Public Health England

Protecting and improving the nation's health

Impact of COVID-19 on routine childhood immunisations: early vaccine coverage data to May 2021 in England

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Main points

This series of reports presents an early assessment of the extent of COVID-19-related impact on childhood vaccinations based on vaccine coverage data for dose 1, 2 and 3 Hexavalent and dose 1 MMR vaccines extracted from ImmForm.

This is the 19th report and includes vaccine coverage data up to the end of May 2021.

Early vaccine coverage

Early vaccine coverage data uploaded on ImmForm is extracted at 6 months of age to assess vaccine coverage for Hexavalent vaccine doses 1 to 3, and at 18 months to assess vaccine coverage for MMR1. Vaccine coverage data extracted from ImmForm up to and including May 2021 indicates that:

- 87.7% of infants completed the 3-dose course of Hexavalent vaccine by 6 months of age – this is 1.8 percentage points lower compared to May 2019 and 3.8 percentage points higher compared to May 2020
- for children scheduled to receive MMR1 vaccine from March 2020 onwards, vaccine coverage measured at 18 months of age remains approximately 86.0%. In May 2021, 86.4% of infants were vaccinated with MMR1 by 18 months of age – this is 1.7 and 1.5 percentage points lower than May 2019 and May 2020, respectively. The WHO coverage target for MMR1 is 95% coverage by 24 months

All children who have missed out on their routine vaccinations during the coronavirus (COVID-19) pandemic remain eligible for their vaccines. As physical distancing and lockdown measures change throughout the course of the pandemic, it is possible that there may be further impact on primary immunisations. It is therefore important for General Practitioners and local teams to continue offering routine immunisations, check that any infants or children impacted during the pandemic are rescheduled for their immunisation and, where required, consider implementing catch-up or recovery plans.

Official vaccine coverage estimates for England reflecting coverage through the COVID-19 pandemic will be assessed in the Cover of vaccination evaluated rapidly (COVER) programme when children reach their first, second, or fifth birthday [1].

Introduction

On 23 March 2020, in response to the COVID-19 pandemic, physical distancing measures were introduced in England which included school closures, stopping gatherings, non-essential use of public transportation and individuals being advised to work from home [2, 3]. Advice from the Joint Committee on Vaccination and Immunisation (JCVI) on routine childhood immunisations stated that children should continue to receive vaccinations according to the national schedule throughout the lockdown [4].

In England, childhood immunisations are offered according to the routine immunisation schedule [5]. Childhood vaccine coverage is routinely assessed in quarterly and annual COVER programme reports when children reach their first, second, or fifth birthdays [6,7]. The COVER reports display the official vaccine coverage estimates for England.

Due to the timing of data extractions for the COVER collection, the full impact of COVID-19 on primary immunisations is only known when children reach their first, second or fifth birthdays starting from Quarter 3 (financial year 2020 to 2021) of the COVER collection report.

The purpose of this report therefore is to provide an early analysis using an alternative data source to assess the impact of COVID-19 on primary immunisations in England at a younger age than the COVER data.

This report summarises vaccine coverage extracted up to May 2021 for dose 1, 2 and 3 of Hexavalent vaccine at 6 months compared to coverage in 2019 and 2020, and vaccine coverage up to May 2021 for dose 1 MMR at 18 months compared to 2019 and 2020.

Target audience

This report is aimed for those who monitor and support the routine immunisation programme in England at both a local and national level.

Methods

The Hexavalent and MMR vaccines were selected for these analyses as a proxy for routine primary immunisations scheduled before 1 year of age and immunisations scheduled from 1 year of age, respectively, to provide an initial indication of the impact of COVID-19 on all primary immunisation programmes.

