



## Vaccine preventable disease 2022

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### Aims of immunisation

- To provide the same immunity which usually follows natural infection but without causing the disease or its side effects
- To generate long lasting immunity
- To interrupt the spread of infection
- After clean water vaccination is the most effective health care intervention we have .

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## Some questions for you?

- What is herd immunity?
- For which diseases do we not have a vaccine?
- What is immunoglobulin and when do we use it?
- From which disease can herd immunity not protect us?
- How many vaccines might you receive in the primary course of immunisations?
- Tell me about tetanus boosters.
- What vaccines should we give a 65 year old?
- Describe active and passive immunity.
- Name some absolute contra-indications to vaccination.

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The routine immunisation schedule from February 2022

Age due	Disease protected against	Vaccine given and trade name	Usual site*
Eight weeks old	Diphtheria, tetanus, pertussis (DTP), polio, Haemophilus influenzae type b (Hib) and meningococcal group C (MenC)	DTaP/IPV/Hib/HepB	Infantric hexa or Vaxella Thigh
	Meningococcal group B (MenB)	MenB	Basseto
	Rotavirus	Rotarix®	By mouth
Sixteen weeks old	Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B	DTaP/IPV/Hib/HepB	Infantric hexa or Vaxella Thigh
	Pneumococcal (13 serotype)	Pneumococcal conjugate vaccine (PCV)	Prevenar 13
	Rotavirus	Rotarix®	By mouth
One year old (on or after the child's first birthday)	Diphtheria, tetanus, pertussis, polio and hepatitis B	DTaP/IPV/Hib/HepB	Infantric hexa or Vaxella Thigh
	MenB	MenB	Basseto
	Hib and MenC	Hib/MenC	Menitoria
	Pneumococcal	PCV booster	Prevenar 13
	Measles, mumps and rubella (German measles)	MMR	MMR/IvaPro® or Priorix
Eligible paediatric age groups**	Measles	Measles booster	Basseto Left thigh
Three years four months old, soon after	Influenza (each year from September)	Live attenuated influenza vaccine (LAIV)*	Fluenc Tetra® <sup>1+</sup> Both nostrils
Boys and girls aged between 10 and 13 years	Diphtheria, tetanus, pertussis and polio	dTaP/IPV	Boostrix-IPV Upper arm
Cancers and genital warts caused by human papillomavirus (HPV) types	Measles, mumps and rubella	MMR (check first dose given)	MMR/IvaPro® or Priorix Upper arm
Fourteen years old (school Year 10)	Tetanus, diphtheria and polio	HPV (two doses 6-12 months apart)	Gardasil Upper arm
	Meningococcal groups A, C, W and Y	Td/HPV (check MMR status)	Revaxis Upper arm
16 years old	Pneumococcal (23 serotype)	MenACWY	Nimence
65 years of age and older	Influenza (each year from September)	Pneumococcal Polyvalent Vaccine (PPV)	Pneumovax 23 Upper arm
70 to 79 years	Shingles	Inactivated influenza vaccine	Multiple Upper arm
		Shingles	Zostavax® <sup>2+</sup> Shingrix (contraindicated) Upper arm
* See article for more information on the use of these vaccines in children under 5 years of age. ** Ineligible vaccine should only be given after checking for T-cell testing result. 1. Contains porcine gelatine. 2. See article for more information on the use of these vaccines in children under 5 years of age.			
For vaccine supply information for the routine immunisation schedule please visit <a href="http://www.immunise.phe.gov.uk">portals.immunise.phe.gov.uk</a> and check vaccine update for an older vaccine supply information: <a href="http://www.gov.uk/government/collections/vaccine-update">www.gov.uk/government/collections/vaccine-update</a>			
<b>immunisation</b> The safest way to protect children and adults			
<b>Selective immunisation programmes</b>			
Target group	Age and schedule	Disease	Vaccines required
Babies born to hepatitis B infected mothers	At birth, four weeks and 12 months old <sup>3</sup>	Hepatitis B	(Hepatitis B (Engerix-B/Hib/HepB/PRC))
Infants in areas of the country with			

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/Users/karms/OneDrive/Documents/insurance%202022/UKHSA-12155-routine-complete-immunisation-schedule\_Feb2022[60410].pdf

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**immunisation** | The safest way to protect children and adults **NHS**

**Selective immunisation programmes**

Target group	Age and schedule	Disease	Vaccines required
Babies due to hepatitis B infected mothers	At birth, four weeks and 12 months old <sup>a</sup>	Hepatitis B	Hepatitis B (Engerix-B/Hib/HibPac/Hib)
Infants in areas of the country with TB incidence of 10 or more cases per 100,000 population <sup>b</sup>	Around 28 days old <sup>c</sup>	Tuberculosis	BCG
Infants with a parent or grandparent born in a high incidence country <sup>d</sup>	Around 28 days old <sup>c</sup>	Tuberculosis	BCG
Children in a clinical risk group	From 6 months to 17 years of age	Influenza	LAIV or inactivated influenza vaccine, as recommended by LAIV or inactivated flu vaccine
Pregnant women	At any stage of pregnancy during flu season	Influenza	Inactivated flu vaccine
	From 16 weeks gestation	Pertussis	cDaptacel/P (Boostrix-IPV)

1. Take blood at 12 months to exclude infection.  
2. Infants born to mothers who have given birth to 10 or more cases of TB.  
3. Check child health record book (red book) for details of vaccination.  
4. Check child health record book (red book) for details of vaccination.

**Additional vaccines for individuals with underlying medical conditions**

Medical condition	Diseases protected against	Vaccines required <sup>e</sup>
Asplenia or splenic dysfunction (including due to sickle cell and coeliac disease)	Meningococcal Influenza	Menocaps (up to ten years of age) PPV (from two years of age) Annual flu vaccine
Cochlear implants	Pneumococcal	PCV13 (up to ten years of age) PPV (from two years of age) Annual flu vaccine
Chronic respiratory and heart conditions (such as cystic fibrosis, chronic pulmonary disease, and heart failure)	Pneumococcal Influenza	PCV13 (up to ten years of age) PPV (from two years of age) Annual flu vaccine
Chronic neurological conditions (such as Parkinson's or motor neurone disease, or learning disability)	Pneumococcal Influenza	PCV13 (up to ten years of age) PPV (from two years of age) Annual flu vaccine
Diabetes	Pneumococcal	PCV13 (up to ten years of age) PPV (from two years of age) Annual flu vaccine
Chronic kidney disease (CKD) (including haemodialysis)	Pneumococcal Influenza (stage 3, 4 and 5 CKD) Hepatitis B (stage 4 and 5 CKD)	PCV13 (up to ten years of age) PPV (from two years of age) Annual flu vaccine Hepatitis B
Chronic liver conditions	Pneumococcal Influenza Hepatitis A Hepatitis B	PCV13 (up to ten years of age) PPV (from two years of age) Annual flu vaccine Hepatitis A Hepatitis B
Haemophilia	Pneumococcal Influenza	PCV13 (up to ten years of age) PPV (from two years of age) Annual flu vaccine
Immunosuppression due to disease or treatment	Pneumococcal	PCV13 (up to ten years of age) PPV (from two years of age) Annual flu vaccine
Complement disorders (including those receiving complement inhibitor therapy)	Meningococcal groups A, R, C, W and Y Influenza	Menocaps/WY PCV13 (up to ten years of age) Annual flu vaccine

1. Check relevant chapter of the Green Book for specific schedules.  
2. Check child health record book (red book) for details of vaccination.  
3. Check child health record book (red book) for details of vaccination.  
4. Consider annual influenza vaccination for household members and those caring for people with these conditions.

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assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/659800/Visual\_Guide\_Vaccine\_poster\_January\_2020.pdf

**NHS**  
Public Health England

### A visual guide to vaccines used in the routine immunisation schedule

Vaccine	Route of administration	Diseases protected against	Age due
Infantis Hexa (DTP/IPV/Hib/HpV)	Injection	Diphtheria, tetanus, pertussis (whooping cough), polio, haemophilus influenzae type b, human papillomavirus	8-12.5 weeks
Prevenar 13 (PCV)	Pneumococcal (7d serotypes)	12 months and 4 years	
Bexsero MenB	Meningococcal group B	8 weeks and 1 year	
Rotarix (rotavirus)	Rotavirus gastroenteritis	8 and 12 weeks	
MenBixx Hib/MenC	Haemophilus influenzae type b (HiB) and meningococcal group C	1 year	
M-M-RixPre or Priorix MMR	Mumps, measles and rubella	1 year and 2 years & 3 months	
FluoroTetra LAIV (influenza)	Influenza	Eight paediatric age groups <sup>a</sup>	
Repevax (DTP)	Diphtheria, tetanus, pertussis and polio	3 years & 4 months and 12 years & 10 months (school year)	
Gardasil (HPV)	Cervical cancer (normalised titres 10 and 18 and genital warts types 16 and 18)	Boys and girls aged 9 years and 12 years (school year)	
Repevax Td (Td)	Tetanus, diphtheria and polio	14 years (school year)	
Nimence MenOMV	Meningococcal groups A, C, W and Y <sup>b</sup>	14 years (school year)	
Bacillus-IPV or Repevax (DTP/Polio)	Diphtheria, tetanus, pertussis and polio	Prepubescent women from 10 weeks (school year)	
Pneumococcal Polysaccharide Vaccine (PPV)	Pneumococcal (23 serotypes)	65 years	
Zostavax (Shingles)	Shingles	70 years	

<sup>a</sup>Parents of school-age children should not assume that their child has had all the recommended childhood immunisations. Full details of the routine immunisation schedule are available at [www.gov.uk/government/collections/vaccine-schedule](http://www.gov.uk/government/collections/vaccine-schedule).  
<sup>b</sup>Parents of school-age children should not assume that their child has had all the recommended childhood immunisations. Full details of the routine immunisation schedule are available at [www.gov.uk/government/collections/vaccine-schedule](http://www.gov.uk/government/collections/vaccine-schedule).

The safest way to protect your health **immunisation**

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Vaccination of individuals with uncertain or incomplete immunisation status

For online Green Book, see [www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book](http://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book) • For other countries' schedules, see [http://apps.who.int/immunization\\_monitoring/globalsummary/](http://apps.who.int/immunization_monitoring/globalsummary/)

**Infants from two months of age up to first birthday**

DTaP/IPV/Hib/HepB\* + MenB\* + Rotavirus\*

Four week gap

DTaP/IPV/Hib/HepB\* + MenB\* + Rotavirus\*

Four week gap

DTaP/IPV/Hib/HepB\* + MenB\*\*

A child who has received 1 or more doses of primary diphtheria, tetanus, polio and pertussis should complete the 3 dose course with DTaP/IPV/Hib/HepB\* + MenB\* + Rotavirus\*. This can be given as Hib/MenC and/or, monovalent hepatitis B vaccine.

Doses of MenB should ideally be given 8 weeks apart. They can be given 4 weeks apart in order for the first dose of MenB to be given before the rotavirus vaccine schedule can be completed before the first birthday if possible (i.e. if infant is aged <12 weeks)

First dose of rotavirus vaccine to be given only if infant is more than 6 weeks and under 18 weeks and age at first dose is less than 24 weeks old.

Infants who are aged >12 weeks over starting the rotavirus schedule can be given their single infant priming dose of PCV with their first set of primary vaccinations.

**Booster + subsequent vaccination**

As per UK schedule ensuring at least a 4-week interval between primary DTaP/IPV/Hib/HepB and the booster Hib/MenC dose, and a minimum 4 week interval between MenB and PCV priming and booster doses.

**General principles**

- unless there is a documented or reliable verbal vaccine history, individuals with uncertain or incomplete immunisation status should be unimmunised and a full course of immunisation planned
- individuals coming to the UK part way through their immunisation schedule should be transferred onto their new schedule and immunised as appropriate for age
- if the primary course has been started but not completed, the full course – no need to repeat doses or restart course
- plan catch-up immunisation schedule with minimum number of visits and within a minimum possible timescale – to protect individual in shortest time possible

**MMR – from first birthday onwards**

- doses of measles-containing vaccine given prior to 12 months of age should not be counted
- 2 doses of MMR should be given irrespective of history of measles, mumps or rubella infection and/or age
- if child <30m, give 2nd dose MMR as pre-activite dTaP/IPV unless particular reason to give earlier
- second dose of MMR should not be given <18m of age except where protection against measles is urgently required

**Flu vaccine (during flu season)**

- those aged 65yrs and older
- those aged 2yrs and older in the defined clinical risk groups (see [Green Book: Pneumococcal chapter](#))
- those aged 6 months and older in the defined clinical risk groups (see [Green Book: Influenza chapter](#))

**Pneumococcal polysaccharide vaccine (PPV)**

- those aged 65yrs and older
- those aged 2yrs and older

**Shingles vaccine**

- those aged 70 years up to their 60th birthday

BCG and Hepatitis B vaccines for those at high risk should be given as per Green Book recommendations.  
Individuals in clinical risk groups may require additional vaccinations. Please check [Green Book chapters](#).

First booster of t/d/PPV. Preferably 5 years after primary course. Second booster of t/d/PPV: Ideally 10 years (minimum 5 years) following first booster

t/d/PPV + MenACWY\* + MMR  
Td/PPV + MMR  
Four week gap  
Td/PPV/Hib/HepB\*

\* Those aged from 10 years up to 25 years who have never received a MenC-containing vaccine should be offered this vaccine. Those aged 10 years up to 25 years up to 25 years may be eligible or may shortly become eligible for MenACWY usually given at 12-13 years of age. Those born on or after 1/9/1996 remain eligible for Men ACWY until their 25th birthday

HPV vaccine

- all females who have been eligible remain so up to their 25th birthday
- males born on/after 1/9/00 are eligible up to their 25th birthday
- individuals commencing HPV vaccine course:
  - before age 15 yrs should follow 2 dose, 0-6 months schedule
  - at age 15 yrs and above should follow 3 dose 0, 1, 4-6 months schedule
  - follow 3 dose catch-up schedule with a HPV vaccine no longer not used in the UK provided the course can be completed with the vaccine currently being used
  - for 2 dose course, give second dose even if more than 6 months apart from first dose or individual is then aged 15yrs or more
  - 3 dose courses started but not completed before age 15yrs should be completed ideally allowing 3 months between second and third dose and 6 month interval if otherwise unlikely to complete course
  - if 3 dose course commenced under 15yrs and incomplete:
    - only received 1 dose, give a second dose 0-6 months apart
    - received 2 doses less than 6 months apart, give a third dose at least 3 months after second dose

IMM190-03 Effective from August 2021 - Authorised by: Laura Craig

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PROTECTED VIEW Be careful—files from the internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. [Enable Editing](#)

Select country:

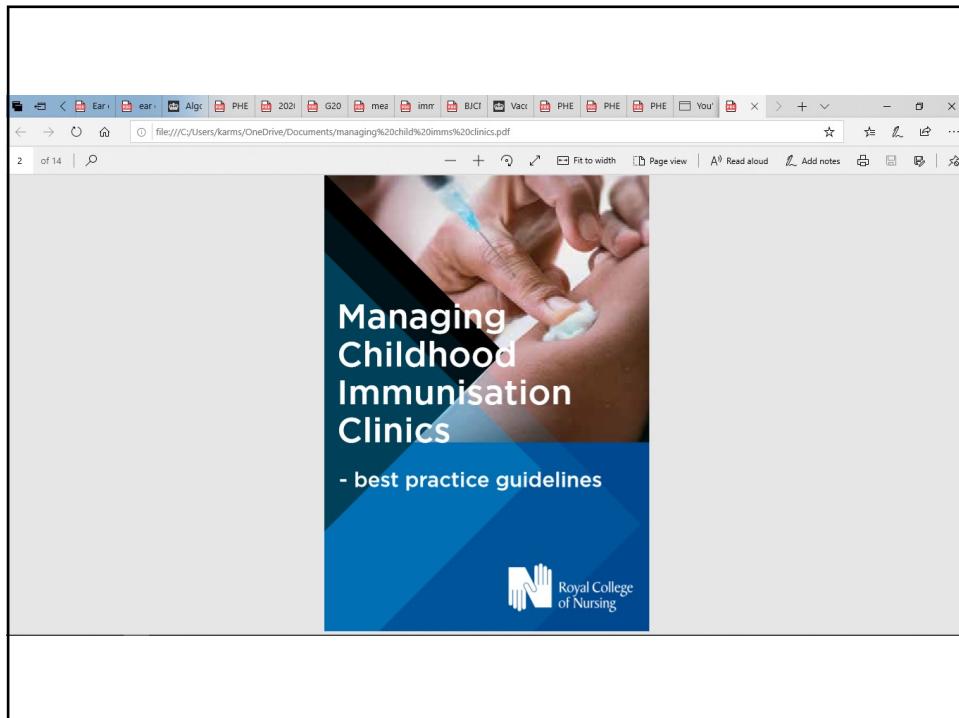
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- France
- Germany
- India
- Ireland
- Italy
- Kenya
- Lithuania
- Nigeria
- Pakistan
- Philippines
- Poland
- Portugal
- Romania
- South Africa
- Spain
- Sri Lanka
- United States of America

This tool is intended to help staff in general practice (i) ascertain what vaccines individuals moving to England from abroad have received and (ii) record those vaccines in their IT system. It contains, for each of the 20 countries individuals most commonly immigrate to the UK from, the vaccinations schedule, the name of the diseases/vaccines in the local language and, where available the vaccine used in the countries of origin. Please note that it should not be assumed that individuals have received all vaccines in their national schedule without a documented or reliable verbal history of immunisation.

