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England

Protecting and improving the nation's health

Maternal Immunisation

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Session objectives

- Immunisation against influenza in pregnancy
- Immunisation against pertussis in pregnancy
- Maternal and healthcare worker attitudes to antenatal vaccination
- Conclusions
- Resources
- Questions



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Influenza

Influenza immunisation in pregnancy

- Introduced in the UK in 2010 for all pregnant women at any gestation using an inactivated vaccine
- This followed the A(H1N1) influenza pandemic of 2009 in which pregnant women were found to be at increased risk of serious complications of flu (Jamieson et al. 2009)
- 272 women hospitalised with confirmed A/H1N1 virus (50 admitted to ITU)
- 1.7% of women admitted to hospital died (1.6 deaths per 100,000)
- MBRRACE-UK report into maternal deaths between 2009 and 2012 found one in 11 women died from influenza (Knight M et al 2014)

Influenza infection in pregnancy and newborns

- Women of childbearing age are often exposed to influenza through contact with children which can lead to higher rates of influenza associated disease in pregnant versus non-pregnant women
- Influenza infection in pregnancy increases the risk of maternal mortality, especially in late pregnancy
- Influenza infection in pregnancy increases the risk of miscarriage, low birth weight and premature birth,
- Risks are higher in women with additional risk factors e.g. obesity, diabetes
- Children under the age of six months have the highest rate of GP consultations and hospitalisations for influenza in the UK
- Children <6 months of age cannot be immunised but do benefit from maternal immunisation through maternal antibodies

Influenza vaccination – triple benefits

1. Protects the mother

2. Reduces the risk to the unborn child

- 60-70% reduction in risk of prematurity
- Prevents low birthweight (mean birthweight:150g higher in vaccinated women)

3. Protects the newborn baby

- Prevents the mother being a source of transmission to the newborn child
- Provides passive immunity against influenza to infants in the first few months of life following birth
- 40-90% reduction in risk of influenza in first six months

When to vaccinate pregnant women against flu?

- For those already pregnant, at the start of the flu season, as early as possible between September and early November, before flu starts circulating in the community
- Pregnancy is different to other influenza at risk groups as women become pregnant throughout the flu season and are therefore eligible for the vaccine
- Newly pregnant women should also be vaccinated throughout the season
- Annual revaccination is important as protection is thought to last for one flu season only and the content of seasonal flu vaccines changes between seasons
- In the current (2019/20) flu season, pregnant women can be offered either the standard egg grown quadrivalent inactivated influenza vaccine (QIVe), or cell grown quadrivalent inactivated influenza vaccine (QIVc)

Inactivated influenza vaccine safety in pregnancy

‘No study to date has demonstrated an increased risk of either maternal complications or untoward fetal outcomes associated with inactivated influenza vaccination’

And

‘Inactivated influenza vaccine can be safely and effectively administered during any trimester of pregnancy’

(review of studies by Tamma, AJOG 2009)