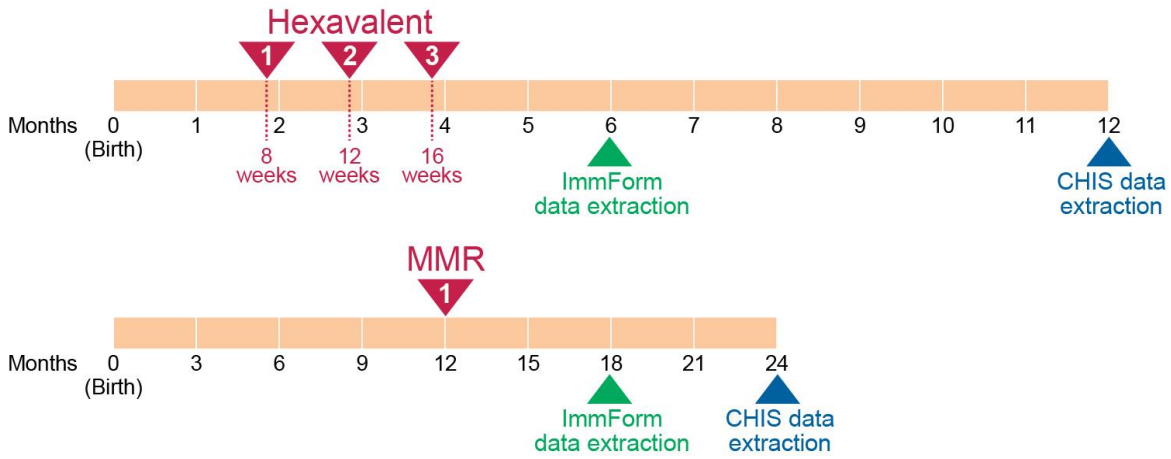
Early monitoring vaccine coverage

GP practice-level vaccine coverage data, automatically uploaded via participating GP IT suppliers to the ImmForm[1] website on a monthly basis, was used to provide an early assessment of vaccine coverage for some of the routine childhood vaccinations. This data is validated and analysed by Public Health England (PHE) to check data completeness, to identify and query any anomalous results, and to describe epidemiological trends. Vaccine coverage is calculated as the number of infants reaching a target age and receiving a vaccine or vaccines as a proportion of the total number of infants at the target age registered at the GP practice.

Vaccine coverage estimates were extracted from ImmForm on a monthly basis for all children who reached 6 months or 18 months of age in that calendar month. Vaccine coverage estimates for Hexavalent vaccines 1, 2 and 3 were estimated when children reached 6 months of age, whilst vaccine coverage estimates for MMR1 were estimated when children reached 18 months of age. Vaccine coverage estimates for a different cohort of children were therefore extracted each month. To assess the potential impact of COVID-19, we compared vaccine coverage data extracted from ImmForm for 2019, 2020 and 2021. Figure 1 shows the recommended scheduled timing of the Hexavalent dose 1, 2 and 3, and MMR1 vaccinations, and compares the timing of the ImmForm and CHIS extractions, which are extracted for reporting on vaccine coverage in the COVER official statistics.

[1] ImmForm is the system used by Public Health England to record vaccine coverage data for some immunisation programmes and to provide vaccine ordering facilities for the NHS

Figure 1. Timeline from when infants are scheduled for their first, second and third dose of hexavalent vaccine and first dose of MMR vaccine and the time when ImmForm and CHIS data are extracted.



Tables A1 and A2 (Appendix) show how ImmForm data extracted relate to the recommended schedule for Hexavalent and MMR1 vaccines. If COVID-19 had impacted vaccine delivery in a specific calendar month, this would be reflected in the Immform data in different months depending on the particular vaccines affected. For example, if COVID-19 had impacted vaccinations scheduled in April 2020, we would expect to see this reflected in the ImmForm data in June 2020 for Hexavalent dose 3, July 2020 for Hexavalent dose 2, August 2020 for Hexavalent dose 1 and October 2020 for MMR1 (Tables A1 and A2).

Results

Early vaccine coverage assessment in England

Monthly vaccine coverage data are available on ImmForm for at least 92% of general practices since January 2019, and for more than 95% of practices for most of this period.

Hexavalent Vaccine

Early vaccine coverage estimates for 2020 and 2021 show there has been a decrease in vaccine coverage measured at 6 months of age for Hexavalent doses 1, 2 or 3, in every month since April 2020 when compared to 2019. (Table 1). The largest percentage decrease is seen in Hexavalent 3 vaccine, indicating fewer children have completed the full 3-vaccine course, though the percentage decrease has got smaller for all 3 doses since January 2021.

Infants who were scheduled from 8 weeks of age for dose 1 Hexavalent vaccine in March 2020 onwards are reflected in the ImmForm vaccine coverage estimates at 6 months of age from July 2020 onwards. Hexavalent 1 coverage trends for 2020 and 2021 compared to 2019 are broadly similar but lower, with the largest decrease of 0.8 percentage points seen in the July 2020 data for infants scheduled to receive their first dose of Hexavalent vaccine in March 2020. Vaccine coverage was 0.8 percentage points lower in May 2021 compared to May 2019 and 0.3 percentage points lower compared to May 2020 (Figure 2).

