National Audit Office

The rollout of the COVID-19 vaccination programme in England

Department of Health & Social Care and Department for Business, Energy & Industrial Strategy

REPORT

by the Comptroller and Auditor General

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Report by the Comptroller and Auditor General

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Gareth Davies
Comptroller and Auditor General
National Audit Office

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Contents

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Key facts

£5.6bn

total spending on the COVID-19 vaccine programme by the end of October 2021 (including procurement costs for the UK and deployment costs for England)

87m

number of COVID-19 vaccine doses administered in England by the end of October 2021

85%

proportion of people aged 18 and over in England who had received two doses of COVID-19 vaccine by the end of October 2021, compared with a planning assumption of 75%

More than 340 million	number of doses of COVID-19 vaccine the UK had contracted or agreed to purchase by the end of October 2021, for delivery by the end of 2022
71%	percentage of COVID-19 vaccinations administered by GPs and community pharmacies up to the end of October 2021, against an initial planning assumption of 56%
£2.9 billion	total spent to purchase COVID-19 vaccines for the UK up to the end of October 2021, out of a total spend of £3.3 billion by the Vaccine Taskforce
£2.2 billion	total spent on COVID-19 vaccine distribution and deployment in England to the end of October 2021
4.0%	estimated percentage of COVID-19 vaccine doses damaged or not used in England ('wastage') up to the end of October 2021, against a planning assumption of 15%–20%
48%–86%	range in percentage of adults vaccinated with two doses by ethnic group at the end of October 2021 (48% for people of Chinese origin up to 86% for people of White British origin)
£8.3 billion	total funding available for the COVID-19 vaccination programme up to the end of March 2022, consisting of £4.6 billion for the Taskforce, primarily to purchase vaccines, and £3.7 billion for vaccine deployment

Summary

Introduction

1 COVID-19 vaccines first became available at the end of 2020. Since then, vaccination has been central to the government's pandemic response. The UK Health Security Agency (UKHSA) estimated that by the end of September 2021, vaccinations may have averted as many as 128,000 deaths and 262,000 hospitalisations by September 2021.

2 A number of national and local bodies have been involved in the COVID-19 vaccine programme (the programme) as follows:

- The **Vaccine Taskforce (the Taskforce)**, created in April 2020, one of whose objectives is to secure vaccine supplies for the UK.
- Initially, the Taskforce delivered its responsibilities on behalf of the **Department for Business, Energy & Industrial Strategy (BEIS)**. From August 2021, the **Department of Health & Social Care (DHSC)** assumed accountability for Taskforce activities relating to procurement, clinical testing and development. DHSC is also responsible for planning how to administer the vaccine to the public in England.
- **NHS England and NHS Improvement (NHSE&I)** leads on operational delivery of COVID-19 vaccinations in England. It has worked with **Public Health England (PHE)** on vaccine supply, storage and distribution within England. From October 2021, PHE's responsibilities transferred to the new **UKHSA.**
- A range of local healthcare providers – **NHS hospitals, GPs and community pharmacies** – have administered vaccines in their own premises and other settings including dedicated vaccination centres.

3 In implementing the programme, the government has followed advice from the **Joint Committee on Vaccination and Immunisation (JCVI)** and the **Chief Medical Officers**. This advice determines who is eligible and should be prioritised for vaccination, and which vaccines can be given to which groups. As further evidence on the safety and effectiveness of the COVID-19 vaccines became available and the nature of the COVID-19 pandemic has changed over time, advice has continued to change and has often had to be implemented at extremely short notice. As with other vaccines, the **Medicines and Healthcare products Regulatory Agency (MHRA)** has to approve COVID-19 vaccines before they can be used and monitors safety after approval.

Scope of this report

4 In December 2020, we published our *Investigation into preparations for potential COVID-19 vaccines*. At the time, the Taskforce had signed five contracts with vaccine suppliers and one vaccine had been approved for use. This report extends our examination up to the end of October 2021, by which time four vaccines had been approved for use and the rollout of first and second doses of COVID-19 vaccinations to adults had taken place. The programme had also commenced rollout of first doses to 12- to 17-year-olds, and booster vaccinations. Since October 2021, the programme has expanded further, including the broadening and acceleration of the booster programme and second doses for 12- to 17-year-olds.

5 This report evaluates the government's COVID-19 vaccine programme focusing on events up to the end of October 2021 and assessing whether the programme is well placed to meet its objectives in full. The report focuses on England, with the exception of procurement which the government has done on a UK-wide basis. We describe aspects of clinical advice, vaccine certification, the booster programme and some events after October 2021 but do not evaluate them in depth.

Key findings

The rollout of vaccinations to the public

6 The vaccine programme met stretching and unprecedented targets to offer two doses of COVID-19 vaccine to most adults in a short space of time. The government made public commitments to offer vaccines first to priority groups and then to the entire adult population of England. Up to July 2021, NHSE&I achieved all its major deployment targets, including offering a first vaccine dose to nine priority groups by 15 April and extending that offer to all adults by 19 July. The programme met its target to vaccinate two-thirds of all adults by 19 July. By the end of October, it had administered around 87 million doses, about six times the number in the previous annual flu vaccine programme (paragraphs 3.6 and 3.7).

7 Uptake has exceeded expectations and has been higher than for previous flu vaccination programmes. As the rollout began, Office for National Statistics surveys suggested that the large majority of people (84%) felt positively about being vaccinated. This figure had increased to 96% by June/July 2021. Vaccine uptake has exceeded NHSE&I's initial planning assumption that 75% of adults would take two doses. By the end of October 2021, 85% of adults had received two doses. Uptake of flu vaccines in the winter of 2019-20 in England was 72% for people aged 65 and over and 45% for people under 65 in a clinical risk group. Uptake in England also compared well with the other home nations and European Union countries: 85% received two doses compared with a range of 76% to 93% (paragraphs 3.5, 3.22 and 3.28).

8 Despite national and local efforts to address inequalities, lower vaccination rates persist in some groups. Uptake of COVID-19 vaccinations at the end of October 2021 remained substantially below the national average for:

- younger age groups, being lowest among those aged 18–24 (64%) and 25–29 (68%);
- particular ethnic minority groups, being lowest among adults of Chinese origin (48%), Black Caribbean origin (49%) and Black Other origin (49%), compared with 76% for all ethnic origins (this analysis does not adjust for age and uses a slightly different measure of uptake from the 85% referred to above); and
- expectant mothers (in October 2021, 29% of women giving birth had received at least two doses of COVID-19 vaccine).

Previous vaccination programmes have shown that uptake varies for different groups and in complex ways. The COVID-19 vaccine programme recognised the need for a range of approaches to address low uptake, including campaigns to increase confidence in vaccine safety, targeted materials for different communities, different routes to get vaccinated, and partnerships with community organisations. There are signs that some measures succeeded in improving uptake but the government has not yet identified how it can fully overcome persistent inequalities (paragraphs 3.22, 3.25 to 3.28 and Figure 22).

9 The programme has not met some later objectives, including one to vaccinate most 12- to 15-year-olds by late October 2021. The government decided to extend vaccination eligibility to 12- to 15-year-olds in the middle of September and originally planned to provide vaccines primarily through school-based immunisation services. However, there were a number of challenges to this rollout and by the end of October only 25% of the age group had been vaccinated. NHSE&I later broadened its offer to enable 12- to 15-year-olds to receive vaccines at other sites. By the end of January 2022, 58% had been vaccinated with one dose (paragraphs 3.7 and 3.8).

10 Overall, the programme has taken steps to make the vaccine convenient to access; GPs and community pharmacies have administered many more doses than originally planned. NHSE&I set up three main routes to access vaccines: GPs and community pharmacies (which it assumed would provide 56% of vaccinations); vaccination centres (which it assumed would provide 41%) and hospitals (for the remaining 3%). By the end of October, 71% of vaccines had been administered by GPs and community pharmacies, through a variety of local services and locations, and only 21% had been delivered at vaccination centres. In terms of delivery costs, dedicated vaccination centres have been the most expensive method at £34 per dose compared with £24 for GPs and community pharmacies. GPs and community pharmacies were the most popular delivery model for all priority groups although people aged under 65 were more likely than others to use dedicated vaccination centres (paragraphs 3.9 to 3.11).

11 A combination of existing staff, returning healthcare staff, newly trained vaccinators and volunteers have administered the vaccines. DHSC and NHSE&I anticipated that at its peak the programme would need 60,000 vaccinators and 65,000 non-clinical staff. They increased capacity by legislating to allow a wider range of individuals to give vaccinations and by recruiting clinical and non-clinical paid staff and volunteers. In our local case study interviews, we heard about the goodwill, flexibility and dedication needed to set up and run vaccination sites at such pace and scale. Staff accepted that the programme faced inherent uncertainties but there was frustration that important changes, for instance offering vaccines to 12- to 15-year-olds outside school, were sometimes announced in the media before NHSE&I had communicated them to local sites. NHSE&I told us that it was unable to communicate in advance with local sites owing to the confidential nature of the advice (paragraphs 3.13 and 3.17).

12 NHSE&I and NHS Digital (NHSD) created new digital tools to support the vaccine deployment, making effective use of imperfect existing data. The programme set up a national data system that allowed the NHS to identify, record and transmit patient vaccination data across the health and care system. NHSE&I also created central dashboards with detailed and real-time analysis of uptake and supply. These tools supported programme leaders to manage key programme risks and monitor divergence from central directions in local areas. Some priority groups (for example, the social care workforce and unpaid carers) were hard to identify from the main GP records but NHSE&I made creative use of multiple other data sources to improve identification. NHSE&I, working with NHSD, set up the national online booking system, which was primarily available for dedicated vaccination centres and community pharmacies. Our local case study areas had mixed views on how well this had facilitated access and supported their operations (paragraphs 3.18 to 3.21, 3.23 and 3.24).

Update on overall costs, procurement and supply

13 Up to the end of October 2021, the programme had spent £5.6 billion out of total available funding of £8.3 billion for the two years to the end of March 2022.

- The £8.3 billon funding consists of £4.6 billion for the Taskforce, primarily to purchase vaccines, and £3.7 billion for vaccine deployment.
- The £5.6 billion expenditure comprises £3.3 billion by the Taskforce, of which £2.9 billion was to purchase vaccines, and £2.2 billion for vaccine deployment.
- Based on all UK agreements in place as at the end of October with six suppliers, we calculated that the average procurement cost per dose was £15.02 (including VAT), although this has varied between suppliers and over time as the market situation has changed.

- For the period up to the end of October, we calculated that the average deployment cost per dose administered was £25.70. (Due to the different types of doses covered, this cannot be added together with the average procurement cost above to produce an average total cost, and there are additional deployment costs, for example, the use of volunteers, that cannot be easily quantified.) (paragraphs 1.5 to 1.8).

14 By the end of October 2021, the Taskforce had contracts or agreements in place with six suppliers for more than 340 million doses of vaccine to be delivered to the UK by the end of 2022. This compares with around 357 million doses contracted for or agreed in principle at the time of our last report in December 2020. Up to the end of October 2021, 145.9 million doses had been supplied against the UK vaccine contracts, and the Taskforce had paid out £2.8 billion on vaccine procurement contracts. Including future commitments, total contract costs have increased from £3.7 billion to £5.8 billion. This implies a substantial increase in the procurement cost per dose. This reflects the fact that there is a larger share of the more expensive vaccines now approved for use in the October 2021 portfolio. The supply contracted for may ultimately exceed the UK's vaccination needs but this depends on how the pandemic and government policy evolve. To date, the Taskforce has used various methods to optimise national supply and reduce surpluses, including cancelling or rescheduling deliveries, international donations, and bilateral transfers with other countries (paragraphs 2.6, 2.7, 2.9, 2.10 and 2.19).

15 Up to the end of October 2021, there was an estimated total wastage of around 4.7 million doses, or 4.0% of total supply, in the vaccine programme in England; this included 1.9 million doses unused after changes to clinical advice about the AstraZeneca vaccine. Wastage can occur when vaccine is not handled in line with guidance (for instance, regarding refrigeration) or cannot be used before its expiry date. We estimated overall wastage for England at 4.0% of total supply, lower than the 15%–20% that the vaccine programme initially assumed: under 1% across the national distribution and storage chain and 4.5% locally. There was a particular challenge with expiring AstraZeneca doses after JCVI's recommendation that people under 40 should preferably not be offered it. Although the Taskforce, working with PHE and others, was able to avoid some wastage by redirecting 4.5 million AstraZeneca doses to other countries, vaccines already at local sites had to be destroyed in line with regulations. Approximately 1.9 million doses were written off. Local providers were allowed to transfer stock between one another: our local case study interviews highlighted the value of this, although three felt the process was too slow and bureaucratic (paragraphs 2.17 to 2.19).

Success factors and future risks

16 The COVID-19 vaccine rollout was the biggest vaccination programme in UK history. Those delivering it employed a number of successful approaches to achieve most of its objectives up to October 2021. In particular, we have noted the following that facilitated delivery at speed:

- Early and decisive action with a clear statement of the risks involved in different possible approaches.
- A conscious decision to pursue more than one solution, both in terms of vaccines and vaccination sites to provide flexibility and contingency.
- The adapting of existing processes to streamline vaccine development, procurement, approval and authorisation.
- Great clarity of purpose and priorities from the start of the vaccination rollout.
- A balance between central command-and-control and wider empowerment (particularly once it was acknowledged that GPs and pharmacies would play a bigger role than originally planned).
- Using existing infrastructure and expertise where possible, and identifying early on where new infrastructure was needed.
- The effective use of data to manage the programme closely and intervene quickly when problems emerged (paragraphs 1.16 to 1.17, 2.20 and 3.29 to 3.30).

17 There are considerable risks to the programme's continuing success.

- In the autumn of 2021, the programme expanded to include booster doses, first for some and then for all adults, and second doses for 12- to 17-year-olds. Following the emergence of the Omicron variant in winter 2021, new targets were set to offer all adults a booster by the end of December. These developments have meant the programme continuing to operate at a very high scale and pace and with significant complexity into a second year.
- There are still around 3.7 million unvaccinated adults who are unevenly spread throughout the population.
- Our assessment is that staffing remains a major risk, due to staff burnout, and the lack of surplus capacity in the healthcare system generally.
- In November 2021, the Taskforce signed contracts for 114 million more vaccine doses to be delivered in 2022 and 2023. This will provide flexibility to meet increases in demand and acquire new variants of vaccines, but the programme will have to manage carefully any resulting surpluses and the increased risk of wastage (paragraphs 2.7, 2.21 and 3.31 to 3.33).

18 Up to the end of 2021, DHSC, BEIS and other national bodies had not yet identified what a sustainable long-term model of regular COVID-19 vaccination would entail. Given the continuing significant uncertainties of the pandemic, at the end of 2021 DHSC still felt that it was too early to fix on a business-as-usual approach to COVID-19 vaccination but told us it was planning to address this in 2022. UKHSA noted that the emergency arrangements may not be best for long-term efficient working. In good time, DHSC and BEIS will need to consider the best long-term organisational structure for the new roles currently performed by the Taskforce and NHSE&I, alongside UKHSA's existing responsibilities, and how future costs and other resources may need to differ from the emergency response (paragraphs 1.18, 2.21 and 3.31).

Conclusion on value for money

19 Initiated in 2020, the vaccine programme has operated at unprecedented pace, scale and complexity, and in conditions of profound uncertainty, to achieve the pressing objectives of supporting the creation of vaccines, securing access to them, and administering them to the population as quickly as possible. It is through the collective efforts of many national and local public bodies, scientists, vaccine manufacturers, and individual staff and volunteers, as well as government's power as a coordinator and funder, that so many of the programme's objectives have been met and in some areas exceeded.

20 In our review, we saw many examples of good practice, including clarity of purpose and priorities, timely and data-driven decision-making, and a willingness to innovate and adapt where necessary balanced with the repurposing of existing infrastructure and expertise. National and local partners showed an ability to adapt quickly, for example the rapid shift to deliver more vaccinations through GPs and pharmacies. The evidence indicates that the programme has saved lives and reduced the incidence of serious illness and hospitalisation.

21 Given the unprecedented circumstances of the pandemic and the programme's achievements up to October 2021, we assess that it has provided value for money to date. By the end of October, the programme had spent £5.6 billion to achieve its objectives. Much about COVID-19, the vaccines market and the UK's future requirements remains unpredictable but far more is now known than in 2020. The programme needs to identify a clear path to a future sustainable model, securing the benefits of its many innovations and ensuring it has a full picture of costs and workforce requirements as it takes key decisions. It needs to challenge anew all elements of its cost base and adapt accordingly. Most importantly, it needs to maintain the high levels of vaccine uptake it has achieved among the general population and increase levels for groups where uptake still lags behind.

Recommendations

22 Our recommendations are as follows:

a In the light of the expanded and accelerated booster programme, **NHSE&I should take additional steps to manage the vaccine workforce and its welfare sustainably**, and to examine how the programme can minimise its potential adverse impact on other health and public health services, bearing in mind it is the same workforce which delivers all these services. It should also ensure it gives front-line providers the necessary lead-in time to prepare for programme changes.

b **NHSE&I and UKHSA, working with local and national partners, should seek new ways to increase uptake for groups where rates are lower than for the rest of the population**, and should also evaluate what has worked well to date and could be replicated in future in other vaccination and similar public health programmes.

c **The Taskforce, NHSE&I and UKHSA, working with local partners, should set out a clear strategy for managing surpluses and wastage in 2022 and review the overall expected wastage**, ensuring they learn lessons from the write-offs required for AstraZeneca.

d Taking into account its ongoing procurements, **the Taskforce should set out a clear strategy for how it will maintain flexibility to respond to the continuing uncertainties of the pandemic, including the emergence of new variants, and changes in demand**. This should include consideration of the mix of vaccines in its portfolio, timing of deliveries and the relative cost and efficacy of different vaccines.

e **DHSC and BEIS, working with the Taskforce, NHSE&I and UKHSA, should capture wider lessons from the programme, and identify what adaptations and innovations they should retain for other health and public health programmes and future responses to emergencies**. By the same token they should take steps to identify and address acknowledged weaknesses, such as the accuracy and availability of care sector data and the identification of unpaid carers.

f **DHSC and BEIS, working with the Taskforce, NHSE&I and UKHSA, should set out a clear plan to identify and reach a sustainable future model for COVID-19 vaccination, clearly setting out responsibilities at national and local level**, based on a considered review of the costs, structures, staffing and delivery models used so far. In advance of any formal plan, they should seek early opportunities to consolidate COVID-19 vaccine activities within existing structures.

Part One

The COVID-19 vaccine programme

1.1 Effective COVID-19 vaccines first became available at the end of 2020. Since then, vaccination has been central to the government's pandemic response.[1] The rollout was the biggest and most complex vaccination programme in UK history. Our first report on the vaccine programme, *Investigation into preparations for potential COVID-19 vaccines,*[2] considered events up to December 2020. At that stage, we reported how the programme had to work at pace and without any certainty that an effective vaccine would be found. This report looks in detail at what happened between then and the end of October 2021.

1.2 This part provides an overview of the COVID-19 vaccination programme,[3] including:

- roles and responsibilities;
- funding and costs to date; and
- benefits and impacts.
- Part Two then examines progress with COVID-19 vaccine procurement and supply. Part Three looks in detail at the rollout of COVID-19 vaccines to the public.

1 In its 2021 Autumn and Winter Plan, the government stated that "the main line of defence [against COVID-19] is now vaccination rather than lockdown".
2 Comptroller and Auditor General, *Investigation into preparations for potential COVID-19 vaccines,* Session 2019–2021, HC 171, National Audit Office, December 2020.
3 As set out in our December 2020 report, vaccines will be bought for the UK, Crown Dependencies and Overseas Territories. Northern Ireland, Scotland, Wales, Crown Dependencies and Overseas Territories are each responsible for deploying the vaccine to their own populations. This report focuses on deployment in England, while examining procurement on a UK-wide basis.

Roles and responsibilities

1.3 A number of national and local bodies have been responsible for procuring, supplying and administering COVID-19 vaccines (**Figure 1** on pages 16 and 17):

- Created in April 2020, the **Vaccine Taskforce (the Taskforce)** has been responsible for procuring COVID-19 vaccines from pharmaceutical companies, supporting vaccine research and developing future manufacturing capacity in the UK.
- Initially, the Taskforce delivered its responsibilities on behalf of the **Department for Business, Energy & Industrial Strategy (BEIS)**. From August 2021, the **Department of Health & Social Care (DHSC)** assumed accountability for Taskforce activities relating to procurement and clinical testing. DHSC is also responsible for planning how to administer the vaccine to the public in England.
- **NHS England and NHS Improvement (NHSE&I)** leads on operational delivery of COVID-19 vaccinations in England, including designing and implementing delivery models. NHSE&I worked with **Public Health England (PHE)** on vaccine supply, storage and distribution within England. From October 2021, PHE's responsibilities transferred to the new **UK Health Security Agency (UKHSA).**[4]
- A range of local healthcare providers – **NHS hospitals, GPs and community pharmacies** – working with their integrated care systems, have administered vaccines in their own premises or other settings, including temporary vaccination sites such as dedicated vaccination centres, in people's homes and in care homes.[5]
- Numerous commercial and third-sector bodies hold contracts to support the programme, including to manufacture, transport and store vaccines, and to provide venues and volunteers.

1.4 In addition to the **Chief Medical Officer** for England, the government's most senior advisor on health matters, two bodies have important roles in providing independent clinical advice and monitoring:

- The **Medicines and Healthcare products Regulatory Agency (MHRA)** is the UK regulator, which approves vaccines for use and monitors safety after approval.
- The **Joint Committee on Vaccination and Immunisation (JCVI)** advises the UK government on who is eligible for vaccination and how to prioritise them.

4 PHE was formally abolished in October 2021, and responsibilities relating to the COVID-19 vaccine programme were taken over by the new body UKHSA. Where we describe activities taking place up to the end of October, we will mainly refer to PHE.

5 Integrated care systems (ICSs) are new partnerships between the organisations that meet health and care needs across an area, such as hospitals and social care providers, to coordinate services and to plan in a way that improves population health and reduces inequalities between different groups.

Funding and costs

1.5 The total funding available to the COVID-19 vaccine programme in 2020-21 and 2021-22 is £8.3 billion (**Figure 2** on pages 18 and 19). This comprises:

- £4.6 billion for the Taskforce, of which the majority, £3.9 billion, was to purchase vaccines; and
- £3.7 billion to support deployment in England, including the rollout of two vaccinations and boosters to all adults, and two doses to all 12- to 17-year-olds.