Staff in general practice are strongly encouraged to code these vaccines using Read 2/CTV 3/SNOMED codes in order to ensure the patients can be identified as vaccinated for the purposes of call/recall and vaccine coverage calculations. Information and advice about vaccination for individuals with uncertain or incomplete immunisation status can be [here](#)

v1.1- June 2019  
Comments or queries can be addressed to [immunisation@phe.gov.uk](mailto:immunisation@phe.gov.uk)

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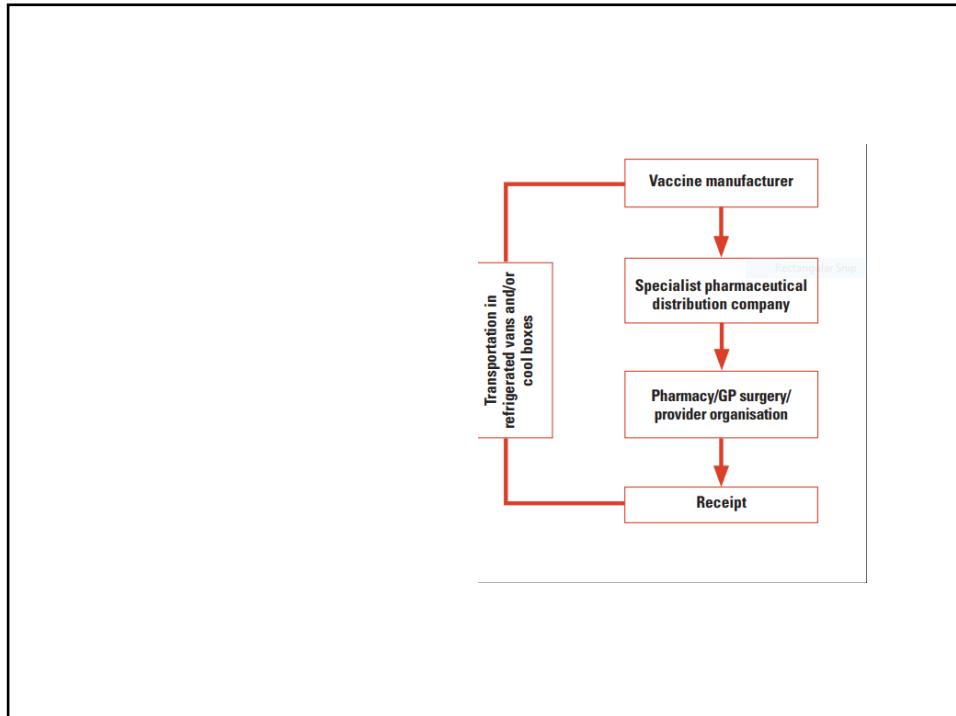
9

A screenshot of a PDF viewer showing a page titled "Remember your 8 Rs". The page contains a list of eight items under the heading "Before giving a vaccine always check:"

- 1 Right patient
- 2 Right vaccine and diluent (where applicable)
- 3 Right to give (ie, no contraindications)
- 4 Right time (including correct age and interval, as well as before the product expiration date)
- 5 Right dose
- 6 Right route (including correct needle gauge and length and technique)
- 7 Right site
- 8 Right documentation (to ascertain what the patient has already had/needs)

The PDF viewer interface is visible at the top.

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## Monitoring the vaccines

- To protect your patients, you need to protect your vaccines so remember to:
- • Read: take a daily reading of the thermometer's maximum, minimum and current temperatures at the same time every day during the working week
- • Record: record temperatures in a standard fashion, on a standard form and sign each entry on the recording sheet
- • Reset: reset the thermometer after each reading. The thermometers should also be reset when temperatures have stabilized after periods of high activity e.g. restocking
- • React: the person making the recording should take action if the temperature falls outside the +2°C to +8°C range and document this action

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## QOF requirements have changed

### ► NEW QOF allocation

- To provide practice stability and support recovery, QOF for 2021/22 will be based upon the indicator set already agreed for 2020/21, with very limited changes only. The one main exception is vaccinations and immunisations, where we previously committed to improving payment arrangements for vaccinations and immunisations by replacing the Childhood Immunisation DES with item of service payments, and a new vaccination and immunisation domain within QOF. Four indicators have been agreed to comprise the new vaccination and immunisation domain, transferring almost £60m from the DES to QOF in 2021/22. This reform to the contract does not generate new workload but provides clearer support for the delivery of vaccinations and immunisations

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## More QOF

- Annex A – new QOF indicators for 2021/22
- Table 1 - New vaccination and immunisation domain Indicator ID Indicator wording Points Payment thresholds Points at lower threshold NM197 (adapted)
- The percentage of babies who reached 8 months old in the preceding 12 months, who have received at least 3 doses of a diphtheria, tetanus and pertussis containing vaccine before the age of 8 months. 18 points if 90-95% 3 points if lower threshold
- NM198 The percentage of children who reached 18 months old in the preceding 12 months, who have received at least 1 dose of MMR between the ages of 12 and 18 months 18 points if 90-95% and 7 points if low threshold met

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## QOF 3

- ▶ NM199 The percentage of children who reached 5 years old in the preceding 12 months, who have received a reinforcing dose of DTaP/IPV and at least 2 doses of MMR between the ages of 1 and 5 years. 18 points if 87-95% 7 points if lower threshold met
- ▶ NM201 The percentage of patients who reached 80 years old in the preceding 12 months, who have received a shingles vaccine between the ages of 70 and 79 years. 10 points if 50-60% 0 points for any other threshold

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## ***CHILD WITH MEASLES***



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## History of measles

- ▶ For many years a frightening and serious illness
- ▶ Many cases in Europe and worldwide in the last few years
- ▶ MMR uptake now better at 90%+
- ▶ Wakefield sues for defamation in Texas court
- ▶ **Latest update**
- ▶ UK measles free WHO 2017
- ▶ 2018 991
- ▶ 2019 532 confirmed to June 2019
- ▶ So cases are being imported- this is the problem- no longer considered measles free country
- ▶ 2020 and 2021 – still prevalent, mostly imported

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### The Countries With The Most Reported Measles Cases

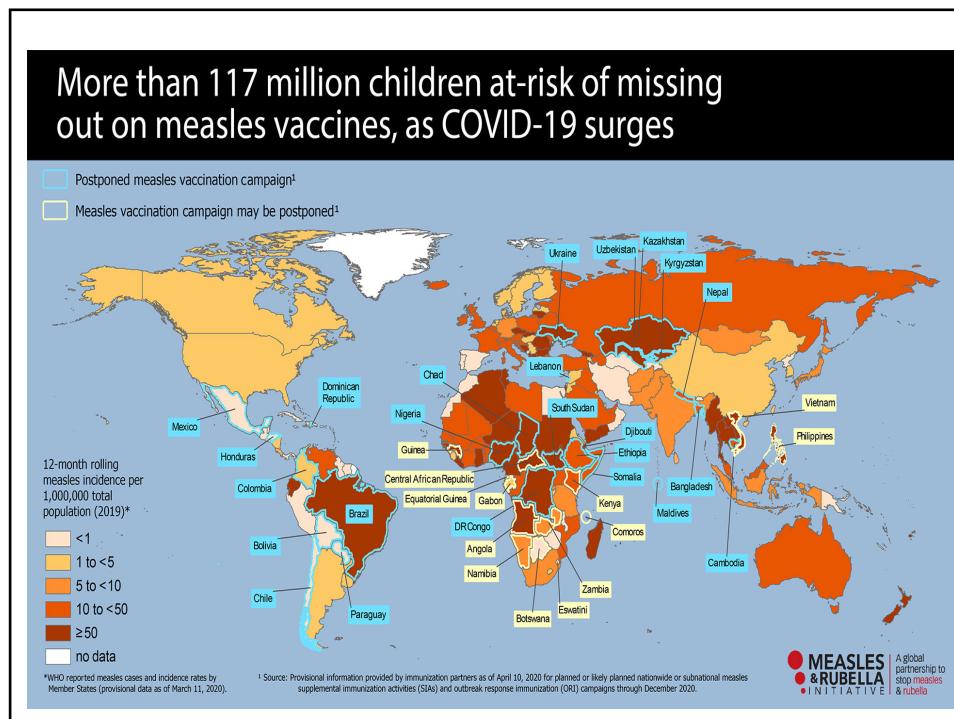
Countries by number of confirmed measles cases from January to April



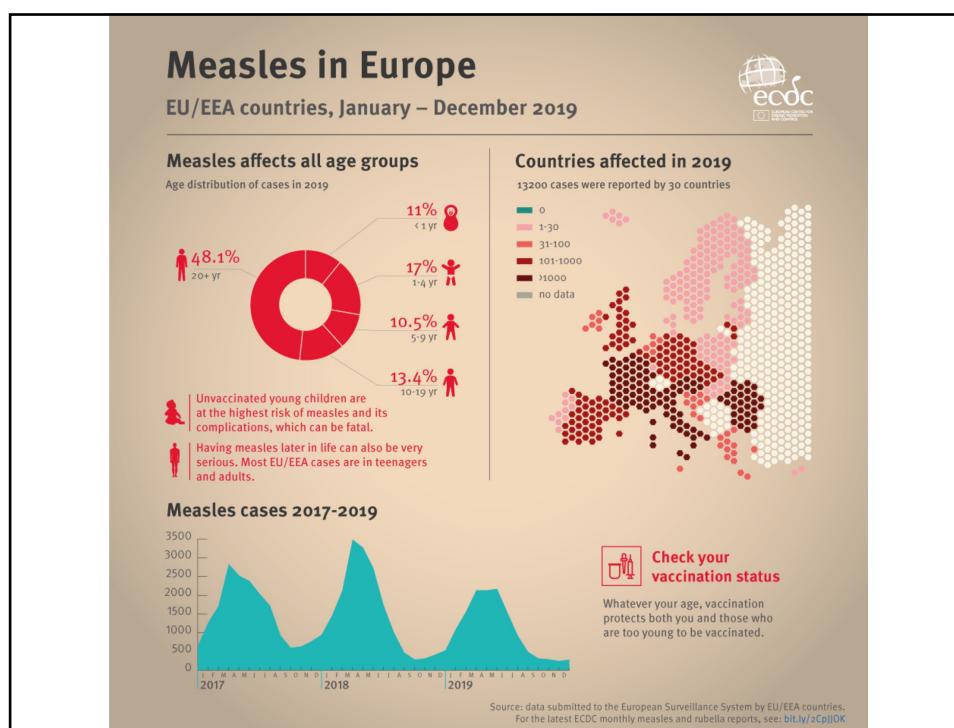
@StatistaCharts Source: World Health Organization

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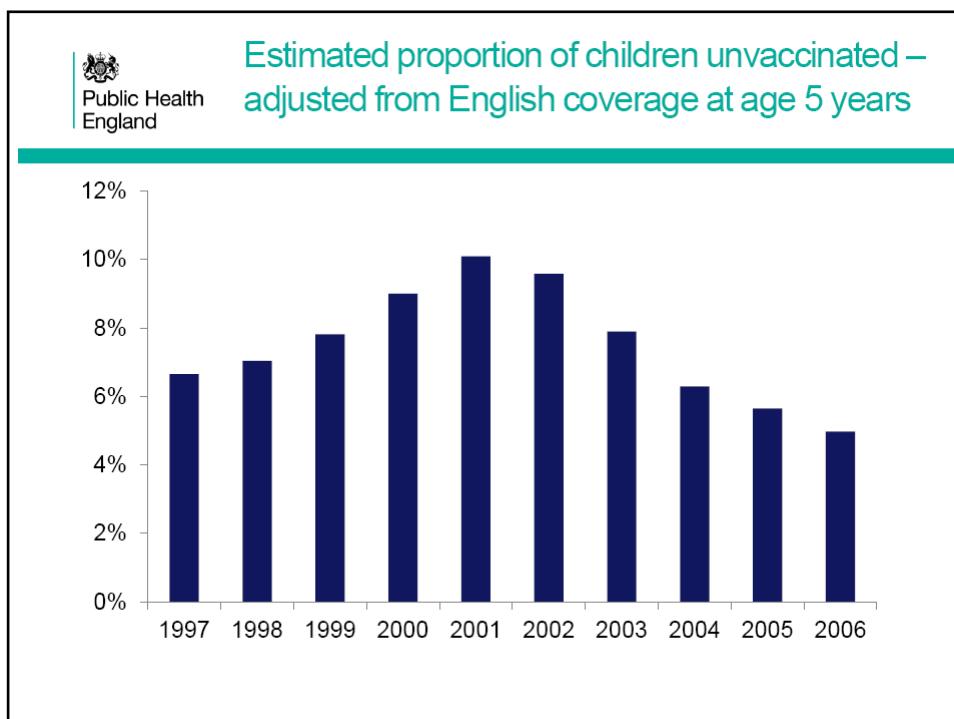
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## Measles cases

- 2017 lost measles free status due to imported cases
- 2018 991 cases in England and Wales ( 2-17 284)
- First dose coverage is high at 95% but second dose is 87.4%
- Currently see next slide

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## UK cases

Year	Measles	Mumps	Rubella
2019*	810(798)	5558(5042)	3(3)
2018	989(968)	1088(1061)	3(3)
2017	283 (265)	1840 (1796)	3(3)
2016	541 (526)	573 (537)	2(2)

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## 2020/21 MMR

2018	989(968)	1,088(1,061)	3(3)
2019	808(797)	5,718(5,055)	3(3)
2020	79(79)	3,738(3,215)	0(0)
2021*	2(2)	18(17)	0(0)

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## MMR being missed

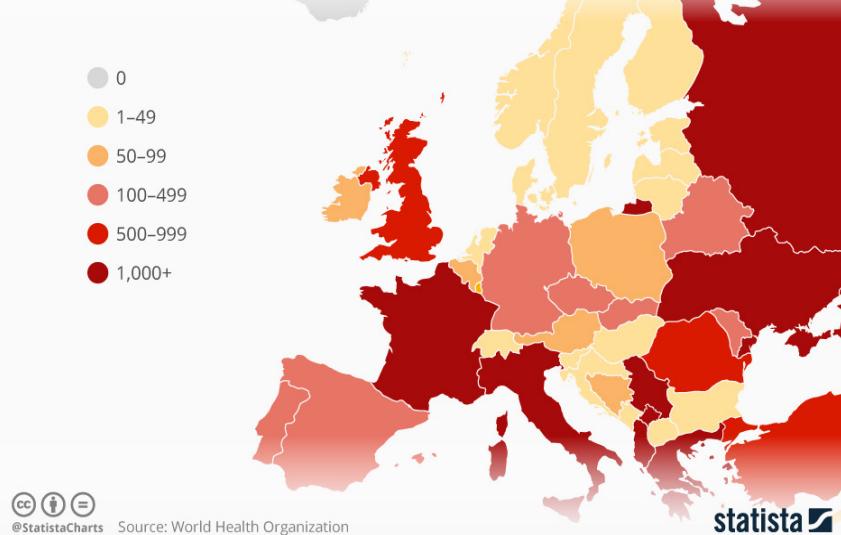
The recent European Immunization week news and events emphasised the importance of vaccines to protect people of all ages, and we are also reflecting on the drop in vaccine coverage.

More than 1 in 10 eligible children under the age of 5 in England haven't had the MMR vaccine or are only partially vaccinated.

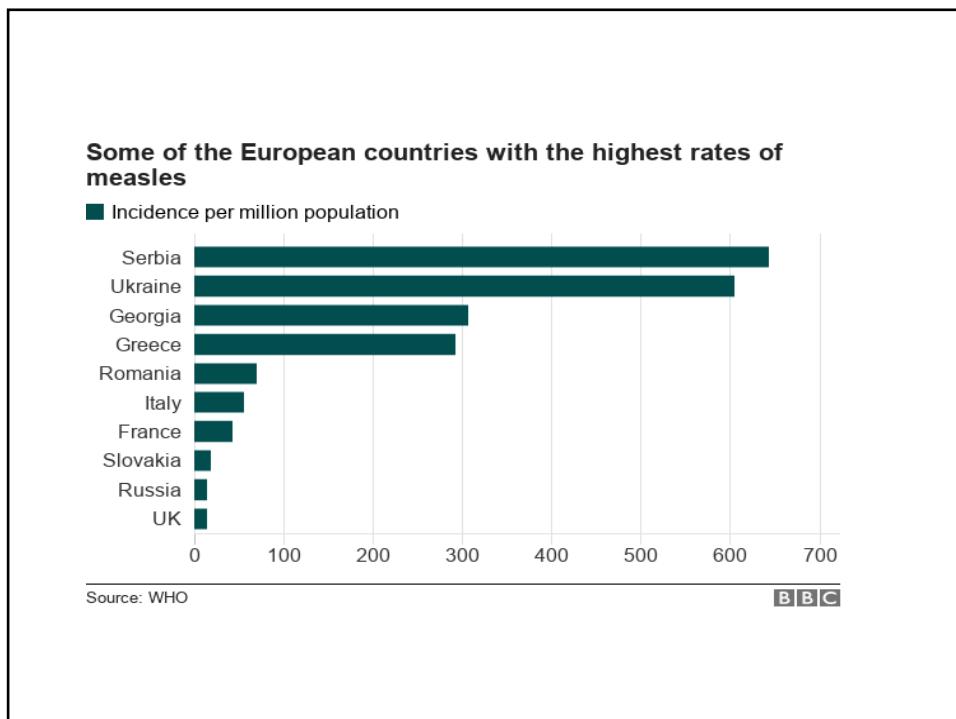
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### Europe Still Struggling With Major Measles Outbreak

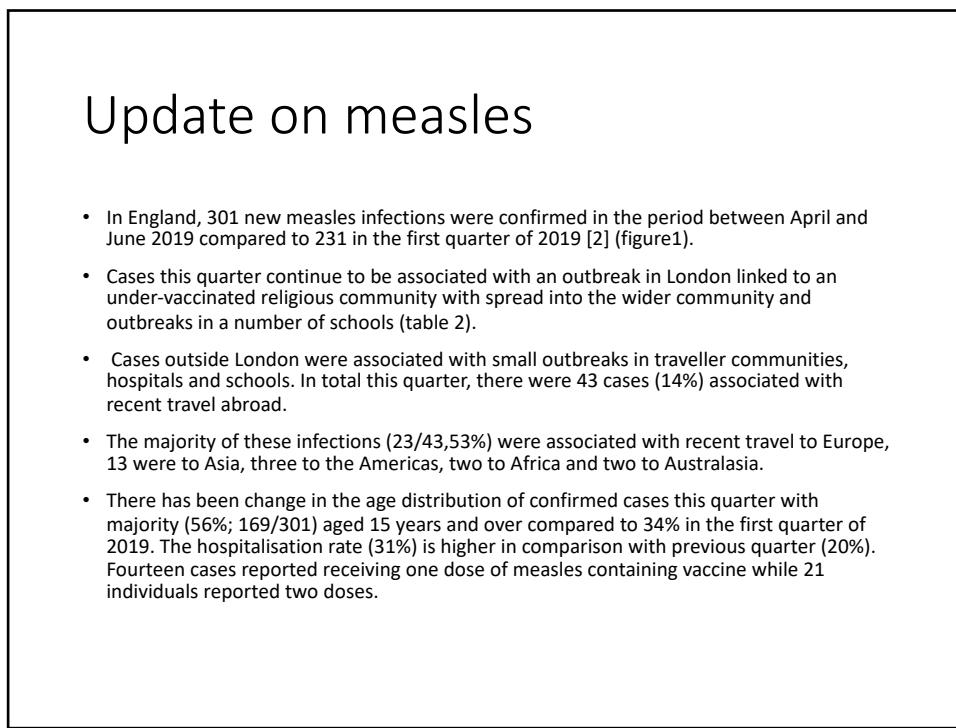
Measles cases in Europe from January 2018 to August 2018



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## MMR

- Added as a new QOF
- Need between 90 and 95% for full points
- No up to date data but QOF demonstrates that the need for more vaccination is a priority

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## Scenario

- A mother of twins does not want them immunised with MMR at 1 year old. What advice would you give?

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## Scenario

- ▶ A 9 month old is visiting India when she will be 10 months old for 3 months. What advice would you give about the possible risks of measles infection?
  - ▶
    - a. Give MMR now and another on her return but then no more.
    - b. Advise you can do nothing as she is less than one year
    - c. Give her an MMR early and then have the remaining MMRs at the scheduled time.