Infants scheduled from 12 weeks of age for dose 2 Hexavalent vaccine from March 2020 onwards are reflected in June 2020 ImmForm coverage data onwards. Hexavalent 2 coverage trends from the beginning of the pandemic in 2020 and throughout 2021 are broadly similar but remain lower than coverage in 2019. The largest decrease of 2.3 percentage points compared to 2019 was observed in May 2020 (infants born in February 2020), which reflects children eligible for both their first and second dose of Hexavalent in the early months of the first lockdown. Vaccine coverage was 1.0 percentage points lower in May 2021 compared to May 2019 and 1.2 percentage points higher compared to May 2020 (Table 1, Figure 2).

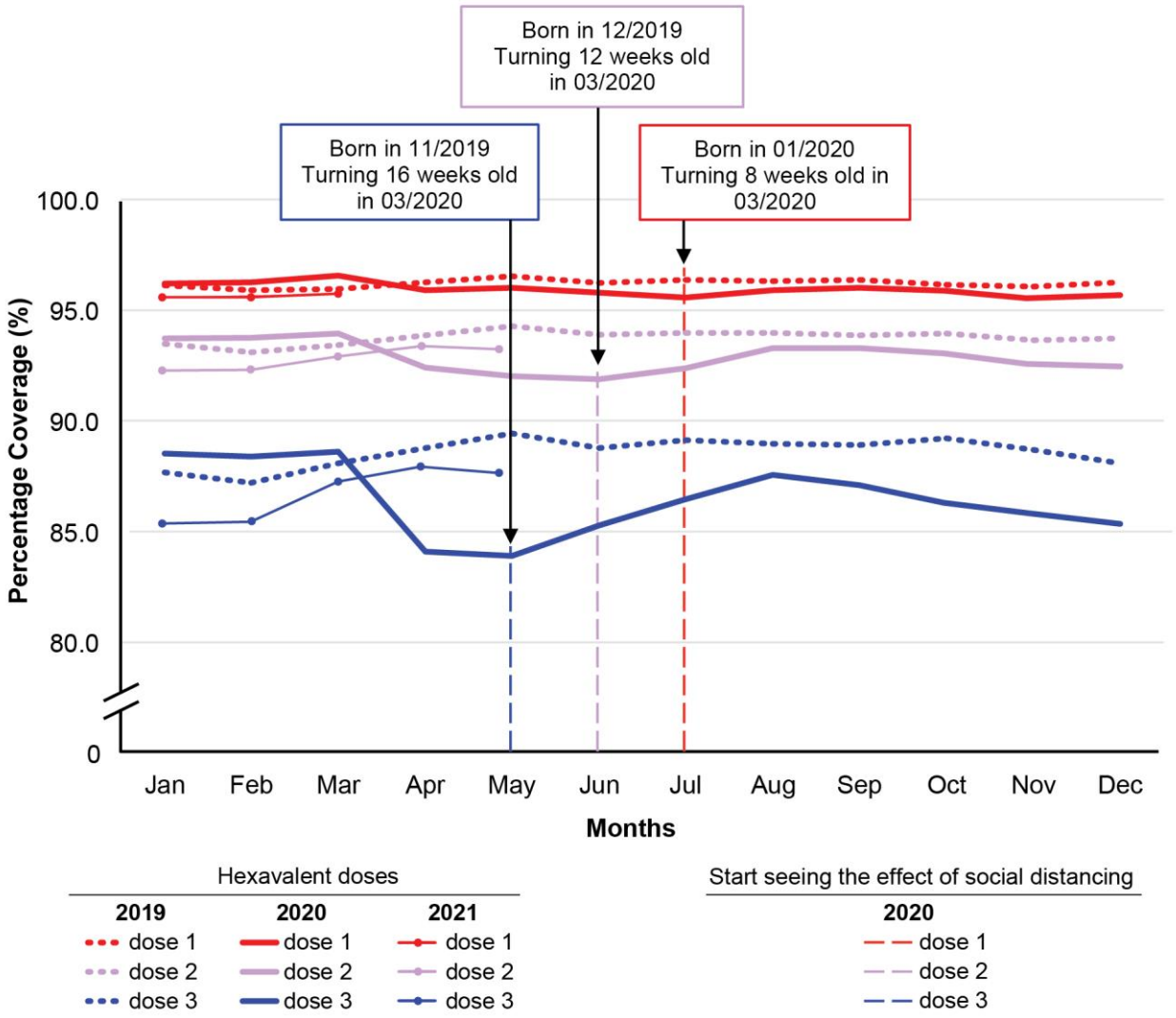
Infants scheduled from 16 weeks of age for dose 3 Hexavalent vaccine from March 2020 onwards are reflected in May 2020 ImmForm coverage data onwards. Vaccine coverage for dose 3 Hexavalent in May 2020 was substantially lower (5.5 percentage points) compared to coverage in May 2019, indicating that infants partially immunised and scheduled for their third dose of Hexavalent in March 2020 are likely to have been impacted by COVID-19 restrictions. Vaccine coverage was 1.8 percentage points lower in May 2021 compared to May 2019 but was 3.8 percentage points higher compared to May 2020 (Table 1, Figure 2).

