needed for appropriate targeting and tailoring of policies and interventions.

### ***Enhanced data collection***

178. **Implement enhanced routine data collection, monitoring, and evaluation systems.** To effectively strengthen vaccine confidence, address vaccine hesitancy, and prepare for future health crises across the UK, a comprehensive approach to data collection, policy guidance, and advisory engagement is essential. Several data strengthening recommendations are proposed below, in line with findings from this report.
  - 178.1. Concerns about specific vaccines across the life-course, as well as novel vaccines and vaccine technologies.
  - 178.2. Understanding of practical barriers which can significantly impact vaccine hesitancy. Practical barriers include, but are not limited to, transportation barriers, language barriers, access to healthcare facilities, financial constraints, time, information access and digital literacy.
  - 178.3. A widened focus on migrant communities, ethnic minority groups, and disabled persons, who often face structural barriers to healthcare, as well as deep-rooted fear and mistrust of the state
  - 178.4. Measuring the impact of past and present UK Government policies on vaccine hesitancy and vaccine access, as well as the interaction between these practical barriers to vaccination and vaccine hesitancy.
  - 178.5. Detailed demographic information, including – where possible – fine-grained ethnicity, migrant-status, disability-status, socio-economic status, religious affiliation, languages spoken, and household composition
  - 178.6. To capture real-time hesitancy and refusal trends effectively, increased survey sampling in high-risk regions with historically low vaccine uptake, areas with elevated epidemiological risks, and deprived areas is advised.
  - 178.7. Some standardisation of data collection across the four nations of the UK is recommended to enable direct comparisons and evaluations and a deeper understanding of regional variations in vaccine uptake and barriers. A partially unified data framework can enhance coordination across public health efforts, promoting cohesive strategies to address vaccine hesitancy across the UK.

178.8. Given that younger populations showed a larger decline in vaccine confidence than older populations, it will be important to monitor and address specific concerns, especially in these younger populations, where confidence is crucial for the uptake of childhood vaccines

178.9. A more detailed understanding of how perceptions and experiences of vaccine side-effects, including from Covid-19 vaccines (while rare), contribute to current levels of vaccine hesitancy across the UK.

*Open access to data for policy and community use*

179. Making anonymised data (where possible) openly accessible will support transparency, independent analysis, and cross-sector policy development. Open-access data empowers communities and policymakers to address region-specific challenges and design informed local interventions. By increasing transparency, it may also strengthen public trust and encourage collaborative, data-driven solutions across the UK by a range of stakeholders, including migrant and ethnic community organisations, disability advocacy groups, healthcare providers, epidemiologists, social scientists, policymakers, local councils, and educational institutions.

*Adapt data collection for pandemic preparedness*

180. Data should also be collected to align with pandemic preparedness goals, ensuring that lessons learned from current efforts can be applied in future health crises. Regular surveys to capture shifts in confidence, access, and uptake will make the health system more adaptable to changes in public attitudes and reinforce preparedness for future emergencies. By implementing these targeted measures, data collection and analysis can become a robust tool for understanding vaccine hesitancy, supporting confidence, and preparing for future public health challenges.

*Establish a multidisciplinary data-collection advisory group*

181. An advisory group comprising diverse stakeholders from each home nation is essential to oversee the processes outlined above. This group should include survey and statistical experts to guide survey design and data interpretation, as well as representatives from migrant, ethnic, and disability advocacy organisations to ensure that data collection is both inclusive and informed by the specific needs of these communities, epidemiologists and economists to align data collection with other public health priorities, such as epidemiological modelling of disease transmission, economic impact assessments, and health system capacity planning, as well as digital health experts to manage data privacy and open-access issues.

***Addressing health inequalities***

182. ***Address health inequities with transparent and inclusive policy making.*** Addressing racial and ethnic discrimination is critical to achieving health equity.

183. ***Enhance Representation and Accountability:*** Ensure racial and ethnic minorities are included in research design, clinical trials, and public health decision-making processes. Provide

anti-discrimination training for healthcare staff and implement effective systems for reporting and addressing discriminatory practices in healthcare settings.

184. *Partner with Communities to Rebuild Trust:* Actively engage with community leaders and organizations to co-design interventions that are culturally tailored and contextually relevant. Foster dialogue about health interventions that acknowledges the cumulative impact of historical and institutional racism.
185. *Expand Community-Centred Engagement:* Invest in long-term partnerships with community-based organizations to co-develop interventions that address barriers to healthcare. Ensure these efforts complement, rather than replace, state responsibilities in addressing health disparities.
186. *Identify Trusted sources of Information and Community Champions:* Develop targeted public health messaging campaigns that address specific vaccine concerns and use trusted channels, including community and faith-based organizations. Prioritize culturally and linguistically appropriate messaging to counter misinformation and improve accessibility for diverse populations.
187. *Integrate Equity into Research and Data Collection:* Standardise ethnicity and disability data collection methods across health systems to ensure consistency and reliability. Use disaggregated data to better understand how specific factors—such as ethnicity, disability type, and socio-economic status—affect health outcomes and access.
188. *Tailor Public Health Strategies:* Replace one-size-fits-all approaches with interventions that address the unique needs of specific communities. Incorporate intersectional factors, such as race, ethnicity, gender, and socio-economic status, into the design of public health campaigns and services.
189. *Eliminate Structural Barriers:* Collaborate with stakeholders to address systemic issues, such as discriminatory immigration and healthcare policies, that prevent equitable access. Include funding for culturally specific healthcare navigation services to support individuals in navigating complex systems.