1.6 The programme's actual expenditure has been subject to many uncertainties, including the unit costs of vaccines purchased, the eligible population and the level of uptake, delivery models, and the number of doses required per person. Up to the end of October 2021, the programme had spent a total of £5.6 billion (Figure 2):

- The Taskforce spent £3.3 billion, including £2.9 billion on purchasing COVID-19 vaccines and £0.2 billion on efforts to increase domestic manufacturing capacity.
- Up to the end of October, COVID-19 vaccine deployment had cost £2.2 billion. Of this, £1.6 billion was directly related to work at vaccination sites, including around £1.1 billion for services provided by GPs and community pharmacies, £0.4 billion for vaccination centres, and £0.1 billion for NHS hospitals.

1.7 We calculated that the average procurement cost per dose was £15.02 (including VAT), based on all agreements in place in October 2021 (including vaccines not approved or used in the UK).[6] The average procurement cost per dose varies considerably between suppliers and for the same supplier over time as market circumstances and contractual terms changed. The average procurement cost per dose, based only on the contracts for the three vaccines actually deployed in the UK, is higher than £15.02. We have not presented these data in the report in order to protect the government's commercial position. For the period up to the end of October, the average cost of administering each dose was £25.70.[7] (The two averages cannot be added together to get a total cost per dose as the first is based on doses contracted for by the end of October 2021, while the second is based on doses administered up to the end of October 2021.)

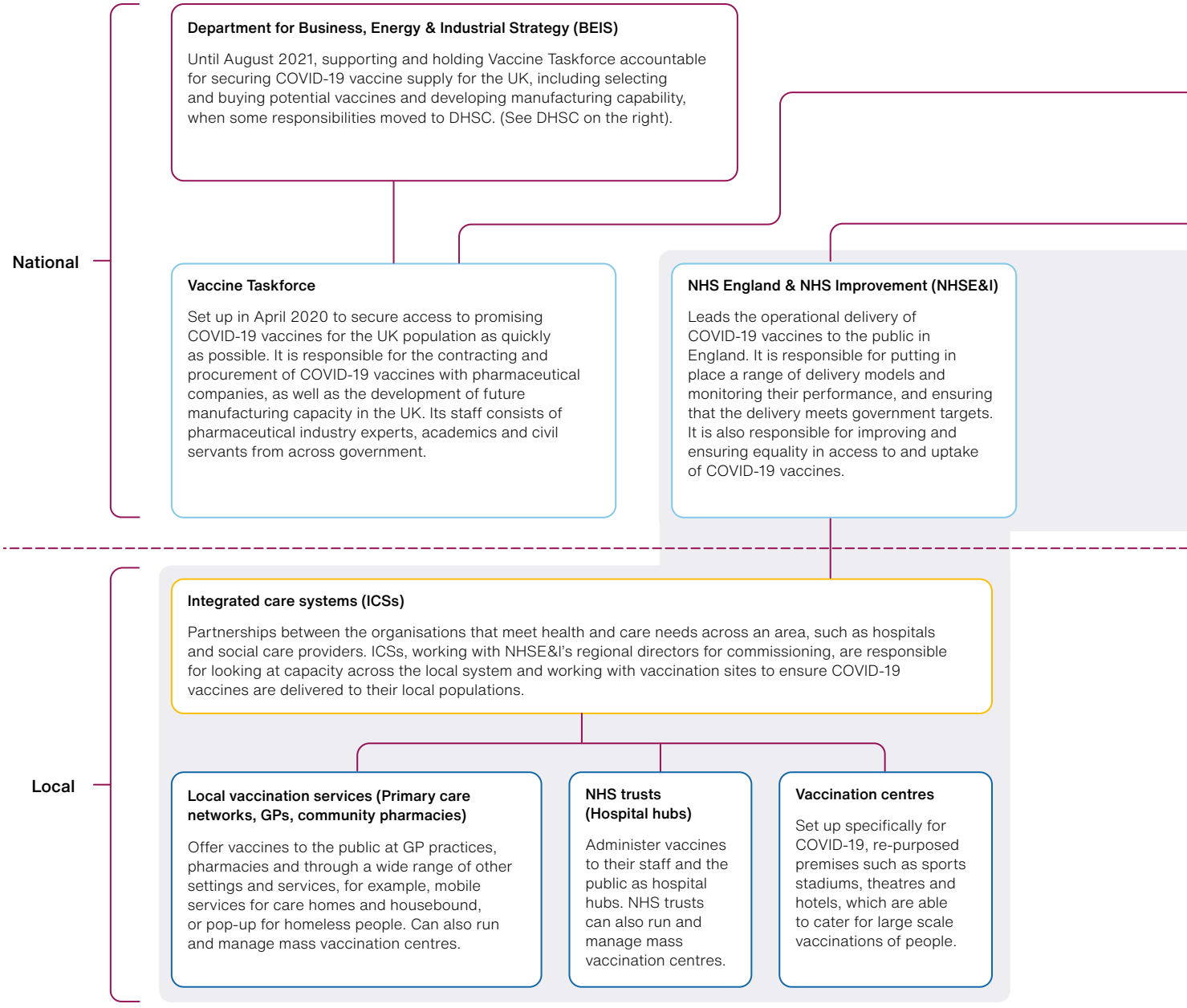
6 The calculation is based on all doses contracted for by the end of October 2021, whether or not the vaccine was approved or deployed. This includes vaccines with non-binding agreements in place, but excludes the terminated Valneva contract. Exchange rates used are as at the end of October 2021 as the Taskforce does not hedge its foreign exchange exposure. See paragraph 2.7 for further analyses of procurement cost per dose.

7 The calculation is based on the total costs of the deployment programme, divided by the number of first, second, third and booster doses administered up to the end of October 2021. The calculation includes distribution, storage and transportation costs incurred on doses which have not yet been administered or have expired.

Figure 1

Roles and responsibilities for the COVID-19 vaccination programme in England, October 2021

Government departments and arm's-length bodies, local bodies and contractors deliver the COVID-19 vaccination programme



- Government departments
- Other government bodies
- Local healthcare bodies administering vaccines
- Other bodies providing support to the vaccine deployment
- Regulatory or clinical advisory bodies
- Bodies accountable as part of the Vaccine Deployment Programme

Source: National Audit Office analysis based on published and unpublished documents and interviews with government officials

Department of Health & Social Care (DHSC)

Overall responsibility for the deployment and communication of the vaccination programme; the Secretary of State for Health and Social Care holds ministerial accountability. From August 2021, DHSC also assumed responsibility for COVID-19 vaccine procurement, and clinical testing and development.

Cabinet Office

Leads the cross-government team responsible for all COVID-19 marketing and communications. It works closely with DHSC on communications for the vaccination programme.

Department for Digital, Culture, Media & Sport

Helps coordinate efforts across government to fight misinformation about COVID-19 vaccines.

Public Health England (up to October 2021)/UK Health Security Agency (from October 2021)

Responsible for monitoring real-world impact and effectiveness of vaccines, and working with MHRA to monitor potential side effects and adverse events. Together with NHSE&I, responsible for running COVID-19 vaccine supply, storage and distribution arrangements for England.

NHS Digital

Provides digital services to the programme as commissioned by NHSE&I, for example, National Booking Services and data systems that allow the identification of everyone receiving the vaccines, including their vaccination status.

The Medicines and Healthcare products Regulatory Agency (MHRA)

Independent UK regulator whose role is to ensure medicines, devices and vaccines work effectively and are acceptably safe for use.

Joint Committee for Vaccinations and Immunisations

Independent medical and scientific expert body which advises the UK government on the provision of vaccination and immunisation services.

Contractors

The Taskforce procures and manages contracts with commercial and academic suppliers of COVID-19 vaccines, and other consumables required to deliver the vaccines to monitor and ensure supplies. Government also has a number of contracts in place to support delivery of the COVID-19 vaccination programme including: logistical companies to transport, store and distribute vaccines, venue providers and provision of volunteers.

Third sector bodies

A range of charitable organisations and community bodies provided support to the programme. This included providing volunteers, helping with interpretation, engaging with and mobilising their communities, communicating vaccine policies and combating misinformation.

Local authorities

Engage with and provide information on COVID-19 vaccines to their local communities. Local directors of public health and their teams have an important role in working with the NHS to ensure uptake of vaccines and address diversity issues in their area.

Notes

1 Before August 2021, the Vaccine Taskforce was hosted by and reported to BEIS. Since August 2021, the Taskforce has reported to BEIS and DHSC. However, BEIS continues to host the Taskforce, providing IT support, premises, and human resources functions.

2 The Figure only includes the principal organisations involved in the vaccine programme. Many other organisations, for example the Home Office and Her Majesty's Prison & Probation Service, have also supported the programme in specific ways. The Department for Education also supported the roll out of vaccines to 12- to 15-year-olds in schools.

3 A few national bodies included in the Figure, for example, the Medicines and Healthcare products Regulatory Agency, have responsibilities not just for England but for the UK.

Figure 2

Total funding for the COVID-19 vaccine programme 2020-21 and 2021-22 and expenditure to the end of October 2021 in England

The vaccine programme spent £5.6 billion up to the end of October 2021

Area of spend	Funding for 2020-21 and 2021-22	Spend for 2020-21 and to the end of October 2021
	(£m)	(£m)
Vaccine development and procurement	**4,581**	**3,343**
Vaccines	3,943	2,877
Antibodies	111	111
Clinical trials	140	96
Onshoring	322	216
Operating costs	65	42
Vaccine deployment	**3,698**	**2,237**
Deployment models		
• Local vaccination services (including GP-led and pharmacy services)	1,478	1,066
• Vaccination centres	649	431
• Hospital hubs	119	96
Total NHS England & NHS Improvement (NHSE&I) costs directly related to vaccine delivery models	**2,246**	**1,593**
Security	57	46
Workforce mobilisation and training	71	30
Core programme	229	124
Logistics	59	37
Consumables and Equipment	33	30
Total NHSE&I costs not directly attributed to delivery models	**449**	**267**
Technical and data	458	264
VAT	69	45
Total NHSE&I costs	**3,223**	**2,169**
Estimates for extensions of the booster programme to all adults and second doses for 12- to 15-year-olds	247	
Direct Department of Health & Social Care (DHSC) administered costs	228	68
Total COVID-19 vaccination programme	**8,279**	**5,580**

Figure 2 *continued*
Total funding for the COVID-19 vaccine programme 2020-21 and 2021-22 and expenditure to the end of October 2021 in England

Notes

1 For the deployment programme, funding is estimated by total costs forecast, which includes some costs for the financial year 2022-23.

2 Spend data presented here have not been fully audited and validated and may be subject to potential adjustments.

3 Costs labelled 'Technical and data' are associated jointly with the COVID-19 vaccination programme and the annual flu vaccination programme.

4 Direct DHSC administered costs include costs for Public Health England, NHS Digital, and the central vaccine security team.

5 NHSE&I expenditure includes direct spending by NHSE&I centrally and regionally. The VAT category only includes VAT on central NHSE&I expenditure. VAT paid for by NHS regions and delivery models is included in the costs for delivery models or other workstreams.

6 Some of the costs incurred by the Vaccine Taskforce also include services for the rest of the UK, including costs of vaccines procured.

7 Costs for onshoring includes spend on infrastructure and other enabling projects in order to increase the domestic vaccine manufacturing capacity.

8 The spend on vaccines includes COVAX costs. It differs from the figure given in Figure 7 in part due to funding given to vaccine development projects which were unsuccessful.

9 Totals may not sum due to rounding.

Source: National Audit Office analysis of Vaccine Taskforce and Department of Health & Social Care information

1.8 Additionally, some programme costs cannot be easily quantified. Stakeholder groups and officials in local case study areas told us that the programme's success relied on goodwill, flexibility and support from many healthcare staff and volunteers. Organisations often provided venues for free or at reduced rates, meaning that some costs might be higher were the vaccination programme to continue in future. Given the unusual circumstances of the pandemic and the terms on which developers have been willing to supply COVID-19 vaccines, government has also provided broad indemnities to the producers of approved vaccines, as noted in our December 2020 report. This gives uncapped cover for future claims against producers for adverse effects of their vaccines. A number of existing clinical negligence and insurance schemes provide indemnity cover to GPs, pharmacies and NHS trusts for future claims for adverse events occurring during the administering of COVID-19 vaccines.

1.9 In the Spending Review 2021, DHSC received £9.6 billion for all its key COVID-19 programmes. At the time of reporting, it told us it was still in discussions with Her Majesty Treasury on how this would be allocated between programmes. As part of the BEIS Spending Review settlement, the Taskforce received £429.5 million for developing UK manufacturing capacity for the period 2022-23 through to 2024-25.

Programme impacts

1.10 A key impact of the vaccine programme relates to the speed with which it has operated. The UK government identified that a successful vaccination programme could protect people from serious illness and death and help them return to a more normal life. The government also recognised that these benefits could be maximised through faster vaccine deployment. It took early action to develop a portfolio of possible vaccines and to sign contracts with their manufacturers before regulatory approval to use them had been granted. In December 2020, it became the first country in the world both to authorise a COVID-19 vaccine and to begin vaccination (**Figure 3**).

1.11 In rolling out vaccines to the public the programme initially had three overarching objectives:

a first, to vaccinate the entire adult population as soon as practicable;

b second, to prevent further serious illness and death from COVID-19; and

c third, to help restore and protect the UK's economic growth.

1.12 Against the first objective, the programme met all of its early deadlines to offer vaccines to the public. A large majority of people, but still not the entire population, has been vaccinated. This is covered in detail in Part Three (see paragraphs 3.5 to 3.8).

1.13 Against the second objective, clinical trials for all UK-approved vaccines showed that they reduced the risk of developing symptomatic COVID-19 infections and becoming seriously ill.[8] PHE and UKHSA have subsequently monitored real-world data on the vaccines' effects.[9] Based on emerging evidence, in November 2021, UKHSA assessed that COVID-19 vaccination reduced an individual's risk of hospitalisation by 90%–99%, and death by 90%–99%. Assuming no other physical interventions (for example, social distancing), UKHSA estimated that the programme could have prevented 128,000 deaths and 262,000 hospitalisations by 24 September and 19 September respectively. Across the country, levels of hospitalisation and mortality at the end of October 2021 were significantly lower than during previous periods with similar levels of infection (**Figure 4** on pages 22 and 23).

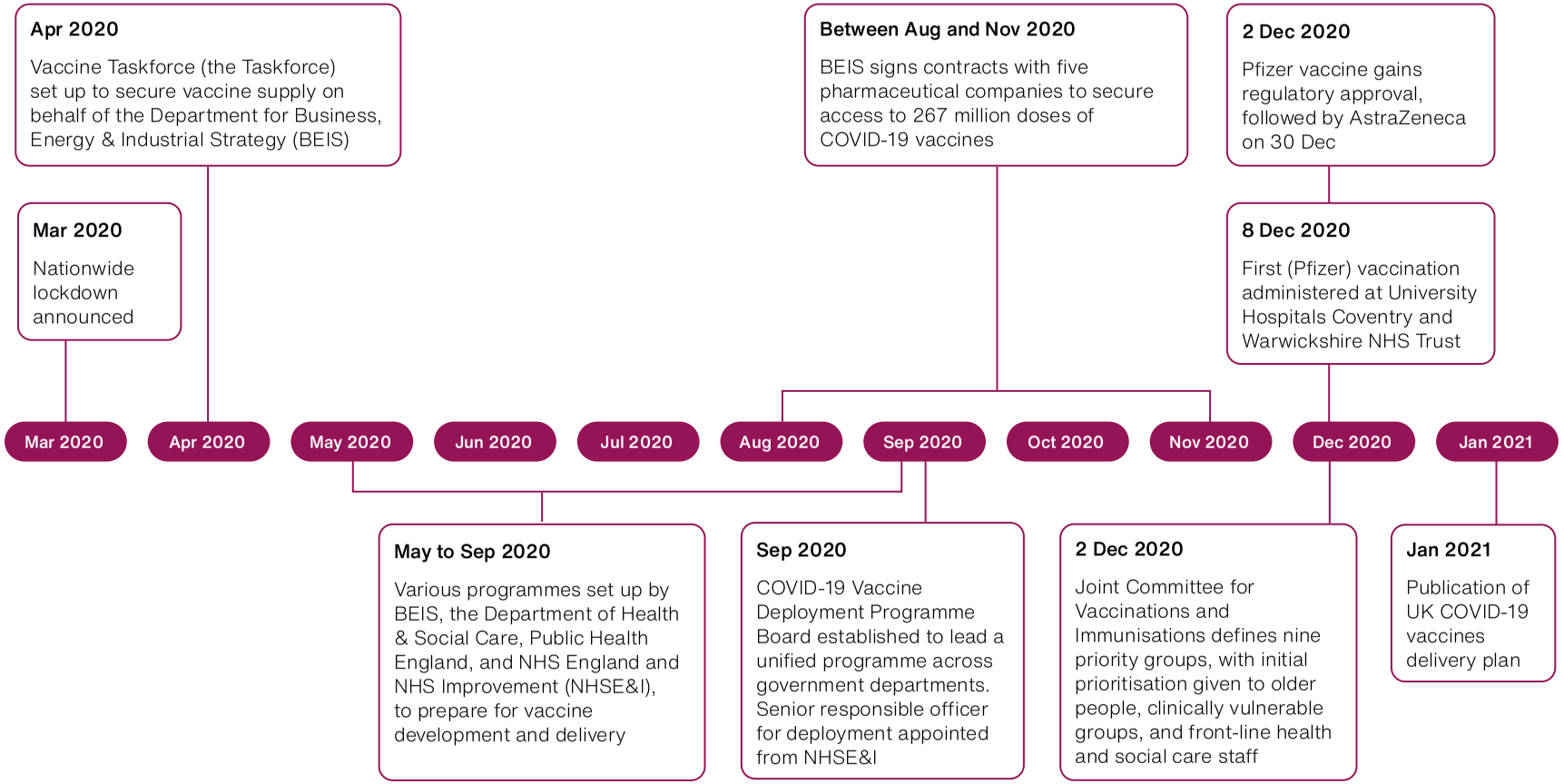
8 It is important to measure both vaccine efficacy (how well a vaccine performs in clinical trials) and vaccine effectiveness (how well a vaccine works in the real world). Vaccine efficacy will determine whether or not a vaccine gets approved for use by regulators, while effectiveness must be monitored following approval and deployment.

9 The Taskforce has also funded studies on the real-world effectiveness of vaccines, for example "CovBoost", which examined which COVID-19 vaccines were most effective as a booster vaccination.

Figure 3

Timeline of the UK COVID-19 vaccine programme up to the start of mass vaccination, March 2020 – January 2021

Early action meant that the UK became the first country in the world both to authorise a COVID-19 vaccine and to begin mass vaccination



Notes

1 See also Figure 14 for a timeline of the main clinical advice and targets and rollout dates for deployment.

2 Before the inception of the Vaccine Taskforce, the Department of Health & Social Care in February 2020 issued a call, through the National Institute for Health Research and UK Research and Innovation, for vaccines and other treatments against COVID-19. By March, it was supporting six different projects, including what became the Oxford AstraZeneca vaccine.

