National Immunisation Advisory Committee (NIAC) Immunisation Guidelines 2013					
Date	**Chapter**	**Page**	**Previous text**	**New or added text**	**Reason for change**
	2. General Immunisation Procedures	**7**		For health care workers born in Ireland since 1978 or born outside Ireland; and for adults from low resource countries, without evidence of two doses of MMR vaccine.	Clarification
		10	When vaccines are given intramuscularly to persons with bleeding disorders or on anticoagulants, it is prudent to use a 25-gauge needle and to apply gentle pressure to the vaccine site for 1-2 minutes after the injections.	When vaccines are given intramuscularly to persons with bleeding disorders or on anticoagulants, it is prudent to use a 23 gauge or finer needle and to apply gentle pressure to the vaccine site for 1-2 minutes after the injections. If using a 25 gauge needle, the vaccine should be injected into the muscle over 5 seconds to reduce the risk of tissue damage.	Consistency with US and Australian guidance
	3. Immunisation of Immunocompromised Persons	**14**		Inclusion of Down syndrome as indication for additional vaccines.	Those with Down syndrome have a degree of immunodeficiency. Explanation of abbreviations Reordered alphabetically
	4. Occupational Health	**2**	**Group 1: Health Care Workers** **BCG** • BCG is indicated for HCWs aged <35 who are unvaccinated and are TST or IGRA negative, who will have contact with T B patients or with clinically contaminated items. • Any HCW who has been in close contact with a case of smear-positive tuberculosis	**Group 1: Health Care Workers** **BCG** • BCG is indicated for unvaccccinated HCWs aged <35 years who are TST negative, who will have contact with TB patients or with clinically contaminated material. • Not all HCWs are at equal risk of TB. A risk assessment should be carried out to see if BCG is indicated for unvaccinated HCWs aged	Clarification.

			should be assessed by an occupational health or public health professional.	35 and older who are TST negative, taking into account their country of origin and the nature of their work. For more details see page 114 of Guidelines on the Prevention and Control of Tuberculosis in Ireland 2010. http://www.hpsc.ie/A-Z/VaccinePreventable/TuberculosisTB/Publications/File,4349,en.pdf	
		3	**Measles, Mumps, Rubella** Most health care workers born before 1978 are likely to have had infection. MMR vaccine should be offered to such individuals on request if they are considered at high risk of exposure. Health Care Workers born since 1978 in the following situations	**Measles, Mumps, Rubella** Most health care workers born in Ireland before 1978 are likely to have had infection. MMR vaccine should be offered to such individuals on request if they are considered at high risk of exposure. Health Care Workers born in Ireland since 1978 or born outside Ireland in the following situations	Clarification.
		5	**Group 4: Laboratory and Research Workers BCG** • BCG is indicated for laboratory workers aged <35 years who are unvaccinated and will have contact with contaminated items or TB isolates and are TST or IGRA negative.	**Group 4: Laboratory and Research Workers BCG** • BCG is indicated for unvaccinated laboratory workers aged <35 years who are TST negative, who will have contact with contaminated material or TB isolates. • Not all laboratory workers are at equal risk of TB. A risk assessment should be carried out to see if BCG should be given to those unvaccinated laboratory workers aged 35 and older, who are TST negative, taking into account their country of origin and the nature of their work. For more details see page 114 of the Guidelines on the Prevention and Control of Tuberculosis in Ireland 2010. http://www.hpsc.ie/A-Z/VaccinePreventable/TuberculosisTB/Publications/File	Clarification.