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## Rubella-German measles

- Previously given to girls as rubella
- Now inclusive to MMR
- Congenital most problematic
- More commonly cases mostly from African and Indian sub continents
- Given to women pre conceptually or just after birth
- From April 1st 2016 routine screening for rubella MMR will end-vaccinate those at risk or who have not received it in the schedule- as numbers are so low

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## Scenario

- You recommend that a mother with a one year old child checks her own rubella status-how can she do this?

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## Mumps



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## A student with Mumps



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How will we manage a person with mumps?

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## Mumps 2020 UK

Provisional data from Public Health England (PHE) show that there were 5,042 lab-confirmed cases of mumps in England in 2019, compared to 1,066 cases in 2018. This is the highest number of cases since 2009.

The rise in cases looks set to continue in 2020, with 546 confirmed cases in January 2020 compared to 191 during the same period in 2019.

The steep rise in cases in 2019 has been largely driven by outbreaks in universities and colleges.

Many of the cases in 2019 were seen in the so-called ‘Wakefield cohorts’ – young adults born in the late nineties and early 2000s who missed out on the MMR vaccine when they were children.

These cohorts are now old enough to attend college and university and are likely to continue fuelling outbreaks into 2020.

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## Mumps

- Pre 1990 children only given measles and rubella
- Susceptible group 20 years +
- Data HPA 2006 43,000 case mumps
- 2019 5,500 cases mostly students
- Swelling of parotid glands with fever and malaise
- Reproductive organs affected-pain usually the only problem

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## Mumps data 2019

- A total of 2,028 cases of mumps were confirmed in the second quarter of 2019, continuing the increase seen in the first quarter of 2019 (795 cases) [2] (figure 2). This is the highest quarterly figure for mumps cases since 2009.
- Mumps cases were reported in all regions of England (table 3), predominantly in young adults aged 15 to 34 years (1669/202, 82%). Some of the cases confirmed this month were associated with outbreaks linked to Universities across England. Nearly half (998/2028, 49%) of the cases this quarter were unvaccinated.
- Although mumps in fully vaccinated individuals can occur, due to secondary vaccine failure, it is less likely to lead to complications requiring hospitalisation such as orchitis and meningitis.

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So....

- Check children and particularly students have had 2 MMRs
- Also before travel abroad
- 2020 low numbers but this is during lockdown- numbers expected to rise again

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## ... recently

Provisional data from Public Health England (PHE) show that there were 5,042 lab-confirmed cases of mumps in England in 2019, compared to 1,066 cases in 2018. This is the highest number of cases since 2009. The rise in cases looks set to continue in 2020, with 546 confirmed cases in January 2020 compared to 191 during the same period in 2019.

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Mumps is a viral infection that used to be common in children before the introduction of the MMR vaccine.

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## Hib

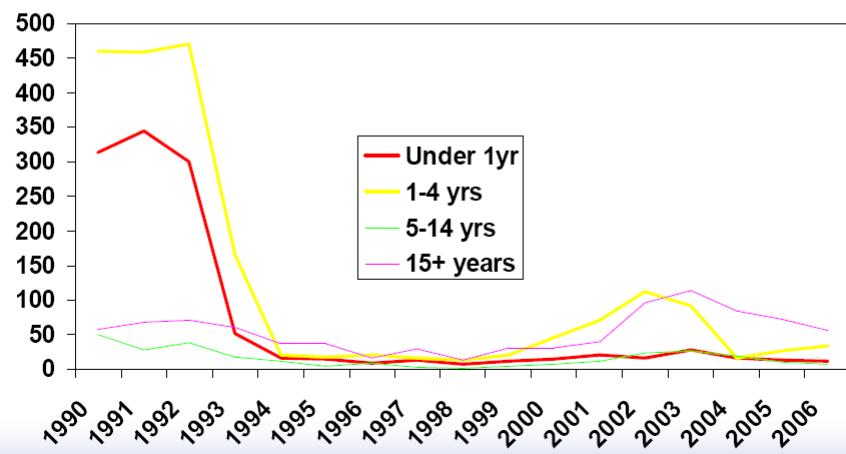
- *Haemophilus influenzae type b* (Hib) causes serious invasive disease, especially in young children
- Most common are meningitis, bacteraemia and epiglottitis
- Also causes septic arthritis, osteomyelitis, pneumonia
- Spread through coughing, sneezing or close contact
- 1970s polysaccharide vaccine then conjugate

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### Invasive Hib cases by age group 1990-2006, E&W (courtesy of HPA Centre for Infections)



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## Change to current programme

- What do we give at present?
- 8,12,16 weeks Hib containing vaccine and 1 y
  - The Joint Committee on Vaccination and Immunisation (JCVI) has been notified of the discontinuation of Menitorix® (Hib/MenC). This necessitates a change to the routine infant schedule as this vaccine is currently given at 12 months.
  - After careful consideration of the options, the JCVI advises that:
  - an additional dose of Hib-containing multivalent vaccine should be offered at 12 or 18 months of age – note that giving this at 18 months would require the creation of a new immunisation visit
  - the second dose of measles, mumps and rubella (MMR) vaccine should be brought forward from 3 years 4 months to 18 months of age to improve coverage
  - including a dose of MenC-containing vaccine (such as MenACWY) in the infant schedule is not recommended – efforts to sustain and improve coverage of MenACWY in adolescents are important to maintain herd immunity

45

## Diphtheria

- Diphtheria is an acute infectious disease of humans affecting the upper respiratory tract and occasionally the skin, caused by the action of diphtheria toxin produced by toxigenic *Corynebacterium diphtheriae* or by *C.ulcerans*. The most characteristic feature of diphtheria affecting the upper respiratory tract is a membranous pharyngitis (often referred to as a pseudo-membrane) with fever, enlarged anterior cervical lymph nodes and oedema of soft tissues giving a "bull neck" appearance.
- The pseudo-membrane may cause respiratory obstruction. The toxin also affects other parts of the body including the heart and nervous systems, causing paralysis and cardiac failure.
- Milder infections resemble streptococcal pharyngitis and the pseudo-membrane may not develop, particularly in vaccinated individuals. The bacteria can also be carried without any symptoms at all

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## Diphtheria



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## Diphtheria



48

## Addition of diphtheria to tetanus booster

- This was added to the tetanus and polio vaccine as epidemiology showed low levels of immunity in adults in the UK – around 2000
- Thinking of population susceptibility

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## Scenario

- A 5 year old refugee from Somalia is booked into your clinic for immunisations.
- How would you manage this session?
- What do you need to consider?

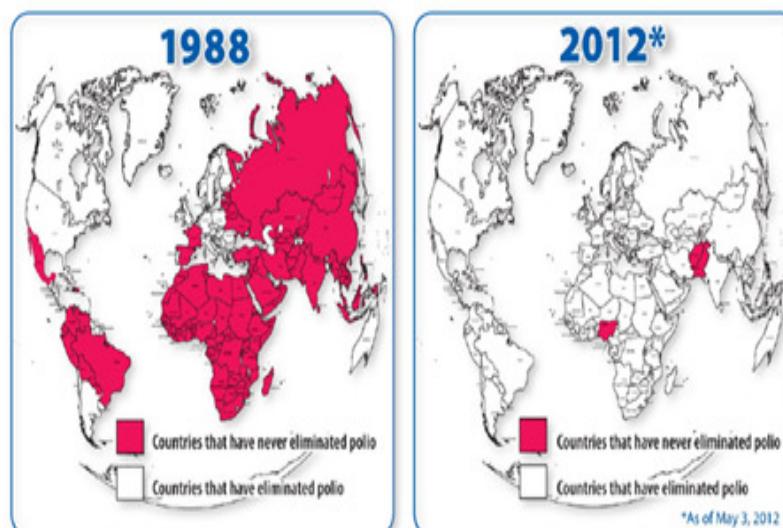
50

## Polio

Poliomyelitis (polio) is a highly infectious vaccine preventable disease caused by a virus. It invades the nervous system, and can cause total paralysis in a matter of hours. It can strike at any age, but affects mainly children under three (over 50% of all cases). The virus enters the body through the mouth and multiplies in the intestine.



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In 1988, there were 350,000 new cases of polio reported across the globe. Last year there were 223. Thanks to global efforts to tackle this disease we are within reach of finally consigning polio to the history books.

Yet new cases in Syria and East Africa threaten to reverse decades of progress. Now is the time to step up efforts to finally rid the world of polio. This should not be limited to one country or one organisation. Everyone has a part to play.

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## Current endemic areas

- Afghanistan
- Pakistan
- Nigeria- recently first 2 cases of wild polio virus causing paralysis-first for 20 yrs
- Syria-war torn region
- Ensure patients going to and returning from these areas are aware of this and are vaccinated-some countries may wish exit vaccination visas or will enforce oral/IM polio vaccination
- Notifiable disease

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## WHO polio facts

### **Fact 1: Polio continues to paralyse children**

While polio is a distant memory in most of the world, the disease still exists in

some places and mainly affects children under 5.

One in 200 infections leads to irreversible paralysis (usually in the legs). Among those paralysed, 5% to 10% die when their breathing muscles become immobilized.

### **Fact 2: We are 99% of the way to eradicating polio globally**

When the Global Polio Eradication Initiative was formed, polio paralysed more than 350 000 people a year.

Since that time, polio case numbers have decreased by more than 99%. More than 16 million people have been saved from paralysis because of vaccination efforts against polio.

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## Polio prevalence

Poliomyelitis, also known as polio or infantile paralysis, is a vaccine-preventable systemic viral infection which attacks the nervous system and can cause irreversible paralysis within hours of infection. Children under five are the most vulnerable, but there is a vaccine which prevents the disease.

### WITH RECENT CASES OF:

- Wild polio virus
- \*Circulating vaccine-derived polio virus



\*On rare occasions, an excreted vaccine-virus can continue to circulate for an extended period of time and can genetically change into a form that can paralyse – this is what is known as a circulating vaccine-derived polio virus.

Source: Global Polio Eradication Initiative, World Health Organization. Data is for 2019, year to date.

C. Inton, 20/09/2019

REUTERS

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## Question

- Polio is excreted in the faeces?
- True or false?
- How do we manage this?
- Does this relate to injectable polio?

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## War torn countries

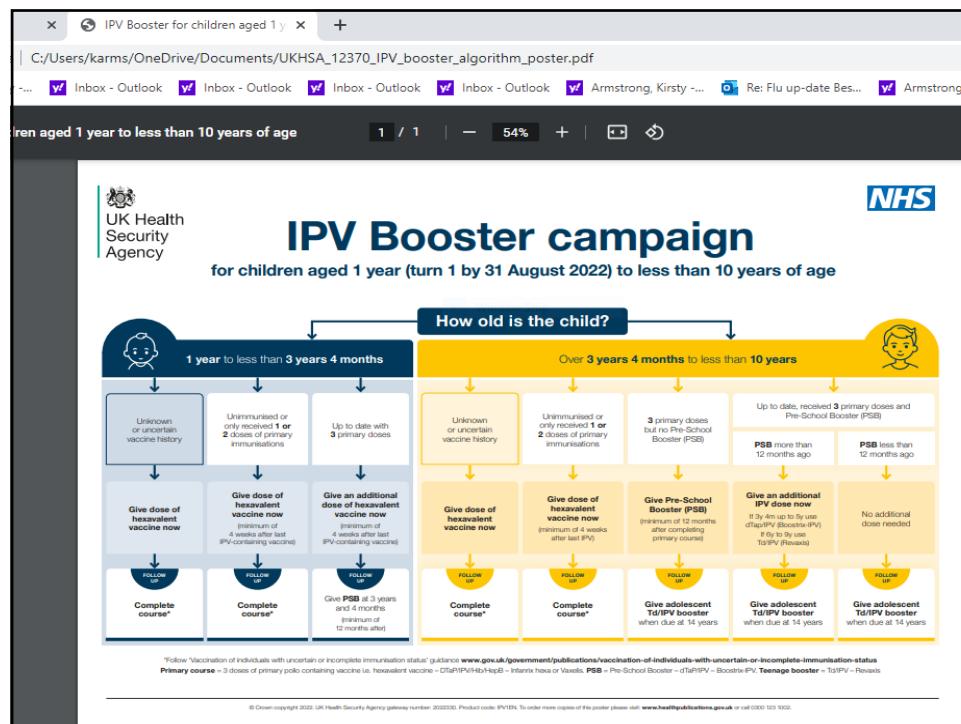
- Where healthcare is affected by war or invasion many diseases will return
- Consider where these might be and think of those you see who arrive from abroad

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## Polio in the UK- London sewage

- Genetically-related polio virus was found in sewage samples taken between February and June. • The virus has continued to evolve and is now classified as a 'vaccine-derived' poliovirus type 2 (VPV2), which on rare occasions can cause serious illness, such as paralysis, in people who are not fully vaccinated. • This suggests it is likely there has been some spread between closely-linked individuals in North and East London and that they are now shedding the type 2 poliovirus strain in their faeces. • The virus has only been detected in sewage samples and no associated cases of paralysis have been reported – but investigations will aim to establish if any community transmission is occurring. • The last case of wild polio contracted in the UK was confirmed in 1984. The UK was declared polio-free in 2003. • Vaccine-derived poliovirus is rare and the risk to the public overall is extremely low. • It is important that anyone who is not up to date with their polio vaccinations is caught up.

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## Scenario

- A child comes for their polio catch up.
- They are 3 years and 2 months old
- Should you give the hexavalent now ( instead of Boostrix –IPV) and the 2<sup>nd</sup> MMR? Eg the PSB early
- What are the implications of this?
- How can you make this medico-legally water tight?

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## Tetanus

- Tetanus is caused by a neurotoxin produced by *Clostridium tetani*, an anaerobic spore forming bacillus. Tetanus spores are widespread in the environment, including in soil, and can survive hostile conditions for long periods of time. Hence tetanus disease can be eliminated by vaccination but never eradicated.
- Transmission occurs when spores are introduced into the body, often through a puncture wound but also through trivial, unnoticed wounds, through injecting drug use, and occasionally through abdominal surgery. The infection is not passed from person to person and there is no herd immunity.
- The incubation period of the disease is usually between three and 21 days, although it may range from one day to several months, depending on the character, extent, and localisation of the wound

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## Tetanus

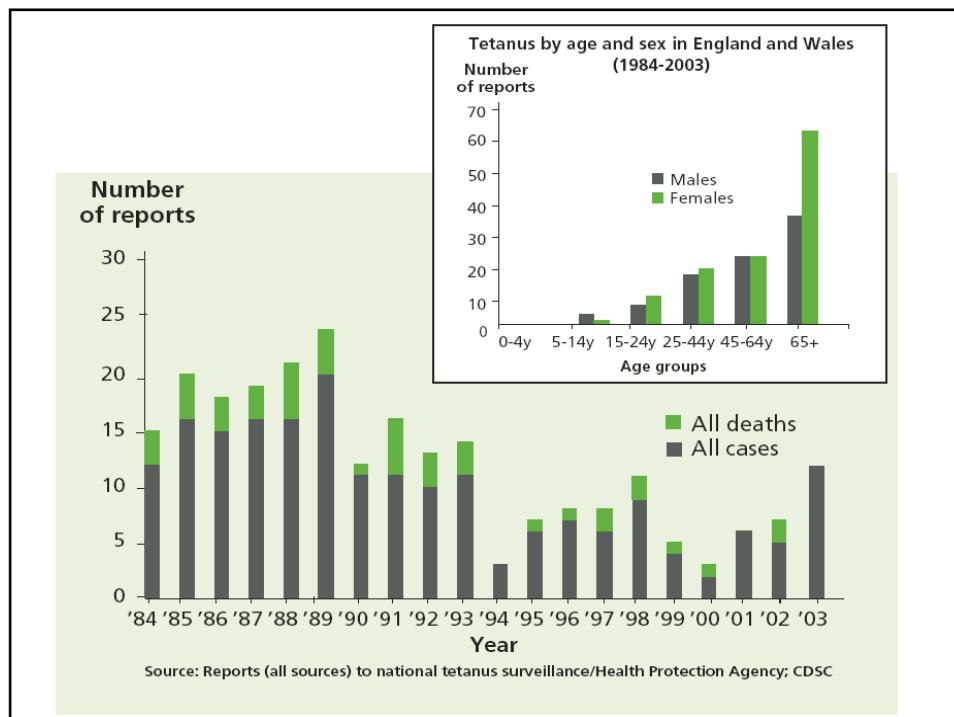


63

## Risk groups

- IVDUs
- Older females
- Un-immunised

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## Tetanus prone wounds

- • wounds or burns that require surgical intervention that is delayed for more than six hours
- • wounds or burns that show a significant degree of devitalised tissue or a puncture-type injury, particularly where there has been contact with soil or manure
- • wounds containing foreign bodies
- • compound fractures
- • wounds or burns in patients who have systemic sepsis.

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## Tetanus cases

- 7 cases
- With IVDU
- Also with history of injury or injecting drugs
- None had completed course of tetanus

67

file:///C:/Users/karms/OneDrive/Desktop/chiddingsfold%20new/Tetanus\_quick\_guide\_poster.pdf

**Public Health England**

**NHS**

**Post exposure management for Tetanus Prone Wounds**

Immunisation Status	Immediate treatment			Later treatment
	Clean wound <sup>1</sup>	Tetanus Prone	High risk tetanus prone	
Those aged 11 years and over, who have received an adequate priming course of tetanus vaccine <sup>1</sup> with the last dose within 10 years	None required	None required	None required	Further doses as required to complete the recommended schedule (to ensure future immunity)
Children aged 5–10 years who have received priming course and pre-school booster	None required	Immediate reinforcing dose of vaccine	Immediate reinforcing dose of vaccine	
Children under 5 years who have received an adequate priming course			One dose of human tetanus immunoglobulin <sup>2</sup> in a different site	
Received adequate priming course of tetanus vaccine <sup>3</sup> but last dose more than 10 years ago				
Children aged 5–10 years who have received an adequate priming course but no preschool booster (Includes UK born after 1961 with history of accepting vaccinations)				
Not received adequate priming course of tetanus vaccine <sup>3</sup> (Includes uncertain immunisation status and/or born before 1961)	Immediate reinforcing dose of vaccine	Immediate reinforcing dose of vaccine	One dose of human tetanus immunoglobulin <sup>2</sup> in a different site	

**1** Clean wounds are defined as wounds less than six hours old, non-penetrating with negligible tissue damage.

**2** If TIG is not available, HNIG may be used as an alternative.

**3** At least three doses of tetanus vaccine at appropriate intervals. This definition of "adequate course" is for the risk assessment of tetanus-prone wounds only. The full UK schedule is five doses of tetanus containing vaccine.

Patients who are severely immunosuppressed may not be adequately protected against tetanus, despite having been fully immunised and additional booster doses or treatment may be required.

**Immunisation**  
Helping to protect everyone

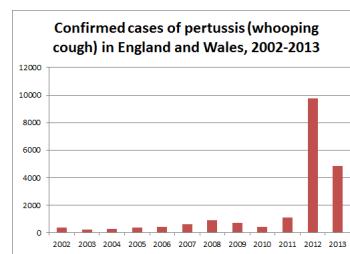
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## Scenario

- Whilst working with a family the 13 year old comes having been bitten by a dog.
- Should he/she receive a tetanus booster?

