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## Vaccine Preventable Disease Programme

# Coverage of pertussis and influenza vaccination in pregnant women in Wales 2016/17

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### Purpose and Summary of Document:

We ascertained coverage of pertussis and influenza vaccine in a sample of pregnant women at the time of their delivery. The survey was conducted on women in health board maternity units in Wales during a five day period in January 2017, with the exception of one health board which surveyed women over a five day period in May 2017. Self-reported uptake was 78.3% for pertussis vaccination, 76.8% for influenza vaccination and 71.9% for both pertussis and influenza vaccination. Of the women surveyed, 93.9% recalled being offered pertussis vaccination and 94.1% recalled being offered influenza vaccination. Coverage of pertussis vaccination has increased this year compared to last year, from 72.4% to 78.3% and coverage of influenza vaccination has also increased, from 75.6% to 76.8%.

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# 1 Background

Following a rise in the number of cases of whooping cough in young babies during 2012, the Chief Medical Officer (CMO) for Wales announced on 28<sup>th</sup> September 2012 that pregnant women will be offered a vaccination to protect their newborn babies as a temporary programme (Welsh Government, 2012). Cases of pertussis in infants born to vaccinated mothers have reduced by over 90% as a result of the programme (Amirthalingam *et al*, 2014). In light of the success of the vaccination programme in saving infant lives and the continued increase in pertussis incidence, the Joint Committee on Vaccination and Immunisation (JCVI) recommended in June 2014 that the programme should be extended for a further five years (JCVI, 2014). Pregnant women are at higher risk of complications of influenza and therefore are also recommended to receive seasonal influenza vaccine (Welsh Government, 2014).

Based on available evidence at the time JCVI recommended in 2012 offering pertussis vaccination to pregnant women between 28 to 32 weeks gestation would maximise infant antibody levels at birth (JCVI, 2012). In April 2016, based on new evidence, the advice was changed to recommend that immunisation against pertussis could take place from week 16 of pregnancy (JCVI, 2016).

Ascertaining accurate denominator information and calculating uptake at the point of immunisation, in a robust way, for this group through data routinely collected from general practice is problematic.

Although routine surveillance data is collected automatically from General Practice on vaccinations given to pregnant women, difficulties in robust ascertainment of the denominator result in underestimation of uptake. Therefore, this annual survey was established to provide robust estimates of coverage of pertussis and influenza vaccine in pregnant women at the time of delivery. This year, the survey was conducted in January 2017.

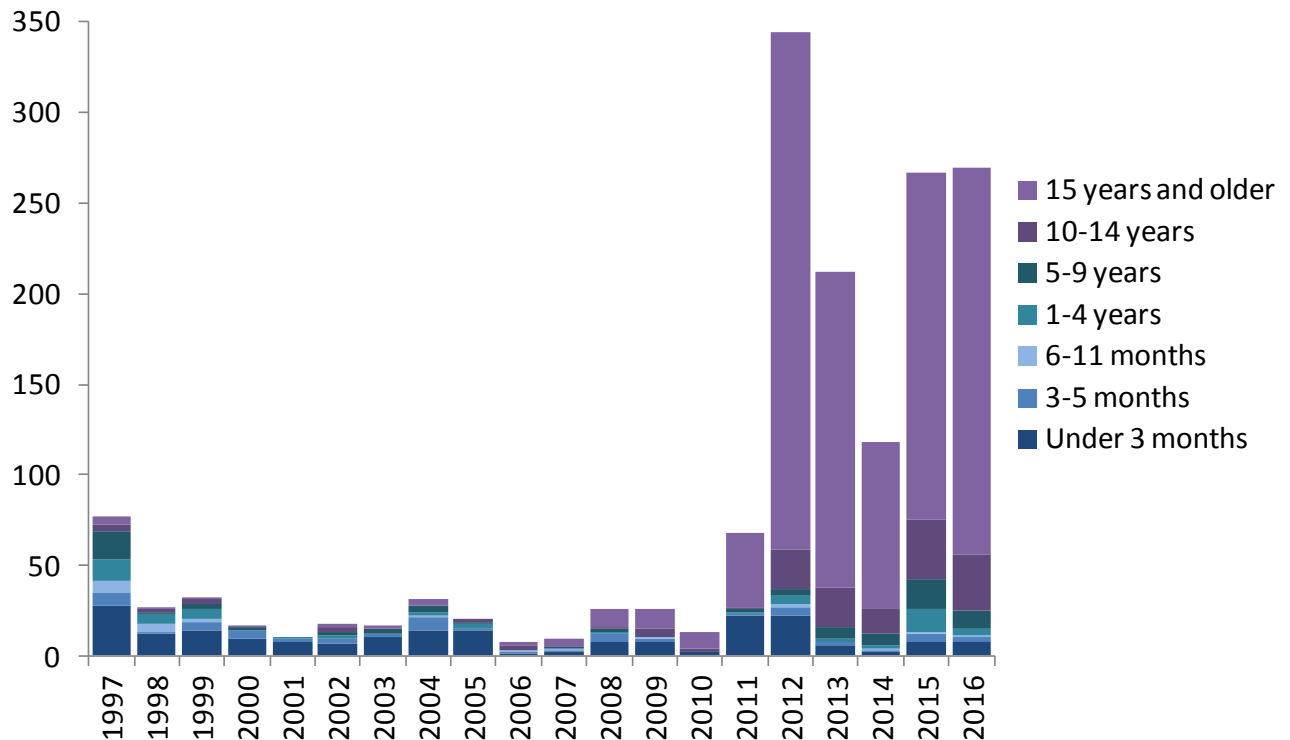
## 2 Introduction

### 2.1 Pertussis

Pertussis incidence typically has a cyclical pattern with peaks in cases every three to four years. The peak prior to 2012 in England and Wales was in 2008, with 902 laboratory confirmed cases (PHE, 2014). In 2012, there was a significant increase in the number of pertussis cases reported in the UK (Kmietowicz, 2012), USA (Centers for Disease Control and Prevention, 2015), New Zealand (Institute of Environmental Science and Research Ltd, 2012) and Australia (Government of Western Australia, 2012). In Wales, there were 344 confirmed cases in 2012, 29 cases were in infants under one year of age of which 22 were aged under three months (PHE, 2014). Children under one year of age are the group most susceptible to serious complications. Hospitalisation admissions data from Wales, show that the mean age for admission due to pertussis over the last 5 years is 5 months (PEDW, 2017).