				,4349,en.pdf	
	12. Measles	**6**	**Indications** 3. Children and young adults of migrant or ethnic minority groups or coming from low resource countries are less likely to have been vaccinated with MMR. Without documented evidence of measles vaccination they should be offered two doses of MMR vaccine one month apart. 4. Health-Care Workers (HCWs) born since 1978 in the following situations should be vaccinated (see Chapter 4).	**Indications** 3. Children and adults of migrant or ethnic minority groups or coming from low resource countries are less likely to have been vaccinated with MMR. Without documented evidence of measles vaccination they should be offered two doses of MMR vaccine one month apart. 4. Health-Care Workers (HCWs) born in Ireland since 1978 or born outside Ireland in the following situations should be vaccinated (see Chapter 4).	For consistency with Rubella chapter.
	13. Meningococcal Infection	**10 onwards**	**See existing text below**	See new and changed text below.	Addition of MenB vaccine guidance. Those with Down syndrome have a degree of immunodeficiency. Clarification of meninigococcal vaccination history.
	14. Mumps	**4**	**Indications** 2. Children and young adults of migrant or ethnic minority groups or coming from low-resource countries are less likely to have been vaccinated with MMR. Without documented evidence of mumps vaccination they should be offered 2 doses of MMR vaccine one month. 3. Health-Care Workers (HCWs) born since 1978 in the following situations should be vaccinated (see Chapter 4).	**Indications** 2. Children and adults of migrant or ethnic minority groups or coming from low-resource countries are less likely to have been vaccinated with MMR. Without documented evidence of measles vaccination they should be offered two doses of MMR vaccine one month apart. 3. Health-Care Workers (HCWs) born in Ireland since 1978 or born outside Ireland in the following situations should be vaccinated	For consistency with Rubella chapter. Clarification.

				(see Chapter 4).	
	16. Pneumococcal infection	**8**	**Table 16.1 (see below)**	Inclusion of Down syndrome	Those with Down syndrome have a degree of immunodeficiency
	22. Tuberculosis	**6**	9. Health-care workers aged <35 who are unvaccinated and are TST or IGRA negative and who will have contact with patients or with clinically contaminated items. Different categories of HCW aged >35 years are at varying risk of TB (see Chapter 4).	9. Unvaccinated health-care workers aged <35 who are TST negative and who will have contact with patients or with clinically contaminated material. 10. Not all HCWs are at equal risk of TB. A risk assessment should be carried out to see if BCG should be given to unvaccinated HCWs aged 35 and older, who are TST negative, taking into account their country of origin and the nature of their work. For more details see page 114 of the Guidelines on the Prevention and Control of Tuberculosis in Ireland 2010. http://www.hpsc.ie/A-Z/VaccinePreventable/TuberculosisTB/Publications/File,4349,en.pdf	Clarification.
		7	8. Infants up to 6 months of age born to mothers who received immunomodulating drugs in the second and/or third trimesters of pregnancy. Immunomodulators include TNF-alpha inhibitors such as monoclonal antibodies (e.g. infliximab, etc) and fusion proteins (e.g.etanercept); calcineurin inhibitors (e.g. cyclosporin); cytotoxics (e.g. azathiaprin, methotrexate); and high-dose steroids. BCG should be deferred for 28 days in infants born to mothers using topical tacrolimus. 9. Breast fed infants whose mother is taking immunomodulating drugs should be	8. Infants up to 6 months of age born to mothers who received immunomodulating drugs in the second and/or third trimesters of pregnancy. Immunomodulators include TNF-alpha inhibitors such as monoclonal antibodies (e.g. infliximab, etc) and fusion proteins (e.g.etanercept); calcineurin inhibitors (e.g. cyclosporin), cytotoxics (e.g. azathiaprin, methotrexate) and mesalazine. BCG should be deferred for 28 days in infants born to mothers using topical tacrolimus. 9. Infants up to 3 months of age born to mothers who received high dose steroid	Consistency with Chapter 3 Page 7 Bullet point 6. Addition of mesalazine.