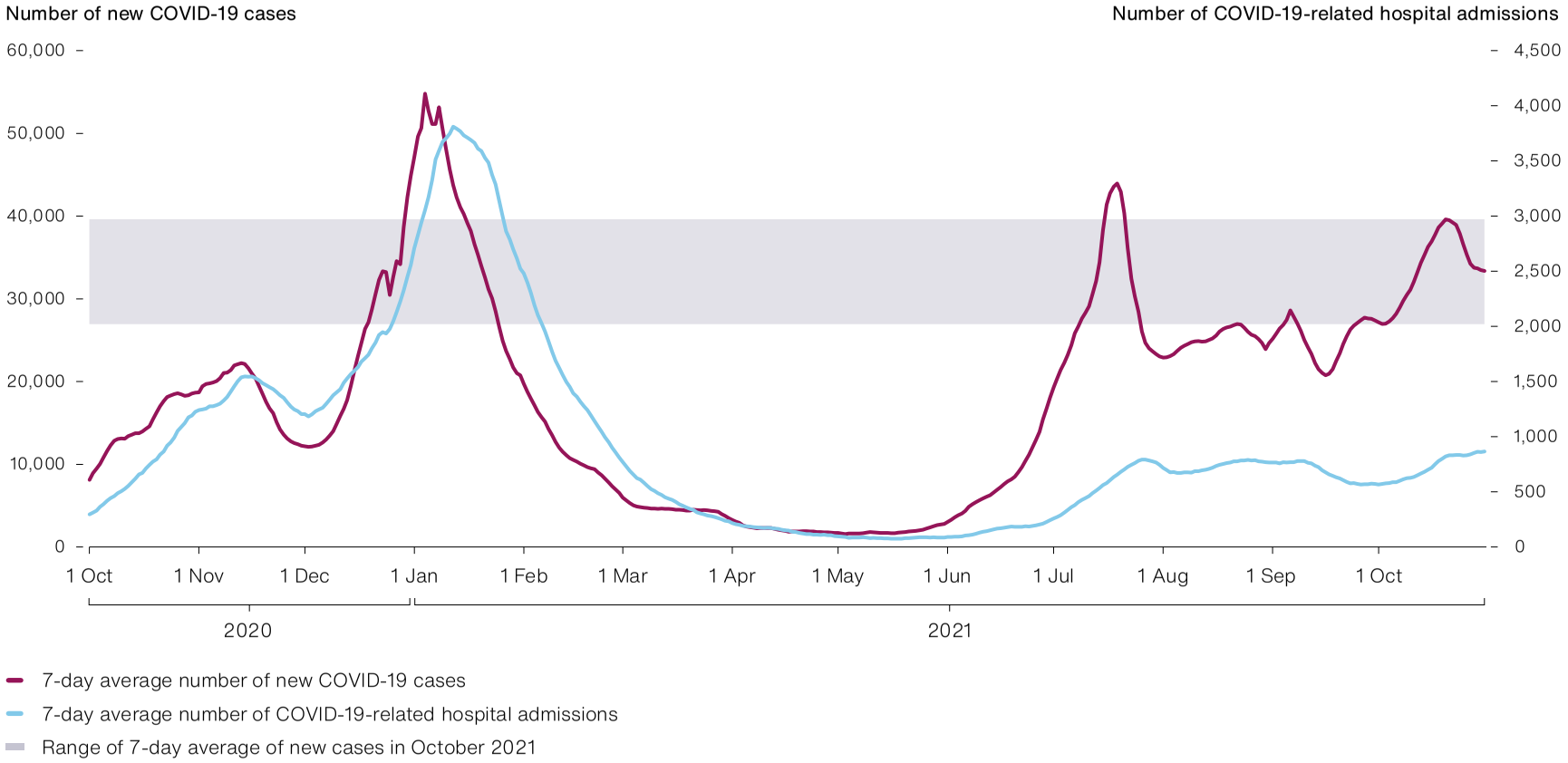
Source: National Audit Office analysis of Department for Business, Energy & Industrial Strategy, Department of Health & Social Care, and Public Health England information and publications

Figure 4

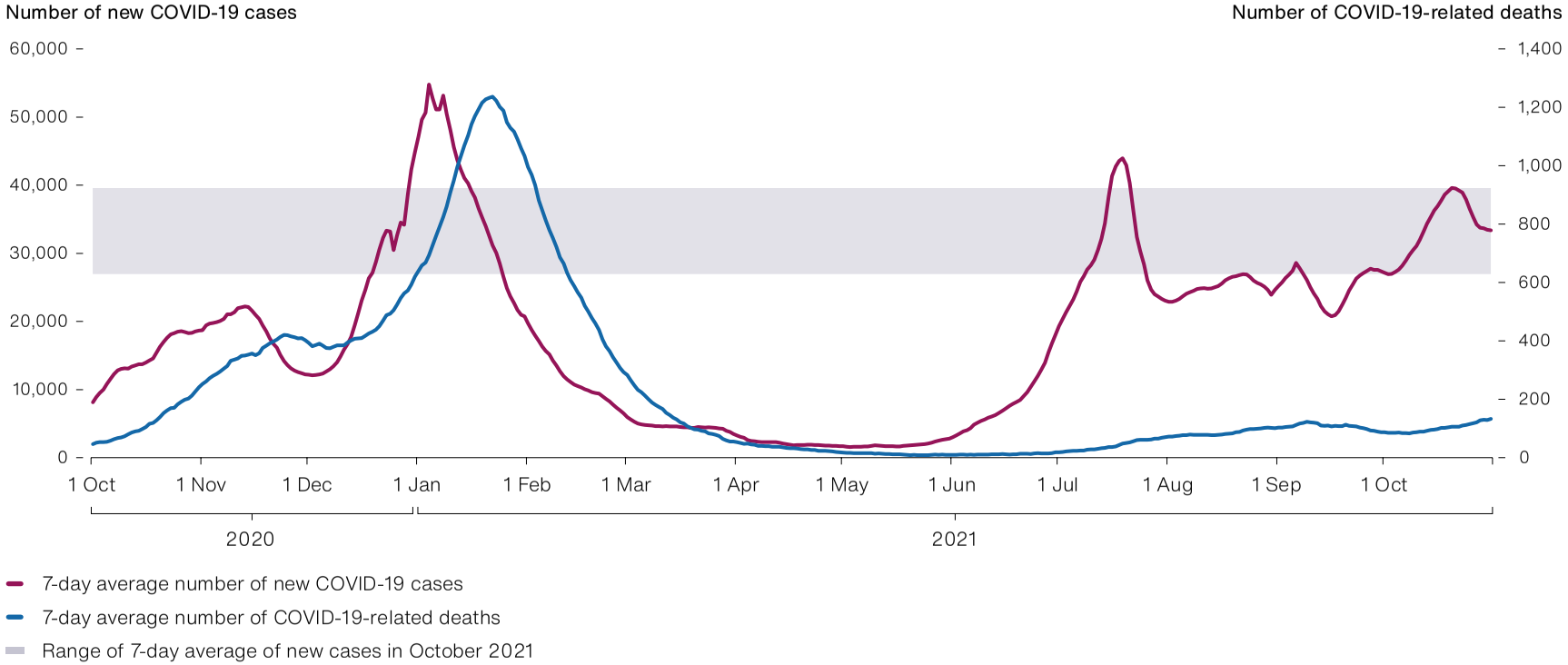
Trends in the number of COVID-19 diagnoses, hospital admissions and deaths in England, 1 October 2020 to 1 November 2021

Levels of hospitalisation and mortality due to COVID-19 were significantly lower in October 2021 than in previous periods with similar levels of infection

Trends in the number of new cases and COVID-19-related hospital admissions



Trends in the number of new cases and COVID-19-related deaths



Notes

1 Many factors aside from vaccination affect levels of hospitalisation and mortality, including the nature of the prevailing variant in each wave, levels of immunity from previous infections, the impact of the weather on the severity of symptoms, and the proportion of infected people in older age groups. We have not adjusted for these factors in this analysis.

2 We included data from 1 October 2020 onwards as testing capacity in the UK was more constrained before that date and the number of cases reported for the period before that is less comparable to that reported for the period after.

3 For both charts, when the number of cases were in the same range as during October 2021 (sections of the red line in the shaded area), the corresponding hospitalisation and death rates were much higher in the past.

Source: National Audit Office analysis of Department of Health & Social Care daily dashboard data

1.14 The impact of vaccines on overall transmission of the virus has been weaker than on serious infection and death. Despite a high level of vaccine uptake, the number of infections also remained high between August and October 2021. The Office for National Statistics (ONS) reported that full vaccination with Pfizer or AstraZeneca was up to 73% and 62% effective against infection with the Delta variant but that the effects did wane with time.

1.15 Against the third objective, the high level of vaccine uptake was vital to the government's decision progressively to remove many restrictions on society and the economy in the period up to July 2021. The ONS said the economy in England grew by 0.4% in August during the first full month without COVID-19 controls. In the Taskforce's business case for the booster programme, it estimated the economic benefits could be between £47.6 billion and £168 billion. In our view, it is unlikely to be possible to quantify the economic impact of the vaccine programme in isolation because of the number of other factors in play. Nevertheless, greater or longer restrictions on everyday life, including on economic activity, could have been necessary without vaccinations.

Success factors and future risks

1.16 It usually takes several years to develop a vaccine, approve it for use and roll it out to the public. For COVID-19 vaccines, eight months elapsed between setting up the Taskforce and starting to administer vaccines to the population. Ten months after that, 85% of people aged 18 and over in England had received two doses of a COVID-19 vaccine. To deliver at such pace, government bodies and others worked in different ways.[10] As shown in **Figure 5** on pages 26 and 27 the timing of contract negotiations, clinical trials and regulatory approval were significantly adapted for COVID-19 vaccines, with many more activities carried out in parallel than would usually be the case. Together with PHE, the Taskforce and NHSE&I took on responsibility for the procurement, contract management and distribution of COVID-19 vaccines. Prior to COVID-19, PHE had lead responsibility for many of the national vaccination and immunisation programmes.[11]

10 Our December 2020 investigation documented that government had organised itself to work at pace through: the establishment of the Vaccine Taskforce; changes to BEIS, HM Treasury and Cabinet Office approval procedures; the formation of a Ministerial Panel (including BEIS, DHSC, the Treasury and Cabinet Office) to fast-track approval of vaccine purchases; and the creation of a single deployment programme led by NHSE&I.

11 This reflects PHE's prior responsibilities for childhood vaccines. For adult influenza, GPs and pharmacies are responsible for buying their own vaccines. From October 2021, UKHSA took on PHE's vaccine-related responsibilities, both for COVID-19 and other vaccines.

1.17 Our 2021 report *Lessons learned: Delivering programmes at speed* identified important considerations for programmes seeking to achieve their objectives at pace (**Figure 6** on page 28).[12] We have found that many of these were relevant to the vaccine programme and we provide more details of this in Parts Two and Three.

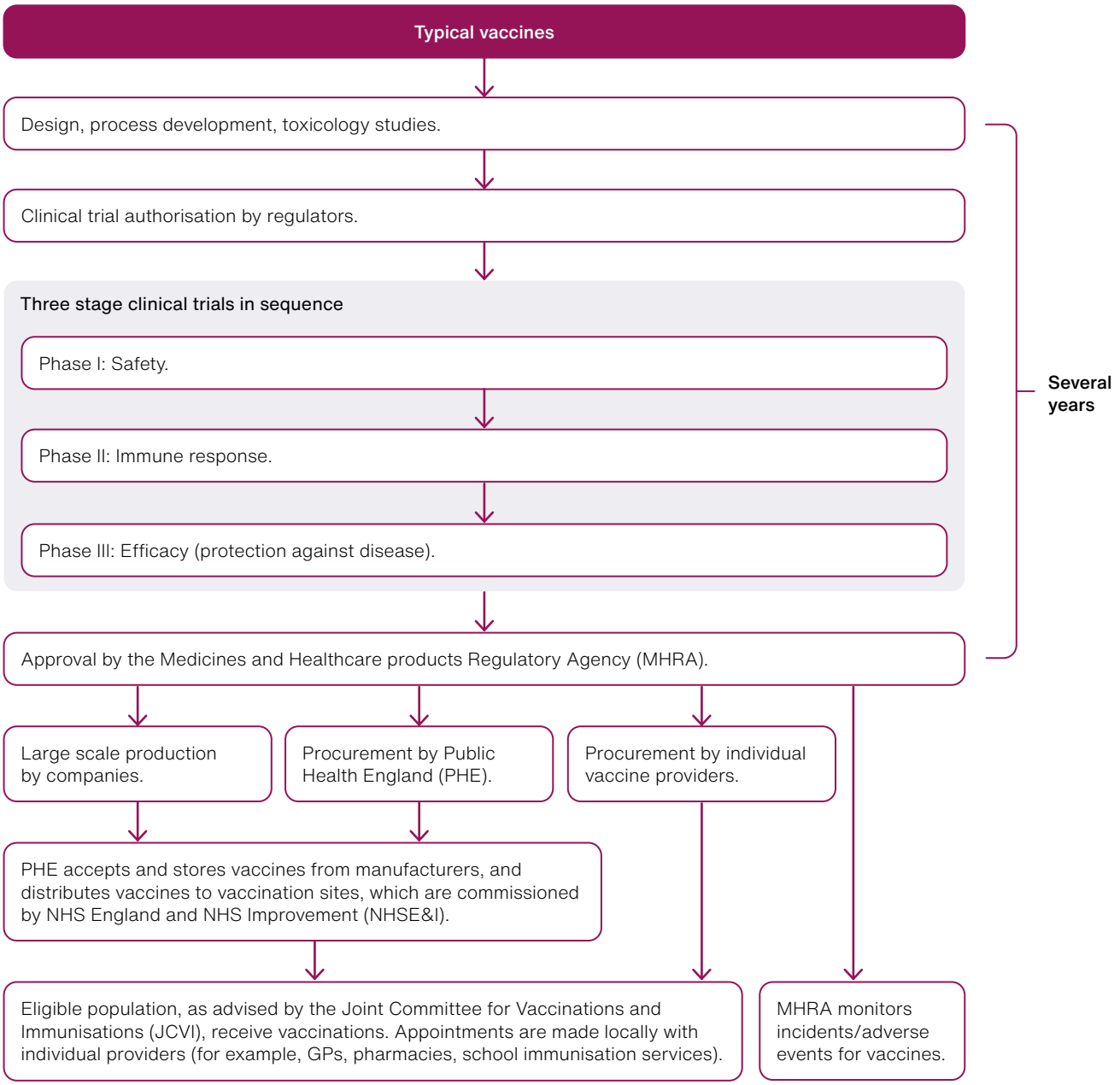
1.18 The Taskforce and the COVID-19 vaccine deployment programme represent a substantial part of the government's emergency COVID-19 response. In December 2021, a combined total of more than 700 staff (full time equivalent) in DHSC, NHSE&I and the Taskforce worked on COVID-19 vaccination, compared with around 20 staff employed on matters related to vaccinations within PHE, DHSC and NHSE&I prior to the pandemic. DHSC told us in November 2021 that it was starting to consider, together with BEIS and other national bodies, what a future model for COVID-19 vaccination would entail but that it was too soon to be certain about this owing to the ongoing pandemic response. DHSC said it planned to make decisions about this in 2022. UKHSA noted that the current emergency arrangements may not be best for long-term efficient working. In Parts Two and Three, we set out some of the main future risks that national bodies will have to manage if the COVID-19 vaccination programme becomes a regular feature of the health landscape.

12 Comptroller and Auditor General, *Lessons learned: Delivering programmes at speed*, Session 2019-2021, HC 667, National Audit Office, September 2021.

Figure 5

Development, procurement and deployment processes for COVID-19 vaccines compared to typical vaccines in England

COVID-19 vaccine development and approvals moved at pace compared with typical vaccines



Note

1 MHRA monitors safety and adverse events associated with vaccines in the UK after their approval, including the COVID-19 vaccines. MHRA worked closely with PHE to adapt its safety monitoring process to better cope with the complexity and scale of the COVID-19 vaccines rollout, including putting in place additional capacity in reporting and analysis, improving data quality (for example, de-duplicating incident reports) and making public communications clearer and more understandable.

Source: National Audit Office review of both published and unpublished government documents

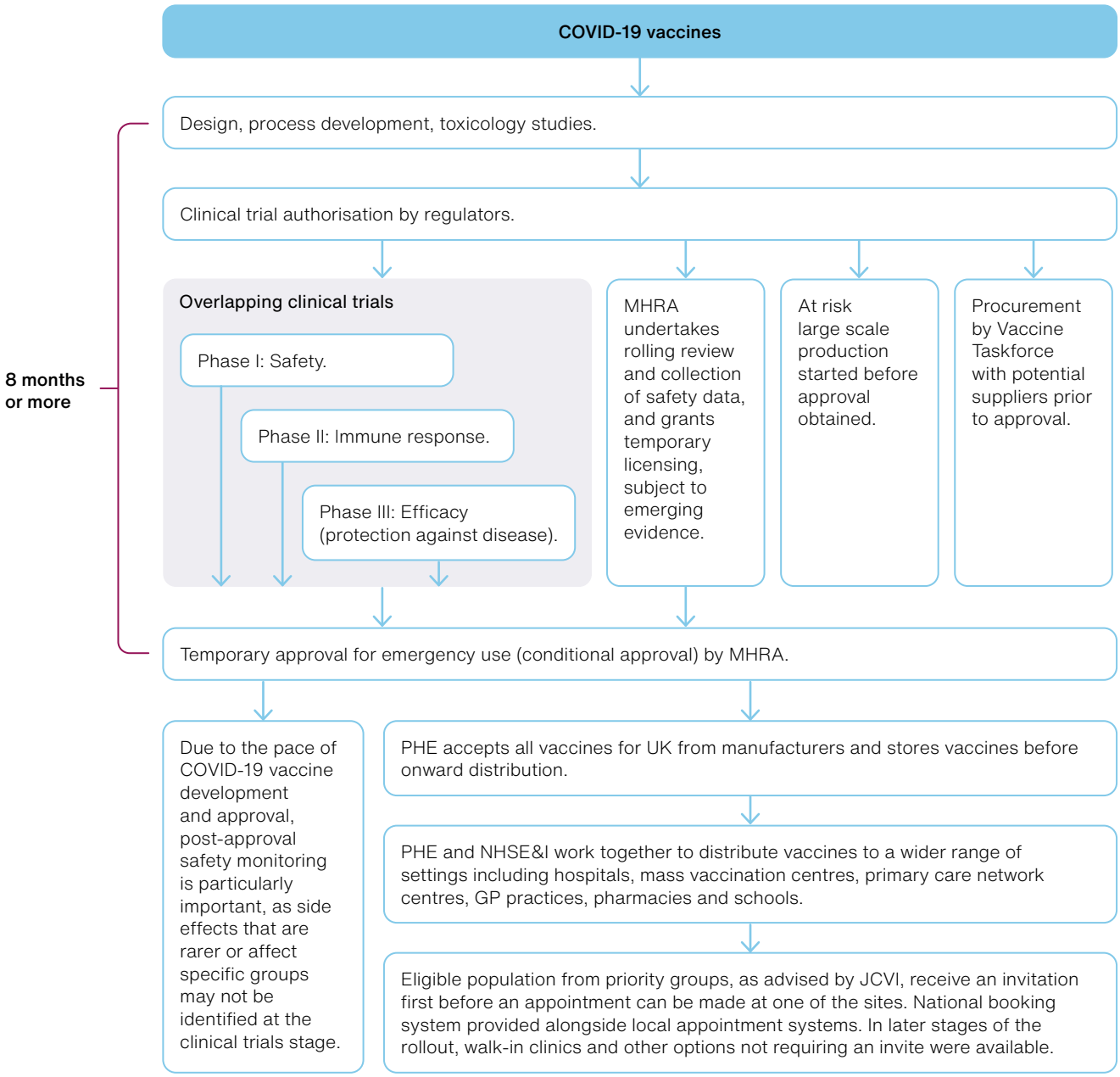

COVID-19 vaccines
Design, process development, toxicology studies.
Clinical trial authorisation by regulators.
Overlapping clinical trials
Phase I: Safety.
Phase II: Immune response.
Phase III: Efficacy (protection against disease).
MHRA undertakes rolling review and collection of safety data, and grants temporary licensing, subject to emerging evidence.
At risk large scale production started before approval obtained.
Procurement by Vaccine Taskforce with potential suppliers prior to approval.
8 months or more
Temporary approval for emergency use (conditional approval) by MHRA.
Due to the pace of COVID-19 vaccine development and approval, post-approval safety monitoring is particularly important, as side effects that are rarer or affect specific groups may not be identified at the clinical trials stage.
PHE accepts all vaccines for UK from manufacturers and stores vaccines before onward distribution.
PHE and NHSE&I work together to distribute vaccines to a wider range of settings including hospitals, mass vaccination centres, primary care network centres, GP practices, pharmacies and schools.
Eligible population from priority groups, as advised by JCVI, receive an invitation first before an appointment can be made at one of the sites. National booking system provided alongside local appointment systems. In later stages of the rollout, walk-in clinics and other options not requiring an invite were available.

Figure 6
Considerations for delivering programmes at speed

To deliver a programme successfully at speed, decision-makers need to ask themselves:

- **Why the programme needs to be delivered quickly.**
- **Determining if speed is necessary and justifiable to decide where risks can be taken.**

- **How much risk they want to, and can, take on within the programme and across the organisation.**
- **Understanding the risks to value for money, such as things being missed or increased costs, and their risk appetite will help them decide whether those risks are worth taking.**

- **Whether they can effectively monitor and manage the risks of speed by, for example:**
  - **Including speed as a specific programme objective to provide a clear framework for decision-making and help make trade-offs between speed, cost and outcomes.**
  - **Building teams with the right leadership, skills and experience to make clear, timely and reliable decisions.**
  - **Tailoring processes to add value and momentum to programme decision-making.**
  - **Recognising the uncertainties of delivering at speed and managing these.**

Source: National Audit Office report, *Lessons Learned: Delivering programmes at speed*, Session 2019–2021, HC 667, National Audit Office, September 2021

Part Two

Vaccine procurement and supply

2.1 This part of the report looks at vaccine procurement and supply, including:

- the overall approach used and progress to date; and
- success factors and future risks for procurement and supply.

2.2 For COVID-19, the Vaccine Taskforce (the Taskforce) was responsible for procurement, the subsequent management of contracts and incoming supply. Public Health England (PHE) and NHS England and NHS Improvement (NHSE&I) have run the distribution process for England.

Overall procurement strategy

2.3 One of the Taskforce's initial objectives was to secure access to promising COVID-19 vaccines for the UK population as quickly as possible.[13] Its strategy was to build a broad portfolio, recognising that many vaccines were still in development and could fail to receive regulatory approval.[14] This approach is examined in detail in our first report.

2.4 After March 2021, the Taskforce adapted its approach to include buying vaccines for adult booster vaccinations and for young people, and against new virus variants when available. In new contracts and contract amendments between December 2020 and the end of October 2021 (for supply up to the end of 2022), the Taskforce sought where possible to retain flexibility of supply by including options to terminate contracts and increase doses. To maintain the programme's effectiveness against future virus variants, it also included options to substitute or procure vaccine variants or reformulations.

13 As noted in paragraph 1.16, government and regulators adapted the normal procurement and approval procedures to speed up the vaccine development process, while still following regulatory requirements.

14 In our first report, which covered the first five contracts signed with vaccine manufacturers, we noted a wide range of costs and contract terms. There were variations in terms of the amount of upfront and non-refundable payments; the inclusion of priority access for the UK; delivery schedules; contract termination rights; the cost per dose; and inclusion of research and development costs. None of the contracts provided the UK with any rights to the intellectual property associated with the vaccines.

2.5 The Taskforce has now begun procuring vaccines for 2023. It plans to continue with its 'managed risk' strategy of buying different types of vaccine and from a range of manufacturers. Over time it wants to achieve a closer alignment between what it purchases and likely demand, but continuing uncertainties during the pandemic mean that has not been possible to date.

Update on procurement and supply

2.6 In December 2020, we reported that the Taskforce had seven agreements in place with seven suppliers for 357 million potential doses at an expected cost of £3.7 billion.[15] By the end of October 2021, it had eight agreements in place with six suppliers (**Figure 7** on pages 32 and 33) for more than 340 million doses for delivery up to the end of 2022. (This includes vaccines already delivered and used in 2020 and 2021.) In September 2021, the Taskforce cancelled a contract with Valneva, which was for 60 million doses. Including the cancelled contract, total contracted costs at the end of October 2021 were £5.8 billion, of which £2.8 billion had been paid out.

2.7 Based on all the agreements in place in December 2020, we calculate a procurement cost per dose of £10.22 (including VAT) at that time.[16] This could not have been expected to be an accurate predictor of future costs, as the original contracts were signed without any certainty of a viable vaccine being produced. As set out in paragraph 1.7, for all the agreements in place in October 2021 (including vaccines not approved or used in the UK), we estimate a procurement cost per dose of £15.02 (including VAT).[17] This reflects the fact that there is a larger share of the more expensive vaccines now approved for use in the October 2021 portfolio. Currently, the UK does not have any contracts in place to purchase more AstraZeneca vaccine, which was the least expensive of the approved vaccines. Conversely, in November 2021, the Taskforce agreed to purchase an additional 114 million doses of the more expensive Pfizer and Moderna vaccines for use in both 2022 and 2023. This means that the average procurement cost per dose of a COVID-19 vaccine used in the UK is likely to increase further in future.

