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Impact of COVID-19 on childhood vaccination counts to week 43, and vaccine coverage to September 2020 in England: interim analyses

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Impact of COVID-19 on childhood vaccination counts to week 43 and vaccine coverage to September 2020 in England: interim analyses

Main points

This series of reports presents an interim assessment of the extent of COVID-19-related impact on childhood vaccinations based on both (a) aggregated vaccine counts of dose 1 Hexavalent and dose 1 MMR vaccinations delivered to infants/children and (b) vaccine coverage data for dose 1, 2 and 3 Hexavalent and dose 1 MMR vaccines extracted from ImmForm.

This fifth report, that includes vaccination counts data up to week 43, and vaccine coverage data up to September 2020, indicates that:

Vaccination counts for the first dose of Hexavalent (DTaP/IPV/Hib/HepB) in children aged 6 months and the first dose of MMR (Measles, Mumps, Rubella) in children aged 12 to 18 months were extracted from The Phoenix Partnership, which represents data from approximately 38% of GP practices in England. Hexavalent and MMR vaccination counts fell at the time of introduction of physical distancing measures in March 2020 (week 13) compared to the same period in 2019. This was followed by a rise from weeks 16 onwards which has stabilised and is comparable to vaccination counts prior to the COVID-19 pandemic. Overall vaccination counts for Hexavalent and MMR vaccine remain lower at 3.8 and 2.8 percentage points lower by week 43 in 2020 than the overall vaccination counts by week 43 in 2019.

The initial decrease in **vaccination counts** is likely to be associated with COVID-19 messaging about staying at home which could have overwhelmed the messaging that the routine immunisation programme was to continue. The data presented is from one of the largest GP IT suppliers (TPP) and therefore do not represent data for all of England. Therefore, this data may not reflect regional and local variation.

Vaccine coverage data uploaded on ImmForm for infants who were scheduled for their first dose of Hexavalent vaccine at 8 weeks around the time when social distancing measures were initiated continues to follow similar trends to, and is comparable with, coverage estimates for the same target age group during 2019 and early 2020.

Infants scheduled for their **second and/or third dose(s) of the Hexavalent vaccine** around the time that social distancing measures were initiated indicate lower vaccine

coverage in 2020 compared to the equivalent cohorts in 2019, which may reflect an impact on completed courses of Hexavalent vaccine. These infants will remain eligible for the vaccine and will be reassessed at their first birthday in the routine quarterly COVER programme.

Likewise, children scheduled for their first dose of MMR vaccine at 12 months around the time that social distancing measures were initiated had slightly lower MMR vaccine coverage when measured at 18 months of age in the September 2020 evaluation compared to September 2019. This data must be viewed with caution as it reflects only the very initial period when social distancing measures were implemented. Future reports will include monthly vaccine coverage estimates uploaded to ImmForm via GP IT supplier extracts.

The observed drop in vaccination counts and coverage for both vaccines could impact on subsequent doses offered throughout the pandemic. 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 at the local level throughout the country. It is therefore important for GPs to continue offering routine immunisations, check that any infants or children impacted during the early stages of the pandemic are rescheduled for their immunisation and, where required, **recovery plans should be put in place** to account for the initial drop in vaccination counts observed.

Introduction

On 23 March 2020 (week 13), 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 [1,2]. 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 [3].

In England, childhood immunisations are offered according to the routine immunisation schedule. Childhood vaccine coverage is routinely assessed in quarterly COVER (Cover of vaccination evaluated rapidly) programme reports for children who reached their first, second, or fifth birthday [4]. The COVER reports display the official vaccine coverage estimates for England. Due to the timing of data extractions for the COVER collection, it is not possible to assess the initial impact of COVID-19 on primary immunisations in the initial weeks and months of the pandemic.

The purpose of this report therefore is to provide an interim analysis using alternative data sources to assess the impact of COVID-19 on primary immunisations in England. To evaluate the early impact of physical distancing measures on the delivery of childhood vaccinations 2 datasets have been analysed:

1. An assessment of aggregated weekly vaccination counts from 2019 and 2020 for dose 1 Hexavalent (Diphtheria, Tetanus, Pertussis (whooping cough), Polio, *Haemophilus influenzae* type b (Hib) and Hepatitis B) delivered to infants 6 months and younger and MMR1 (fist dose of Measles, Mumps and Rubella vaccine) to children between the ages of 12 and 18 months provided by the GP IT supplier The Phoenix Partnership (TPP)[1].
2. An early assessment of national vaccine coverage from aggregated GP vaccine coverage data for dose 1, 2 and 3 of Hexavalent vaccines at 6 months and MMR1 at 18 months collected monthly via ImmForm[2]. The ImmForm coverage data provides interim estimates of vaccine coverage until the official COVER statistics reflecting the cohorts impacted by COVID-19 are assessed during 2021.