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## Pertussis



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## Whooping Cough

- Disease of the respiratory tract caused by *Bordetella pertussis* bacteria
  - Starts with cold-like symptoms, develops into bouts of severe coughing followed by characteristic whoop or vomiting
  - Coughing can last for two to three months
- Spreads easily from person-to-person in droplets produced by coughing or sneezing
- Most dangerous in children under 1 year of age who are also at risk of the serious complications
  - Pneumonia, collapsed lungs or apnoeic attacks (stopping breathing)
  - Lack of oxygen leading to convulsions, brain damage, death
  - Weight loss and dehydration
- Older children and adults may simply have prolonged cough – infection often goes unrecognised

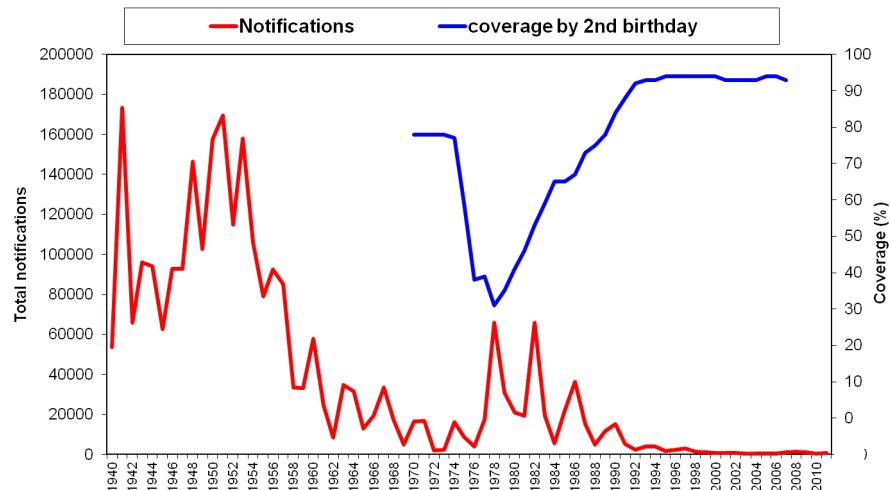
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Pertussis immunisation for pregnant women

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### Whooping cough notifications and vaccine coverage 1940-2011(England and Wales)



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## Summary of long term whooping cough trends

- Prior to the routine use of vaccination, over 100,000 cases of whooping cough reported each year in England and Wales
- Numbers of cases fell dramatically following the roll out of vaccination (by 1957)
- Epidemics (of up to 60,000 cases) occurred when vaccine coverage fell in the mid-1970s
- Vaccine coverage recovered and has exceeded 90% since the late 1980s
- Numbers of cases of whooping cough have been at historic low levels for over 20 years

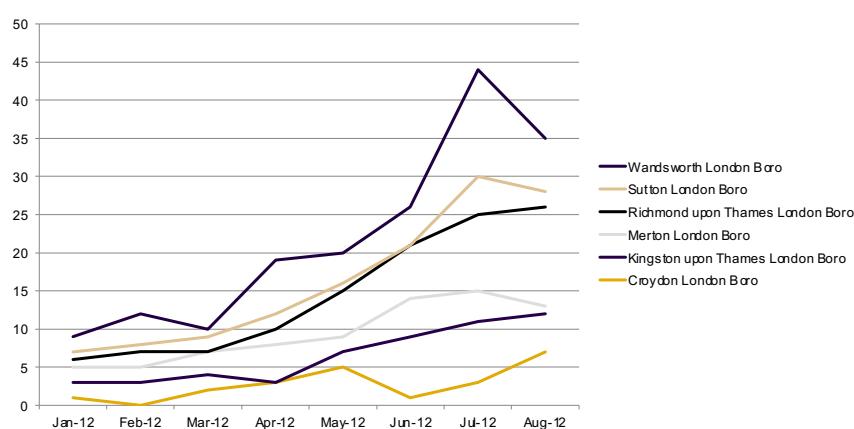
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### Pertussis cases in SW London, 2012

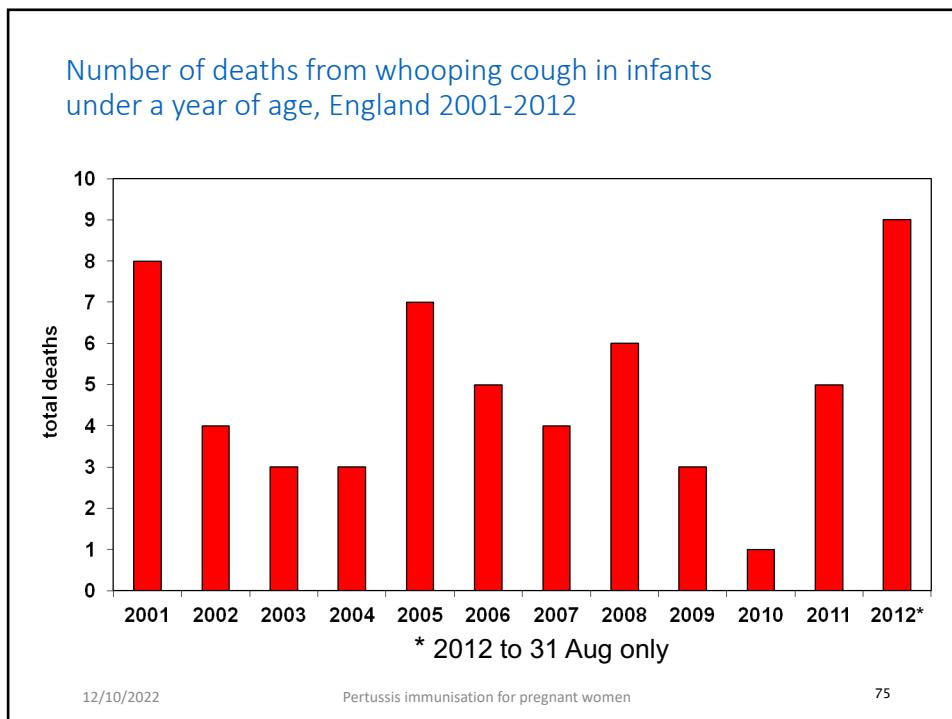


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## Summary of whooping cough recently

- Increase in all indicators of disease; 4,971 cases in 2012
  - Numbers less than 10% of the levels reported before vaccination
- Highest incidence of disease in infants, followed by older children and adults
  - Very low incidence in the age groups covered by the current childhood vaccination programme
- Most cases in infants occur below the age that can be prevented by the current vaccination programme (see next slide)
  - at 2, 3 and 4 months of age, with booster at 3½ years
- All deaths in 2012 were in unvaccinated children below the age of three months

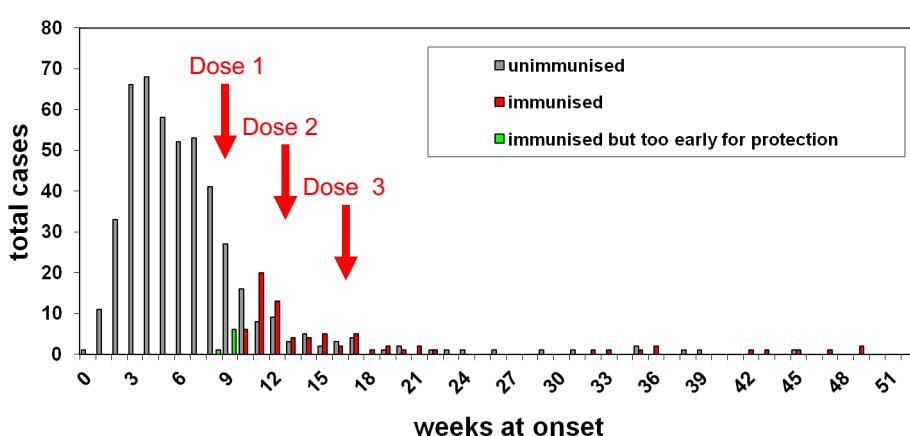
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Age in weeks at disease onset in infants <1 year of age (2011-Aug 2012. E&W)



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## Symptoms of Pertussis

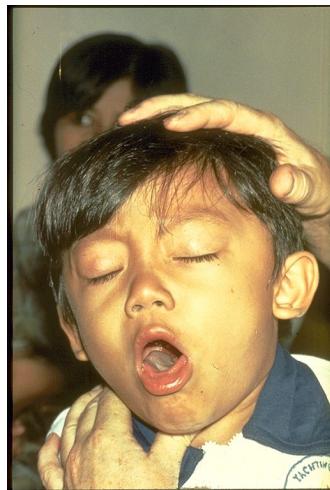


Photo courtesy of WHO

Pertussis immunisation for pregnant women

- Initially: cold-like symptoms - runny nose, watery eyes, sneezing, fever and a mild cough
- Followed by: gradually worsening cough, which develops to paroxysms of coughing followed by characteristic whoop

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## Baby with pertussis

- <https://youtu.be/S3oZrMGDMMw>

80

40

## Complications of Pertussis

- Respiratory – the majority of cases involve some degree of collapsed lung and/or pneumonia
- Neurological – lack of oxygen leading to altered consciousness, convulsions, permanent brain damage, death
- Severe weight loss and dehydration due to vomiting
- Sudden death - babies may stop breathing, apnoeic attacks
- Despite low levels of disease, pertussis remains a significant cause of death in infants <6m
- 

12/10/2022

Pertussis immunisation for pregnant women

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## Pertussis vaccination programme for pregnant women

- Started 1 October 2012 (announced 28 September)
- All pregnant women should be vaccinated from 28 weeks of pregnancy (this has now changed to 16/20 weeks)
  - In addition, women who have never completed a course of pertussis vaccine can be vaccinated after the baby is born, up until the baby has its first dose of pertussis-containing vaccine

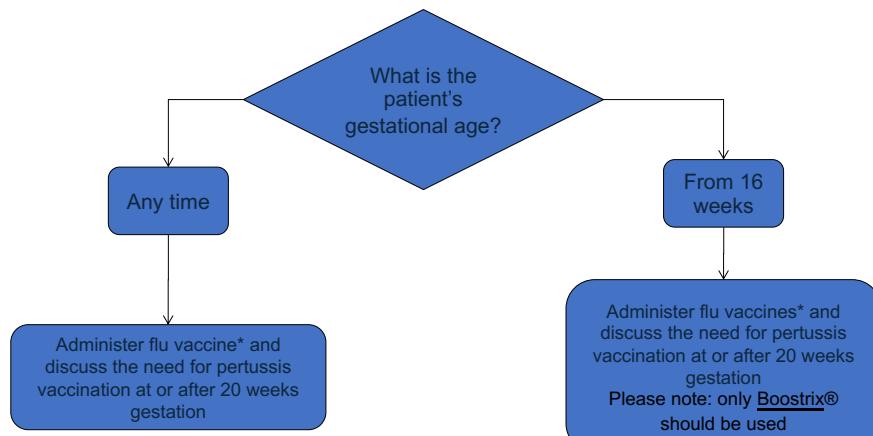
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## Vaccination of pregnant women: Flowchart for Primary Care



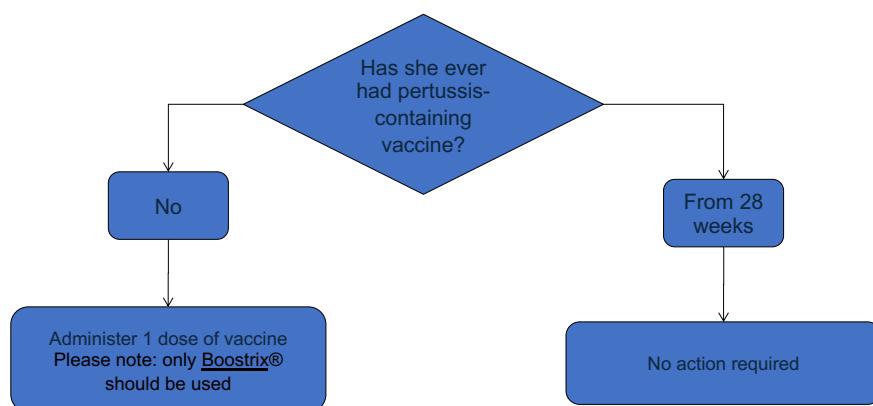
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## Vaccination of new mothers (mothers of newborn babies, until baby's first vaccination): Flowchart for Primary Care



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### Rationale for the programme

- Babies get ill before they can be protected by vaccination (of the babies)
- Vaccination of their mothers will:
  - Directly protect babies through trans-placental transfer of maternal antibodies
  - Indirectly protect babies through protection of their mothers (many cases are acquired from the mother or other close household contact)

12/10/2022

Pertussis immunisation for pregnant women

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### Which vaccine should be used?

- Boostrix or Repevax are the vaccines available in the UK and suitable for this campaign
  - They contain tetanus, low dose diphtheria, inactivated polio and 5-component pertussis vaccine (TdaP/IPV)
- Other vaccines are not suitable
  - Pediacel® (DTaP/IPV/Hib) and Infanrix IPV® (DTaP/IPV) contain high-dose diphtheria (D), which **should not be given to adults**
  - Revaxis® (tetanus/diphtheria/inactivated polio vaccine (Td/IPV)) **does not contain Pertussis**
  - **Repevax superseded by Boostrix**

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Pertussis immunisation for pregnant women

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### Other vaccines routinely given in pregnancy

- In the UK, influenza vaccine is given in pregnancy. (In developing countries where they are common complications of pregnancy, tetanus and/or diphtheria vaccines are given.)
- Flu vaccine should be given during the flu season, at any point in pregnancy and as early as possible
- Pertussis vaccine should be given after 16 weeks (20/40) – ideally before 38 weeks, but if this is not done, it should be given right up to birth-both vaccines should be repeated in subsequent pregnancies (while pertussis campaign is in place)

12/10/2022

Pertussis immunisation for pregnant women

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### Additional information

- A single dose (0.5ml) of vaccine should be given regardless of the number of fetuses carried (i.e. to twin or multiple pregnancies)
- Pertussis vaccine may be administered with influenza vaccine and/or anti-D, at the same appointment
  - Although flu vaccine should be given as soon as possible in the flu season, and pertussis vaccine should not be given before 16 weeks
- Adverse events following vaccination should be reported in the usual way – see [www.yellowcard.gov.uk](http://www.yellowcard.gov.uk) or BNF

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Pertussis immunisation for pregnant women

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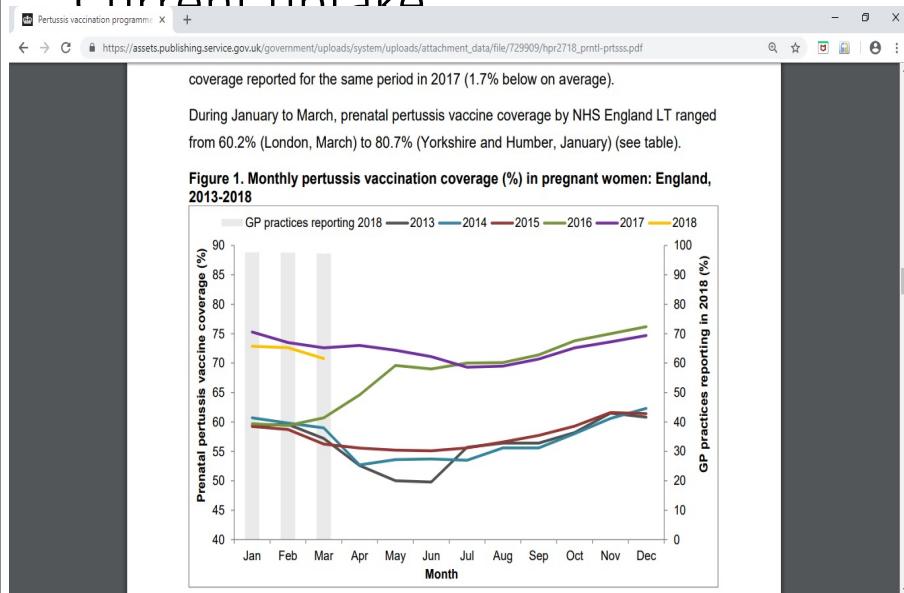
88

## Pertussis worldwide

- Evidence of waning immunity-in the long term
- Mini-epidemics in Australia, Europe and USA now resolved
- Use of vaccines licensed in all age groups
- May add in booster to SLB in the long term
- Current pertussis uptake in pregnancy 60%
- Recent cases

89

### Current uptake



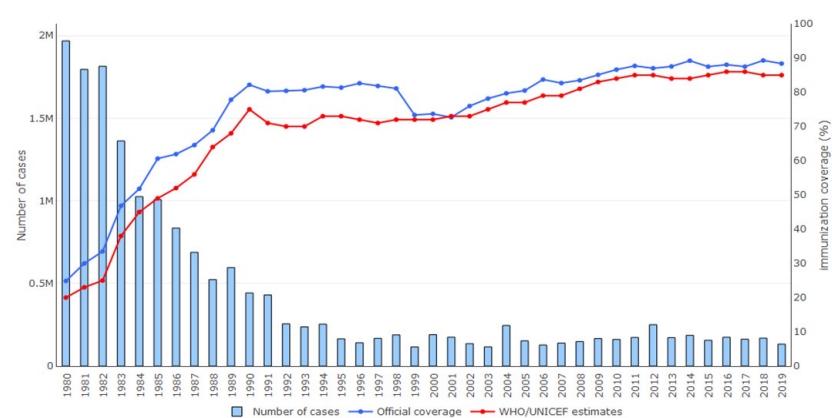
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## Cont'd

- Uptake currently 60 % up from 49%
- Recent published paper showing antibodies in breast milk in those who were not vaccinated in pregnancy but just after birth
- Recent death in Australia
- Travellers (grandparents) need to access it once in the country of cocooning

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**Pertussis Global annual reported cases and DTP3 coverage  
1980-2019**

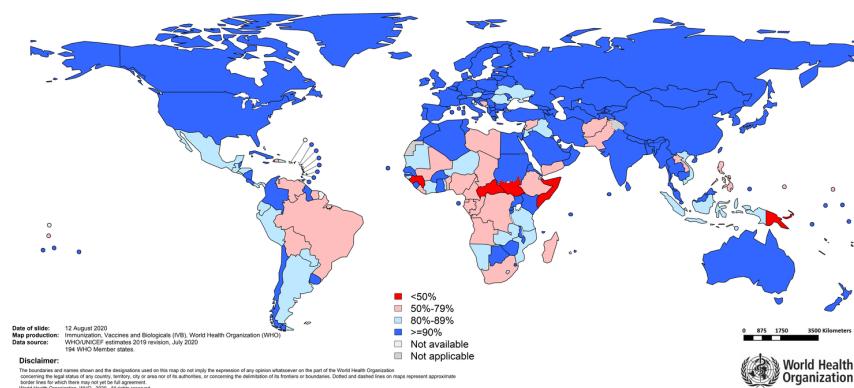


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## The changing face of pertussis

Immunization coverage with 3rd dose of diphtheria and tetanus toxoid and pertussis containing vaccines

2019



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## Pertussis in babies

- There were no reported deaths in infants with pertussis confirmed between January and March 2021. The last pertussis related death of an infant was reported in the second quarter (April to June) of 2019. Of the 20 infants who have died following confirmed pertussis disease and who were born after the introduction of the maternal programme (on 1 October 2012), 18 were born to mothers who had not been immunised against pertussis during pregnancy. Calculated maternal vaccine effectiveness against death in their infant from pertussis is very high at around 95%

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## Question

In which trimester should we give pertussis vaccine to pregnant women?