During 2013 and 2014, the number of confirmed pertussis cases in Wales decreased to 212 cases and 114 cases, respectively, rising again to 267 in 2015 and to 270 (provisional) cases in 2016. Although the number of confirmed cases in children under one year of age remains low, there were ten confirmed cases in this age group in 2016 and twelve in 2015, compared to eight cases in 2013 and three in 2014 (Figure 1).

**Figure 1:** Laboratory confirmations of pertussis by age group and year, Wales; 1997-2016



Data source: PHE laboratory confirmed cases of pertussis

Given the continued heightened pertussis activity, the maternal pertussis immunisation programme remains important in the control of pertussis in those less than one year of age who are most at risk. In England fourteen babies under the age of three months died of pertussis in 2012. After the introduction of the maternal vaccination three babies under 3 months of age in England and Wales died during 2013, eight in 2014 and four in 2015. Mothers were mostly unvaccinated, although two deaths were in infants whose mother was vaccinated too close to delivery to ensure maximum protection (PHE, 2016). The greatest decrease in disease since the peak in 2012 has been in infants under six months of age, those targeted by the maternal pertussis vaccination programme.

## 2.2 Influenza

There were 29 deaths of pregnant women and women up to six weeks postpartum in association with influenza in the UK in 2009–12, representing one in eleven maternal deaths (MBRRACE-UK, 2014). Influenza presents particularly significant risks to pregnant women and their babies. If a woman catches influenza during pregnancy she is at increased risk of experiencing severe disease, admission to intensive care and perinatal mortality (Jamieson *et al*, 2009; Pierce *et al* 2011). There were no maternal deaths in the UK from influenza in 2012 and 2013, and one death in 2014 (MBRRACE UK, 2016). This period follows the introduction of maternal vaccination against influenza, but is mainly due to the low level of influenza activity in 2012 to 2014 compared to 2009 and 2010.

## 2.3 Vaccination of pregnant women

### Pertussis

In April 2016 the Green Book (Immunisation against infectious disease) pertussis chapter was updated to recommend that maternal pertussis immunisation can take place from week 16 of pregnancy (JCVI, 2016). Vaccination of the mother boosts maternal antibodies that can pass across the placenta to the unborn infant to provide protection during the early weeks of life. Antibodies in the infant remain high up until around 8 weeks of age, when the first dose of the primary vaccination course is scheduled (Dabrera *et al*, 2015).

The UK's Medicines and Healthcare Products Regulatory Authority (MHRA) carried out a study of more than 20,000 pregnant women in the UK who have received the pertussis vaccine (Donegan *et al*, 2014). The study assessed the safety of the vaccine in pregnancy and found no increased risk to the baby or the mother associated with the vaccine. This is an important study evaluating the safety of the pertussis vaccine in pregnancy.

### Influenza

All pregnant women are recommended to receive influenza vaccine irrespective of their stage of pregnancy. This was first recommended in the 2010/11 season. The vaccine provides protection for the woman and the baby during pregnancy and protects the baby against influenza for up to six months following birth (Dabrera *et al*, 2014).

## 2.4 Measurement of influenza and pertussis vaccine uptake in pregnant women using Read coded data from General Practice

In addition to this survey, Public Health Wales also monitors uptake of influenza immunisation in women who are recorded as being pregnant in General Practices through Audit+. There are challenges in defining general Practice immunisation uptake data for influenza and pertussis in pregnant women, particularly in ascertainment of accurate denominators. This highlights the importance of also conducting an annual survey of women giving birth who have been vaccinated. Current influenza immunisation uptake data collected for 2016/17 through Audit+ includes all women who were recorded as being pregnant as at the start of September 2016 or who were newly recorded as being pregnant between September 2016 and January 2017. As a result, the denominator will include a proportion of women whose pregnancies ended before they would have been offered the vaccine. The timeliness of removal of pregnancy associated Read codes from patient records in general practice after pregnancies have ended is unknown, late removal of these codes would result in an inflated denominator of pregnant women and underestimation of uptake. The current estimated uptake of influenza in 2016/17 in all pregnant women using Audit+ data as of 18<sup>th</sup> April 2017 was 47.2% for Wales (PHW, unpublished data).

### 3 Methods

All seven health boards in Wales agreed to participate in the survey. The sample frame for this survey was all pregnant women delivering in Wales in main maternity units over a five day period in January 2017, with the exception of Cwm Taf University Health Board which carried out its survey over a five day period in May 2017.

All main maternity units in Wales were included in the survey and maternity services collected data using a standard questionnaire (Appendix 1). The questionnaire collected self-reported information from the women on their age, the offer and receipt of pertussis and influenza vaccinations, gestational week when vaccinated and gestational week at delivery.

An additional survey was conducted amongst the participating midwives on data collection methods this year. The survey asked which of the following methods were used to collect information from women delivering in 2016/17: face to face interviews, looking at notes, contacting GPs or other; and which was the primary method for data collection. We also asked about progress in health boards in ensuring immunisation statuses for pregnant women were captured in electronic maternity data systems.

## 4 Results

### 4.1 Survey participation

Up to date data on the annual number of deliveries by unit in Wales were not available as at the time of this report, so reliable estimates of survey participation could not be evaluated but is believed to be very high. The most recent data on deliveries by unit are from 2014/15. The total number of women surveyed this year was 423, this is similar to the 427 women surveyed last year (PHW, 2016). However, the distribution of women surveyed across the health boards is different compared to the previous survey (Table 1). The number of women surveyed increased in ABM UHB, Cwm Taf UHB and Powys THB but decreased in all other health boards. During 2015/16 the highest proportion of women surveyed delivered in Betsi Cadwaladr UHB (22%), followed by Cardiff and Vale UHB (21%) and ABM UHB (18%). During 2016/17 the highest proportion of women surveyed delivered in ABM UHB (29%), followed by Betsi Cadwaladr UHB (18%) and Cardiff and Vale UHB (18%).

**Table 1.** The number of pregnant women participating in the 2016/17 survey, compared to the number of pregnant women participating in the 2015/16 survey, by health board.

