The routine childhood immunisation schedule

Feb 2017

Objectives

- Describe the routine childhood immunisation schedule
- Influenza immunisation of children
- Understand the rationale behind the schedule
- Understand the extent of the flexibility of the schedule

The routine immunisation schedule — from Summer 2016

Age due	Diseases protected against	Vaccine given and trade name		Usual site[1]
Eight weeks old	Diphtheria, tetanus, pertussis (whooping cough), polio and *Haemophilus influenzae* type b (Hib)	DTaP/IPV/Hib	Pediacel or Infanrix IPV Hib	Thigh
	Pneumococcal (13 serotypes)	Pneumococcal conjugate vaccine (PCV)	Prevenar 13	Thigh
	Meningococcal group B (MenB)[2]	MenB[2]	Bexsero	Left thigh
	Rotavirus gastroenteritis	Rotavirus	Rotarix	By mouth
Twelve weeks	Diphtheria, tetanus, pertussis, polio and Hib	DTaP/IPV/Hib	Pediacel or Infanrix IPV Hib	Thigh
	Rotavirus	Rotavirus	Rotarix	By mouth
Sixteen weeks old	Diphtheria, tetanus, pertussis, polio and Hib	DTaP/IPV/Hib	Pediacel or Infanrix IPV Hib	Thigh
	MenB[2]	MenB[2]	Bexsero	Left thigh
	Pneumococcal (13 serotypes)	PCV	Prevenar 13	Thigh
One year old	Hib and MenC	Hib/MenC booster	Menitorix	Upper arm/thigh
	Pneumococcal (13 serotypes)	PCV booster	Prevenar 13	Upper arm/thigh
	Measles, mumps and rubella (German measles)	MMR	MMR VaxPRO[3] or Priorix	Upper arm/thigh
	MenB[2]	MenB booster[2]	Bexsero	Left thigh
Two to eight years old (including children in school years 1, 2 and 3)[5]	Influenza (each year from September)	Live attenuated influenza vaccine LAIV[6]	Fluenz Tetra[3]	Both nostrils
Three years four months old	Diphtheria, tetanus, pertussis and polio	DTaP/IPV	Infanrix IPV or Repevax	Upper arm
	Measles, mumps and rubella	MMR (check first dose given)	MMR VaxPRO[3] or Priorix	Upper arm
Girls aged 12 to 13 years	Cervical cancer caused by human papillomavirus (HPV) types 16 and 18 (and genital warts caused by types 6 and 11)	HPV (two doses 6-24 months apart)	Gardasil	Upper arm
Fourteen years old (school year 9)	Tetanus, diphtheria and polio	Td/IPV (check MMR status)	Revaxis	Upper arm
	Meningococcal groups A, C, W and Y disease	MenACWY	Nimenrix or Menveo	Upper arm
65 years old	Pneumococcal (23 serotypes)	Pneumococcal polysaccharide vaccine (PPV)	Pneumococcal polysaccharide vaccine	Upper arm
65 years of age and older	Influenza (each year from September)	Inactivated influenza vaccine	Multiple	Upper arm
70 years old	Shingles	Shingles	Zostavax[3]	Upper arm[4]

[1] Where two or more injections are required at once, these should ideally be given in different limbs. Where this is not possible, injections in the same limb should be given 2.5cm apart. For more details see Chapters 4 and 11 in the Green Book. All injected vaccines are given intramuscularly unless stated otherwise.
[2] Only for infants born on or after 1 May 2015
[3] Contains porcine gelatine
[4] If LAIV (live attenuated influenza vaccine) is contraindicated and child is in a clinical risk group, use inactivated flu vaccine
[5] At appropriate age up to 31 August 2016 and also including primary school aged children in the pilots
[6] This can be administered subcutaneously but intramuscular is preferred.