Is there anything else we need to give them?

95

## Pertussis 2019

- Cases 3681
- Up on the year before
- Pertussis is a cyclical disease eg every 3-4 years
- It is endemic

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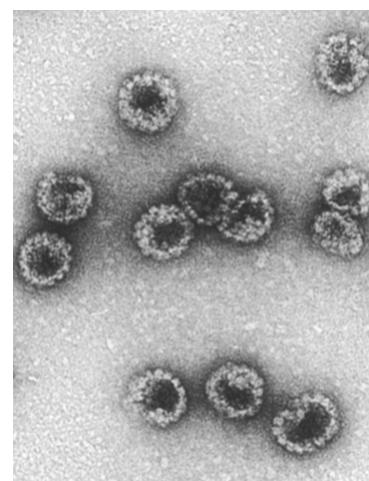
## The HPV vaccine-Gardasil

- From September 2012 Gardasil was the vaccine of choice to protect against HPV types 16, 18, 6 and 11
- Originally Cervarix chosen
- However for sexual health and other reasons JCVI recommends use of Gardasil for all females up to 25 years old.
- No catch up and not recommended to mix vaccine types as cover may be incomplete
- Boys vaccinated in UK from September 2019
- New nonovalent possible in future

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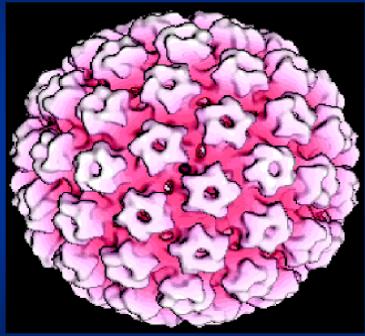
## Prophylactic HPV vaccines

- Highly purified virus-like particles (VLPs) of the major capsid (L1) protein
- Generated in yeast cells
- Recombinant
- Merck/Sanofi-Pasteur MSD
- Gardasil™
- HPV types 6, 11, 16 & 18
- GlaxoSmithKline
- Cervarix™
- HPV types 16 & 18



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## What is HPV?



- Small DNA virus
- Only infects squamous epithelia
- Common virus with >100 types identified
- 30-40 infect the genital area of women and men
- 2 groups –  
low risk types causing warts HPV 6,11  
high risk types causing cancer HPV 16,18

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 Public Health England Health Matters

### Scale of the problem

↑


In 2018, in England  
**447,694**  
 new diagnoses of STIs  
 were made at sexual  
 health services

**5% increase**  
 since 2017  
 422,147 new STI diagnoses in 2017

**Increase in total number of new STI diagnoses** from 2017 to 2018 was due to increases in diagnoses:

<b>26%</b> of gonorrhoea from 44,812 to 56,259
<b>6%</b> of chlamydia from 205,365 to 218,095
<b>5%</b> of syphilis from 7,149 to 7,541
<b>3%</b> of first episode genital herpes from 32,828 to 33,867

100

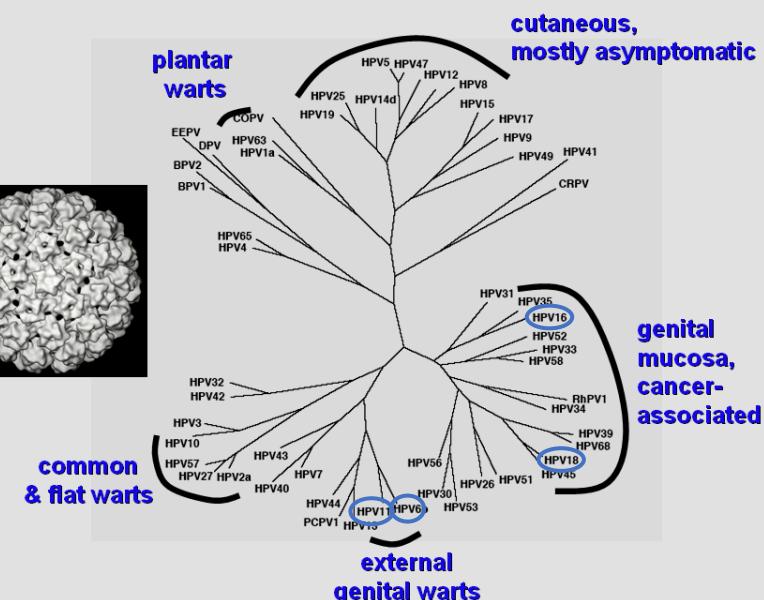
### Categories of genital HPV infection

- Genital HPV types are categorised as either:
  1. high-risk (oncogenic) types - which cause cervical intraepithelial neoplasia and invasive cancer, and
  2. low-risk types - which cause genital warts.
- 99% of cases of cervical cancer are caused by HPV infection.
- Two high-risk types, HPV 16 and 18, cause over 70% of cervical cancers.
- Genital warts are mainly caused by types 6 and 11.
- Other HPV types can also cause cervical cancer.

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101

### Papillomaviruses Infect Skin and Mucosal Sites



de Villiers et al, Classification of papillomaviruses. Virology 324:17-24, 2004

102

### Original HPV vaccination programme

- From September 2014, the number of doses of HPV vaccine that are given to teenage girls will be reduced from three to two.
- The key changes to the programme are as follows:
  - the first dose can be given at any time during school year 8
  - the minimum time between the first and second dose should be six months where the priming dose is received at less than 15 years of age
  - the maximum time between the first and second dose is 24 months
  - for operational purposes, PHE recommends around a 12-month gap between the two doses which would reduce the number of HPV vaccination sessions.
- However, local needs should be considered when planning the programme
- Boys added more September 2019 – great reduction in cases
- Consider some risk groups who may need HPV....

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### New HPV programme from April 1<sup>st</sup> 2022

- Gay and bisexual men and those aged 15 and over to receive 2 doses of the HPV vaccine. People with HIV or known to be immunocompromised will continue to receive 3 doses.
- From Friday 1 April, gay and bisexual men and those aged 15 and over will only need to receive 2 doses of the human papillomavirus (HPV) vaccine instead of 3 to be fully vaccinated, based on advice from the Joint Committee on Vaccination and Immunisation (JCVI).
- The vaccine helps to prevent HPV infection which can cause genital warts and HPV-associated cancers such as cervical cancer, some other cancers of the genital areas and anus and some cancers of the head and neck. Those who are eligible for the HPV vaccine can get it free on the NHS up until their 25th birthday.

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## HPV cont'd

- There is also a HPV vaccination programme for gay and bisexual men and other men who have sex with men (MSM) up to 45 years of age, who attend sexual health or HIV clinics.
- The routine adolescent HPV vaccination programme, offered to 12 to 13 year olds in school, has been following a 2-dose schedule since September 2014. In May 2020 the JCVI, who regularly review all vaccination programmes, advised that the 2-dose schedule could be extended to adults as the evidence showed 2 doses offers good protection in older individuals. The 2 doses should be given at least 6 months apart.
- The committee also advised that the 3-dose schedule should continue to be offered to eligible individuals living with HIV or known to be immunocompromised at the time of vaccination

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## HPV reduction

- There is growing evidence of the success of the programme so far. In 2018, 10 years after the introduction of the programme, the prevalence of HPV types 16/18 in 16 to 18 year old women in England who were offered vaccination at age 12 to 13 years had reduced substantially to less than 2% (compared to over 15% prior to the vaccination programme in 2008). A 2018 Scottish study showed that the vaccine has reduced pre-cancerous cervical disease in 20 year old females by up to 71%. In England, diagnoses of genital warts have declined by 91% and 81% between 2015 and 2019 in 15 to 17 year old girls and boys, respectively (the latter demonstrating herd protection). From September 2019 the adolescent HPV vaccination programme became universal with 12 to 13 year old males becoming eligible alongside females.

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## Change to HPV vaccine

- The vaccine supplied for the programme will change from Gardasil® to Gardasil® 9 during the 2021 to 2022 academic year. UKHSA will continue to supply vaccine for the HPV programme in the usual way and will issue the remaining central supplies of Gardasil® before the switch to Gardasil® 9. This change will affect both arms of the HPV programme (adolescents aged 12 to 13 years and those who remain eligible until their 25th birthday, and MSM up to 45 years of age).
- For the school-based programme in particular, there will need to be clear communication with parents and eligible adolescents and robust arrangements in place to ensure the consent process is adequate for this transition period during the 2021 to 2022 academic year.
- The 9-valent vaccine Gardasil® 9 (manufactured by Merck Sharp & Dohme Limited (MSD)) received licensing approval from the European Medicines Agency (EMA) for a 2-dose schedule in adolescent girls in April 2016 and is licensed for individuals aged 9 up to and including 14 years of age (Summary of Product Characteristics (SPC), Gardasil 9).
- Gardasil® 9 can be used for all those eligible: adolescents aged 12 to 13 years and those who remain eligible until they turn 25 years of age, and MSM up to 45 years.

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## Of note

- “HPV jab cuts cervical cancer cases by almost 90% but 1 in 10 girls still haven’t had it.”
- Vaccine update April 2022

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## HPV in General practice

- Although we can give these vaccines in GP there may not be a payment as it is a school based programme
- However as a result of clinical need we can offer them if necessary
- Suggest MSM to connect with GUM clinics for good care eg HPV, PrEP, PEP, screening

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## Pneumococcal Disease

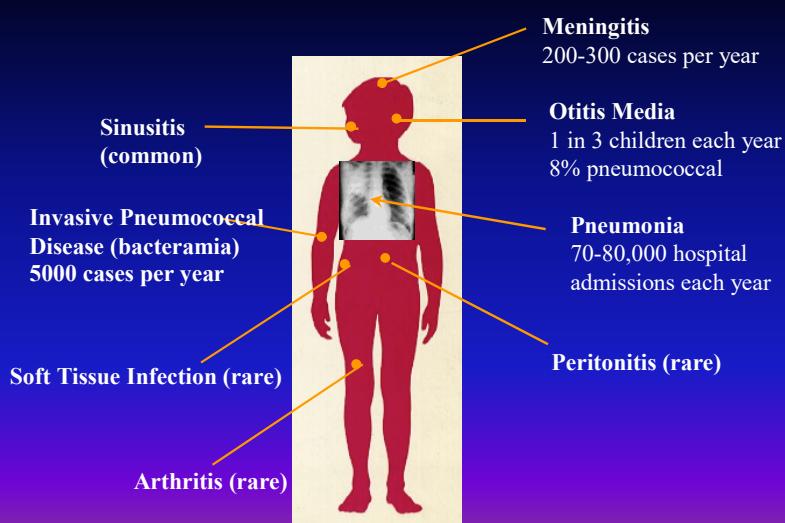
110

What diseases are caused by Strep Pneumoniae?

- Sinusitis
- Invasive Pneumococcal Disease
- Meningitis
- Pneumonia
- Otitis Media
- Arthritis
- Peritonitis
- Soft Tissue Infection

111

### *Spectrum of pneumococcal infection*



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## Pneumococcal Vaccines

### 1. Pneumococcal Polysaccharide Vaccine 'Pneumovax' (PPV)

- Stimulates the body to produce antibodies that protect against 23 types of pneumococcal bacteria, as it contains polysaccharides from 23 types of pneumococcal bacteria
- These 23 types of bacteria cause about 96% of disease in the UK
- Efficacy 50-70% against invasive disease

### 2. Pneumococcal Conjugate Vaccine 'Prevenar' (PCV)

- Contains polysaccharide from 7 common capsular types and are conjugated to protein
- Estimated that the 7 capsular types cause about 66% of all cases overall and 82% in children under 5
- Recent addition Prevenar 13 - additional 6 different strains

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### Changes to the infant pneumococcal conjugate vaccine (PCV) schedule taking place in the New Year (2020)

- It was confirmed in April 2019 that England will follow a 1 + 1 PCV schedule, based on the advice of the Joint Committee of Vaccination and Immunisation (JCVI). Public Health England reconvened the PCV project board in May 2019, with NHS England and Improvement and the Department of Health and Social Care, to implement the recommended changes.
- A decision on which birth cohort this will be implemented for has now been made. All infants born on or after 1 January 2020 will be offered the updated schedule, (referred to as a 1 + 1 PCV schedule). This will be a single dose of PCV13 alongside the routine DTaP/IPV/Hib/HepB and rotavirus immunisations at 12 weeks of age, followed by the PCV13 booster on or after the first birthday.
- This 1 + 1 schedule will replace the previous schedule of 2 + 1 (at 8 and 16 weeks, and the booster dose given on or after the first birthday). All infants born before and including 31 December 2019 will remain on the 2 + 1 schedule.
- The impact to the schedule will come into effect in late February 2020; when babies in the first cohort will no longer require an 8-week PCV dose.
- The first vaccines to be given on the new 1 + 1 schedule will start in late March 2020 when infants born on or after 1 January 2020 attain 12 weeks of age. Further details will be published in the December issue of Vaccine Update, with all resources and materials made available in December and January 2020.

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## Which Risk Groups need the Pneumococcal Vaccine?

- asplenia or severe dysfunction of the spleen, including sickle cell disease and coeliac syndrome
- chronic respiratory and lung disease including severe asthma
- chronic renal disease including nephrotic syndrome
- chronic heart disease
- chronic liver disease including cirrhosis
- diabetes mellitus
- immunodeficiency or immunosuppression due to disease or treatment
- HIV infection at all stages
- Individuals with cochlear implants
- Individuals with CSF shunts
- children under 5y who have previously had invasive pneumococcal disease
- 

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### Immunisation of individuals with underlying medical conditions

#### Specific indications for immunisation of other vulnerable groups

Some medical conditions or treatments increase the risk of complications from specific infectious diseases. Individuals who have such conditions or receive such treatments require additional protection, as listed in the appropriate chapters, and so the following vaccines are recommended:

##### Asplenia or splenic dysfunction (see Box 7.1 below)

- Hib/MenC conjugate, meningococcal ACWY conjugate and MenB vaccines (see Chapter 22)
- influenza vaccine (see Chapter 19)
- pneumococcal vaccine (see Chapter 25).

##### Cochlear implants

- pneumococcal vaccine (see Chapter 25).

##### Complement disorders (including those receiving complement inhibitor therapy) (see Box 7.1 below)

- Hib/MenC conjugate, meningococcal ACWY conjugate and MenB vaccines (see Chapter 22)
- pneumococcal vaccine (see Chapter 25).

##### Chronic respiratory and heart conditions

- influenza vaccine (see Chapter 19)
- pneumococcal vaccine (see Chapter 25).

##### Chronic kidney conditions (including haemodialysis)

- influenza vaccine (see Chapter 19)
- pneumococcal vaccine (see Chapter 25)
- hepatitis B vaccine (see Chapter 18).

##### Chronic liver conditions

- influenza vaccine (see Chapter 19)
- pneumococcal vaccine (see Chapter 25)
- hepatitis A vaccine (see Chapter 17)
- hepatitis B vaccine (see Chapter 18).

##### Chronic neurological conditions

- influenza vaccine (see Chapter 19)
- pneumococcal vaccine (see Chapter 25).

Immunisation of  
individuals with  
underlying  
medical conditions

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**Immunisation of individuals with underlying medical conditions**

**Individuals receiving immunosuppressive medication or corticosteroids may be at increased risk of infection**

**Diabetes**

- influenza vaccine (see Chapter 19)
- pneumococcal vaccine (see Chapter 25).

**Haemophilia**

- hepatitis A vaccine (see Chapter 17, including advice on route of administration)
- hepatitis B vaccine (see Chapter 18, including advice on route of administration).

**Immunosuppression**

- influenza vaccine (see Chapter 19)
- pneumococcal vaccine (see Chapter 25).

Additionally, individuals who receive bone marrow transplants are likely to lose any natural or immunisation-derived protective antibodies against most vaccine-preventable diseases. It is unclear whether they may acquire the donor's immunity, and therefore all individuals should be considered for a re-immunisation programme. Specialist advice should be sought and is available at: [http://www.reph.ac.uk/sites/default/files/asset\\_library/Publications/I/immunocomp.pdf](http://www.reph.ac.uk/sites/default/files/asset_library/Publications/I/immunocomp.pdf)

**Note:** Data on long-term antibody levels in these groups of patients are limited. Additional doses to cover the higher risks of Hib, meningococcal and pneumococcal disease during childhood should be considered, depending on the person's underlying condition. Specialist advice may be required.

All individuals who are to receive Eculizumab (complement inhibitor) therapy should be vaccinated at least two weeks prior to commencement of therapy (Summary of Product Characteristics for Soliris®, Alexion Europe, 2012). This advice applies to all newly diagnosed patients.

Where an opportunity arises, and depending on individual patient's circumstances, MenACWY conjugate and MenB vaccination should be considered for those that only received MenC conjugate vaccine previously.

**Other methods of protecting vulnerable individuals**

Immunosuppressed individuals (as above) can be protected against some infections by the administration of passive antibody. After exposure to measles or chickenpox, such individuals should be considered for an injection of the appropriate preparation of immunoglobulin varicella zoster immunoglobulin (VZIG) or human normal immunoglobulin (HNIG) – see varicella and measles, Chapters 34 and 21 respectively. Individuals exposed to chickenpox may

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**Immunisation of individuals with underlying medical conditions**

benefit from prophylactic acyclovir at a dose of 40mg/kg per day in four divided doses (Kumagai *et al.*, 1999). This may be considered in addition to VZIG or as an alternative when VZIG is not indicated. Treatment with acyclovir should be commenced promptly in this group.

Prophylaxis with other antibiotic or antiviral drugs may also be indicated in immunosuppressed individuals exposed to infections such as pertussis or influenza. Advice should be sought from the local health protection team.

Antibiotic prophylaxis (usually phenoxymethyl penicillin) is advisable for asplenic and hypoplastic patients. Guidelines have been published (Davies *et al.*, 2011) and a patient card and information leaflet are available (details at the end of this chapter).

Box 7.1 Practical schedule for immunising individuals with asplenia, splenic dysfunction or complement disorders (including those receiving complement inhibitor therapy\*) depending on the age at which their at-risk condition is diagnosed. Individuals with asplenia or splenic dysfunction aged six months or older should also be offered influenza vaccine (see Chapter 19).