[1] TPP supplies SystmOne which is an electronic patient record used by more than 2,600 primary care practices in the UK
[2] 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

This report will summarise vaccination counts for dose 1 Hexavalent and MMR1 updated weekly from TPP in 2020 compared to 2019 for the age groups stated above. This report will also summarise vaccine coverage extracted up to September 2020 for dose 1, 2 and 3 of Hexavalent vaccine at 6 months compared to coverage in 2019, and vaccine coverage up to September 2020 for dose 1 MMR at 18 months compared to 2019.

Target audience

This report is aimed for those who routinely monitor and support the routine immunisation programme in England. Furthermore, this report is aimed for local areas who monitor and deliver immunisation programmes in their local areas while recognizing national trends in coverage throughout the pandemic in this report.

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 at 1 year of age, respectively, to provide an initial indication of the impact of COVID-19 on all primary immunisation.

Monitoring weekly vaccination counts provided by TPP

Aggregated weekly counts of the dose 1 Hexavalent delivered to infants 6 months and younger and dose 1 MMR to children between the ages of 12 and 18 months were provided by TPP for all weeks in 2019 and the first 43 weeks of 2020. Weekly trends in vaccination counts were compared between 2019 and 2020.

Early monitoring vaccine coverage

GP practice-level vaccine coverage data automatically uploaded via participating GP IT suppliers to the ImmForm 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 PHE to check data completeness, to identify and query and anomalous results, and to describe epidemiological trends. Vaccine coverage is calculated as the number of infants reaching a target age and receiving a vaccine(s) as a proportion of the total number of infants at the target age registered at the GP practice.

We compared vaccine coverage data from 2020 with the equivalent month in 2019.

Vaccine coverage estimates for infants born in January 2020, and who were scheduled to receive their first dose of Hexavalent vaccine (at 8 weeks of age) in March 2020, were extracted from ImmForm in July 2020. Thereafter we extracted monthly first dose Hexavalent coverage data for infants that reached 6 months of age in the evaluation month (Table 1).

Similarly, vaccine coverage estimates for infants born in December 2019 and scheduled to receive their second dose of Hexavalent vaccine (at 12 weeks of age) in March 2020, were extracted from ImmForm from June 2020. Thereafter we extracted monthly second dose Hexavalent coverage data for infants that reached 6 months of age in the evaluation month (Table 1).

Finally, vaccine coverage estimates for infants born in November 2019 and scheduled to receive their third dose of Hexavalent vaccine (at 16 weeks of age) in March 2020 onwards were extracted from ImmForm from May 2020. Thereafter we extracted monthly third dose Hexavalent coverage data for infants that reached 6 months of age in the evaluation month (Table 1).

Children are first offered MMR1 on or shortly after their first birthday. Vaccine coverage estimates for infants born in March 2019, and who were scheduled to receive MMR1 from March 2020 onwards, were extracted from ImmForm when these infants reached 18 months of age from September 2020. Coverage estimates for MMR1 in those becoming 18 months in subsequent months will be published monthly hereafter.

Physical distancing measures were introduced in England on 23 March 2020, so it would be expected that infants and children eligible for vaccines in April would also have been affected by COVID-19 and reflected in the following monthly ImmForm extracts at 6 or 18 months.

Similarly, infants and children that were scheduled for vaccines prior to 23 March 2020 may also have been impacted by the implementation of social distancing measures, therefore, coverage within their 6 and 18-month evaluation on ImmForm may be lower and shown in previous monthly extracts.