Influenza vaccine uptake in pregnancy: England 2016/17 to 2018/19

Year	Vaccine uptake
2016/17	44.8%
2017/18	47.0%
2018/19	45.2%



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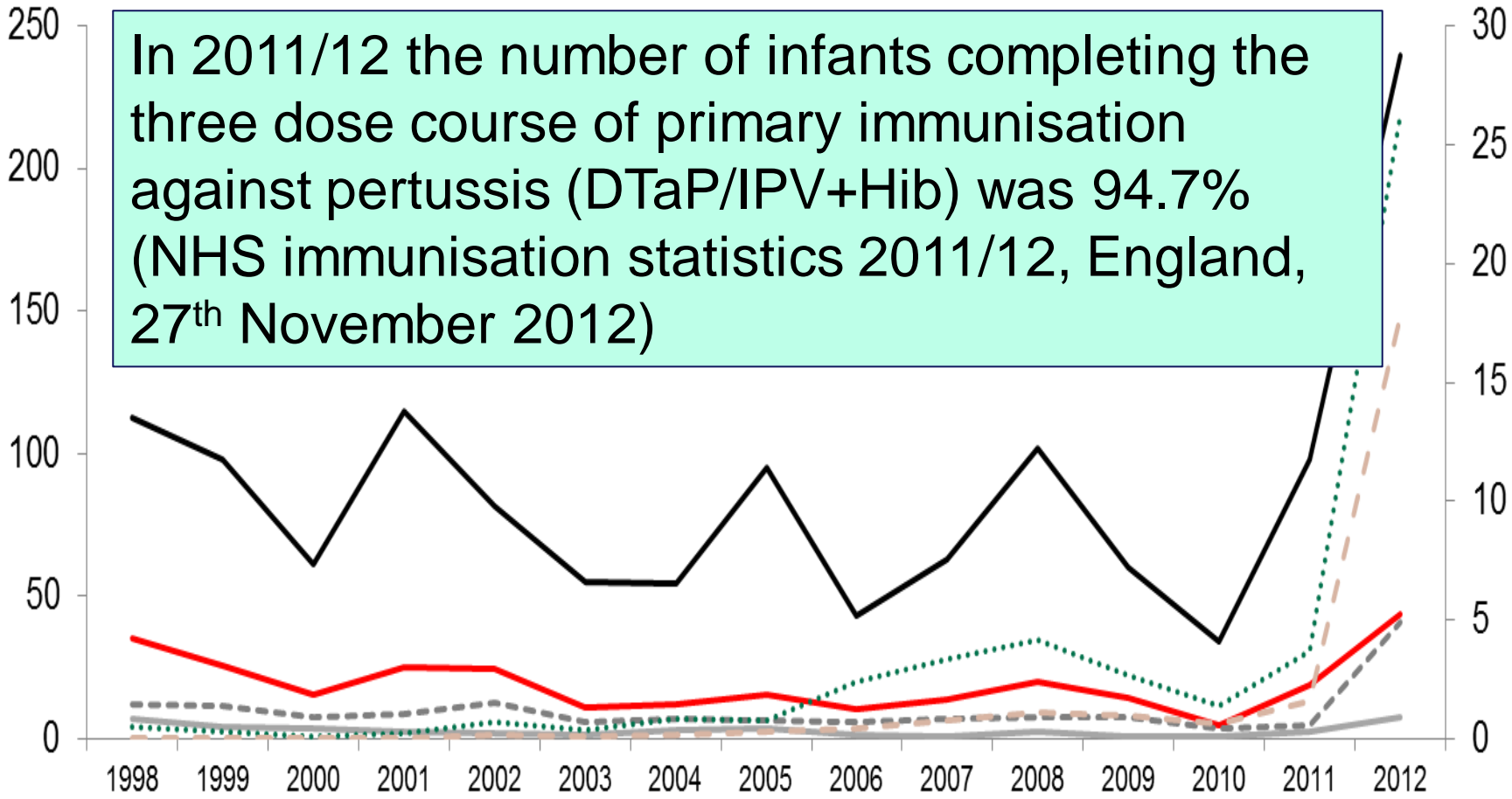
Pertussis