Health Board	Number of women with uptake data 2015/16		Number of women with uptake data 2016/17	
	(n)	(%)	(n)	(%)
Abertawe Bro Morgannwg UHB	77	18%	124	29%
Aneurin Bevan UHB	68	16%	53	13%
Betsi Cadwaladr UHB	92	22%	77	18%
Cardiff & Vale UHB	91	21%	78	18%
Cwm Taf UHB	54	13%	61	14%
Hywel Dda UHB	39	9%	16	4%
Powys THB	6	1%	14	3%
<b>Wales</b>	<b>427</b>	<b>100%</b>	<b>423</b>	<b>100%</b>

<sup>†</sup>Data for all women delivering during the 5 day period in Hywel Dda University Health Board were unavailable.

## 4.2 Data collection methods in health boards

Six of the seven health boards responded to the survey on data collection methods, reporting on methods used to collect data in the most recent survey. All areas reported that they asked the women to recall whether they have been offered or received influenza and pertussis vaccinations during pregnancy (Table 2). Three health boards also looked at notes and one health board contacted GPs in addition to asking women face-to-face and looking at notes.

Aneurin Bevan UHB and Cardiff and Vale UHB reported that they are in the process of developing a database or adapting an existing database to record information on vaccine uptake in pregnant women.

**Table 2.** Reported methods of data collection for the Point of Delivery Survey in Wales 2016/7, by health board<sup>1</sup>

Health Board	Asking women face-to-face	Looking at notes	Contacting GPs
Abertawe Bro Morgannwg UHB	<u>Yes</u>		
Aneurin Bevan UHB	Yes	Yes	
Betsi Cadwaladr UHB	<u>Yes</u>		
Cardiff & Vale UHB	Yes	<u>Yes</u>	Yes
Cwm Taf UHB	Yes	Yes	
Powys THB	<u>Yes</u>		

<sup>1</sup>Where specified, primary data collection methods have been underlined

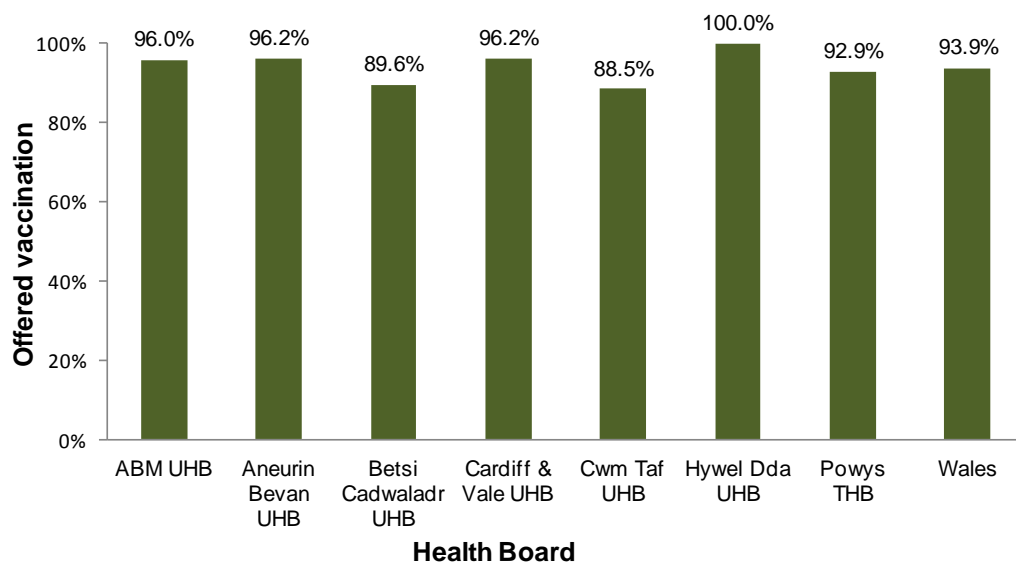
## 4.3 Offer of pertussis vaccination

Women were asked if they were offered pertussis vaccine during their pregnancy. Table 3 shows that 93.9% (397/423) reported they were offered the vaccine during pregnancy. Ten (2.4%) did not recall being offered pertussis vaccination. Responses were missing for 16 women (3.8%). Reported offer of pertussis vaccination ranged by health board from 88.5% (Cwm Taf UHB) to 100.0% (Hywel Dda UHB) (Figure 2).

**Table 3.** Number of women participating in the 2016/17 survey who recall being offered pertussis vaccination during pregnancy

Offered pertussis vaccination while pregnant	Number of women (n)	Percentage (%)
Yes	397	93.9%
No	10	2.4%
Not sure/missing	16	3.8%
<b>Total</b>	<b>423</b>	<b>100%</b>

**Figure 2.** Number of women participating in the 2016/17 survey who recall being offered pertussis vaccination during pregnancy, by health board (n=423)



<sup>1</sup>Data for all women delivering during the 5 day period in Hywel Dda University Health Board were unavailable.

#### 4.4 Uptake of pertussis vaccination

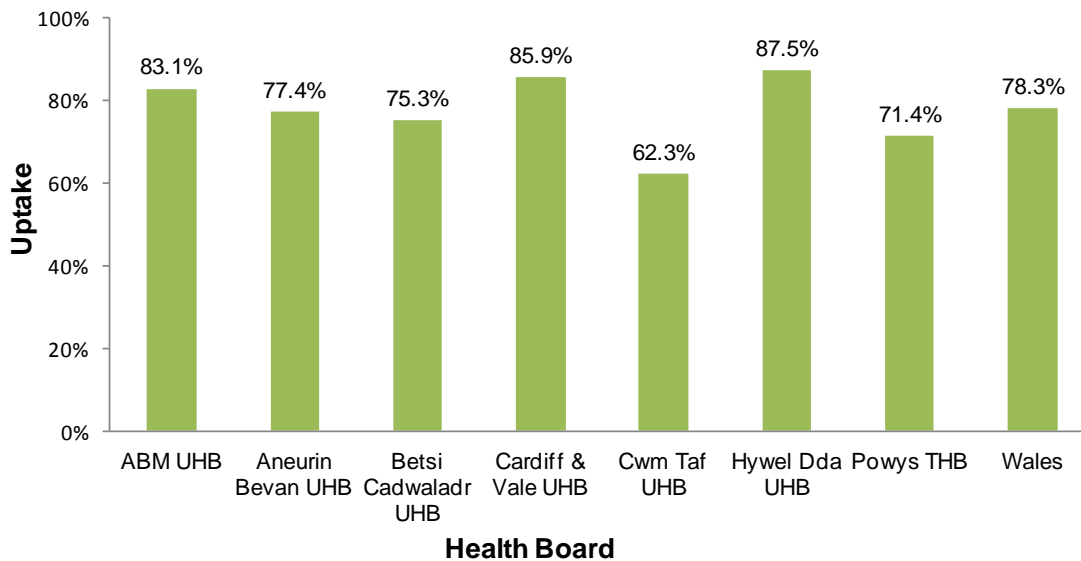
Self-reported coverage of pertussis vaccination in the women surveyed was 78.3% (331/423) for Wales, and ranged by health board from 62.3% (Cwm Taf UHB) to 87.5% (Hywel Dda UHB) (Table 4 and Figure 3). Responses were missing for 40 women (9.5%).