**First diagnosed under six months**

- Give the MenB vaccine at 2, 3 and 4 months along with the routine infant vaccinations if the routine schedule has already been initiated, then give 3 doses of MenB with an interval at least one month apart
- If MenC has not yet been given as part of routine schedule, give one dose of MenACWY conjugate vaccine followed by a second dose at least one month apart. If MenC has already been given as part of routine schedule, then give one additional dose of MenACWY at least one month later
- Give the routine 12-month boosters: Hib/MenC, PCV13 and MMR
- Give a MenB booster, an extra dose of PCV13 and one dose of MenACWY conjugate vaccine two months after the 12-month boosters
- After the second birthday, an additional dose of Hib/MenC should be given, along with the pneumococcal polysaccharide vaccine (PPV23).

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Immunisation of individuals with underlying medical conditions  
Individuals with underlying medical conditions  
May 2014

**First diagnosed at 6-11 months**

- Give 2 doses of MenB vaccine at least two months apart (the second dose may be given with the routine 12-month boosters)
- If MenC has not yet been given as part of routine schedule, give one dose of Men-ACWY conjugate vaccine followed by a second dose at least one month apart. If MenC has already been given as part of routine schedule, then give one additional dose of Men-ACWY at least one month after any MenC dose.
- Give the routine 12-month boosters: Hib/MenC, PCV13 and MMR
- Give a dose of Men-ACWY conjugate vaccine and an extra dose of PCV13 two months after the Hib/MenC booster
- After the second birthday, an additional dose of Hib/MenC and the MenB booster should be given, along with the pneumococcal polysaccharide vaccine (PPV23).

**First diagnosed at 12-23 months**

- If not yet administered, give the routine 12-month boosters: Hib/MenC, PCV13 and MMR
- Give a dose of Men-ACWY conjugate vaccine and an extra dose of PCV13 two months after the Hib/MenC and PCV13 boosters
- Give 2 doses of MenB vaccine at least two months apart (either of these doses can be given at the same time as the other vaccine visits)
- After the second birthday, an additional dose of Hib/MenC should be given, along with the pneumococcal polysaccharide vaccine (PPV23)
- This age group should also receive an additional dose of MenB vaccine with an interval of 12 to 23 months after the primary course.

**First diagnosed from two years onwards**

- Ensure that the child has been immunised according to national schedule, including the 12-month boosters
- Give an additional dose of Hib/MenC and the first dose of MenB vaccine along with the pneumococcal polysaccharide vaccine (PPV23)\*\*
- Give a dose of Men-ACWY conjugate vaccine and the second dose of MenB two months after the Hib/MenC booster\*\*\*.

\* Soliris acts by down regulating the terminal complement components so those on Soliris therapy are not at increased risk of meningococcal disease.  
\*\* Severely immunocompromised individuals (as described in Chapter 25) aged five years or over should receive one dose of PCV13 followed by PPV at least two months later, as well as annual influenza vaccinations (Chapter 19), but do not require meningococcal conjugate vaccination.  
\*\*\* In adolescents (from 11 years of age) and adults, this interval can be reduced to one month.

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## Which groups may need booster pneumovax?

- 1. All of the risk groups?
- 2. Selected groups. Name these...

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Clinical risk group	Examples (decision based on clinical judgement)
<b>High priority</b>	
Aspernia or dysfunction of the spleen	This also includes conditions such as haemogenous sickle cell disease and coeliac syndrome that may lead to splenic dysfunction.
Immunosuppression	Due to disease or treatment, including patients undergoing chemotherapy leading to immunosuppression, bone marrow transplant, aspernia or splenic dysfunction. This includes at all stages of immunosuppression, including those affecting the immune system (e.g. IMiD, NIMOD, complement inhibitors).
Individuals with cerebrospinal fluid leaks	Individuals are or likely to be at systemic steroids for more than a month at a dose equivalent to prednisolone at 20mg or more per day (any age), or for children under 20kg, a dose of 5mg to 10mg per kg per day.
Individuals with cochlear implants	It is important that immunisation does not deny the cochlear implantation.
<b>Moderate priority</b>	
Chronic respiratory disease	This includes chronic obstructive pulmonary disease (COPD), including chronic bronchitis and emphysema; and sarcoidosis, pulmonary fibrosis, cystic fibrosis, interstitial lung fibrosis, pneumoconiosis and bronchiectasis.
Chronic heart disease	Children with respiratory conditions caused by aspiration, including those with a history of gastroesophageal reflux with a risk of aspiration. Asthma is not an indication, unless so severe as to require continuous or frequently repeated use of systemic steroids (as defined above).
Chronic kidney disease	Nephrotic syndrome, chronic kidney disease at stages 4 and 5 and those on kidney dialysis or kidney transplantation.
Chronic liver disease	This includes cirrhosis, fatty liver and chronic hepatitis.
Diabetes	Diabetes mellitus requiring insulin or oral hypoglycaemic drugs. This does not include diabetes that is well controlled.
<b>Low priority</b>	
	Healthy individuals aged 10 years and over. Booster doses for aspernia, those with splenic dysfunction and chronic kidney disease.

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## Tuberculosis

Many people die as a result of TB.

The mortality from TB, that is the number of deaths, is that TB is the tenth leading cause of death worldwide.

TB is the leading cause from a single infectious agent, ranking above HIV/AIDS.

In 2019 an estimated 1.21 million people who were HIV negative died of TB.

In addition there were an estimated 208,000 deaths resulting from TB disease among people who were HIV positive.

So in 2019 there were an estimated total of 1,418,000 TB related deaths.

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## Common symptoms/clinical presentation of TB



- Cough 78%
- Weight loss 74%
- Fatigue 68%
- Fever 60%
- Night sweats 55%
- Coughing up blood 37%
  
- Combination of symptoms required

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## 2019 UK TB rates

- There were 4,655 TB cases – a rate of 8.3 per 100,000 population
- The rate of TB among the most deprived 10% of the population is six times higher than among the least deprived 10%
- rates of TB among people born outside the UK are 14 times higher than among people born in the UK
- 13% of people with TB have at least one social risk factor for the illness (homelessness, a history of substance misuse, or time spent in prison)
- TB remains concentrated in major cities with London experiencing over 36% of cases
- Almost 30% of people with pulmonary TB, the potentially infectious form of the disease, experienced a delay of more than four months between symptom onset and beginning treatment

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## TB rates are reducing in most groups in the UK

PHE is working towards the World Health Organisation (WHO) goal to halve TB incidence by 2025, and ultimately eliminate the disease.

TB is an infectious disease that usually affects the lungs. The most common symptoms of TB are a persistent cough for more than 3 weeks, unexplained weight loss, fever and night sweats.

Although TB can be fatal if left untreated, it is curable for the majority with a course of antibiotics.

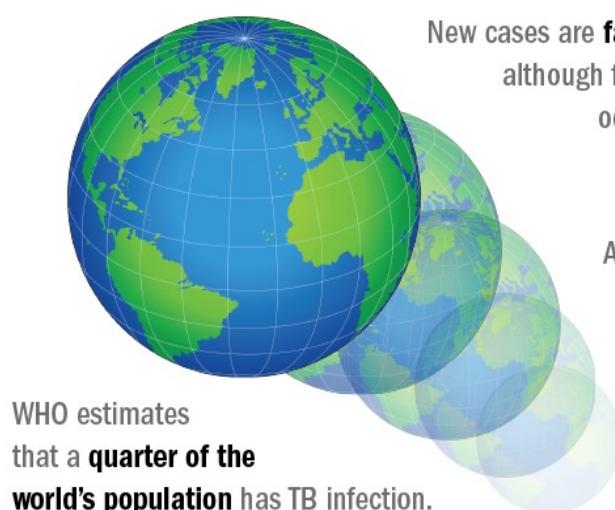
While huge strides have been made to reduce TB rates, further work needs to be done to eliminate the disease in

England. The most deprived 10% of the population have a rate of TB more than 7 times higher than the least deprived

10%, and people born outside the UK have a rate 13 times higher than people born in the UK. People, especially those from these communities, should be aware of the symptoms and make sure they visit their GP if they are concerned.

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## 2018 Global Tuberculosis Report



New cases are **falling by 2% per year**, although faster reductions have occurred in Europe and Africa since 2013.

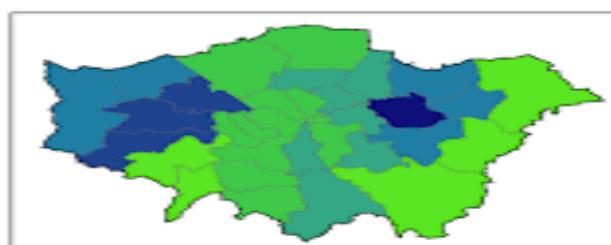
An estimated 558,000 people developed **disease resistant to at least rifampicin** in 2017.

Source: World Health Organization

MDege News

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## 2021 data London

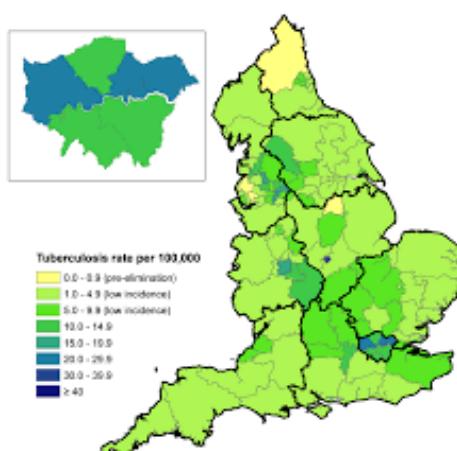


Tuberculosis rate per 100,000

0.0 - 0.9 (pre-elimination)
1.0 - 4.9 (low incidence)
5.0 - 9.9 (low incidence)
10.0 - 14.9
15.0 - 19.9
20.0 - 29.9
30.0 - 39.9
≥ 40

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## TB in England 2021 report



Tuberculosis rate per 100,000

0.0 - 0.9 (pre-elimination)
1.0 - 4.9 (low incidence)
5.0 - 9.9 (low incidence)
10.0 - 14.9
15.0 - 19.9
20.0 - 29.9
30.0 - 39.9
≥ 40

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## Communication

- Why is BCG not given more widely as we hear TB is on the increase especially in London?
- BCG has a limited role in preventing the spread of TB
- TB is best controlled by picking up cases quickly, checking their family and close contacts and ensuring proper treatment
- BCG has a role in protecting the at risk groups especially the very young
- BCG has limited benefit for older children and adults
- Since 1<sup>st</sup> April 2016 universal London wide neo natal programme - but poor vaccine supplies
- Recent fall in cases

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## BCG offered to

- all infants (aged 0 to 12 months) living in areas of the UK where the annual incidence of TB is 40/100,000 or greater\* - care with SCIDs
- all infants (aged 0 to 12 months) with a parent or grandparent who was born in a country where the annual incidence of TB is 40/100,000 or greater†
- previously unvaccinated children aged one to five years with a parent or grandparent who was born in a country where the annual incidence of TB is 40/100,000 or greater.† These children should be identified at suitable opportunities, and can normally be vaccinated without tuberculin testing
- previously unvaccinated, tuberculin-negative children aged from six to under 16 years of age with a parent or grandparent who was born in a country where the annual incidence of TB is 40/100,000 or greater.†
- These children should be identified at suitable opportunities, tuberculin tested and vaccinated if negative (see section on tuberculin testing prior to BCG vaccination)

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## Cont'd

- ▶ • previously unvaccinated tuberculin-negative individuals under 16 years of age who are contacts of cases of respiratory TB (following recommended contact management advice – see National Institute for Health and Clinical Excellence (NICE), 2006)
- ▶ • previously unvaccinated, tuberculin-negative individuals under 16 years of age who were born in or who have lived for a prolonged period (at least three months) in a country with an annual TB incidence of 40/100,000 or greater.<sup>t</sup>

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 Public Health England

Table 11: Number and proportion of all people with TB that are culture confirmed by PHE Centre, England, 2010-2019

Data to the end of December 2019

PHE Centre <sup>a</sup>	2010		2011		2012		2013		2014		2015		2016		2017		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
London	1,955	60.3	2,099	60.1	2,096	61.6	1,779	59.8	1,541	60.3	1,366	59.9	1,304	63.0	1,100	61.9	
West Midlands	525	60.2	612	61.0	581	54.0	551	56.3	424	54.7	401	57.4	417	58.2	413	62.6	
North West	440	61.9	493	60.6	492	63.2	440	64.2	431	64.9	368	62.1	379	67.6	343	64.2	
South East	493	60.9	508	62.1	470	60.6	446	62.3	393	61.2	365	63.7	379	64.3	324	61.2	
East of England	310	61.3	352	62.9	311	62.6	283	62.7	286	65.6	243	62.5	277	63.8	263	64.5	
Yorkshire and the Humber	363	57.8	382	57.5	348	58.7	365	62.6	328	63.6	267	61.1	304	72.4	215	62.5	
East Midlands	298	60.3	298	60.6	297	59.8	243	58.8	239	59.8	243	68.1	211	61.9	213	61.0	
South West	141	53.2	201	65.5	190	63.3	186	57.1	177	56.0	173	60.7	151	63.4	144	63.4	
North East	97	64.7	104	79.4	115	68.9	105	76.1	115	68.5	85	66.4	86	71.1	78	71.6	
England <sup>b</sup>	4,622	60.2	5,049	61.0	4,900	60.6	4,398	60.5	3,934	60.8	3,508	61.2	3,588	63.9	3,173	62.6	2,866

<sup>a</sup> Ordered by decreasing total number of TB notifications in 2019  
<sup>b</sup> Total of people including those with an unknown PHE Centre of residence

Source: Enhanced Tuberculosis Surveillance system (ETS)  
Data extracted: March 2020  
Prepared by: TB Surveillance Team, TB Unit, TARGET, National Infection Service, Public Health England.

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## BCG vaccine

- The BCG vaccine contains a weakened strain of TB bacteria, which builds up immunity and encourages the body to fight TB if infected with it, without causing the disease itself. The BCG vaccination is thought to protect up to 80% of people against the most severe forms of TB for at least 15 years, perhaps even up to 60 years

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## BCG and SCID

- The BCG vaccine has been offered to babies that fall into one of the above categories soon after birth, often whilst the baby is still in hospital. The evaluation of the addition of screening for Severe Combined Immunodeficiency (SCID) to the routine newborn screening test at 5 days of age made it necessary to move the BCG vaccination to when a SCID screening outcome will be available, which may be available from around day 14 to 17 after birth. This is to ensure that babies with SCID are not given the live attenuated BCG vaccine which is contraindicated in these babies.
- The SCID screening evaluation is taking place in 6 areas across England and will cover about 60% of newborn babies (Manchester, Birmingham, Sheffield, Newcastle, London Great Ormond Street Hospital and London Southeast Thames). It is necessary to change the BCG programme nationally to ensure consistency and safety for all babies across the country and to guarantee data collection for the programme. This also provides an important opportunity to improve upon the existing BCG service.

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## Point 2

- From 1 September 2021, eligible babies born on or after this date should be offered the BCG vaccine by 28 days or soon after. It is possible to arrange BCG vaccination earlier than 28 days providing the appropriate SCID screen outcome is available.
- Providers are required to check the record for a negative SCID outcome, or confirmation that the child was not offered SCID screening, before administering the BCG vaccine. BCG immunisation appointment letters should include instructions for parents or guardians to bring the infant's Red Book and the letter with the outcome of newborn bloodspot screening.
- Vaccination may be administered earlier than 28 days provided that a SCID screen outcome is available

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## SCID and BCG

- BCG should only be given when the baby has a known SCID screening outcome of 'SCID not suspected', 'SCID not offered' or 'SCID declined'. They should receive the vaccine by 28 days old. It can be given at any time in relation to the rotavirus and other vaccines, including other live vaccines.  
Changing the timing of the neonatal BCG immunisation programme to a 28 day immunisation programme: effective from 1 September 2021 - GOV.UK ([www.gov.uk](http://www.gov.uk))

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## Scenario

- The parent of a teenager asks you why their child has not received their BCG vaccine like they did when they were 14 years old?

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## Rotavirus

- Rotavirus is the most common cause of gastroenteritis in young children. Most children will experience at least one infection with rotavirus by the time they are five years old, with some requiring hospitalisation for dehydration
- An oral vaccine against rotavirus is being introduced into the infant immunisation programme at the 2 and 3 month appointments
- Rotavirus vaccination should significantly reduce rotavirus gastroenteritis in young children

The infant rotavirus vaccination programme

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## What is rotavirus?

- Rotavirus is a virus that causes gastroenteritis, in particular in infants and young children
- Estimated that all children will become infected with rotavirus at least once by the time they are 5 years old
- Estimated that rotavirus causes around half of all gastroenteritis in children aged under 5 years

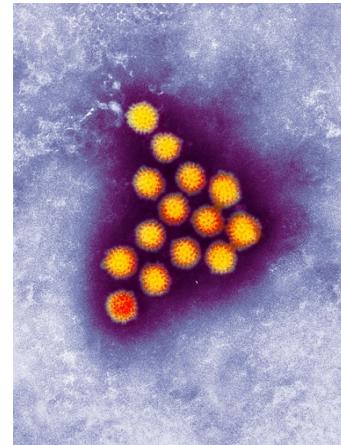


Image courtesy of PHE/SPL

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## What is rotavirus?

- **Incubation period**
- The incubation period is approximately 2 days
- 
- **Infectious period**
- Shedding of the virus in faeces may begin before the onset of major symptoms and may continue for several days after symptoms have resolved

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## Clinical presentation of rotavirus

- Rotavirus gastroenteritis usually begins with the symptoms of
- Diarrhoea
- Vomiting
- The child may also have
- A fever (high temperature) of 38°C or above
- Abdominal pain
- The symptoms of vomiting usually pass within 1 to 2 days. In most children, vomiting will not last longer than 3 days
- The symptoms of diarrhoea usually pass within 5 to 7 days. Most children's diarrhoea symptoms will not last longer than 2 weeks

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## Complications of rotavirus

- Gastroenteritis can cause dehydration:
- This can be more serious than the rotavirus infection itself and can require hospitalisation for intravenous rehydration
- Approximately 12,700 children are estimated to be admitted to hospital each year with rotavirus in England and Wales

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## Transmission of rotavirus

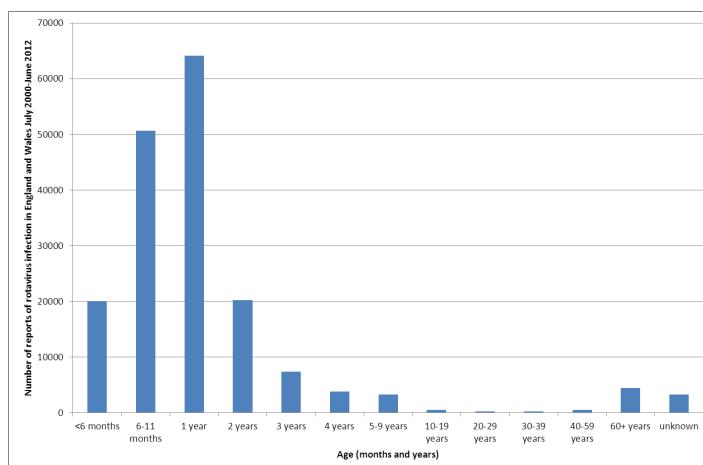
- Rotavirus is **highly** infectious
- As few as 10-100 virus particles may cause disease
- Transmission mainly via the faecal-oral route
- If a child leaves tiny samples of infected faeces on surfaces or utensils e.g. after not washing their hands properly after going to the toilet, they can be picked up by another child
- Small droplets of infected faeces can also be carried in the air, which children can breathe in

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## Epidemiology of rotavirus in England and Wales – who is most at risk?