2.8 By the end of October 2021, 145.9 million doses had been supplied against the UK vaccine contracts, of which 126.8 million were for UK use. In the same time period, the Taskforce completed international donations (through the COVAX scheme or bilaterally) and other bilateral transfers, accounting for 19.1 million doses.[18] The donations are part of the government's commitment to donate 100 million doses to developing countries by June 2022.

15 Comptroller and Auditor General, *Investigation into preparations for potential COVID-19 vaccines*, Session 2019-21, HC 1071, National Audit Office, December 2020.

16 The calculation is based on the total costs of the vaccine contracts and other agreements (including VAT) in place by the end of December 2020, divided by the number of doses contracted for. Exchange rates used are as at the end of October 2021 as the Taskforce does not hedge its foreign exchange exposure.

17 See footnote 6 for details of how this cost per dose was calculated.

18 The COVAX scheme is co-led by the World Health Organization (WHO) and others alongside delivery partner UNICEF, to facilitate sharing and donating COVID-19 vaccine doses between countries and manufacturers.

2.9 Future UK demand for COVID-19 vaccines remains uncertain because of possible changes in the virus itself and clinical advice on who should be vaccinated and how often. There are future scenarios in which the government could end up with a surplus of vaccines but there is also the possibility of future gaps in supply. Assuming uptake of 85% and stock loss of 15%, we estimate that the UK needed around 170 million doses to meet all clinical advice accepted by the government up to the end of December 2021 (including second doses for 12- to 17-year-olds and booster doses for all adults and 16- to 17- year-olds). If a further booster dose were to be given to all adults during 2022 this would increase the need to around 220 million doses. As at the end of October 2021, the UK had contracts for around 340 million doses up to the end of 2022.

2.10 The Taskforce has already used a number of methods to optimise supply and reduce potential surpluses, including cancelling or rescheduling delivery (dependent on the terms of the contract), and international donations, and bilateral transfers or swaps with other countries as set out above (**Figure 8** on page 34).[19] The Taskforce told us that the global market for COVID-19 vaccines remained "overheated" with many countries already securing supplies for 2023. The scale of the international COVID-19 vaccination effort is already double that of routine vaccines in a typical year, putting strain on underlying supply chains for materials such as glass vials and syringes. It is clear to us that the government can expect to take a very active approach to managing COVID-19 procurement for some time to come.

Vaccine distribution in England

2.11 By the end of October 2021, 49 million Pfizer doses, 40 million AstraZeneca doses and three million Moderna doses had been distributed to local sites in England. PHE, NHSE&I and three sub-contractors have worked together to store and distribute the vaccines, as set out in Figure 8.[20,21] NHSE&I introduced a new digital management system, set up by Palantir using its software platform known as Foundry, to support the distribution effort and track how vaccine stock was being used.

19 The Taskforce and the Foreign, Commonwealth & Development Office make and implement decisions on dose sharing between different countries.

20 All of the COVID-19 vaccines have particular storage and handling requirements, including: the need for ultra-low or normal freezer transportation and storage; and limits in how many times they can be handled by different parties. Pfizer also initially came in a large pack size that needed to be broken down before delivery to smaller vaccination sites. In May 2021, the Medicines and Healthcare products Regulatory Agency (MHRA) extended the shelf-life of the Pfizer vaccine from five days to 31 days once thawed, allowing much more flexibility in storage and usage. Following an audit of security arrangements for transportation and storage and updated advice from DHSC, some newer vaccination venues increased security measures.

21 PHE also procured and supplied additional consumables which were required by vaccination sites, such as needles and syringes.

Figure 7

COVID-19 vaccine doses contracted for and received by UK by 31 October 2021

By the end of October 2021, the UK had contracted to purchase more than 340 million doses

Vaccine manufacturer	Date contract signed or date agreement signed if contract not yet in place	Number of doses purchased by year of delivery		Number of doses supplied as at 31 October 2021		
		2021	2022	Contracted doses supplied against UK contracts	of which:	
					For UK use	For international donations and other transactions
		(m)	(m)	(m)	(m)	(m)
Approved and deployed vaccines						
AstraZeneca UK Ltd and the University of Oxford	August 2020	100.0		64.1	50.0	14.1
Pfizer Inc and BioNTech SE	October 2020 (amended March and April 2021), August 2021, and COVAX purchase for UK use agreed June 2021	100.5	35.0	72.1	67.1	5.0
Moderna Inc (aka SpikeVax)	November 2020 (amended November and December 2020)	17.0		9.7	9.7	0.0
Total approved and deployed		**217.5**	**35.0**	**145.9**	**126.8**	**19.1**
Vaccines approved but not yet deployed (as at October 2021)						
Janssen Pharmaceutical NV	January 2021 (amended in May, based on non-binding agreement signed August 2020)		20.0			
Vaccines not yet approved (as at October 2021)						
Novavax Inc	October 2020		60.0			

Figure 7 *continued*

COVID-19 vaccine doses contracted for and received by UK by 31 October 2021

Vaccine manufacturer	Date contract signed or date agreement signed if contract not yet in place	Number of doses purchased by year of delivery		Number of doses supplied as at 31 October 2021		
		2021	2022	Contracted doses supplied against UK contracts	of which:	
					For UK use	For international donations and other transactions
		(m)	(m)	(m)	(m)	(m)
Sanofi S.A. and GlaxoSmithKline Biologicals S.A.	September 2020 (based on non-binding agreement signed July 2020)		7.5			
Total not yet approved or deployed		**87.5**				
Total doses contracted		**340**				
Total contracted costs including terminated contract (£m)		**5,843**				
Contract spend up to the end of October 2021 including terminated contract (£m)		**2,795**				

Notes

1 Procurement contracts cover the whole UK, and costs and activity in 2020-21 and later years. Since we last reported, the government has signed one new contract with Janssen based on a previous non-binding agreement, and a second contract with Pfizer, and made a number of amendments to existing agreements. This table excludes contracts with Pfizer and Moderna announced in December 2021 for an additional 114 million doses for 2022 and 2023.

2 Figures on doses exclude a contract with Valneva for 60 million doses, signed in September 2020, which was cancelled in September 2021. The total cost and spend figures include this contract, which had incurred £327 million of spend to the end of October 2021.

3 The figures for doses supplied against contract, and international donations and transactions, include five million Pfizer doses subject to swap deals with Australia and Korea. These are counted as part of the total supplied against contract, although the UK received them back for its own use after the end of October 2021.

4 Where contract costs are in foreign currencies, these have been converted at the Bank of England Exchange daily spot rate as at 29 October 2021: €1.1845=£1; $1.3706=£1. Costs include VAT.

5 Figures for doses supplied against contract are based on information from the Vaccine Taskforce; these were checked for consistency with Public Health England information on doses receipted into the UK. Spend data presented here have not been fully audited and validated and may be subject to potential adjustments.

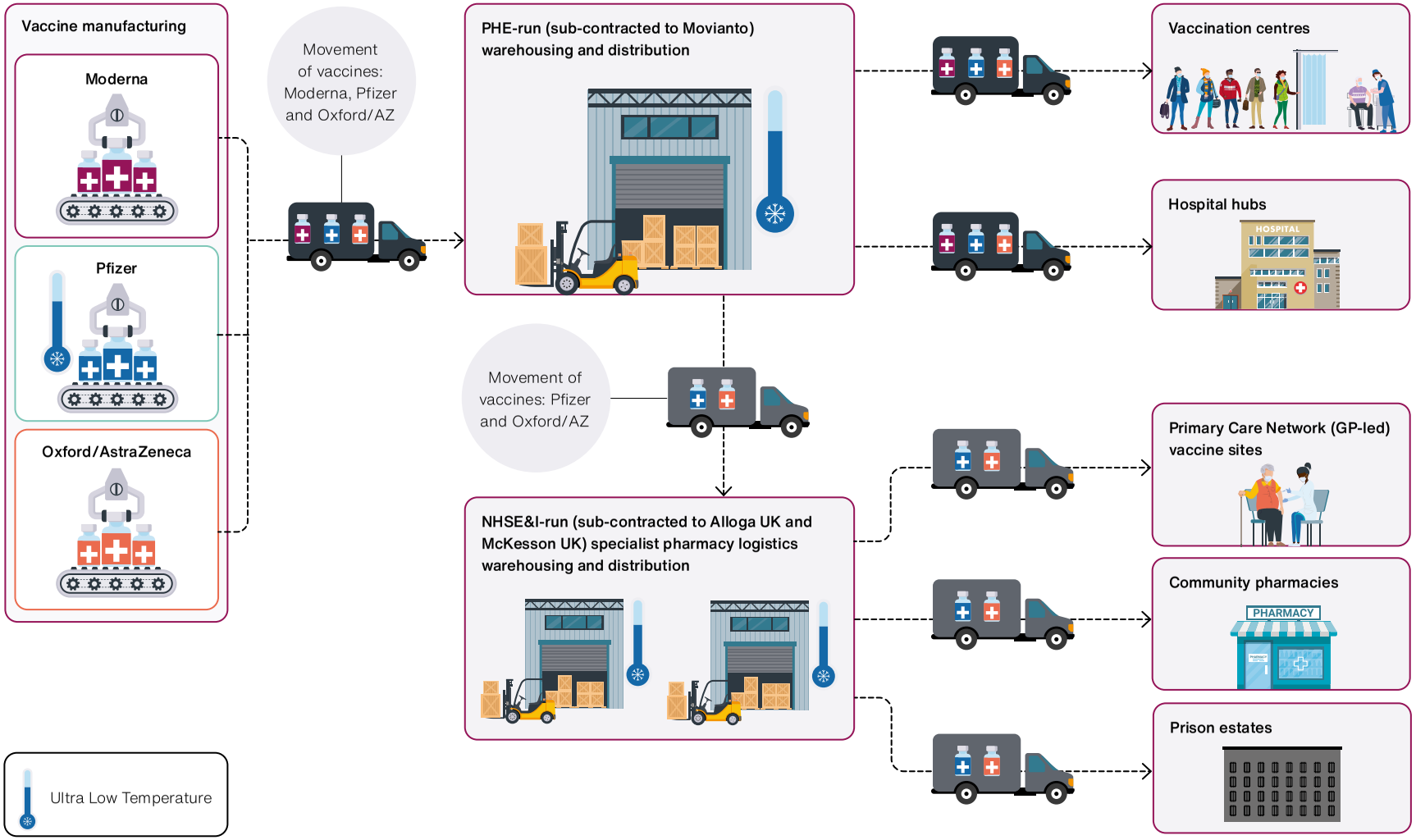
6 The Novavax vaccine was subsequently approved for use in the UK in February 2022.

Source: National Audit Office analysis of Vaccine Taskforce documentation

Figure 8

Distribution of COVID-19 vaccines from manufacturers to point of vaccination in England

Public Health England (PHE), NHS England and NHS Improvement (NHSE&I) and sub-contractors have worked together to store COVID-19 vaccines and distribute them to vaccination sites



Note

1 From October 2021, the UK Health Security Agency took over PHE's responsibilities for vaccine handling and distribution.

Source: National Audit Office analysis of NHS England and NHS Improvement and Public Health England information

2.12 From December 2020 until June 2021, the programme administered almost all doses to people just a short time after vaccines arrived in England, owing to limited supplies, the desire to vaccinate priority groups as quickly as possible, and the specific characteristics and handling requirements of each vaccine (**Figure 9** overleaf). The Taskforce told us it had aimed to hold at least two to three weeks of vaccine stock centrally at all times, with additional increases before new campaigns, for example for boosters or particular priority groups. Since June 2021, incoming vaccine supplies have exceeded demand by a much greater margin.

2.13 Initially, NHSE&I operated a 'push model' whereby it determined centrally the amount each local area received. It also required local vaccine providers to restrict future vaccination appointments based on known supply. During September and October 2021, NHSE&I rolled out a 'pull model' whereby vaccination sites can order the number of doses they think they will need. In our 10 local case study interviews, seven areas commented that it had been difficult not having enough local control and said a lot of work had been needed to get supplies to the right place under the push model; five said they found the pull model more helpful.

Problems with supply and distribution

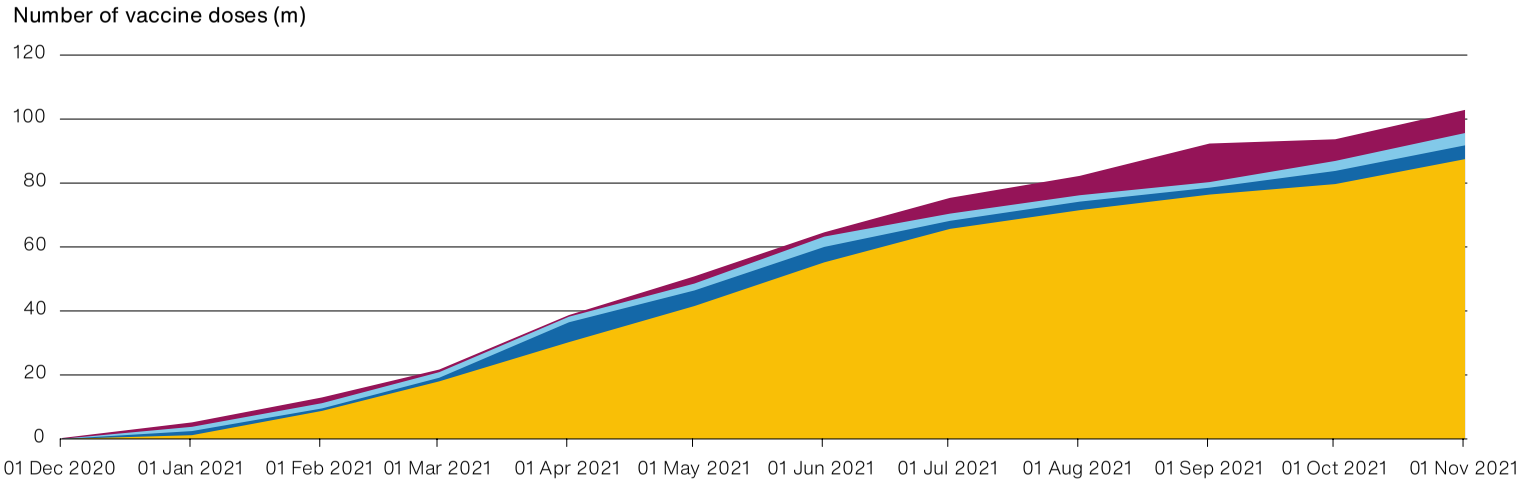
2.14 The programme worked in a number of ways to manage potential disruptions to vaccine supply and their impact on rollout. The delivery schedules for the initial contracts were not binding but set out anticipated timetables which manufacturers were to do their best to meet. Schedules were generally confirmed only a month before delivery. The Taskforce told us its approach was to work collaboratively with manufacturers to address issues as they arose and to mitigate them where possible. During 2021, a number of disruptions or threats occurred in relation to supply chains, manufacturing capacity and international relations. Details of two of these are given in **Figure 10** on page 37.

2.15 In the first months of the rollout, supply was constrained and unpredictable, reflecting overall global supply. Feedback from local sites to NHSE&I and our 10 local case study interviews highlighted overall limitations in supply, short notice of deliveries, sudden cancellations of deliveries, and requests to take short-dated stock as the issues that had most often caused difficulties. Three interviews noted that in late 2021 some supply and distribution challenges remained. Many stakeholders told us that the problems had been overcome by the dedication and goodwill of everyone involved, from national bodies and contractors to local bodies such as GPs and pharmacies. The Taskforce, PHE and NHSE&I have met weekly to discuss supply and distribution issues.

Figure 9

Cumulative reported COVID-19 vaccinations compared with stocks available, allocated and delivered in England, December 2020 to October 2021

There was little margin between supply and demand of vaccines until June but the situation has improved since



	01 Dec 2020	01 Jan 2021	01 Feb 2021	01 Mar 2021	01 Apr 2021	01 May 2021	01 Jun 2021	01 Jul 2021	01 Aug 2021	01 Sep 2021	01 Oct 2021	01 Nov 2021
Stock available	0	5	13	22	39	51	65	75	82	92	94	103
Allocated	0	4	11	21	38	49	63	70	76	80	87	96
Delivered	0	2	10	19	36	46	60	68	74	79	84	92
Administered	0	1	9	18	30	42	55	66	71	76	80	87

Notes

1 Based on Public Health England records, "stock available" is the stocks of all of the COVID-19 vaccines supplied and available to use in England; "allocated" is the stocks of COVID-19 vaccines allocated for use at vaccination sites; and "delivered" is the stocks of COVID-19 vaccines recorded as delivered to vaccination sites.

2 Vaccines "administered" data are based on data published by NHS England and NHS Improvement including first, second, third and booster doses administered in England.

Source: National Audit Office analysis of Public Health England data and published NHS England and NHS Improvement data

Figure 10
Problems with COVID-19 vaccine supply in 2021

The COVID-19 vaccine programme faced a number of disruptions or threats to COVID-19 vaccine supply chains internationally

Date	Supply constraint or threat, and actions taken in response
January–March 2021	**International tension:** Relations became strained between the UK and the EU due to AstraZeneca's perceived preferential treatment of the UK for vaccine deliveries. The EU threatened to block vaccine exports and took legal action against AstraZeneca. **Actions:** Diplomatic discussions took place between the UK, the EU, the Irish government and manufacturers. The UK continued to receive supplies of vaccines from the EU.
March–April 2021	**Export disruption:** The Indian government stopped all exports of AstraZeneca vaccine from its Serum Institute, instead diverting the supplies for domestic use. **Actions:** NHS England and NHS Improvement notified local areas in mid-March of a potential four-week shortage of supply. It also paused rollout of first doses of AstraZeneca and used existing stocks to ensure that second dose appointments were honoured. First doses were limited to other vaccine types.

Source: National Audit Office analysis of Vaccine Taskforce, NHS England and NHS Improvement, and published documentation

2.16 UK Health Security Agency (UKHSA) officials told us that the split in responsibility for procurement, supply and distribution had at times created difficulties and led to inefficiencies. They gave examples of where they had not been sighted on procurement decisions that impacted on the storage and operational requirements for which it was responsible. This included changes to the size of vaccine packs and late or unexpected deliveries.

Managing wastage

2.17 Wastage can occur when vaccine is not handled in line with guidance (for instance regarding refrigeration) or cannot be used before its expiry date. The programme aimed to waste as little vaccine as possible. We heard in one local case study of vaccine centre staff often working late to use up spare doses rather than throw any away. Overall, by the end of October 2021, stock loss in the programme for England was an estimated 4.0% of all doses received (approximately 4.7 million doses), lower than the programme's original planning assumption of 15%–20%.[22,23] Specifically, wastage as a percentage of doses was:

- 0.5% within the national storage and distribution chain managed by PHE;
- 0.02% within the NHSE&I storage and distribution chain; and
- 4.5% at vaccination providers.

Our local case studies highlighted how potential wastage issues differed by vaccine type and delivery model. For example, restrictions on transferring Pfizer and Moderna vaccines between different sites had tended to increase wastage, as had some hospitals receiving larger packs of vaccines than they needed.

2.18 To reduce wastage, NHSE&I, in collaboration with regional pharmacists, approved transfers of COVID-19 vaccines between different local bodies. Normally, such transactions would be illegal under medicines legislation.[24] In total NHSE&I estimated that 4.6 million doses had been transferred by the end of October 2021. In our local case study interviews, six participants noted the importance of these local transfers, although three considered that the process had been too slow and bureaucratic.

2.19 In August and September, the programme faced a particular challenge regarding expiring supplies of AstraZeneca vaccine. This followed the Joint Committee on Vaccination and Immunisation's (JCVI's) recommendation in May that those aged under 40 should preferably not be offered AstraZeneca. Unused AstraZeneca doses that had left the oversight of PHE and been sent to NHSE&I or local sites could not be returned due to restrictions on the handling of vaccines associated with quality assurance, and had to be destroyed. As a result, approximately 1.9 million doses had to be written off. The Taskforce, working with PHE and the Foreign, Commonwealth & Development Office, was able to avoid some wastage by redirecting 4.5 million AstraZeneca doses to other countries.

22 NHSE&I based this planning assumption on the handling characteristics of the Pfizer vaccine, which included very high expected wastage rates for some delivery models, for example, up to 80% for roving models. The overall stock loss calculation for England is estimated, based on stock loss figures from NHSE&I and adjusted figures from PHE, to take into account the fact that it handles vaccines for the whole of the UK. The specific PHE stock loss figure given above is unadjusted and is for the UK. This calculation cannot take into account possible stock loss for those vaccines which have not yet been delivered to sites or used, which could increase the overall percentage of stock loss for vaccines received.

23 Previous rates for routine vaccinations (excluding seasonal ones such as influenza) vary between 1%–2%.

24 MHRA noted that, in anticipation of the need to move COVID-19 vaccines from one site to another, it had amended the legislation for the purposes of public health to allow these transfers.

Success factors and future risks for procurement and supply

2.20 Figure 11 sets out our assessment of the strengths of the programme's approach to procurement, supply and distribution at pace. We note particularly how the Taskforce and its partners worked with a clear strategy while acknowledging uncertainties and took a proactive and practical approach to dealing with potential barriers, adapting existing processes as required.

Figure 11
Success factors for COVID-19 vaccine procurement, supply and distribution in England

The COVID-19 vaccine programme adopted a number of good practices in managing the procurement and supply chain of COVID-19 vaccines at speed

Considerations for delivering programmes at speed	Key actions by the vaccine programme
Set speed as a specific programme objective to provide a clear framework for decision-making and help make trade-offs between speed, cost and outcomes.	The Vaccine Taskforce's (the Taskforce's) overriding objective was to secure access as early as possible to sufficient vaccine for the UK population. The Department for Business, Energy & Industrial Strategy (BEIS), through the Taskforce, worked to an accelerated timetable of 12–18 months for COVID-19 vaccine procurement compared with a normal timeframe of several years for vaccine research and development. Some contracts included priority access for the UK and provided funding to support early research and development.
Build teams with the right leadership, skills and experience to make clear, timely and reliable decisions.	The Taskforce consisted of people with a wide range of skills and backgrounds, including civil servants, expert contractors and industry specialists. To scale up for the COVID-19 vaccine rollout, the supply and distribution process combined existing Public Health England infrastructure with new additional capacity set up and managed by NHS England & NHS Improvement (NHSE&I).
Tailor programme processes to add value and momentum to programme decision-making.	The Taskforce, regulators and other bodies set up or adapted processes to streamline and speed up the steps to vaccine approval. The Taskforce also worked with HM Treasury and other departments to streamline funding approval processes. The new Foundry system was used by NHSE&I to improve central decision-making about where to allocate vaccine supply. Exceptionally, local transfers were allowed for COVID-19 vaccines to optimise supply and minimise waste.
Recognising the uncertainties of delivering at speed and managing these.	In its business case, the Taskforce was clear about the trade-offs it was making between speed of access, cost, and uncertain outcomes. It chose to purchase several different potential vaccines recognising that some might never be approved as safe and effective. From the outset, the Taskforce also considered the need for a strategy to deal with surplus doses, including international donations and bilateral transfers or swaps between countries. It has also used contractual levers to purchase additional doses, reschedule deliveries, and renegotiate or terminate contracts.