**Table 4.** Number of women participating in the 2016/17 survey who recalled receiving pertussis vaccine during pregnancy

Received pertussis vaccination while pregnant	Number of women (n)	Percentage (%)
Yes	331	78.3%
No	52	12.3%
Not sure/missing	40	9.5%
<b>Total</b>	<b>423</b>	<b>100%</b>



**Figure 3.** Uptake of pertussis vaccination in pregnant women participating in the 2016/17 survey, by health board<sup>1</sup> (n=423)

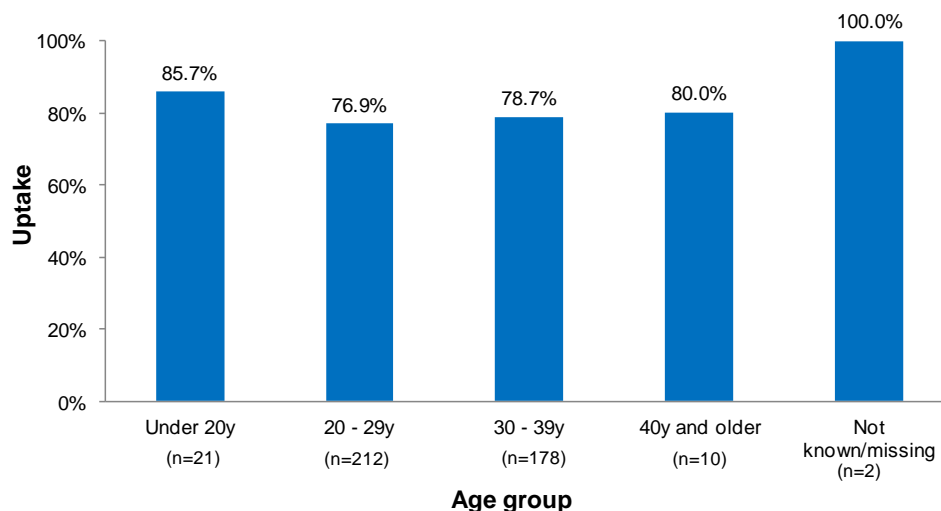


<sup>1</sup>Uptake figures for Cwm Taf UHB are disproportionately affected by missing data.

<sup>2</sup>Data for all women delivering during the 5 day period in Hywel Dda University Health Board were unavailable.

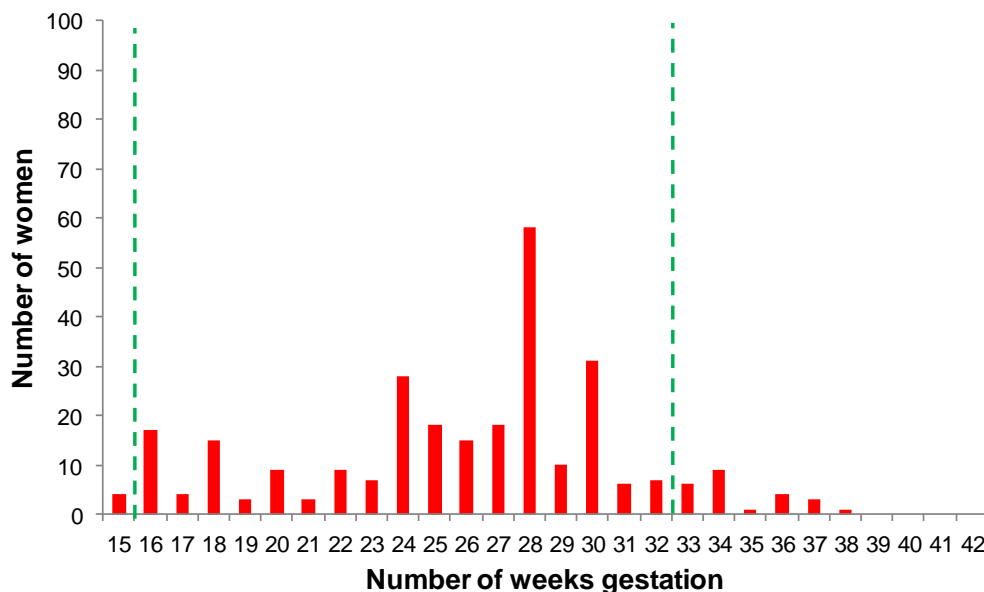
Coverage of pertussis vaccination varied by age–group, being highest in women aged under 20 years (85.7%, 18/21) and lowest in women aged 20-29 years (76.9%, 163/212) (Figure 4). Information on age was unknown or missing for 0.6% (2/331) of vaccinated women.

**Figure 4.** Uptake of pertussis vaccination in pregnant women participating in the 2016/17 survey, by age group (n=423)



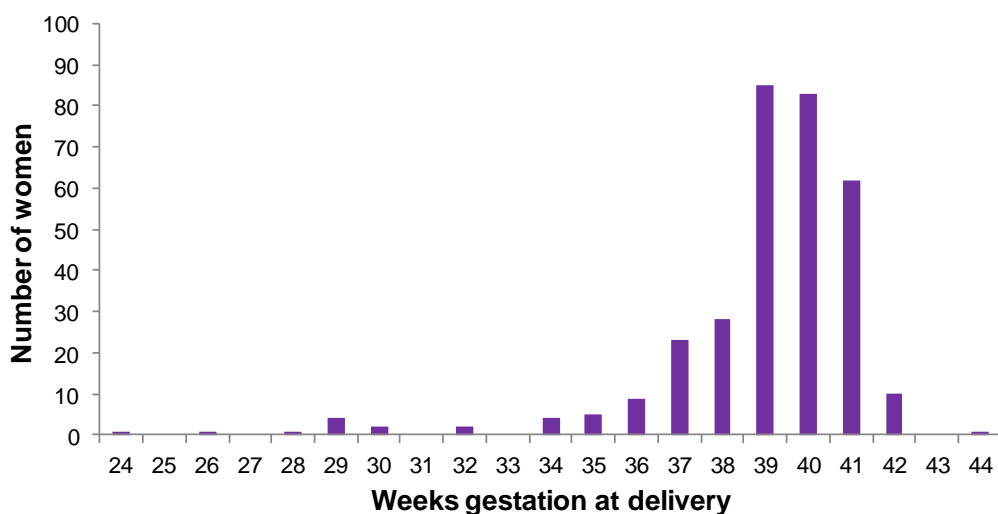
The women who took part in this survey would have been subject to the newer recommendations for the pertussis vaccination to be given from week 16 to 32 of gestation. Out of the women who had received pertussis vaccination in this survey, for which gestational week of vaccination was known, 90.2% (258/286) had received the vaccine during week 16 to 32 (Figure 5). Information on gestational week when vaccinated was unknown or missing for 13.6% (45/331) of vaccinated women.