Numbers of laboratory confirmed cases of rotavirus infection in E&W July 2000-June 2012

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## Rotarix® dosage and schedule

### 2 dose schedule

- First dose of 1.5ml at 8 weeks (two months) of age
- Second dose of 1.5ml at least four weeks after the first (i.e. 12 week appointment)
- It is preferable that the full course of two doses is completed before 16 weeks of age. Rotarix® must be given no later than 24 weeks (i.e. 23 weeks and 6 days)
- The first dose must be given before 15 weeks of age. If infant does not have first dose before 15 weeks then do not give Rotarix®
- If the course is interrupted it should be resumed but not repeated, provided that the second dose can be given before 24 weeks
- If infant spits out/regurgitates most of dose, a replacement dose may be given at same visit

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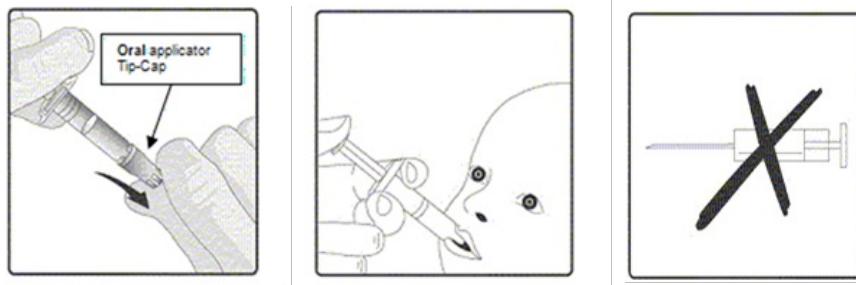
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## LIVE ORAL VACCINE



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## Administration of Rotarix®



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## Contraindications

- Confirmed anaphylactic reaction to a previous rotavirus vaccine
- Confirmed anaphylactic reaction to component of vaccine
- Previous history intussusception
- Over 24 weeks of age
- Infants presenting for their first dose of Rotarix® over 15 weeks of age
- Severe Combined Immunodeficiency (SCID) disorder
- Malformation of GI tract that could predispose to intussusception.
- Rare hereditary problems of fructose intolerance, glucose-galactose malabsorption or sucrose-isomaltose insufficiency
- There are very few infants who cannot receive rotavirus vaccine

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## SCID and rotavirus

- Rotavirus vaccine is usually given at 8 and 12 weeks to protect against some forms of diarrhoea and vomiting. After checking practice records, viewing the Redbook and talking to the parents, in the absence of an abnormal SCID screening result or if no result can be found, rotavirus vaccine should be administered at 8 weeks and 12 weeks of age, as usual. The timing is the same whether and when BCG vaccine was given. Please see Greenbook chapter 32 - tuberculosis (publishing.service.gov.uk) p.5

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## SCID and rotavirus

- This guidance applies to babies born on or after 1 September 2021, who will attend for their routine 8 week immunisation appointment from 27 October 2021.
- Rotavirus (Rotarix®) vaccine is a live oral vaccine routinely given at 8 and 12 weeks of age as part of the infant immunisation schedule. All live vaccines, including Rotarix®, are contraindicated in babies who receive a SCID diagnosis.
- In the areas participating in the SCID evaluation, SCID screening will form part of the routine newborn screening test at 5 days, with most results expected within 10 to 12 days. All babies should have a result available by 28 days, including those in non screening areas where they will be assigned a 'SCID screening not offered' result.
- Childhood Information Systems (CHISs) will receive SCID screening outcomes (as part of newborn blood spot results), and will inform practices when available and ahead of the 8 week immunisation appointment.
- Practices should update their protocols to ensure that where SCID results (including SCID screening not offered) have been received by the practice, they are available in the patient record for the practice nurse at the 8 week immunisation appointment

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## SCID and MMR

- Any baby with SCID is likely to have presented with recurrent infections before they are due to have MMR. It is not necessary to have a result of SCID screening available at the time of immunisation. The parents should, of course, be asked about the baby's health, as one would have done prior to SCID screening

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## Immunosuppression and HIV

- Rotarix® should not be administered to infants known to have severe combined immunodeficiency disorder (SCID)
- For infants with other immuno-suppressive disorders rotavirus vaccination should be actively considered, if necessary in collaboration with the clinician dealing with the child's underlying condition
- Rotarix® vaccination is advised in HIV infected infants. Additionally infants of unknown HIV status, but born to HIV positive mothers should be offered vaccination

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## Precautions

- - Potential transmission of live attenuated vaccine from infant
  - Vaccination of the infant will offer protection to household contacts from wild-type rotavirus disease and outweigh any risk from transmission of vaccine virus to any immunocompromised close contacts
  - Those in close contact with recently vaccinated infants should observe good personal hygiene

The infant rotavirus vaccination programme

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## Key messages

- Rotavirus is the most common cause of gastroenteritis in young children. Most children will experience at least one infection with rotavirus by the time they are 5 years old, some requiring hospitalisation for dehydration
- An oral vaccine against rotavirus is being introduced into the infant immunisation programme at the 2 and 3 month appointments
- Rotavirus vaccination should significantly reduce rotavirus gastroenteritis in young children

The infant rotavirus vaccination programme

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## Live vaccines

- Which are the live vaccines that we use?
- What are the absolute contra-indications?
- And relative contra-indications?
- What about live vaccine intervals??

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Table: Recommendations for giving more than one live attenuated vaccine in current use in the UK

Vaccine combinations	Recommendations
Yellow Fever and MMR	A four week minimum interval period should be observed between the administration of these two vaccines. Yellow Fever and MMR should not be administered on the same day.
Varicella (and zoster) vaccine and MMR	If these vaccines are not administered on the same day, then a four week minimum interval should be observed between vaccines.
Tuberculin skin testing (Mantoux) and MMR	If a tuberculin skin test has already been initiated, then MMR should be delayed until the skin test has been read unless protection against measles is required urgently. If a child has had a recent MMR, and requires a tuberculin test, then a four week interval should be observed.
All currently used live vaccines (BCG, rotavirus, live attenuated influenza vaccine (LAIV), oral typhoid vaccine, yellow fever, varicella, zoster and MMR) and tuberculin (Mantoux) skin testing.	Apart from those combinations listed above, these live vaccines can be administered at any time before or after each other. This includes tuberculin (mantoux) skin testing.

Background evidence

Show all X

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## Live vaccines intervals May 2010

VACCINE COMBINATIONS	RECOMMENDATIONS
Yellow fever and MMR	A four week minimum interval period should be observed between the administration of these two vaccines. Yellow Fever and MMR should not be administered on the same day.*
Varicella (and zoster) vaccine and MMR	If these vaccines are not administered on the same day, then a four week minimum interval should be observed between vaccines.†
Tuberculin skin testing (Mantoux) and MMR	MMR vaccination and tuberculin skin testing can be performed on the same day. However, if a tuberculin skin test has already been initiated with MMR, it should be delayed until the skin test has been read unless protection against measles is required urgently. If a child has had a recent MMR, and requires a tuberculin test, then a four week interval should be observed.‡
All currently used live vaccines (BCG, rotavirus, varicella, oral polio, influenza vaccine (LAIV), oral typhoid vaccine, yellow fever, varicella, zoster and MMR).	Apart from those combinations listed above, these vaccines can be administered at any time before or after each other. This includes tuberculin (Mantoux) skin testing.¶
* Co-administration of these two vaccines can lead to sub-optimal antibody responses to yellow fever, mumps and rubella antigens (Nascimento et al, 2011). Where protection is required rapidly then the vaccines should be given at any interval; an additional dose of MMR should be considered.	
† A study in the US (Mullooley & Black, 2001) showed a significant increase in breakthrough infections when varicella vaccine was administered within 30 days of MMR vaccine, suggesting that MMR vaccine caused an attenuated varicella response. If the vaccines are given on the same day, however, the responses have been shown to be adequate (Plotkin, Oratzstein & Offit, 2013). As the zoster (shingles) vaccine contains the same virus as varicella (chicken pox) vaccine, this recommendation has been extrapolated to MMR and zoster. Where protection from either vaccine is required rapidly then the vaccines can be given at any interval and an additional dose of the vaccine given second should be considered.	
‡ Administering tuberculin (Mantoux) within 28 days of MMR vaccine may result in decreased reactivity of the tuberculin skin test. If a tuberculin skin test is required and MMR has been given within the last 28 days, it should be delayed until the skin test has been read. If protection against measles is urgently required, then the benefit of protection from the vaccine outweighs the potential interference with the tuberculin test. In this circumstance, the individual interpreting the negative tuberculin test should be aware of the recent MMR vaccination when considering how to manage that individual.	
¶ Whilst there is no evidence of decreased reactivity or interference from other live vaccines, those interpreting the results of the tuberculin skin test should be aware of any recently administered live injectable vaccines.	
MMR=measles, mumps, and rubella; BCG=Bacillus Calmette-Guérin (tuberculosis)	

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## Medico legal issues

- What do you think these are?
- Documentation
- Indemnity
- Competence
- Duty of care
- Consent
- Capacity
- Medico legal frameworks – PSDs, PGDs, protocols

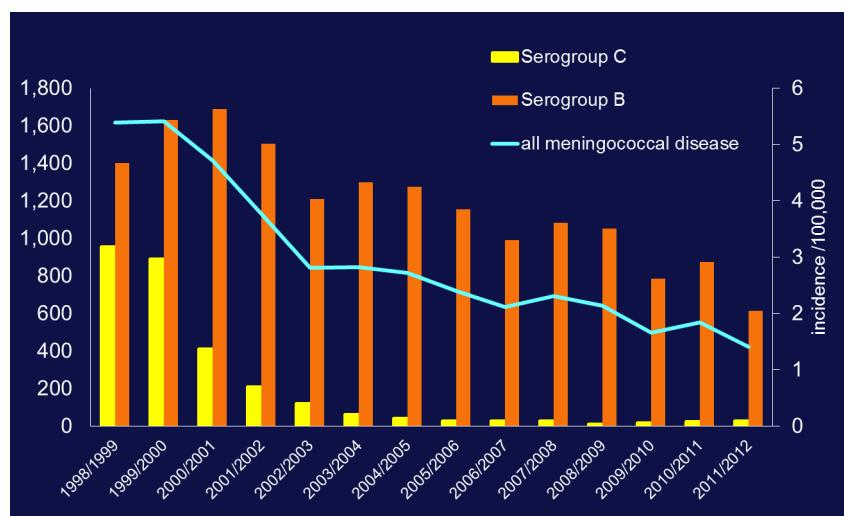
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## Meningitis and IMD

- What strains of meningitis do we see in the UK?
- How else can you contract meningitis?
- What is the difference between this and sepsis?

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IMD Incidence and Cases in England & Wales (1998/99-2011/12)



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## Dosage & timing of infant Paracetamol suspension (120mg/5ml) for the routine immunisation programme at 2 + 4 months

Age of baby	Dose 1	Dose2	Dose 3
2 months / 4 months	2.5ml as soon as possible after vaccination	2.5ml, 4-6 hours after 1 <sup>st</sup> dose	2.5ml, 4-6 hours after 2 <sup>nd</sup> dose

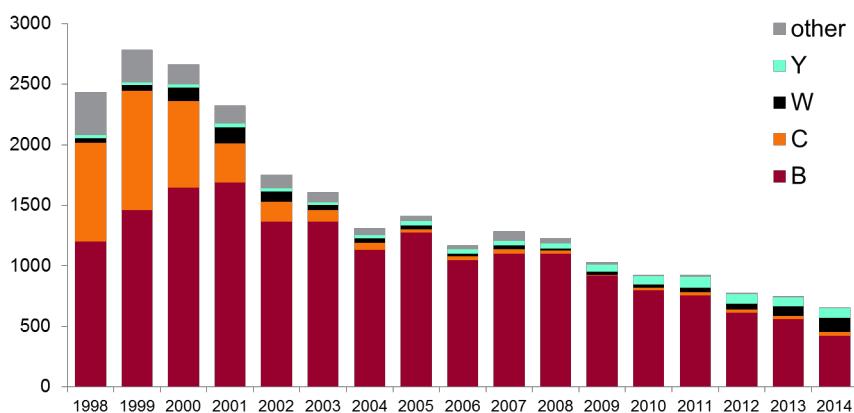
If baby still febrile after the first three doses of paracetamol but is otherwise well, parents can continue giving paracetamol at recommended intervals up to 48 hours post-vaccination. Do not exceed four doses in a day.

If any concern at all speak to GP or call NHS 111.

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## Laboratory confirmed cases invasive meningococcal disease

England and Wales



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## MenW cases in England

- MenB infections continue to decline
- MenW infections have increased since 2009

Year	MenW
2009	23
2010	27
2011	33
2012	46
2013	78
2014	119

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## Meningitis

- So although we have very low cases of any type of meningitis care still needs to be exercised and the vaccine uptake needs to be high

Public Health England (PHE) have this week released new figures showing 461 confirmed cases of invasive meningococcal disease (IMD) for the last epidemiological year, which runs from the beginning of July 2019 – end of June 2020. This is 12% lower than the 526 cases confirmed in July 2018 – June 2019.

Invasive meningococcal disease (IMD) refers to meningitis or septicaemia caused by meningococcal bacteria – the leading cause of bacterial meningitis in the UK. Around 1 in 10 of us carry the bacteria in the back of our nose and throats, and it is passed from person to person by close contact.

The report suggests that the social distancing measures introduced in March 2020 to combat the spread of COVID-19 have contributed to this fall in cases of disease. Between April – June 2020, only 29 cases of IMD were confirmed, which is 76% lower than the 121 cases confirmed in the same period during 2019.

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## IMD

- Which of the following is/are true about IMD?
- 
- a) Is transmitted through aerosol droplet or direct contact with respiratory secretions
- b) Up to 50% of the population carry the bacteria without causing them harm
- c) The incubation period is most commonly 2 to 7 days
- d) Most people catch the disease only from kissing contact

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## Shingles



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## Key messages about Shingles

- shingles can lead to a severe painful illness in older people that can persist for several months or even years
- the severity of the illness increases with age and older people aged 70 years and over are at an increased risk
- over 50,000 cases of shingles occur in people aged 70 years and over each year in England and Wales with approximately 50 cases resulting in death
- shingles vaccine is now offered routinely to individuals aged 70 years to reduce the incidence and severity of shingles and shingles related complications in older people

**It is important that healthcare professionals encourage and offer vaccination to all eligible patients**

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## What is shingles?

- shingles is a viral infection of the nerve cells and surrounding skin
- after a person recovers from chickenpox infection (caused by the varicella zoster virus), the virus remains dormant in the nerve cells and can reactivate at a later stage when the immune system is weakened
- reactivation of the dormant virus leads to the clinical manifestation of shingles
- reactivation can be associated with older age, malignancy, immunosuppressant therapy or HIV infection

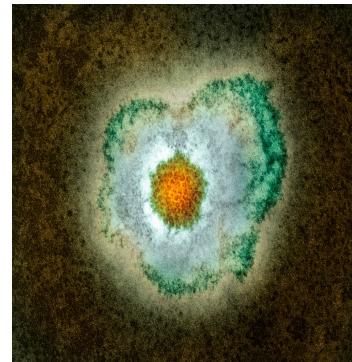


Image courtesy of PHE/SPL

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## Clinical presentation of shingles

### **Prodromal phase**

The first signs of shingles may include

- abnormal skin sensations and pain in the affected area of skin
- headache
- feeling generally unwell
- photophobia
- malaise
- fever (although this is less common)

A prodromal illness is experienced by 80% of individuals with shingles and can last up to 72 hours before the rash appears

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## Clinical presentation of shingles (cont'd)

### **Acute stage**

- a rash of fluid filled blisters develops after a few days and commonly occurs either on one side of the face or body, usually within the distribution of a dermatome (an area of skin that is supplied by a single nerve)
- the rash often causes intense pain and itching and a tingling, pricking or numb sensation in the area of the affected nerve
- the rash forms blisters that typically scab over in 7-10 days and this eventually clears within 2-4 weeks
- in individuals with weakened immune systems, a more disseminated rash covering multiple dermatomes may occur and this may appear similar to the chickenpox rash

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## Possible complications of shingles

Complications are more likely in adults aged over 50 years, with the severity of the illness increasing with age.

The **most common** complications are

- post herpetic neuralgia (PHN)
- secondary bacterial skin infections

Other less common complications can include

- ophthalmic zoster (leading to keratitis, corneal ulceration, conjunctivitis, retinitis, optic neuritis and/or glaucoma)
- peripheral motor neuropathy

In severe cases, shingles can lead to hospitalisation and death

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## Possible complications of shingles (cont'd)

**Post herpetic neuralgia** (PHN) is a common complication of shingles in older adults:

- PHN is a pain at the rash site that persists for, or appears more than 90 days after the onset of the shingles rash
- on average, PHN lasts from 3 to 6 months but can persist for longer
- severity of pain can vary and may be constant, intermittent or triggered by stimulation of affected area, eg wind on the face
- the pain may be a burning, itching, stabbing or aching pain, which is extremely sensitive to touch and is not generally relieved by common painkillers
- PHN is more likely to develop, and is more severe, in people over the age of 50, with one third of sufferers over the age of 80 experiencing intense pain

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## Incidence of shingles

- over 50,000 cases of shingles occur in people aged 70 years and above each year in England and Wales
- of these, 14,000 develop a very painful and long lasting condition called post herpetic neuralgia (PHN)
- 1,400 cases of shingles result in hospitalisation
- 1 in 1,000 cases of shingles in people aged 70 years and over are estimated to result in death
- risk of shingles higher in individuals with lupus, rheumatoid arthritis, diabetes and granulomatosis with polyangiitis

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## Epidemiology of shingles in England and Wales

Age Group	Incidence per 100,000 per year (general)	Percentage developing post herpetic neuralgia after 90 days	Proportion hospitalised first diagnosis (first three diagnoses)	Mean number of days in hospital (median)
60-64	706	9%	0.8% (1.3%)	9 (4)
65-69	791	11%	1.0% (1.7%)	8 (5)
70-74	876	15%	1.5% (2.4%)	11 (5)
75-79	961	20%	2.2% (3.8%)	14 (7)
80-84	1046	27%	3.0% (5.2%)	17 (9)
85+	1216	52%	4.4% (8.1%)	22 (13)

Estimated annual age-specific incidence, hospitalisation rate, length of inpatient stay, Burden of disease in the immunocompetent population England and Wales. (Data taken from van Hoek et al, 2009).