Annual age specific pertussis rates in England 1998 to 2012

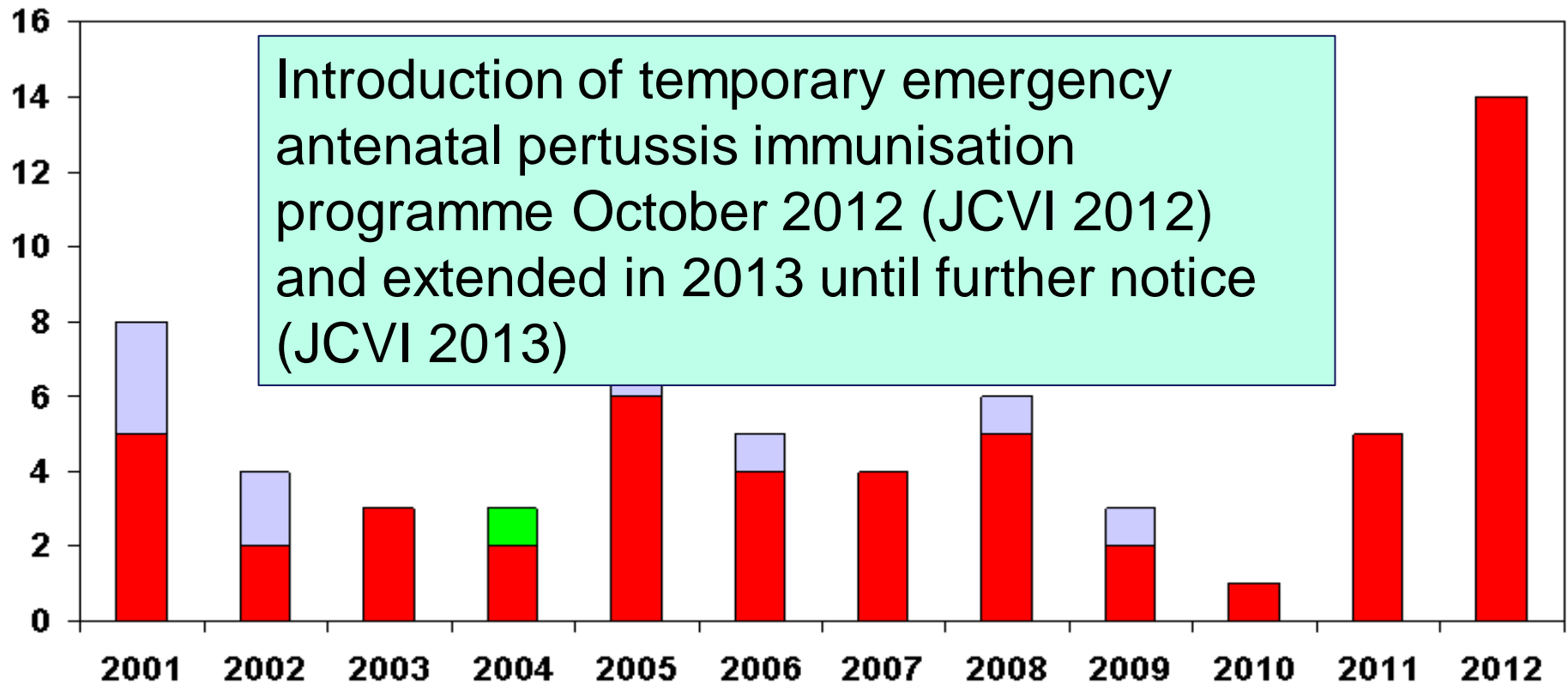
Incidence per 100,000 (<1 year age groups)

G Amirthalingam et al
Eurosurveillance (2012)

Incidence per 100,000 (>= 1 year age groups)