Table 1. Vaccine type, dose and age of cohort when data is extracted from ImmForm survey

Vaccine	Dose	Age due under routine immunisation schedule	Month of birth	Scheduled for vaccine	Age when extracted from ImmForm	Month when directly impacted by ImmForm
Hexavalent	1	8 weeks	Jan 2020	March 2020	6 months	July 2020 onwards
	2	12 weeks	Dec 2019	March 2020		June 2020 onwards
	3	16 weeks	Nov 2019	March 2020		May 2020 onwards
MMR	1	12 months	March 2019	March 2020	18 months	Sept 2020 onwards

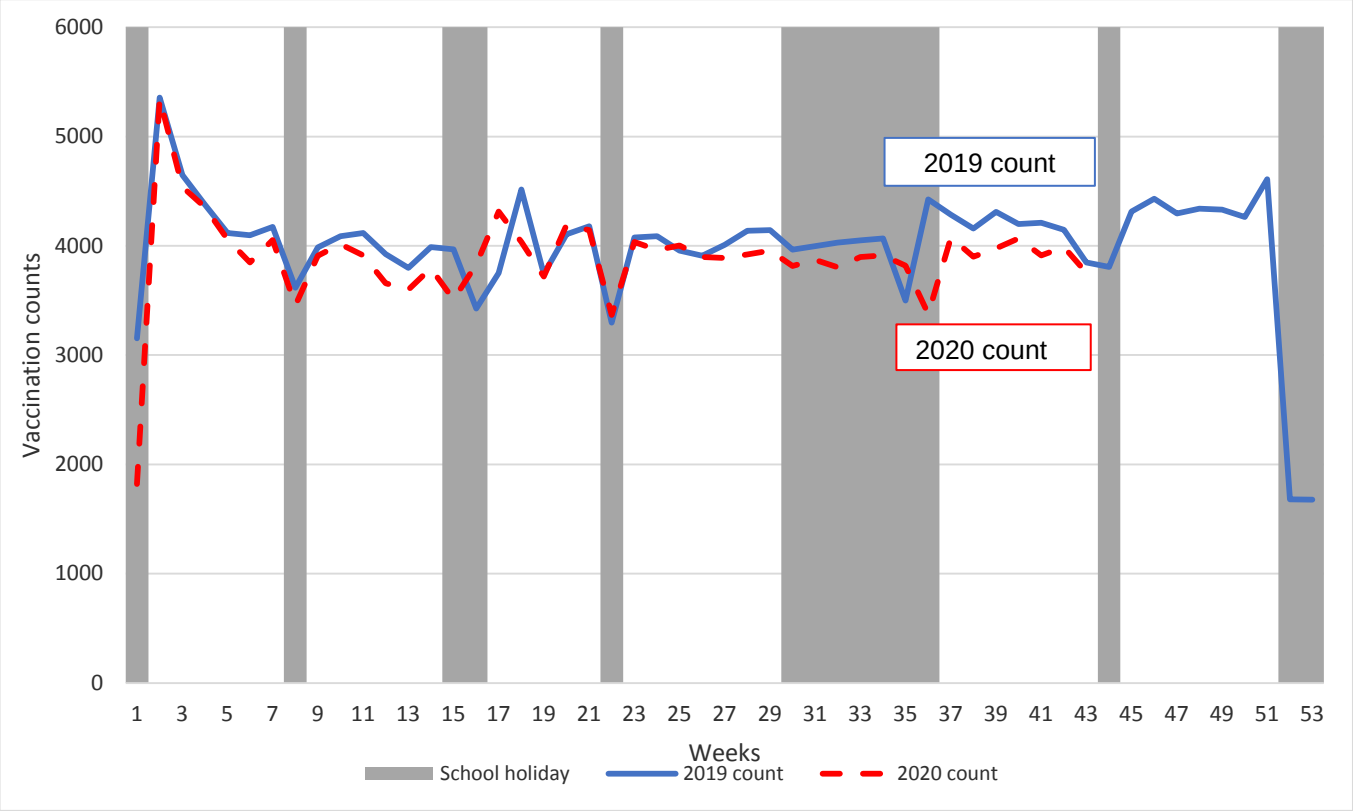
Results

Vaccination counts provided by TPP

TPP represents approximately 38% of data for all practices in England. Vaccination counts from TPP general practices in 205 CCGs that were in operation in 2019 and 2020 were extracted. By week 43, a total of 167,322 Hexavalent vaccination counts were extracted in 2020 compared to 173,950 in 2019 (-3.8 percent point change) and 167,670 MMR vaccination counts in 2020 compared to 172,419 in 2019 (-2.8 percent point change).