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Selective immunisation programmes

Target group	Age and schedule	Disease	Vaccines required
Babies born to hepatitis B infected mothers	At birth, four weeks, eight weeks and at one year[1]	Hepatitis B	Hepatitis B vaccine (Engerix B / HBvaxPRO)
Infants in areas of the country with TB incidence >= 40/100,000	At birth	Tuberculosis	BCG
Infants with a parent or grandparent born in a high incidence country[2]	At birth	Tuberculosis	BCG
Pregnant women	During flu season At any stage of pregnancy	Influenza	Inactivated flu vaccine
Pregnant women	From 20 weeks gestation[3]	Pertussis	dTaP/IPV (Boostrix-IPV or Repevax)

[1] Take blood for HBsAg to exclude infection
[2] Where the annual incidence of TB is >= 40/100,000
www.gov.uk/government/uploads/system/uploads/attachment_data/file/393840/Worldwide_TB_Surveillance_2013_Data_High_and_Low_Incidence_Tables_____2_.pdf
[3] Can be given from 16 weeks but usually offered after the anomaly scan

Additional vaccines for individuals with underlying medical conditions

Medical condition	Diseases protected against	Vaccines required[1]
Asplenia or splenic dysfunction (including sickle cell and coeliac disease)[2]	Meningococcal groups A, B, C, W and Y Pneumococcal Haemophilus influenzae type b (Hib) Influenza	Hib/MenC MenACWY MenB PCV13 (up to five years of age) PPV (from two years of age) Annual flu vaccine
Cochlear implants	Pneumococcal	PCV13 (up to five years of age) PPV (from two years of age)
Chronic respiratory and heart conditions[2] (such as severe asthma, chronic pulmonary disease, and heart failure)	Pneumococcal Influenza	PCV13 (up to five years of age) PPV (from two years of age) Annual flu vaccine
Chronic neurological conditions[3] (such as Parkinson's or motor neurone disease, or learning disability)	Pneumococcal Influenza	PCV13 (up to five years of age) PPV (from two years of age) Annual flu vaccine
Diabetes[3]	Pneumococcal Influenza	PCV13 (up to five years of age) PPV (from two years of age) Annual flu vaccine
Chronic kidney disease (CKD)[3] (including haemodialysis)	Pneumococcal (stage 4 and 5 CKD) Influenza (stage 3, 4 and 5 CKD) Hepatitis B (stage 4 and 5 CKD)	PCV13 (up to five years of age) PPV (from two years of age) Annual flu vaccine Hepatitis B
Chronic liver conditions[3]	Pneumococcal Influenza Hepatitis A Hepatitis B	PCV13 (up to five years of age) PPV (from two years of age) Annual flu vaccine Hepatitis A Hepatitis B
Haemophilia	Hepatitis A Hepatitis B	Hepatitis A Hepatitis B
Immunosuppression due to disease or treatment[3]	Pneumococcal Influenza	PCV13 (up to five years of age)[2] PPV (from two years of age) Annual flu vaccine
Complement disorders[3] (including those receiving complement inhibitor therapy)	Meningococcal groups A, B, C, W and Y Pneumococcal Haemophilus influenzae type b (Hib) Influenza	Hib/MenC MenACWY MenB PCV13 (to any age) PPV (from two years of age) Annual flu vaccine

[1] Check relevant chapter of green book for specific schedule

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The schedule for routine immunisation 2017

At 2, 3, 4, months (chronological, not gestational age)

The "5 in one" = DTaP/IPV/Hib:

- Diphtheria (D)
- Tetanus (T)
- Acellular pertussis (whooping cough) (aP)
- Polio (IPV)
- Haemophilus influenzae type b (Hib)

Plus:

- Meningococcus group B (2+4 months) (MenB)
- Pneumococcus (2+4 months) (PCV)
- Rotavirus (2+3 months)

After first birthday

- Boosters for
  - Haemophilus influenzae b (in Hib/MenC)
  - Meningitis B
  - Pneumococcus

- First dose of measles, mumps and rubella (MMR)

- First dose of Men C (in Hib/Men C)

Preschool booster

- 3 years 4 months
- Second dose of MMR
- DTaP/IPV = first boosters of:
  - Diphtheria
  - Tetanus
  - Pertussis
  - Polio

At school

Td/IPV = second boosters of:

- Tetanus
- Diphtheria (d=low dose to minimise adverse reactions)
- Polio

Men ACWY

Human Papilloma Virus (HPV) Vaccine

In some schools: MMR for those young people who have not had 2 doses

In autumn

- A single dose of live nasal influenza vaccine for individuals aged 2-16 years annually
- Programme is being rolled out gradually
- Injectable inactivated vaccine if the live virus is contraindicated
- But if refuse the nasal, not entitled to the injectable

What age? What vaccine? How many doses?