Notes

1 These factors are not exhaustive and are selected from the areas considered in the National Audit Office Report *Lessons learned: Delivering programmes at speed*, Session 2019–2021, HC 667, National Audit Office, September 2021.

2 While our focus is England, many of the success factors commented on here apply across the UK.

Source: National Audit Office assessment based on document review and analysis of interviews with government and non-government stakeholders

2.21 The course of the pandemic has continued to be unpredictable. The programme still has significant risks to manage when it comes to future supply, including changes to vaccines' effectiveness against new variants, changes to future demand based on clinical advice, and the competitive global market. It will have to manage carefully any resulting surpluses and the increased risk of wastage. Our assessment of the key risks is in **Figure 12**.

Figure 12

Assessment of main risks for COVID-19 vaccine procurement, supply and distribution in England

The COVID-19 vaccine programme continues to face a number of risks in its procurement, supply and distribution of COVID-19 vaccines, including future uncertainties and a competitive international market

Area of risk	NAO commentary
The UK's future requirement for vaccines is uncertain.	UK demand for COVID-19 vaccines is largely determined by clinical advice which in turn is dependent on emerging information about the virus, such as new virus variants, and the relative performance of different vaccines against them. Government must continue to plan and procure on the basis of particular demand scenarios, while considering the right amount of flexibility to pay for in new contracts. This includes what options and delivery scheduling it needs to build into contracts to ensure timely access to new and reformulated versions of each vaccine. It also needs to consider the best mix of vaccine providers and types to maintain in its portfolio to mitigate against ongoing uncertainty.
The global market for COVID-19 vaccines is set to remain highly competitive.	The global market continues to be uncertain with high overall demand, potential disruptions to supply due to strain on underlying supply chains, and the continuing risk of international export restrictions.
Managing potential surpluses and minimising wastage.	The Taskforce and NHS England and NHS Improvement (NHSE&I) identified options to manage surplus doses at an early stage, and to date day-to-day wastage has been lower than planned. But there is the potential for significant surpluses to emerge during 2022 depending on future clinical advice, and for the challenges of minimising wastage to change in the event of different patterns of demand (for example, much lower demand). In particular, the system must ensure it has learnt any lessons from the write-off of AstraZeneca doses.
Transition of COVID-19 procurement and supply chain arrangements.	At the appropriate time, the structures that have delivered the vaccine programme so far will need to change into a longer-term sustainable arrangement. This could bring scope for efficiencies but it also brings the risk of losing valuable innovations, key personnel and important learning. Careful succession planning and a robust review of the new costs and resources required will be needed. The programme could also consider whether it can take any immediate steps to consolidate emergency arrangements for COVID-19 procurement and supply into existing structures.

Note

1 While the focus of our review is England, many of the risks here apply across the UK.

Source: National Audit Office assessment based on document review and analysis of interviews with government and non-government stakeholders

Part Three

Vaccine deployment and uptake

3.1 This part of the report looks at the rollout of COVID-19 vaccination, including:

- overall progress with COVID-19 vaccination;
- how national and local bodies delivered COVID-19 vaccination;
- actions to address differences in uptake for different population groups; and
- success factors and future risks for COVID-19 vaccine deployment.

3.2 NHS England and NHS Improvement (NHSE&I) led on the COVID-19 vaccine deployment programme, working with local health bodies and care providers, and national bodies such as Public Health England (PHE).

Main stages of the rollout

3.3 Government accepted the recommendations of the Joint Committee on Vaccination and Immunisation (JCVI), which provides independent clinical advice, on how and to whom vaccines should be administered, as well as that of the Chief Medical Officers. In particular, JCVI advised on the order in which population groups were offered vaccines (**Figure 13** overleaf).

Figure 13

Priority groups for COVID-19 vaccination in England, up to the end of October 2021

COVID-19 vaccines were rolled out to the population by priority groups as advised by the Joint Committee on Vaccination and Immunisation

Cohort	Description
1	Residents living in care homes for older adults and their carers
2	All those 80 years of age and over Front-line health and social care workers
3	All those 75 years of age and over
4	All those 70 years of age and over Clinically extremely vulnerable individuals
5	All those 65 years of age and over
6	All individuals aged 16 years to 64 years with underlying health conditions which put them at higher risk of serious disease and mortality, and unpaid carers
7	All those 60 years of age and over
8	All those 55 years of age and over
9	All those 50 years of age and over
10	All those aged 40 to 49 years of age
11	All those aged 30 to 39 years of age
12	All those aged 18 to 29 years of age
16- to 17-year-olds	
12- to 15-year-olds (initially to those with selected health conditions or whose household contained someone who was immunosuppressed)	

Source: National Audit Office summary of published advice from the Joint Committee on Vaccination and Immunisation and Chief Medical Officers

3.4 The rollout has fallen into three main phases (**Figure 14** on pages 44 and 45):

- Phase 1, starting on 8 December 2020, aimed to vaccinate the greatest number of at-risk people in the shortest possible time. It covered the first nine priority groups, around 27 million people in England. This included health and care workers, those over the age of 50, those considered clinically extremely vulnerable, and those aged over 16 with underlying health conditions (Figure 13). All were to receive two doses.[25]
- Phase 2, beginning in April 2021, extended vaccination with two doses to priority groups 10 to 12, comprising those aged 18–49.[26]
- Phase 3 extended vaccination with a single dose to most 16- and 17-year-olds (from August) and 12- to 15-year-olds (from September).[27] Phase 3 also initiated the rollout of booster vaccines from September and third primary doses for those who are severely immunocompromised.[28] The booster campaign is not evaluated in this report.

Overall progress against commitments

3.5 Overall uptake exceeded NHSE&I's initial planning assumption that 75% of adults would come forward for both doses. By the end of October 2021, 85% of adults (aged 18 and over) had had two doses. Uptake for younger people was lower, with 62% of 16- to 17-year-olds and 25% of 12- to 15-year-olds receiving a first dose, although this likely reflects in part the later rollout start for these age groups. The 85% uptake rate for adults in England compared well with those in other home nations and European Union countries, which ranged between 76% and 93% (**Figure 15** on page 46).[29]

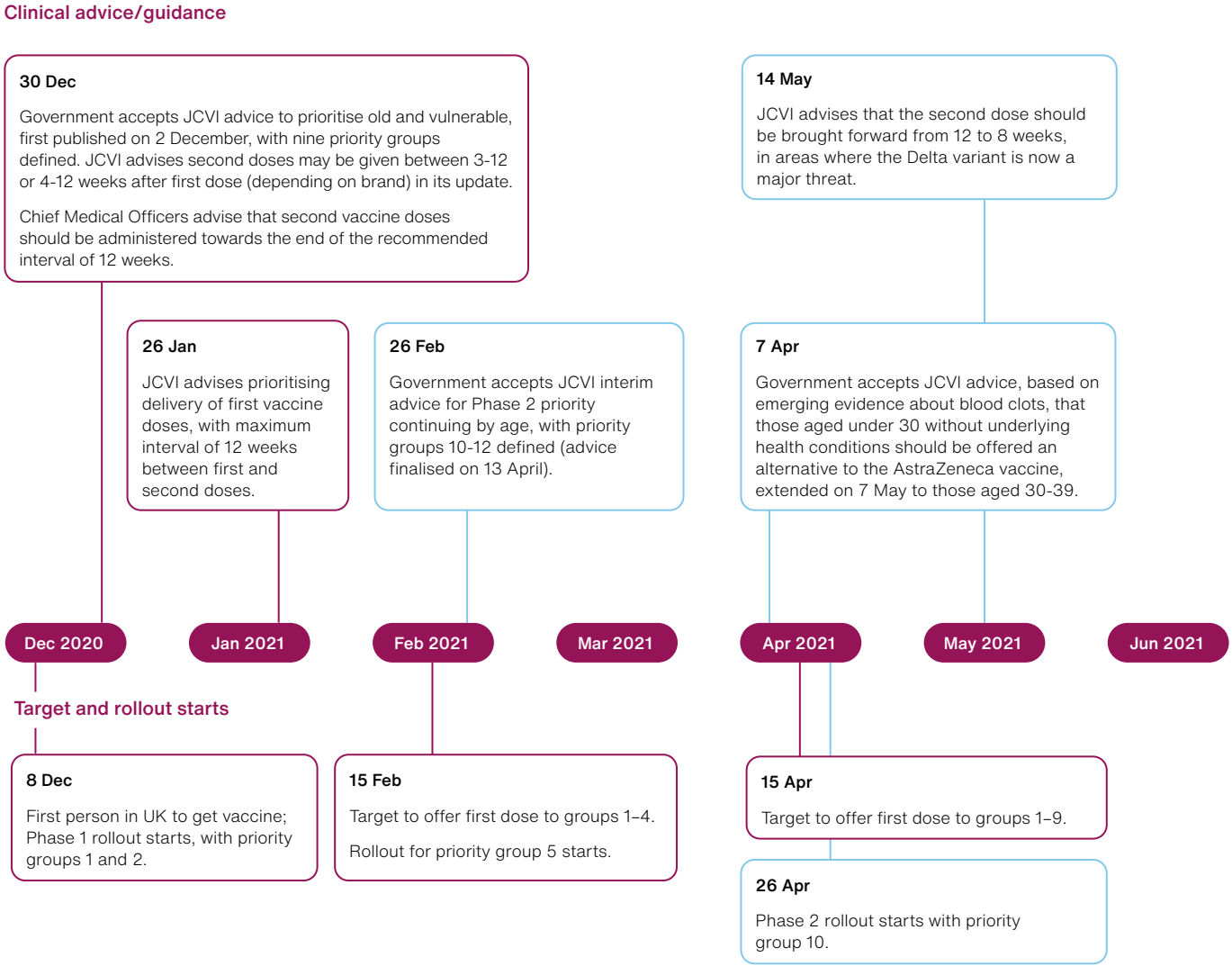
3.6 At its peak in March, the programme delivered 3.5 million doses in a week. By the end of October 2021, it had administered more than 87 million doses in England, about six times the number of flu vaccine doses administered during 2019-20. This comprised 42 million first doses, 38 million second doses, and seven million booster or third doses.

25 Of the COVID-19 vaccines approved for use in the UK, the recommended primary course for adults is two doses for Pfizer, AstraZeneca or Moderna. The recommended primary course for the Janssen vaccine is one dose, but this has not been rolled out in England to date.
26 Phase 2 also covered the rollout of third vaccine doses (as distinct from booster vaccinations) for people aged 12 and over who were severely immunocompromised, at least eight weeks after their second dose.
27 In Phase 3, COVID-19 vaccines were first rolled out to all 16- to 17-year olds, as well as 12- to 15-year-olds with specific underlying health conditions that put them at risk of severe COVID-19, or who were household contacts of persons who are immunosuppressed. This was later expanded to all 12-to 15-year-olds. In November 2021, the government accepted JCVI advice for a second dose for 12- to 15-year-olds and 16- to 17-year-olds.
28 The initial advice was for a one-dose booster vaccination for priority groups 1–9, six months after completion of their initial vaccine course. By November 2021, government had accepted further JCVI advice that all adults aged 18 and over should receive the booster, with the interval between second doses and booster shots reduced from six months to three.
29 We compare uptake rates for those aged 18 and over, as rollouts for those aged under 18 started later in some countries and were at different stages at the time of writing this report.

Figure 14

Main clinical advice accepted by government from the Joint Committee on Vaccination and Immunisation (JCVI) and Chief Medical Officers, and target and rollout dates for the COVID-19 vaccination programme in England, December 2020 – December 2021

The programme had to act with speed to implement new policy objectives, based on emerging clinical advice on COVID-19 vaccinations from JCVI and Chief Medical Officers



- Phase 1 (priority groups 1–9)
- Phase 2 (priority groups 10–12)
- Phase 3 (priority groups 12- to 17-year-olds and boosters)

Note

1 Does not include all clinical advice issued, for example, advice on adults with severe learning difficulties, young people living with immunosuppressed adults and pregnant women.

Source: National Audit Office analysis of Joint Committee on Vaccination and Immunisation and Chief Medical Officers announcements, NHS guidance letters and internal NHS England and NHS Improvement information

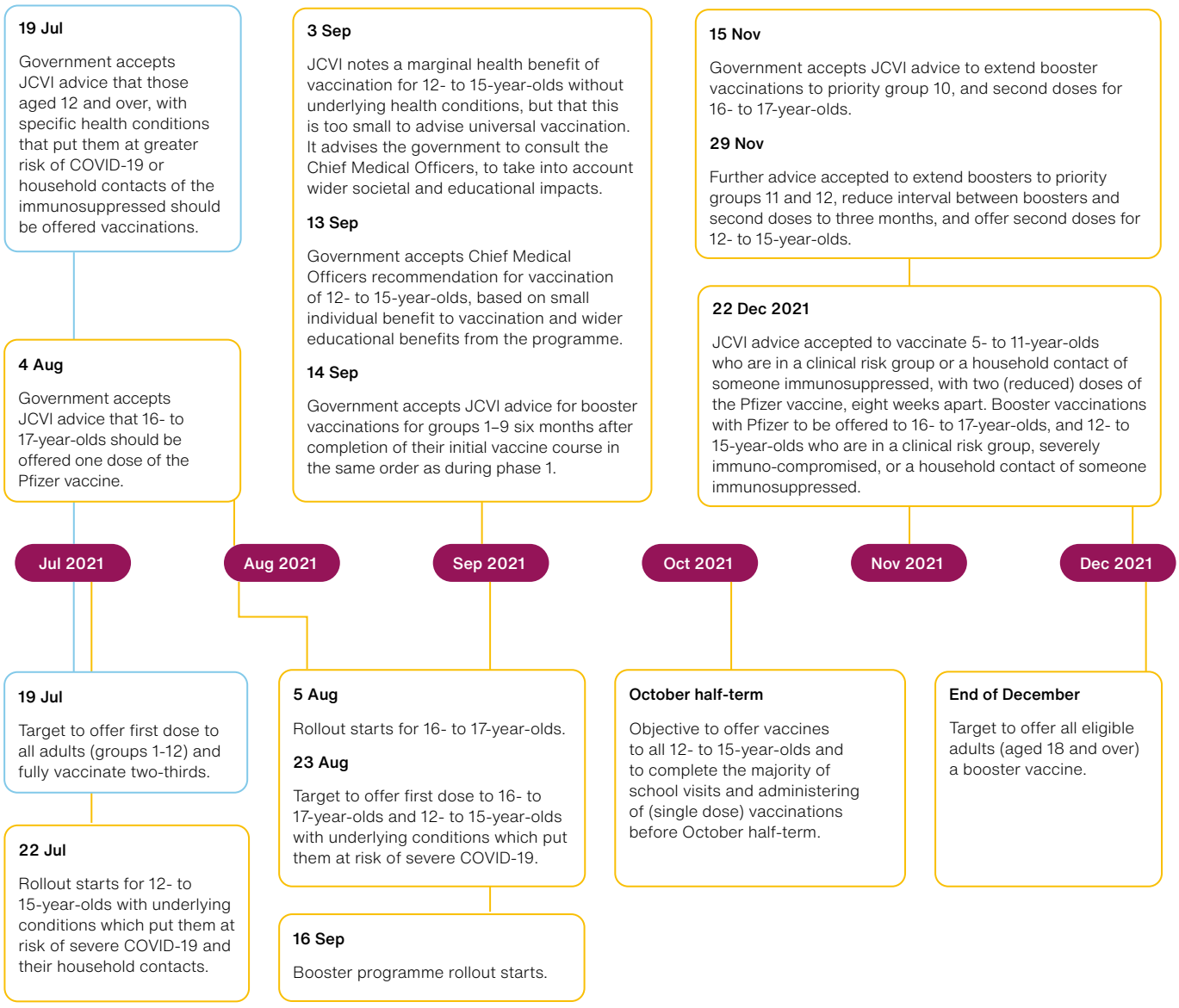
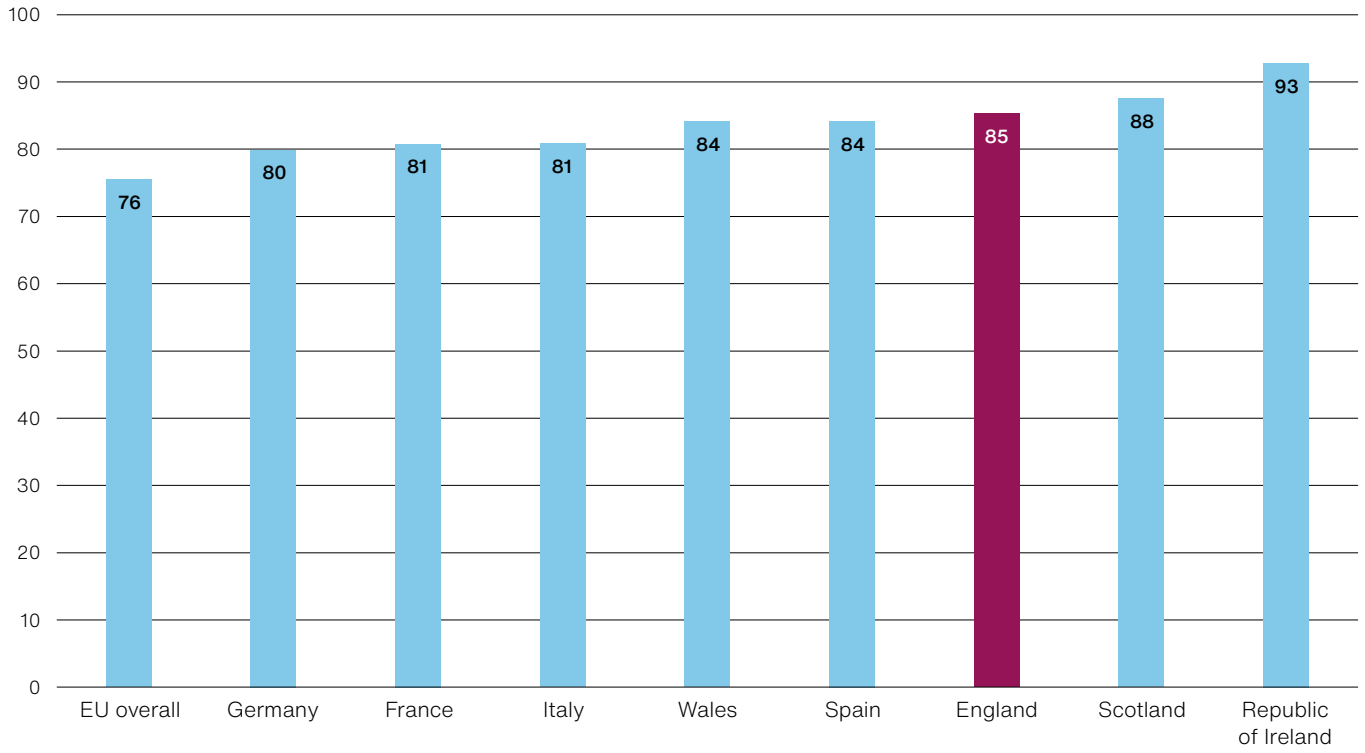

19 Jul
Government accepts JCVI advice that those aged 12 and over, with specific health conditions that put them at greater risk of COVID-19 or household contacts of the immunosuppressed should be offered vaccinations.
4 Aug
Government accepts JCVI advice that 16- to 17-year-olds should be offered one dose of the Pfizer vaccine.
3 Sep
JCVI notes a marginal health benefit of vaccination for 12- to 15-year-olds without underlying health conditions, but that this is too small to advise universal vaccination. It advises the government to consult the Chief Medical Officers, to take into account wider societal and educational impacts.
13 Sep
Government accepts Chief Medical Officers recommendation for vaccination of 12- to 15-year-olds, based on small individual benefit to vaccination and wider educational benefits from the programme.
14 Sep
Government accepts JCVI advice for booster vaccinations for groups 1–9 six months after completion of their initial vaccine course in the same order as during phase 1.
15 Nov
Government accepts JCVI advice to extend booster vaccinations to priority group 10, and second doses for 16- to 17-year-olds.
29 Nov
Further advice accepted to extend boosters to priority groups 11 and 12, reduce interval between boosters and second doses to three months, and offer second doses for 12- to 15-year-olds.
22 Dec 2021
JCVI advice accepted to vaccinate 5- to 11-year-olds who are in a clinical risk group or a household contact of someone immunosuppressed, with two (reduced) doses of the Pfizer vaccine, eight weeks apart. Booster vaccinations with Pfizer to be offered to 16- to 17-year-olds, and 12- to 15-year-olds who are in a clinical risk group, severely immuno-compromised, or a household contact of someone immunosuppressed.
Jul 2021
Aug 2021
Sep 2021
Oct 2021
Nov 2021
Dec 2021
19 Jul
Target to offer first dose to all adults (groups 1-12) and fully vaccinate two-thirds.
22 Jul
Rollout starts for 12- to 15-year-olds with underlying conditions which put them at risk of severe COVID-19 and their household contacts.
5 Aug
Rollout starts for 16- to 17-year-olds.
23 Aug
Target to offer first dose to 16- to 17-year-olds and 12- to 15-year-olds with underlying conditions which put them at risk of severe COVID-19.
16 Sep
Booster programme rollout starts.
October half-term
Objective to offer vaccines to all 12- to 15-year-olds and to complete the majority of school visits and administering of (single dose) vaccinations before October half-term.
End of December
Target to offer all eligible adults (aged 18 and over) a booster vaccine.