**Figure 5.** Number of weeks gestation when vaccinated in pregnant women participating in the 2016/17 survey (n=286, dashed green lines refer to the recommended gestational week period to receive pertussis vaccination as at time of the survey)



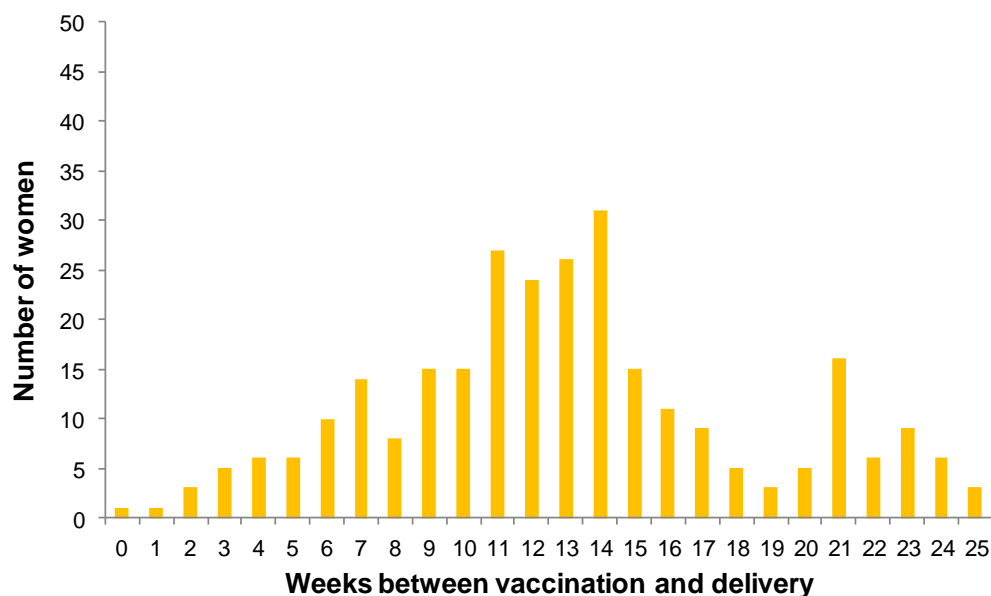
Gestational week at delivery for women who had received pertussis vaccination ranged from week 24 to 44 (Figure 6), and 93.5% (300/321) of women delivered between week 36 and 42. Information on gestational week at delivery was unknown or missing for 3.0% (10/331) of vaccinated women.

**Figure 6.** Number of weeks gestation at delivery for women who received pertussis vaccination participating in the 2016/17 survey (n=321)



The mean interval between pertussis vaccination and delivery was 13 weeks and ranged from 0 weeks to 25 weeks (Figure 7).

**Figure 7.** Number of weeks interval between receiving pertussis vaccination and delivery in pregnant women participating in the 2016/17 survey (n=280)



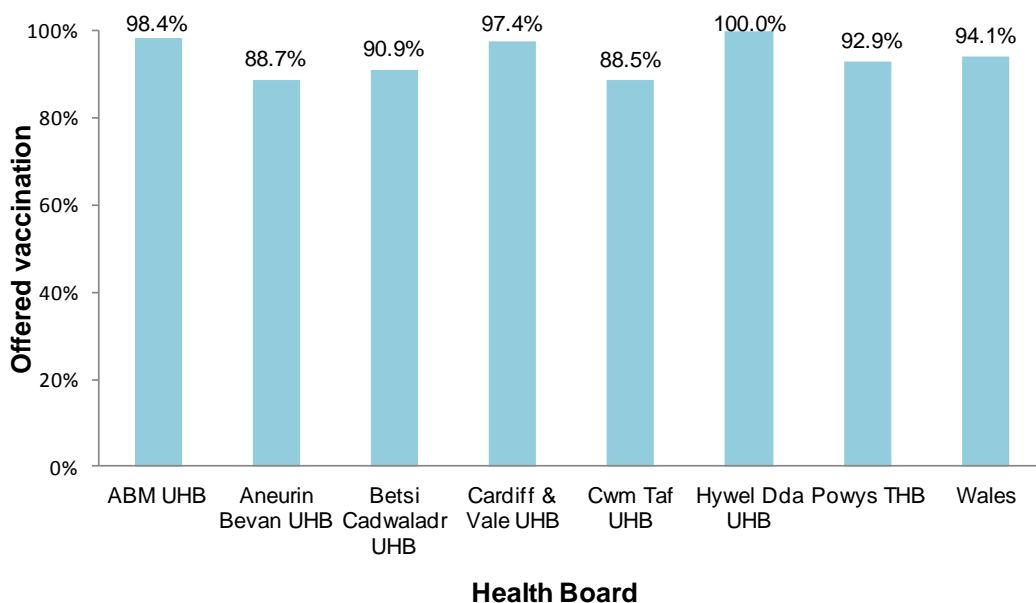
#### 4.5 Offer of influenza vaccination

Women were asked if they were offered influenza vaccination during their pregnancy. Table 5 shows that 94.1% of women reported that they were offered influenza vaccine and only 1.9% did not recall being offered influenza immunisation. Responses were missing for 17 women (4.0%). Reported offer of influenza vaccination ranged by health board from 88.5% (Cwm Taf UHB) to 100.0% (Hywel Dda UHB) (Figure 8).