NHS

Which flu vaccine should children have?

There are two types of flu vaccine available for children in 2016/17 – the 'live' nasal spray vaccine and the inactivated injected flu vaccine. This chart indicates which vaccine children should get.

What is the child's age?

under 6 months of age

They are too young to have the flu vaccine (this is why it's important that expectant mothers have a flu vaccination – they can have it at any stage of their pregnancy)

6 months to under 2 years

Are they in an at-risk group?

- **Yes** → They should have the inactivated injected flu vaccine. Children who have never had a flu vaccination will need two doses four weeks apart
- **No** → The child is not eligible for the flu vaccine

2, 3 or 4 years

Are they in an at-risk group?

- **Yes** → Are there medical reasons why they can't have the nasal spray vaccine?
  - **Yes** → They should have the inactivated injected flu vaccine. Children who have never had a flu vaccination will need two doses four weeks apart
  - **No** → They should have the nasal spray vaccine. At-risk children aged up to 9 years who have never had a flu vaccination will need two doses four weeks apart
- **No** → They should have the nasal spray vaccine

5, 6 and 7 years rising 8

In school years 1, 2 and 3

Are they in an at-risk group?

- **Yes** → Are there medical reasons why they can't have the nasal spray vaccine?
  - **Yes** → They should have the inactivated injected flu vaccine. Children who have never had a flu vaccination will need two doses four weeks apart
  - **No** → They should have the nasal spray vaccine. At-risk children aged up to 9 years who have never had a flu vaccination will need two doses four weeks apart
- **No** → They should have the nasal spray vaccine

8 to under 18 years

Are they in an at-risk group?

- **Yes** → Are there medical reasons why they can't have the nasal spray vaccine?
  - **Yes** → They should have the inactivated injected flu vaccine. Children who have never had a flu vaccination will need two doses four weeks apart
  - **No** → They should have the nasal spray vaccine. At-risk children aged up to 9 years who have never had a flu vaccination will need two doses four weeks apart
- **No** → The child is not eligible for the flu vaccine

Notes.

- **Those aged two, three or four years old** on 31 August 2016 (but not five years) are eligible for flu vaccination.
- **Children of school years 1, 2 and 3 age** (i.e. those aged five, six and seven on 31 August 2016, rising to eight years old) are eligible for flu vaccination.
- **At-risk children** include those who have a long-term health conditions such as asthma, and other respiratory diseases, liver, kidney and neurological conditions including learning

- **The nasal spray vaccine** is a 'live' vaccine but the viruses in it have been weakened so they can not cause flu. It is not suitable for all children, including those who are severely asthmatic or immunocompromised, or are on salicylate therapy. Children with egg allergy can have the nasal vaccine. However, parents whose children have a history of severe egg allergy with anaphylaxis should seek specialist advice. There is no suitable alternative flu vaccine available for otherwise healthy children.

- **The vaccine will continue to be offered** to all primary school-aged children in former pilot areas.

What are the issues?

- What age?
  - In an at-risk category: 6 months and older
  - Not in an at-risk category: 2- 16 years inclusive

- Which vaccine? Live nasal or injectable?
  - Age: nasal vaccine not licensed for those under 24m and is not used for adults (ie anyone aged 18 years or over)
  - Medical contra-indications (because nasal vaccine is a live viral vaccine)

- How many doses? One or two? Determined by:
  - Age (is the child aged 9 years or more?)
  - Whether the child is in an at-risk category
  - Whether the child has had the vaccine before

How many doses?

	In an at-risk category	NOT in an at-risk category
Aged 9 years or more OR had a previous dose	One	One
Aged under 9 years AND has not had a previous dose-	Two doses 4 weeks apart	One

What are the at-risk categories?