Figure 15

Proportion of adults (aged 18 and over) with two doses of a COVID-19 vaccine at the end of October 2021, by country

Uptake rates for adults in England compare well with the other home nations and European Union (EU)

Percentage of adults aged 18 and over vaccinated with two doses



Note

1 A sample of large European countries with similar level of income and home nations are included in the figure.

Source: National Audit Office analysis of data published by home nations and European Centre for Disease Prevention and Control

3.7 The government made a number of public commitments on rollout, focused on how quickly groups would be offered the vaccine (**Figure 16** on pages 47 and 48). Up to July 2021, NHSE&I and its delivery partners achieved all their major deployment targets, including offering vaccines in all care homes by 31 January, to the first four priority groups by 15 February, and to the first nine priority groups by 15 April 2021, and vaccinating two-thirds of all adults by 19 July.

Figure 16

Progress against published commitments for COVID-19 vaccine deployment in England, December 2020 – October 2021

Up to July 2021, NHS England and NHS Improvement (NHSE&I) and its delivery partners achieved all their major deployment targets

Government target/ commitment	Comments	National Audit Office assessment of performance against target/commitment
Offer vaccines to all older care home residents and staff by 31 January.	NHSE&I announced that this target had been met on 1 February. It gained confirmation via the Capacity Tracker survey of care homes and its regional teams that, by 31 January, 100% of older adult care homes had received a visit (excluding a small number that could not because of a COVID-19 outbreak).	Met
Deliver more than 2 million doses a week by the end of January.	In the week ending 24 January, 2,234,312 people were vaccinated in England.	Met
100% of the population of England to be within 10 miles of a vaccination service by the end of January.	By the deadline, 98% lived within this radius. NHSE&I stated that the remainder would be catered for through pop-up and mobile services.	Almost met
Establish around 1,200 Local Vaccination Service sites, 206 Hospital Hubs, and 50 Vaccination Centres by the end of January.	1,158 Local Vaccination Services, 254 Hospital Hubs and 50 Vaccination Centres were set up by the deadline.	Met
Offer vaccination to front-line health and social care workers, those aged 70 and over, and clinically extremely vulnerable individuals by 15 February.	Government announced that this target had been met on 13 February. NHSE&I gained confirmation from local healthcare partners that they had offered a vaccination to all front-line staff. For the remaining groups, NHSE&I conducted a survey of local vaccination sites which confirmed that these groups were fully offered a vaccine. In order to meet the target for social care workers, the National Booking Service was made available to care staff a few days before the deadline, rather than individual invitations being sent out.	Met
Offer vaccines to priority groups 5–9 (those aged 50–69, those aged 16–64 with underlying health conditions, and carers) by 15 April.	The Department of Health & Social Care (DHSC) announced that this target had been met on 13 April. NHSE&I provided an offer to these groups through a mixture of written letters and SMS messages in February and March.	Met

Figure 16 *continued*
Progress against published commitments for COVID-19 vaccine deployment in England, December 2020 – October 2021

Government target/ commitment	Comments	National Audit Office assessment of performance against target/commitment
Offer all adults a first dose by 19 July, and vaccinate two-thirds of adults with two doses.	DHSC announced that this target had been met on 18 July. By the week ending 18 July, 68% of adults had received two doses. NHSE&I provided an offer to these groups through a mixture of written letters and SMS messages from April to July. Initially set for autumn in the Vaccines Delivery Plan, this was brought forward to the end of July in the Spring COVID-19 Response Plan and then to 19 July.	Met
Offer vaccines to all 16- to 17-year-olds and 12- to 15-year-olds with underlying health conditions by 23 August.	NHSE&I provided an offer to 16- to 17-year-olds through a mixture of written letters and SMS messages through July and August. NHSE&I gained assurance from local areas that, by 6 September, all areas had completed a search of GP records for 12- to 15-year-olds with underlying health conditions and areas where Primary Care Networks were providing vaccinations had offered appointments to those eligible, but the work of making offers was not completed until 27 October.	Met (16–17) Not met (12–15 with health conditions)
Offer third doses to immunosuppressed adults by 11 October.	NHSE&I did not complete offers to the immunosuppressed until 18 October.	Not met
Offer vaccines to all 12- to 15-year-olds before October half term, with stated objective to complete the majority of school visits and administering of (single dose) vaccinations.	NHSE&I sent offer letters to this group by 26 October, the second day of half term. By the end of October, only 25% of 12- to 15-year-olds had received a first dose.	Almost met (offer) Not met (vaccination)

Note
1 There was no formal target set for when offers should be made to 12- to 15-year-olds who were a household contact of someone immunosuppressed.

Source: National Audit Office analysis of UK COVID-19 Vaccines Delivery Plan, government announcements, and internal NHS England and NHS Improvement data and documentation

3.8 NHSE&I did not meet some later objectives. While the programme almost met the target to make offers to all 12- to 15-year-olds by October half-term, it did not achieve its objective to vaccinate the majority of them. By the end of October 2021, it had succeeded in giving first doses to only 25% of the age group. The intended primary deployment model for this age group was School Age Immunisation Services (SAIS) and this was part of the reason for the slow rollout. The Department of Health & Social Care (DHSC) noted that it had also taken longer than expected to gain consent from parents, potentially requiring multiple school visits. Local case study interviews also described issues with consent procedures alongside other reasons for delay including the high number of infections among the age group at that time. On 19 October, NHSE&I enabled appointment booking for 12- to 15-year-olds via the National Booking Service (NBS). At the end of January 2022, 58% of 12- to 15-year-olds had received a first dose.

Approach to deployment

The use of different delivery models

3.9 The UK Vaccines Delivery Plan, published in January 2021, set out three main routes through which the public could get vaccinated, with the aim of catering to different preferences and making access as easy as possible:

- **Hospital hubs**, based at NHS trusts, which primarily vaccinated health and care staff.
- **Local vaccination services**, comprising groups of primary care networks, led by GPs, and community pharmacies, which comprised the majority of locations.[30] These included a wide variety of different services and settings such as: mobile services, pop-up and walk-in clinics (see also paragraph 3.27).
- **Vaccination centres**, set up specifically for COVID-19 vaccinations and based in venues such as stadiums, theatres and hotels. Centres could be run by NHS trusts, primary care networks or pharmacies.

30 Primary care networks are networks of GP practices. They were established in 2019 across the NHS as part of the NHS Long Term Plan to support care integration in their local communities, including working more closely with their local NHS acute service providers.

3.10 NHSE&I initially planned on the basis that 41% of vaccinations would be delivered at vaccination centres, 56% by GPs and community pharmacies and 3% in hospitals. By the end of October, only 21% of first and second doses had been delivered at vaccination centres and 71% by GPs and pharmacies (mostly GPs, at 56%). In total, GPs had administered 44.5 million doses by the end of October (**Figure 17**). Healthwatch has reported that public trust was higher in medical professionals when there was an existing relationship, which may help to explain the popularity of local vaccination services.

3.11 The use of multiple delivery models was a deliberate choice which has improved accessibility and helped to vaccinate as many people as quickly as possible but this has increased costs. **Figure 18** on page 52 shows how different priority groups used different delivery models to receive their vaccines: across all groups, local vaccination services were used most, with people aged under 65 more likely than others to use vaccination centres. NHSE&I assumed that GP and pharmacy routes, and vaccination centres would be the most expensive of the main delivery models at £37 and £36 per dose respectively, in part reflecting different staffing requirements.[31] Overall, costs per dose have been lower than anticipated. However, vaccination centres have ended up being the most expensive model at £34 per dose, compared with £24 per dose for GPs and community pharmacies (**Figure 19** on page 53). NHSE&I told us that this was due to a variety of operational factors including the need to establish new clinical facilities, short-term leases of venues, recruitment and training of temporary staff and fluctuations in demand. Vaccination centres have also operated at only half their planned output.

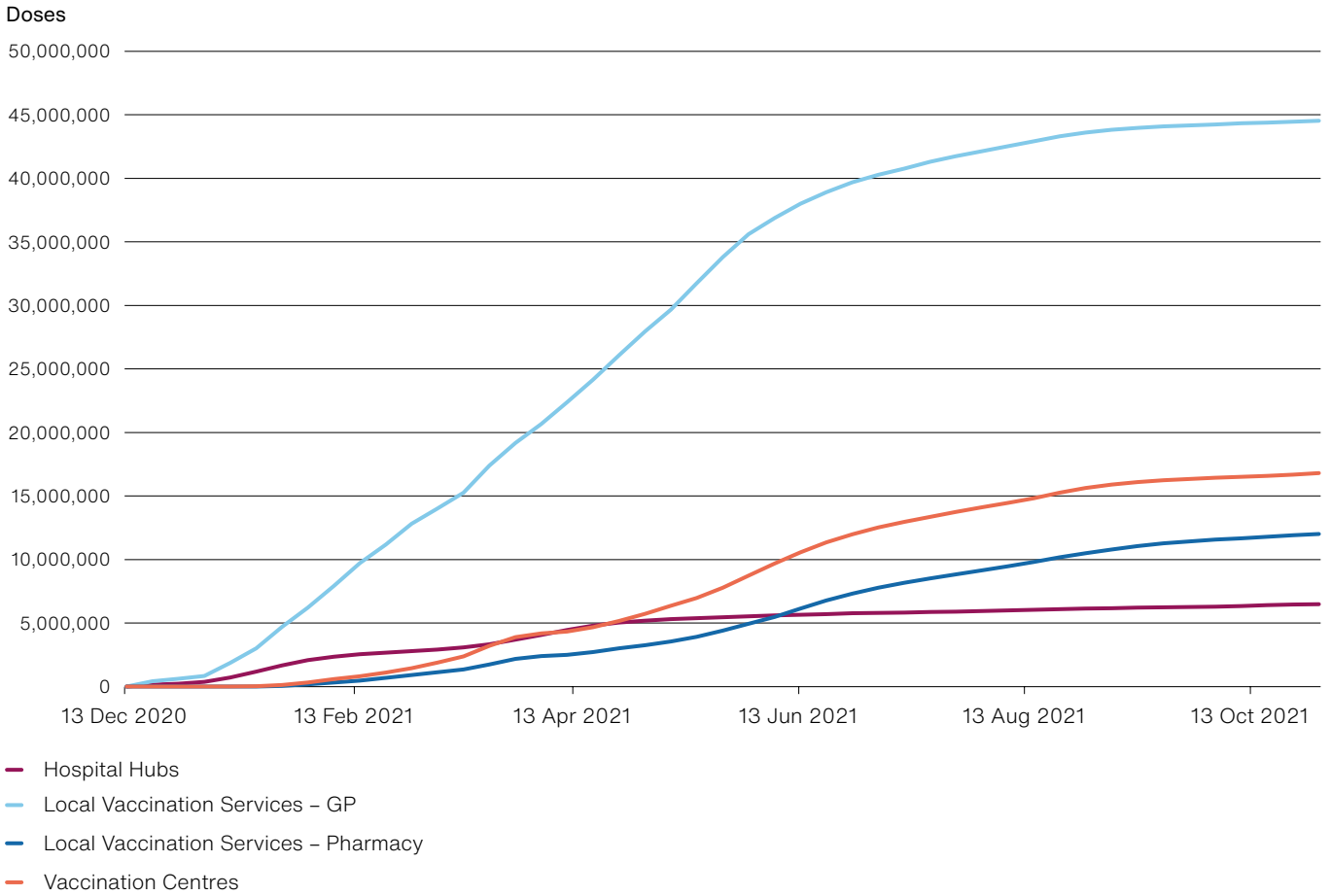
3.12 Some of our local case study interviewees told us that the multiple routes to access could also create tensions and competition between providers and, at times, confusion for some members of the public. NHSE&I's own review found that local stakeholders felt that those centrally running the vaccination programme sometimes failed to listen to experiences from the front-line and adapt and change their processes accordingly. NHSE&I did highlight to us examples of the national team improving processes in response to feedback, such as changes to how local areas could order vaccines (paragraph 2.13).

31 NHSE&I anticipated that vaccination centres would require 149 members of staff, compared with 24 for GPs or pharmacies or three in hospitals. These estimates included workforce and estates costs as well as an apportionment of all other central costs of the vaccination programme.

Figure 17

Number of COVID-19 vaccination doses administered through different routes in England, December 2020 to October 2021

In total, GPs had administered 44.5 million doses (56% of all doses administered) by the end of October



Note

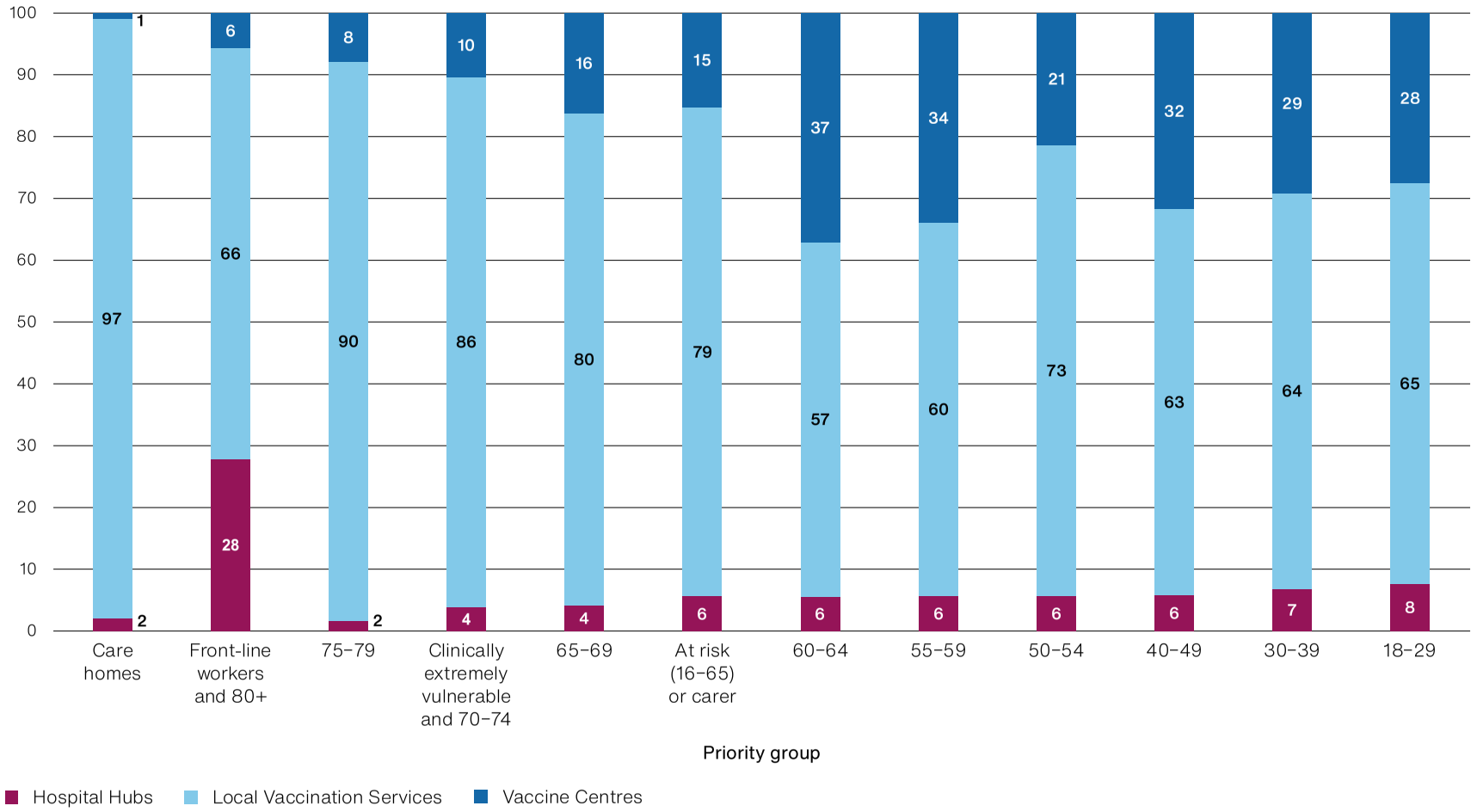
1 Data used include the first and second COVID-19 vaccines administered up to the end of October 2021 but exclude booster doses. The figure also excludes the relatively small number of doses administered in prison and military settings, and in settings recorded as unknown.

Source: National Audit Office analysis of internal NHS England and NHS Improvement data

Figure 18

Percentage of COVID-19 vaccination doses delivered for each priority group by delivery model in England, December 2020 to October 2021

Local vaccination services delivered the majority of COVID-19 vaccines for all priority groups



Notes

1 This analysis includes only the first 12 COVID-19 vaccine priority groups. It also excludes a small proportion of cases where the delivery route was unknown.

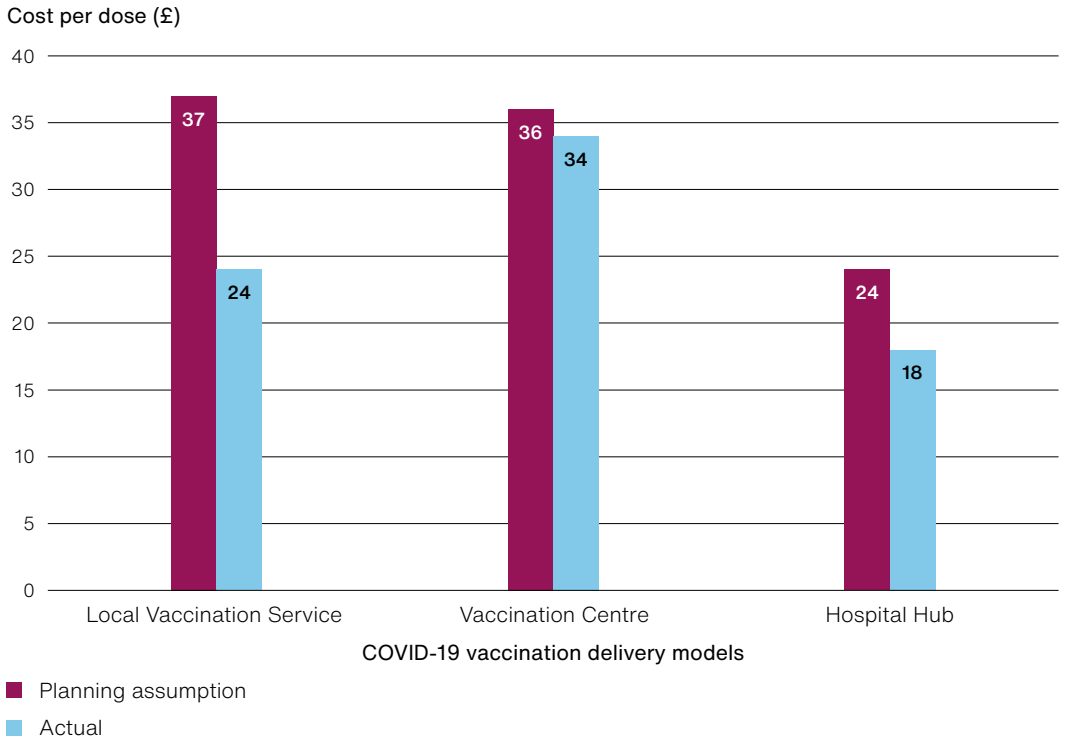
2 Data used include the first and second COVID-19 vaccines administered up to the end of October 2021 but exclude booster doses. Some columns may not add to 100% owing to rounding.

Source: National Audit Office analysis of NHS England and NHS Improvement data

Figure 19

Planned and actual deployment costs per COVID-19 vaccination dose by delivery model in England, December 2020 to October 2021

Overall, costs per dose have been lower than anticipated



Note

1 Central programme costs such as technology and data, and logistics have been apportioned to each delivery model in proportion to their direct costs.

Source: National Audit Office analysis of NHS England and NHS Improvement data

3.13 In November 2020, the programme estimated that the national workforce employed on COVID-19 vaccination would need to peak in January 2021 at more than 45,000 full-time equivalent positions (60,000 part-time vaccinators and 65,000 part-time non-clinical staff). DHSC and NHSE&I took steps to secure this workforce including: legislating to allow a wider group of healthcare professionals (for example, physiotherapists) to administer vaccines; recruiting around 25,000 clinical volunteers through St John Ambulance; recruiting around 92,000 non-clinical volunteers through the national NHS Volunteer Responders programme (run by the Royal Voluntary Service (RVS) and GoodSam); and getting support from the armed forces. Through NHS Professionals, around 21,000 paid staff were recruited as clinical and non-clinical vaccinators and registered healthcare professionals.

3.14 Local case study areas we interviewed were positive about the contribution of local staff and volunteers. In six out of 10 interviews, respondents said they had enough staff in the initial stages, while four noted shortages of nurses or people recording consent. St John Ambulance and the RVS said their volunteers had initially been under-used in some areas. NHSE&I data shows that only 23% of the volunteers it recruited had been utilised by June 2021.

3.15 Some local case study areas had seen staffing become more of an issue as the economy returned towards normal in the second half of 2021 and healthcare professionals became needed elsewhere. They also reported fears about the risk of burnout given the sustained pressure on some staff. UKHSA noted that the COVID-19 vaccination effort had diverted staff and other resources away from routine school vaccinations and this was also flagged as a risk by the JVCI and the Chief Medical Officers.

The role of clinical advice

3.16 NHSE&I had to ensure that the programme was in line with Medicines and Healthcare products Regulatory Agency (MHRA) regulations and any subsequent advice and followed clinical advice from the JCVI and the Chief Medical Officers, as accepted by ministers. This has determined who is eligible and should be prioritised for vaccination, vaccination type and all clinical aspects of the programme. For example, advice on intervals between first and second doses changed over time to allow a maximum of three to four weeks, then 12 weeks and then eight weeks between doses. As further evidence became available on the efficacy and safety of the COVID-19 vaccines and in the light of developments in the pandemic such as new virus variants, advice has continued to change over time (Figure 14). These changes often had to be implemented at very short notice. For example, on 7 April 2021, reflecting information about a possible link between the AstraZeneca vaccine and the risk of rare blood clots, JCVI issued new advice that people aged under 30 should be offered an alternative to AstraZeneca where available (this was extended to people under 40 on 7 May). NHSE&I had to rapidly communicate the policy and operational changes required, and its delivery partners had to make healthcare professionals available immediately to support conversations about the choice of vaccine for appointments which could not be cancelled the following day.

3.17 Stakeholders told us that goodwill, flexibility and determination had been essential in a fast-changing situation. But, from our local case studies and local feedback gathered by NHSE&I, there was widespread frustration with changing messages and the speed with which some changes had to be implemented. A particular frustration was the fact that programme changes were often announced in the media before NHSE&I had communicated them to local providers. For example, this was the case with offering vaccinations to 12- to 15-year-olds outside school settings. Local case study areas were left with little or no time to prepare and updated guidance was not always available before members of the public began to demand what had been announced. NHSE&I told us that it was unable to communicate in advance with local sites owing to the confidential nature of the updated advice.