Table 1. Vaccine coverage for dose 1, 2 and 3 of the Hexavalent vaccine by survey month (extracted at 6-month age cohorts) in 2019, 2020 and 2021

Month	Hexavalent dose 1 (%)						Hexavalent dose 2 (%)						Hexavalent dose 3 (%)					
	2019	2020	% point diff/nce 2020 c.f. 2019	2021	% point diff/nce 2021 c.f. 2019	% point diff/nce 2021 c.f. 2020	2019	2020	% point diff/nce 2020 c.f. 2019	2021	% point diff/nce 2021 c.f. 2019	% point diff/nce 2021 c.f. 2020	2019	2020	% point diff/nce 2020 c.f. 2019	2021	% point diff/nce 2021 c.f. 2019	%point diff/nce 2021 c.f. 2020
Jan	96.1	96.2	0.1	95.6	-0.5*	-0.6*	93.5	93.7	0.3	92.3	-1.2*	-1.4*	87.7	88.5	0.8	85.4	-2.3*	-3.1*
Feb	95.9	96.3	0.4	95.6	-0.3*	-0.7*	93.1	93.8	0.7	92.3	-0.8*	-1.5*	87.2	88.4	1.2	85.5	-1.7*	-2.9*
Mar	96.0	96.6	0.6	95.8	-0.2*	-0.8*	93.4	94.0	0.5	92.9	-0.5*	-1.1*	88.1	88.6	0.5	87.3	-0.8*	-1.3*
Apr	96.2	95.9	-0.3	95.9	-0.3*	0.0*	93.9	92.4	-1.5	93.3	-0.6*	0.9*	88.8	84.1	-4.7	87.9	-0.9*	3.8*
May	96.5	96.0	-0.5	95.7	-0.8*	-0.3*	94.3	92.0	-2.3	93.3	-1.0*	1.2*	89.4	83.9	-5.5*	87.7	-1.8*	3.8*
Jun	96.2	95.8	-0.4				93.9	91.9	-2.0*				88.8	85.3	-3.5*			
Jul	96.4	95.6	-0.8*				94.0	92.4	-1.6*				89.1	86.5	-2.7*			
Aug	96.3	95.9	-0.4*				94.0	93.3	-0.7*				89.0	87.6	-1.4*			
Sep	96.4	96.0	-0.4*				93.9	93.3	-0.6*				88.9	87.1	-1.8*			
Oct	96.2	95.9	-0.3*				93.9	93.0	-0.9*				89.2	86.3	-3.0*			
Nov	96.1	95.5	-0.6*				93.6	92.5	-1.1*				88.7	85.8	-2.9*			
Dec	96.2	95.7	-0.6*				93.7	92.5	-1.3*				88.1	85.4	-2.7*			

* Indicates cohorts of infants scheduled to receive their vaccine from March 2020 onwards

Figure 2. Vaccine coverage for dose 1, 2 and 3 of the Hexavalent vaccine by survey month in 2019, 2020 and 2021



MMR1 Vaccine

MMR1 monthly vaccine coverage estimates measured at 18 months of age from 2019 to 2021, show a monthly decrease from April 2020 onwards. In May 2021, 86.4% of infants were vaccinated with MMR1 at 18 months of age (Table 2 and Figure 4).

The largest decreases of 2.0 to 2.1 percentage points compared to 2019 was observed in August to November 2020 which reflects children eligible for their first MMR vaccine in the early months of the first lockdown. Vaccine coverage was 1.7 percentage points lower in May 2021 compared to May 2019 and 1.5 percentage points lower than coverage in 2020 (Table 2, Figure 4).