- Any long term health condition, eg
  - Respiratory diseases such as asthma
  - Liver, kidney, heart, neurological diseases
  - Diabetes
  - Immunosuppression
  - Asplenia/splenic dysfunction
  - Learning disability
- OR any child you think might benefit because of other risk factors

What are the contra-indications to the live nasal vaccine?

- To any vaccine:
  - Febrile illness
  - Anaphylactic reaction to constituents

- To a live vaccine
  - Pregnancy
  - Anti-virals within previous 48 hours
  - Unrepaired cranio-facial malformations
  - Immunosuppression as a result of treatment (eg high dose steroids) or disease (eg leukaemia)
  - Anyone in the household who is severely immunosuppressed
  - Treatment with salicylates
  - Anaphylaxis to egg that has required intensive care
  - SEVERE asthma (defer if active wheezing)

Some of the vaccines are one-offs or short courses

At birth (if required): Hep B (and then at 4 and 8 weeks), BCG (if required)

At 2 months: "5 in one" + pneumococcus + Men B + rotavirus
At 3 months: "5 in one" + rotavirus
At 4 months: "5 in one" + pneumococcus + Men B

At 12-13 months: Hib/Men C + MMR + pneumococcus + Men B (+ hep B if required)

Pre-school: Dip, tet, po, pert + MMR (+ hep B if required)

School year 8: HPV x 2 doses 6-12 months apart (girls aged 12-13 years, 3 doses if start the course aged 15 years or over)

School year 9: Dip, tet, po + Men ACWY

Most span several years

At birth (if required): Hep B (and then at 4 and 8 weeks), BCG (if required)

At 2 months: "5 in one" + pneumococcus + Men B + rotavirus
At 3 months: "5 in one" + rotavirus
At 4 months: "5 in one" + pneumococcus + Men B

At 12-13 months: Hib/Men C + MMR + pneumococcus + Men B (+ hep B if required)

Pre-school: Dip, tet, po, pert + MMR (+ hep B if required)

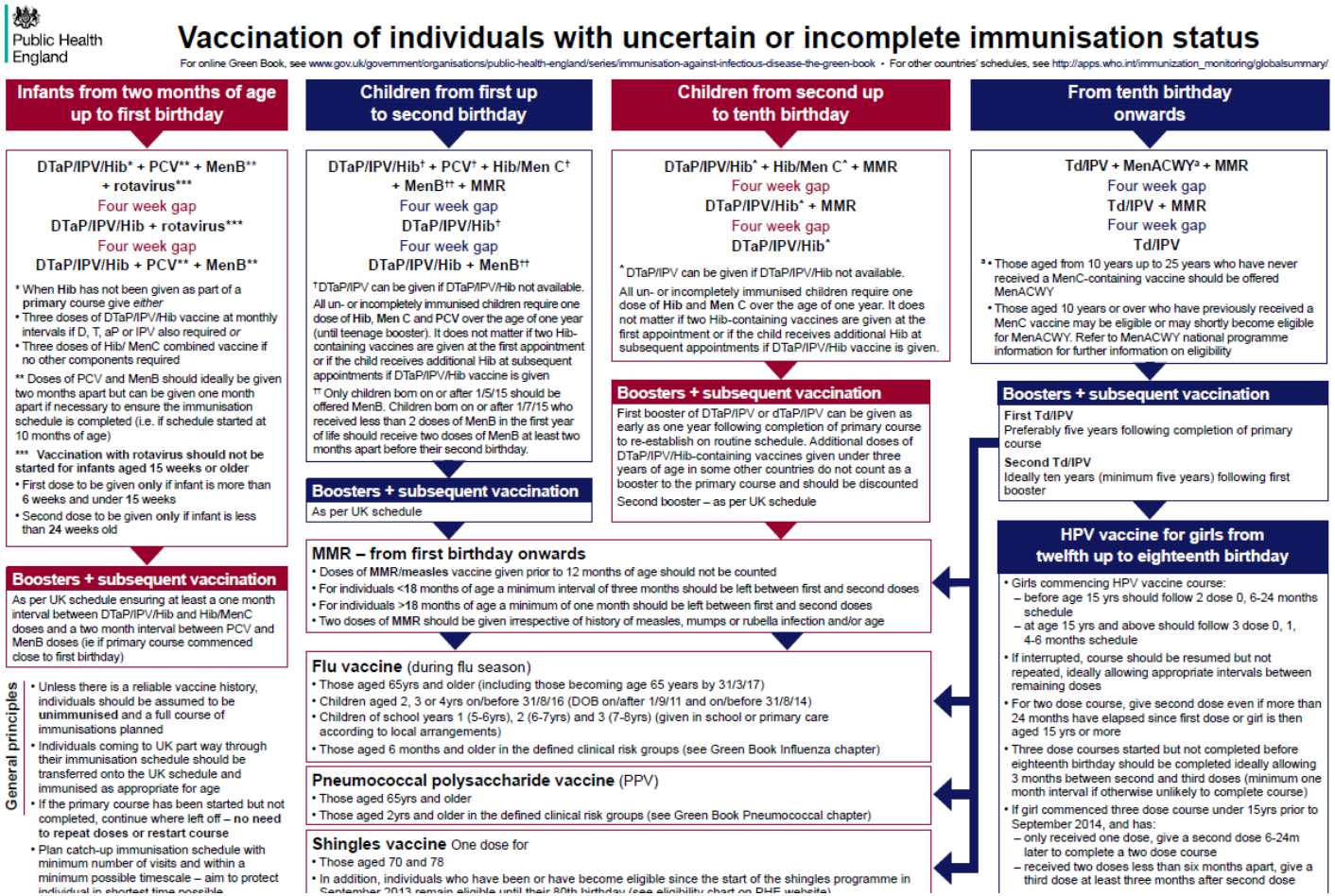
School year 8: HPV x 2 doses 6-12 months apart (girls aged 12-13 years, 3 doses if start the course aged 15 years or over)