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## Why vaccinate older adults against shingles?

The epidemiology of the disease shows that individuals over 70 years of age are not only at an increased risk of developing the disease, but they also suffer a more severe form of the illness resulting in complications such as PHN and an increase in hospital admissions.

**Analytical studies show that the most cost-effective age for offering vaccination to prevent and/ or reduce the disease burden is for those aged 70 to 79.**

Vaccination for individuals over the age of 80 years is not recommended due to the decreased efficacy of the vaccine in this age group.

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## Shingles vaccine coverage data: England

- following the successful introduction of shingles vaccination in September 2013 in England, **there has been a year on year decline in coverage** in both the routine (70-year-old) and catch-up (78-year-old) cohorts

	Year 1 (2013/14)	Year 2 (2014/15)	Year 3 (2015/16)*
Routine (70y)	50.5%	48.7%	46.0%
Catch-up (78y)	N/A*	48.1%	46.0%

It is important that general practices consider how they can optimise the uptake of shingles vaccine in eligible patients in order to reduce the significant burden of disease associated with shingles among older adults

\* To end Feb 2016

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## The recommended vaccine: Zostavax®

A one dose schedule of Zostavax® was assessed in clinical trials using 17,775 adults aged 70 years and over

The vaccine reduced the incidence of shingles by 38% and provided protection for at least 5 years

For those vaccinated but who later developed shingles, the vaccine

- significantly reduced the burden of illness by 55%
- significantly reduced the incidence of PHN by 66.8%

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## Administration of Zostavax® (cont)

- Zostavax® can be administered at the same time as inactivated vaccines such as influenza and 23-valent pneumococcal polysaccharide vaccine (PPV)
- Zostavax® can also be administered at the same time as, or before or after other live vaccines **except** MMR and Yellow Fever
- where MMR and Zostavax® are not administered at the same time, a four week minimum interval should be observed between vaccines
- a four-week interval should be left between administration of Yellow Fever vaccine and Zostavax® – do not give at same appointment
- Zostavax should not be administered to patients currently receiving oral or intravenous antiviral agents such as aciclovir or who are within 48 hours after cessation of treatment as the therapy may reduce the response to the vaccine

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## Contraindications and precautions

**Zostavax® is a live vaccine – it is critically important to check that the recipient has no contraindications to receiving a live vaccine**

- the decision to administer Zostavax® to immunosuppressed individuals should be based on a clinical risk assessment
- if the individual is under highly specialist care and it is not possible to obtain full information on that individual's treatment history, then vaccination should not proceed until the advice of the specialist or a local immunologist has been sought
- **if primary healthcare professionals administering Zostavax® have concerns about the nature of therapies (including biologicals) or the degree of immunosuppression, they should contact the relevant specialist for advice**

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## Contraindications

The shingles vaccine should not be given to a person who:

1. **Has primary or acquired immunodeficiency states** due to conditions including:
  - acute and chronic leukaemias, lymphoma (including Hodgkin's lymphoma)
  - immunosuppression due to HIV/AIDS (see later)
  - cellular immune deficiencies
  - those remaining under follow up for a chronic lymphoproliferative disorder including haematological malignancies such as indolent lymphoma, chronic lymphoid leukaemia, myeloma and other plasma cell dyscrasias (NB: this list not exhaustive)
  - those who have received an allogenic stem cell transplant (cells from a donor) in the past 24 months and **only** then if they are demonstrated not to have ongoing immunosuppression or graft versus host disease (GVHD)
  - those who have received an autologous (using their own stem cells) haematopoietic stem cell transplant in the past 24 months and **only** then if they are in remission

Humoral deficiencies affecting IgG or IgA antibodies are not of themselves a contraindication unless associated with T cell deficiencies. If there is any doubt (eg common variable immune deficiency), immunological advice should be sought prior to administration.

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## Contraindications (cont'd)

The shingles vaccine should not be given to a person who:

### **2. Is on immunosuppressive or immunomodulating therapy including:**

- those who are receiving or have received in the past 6 months immunosuppressive chemotherapy or radiotherapy for malignant disease or non-malignant disorders
- those who are receiving or have received in the past 6 months immunosuppressive therapy for a solid organ transplant (depending upon the type of transplant and the immune status of the patient)
- those who are receiving or have received in the past 12 months biological therapy (eg anti-TNF therapy such as alemtuzumab, ofatumumab and rituximab) unless otherwise directed by a specialist
- those who are receiving or have received in the past 3 months immunosuppressive therapy including
  - i) short term high-dose corticosteroids (>40mg prednisolone per day for more than 1 week)
  - ii) long term lower dose corticosteroids (>20mg prednisolone per day for more than 14 days)
  - iii) non-biological oral immune modulating drugs e.g. methotrexate >25mg per week, azathioprine >3.0mg/kg/day or 6-mercaptopurine >1.5mg/kg/day

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## Contraindications (cont'd)

- Many adults with chronic inflammatory diseases (eg rheumatoid arthritis, inflammatory bowel disease, psoriasis, glomerulonephritis) may be on stable long term low dose corticosteroid therapy (defined as ≤20mg prednisolone per day for more than 14 days) either alone or in combination with other immunosuppressive drugs including biological and non-biological therapies
- Long term stable low dose corticosteroid therapy (defined as ≤20mg prednisolone per day for more than 14 days) either alone or in combination with low dose non-biological oral immune modulating drugs (eg methotrexate ≤25mg per week, azathioprine ≤3.0mg/kg/day or 6-mercaptopurine ≤1.5mg/kg/day) **are not considered sufficiently immunosuppressive and these patients can receive the vaccine**
- specialist advice should be sought for other treatment regimes
- Zostavax® is **not** contraindicated for use in individuals who are receiving topical/inhaled corticosteroids or corticosteroid replacement therapy

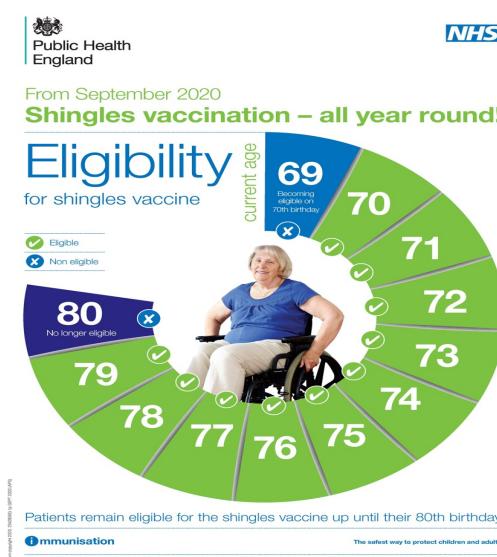
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## Current or recent shingles infection

- any acute illness – defer immunisation until fully recovered
- Zostavax® not recommended for treatment of shingles or post herpetic neuralgia (PHN)
- individuals who have shingles or PHN should wait until symptoms have ceased before being considered for shingles immunisation
- the natural boosting that occurs following an episode of shingles makes the benefit of offering zoster vaccine immediately following recovery limited
- immunocompetent individuals who develop shingles should have their shingles vaccination delayed for one year
- patients who have two or more episodes of shingles in one year should have immunological investigation prior to vaccination

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## Shingles wheel



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**Shingles vaccination**

**Who's eligible?**

Aged **70-79 years?**  
Everyone aged between 70 and 79 years is eligible for the shingles vaccine up to 79 years of age.

Protect yourself from the pain of shingles – speak to your GP surgery about having your vaccine today!

- Extension to the Shingles immunisation programme for those who missed vaccination during lockdown individuals become eligible for routine vaccination against shingles when they become 70 years of age and all those aged up to and including 79 years, are now eligible to receive the vaccine until they become 80 years of age. NHS England had previously advised that individuals who were eligible for the Shingles vaccination programme who turned 80 years during the COVID-19 pandemic and missed the opportunity to be vaccinated, either due to lockdown or because they were shielding at home and unable to attend their general practice, could continue to be vaccinated up to the 31 March 2021. This has now been further extended until 31 July 2021. There are no contractual changes to this programme: offer of vaccination is opportunistic or if requested for the catch up cohort, i.e. those aged 71-79 years. GPs will continue to be reimbursed the standard item of service fee which should continue to be claimed manually. As this cohort will not be included in the Shingles PGD, a Patient Specific Direction (PSD) should be used by practices for this specific cohort of patients.

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## Zostavax and Shingrix

**ZOSTAVAX**  
powder and solvent for suspension for injection  
in a pre-filled syringe  
shingles (herpes zoster) vaccine (live)

1 vial (powder) +  
1 pre-filled syringe (solvent) + 2 needles

Subcutaneous or intramuscular use.

**SHINGRIX**  
Powder and suspension for suspension for injection  
Herpes zoster vaccine (recombinant, adjuvanted)  
Intramuscular use  
1 vial powder (antigen)  
1 vial suspension (adjuvant)

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## Shingrix

- The schedule for Shingrix consists of 2 doses of vaccine given 2 months apart. The second dose can be administered 2 to 6 months after the initial dose but as Shingrix vaccine is being offered to immunocompromised individuals, a 2 month interval between doses is recommended to ensure individuals are protected as soon as possible

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## Criteria for inclusion

- Individuals should first be assessed for eligibility for vaccination with Zostavax® in accordance with the national shingles immunisation programme (see [PHE Zostavax PGD](#)).
- Individuals for whom Zostavax®, shingles (herpes zoster, live) vaccine is clinically contraindicated because of immunosuppression and who:
  - are aged 70 years (routine cohort)
  - have existing eligibility for shingles vaccination under the national immunisation programme but remain unimmunised. Individuals from 70 years of age remain eligible to commence shingles immunisation until their 80th birthday. Where an individual has turned 80 years of age following their first dose of Shingrix®, a second dose should be provided to complete the two-dose schedule.

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## Criteria for exclusion

Individuals for whom no valid consent has been received

Individuals who:

- are under 70 years of age
- are 80 years of age or over, except those who have received a partial course of Shingrix®<sup>2</sup>
- do not have clinical contraindications to receiving Zostavax®, shingles (herpes zoster, live) vaccine<sup>[1]</sup>
- have had a confirmed anaphylactic reaction to a previous dose of varicella vaccine or to any component of the vaccine
- are suffering from acute severe febrile illness (the presence of a minor infection is not a contraindication for immunisation)
- have shingles infection with active lesions

are pregnant

Refer to Chapter 28a and [PHE Zostavax PGD](#) for further detail of those with clinical contraindications to Zostavax® shingles (herpes zoster, live) vaccine, primarily those with primary or acquired immunodeficiency states or on significant immunosuppressive or immunomodulating therapy.

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## Considerations

- Porcine gelatine- how do we deal with this concern?
- Benefit v risk
- Are they truly IC?
- Check the PGDs

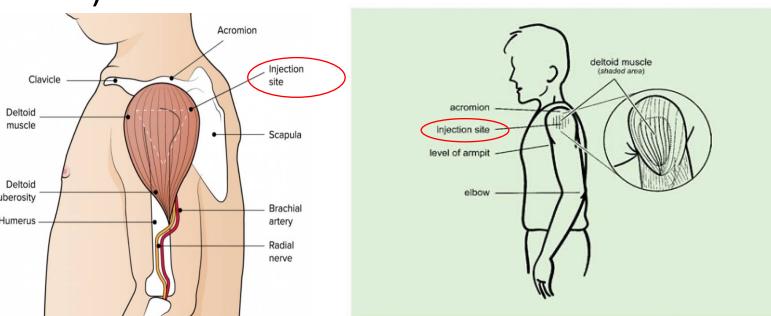
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## Scenario

- John is 75 and wants all of the vaccines for which he is eligible.
- What can you give him today?
- He is fit and well – no PMH of note, no medications, no allergies.
- Consider if this is possible?

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## The deltoid muscle (upper arm)



<https://immunisationandbook.health.gov.au/resource/green-book-faqs/where-anatomical-markers-used-patient-their-deltoid-injection-site>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/147915/Green-Book-Chapter-3.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/147915/Green-Book-Chapter-3.pdf)

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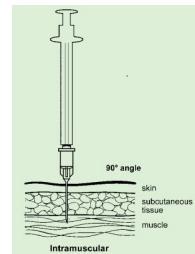
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## Vaccine administration continued

- Skin does not need to be specially cleaned prior to vaccination. If it is visibly dirty then water is sufficient to clean it.
- Plasters are not generally needed to cover injection sites but can be used if necessary. Gentle pressure with a gauze swab can be applied following vaccination if bleeding occurs.

### Intramuscular process:

- identify the correct site for IM injection
- stretch the skin at the site
- insert the needle at a 90° angle far enough to ensure vaccine is delivered into muscle
- depress the plunger
- gently remove the needle
- apply light pressure using gauze or cotton wool if bleeding occurs



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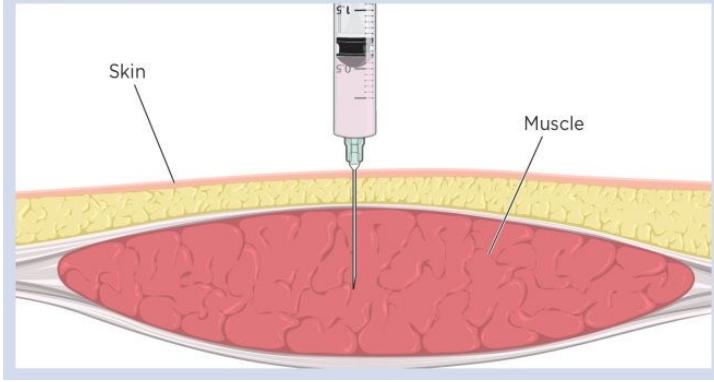


## Using the correct injection technique

- it is essential that the correct site and injection technique be used to administer vaccines
- injecting too high into the upper arm might result in a shoulder injury or a frozen shoulder. This leads to pain, weakness and a limited range of motion that can last for months
- injecting too far to the side of the arm or too low on the arm risks injecting into the axillary nerve or the radial nerve
- to avoid shoulder injury, always assess the limb before administering the vaccine to identify the correct site for injection

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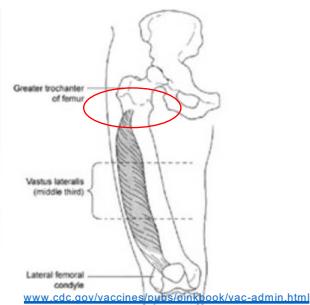


**Fig 3. The needle should be inserted at 90 degrees and penetrate the muscle layer**

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## The Vastus lateralis muscle (anterolateral aspect of the thigh)



Infants under one year receive their immunisations into the anterolateral aspect of the thigh because the deltoid muscle is not sufficiently well developed at this age.

Although the deltoid muscle is more commonly used in older children and adults as it is quicker and easier to access, the vastus lateralis muscle in the thigh can be used in these age groups if necessary.

Provisional – Subject to revision – Use latest version link: x

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► Before administering a vaccine, the individual should be assessed to ensure that:

- there are no contraindications to the vaccine being given
- they or their carer is fully informed about the vaccine to be given and understand the vaccination procedure
- they or their carer are aware of possible adverse reactions to the vaccine and how to treat them
- they have consented to having the vaccine

► Immunisers should ensure that:

- they have the appropriate knowledge and legal authority to administer the vaccine
- the vaccine has been properly stored and prepared for use and that they know where and how to administer it

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## For COVID information

- <https://www.gov.uk/government/collections/covid-19-vaccination-programme>
- Includes competency document and PGDs
- Do check regularly as this guidance including boosters changes regularly

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## 'Flu

- Tell me some of the groups we need to vaccinate?
- Which vaccines do we use?
- Any conundrums ?

200

## scenario

- Joan is 75 and comes with her husband John for her 'flu jab. She is confused today. Who can give consent for her 'flu jab?

201

## Vaccine incidents

- [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1001274/PHE vaccine incident guidance July2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1001274/PHE_vaccine_incident_guidance_July2021.pdf)
- An excellent resource

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## Autumn COVID boosters

The boosters would be for more vulnerable adults, alongside frontline social care and health workers, in order to maintain their protection over the winter against severe COVID-19.

As in autumn 2021, the primary objective of the 2022 autumn booster programme will be to increase population immunity and protection against severe COVID-19, specifically hospitalisation and death, over the winter period.

The Joint Committee on Vaccination and Immunisation's (JCVI's) current view is that in autumn 2022, a COVID-19 vaccine should be offered to:

- residents in a care home for older adults and staff
- frontline health and social care workers
- all those 65 years of age and over
- adults aged 16 to 64 years who are in a clinical risk group

Professor Wei Shen Lim, Chair of COVID-19 vaccination on the JCVI said:

Last year's autumn booster vaccination programme provided excellent protection against severe COVID-19, including against the Omicron variant.

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## Need to know and be competent

- [COVID-19: vaccinator competency assessment tool - GOV.UK \(www.gov.uk\)](#)

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## 'Flu 22-23

- All children aged 2 or 3 years on 31 August 2022
- all primary school aged children (from reception to Year 6) those aged 6 months to under 65 years in clinical risk groups
- pregnant women
- those aged 65 years and over
- those in long-stay residential care homes
- carers
- close contacts of immunocompromised individuals
- frontline staff employed by the following types of social care providers without employer led occupational health schemes:
  - a registered residential care or nursing home
  - registered domiciliary care provider
  - a voluntary managed hospice provider
  - Direct Payment (personal budgets) or Personal Health Budgets, such as Personal Assistants
- those aged 50 to 64 years – healthy group
- secondary school children in Years 7 to 11 (between 11 and 15 years of age on 31 August 2022)

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### Availability of Vaxelis® vaccine as an alternative to Infanrix hexa®

- Since 31 January 2022, as part of the current vaccination programme, Vaxelis® has been available to order via ImmForm. Vaxelis® is an alternative hexavalent vaccine to Infanrix hexa® (DTaP/IPV/Hib/HepB) for routine infant primary immunisations scheduled at 8, 12 and 16 weeks of age. Vaxelis protects against the same 6 diseases as Infanrix hexa® and has been licensed in Europe for more than 5 years.
- Infanrix hexa® will also continue to be available via ImmForm.
- Vaxelis® and Infanrix hexa® vaccines are interchangeable, but where possible and if local stock allows, it is preferable that the same DTaP/IPV/Hib/HepB-containing vaccine be used for all 3 doses of the primary course. However, vaccination should never be delayed because the vaccine used for previous doses is not known or unavailable.

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## Drivers and barriers to vaccination identified in local insight work

- ▶ **Drivers for vaccination:**
  - prosocial approach (protection of others)
  - protection of self
  - community influence
  - practicalities: clinic locations, GP access
  - information (and sources)
- ▶ **Barriers to vaccination:**
  - safety concerns
  - lack of information
  - accessibility of vaccination
  - acceptability or practicality of vaccination locations
  - vaccine misconceptions
  - fertility concerns
  - mistrust of government or other official organisations
- ▶ The biggest factor in someone's decision is speaking with trusted family and friends, as shown in this survey conducted at an outreach clinic

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## Any questions?



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