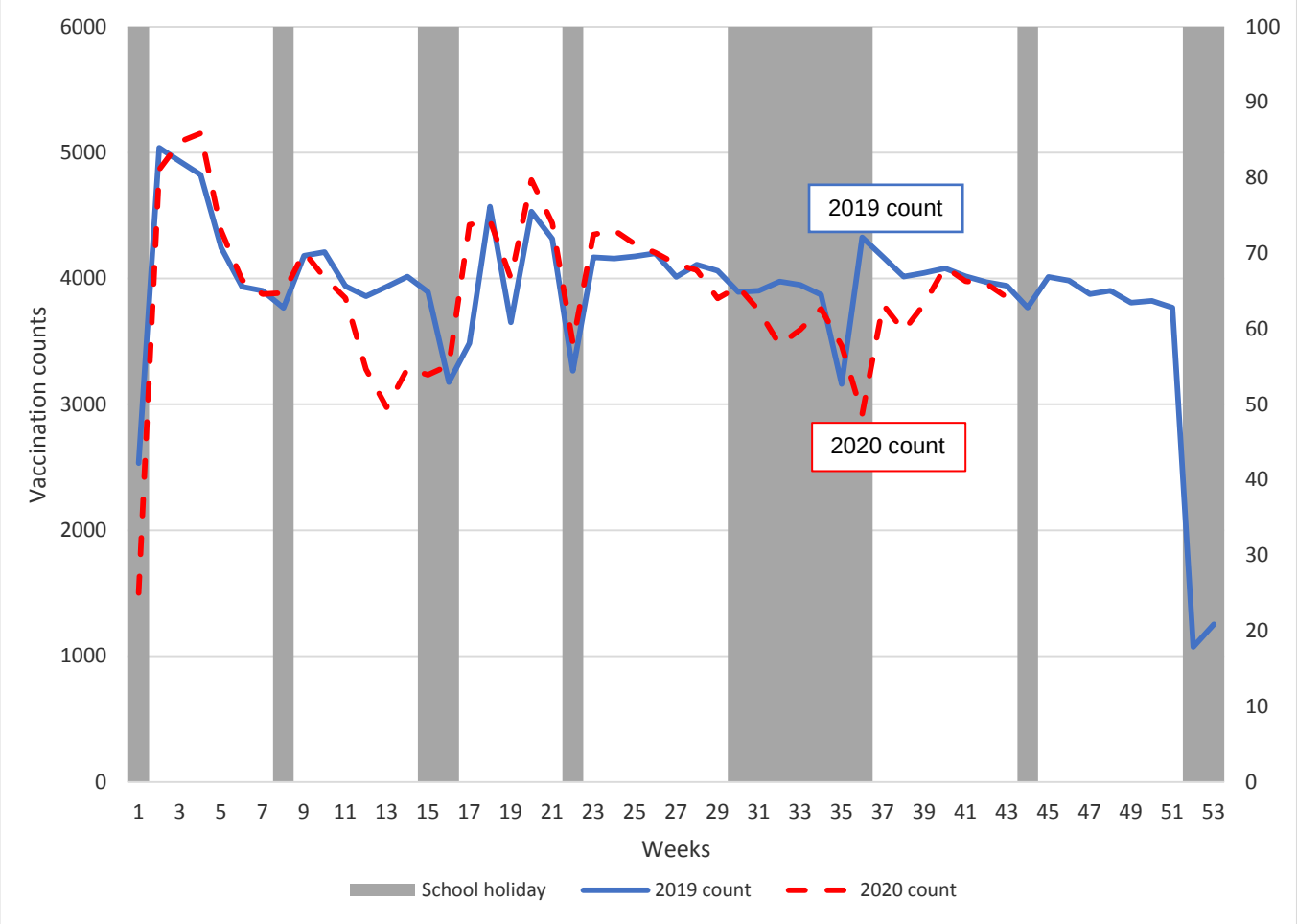
The results initially indicated the first dose Hexavalent vaccination counts for infants younger than 6 months gradually declined, though not accentuated by the physical distancing [1] (Figure 1). MMR1 vaccination counts for children aged 12 to 18 months dropped almost 20% in the first weeks after the introduction of physical distancing compared to the same period in 2019 (Figure 2). Vaccination counts then increased in weeks 16 and 17 despite physical distancing measures remaining in place [1]. Since week 17, vaccination counts for both MMR1 and Hexavalent remain stable with drops in coverage and percentage change in coverage from 2019 and 2020 often during school holidays (Figure 1, 2 and 3).