*Build disability-inclusive strategies*

190. Despite high vaccination rates, Disabled people faced systemic barriers, ranging from inadequate care support to inaccessible communication and infrastructure. The pandemic response fell short in addressing these inequities, highlighting the urgent need for disability-inclusive strategies.
  - 190.1. *Co-Design Strategies with Disabled People and Disabled People's Organisations (DPOs):* Adopt a participatory approach to vaccination and therapeutic rollout strategies by co-producing and co-designing initiatives with Disabled people and DPOs, in line with the principles of the UN Convention on the Rights of Persons with Disabilities (UNCRPD). This approach ensures that the motto "nothing about us, without us" is upheld. Additionally, properly resource DPOs to partner in designing and implementing strategies to better reach and serve Disabled people. These organisations are uniquely positioned to ensure that outreach efforts are effective and equitable

- 190.2. *Provide Accessible Communications and Booking Systems:* Ensure that all communications, booking systems, and certification passes are available in multiple accessible formats, including British Sign Language (BSL), Braille, Easy Read, large print, and audio formats. This guarantees that vital information reaches all individuals, regardless of their communication needs. Additionally, ensure patient records capture individuals' preferred communication methods, allowing invitations and follow-up communications about vaccinations to be delivered in their chosen accessible format
  - 190.3. *Prioritise Disabled People and Carers in Rollout Strategies:* consider priority to Disabled people and their carers based on clinical vulnerability. Tailor rollout strategies to recognize the heightened risks faced by these groups and their support networks
  - 190.4. *Ensure Accessibility of Vaccination Centres:* Guarantee that all vaccination centres are fully accessible to people with a range of disabilities. Conduct regular audits to confirm the presence of ramps, step-free access, and other accessibility features.
  - 190.5. *Expand Outreach and Access Efforts:* Implement proactive outreach measures, including home visits and transportation services, to enable Disabled people, particularly those with sensory or learning disabilities, to access vaccines and therapeutics. These efforts ensure equitable access for individuals who face mobility or communication barriers.
191. Many individuals belong to multiple marginalised groups and face intersecting forms of discrimination based on disability, race, migration status, age, sexual orientation, and other protected characteristics. Addressing these overlapping inequities requires an intersectional approach that accounts for the compounded impacts of marginalisation and prioritises inclusive and equitable strategies and policies to rebuild trust, increase confidence in vaccination, and address health disparities.

## Concluding remarks

192. While appreciating that in unprecedented crises such as the Covid-19 pandemic, with evolving information and heightened uncertainty, many decisions were made based on the evidence at hand with best intentions. Reflecting on what could have been done better is always easier in retrospect, but there are a few key points drawing from the evidence presented in this report that should be remembered for future emergencies, with implications for actions now.
193. Some level of vaccine hesitancy around any new vaccine is normal and questions should not be dismissed but addressed as early as possible to mitigate rumours and perceptions around lack of transparency. Additionally, any reports of vaccine adverse events should be taken seriously and not dismissed without proper investigation especially with new vaccines.
194. In the case of some of the new Covid-19 vaccines, notably the mRNA vaccines which were widely used in the UK, earlier communication from the start of the pandemic about various types of vaccines in the pipeline – including that research around mRNA spans over a

decade – could have mitigated the anxiety about the rapid speed of development and questions of adequate safety and regulatory processes.

195. While the central government controlled key messaging around the pandemic, how that information was understood – or misunderstood – needs local translation and contextualisation. Local health authorities know their communities best – including the local concerns and questions. Systems should be established which allow and encourage local health authorities to register the concerns and questions they hear locally to feed into a central database which can generate appropriate responses to support health care professionals when faced with such questions.
196. While there are multiple examples of positive local efforts to encourage vaccine acceptance, there were few assessments of which interventions specifically impacted uptake. There is still time to revisit some of the efforts that seemed more successful, or which were not successful and prepare case studies, interviewing people who were involved, and gathering relevant data as a valuable resource moving forward.
197. One of the weakest parts of the overall efforts to address vaccine hesitancy and build trust, despite some of the excellent efforts made, was the outreach and engagement in minority ethnic communities, which needed very early engagement, based on already known under-vaccination and average lower health status. If there is one thing that can start now, it is to rebuild the trust in communities by working to rebuild gaps in routine vaccine uptake and confidence. Now is the time to identify who are the local vaccine champions or other trusted local leaders that will be important allies when the next health crisis emerges.

## Annex 1: References

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## Annex 2: Inquiry Documents

KM/1 INQ000489460	Survey from GOV.UK, titled National Statistics, Family Resources Survey: financial year 2020 to 2021, dated 12/05/2023. [Publicly Available]
INQ000474407	Witness Statement of The Migrant Primary Care Access Group, dated 04/10/2024
INQ000485278	Witness Statement of Dr Salman Waqar, NHS General Practitioner on behalf of the Federation of Ethnic Minority Healthcare Organisations (FEMHO), dated 06/06/2024
INQ000474256	Witness Statement of Kamran Mallick on behalf of Disabled People's Organisations, dated 18/07/2024.
INQ000089756	Article from Office for National Statistics, titled 'Updated estimates of coronavirus (COVID-19) related deaths by disability status, England 24 January to 20 November 2020', dated 11 February 2021.