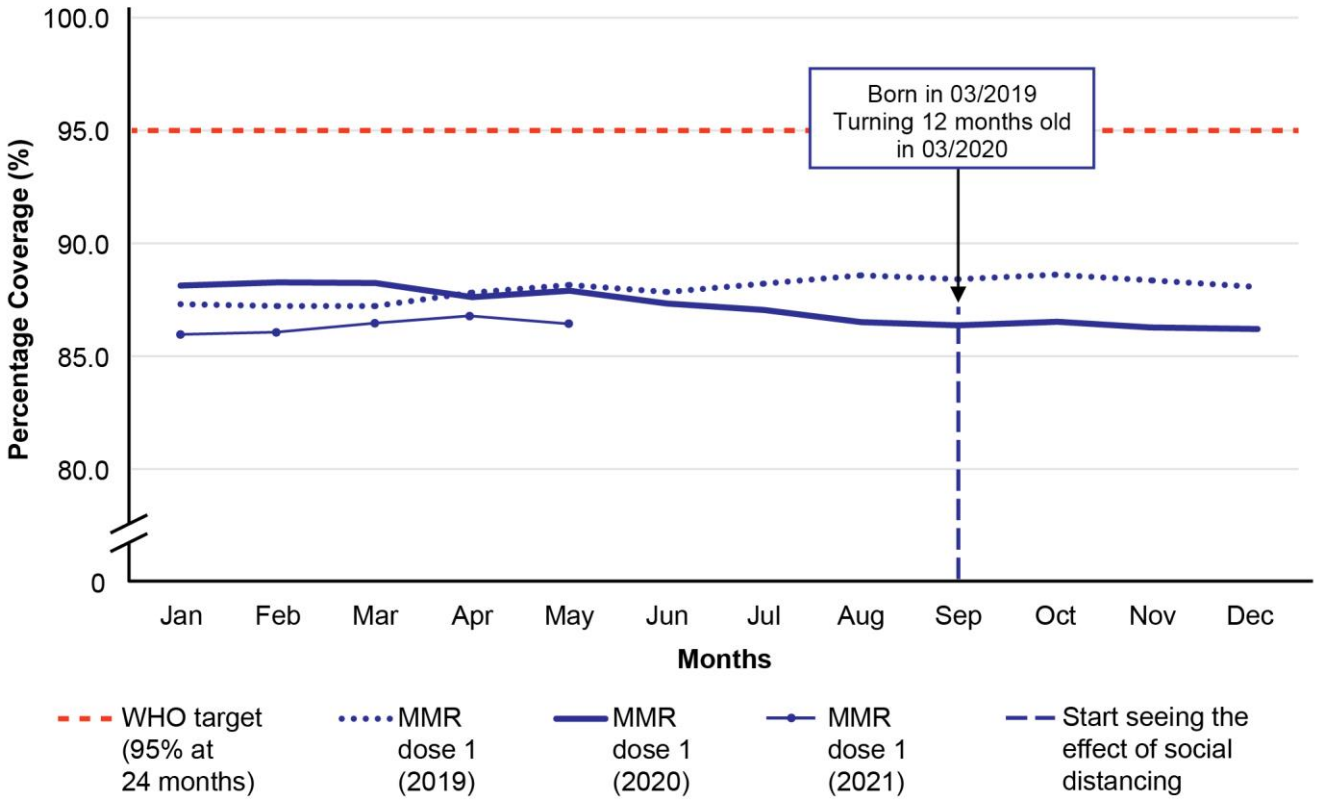
In 2019, 2020 and 2021, MMR1 coverage is substantially below the WHO target of 95% coverage at 24 months.