Use of data and digital systems

3.18 The COVID-19 vaccine programme, supported by NHS Digital, set up a national integrated data system, making use of the existing national immunisation management system that allowed the NHS to identify, record and transmit all patient vaccination data, including vaccination status, across the health and care system for the first time. This included the 'point of care' system, where details about the individual and type of vaccination administered were recorded when people were vaccinated.[32] NHS Digital also set up a national online booking system, primarily for vaccination centres and community pharmacies.[33] Stakeholders told us that the booking system was generally an effective innovation which helped to expand convenient access; but some found that a lack of flexibility (for example, difficulty in cancelling bookings) and the lack of a single booking system for all types of location made it difficult for some sites to manage their workload. NHS Digital told us that it has continued to make changes to the booking system over time in response to feedback from users.

3.19 NHS Digital took what it described as a "modular" approach, building on existing systems to set up quickly the system for the vaccination programme. It has subsequently developed this into a streamlined template, which it is considering using in other vaccination programmes.

32 The NHS Digital systems require a patient to have an NHS number for their vaccination to be recorded and reported. Without an NHS number, a vaccination may have to be recorded manually. NHS Digital estimated that around 1.5 million people in England do not have an NHS number. It is currently exploring options to allow people without an NHS number to be entered in the system when a vaccination is given, for example, through allocation of a new NHS number if a patient is willing to do so.

33 The national booking system was the only online system available for vaccination centres and pharmacies. GP and hospital providers were initially outside the national booking system and had to use their own IT systems to manage appointments, but were later able to opt in to use the national system.

3.20 From December 2020, NHSE&I also used the Foundry software to support the programme's day-to-day operations. This enabled pre-existing data (for example, GP and hospital patient data) to be combined with new data collected through the COVID-19 vaccination programme in real-time. It allowed analysis of vaccination delivery and uptake by site, region and local area, and individual characteristics such as ethnicity and JCVI-defined priority groups. The identification of priority groups was not always easy from established data, requiring creative use of multiple data sources, including in some cases local authority data. NHSE&I's programme leadership team dedicated time every morning to reviewing Foundry data. It was used to manage key programme risks and to monitor divergence from central directions, for instance identifying local areas that were providing second doses too early.

3.21 From January/February 2021, local health systems and local authorities have also been able to use a version of Foundry to model demand and capacity for their sites, and to benchmark themselves against similar areas to gain greater understanding of vaccine inequalities. From April, primary care networks and pharmacies had access to information on vaccination numbers. In our local case study interviews, four out of 10 said they had found Foundry useful in trying to address inequalities. Five used their own information sources and others noted limitations such as issues around access to data or coverage gaps.

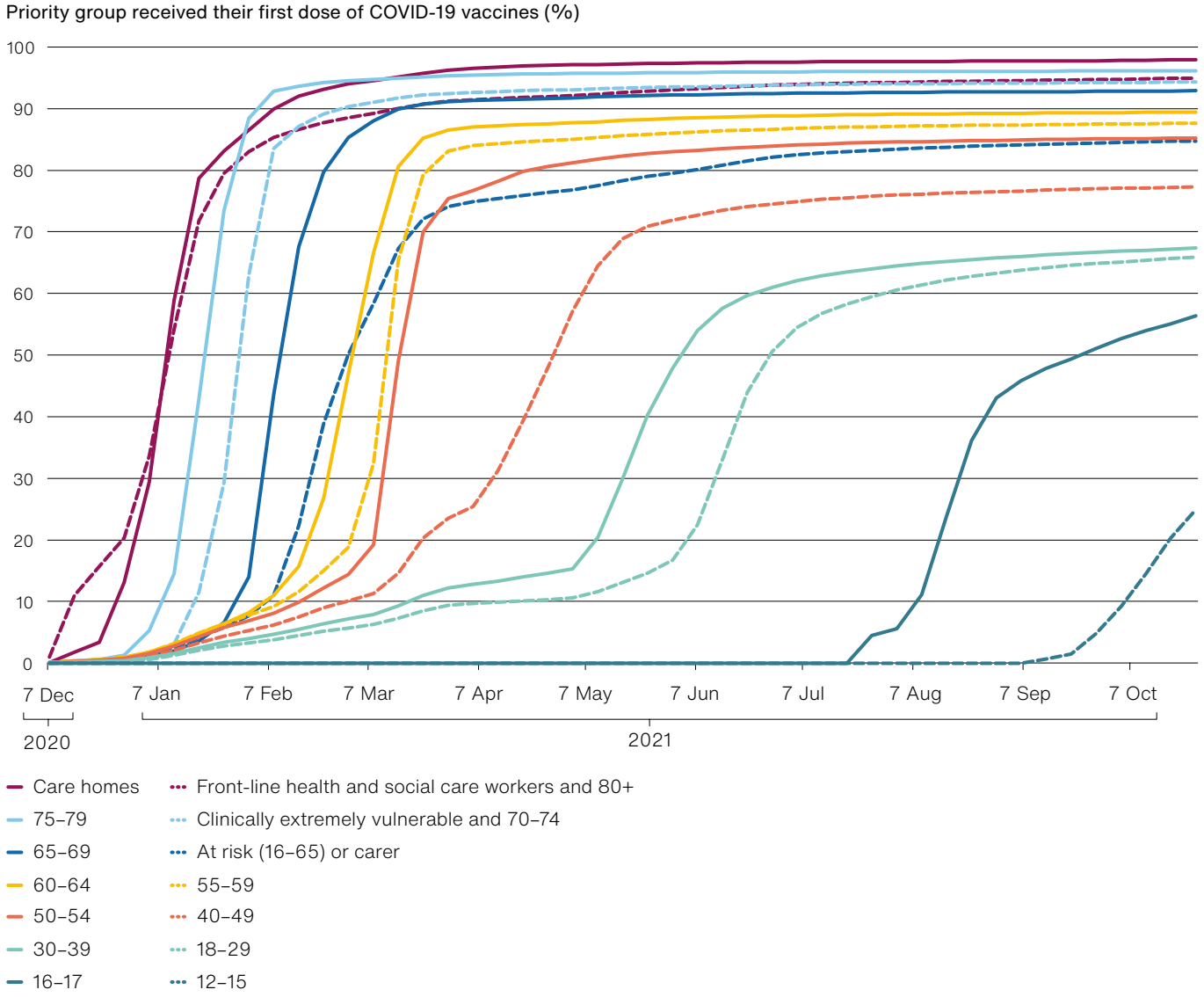
Addressing differences in vaccine uptake

3.22 The programme has generally achieved high uptake but differences between groups have persisted. Up to the end of October, 85% of adults had received two doses of COVID-19 vaccines. This is substantially higher than the uptake for single-dose flu vaccines in 2019-20 (72% for people aged 65 and over, 45% for people aged under 65 in a clinical risk group, 44% for pregnant women and 74% for front-line health and care workers). However, some priority groups had a much slower rate of vaccination (**Figure 20**) and uptake is lower than average for some groups (see paragraph 3.25).

Figure 20

Proportion receiving at least one dose of COVID-19 vaccine by priority group in England, December 2020 to October 2021

Some priority groups have achieved very high rates of COVID-19 vaccination uptake but for a few groups the uptake has remained low



Notes

1 Individuals who could not be assigned to a priority group are excluded.

2 The vaccination of 12- to 15-year-olds with selected health conditions or whose household contained someone who was immunosuppressed began on 22 July 2021 and NHS England and NHS Improvement did not provide uptake data on this group.

Source: National Audit Office analysis of NHS England and NHS Improvement data

3.23 Priority groups 1 and 2 include front-line social care workers, but there is no central register of the social care workforce. In order to ensure access for this group, NHSE&I took the decision to make the National Booking Service (NBS) available to care staff a few days before the deadline, rather than sending personal invitations to each worker. The Scientific Advisory Group for Emergencies (SAGE) advises that an uptake rate for one dose of 80% in staff and 90% in residents in a care home is needed to provide a minimum level of protection against COVID-19 outbreaks. By June 2021, only 65% of older adult care homes in England were meeting the minimum level for staff uptake. This led the government to introduce mandatory vaccination as a condition of deployment for care home staff, which came into force from November 2021.[34] Care sector and local government stakeholders told us that they were very concerned about the consequences of this legislation on recruitment and retention. As at 31 October, 89% of staff at older adult care homes had received two doses of a vaccine, with 85% of older adult care homes meeting the protection levels set by SAGE.

3.24 Priority group 6 comprised unpaid carers and those with underlying health conditions which put them at higher risk. The rollout to this group proceeded relatively slowly. It was challenging for NHSE&I to identify this group from its national data systems, requiring five different data sources to be analysed (GP at-risk or carer records, the GP Learning Disability Register, the QCOVID assessment tool, and local authority and carer's allowance records).[35] Carers UK highlighted particular issues in identifying unpaid carers. Unpaid carers had been encouraged to register as such with their GPs, but GP guidance was not always updated quickly enough. For a short period, individuals could self-identify via the NBS but this was limited due to concern about the risk of misuse. By the end of October 2021, the estimated percentage of people in priority group 6 who had received two doses of a vaccine was 81%.

34 In November 2021, government extended mandatory vaccination as a condition of employment to all front-line health and social care workers, effective from April 2022. In January 2022, it announced that it would revoke this policy for health and social care staff, subject to consultation and Parliamentary approval, in light of the emergence of the Omicron variant.

35 QCOVID is a clinical decision tool intended to support conversations between clinically trained professionals and patients about COVID-19 risk. It was developed as a model to estimate a person's risk of being hospitalised or dying due to catching coronavirus.

3.25 Previous vaccination programmes have shown that uptake varies for different groups and in complex ways. **Figure 21** on pages 60 and 61 shows how COVID-19 vaccination rates varied at the end of October 2021, the point by which all adults could have had two doses. In particular:

- rates were above 90% in all over-50 age groups but substantially lower for those aged 18 to 24 (64%) and 25 to 29 (68%);
- rates for adults were lower among more deprived parts of the population; and
- some ethnic groups had very low levels of vaccination relative to the national rate for adults based on a slightly different uptake measure than the one for age groups: rates were lowest among adults of Chinese (48%), Black Caribbean (49%), or Black Other (49%) origin, compared with 76% for all ethnic origins.[36]

3.26 The vaccines programme and other parts of government have undertaken a range of actions to try to increase uptake of COVID-19 vaccinations in different groups. Up to the end of October 2021, these have included:[37]

- producing a range of general and targeted material, including the UK COVID-19 Vaccine Uptake Plan and other guidance, standard operating procedures, mobilisation packs for specific settings such as care homes, and information leaflets;
- sharing good practice between regions and local areas;
- cross-government communication campaigns to increase confidence in the safety of COVID-19 vaccines and counter disinformation. These campaigns identified and focused on groups that are more likely to be vaccine-resistant or hesitant. They sought to influence them through people they trusted, for example clinicians, scientists and community leaders, and through a range of platforms, including TV, social media sites and particular newspapers;
- providing funding of £7.2 million to local health systems to allow them to take targeted action to increase uptake and reduce inequalities in their areas. Outside the vaccine programme, government also provided funding of £23.75 million to local authorities through the Community Champions Scheme, which they could use to promote vaccine uptake and provide information about vaccine safety. This funding was partly used to recruit faith and community leaders to promote vaccines within their communities; and
- setting up a taskforce in summer 2021 to help improve uptake. The Vaccine Uptake Taskforce brought together operational, communications, behavioural insight and regional expertise, to increase central government's focus on reaching the unvaccinated.

36 In this report, most measures of uptake use mid-2020 population estimates from the Office for National Statistics as a denominator. However, uptake by ethnicity uses population estimates from the National Immunisation Management System. The different levels of uptake by ethnicity could be in part due to their different age profiles and could also be related to levels of deprivation. We have not adjusted for these factors in our analysis by ethnicity.

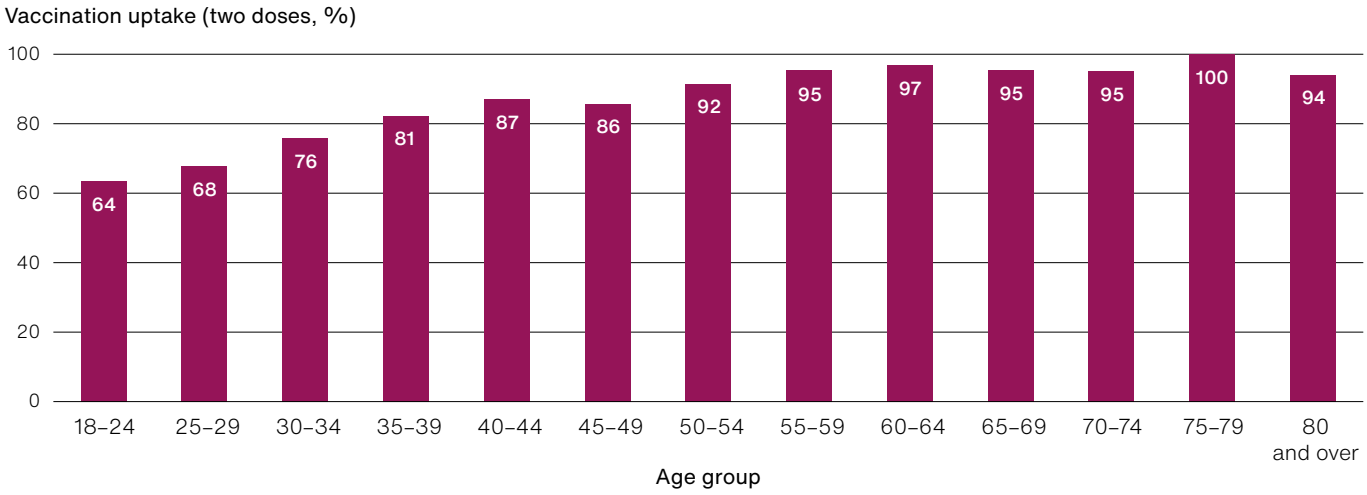
37 Paragraphs 3.9 to 3.15 cover the actions government took to set up the system for people to be invited for, book and get a vaccination, and 3.18 to 3.21 cover actions relating to collating, monitoring and sharing data.

Figure 21

Variations in COVID-19 vaccination uptake for adults by age, deprivation and ethnicity in England, as at 31 October 2021

Uptake is lower for younger people, those in more deprived areas and some ethnic groups

COVID-19 vaccination uptake by age group, 31 October 2021



COVID-19 vaccination uptake by deprivation decile, 31 October 2021

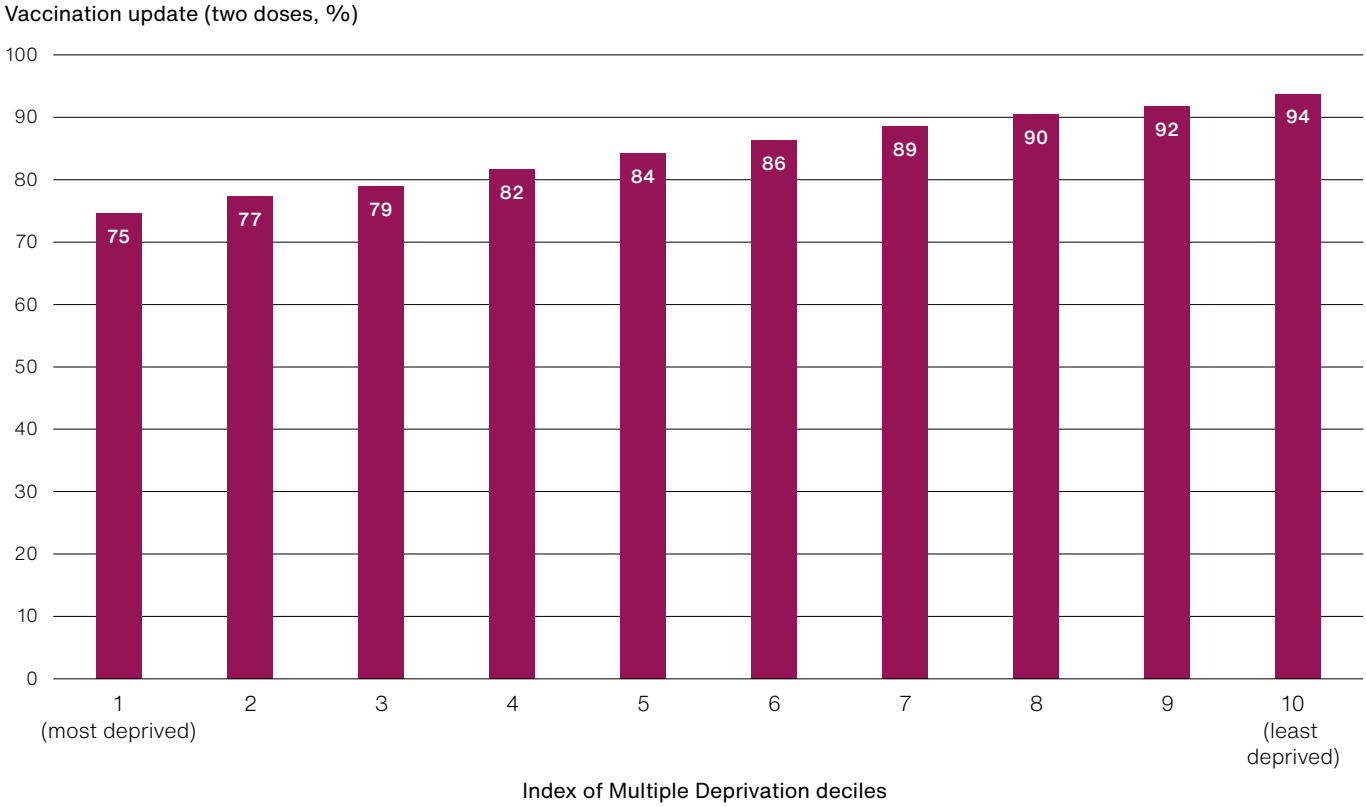
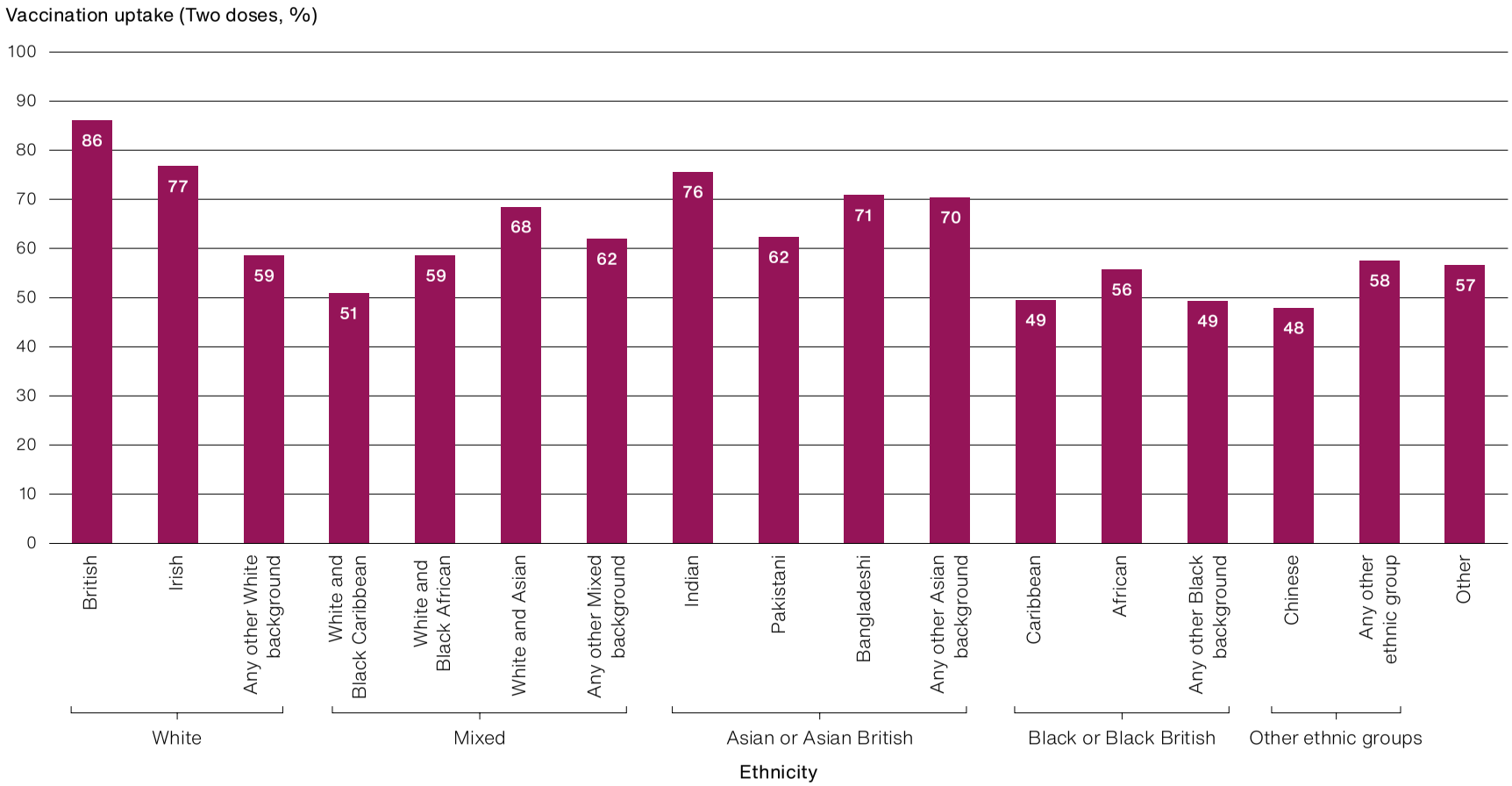


Figure 21 *continued*

Variations in COVID-19 vaccination uptake for adults by age, deprivation and ethnicity in England, as at 31 October 2021

COVID-19 vaccination uptake by ethnicity, 31 October 2021



Notes

1 Uptake by deprivation and age is based on population data from the Office for National Statistics, while ethnicity uptake is based on population data from the National Immunisation Management System.

2 Charts show vaccine uptake as the percentage of people who have had two doses of a COVID-19 vaccine.

3 The different levels of uptake by ethnicity and the lower uptake among some ethnic groups, for example, Chinese and Black African communities, could in part be due to their younger age profile. According to 2011 Census data published in 2018 and updated in 2020 by Office for National Statistics, 44% of the Chinese adult population and 27%–30% of the Black British/Black Other adult population were aged between 18 and 29 (for Black Caribbean, it was 20%), compared with 18% for the White British adult population. In addition, a higher proportion of these groups also live in more deprived areas. Our analysis by ethnicity has not adjusted for these factors.