**Table 5.** Number of women participating in the 2016/17 survey who recall being offered influenza vaccination during pregnancy

Offered influenza vaccination while pregnant	Number of women (n)	Percentage (%)
Yes	398	94.1%
No	8	1.9%
Not sure/missing	17	4.0%
<b>Total</b>	<b>423</b>	<b>100%</b>

**Figure 8.** Number of women participating in the 2016/17 survey who recall being offered influenza vaccination during pregnancy, by health board (n=423)



<sup>1</sup>Data for all women delivering during the 5 day period in Hywel Dda University Health Board were unavailable.

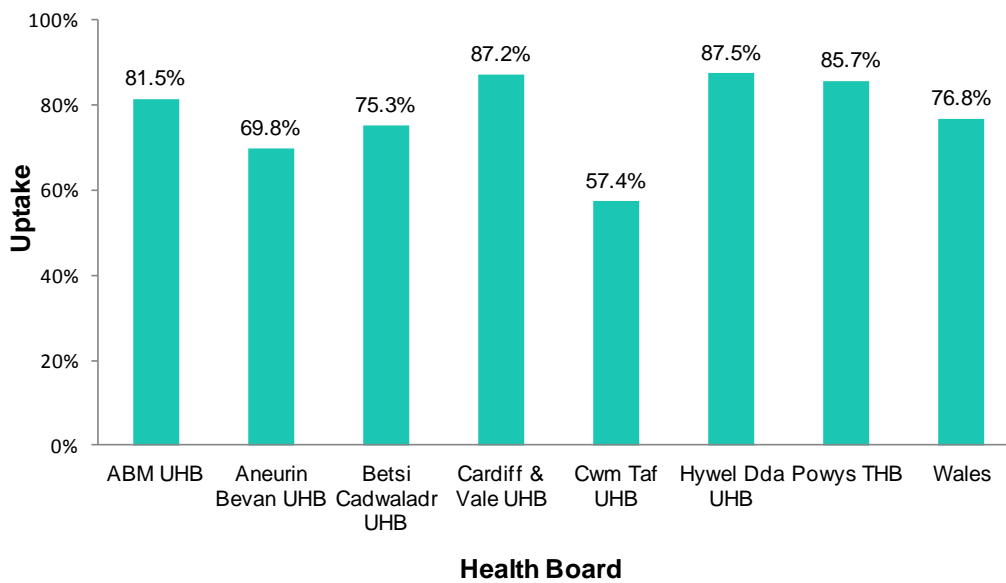
## 4.6 Uptake of influenza vaccination

Women were asked if they recalled receiving an influenza vaccine during pregnancy. Self-reported coverage of influenza vaccination in women included in this survey was 76.8% nationally, ranging by health board from 57.4% (Cwm Taf UHB UHB) to 87.5% (Hywel Dda UHB) (Table 6 and Figure 9).

**Table 6.** Number of women participating in the 2016/17 survey receiving influenza vaccine during pregnancy

Received influenza vaccination while pregnant	Number of women (n)	Percentage (%)
Yes	325	76.8%
No	52	12.3%
Not sure/missing	46	10.9%
<b>Total</b>	<b>423</b>	<b>100%</b>

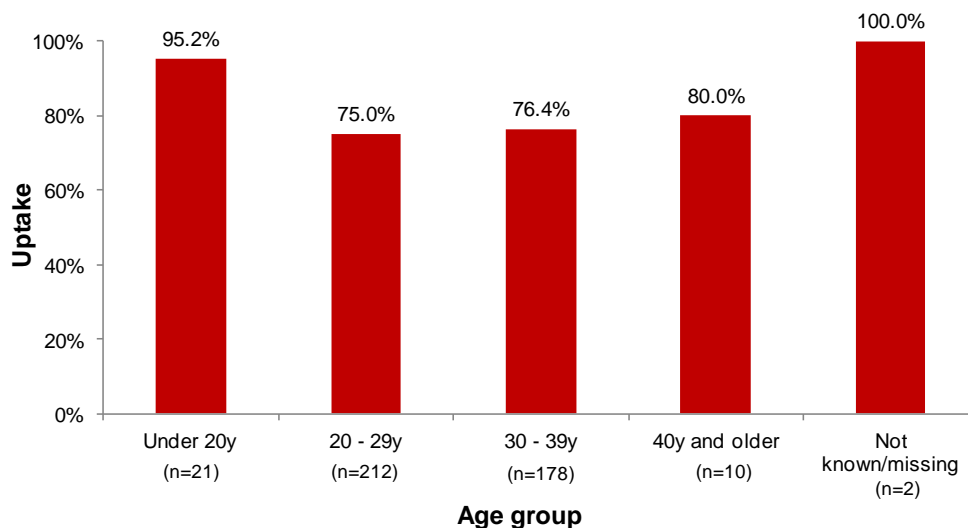
**Figure 9.** Uptake of influenza vaccination in pregnant women participating in the 2016/17 survey, by health board<sup>1</sup> (n=423)



<sup>1</sup>Uptake figures for Cwm Taf UHB are disproportionately affected by missing data  
<sup>2</sup>Data for all women delivering during the 5 day period in Hywel Dda University Health Board were unavailable.

The age-group where uptake of influenza vaccination was highest was women aged under 20 years (95.2%, 20/21) and lowest in women aged 20-29 years (75.0%, 159/212) (Figure 10).

**Figure 10.** Uptake of influenza vaccination in pregnant women participating in the 2016/17 survey, by age group (n=423)



## 4.7 Coverage of both pertussis and influenza vaccination

Of the women surveyed, 92.0% (389/423) recalled being offered both influenza and pertussis vaccines and 71.9% (304/423) received both influenza and pertussis vaccines (Tables 7 and 8). In addition, 91.8% (304/331) of women who received pertussis vaccine also received the influenza vaccine.