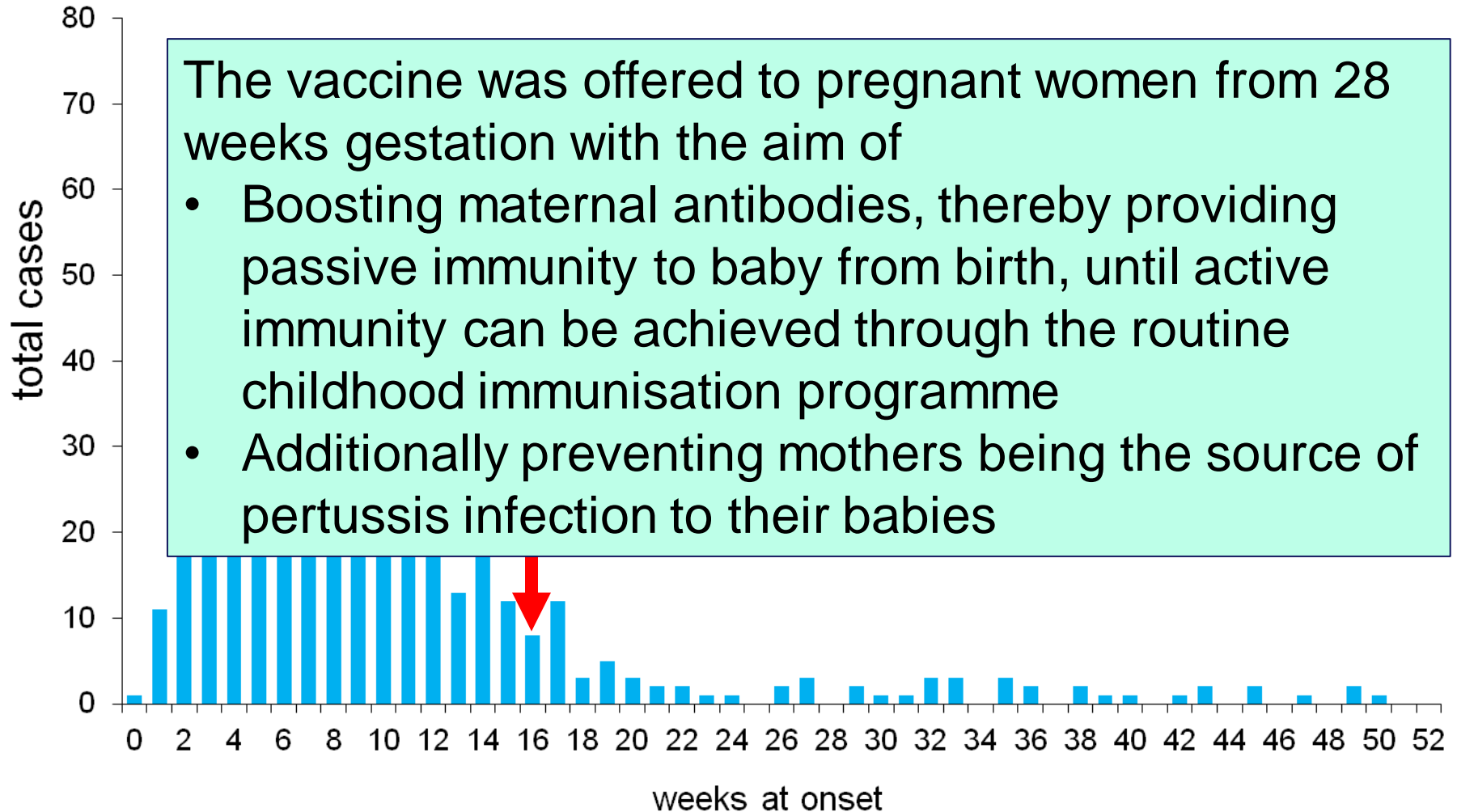


Number of deaths from pertussis in infants in England 2001 to 2012 by month of infant



PHE surveillance data sourced from laboratory confirmed cases, certified