Table 2. Vaccine coverage for dose 1 of the MMR vaccine by survey month (extracted at 18-month age cohorts) in 2019, 2020 and 2021

	MMR dose 1 (%)					
Survey month	**2019**	**2020**	**Percentage point difference 2020 compared to 2019**	**2021**	**Percentage point difference 2021 compared to 2019**	**Percentage point difference 2021 compared to 2020**
Jan	87.3	88.1	0.8	85.9	-1.4*	-2.2*
Feb	87.2	88.3	1.0	86.0	-1.2*	-2.3*
Mar	87.2	88.2	1.0	86.4	-0.8*	-1.8*
Apr	87.8	87.6	-0.2	86.7	-1.1*	-0.9*
May	88.2	87.9	-0.3	86.4	-1.7*	-1.5*
Jun	87.8	87.3	-0.5			
Jul	88.2	87.1	-1.1			
Aug	88.6	86.5	-2.1			
Sep	88.4	86.4	-2.0*			
Oct	88.6	86.5	-2.1*			
Nov	88.4	86.3	-2.1*			
Dec	88.1	86.2	-1.9*			

* Indicates cohorts of infants scheduled to receive their vaccine from March 2020 onwards

Figure 3. Vaccine coverage for MMR1 at 18 months of age by survey month in 2019, 2020 and 2021



Discussion

This report presents an early indication of the impact of COVID-19 on routine childhood immunisations in England, using early vaccine coverage data. The purpose of this report is to provide early coverage estimates to those who monitor and support the routine immunisation programme at both a local and national level, Early assessment of age-specific vaccine coverage allows local areas to assess performance before children reach the age that formal vaccine coverage is evaluated by the COVER programme, therefore giving local teams an opportunity to catch-up where shortfalls have been identified.

The vaccine coverage data has pointed towards a sustained decrease in children receiving routine childhood immunisations in 2020 and 2021 compared to 2019. Since April 2020, fewer infants have completed the full course of 3 Hexavalent vaccines by 6 months of age, and fewer children have received MMR1 by 18 months of age. The initial decrease in vaccination may be associated with COVID-19 messaging about staying home initially, overwhelming the messaging that the routine immunisation programme was to remain operating as usual [2,4,10]. Additionally, anecdotal information indicated that in some areas, to ensure safe and best practice, GPs had to reschedule appointments in the initial weeks to ensure social distancing within GP practices. Overall, decreased vaccination coverage compared to 2019 levels has continued throughout the pandemic, though the size of the decrease in vaccine coverage is increasingly smaller since January 2021 onwards.

Early monthly assessment of completed courses (3 doses) of Hexavalent vaccines in May 2021, measured at 6 months, was at 87.7%. This is lower than the 95% WHO target for the full course of 3 Hexavalent vaccines at 5 years [11]. Dose 3 Hexavalent vaccine coverage was 1.8 percentage points lower in May 2021 compared to May 2019 but was 3.8 percentage points higher compared to May 2020. Early monthly assessment of MMR1 coverage for May 2021 measured at 18 months of age is at 86.4% and falls far short of the WHO target of 95% coverage by 24 months of age [11]. MMR1 18-month coverage was 1.7 percentage points lower in May 2021 than in May 2019. Coverage will continue to be closely monitored for both vaccines in the upcoming months.

The most recent quarterly COVER report, evaluated vaccine coverage for children who reached their first, second or fifth birthday from January to March 2021. Vaccine coverage for children turning 12 months old during the fourth quarterly COVER evaluation report (born January to March 2020) reflects infants who were scheduled to receive their first dose of Hexavalent vaccine during the first national lockdown (from March to May 2020).Vaccine coverage for a completed course of the 3 Hexavalent vaccines at 12 months old in Quarter 4 2020 to 2021 was 1.1 percentage point lower than coverage during the same quarter in 2019 to 2020. Furthermore, among children who were born between January to March 2019 and were scheduled to receive their first dose of MMR from January to March 2020, when lockdown initiated, a 1.5 percentage point decrease in MMR1 at 24 months was observed in the COVER

Quarter 4 report compared to Quarter 4 2019 to 2020. Children scheduled to receive their vaccines in March 2020 onwards, or those who were late booking their appointment and ordinarily would have caught up by their first or second birthday may have been impacted by social distancing and lockdown measures from late March 2020 onwards. This may be a contributing factor to the observed decreases in coverage seen in this quarter [1,6,8].

Strengths and limitations

This analysis of early vaccine coverage for children before they reach the target ages of 12 and 24 months used for routine surveillance systems provides a timelier assessment of the impact of COVID-19 on primary immunisations in England. The report helps monitor national level vaccine coverage throughout the pandemic.

Vaccine coverage estimates from ImmForm show early estimates of vaccine coverage. This data allows for local performance management where areas can assess which cohorts may require further follow-up for vaccination.