School year 9: Dip, tet, po + Men ACWY

The schedule is not set in stone

Once you understand the rationale behind schedule you will understand the extent to which you can be flexible with it

Summary


Public Health England
Vaccination of individuals with uncertain or incomplete immunisation status
For online Green Book, see www.gov.uk/government/organisations/public-health-england/series/immunisation-against-infectious-disease-the-green-book • For other countries' schedules, see http://apps.who.int/immunization_monitoring/globalsummary/
Infants from two months of age up to first birthday
DTaP/IPV/Hib* + PCV** + MenB** + rotavirus***
Four week gap
DTaP/IPV/Hib + rotavirus***
Four week gap
DTaP/IPV/Hib + PCV** + MenB**
* When Hib has not been given as part of a primary course give either
• Three doses of DTaP/IPV/Hib vaccine at monthly intervals if D, T, aP or IPV also required or
• Three doses of Hib/ MenC combined vaccine if no other components required
** Doses of PCV and MenB should ideally be given two months apart but can be given one month apart if necessary to ensure the immunisation schedule is completed (i.e. if schedule started at 10 months of age)
*** Vaccination with rotavirus should not be started for infants aged 15 weeks or older
• First dose to be given only if infant is more than 6 weeks and under 15 weeks
• Second dose to be given only if infant is less than 24 weeks old
Boosters + subsequent vaccination
As per UK schedule ensuring at least a one month interval between DTaP/IPV/Hib and Hib/MenC doses and a two month interval between PCV and MenB doses (ie if primary course commenced close to first birthday)
General principles
• Unless there is a reliable vaccine history, individuals should be assumed to be unimmunised and a full course of immunisations planned
• Individuals coming to UK part way through their immunisation schedule should be transferred onto the UK schedule and immunised as appropriate for age
• If the primary course has been started but not completed, continue where left off – no need to repeat doses or restart course
• Plan catch-up immunisation schedule with minimum number of visits and within a minimum possible timescale – aim to protect individual in shortest time possible
Children from first up to second birthday
DTaP/IPV/Hib† + PCV† + Hib/Men C† + MenB†† + MMR
Four week gap
DTaP/IPV/Hib†
Four week gap
DTaP/IPV/Hib + MenB††
† DTaP/IPV can be given if DTaP/IPV/Hib not available.
All un- or incompletely immunised children require one dose of Hib, Men C and PCV over the age of one year (until teenage booster). It does not matter if two Hib-containing vaccines are given at the first appointment or if the child receives additional Hib at subsequent appointments if DTaP/IPV/Hib vaccine is given
†† Only children born on or after 1/5/15 should be offered MenB. Children born on or after 1/7/15 who received less than 2 doses of MenB in the first year of life should receive two doses of MenB at least two months apart before their second birthday.
Boosters + subsequent vaccination
As per UK schedule
Children from second up to tenth birthday
DTaP/IPV/Hib^ + Hib/Men C^ + MMR
Four week gap
DTaP/IPV/Hib^ + MMR
Four week gap
DTaP/IPV/Hib^
^ DTaP/IPV can be given if DTaP/IPV/Hib not available.