deaths, Hospital episode statistics, GP registration details

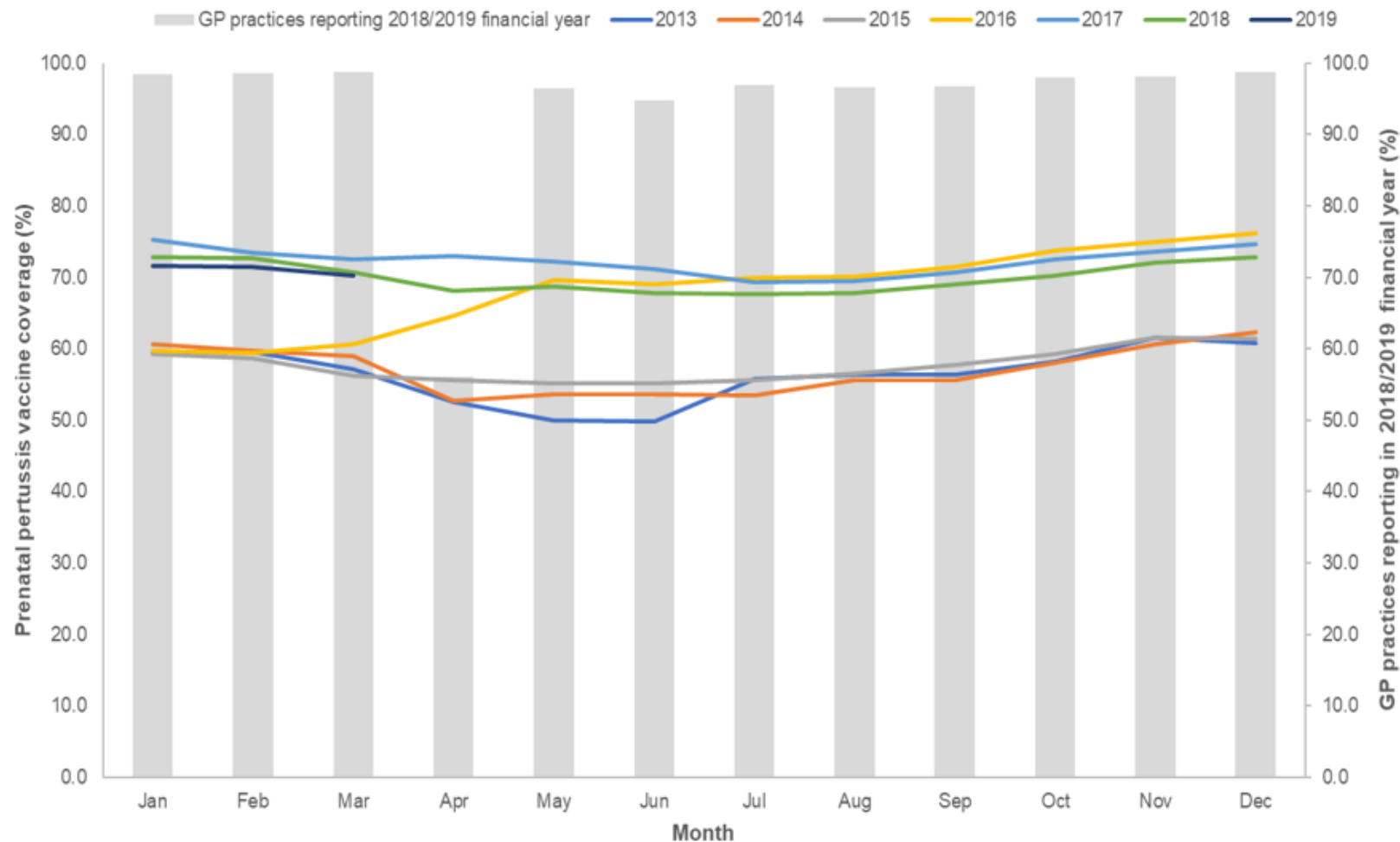
Confirmed cases in infants under 1 year, by week of age at onset 2011-2012 (Amirthalingam, Arch Dis Child 2013)