Vaccine coverage estimates are extracted by GP IT suppliers, based on a set list of SNOMED CT codes, therefore these estimates only reflect coverage for children registered with a GP practice, and that have correct coding in their GP record. Furthermore, the ImmForm data is experimental data and to date has only been used for performance management purposes – it is not validated at the GP practice level. Smaller areas may see greater differences in coverage due to smaller numbers.

Conclusion

Future monthly ImmForm collections will continue to monitor any impact of COVID-19 on early vaccine coverage. Vaccine coverage will vary across the country and local areas can monitor early estimates of coverage in their areas using ImmForm and other data sources to identify areas needing more support.

As physical distancing measures change throughout the course of the pandemic and the risk of other infectious diseases circulating increases it is of utmost importance that GPs continue offering routine immunisations, check and recall those who have not received a vaccine and, where required, recovery plans should be set in place to address any drop in vaccine coverage observed since the beginning of the pandemic.

Local areas should engage with specific cohorts of infants and children who may have been affected when social distancing measures were introduced, to ensure that they are rescheduled for their immunisations [12]. These children will remain eligible and will be assessed in the appropriate age-specific routine quarterly coverage estimates in the COVER publication.

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Appendices

Table A1. Monthly data extracts from ImmForm survey for Hexavalent vaccine, showing month of birth and the month vaccine is first due.

Hexavalent vaccine					
Month data is extracted from ImmForm	**Age at which data is extracted**	**Month of birth**	**Month vaccine first due**		
			Dose 1 (8 weeks old)	Dose 2 (12 weeks old)	Dose 3 (16 weeks old)
Jan 2020	6 months	Jul 2019	Sep 2019	Oct 2019	Nov 2019
Feb 2020	6 months	Aug 2019	Oct 2019	Nov 2019	Dec 2019
Mar 2020	6 months	Sep 2019	Nov 2019	Dec 2019	Jan 2020
Apr 2020	6 months	Oct 2019	Dec 2019	Jan 2020	Feb 2020
May 2020	6 months	Nov 2019	Jan 2020	Feb 2020	Mar 2020
Jun 2020	6 months	Dec 2019	Feb 2020	Mar 2020	Apr 2020
Jul 2020	6 months	Jan 2020	Mar 2020	Apr 2020	May 2020
Aug 2020	6 months	Feb 2020	Apr 2020	May 2020	Jun 2020
Sep 2020	6 months	Mar 2020	May 2020	Jun 2020	Jul 2020
Oct 2020	6 months	Apr 2020	Jun 2020	Jul 2020	Aug 2020
Nov 2020	6 months	May 2020	Jul 2020	Aug 2020	Sep 2020
Dec 2020	6 months	Jun 2020	Aug 2020	Sep 2020	Oct 2020
Jan 2021	6 months	Jul 2020	Sep 2020	Oct 2020	Nov 2020
Feb 2021	6 months	Aug 2020	Oct 2020	Nov 2020	Dec 2020
Mar 2021	6 months	Sep 2020	Nov 2020	Dec 2020	Jan 2021
Apr 2021	6 months	Oct 2020	Dec 2020	Jan 2021	Feb 2021
May 2021	6 months	Nov 2020	Jan 2021	Feb 2021	Mar 2021

Table A2. Monthly data extracts from ImmForm survey for MMR1 vaccine, showing month of birth and the month vaccine is first due.

MMR1			
Month data is extracted from ImmForm	**Age at which data is extracted**	**Month of birth**	**Month vaccine first due**
Jan 2020	18 months	Jul 2018	Jul 2019
Feb 2020	18 months	Aug 2018	Aug 2019
Mar 2020	18 months	Sep 2018	Sep 2019
Apr 2020	18 months	Oct 2018	Oct 2019
May 2020	18 months	Nov 2018	Nov 2019
Jun 2020	18 months	Dec 2018	Dec 2019
Jul 2020	18 months	Jan 2019	Jan 2020
Aug 2020	18 months	Feb 2019	Feb 2020
Sep 2020	18 months	Mar 2019	Mar 2020
Oct 2020	18 months	Apr 2019	Apr 2020
Nov 2020	18 months	May 2019	May 2020
Dec 2020	18 months	Jun 2019	Jun 2020
Jan 2021	18 months	Jul 2019	Jul 2020
Feb 2021	18 months	Aug 2019	Aug 2020
Mar 2021	18 months	Sep 2019	Sep 2020
Apr 2021	18 months	Oct 2019	Oct 2020
May 2021	18 months	Nov 2019	Nov 2020

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