Figure 1: Dose 1 Hexavalent vaccination counts in infants younger than 6 months in TPP practices in operation in both 2019 and 2020 in England by week in 2019 and 2020*



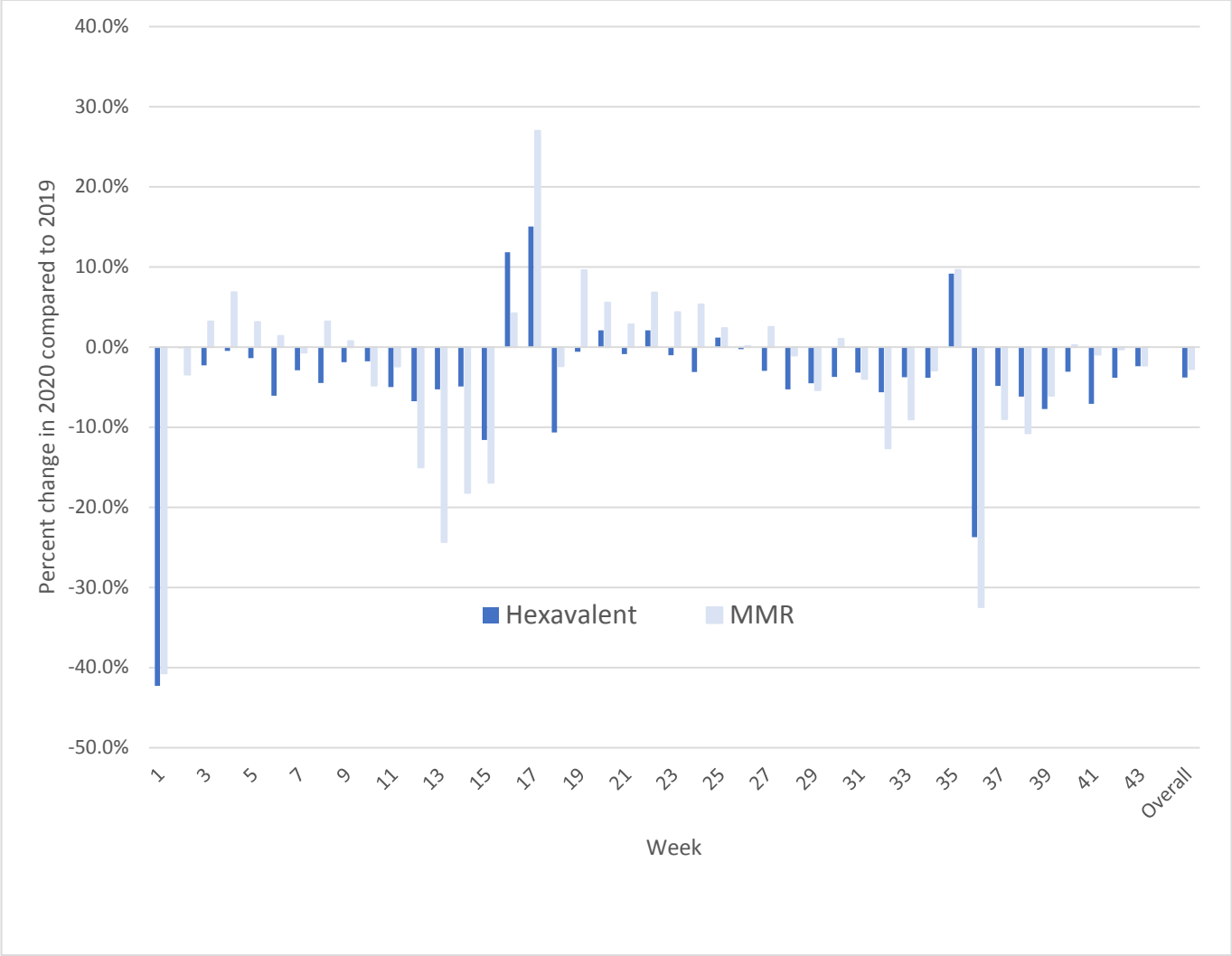
* School holidays (often coinciding with family holidays) for are for the 2020 calendar year. These holidays may vary slightly by year and by local area. School holidays for the 2019/20 academic year were in weeks 43, 52, 53, 1, 8, 15, 16, 19, 22, 30 to 36. School holidays for the 2020/21 academic year are in weeks 44, 52, 53, 7, 13, 14, 18, 22, 29 to 35.

Figure 2: MMR 1 vaccination counts in infants ages 12 to 18 months in TPP practices open in 2019 and 2020 in England by week in 2019 and 2020



* School holidays for are for the 2020 calendar year. These holidays may vary slightly by year and by local area. School holidays for the 2019/20 academic year were in weeks 43, 52, 53, 1, 8, 15, 16, 19, 22, 30 to 36. School holidays for the 2020/21 academic year are in weeks 44, 52, 53, 7, 13, 14, 18, 22, 29 to 35.