Change in timing recommendation to 16 to 32 weeks

- Immunisation earlier in pregnancy results in higher cord blood antibody concentration (Eberhardt 2016)
- Prolonged materno-fetal transfer cumulatively results in a higher amount of transferred antibody than a shorter exposure at the time of peak transfer efficacy
- Giving pertussis-containing vaccine between gestational weeks 16 and 32 should:
 - maximise antibody transfer
 - give pregnant women greater opportunity to take up the offer of vaccination
 - offer some protection to infants born prematurely who may be particularly vulnerable to complications from pertussis
- Women can still be immunised after week 32 of pregnancy until delivery but this may not offer as high a level of passive protection to the baby

Monthly pertussis vaccination coverage (%) in pregnant women England 2013-2019

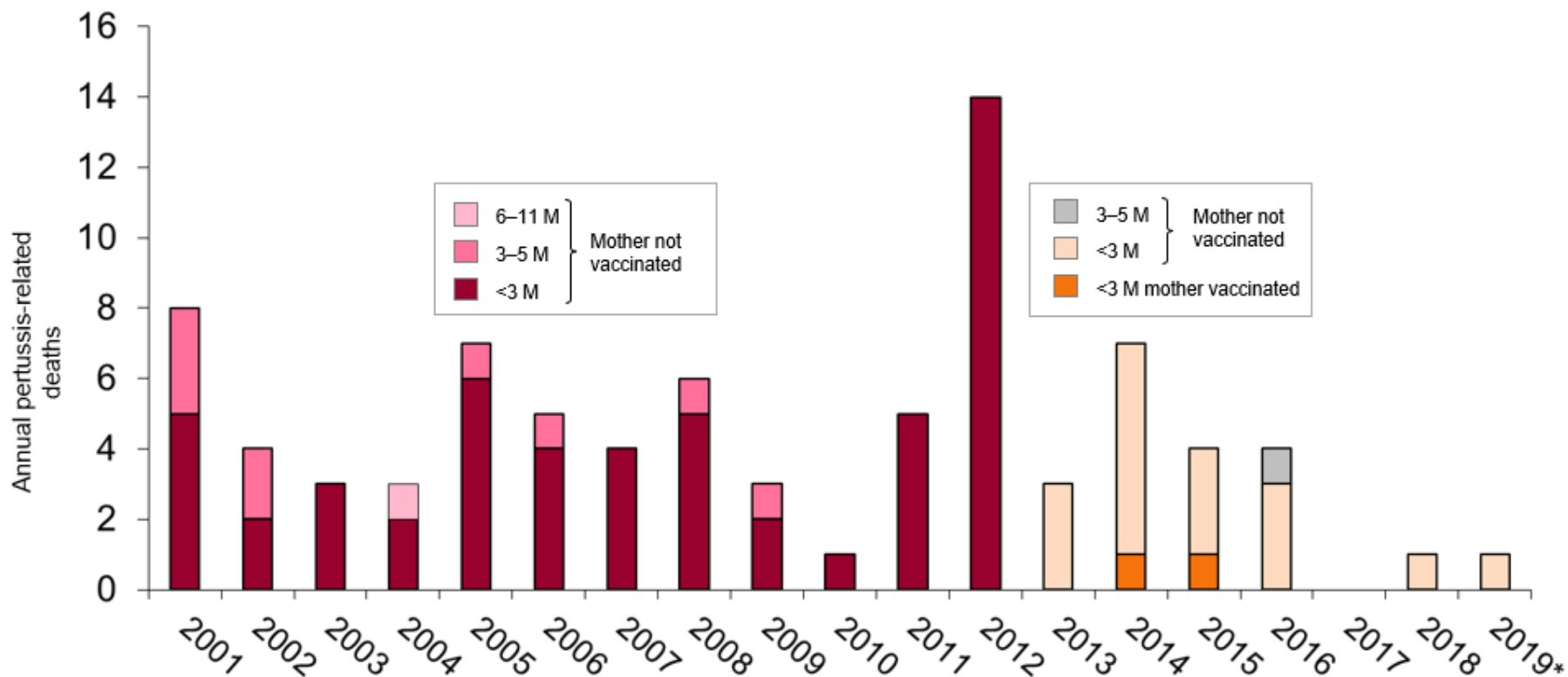


Vaccine coverage 71% Jan-March 2019

Maternal vaccine effectiveness (VE) in preventing infant disease in England

Study	Adjusted VE (95% CI)
Amirthalingam G. et al, Lancet (2014) Repevax (Sanofi Pasteur)	90% (82% to 95%)
Dabrera G et al CID (2014) Repevax (Sanofi Pasteur)	93% (81% to 97%)
Amirthalingam G. et al, CID (2016) Repevax (Sanofi Pasteur) and Boostrix-IPV (GlaxoSmithKline)	91% (88% to 94%)

Deaths from pertussis in infants England 2001-2019



*2019 to end May

Pertussis vaccine safety

- A study by Donegan et al (BMJ 2014) of 18,000 pregnant women vaccinated with Repevax (Sanofi Pasteur), a combined low dose diphtheria, acellular pertussis, and inactivated poliomyelitis vaccine, up to 28 days post vaccination, and more than 6000 women up to delivery found no increased risk compared to unvaccinated controls for:
 - Stillbirth
 - Pre-eclampsia/eclampsia
 - Placenta praevia
 - Interuterine growth retardation/low birth weight
 - Caesarean section
 - Postpartum haemorrhage
 - Premature labour
 - No difference in the time to delivery in the vaccinated and unvaccinated cohorts

Pertussis vaccination in pregnancy: recent programme developments and challenges

- In June 2019, JCVI agreed maternal pertussis should be a permanent programme
- Challenges remain in achieving and maintaining high coverage in target group
- Ensure all pregnant women are offered the vaccine
- Since July 2014, Boostrix®-IPV (dTaP/IPV) has been supplied.
- From mid-January 2020, Repevax® will be available to order through ImmForm for use in the maternal pertussis immunisation programme instead of Boostrix®-IPV
- This is a temporary change and it is anticipated that supplies will revert back to Boostrix®-IPV in autumn 2020