All un- or incompletely immunised children require one dose of Hib and Men C over the age of one year. It does not matter if two Hib-containing vaccines are given at the first appointment or if the child receives additional Hib at subsequent appointments if DTaP/IPV/Hib vaccine is given.
Boosters + subsequent vaccination
First booster of DTaP/IPV or dTaP/IPV can be given as early as one year following completion of primary course to re-establish on routine schedule. Additional doses of DTaP/IPV//Hib-containing vaccines given under three years of age in some other countries do not count as a booster to the primary course and should be discounted
Second booster – as per UK schedule
From tenth birthday onwards
Td/IPV + MenACWY[a] + MMR
Four week gap
Td/IPV + MMR
Four week gap
Td/IPV
[a] • Those aged from 10 years up to 25 years who have never received a MenC-containing vaccine should be offered MenACWY
• Those aged 10 years or over who have previously received a MenC vaccine may be eligible or may shortly become eligible for MenACWY. Refer to MenACWY national programme information for further information on eligibility
Boosters + subsequent vaccination
First Td/IPV
Preferably five years following completion of primary course
Second Td/IPV
Ideally ten years (minimum five years) following first booster
MMR – from first birthday onwards
• Doses of MMR/measles vaccine given prior to 12 months of age should not be counted
• For individuals <18 months of age a minimum interval of three months should be left between first and second doses
• For individuals >18 months of age a minimum of one month should be left between first and second doses
• Two doses of MMR should be given irrespective of history of measles, mumps or rubella infection and/or age
Flu vaccine (during flu season)
• Those aged 65yrs and older (including those becoming age 65 years by 31/3/17)
• Children aged 2, 3 or 4yrs on/before 31/8/16 (DOB on/after 1/9/11 and on/before 31/8/14)
• Children of school years 1 (5-6yrs), 2 (6-7yrs) and 3 (7-8yrs) (given in school or primary care according to local arrangements)
• 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 in the defined clinical risk groups (see Green Book Pneumococcal chapter)
Shingles vaccine One dose for
• Those aged 70 and 78
• In addition, individuals who have been or have become eligible since the start of the shingles programme in September 2013 remain eligible until their 80th birthday (see eligibility chart on PHE website)
HPV vaccine for girls from twelfth up to eighteenth birthday
• Girls commencing HPV vaccine course:
– before age 15 yrs should follow 2 dose 0, 6-24 months schedule
– at age 15 yrs and above should follow 3 dose 0, 1, 4-6 months schedule
• If interrupted, course should be resumed but not repeated, ideally allowing appropriate intervals between remaining doses
• For two dose course, give second dose even if more than 24 months have elapsed since first dose or girl is then aged 15 yrs or more
• Three dose courses started but not completed before eighteenth birthday should be completed ideally allowing 3 months between second and third doses (minimum one month interval if otherwise unlikely to complete course)
• If girl commenced three dose course under 15yrs prior to September 2014, and has:
– only received one dose, give a second dose 6-24m later to complete a two dose course
– received two doses less than six months apart, give a third dose at least three months after second dose

Why does the schedule look like it does?