Figure 3: Percent change in dose 1 Hexavalent (in infants under 6 months) and MMR 1 vaccination (in infants ages 12 to 18 months) counts in 2020 compared to 2019, by week in TPP practices open in 2019 and 2020 in England



Early vaccine coverage assessment in England

Vaccine coverage data for more than 92% of practices are available monthly since January 2019 on ImmForm, and for more than 95% of practices for most of this period.

Hexavalent Vaccine

Infants who were first scheduled at 8 weeks of age for dose 1 Hexavalent vaccine in March 2020 onwards are reflected in the ImmForm vaccine coverage estimates for dose 1 Hexavalent at 6 months from July 2020 onwards and show similar trends in vaccine coverage compared to 2019 (Figure 4).

Infants scheduled at 12 weeks of age for dose 2 Hexavalent vaccine from March 2020 onwards are reflected in June ImmForm coverage data onwards. Vaccine coverage for dose 2 Hexavalent in June and July 2020 was lower than coverage estimates in June and July 2019, indicating that infants scheduled for their second dose of Hexavalent vaccine in March and April have most likely been impacted by COVID-19.

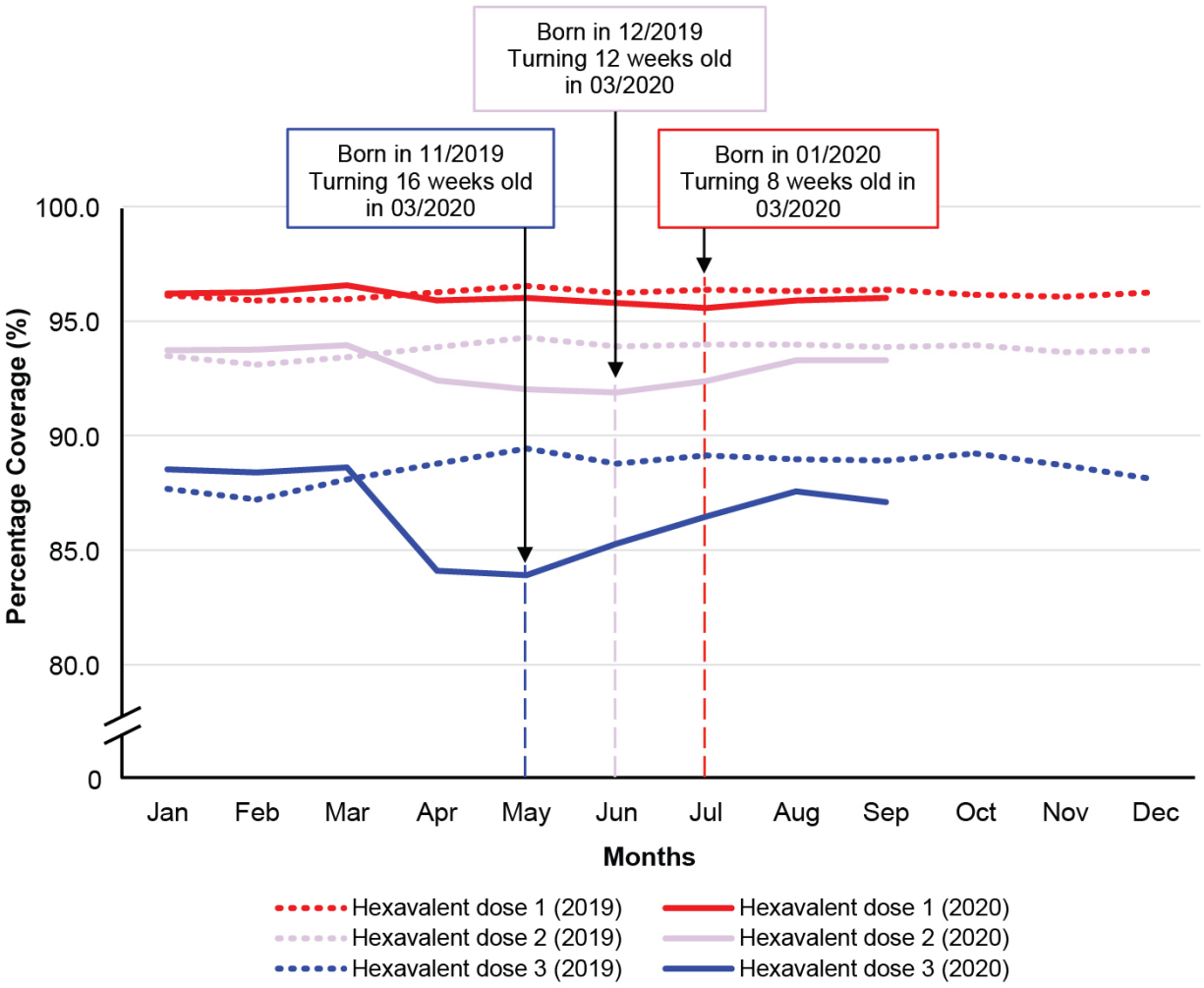
Infants turning 6-months-old in the July and August extract on ImmForm and who were scheduled for dose 2 Hexavalent in May and June appear less impacted by COVID-19 and coverage is more aligned with the 2019 estimates (Figure 4). These infants would have also been scheduled for their first dose of Hexavalent vaccine during April and May when the social distancing measures were still in place.