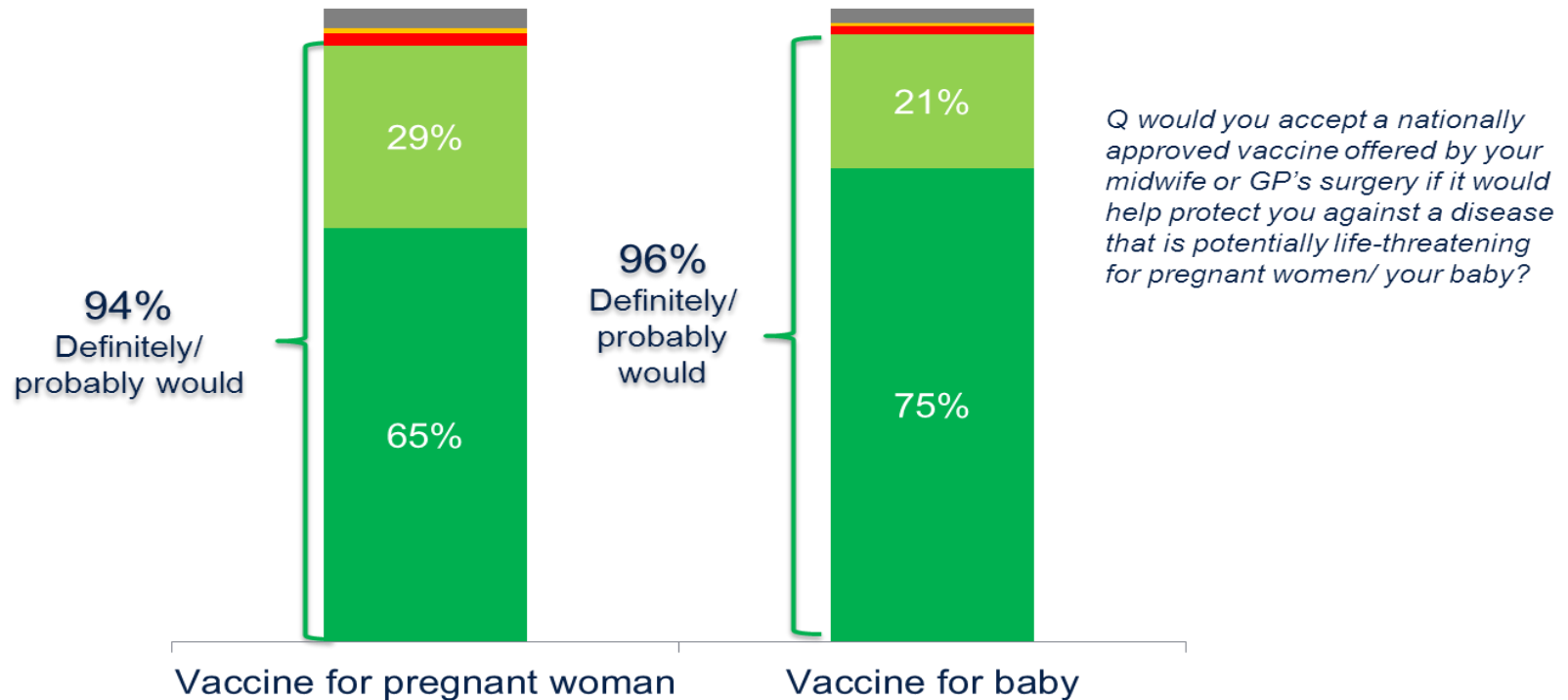


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Attitudes of women and healthcare professionals to vaccination in pregnancy