**Table 7.** Number of women participating in the 2016/17 survey who recalled being offered both the pertussis and influenza vaccines during pregnancy

		Offered pertussis vaccine when pregnant (n)			Total
		Not known/missing	No	Yes	
<b>Offered influenza vaccine while pregnant (n)</b>	Not known/missing	10	0	7	<b>17</b>
	No	0	7	1	<b>8</b>
	Yes	6	3	389	<b>398</b>
	<b>Total</b>	<b>16</b>	<b>10</b>	<b>397</b>	<b>423</b>

**Table 8.** Number of women participating in the 2016/17 survey receiving both the pertussis and influenza vaccines during pregnancy

		Received pertussis vaccine when pregnant (n)			Total
		Not known/missing	No	Yes	
<b>Received influenza vaccine while pregnant (n)</b>	Not known/missing	33	2	11	<b>46</b>
	No	0	36	16	<b>52</b>
	Yes	7	14	304	<b>325</b>
	<b>Total</b>	<b>40</b>	<b>52</b>	<b>331</b>	<b>423</b>

## 4.8 Trends in pertussis vaccination uptake

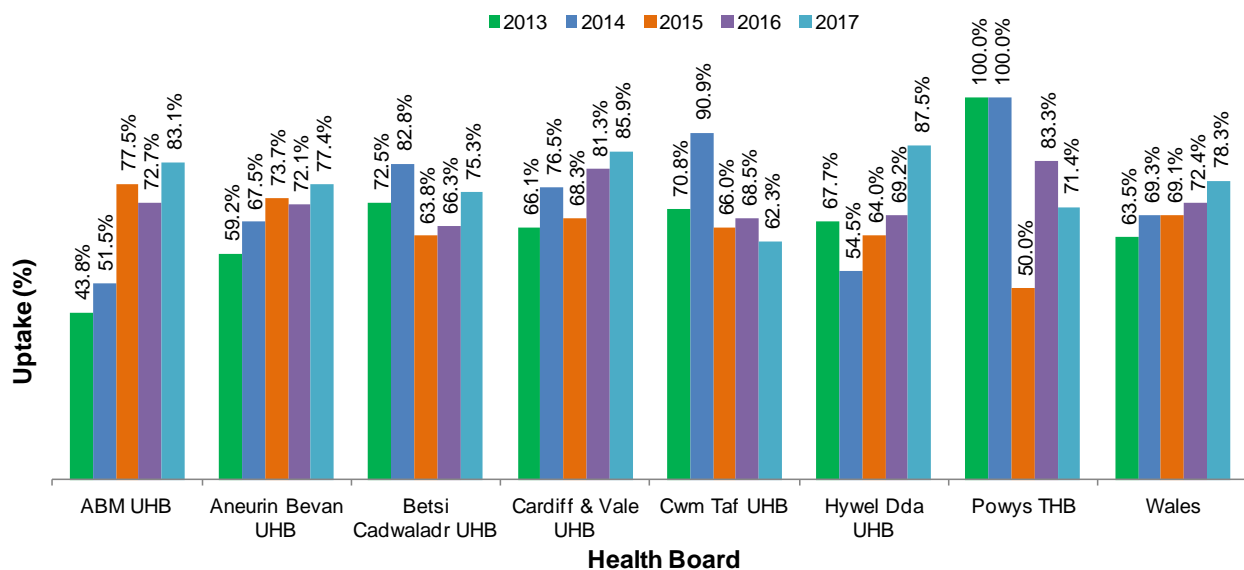
National coverage of pertussis vaccination has increased from 72.4% in the 2015/16 survey to 78.3% in the 2016/17 survey. Uptake compared to the previous year increased in five health boards and decreased in two health boards (Table 9, Figure 11).

**Table 9.** Uptake of pertussis vaccination in pregnant women participating in the 2012/13, 2013/14, 2014/15, 2015/16 and 2016/17 surveys, by health board<sup>1</sup>

Health Board	% received pertussis vaccination				
	2012/13	2013/14	2014/15	2015/16	2016/17
Abertawe Bro Morgannwg UHB	43.8%	51.5%	77.5%	72.7%	83.1%
Aneurin Bevan UHB	59.2%	67.5%	73.7%	72.1%	77.4%
Betsi Cadwaladr UHB	72.5%	82.8%	63.8%	66.3%	75.3%
Cardiff & Vale UHB	66.1%	76.5%	68.3%	81.3%	85.9%
Cwm Taf UHB	70.8%	90.9%	66.0%	68.5%	62.3%
Hywel Dda UHB	67.7%	54.5%	64.0%	69.2%	87.5%
Powys THB	100.0%	100.0%	50.0%	83.3%	71.4%
<b>Wales</b>	<b>63.5%</b>	<b>69.3%</b>	<b>69.1%</b>	<b>72.4%</b>	<b>78.3%</b>

<sup>1</sup>Proportions for Powys THB 2013/16 are based on a small samples of women (2013 n=3, 2014 n=2, 2015 n=4, 2016 n=6), interpret with caution. Uptake figures for Cwm Taf UHB in 2017 are disproportionately affected by missing data. Uptake data for Hywel Dda UHB in 2017 were based on a small sample of women delivering during the 5 day period.

**Figure 11.** Uptake of pertussis vaccination in pregnant women participating in the 2012/13, 2013/14, 2014/15, 2015/16 and 2016/17 surveys, by health board<sup>1</sup>



<sup>1</sup>Proportions for Powys THB 2013/16 are based on a small samples of women (2013 n=3, 2014 n=2, 2015 n=4, 2016 n=6). Uptake figures for Cwm Taf UHB in 2017 are disproportionately affected by missing data. Uptake data for Hywel Dda UHB in 2017 were based on a small sample of women delivering during the 5 day period.