Infants scheduled at 16 weeks of age for dose 3 Hexavalent vaccine from March 2020 onwards are reflected in May ImmForm coverage data onwards. Vaccine coverage for dose 3 Hexavalent in May 2020 was lower compared to coverage in May 2019, indicating that infants scheduled for their third dose of Hexavalent in March have most likely been impacted by COVID-19.

Infant scheduled for dose 3 Hexavalent vaccine from April to July (turning 6-months-old in the June to September extracts on ImmForm, respectively) still appear impacted by COVID-19 though coverage is more aligned with the 2019 estimates (Figure 4).

Hexavalent coverage for dose 2 in April and May 2020 and for dose 3 in April 2020 is lower than coverage during these months in 2019. This may reflect infants scheduled for dose 2 and 3 Hexavalent vaccine prior to March but who missed their opportunity and were further impacted as the social distancing measures began (Figure 4).

Figure 4: Vaccine coverage for dose 1, 2 and 3 of the Hexavalent vaccine by month in 2019 and 2020

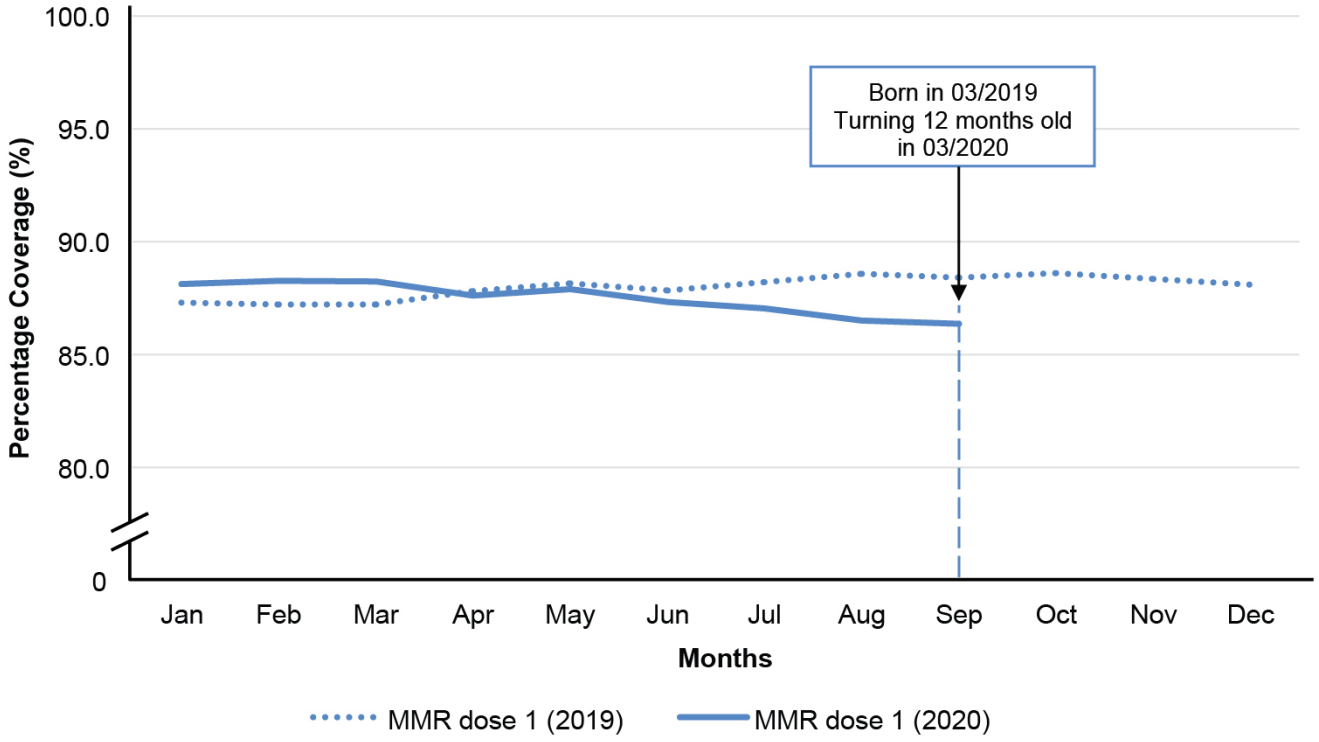


MMR1 Vaccine

Children first scheduled for MMR1 vaccine in March 2020 onwards, at 12-months-old are reflected in the ImmForm vaccine extract at 18 months from September 2020 onwards. MMR1 vaccine coverage at 18 months is slightly lower in September 2020 compared to September 2019 (Figure 5).

The impact of COVID-19 on MMR1 coverage will continued to be monitored in the October 2020 extract (compared to October 2019 coverage) which will reflect children that turned 12 months in April 2020.

Figure 5: Monthly MMR1 vaccine coverage at 18 months of age: 2019 and 2020



Discussion

At the introduction of the physical distancing measures on 23 March 2020 (week 13), vaccination counts for MMR1 and dose 1 Hexavalent fell compared to 2019. Although this report does not include vaccination counts for dose 2 and 3 of the Hexavalent vaccine, results on vaccine coverage would suggest similar findings and an overall drop in counts in 2019 compared to 2020.

This decrease in vaccination counts 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 [1]. 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.

Vaccination counts for both vaccines began to rise in weeks 16 and 17 and were comparable to 2019 counts, and to counts in 2020 prior to the COVID-19 pandemic, indicating that the initial drop had recovered. However, the overall vaccination counts for dose 1 Hexavalent and MMR1 vaccines is slightly lower than the 2019 counts. The drop-in vaccination counts may be explained by a slightly smaller cohort or a small decline in coverage [2]. It is also important to note that school holidays and bank holidays occur in different weeks in 2019 and 2020, and therefore can cause weekly differences.