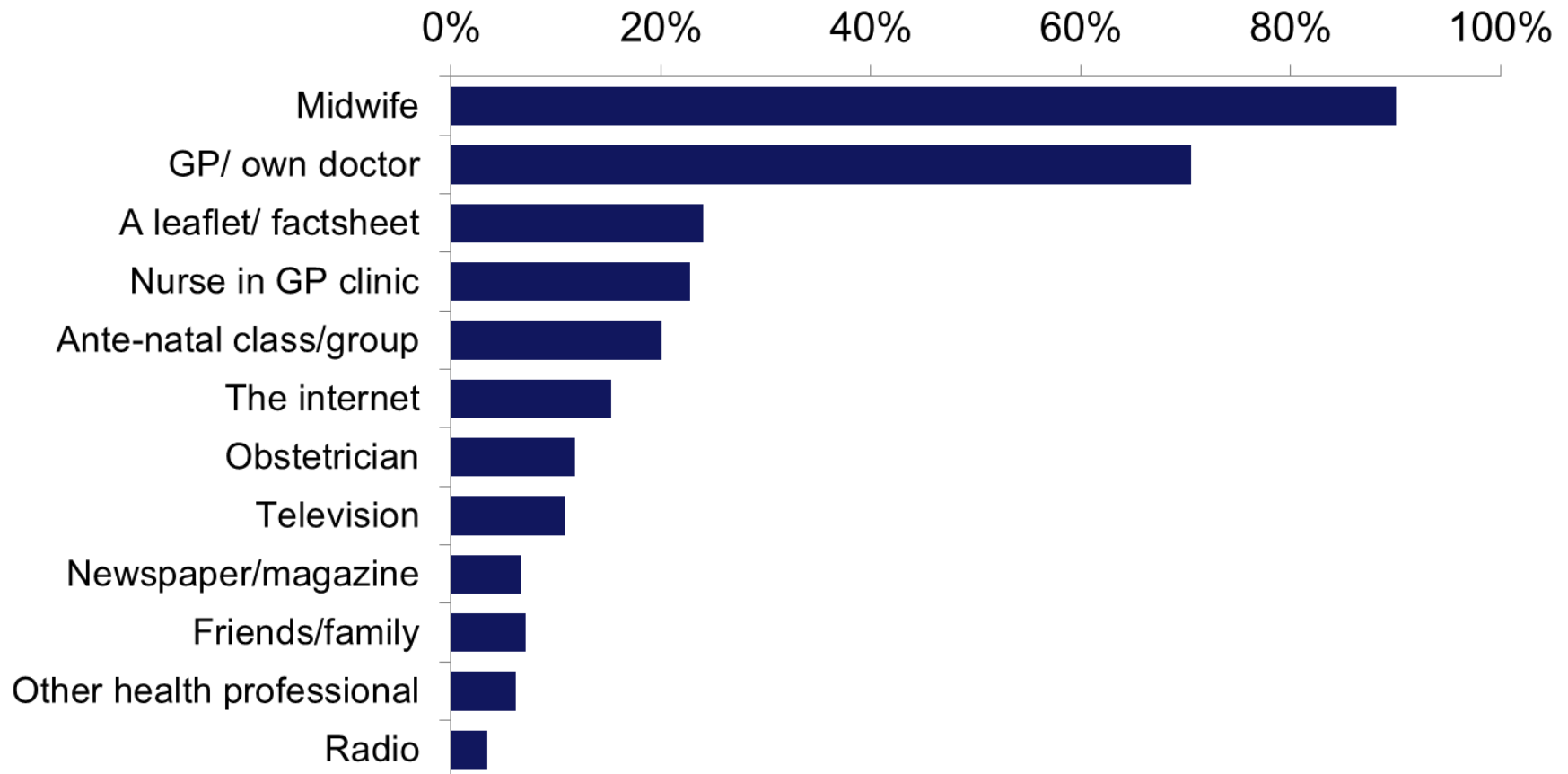
Most mums accept vaccines for themselves in pregnancy and for their babies



Base: All respondents (1,892)

Campbell H et al British Journal of Midwifery, Aug 2015 Vol 23, No 8

Women's ideal source of information if being offered a vaccine in pregnancy (Campbell et al BJM 2015)



Q. Ideally, where would you like to get information from if you are being offered a vaccine in pregnancy?

Vaccination in pregnancy: Attitudes of nurses, midwives and health visitors in England. (Vishram B et al *Human Vaccines and Immunotherapeutics* 2017)

	Practice nurses	Midwives	Health visitors	All
If you were pregnant, would you accept a pertussis vaccine?	92%	82%	78%	84%

There was an association between those who indicated they would accept pertussis vaccine themselves if pregnant and those who recommended pertussis vaccine to pregnant women (OR 6.3, CI 4.4-9.0)

Conclusions

- Vaccination of pregnant women against influenza with an inactivated vaccine provides triple of protection: the pregnant woman, the foetus and the new born baby
- Inactivated influenza vaccines can be safely administered at any stage of pregnancy
- Timely administration of pertussis containing vaccine to pregnant women is highly effective in preventing pertussis in infants (ideally 16 to 32 weeks)
- This complements but does not replace the need for timely baby immunisations at 8, 12 and 16 weeks of age
- Pertussis containing vaccine (dTaP/IPV) is safe to give in pregnancy
- Most pregnant women are accepting of vaccines in pregnancy to protect themselves and their baby
- There is room for improvement in increasing uptake in both programmes
- Because of the trust pregnant women place in midwives, the profession is well placed to support, advise and administer these vaccines

Resources

- Immunisation against infectious disease (the “Green Book”)
<https://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book>
- Immunisation training resources (including link to a slide set on maternal vaccination)
<https://www.gov.uk/government/collections/immunisation#training-resources>
- Vaccine Update (free to subscribe)
<https://www.gov.uk/government/collections/vaccine-update>
- Immunisation leaflets and posters (free to order)
<https://www.healthpublications.gov.uk/Home.html>
- Pertussis: Occupational vaccination of healthcare workers
<https://www.gov.uk/government/publications/pertussis-occupational-vaccination-of-healthcare-workers>