Source: National Audit Office analysis of published NHS England NHS Improvement monthly vaccination statistics

3.27 Figure 18 above shows that different priority groups varied in terms of which delivery model they used to receive their vaccine. In line with the national strategy, local areas used a wide variety of approaches to increase access and uptake, particularly for those in deprived communities where ethnic minority groups tend to be concentrated. For example, our three local case study areas gave examples of mobile services, pop-up and walk-in clinics, clinics for specific groups (for example, women-only); working with community leaders and youth champions; using locations such as mosques, cafes and community centres; and different ways of communicating such as social media and door-knocking. However, in seven of our ten case study interviews, we heard that there could be tensions between national directions and local priorities, for example, one area was discouraged from inviting people to come forward to check their eligibility to be vaccinated, while another noted that central processes for accrediting new approaches (for example, buses) hampered local initiatives. Examples of actions targeted at particular groups are given in **Figure 22** on pages 63 and 64.

3.28 It is often difficult to attribute specific measurable impacts to individual public health campaigns or other activities. Generally during 2021, Office for National Statistics (ONS) research suggests increasing levels of vaccine confidence, with 84% of adults reporting positive sentiment towards a COVID-19 vaccine in December 2020–January 2021 and 96% in June–July 2021.[38] Inequalities persisted, but could have been still greater if the actions described had not been taken. The Cabinet Office found high awareness of central government media campaigns, and there is some qualitative evidence that national campaigns in the summer helped to increase uptake among younger age groups. But overall, government has not yet identified how it can fully overcome persistent inequalities. Stakeholders told us that, for some communities, pre-existing lack of access to, engagement with, or trust in health services had been difficult to overcome, and they also emphasised the importance of supporting local initiatives and conversations.

Success factors and future risks for deployment and uptake

3.29 **Figure 23** on page 65 sets out our assessment of the strengths of the programme's approach to administering COVID-19 vaccines at speed. Again, we note the particular value of the programme's early clarity of purpose and prioritisation, and having explicit objectives related to speed. We think the balance between using existing infrastructure, data, skills and systems and making targeted innovations worked well, as did the conscious choice to set up a range of different routes for the public to access vaccinations. At national and local levels, we saw evidence of a culture of learning and continuous improvement, for example sharing lessons with regions and providers, and interim reviews of and adaptations to approaches.

38 Positive sentiment included respondents who said that they had received the vaccine or had been offered the vaccine and were waiting to be vaccinated, or that they were very or fairly likely to have the vaccine if offered.

Figure 22

Examples of approaches in England to increase COVID-19 vaccination uptake for selected population groups

The programme took a number of measures to help increase uptake of COVID-19 vaccinations among homeless individuals, pregnant women and black communities but uptake remains low for these groups compared with the general population

Group	Potential challenges	Examples of national and local actions	Available information on uptake and hesitancy
Homeless individuals	Individuals may have more chaotic lives, higher clinical vulnerability, and lower trust in public services. They are often not registered with a GP.	In March 2021, the Joint Committee on Vaccination and Immunisation (JCVI) advised that local areas could include the homeless as part of priority group 6. National bodies provided specific mobilisation guides and materials to help homeless individuals register with a GP, and shared examples of different local approaches. Local areas used various outreach approaches, for example, walk-in and pop-up clinics at shelters. National bodies noted that one-dose vaccines could help to improve uptake further, but at the time of this report, these had been approved but not yet deployed in England.	Robust data on the proportion of homeless people vaccinated are unavailable. One estimate from August 2021 suggested that only one in three homeless people had been vaccinated with two doses compared with, at that time, 75% of the general population.
Pregnant women and recent mothers	Specific concerns about the impact of vaccine on fertility and pregnancy. Mixed messages during 2021 about the best approach to take.	Up to April 2021, JCVI's advice was not to vaccinate pregnant women routinely, as clinical data for this group were not yet available. From April, it advised that pregnant women should be offered the vaccine in line with their age and clinical risk group. One of our local case study interviews noted that some midwives were still advising against having the vaccine after that date. In July 2021, government shared guidance with local systems to help increase uptake among pregnant women, including, for example: supporting midwives and health professionals to give the right information to women; ensuring access to information within ante- and post-natal services; widening the rollout of women-only vaccination centres, and deploying mobile units at venues such as schools and nurseries. The Medicines and Healthcare products Regulatory Agency (MHRA)'s weekly reporting on vaccine safety has also included a dedicated section on possible side-effects in pregnancy and menstrual disorders. As of 31 October 2021, there was no evidence that COVID-19 vaccination affected fertility or increased the risk of miscarriage and stillbirth.	The UK Health Security Agency (UKHSA) found that uptake (based on at least two doses) among women giving birth increased from 1% in May to 29% in October. This in part reflects younger people becoming eligible to be vaccinated. According to Office for National Statistics (ONS) surveys, as overall hesitancy has declined, pregnancy-related concerns have become a more prominent reason for not having the vaccine. For example, in March-April 2021, 13% of people not taking up or unlikely to take up a vaccine offer said they were worried about being able to have children in the future compared with 21% in June–July. UKHSA has also reported that there was particularly low uptake among new mothers of black ethnicity and in more deprived areas.

Figure 22 *continued*
Examples of approaches in England to increase COVID-19 vaccination uptake for selected population groups

Group	Potential challenges	Examples of national and local actions	Available information on uptake and hesitancy
Black and Black British communities	Some communities may have lower trust in and engagement with government.	Government established partnerships with a range of third sector organisations, local faith leaders and faith institutions to encourage communities to get vaccinated. It set up social media and messaging groups with Black and Minority Ethnic (BAME) clinicians and community leaders to share information. Research by Healthwatch into vaccine hesitancy for BAME groups found that participants had more trust in people with real-world experience (for example, front-line NHS workers). It said that targeted campaigns, including the use of celebrities, could be counter-productive as they were seen as singling out members of particular communities and trying to pressure them into a decision.	As of 31 October 2021, 56% of people of Black African origin, and 49% of people of Black Caribbean or Black Other origin had received two doses of vaccine. Black and Black British people have the highest vaccine hesitancy levels, but these have declined: 21% according to the ONS surveys for June–July 2021, down from 44% for January–February.

Source: National Audit Office summary of published and internal NHS England and NHS Improvement and Public Health England/UK Health Security Agency data and documentation, and published Office for National Statistics data

3.30 While there was broad agreement across many stakeholders that the programme had engaged well with them and an acceptance of the need for a centralised approach, UKHSA, primary care representatives and some local government stakeholders did not feel their existing experience and knowledge had been taken fully into account at an early enough stage. In particular, the British Medical Association, representing GPs, told us that it was fully engaged in planning from October 2020 onwards, but it felt if this had happened earlier some difficulties with logistics, communications and IT systems could have been avoided.

Risks

3.31 The programme needs to manage a number of risks to ensure delivery of its immediate objectives while also beginning to consider a future sustainable model for COVID-19 vaccinations. **Figure 24** on page 66 sets out our assessment of the main risks. In particular, we note the risk that continuing intensive delivery of vaccinations poses for staff capacity and welfare and the NHS's other priorities. We also note the urgent need to make more progress in vaccinating those groups with lower uptake.

Figure 23

Success factors for COVID-19 vaccination deployment and uptake in England

The COVID-19 vaccine programme adopted a number of good practices in deploying COVID-19 vaccines at speed

Considerations for delivering programmes at speed	Key actions by the vaccine programme
Including speed as a specific programme objective to provide a clear framework for decision-making and help make trade-offs between speed, cost and outcomes.	• NHS England and NHS Improvement's (NHSE&I's) overall objective was to roll out vaccines safely and securely to the maximum number of eligible individuals within England without compromising seasonal flu vaccination. The government set a series of early deadlines for different stages of the rollout and accelerated them when possible in response to changing conditions such as the spread of the Delta variant. • The programme had clear priorities set primarily by advice from the Joint Committee on Vaccination and Immunisation, allowing clarity about which actions were most urgent. NHSE&I and local bodies were responsive to changing clinical priorities, for example, acting quickly to prioritise first dose delivery instead of second doses at the start of 2021. • NHSE&I made use of the established local infrastructure for routine vaccinations where possible (for example, GPs and community pharmacies) which enabled the programme to be set up both at speed and scale.
Build teams with the right leadership, skills and experience to make clear, timely and reliable decisions.	• Headed by a senior responsible owner (SRO) with strong leadership skills, NHSE&I's programme team engaged with and marshalled the efforts of numerous bodies across the public and private sector in preparation for and during the rollout of vaccines. • A range of stakeholders told us that NHSE&I struck a balance between command and control and consultation and engagement, including with professional bodies, charities and patient groups. While stakeholders understood that NHSE&I had to move quickly, the UK Health Security Agency and primary care stakeholders felt they had not been engaged sufficiently at an early enough stage. • NHSE&I was able to harness expertise and skills both within the NHS (NHS Digital) and from wider industry to establish a number of digital platforms quickly (Foundry for internal management, the National Booking Service for the public). These built on and expanded existing systems and data sources in creative ways.
Tailor programme processes to add value and momentum to programme decision-making.	• NHSE&I created draft plans in advance of the initial clinical advice on vaccine deployment to ensure it could respond swiftly once the first vaccine was approved. • NHSE&I's use of data added value to the leadership of the programme, assisted with the management of key programme risks, and allowed both central and local bodies to understand quickly and in detail differences in uptake.
Recognise the uncertainties associated with delivering programmes at speed and have a plan to manage these.	• In its business cases, NHSE&I was open about uncertainties and made use of techniques such as scenario planning and sensitivity analysis to explore the impact of certain patterns of vaccine availability, vaccine uptake and rollout speed. NHSE&I was clear about vaccine supply uncertainties and set national guidance to ask local bodies to plan appointments and workforce around this. • Recognising different preferences for accessing vaccines NHSE&I kept its options on delivery models open, using both existing and new services. It was able to change its approach to focus more on local services provided by GPs and community pharmacies in response to public demand. It also changed how 12- to 15-year-olds could access vaccines after initial plans proved too slow.

Note

1 These factors are not exhaustive and are selected from the areas considered in the National Audit Office Report *Lessons learned: Delivering programmes at speed*, Session 2019-2021, HC667, National Audit Office, September 2021.

Source: National Audit Office assessment based on document review and analysis of interviews with government and non-government stakeholders

Figure 24

Assessment of main risks for COVID-19 vaccination deployment and uptake

The programme needs to manage a number of risks to improve uptake and move towards a future sustainable model

Area of risk	NAO commentary
Staff capacity and welfare	There are a number of risks to manage in regard to staff, in particular burnout, and relationships between the NHS and the primary care sector.
Managing the wider impact on the NHS	The vaccine programme has required effort to be redirected from other NHS activities. This will continue to be the case with each subsequent round of vaccination, unless additional staffing and other resources can be made available. There is a continuing risk that for a variety of reasons COVID-19 vaccinations could disrupt or reduce uptake of other vaccinations.
Factors affecting uptake	NHS England and NHS Improvement (NHSE&I) will need to continue to manage factors affecting overall uptake, and to address persistently low uptake among some population groups. It needs to continue to review how well different initiatives and approaches have worked in order to inform future actions.
Communications to the frontline	NHSE&I needs to ensure that its local partners are informed promptly about policy and operational changes that will affect them so they have time to prepare before the public learns of these developments. Otherwise, there is a risk that the vaccine programme as a whole looks poorly managed.
Transition plans for national arrangements	The Department of Health & Social Care needs to develop plans to transition to a future sustainable model for COVID-19 vaccination. There will be both risks and opportunities as current infrastructure is rationalised and integrated into business as usual. It will be particularly important to identify all the benefits from current approaches, both locally and nationally, so that as many of these as possible can be retained in future.

Note

1 These risk factors are not exhaustive.

Source: National Audit Office assessment based on document review and analysis of interviews with government and non-government stakeholders

Developments in deployment after October 2021

3.32 The vaccine programme has continued to change, with new demands being placed on those administering vaccinations throughout the autumn and winter of 2021. In September 2021, the booster campaign started for the first nine priority groups. Following the emergence of the Omicron variant, boosters were then extended to everyone aged 18 and over, with a target to offer all adults a booster, first, by the end of January 2022, and then, by the end of December 2021. To allow faster delivery, the government announced changes to deployment, including reducing the interval between booster and initial vaccinations from six months to three; increasing payments to GPs and community pharmacies; opening more sites; and drawing on the military for additional support. To meet the end of December target, some NHS and primary care staff were redeployed away from routine services. In addition, all 12- to 17-year-olds are now eligible for a second dose, and 16- to 17-year-olds are eligible for a booster. In December 2021, JCVI advised vaccination for some 5- to 11-year-olds and booster vaccinations for some 12- to 15-year-olds (broadly those at clinical risk themselves or in a household with someone who is immunosuppressed). The programme also continues to offer doses to anyone not yet vaccinated.

3.33 As at the end of January 2022, 88% of adults had received two doses, and 70% a third dose or booster vaccination. An estimated 8%, or around 3.7 million adults, were unvaccinated. By the same point, around 58% of 12- to 15-year-olds had received a first dose, as had 73% of 16- to 17-year-olds.

Appendix One

Our audit approach

1 This report examines whether the government is well placed to meet its full objectives for the COVID-19 vaccination programme in England. It follows our December 2020 report *Investigation into preparations for potential COVID-19 vaccines*.[39] The current report builds on our December 2020 investigation to evaluate the COVID-19 vaccination programme up to the end of October 2021.

2 The report covers:

- what progress the programme made in procurement and deployment up to the end of October 2021;
- what contributed to the programme achieving its initial objectives; and
- what are the future risks for the programme.

3 The report focuses on England, with the exception of procurement which the government has done on a UK-wide basis. We describe but do not evaluate in depth:

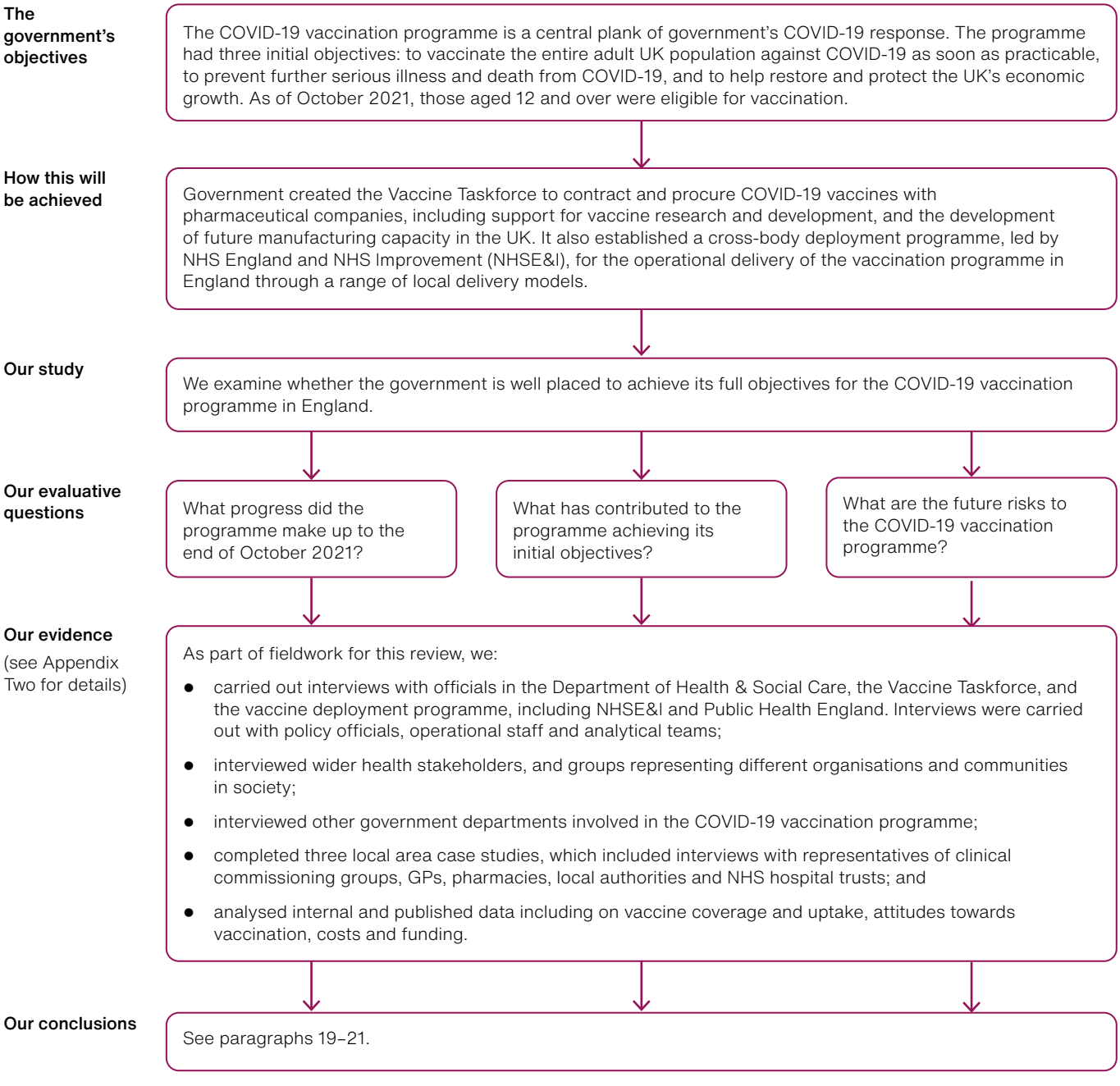
- the content and timing of clinical advice, including on regulatory, approval and safety matters, as issued by the Medicines and Healthcare products Regulatory Agency, Joint Committee on Vaccination and Immunisation or the Chief Medical Officers. These bodies are not formally part of the vaccine programme or its implementation. Their advice was independent, which ministers could then accept and direct the vaccines programme to implement;
- vaccine certification and 'passports' – these are dependent on information from the vaccines programme, but the main focus of the report is on the process for people to receive a vaccination; and
- events after October 2021 – the period up to the end of October 2021 covered the main NHS targets for rolling out two doses to all adults in England, and single doses to 12- to 17- year-olds (as initially only one dose was recommended). The report does not cover the booster programme in depth as, although this started prior to October 2021, it was envisaged at the outset that this would take some months to complete.

39 Comptroller and Auditor General, *Investigation into preparations for potential COVID-19 vaccines*, Session 2019-2021, HC 1071, National Audit Office, December 2020.

4 We applied an analytical framework with evaluative criteria that considered what arrangements would be optimal for achieving value for money. By 'optimal' we mean the most desirable possible, while taking into account the context of the programme, and any specific restrictions or constraints.

5 Our audit approach is summarised in **Figure 25** and our evidence base is described in Appendix Two.

Figure 25
Our audit approach



Appendix Two

Our evidence base

1 We reached our independent conclusions on the COVID-19 vaccination programme in England after analysing evidence collected between July and November 2021. Our audit approach is outlined in Appendix One.

Government interviews

2 We interviewed staff, mostly those with a strategic or operational view of the COVID-19 vaccination programme, in those government departments directly responsible for the programme, including the Department of Health & Social Care (DHSC), the Department for Business, Energy & Industrial Strategy (BEIS), NHS England and NHS Improvement (NHSE&I), the Vaccine Taskforce (the Taskforce), Public Health England (PHE), UK Health Security Agency (UKHSA) and NHS Digital. We also interviewed other departments involved in the delivery of the programme, including the Department for Digital, Culture, Media & Sport, the Cabinet Office, Her Majesty's Prison and Probation Services, as well as the Office for National Statistics (ONS). We also spoke to the UK regulator the Medicines and Healthcare products Regulatory Agency (MHRA).

Stakeholder interviews

3 We carried out stakeholder interviews to understand external views about the programme and its effectiveness, including with the British Medical Association, Care England, Carers UK, Healthwatch England, Homeless Link, Mental Health Consortia, National Pharmacy Association, NHS Providers, Race Equality Foundation, Refugee Council, Royal College of General Practitioners, Royal Voluntary Service, St John Ambulance, Local Government Association, and United Kingdom Homecare Association. We reviewed documents and reports supplied from some of these stakeholders or published online.

Document review

4 We reviewed a range of documents from government departments and their agencies against our main study questions, and particularly to understand progress and developments in the COVID-19 vaccination programme and its plans. This included published material and internal documents accessed under our statutory audit rights, such as ministerial submissions, business plans and cases, board papers and minutes, financial and management reports, internal and external communications, contract information, internal reviews and evaluations of the programme, guidance, and documents published by the Joint Committee on Vaccination and Immunisation (JCVI) and MHRA. We also reviewed publications on COVID-19 vaccinations published by some academic bodies, the World Health Organization and European Medicines Agency.

Data analysis

5 We analysed data from a range of sources to understand the operational and financial performance of the vaccination programme. This included publicly available data from NHSE&I, PHE and UKHSA, ONS, NHS Digital, MHRA and the European Centre for Disease Prevention and Control; and, internal reporting on performance, finance and contracts, and key performance indicators and metrics from DHSC, the Taskforce, NHSE&I, PHE, UKHSA and NHS Digital.

Local case studies

6 We conducted 10 interviews with frontline teams working on the COVID-19 vaccination programme locally, from a sample of three areas: Tower Hamlets, Gloucestershire and Bolton. We interviewed staff who were responsible for delivery of the vaccination programme in their local area, representing clinical commissioning groups, local authorities, NHS trusts, GPs and pharmacies. This included staff responsible for setting up and running vaccine centres. This work was designed to understand:

- how the vaccination programme was rolled out locally in practice, including progress made, success factors and challenges faced by local systems in the rollout to date;
- their engagement with, and the effectiveness of support by, national bodies; and
- future risks faced by local systems as the vaccination programme continues.

Limitations of the evidence

7 The analysis and findings in this report reflect our best understanding at the time of the report, but there are limitations and uncertainty in the completeness and quality of the financial and contractual information available to us. Funding, costs and contracts data are based on internal management information, both audited and unaudited. However, relevant bodies have reviewed and confirmed the accuracy of information relating to them as reflective of their best knowledge at the time of this report. As the programme continues, and further internal assurance work is carried out and payment for aspects of the programme is finalised, some of the figures included in this report may be subject to change.

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