Early assessment of age-specific vaccine coverage allows local areas to assess performance before children reach the age that formal vaccine coverage is evaluated. Hexavalent coverage estimates for those infants that turned 8 weeks at or after the time when social distancing measures were implemented (23 March 2020), evaluated in August 2020 at 6 months of age, continue to follow similar trends to, and are comparable with, coverage estimates for the same target age group during 2019 and early 2020. However, dose 2 and 3 of the Hexavalent vaccine coverage estimates indicate initial drop before and during the initial months when social distancing measures were initiated. Vaccine coverage for dose 2 and 3 of the Hexavalent vaccine is more comparable to 2019 coverage estimates in the most recent monthly extracts though coverage does remain lower in 2020.

Likewise, vaccine coverage estimates for MMR1 at 18 months for September 2020 are lower than 18-month vaccine coverage reported in September 2019. This data must be viewed with caution as it reflects only the very initial period when social distancing measures were implemented. Future monthly ImmForm data will continue to monitor these trends.

Strengths and limitations

This interim 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 more timely assessment of the impact of COVID-19 on primary immunisations in England. The report helps monitor national level vaccine coverage throughout the pandemic.

The vaccination counts data presented in this report was the first available data extracted to monitor the impact of COVID-19 on primary immunisations in England. Weekly vaccination counts do show an early assessment and may predict future drops in vaccine coverage extracted in later ImmForm extracts. However, it is important to note that the data is only from one GP IT supplier (TPP) and coverage estimates cannot be calculated without age-specific denominator data. Additionally, some regions are less represented than others and therefore do not represent data for all of England. This data should therefore be viewed with some caution and will not necessarily reflect vaccination count trends at a local level.

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. It is important to note that the data presented in this report should be viewed with caution as it reflects vaccinations offered in the months when social distancing measures were first implemented. Furthermore, the ImmForm data is experimental data and to date has only been used for performance management purposes and is not validated at the GP practice level.

Conclusion

Future weekly vaccination counts data from TPP and 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 these infants are rescheduled for their immunisations. These infants will remain eligible and full coverage data will be assessed at the appropriate timepoint in the routine quarterly coverage estimates in the COVER publication.

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