## 4.9 Trends in influenza vaccination uptake

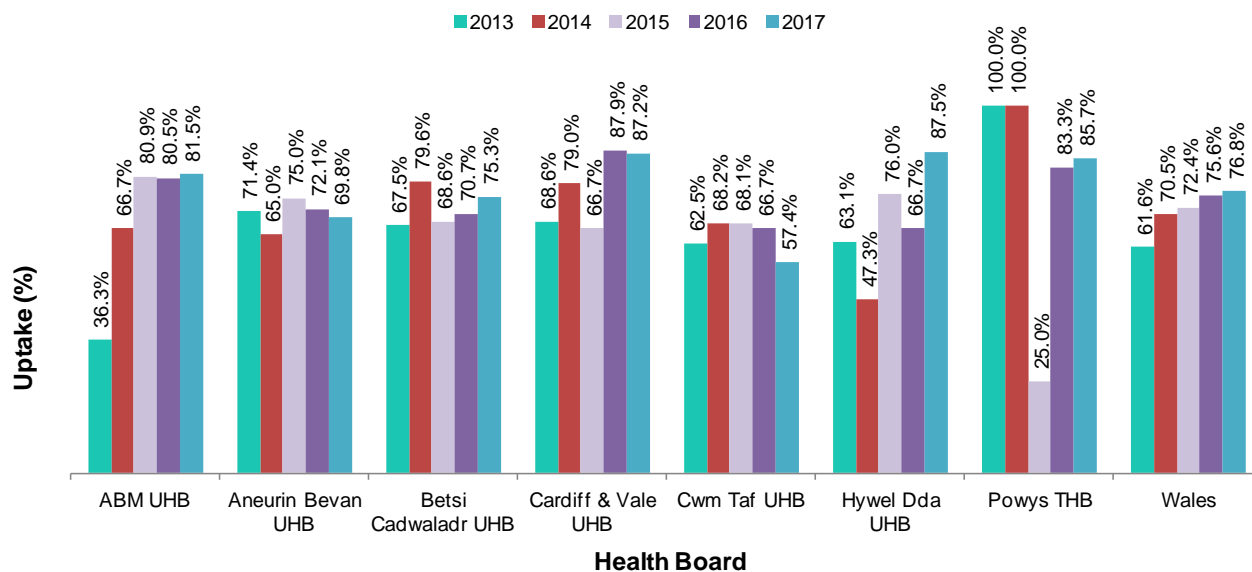
National coverage of influenza vaccination increased to 76.8% in 2016/17 compared to 75.6% in 2015/16. Uptake increased in four health boards in the 2016/17 survey compared to the 2015/16 survey, remained stable in one health board and decreased in two health boards (Table 10, Figure 12).

**Table 10.** Uptake of influenza vaccination in pregnant women participating in the 2012/13, 2013/14, 2014/15, 2015/16 and 2016/17 surveys, by health board<sup>1</sup>

Health Board	% received influenza vaccination				
	2012/13	2013/14	2014/15	2015/16	2016/17
Abertawe Bro Morgannwg UHB	36.3%	66.7%	80.9%	80.5%	81.5%
Aneurin Bevan UHB	71.4%	65.0%	75.0%	72.1%	69.8%
Betsi Cadwaladr UHB	67.5%	79.6%	68.6%	70.7%	75.3%
Cardiff & Vale UHB	68.6%	79.0%	66.7%	87.9%	87.2%
Cwm Taf UHB	62.5%	68.2%	68.1%	66.7%	57.4%
Hywel Dda UHB	63.1%	47.3%	76.0%	66.7%	87.5%
Powys THB	100.0%	100.0%	25.0%	83.3%	85.7%
<b>Wales</b>	<b>61.6%</b>	<b>70.5%</b>	<b>72.4%</b>	<b>75.6%</b>	<b>76.8%</b>

<sup>1</sup>Proportions for Powys THB 2013/16 are based on a small samples of women (2013 n=3, 2014 n=2, 2015 n=4, 2016 n=6). Uptake figures for Cwm Taf UHB in 2017 are disproportionately affected by missing data. Uptake data for Hywel Dda UHB in 2017 were based on a small sample of women delivering during the 5 day period.

**Figure 12.** Uptake of influenza vaccination in pregnant women participating in the 2012/13, 2013/14, 2014/15, 2015/16 and 2016/17 surveys, by health board<sup>1</sup>



<sup>1</sup>Proportions for Powys THB 2013-2016 are based on a small samples of women (2013 n=3, 2014 n=2, 2015 n=4, 2016 n=6). Uptake figures for Cwm Taf UHB in 2017 are disproportionately affected by missing data. Uptake data for Hywel Dda UHB in 2017 were based on a small sample of women delivering during the 5 day period.



## 5 Conclusions

This is the fifth year that the point of delivery survey has been conducted and the survey shows that acceptability of influenza and pertussis vaccine to pregnant women remains high.

This year:

- 78.3% of pregnant women reported they received pertussis vaccination,
- 76.8% of pregnant women reported they received influenza vaccination,
- 71.9% of pregnant women reported they received both pertussis and influenza vaccination and,
- 92.0% of pregnant women recall being offered both pertussis and influenza vaccines during pregnancy.

The uptake of pertussis vaccine has increased from 72% in 2015/16 to 78% in 2016/17, this may be partly due to the change in guidance resulting in more time for vaccination. Most pertussis vaccinations (90%) were given between weeks 16 and 32, the recommended stage of pregnancy at the time the survey was completed. The uptake of influenza vaccine has continued to increase each year between 2012/13 and 2016/17, and remains above the 75% target set by Welsh Government. The percentage of women who recall receiving both vaccines has increased from 67% to 72%.

Data automatically collected from General Practice through Audit+ as at 18<sup>th</sup> April 2017 showed that uptake of influenza vaccination in women pregnant during the influenza season was 47% during 2016/17. This is a measure of the percentage of women immunised, whose general practice record had a pregnancy-associated Read code attached, at any point from September 2016 to January 2017. Due to the challenges in ascertaining accurate uptake data for pregnant women using Read codes in general practice records, the figure (47%) is expected to underestimate the true coverage of influenza vaccination in pregnant women, and the results of this survey also suggest this to be the case.

This most recent survey includes a larger proportion of missing data compared to previous surveys (responses of 'not sure' or fields left blank). Women who do not recall are categorised as not receiving the vaccine rather than being excluded from the analysis. If missing data were excluded national uptake for both vaccines would be 86%. The area with the lowest reported uptake of both pertussis and influenza vaccine conducted their survey at a later date than the other areas and had the highest proportion of missing data.

Although the survey was set up so that women delivering in maternity units across Wales were asked face-to-face, data collection methods differ across health boards. Units relying more on patient notes may have more accurate results and fewer missing data compared to areas that only ask women. Data collection methods have not been formally compared to gather an accurate assessment as to what extent these differences affect the figures reported here.

Two health boards indicated that they are in the process of building an electronic database to record uptake in pregnant women. The availability of an electronic database in all areas would help eliminate recall bias and provide more accurate uptake figures for pertussis and influenza vaccination in pregnant women that can be monitored throughout the year.

A proportion of women reported that they could not recall having been offered vaccination, a limitation of this survey is that it can only measure recollection of offer and not the proportion of women who were actually offered. Self-reported offer of both vaccinations is high and if missing data were excluded, offer of vaccination would be 98% for both vaccines. However efforts should continue to ensure that the offer rate is 100%. Offering and encouraging women to receive pertussis and influenza immunisation during each pregnancy remains the best way of preventing life-threatening pertussis and influenza infections in babies too young to receive their own vaccinations and in women during pregnancy. These annual surveys help to inform decisions about the future of the programmes and service development such as further communications and training resources.

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