A number of factors are taken into account:

- **Age of the child**
- **Spacing** needed between doses of the vaccine
- **Compatibility** with other vaccines given at same time
- Whether the vaccine can be **combined** with another
- **Number of doses** that need to be given for protective response to be made
- Whether **booster** doses are needed and if so, when and how many

Age of the child

Vaccines need to be given as early in life as possible so children are protected when at highest risk of complications from the diseases

Vaccines are recommended for the youngest age group at risk of experiencing the disease for whom the vaccine's efficacy and safety have been demonstrated

They must be avoided when there is potential interference with the immune response by passively transferred maternal antibody: MMR

Can we change the age at which a course is started, starting earlier or later than 8 weeks?

Can we start early? Yes, if necessary

- The first set of primary immunisations can be safely and effectively given from age 6 weeks if necessary e.g. for travel
- BUT giving primary vaccinations before 6 weeks of age is not recommended routinely as the immune response may be suboptimal
- MMR can be given from the age of 6 months to protect a child if there is an outbreak but this dose must be disregarded and further doses given at 12 months and 3 years 4 months

Can we start late? It is best not to as we want to protect the baby as soon as possible.

The effect of age

- Primary courses of **Hib, Men B, pneumococcus** – before the age of 1 year gives good early protection but not long term protection

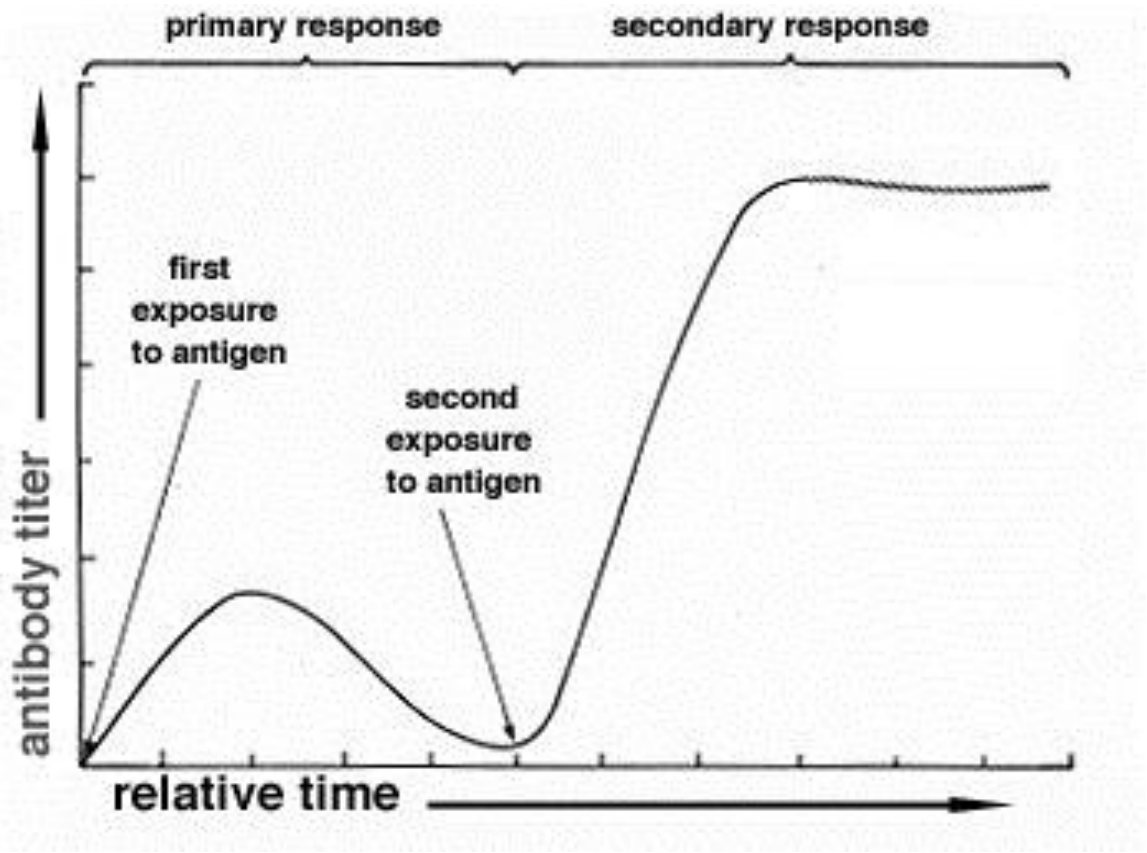
- For longer term protection a single dose only is required after the age of 1 year – no need to give the primary course if it was missed

- After the age of 2 years – **pneumococcus** and **Men B** no longer required – the risk of disease has diminished.

- After the age of 10 years – **haemophilus influenzae b and pertussis** no longer required.

Spacing between doses

Antibodies levels



Can we change the gap between the doses of a course?

Can we change the gap between the doses of a course?

- Dose 1 and dose 2 of the same inactivated vaccine – 4 weeks
- Dose 1 and dose 2 of the same live vaccine – 4 weeks

Can we change the gap between the doses of a course?

- Dose 1 and dose 2 of the same inactivated vaccine – 4 weeks
- Except pneumococcal vaccine (8 weeks) and Men B (8 weeks)
- Because the immunity from 2 doses 2 months apart is as good as the immunity from 3 doses each 1 month apart

Can we change the gap between the doses of a course?

- Dose 1 and dose 2 of the same live vaccine – 4 weeks

- Exception: MMR in children under 18 months – then leave 3 months. If child has the first dose over 18m – then can have a gap of 4 weeks

Can we change the gap between the doses of a course?

Shorter intervals?

Not recommended as this can result in a reduced immune response due to immune interference

BUT if you see an infant travelling before the next set of immunisations can be given, the interval can be reduced to 3 weeks

This dose counts as a valid dose and does not need to be repeated as long as no more than 1 dose is given early in a 3 dose schedule

Can we change the gap between the doses of a course?

Longer intervals?

Not ideal to have a bigger gap than recommended because that would delay protection

But if any course is interrupted, it should be resumed and completed as soon as possible.

It is not necessary to restart the course as immunological memory ensures response to subsequent doses is not impaired (even after an extended interval)

What about leaving gaps between different types of vaccines?

- No specific intervals need be observed between:
  - live and inactivated vaccines eg MMR and Hib/MenC
  - doses of different inactivated vaccines eg Hib/MenC and pneumococcal vaccines

- This means an inactivated vaccine can be administered either simultaneously or at any time before or after a different inactivated vaccine or live vaccine

Live and inactivated vaccines in the routine programme

OK = no specific time gap

First vaccine	Second vaccine	
Inactivated vaccine	Inactivated vaccine	OK
Inactivated vaccine	Live injectable vaccine	OK
Live injectable vaccine	Inactivated vaccine	OK

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.

Number of doses needed for a primary course and is a booster required?

Diphtheria, tetanus and polio

- Needs three doses as a primary course, at monthly intervals
- A booster 3 years later
- A second booster 10 years later
- Five doses are sufficient for life-long immunity

Pertussis

- 3 doses in primary course at monthly intervals
- A booster 3 years later
- Not needed after aged 10 years
- Except pregnant women

Haemophilus influenzae b

- 3 doses at monthly intervals
- Booster at 12 months
- If primary course missed then the single dose at a year suffices
- No more needed after aged 10 years

Pneumococcal vaccine

- 2 doses 2 months apart
- Booster at 12 months
- If primary course missed then the single dose at a year suffices
- No more needed after aged 2 years

Measles, mumps and rubella

- 2 doses needed
  - 3 months apart if the first dose is given under the age of 18 months
  - 4 weeks apart if the first dose is given at the age of 18 months or more

- Aim for the first dose to be at 12 months

Meningitis C

- Single dose needed at 12 months

- Single dose in early adolescence to give long term protection (if missed previous dose – do not need catch-up dose)

Meningitis B

- 2 doses 2 months apart under the age of 12 months
- Booster at 12 months
- Not needed over the age of 24 months

Men B

- If miss one or both infant doses, child under 2 years needs 2 doses a month apart

- Eligible if born on or after 1st July 2015

Compatibility and combinations

- Something that is determined in clinical trials

- Safe to give many vaccines simultaneously