			assessed on a case by case basis (See Chapter 3). 10. Persons with blood dyscrasias, malignant neoplasms involving bone marrow or the lymphoreticular system, or with gamma globulin deficiency or abnormality. 11. HIV positivity. 12. Generalised infected dermatosis. 13. Pregnancy.	therapy for two weeks or more in the second and/or third trimester. 10. Breast fed infants whose mother is taking immunomodulating drugs should be assessed on a case by case basis (See Chapter 3). 11. Persons with blood dyscrasias, malignant neoplasms involving bone marrow or the lymphoreticular system, or with gamma globulin deficiency or abnormality. 12. HIV positivity. 13. Generalised infected dermatosis. 14. Pregnancy.	
	23. Varicella	**7**	No text	**Precautions** 5. Receipt of some antivirals (e.g.acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination.	
		7	**The following are NOT contraindications** 1. Pregnancy of recipient's mother or other close or household contact. 2. Immunodeficient family member or household contact.* 3. Treatment with low dose (less than 2 mg/kg/day) alternate-day, topical, replacement, or aerosolised steroid preparations. 4. Asymptomatic or mildly symptomatic HIV infection. 5. Humoral immunodeficiency (e.g. agammaglobulinaemia). 6. Breast feeding. * If a vaccinee experiences a presumed vaccine-related rash 7-25 days after vaccination, avoid direct contact with	**The following are NOT contraindications** 1. Pregnancy of recipient's mother or other close or household contact*. 2. Immunodeficient family member or household contact.* 3. Treatment with low dose (less than 2 mg/kg/day) alternate-day, topical, replacement, or aerosolised steroid preparations. 4. Asymptomatic or mildly symptomatic HIV infection. 5. Humoral immunodeficiency (e.g. agammaglobulinaemia). 6. Breast feeding. *If a vaccinee experiences a presumed vaccine-related rash 7-25 days after vaccination, avoid direct contact with	Inclusion of additional groups.

			immunocompromised persons for the duration of the rash, if possible. **Adverse reactions** A localised or generalised maculopapular or papulovesicular rash may develop. Transmission of vaccine virus can occur but the risk is very low and primarily occurs in the presence of a post-vaccination rash.	immunocompromised persons, non-immune pregnant women and their newborn in the first week of life and non-immune babies in Special Care Baby Units, for the duration of the rash, if possible. **Adverse reactions** A localised or generalised maculopapular or papulovesicular rash may develop. Transmission of vaccine virus can occur but the risk is very low and primarily occurs in the presence of a post-vaccination rash (see * above).	
		11	**Figure 23.3** Was the contact in the first two days of life? If no and infant is full term VZIG not indicated.	**Figure 23.3** Was the contact in the first seven days of life? If no and infant is full term VZIG not indicated.	Correction

Table 2.3 Catch-up schedule for children and adults

Vaccine	4 months to <12 months	12 months to < 4 years	4 to <10 years	10 to <18 years	18 years and older
BCG	1 dose	1 dose	1 dose	1 dose (up to15 years of age if in low risk group or up to 35 years of age if in specified high risk group)	1 dose (up to 35 years of age if in specified high risk group)
6 in 1 (DTaP/IPV/Hib/Hep B)	3 doses 2 months apart	3 doses 2 months apart	3 doses 2 months apart		
Men C	2 doses 2 months apart	1 dose	1 dose	1 dose	1 dose (up to 23 years of age)
PCV	2 doses 2 months apart	1 dose (omit if >2 years of age[2])			
MMR[3]		1 dose	2 doses 1 month apart	2 doses 1 month apart	2 doses 1 month apart[4]
Tdap/IPV				3 doses 1 month apart	1 dose[5]
Td/IPV					1 month after Tdap/IPV
NOTE	*Continue with routine childhood immunisation schedule from 12 months.*	*Continue with routine school immunisations [4 in 1 (DTaP/IPV) at least 6 months and preferably 3 years after primary course, MMR at least 1 month after previous dose]*	*Continue with routine school immunisations [4 in 1 (DTaP/IPV) at least 6 months and preferably 3 years after primary course]*	*Boosters of Tdap/IPV 5 years after primary course and Tdap 10 years later*	

[1]One dose of single Hib vaccine may be given to children over 12 months of age and up to 10 years of age if this is the only vaccine they require
[2] Unless at increased risk
[3] The second dose of MMR is recommended routinely at 4-5 years but may be administered earlier. Children vaccinated before their first birthday in the case of an outbreak should have a repeat MMR vaccination at 12 months of age, at least one month after the first vaccine with a further dose at 4-5 years of age. If a child aged <18 months receives a second MMR vaccine within 3 months of the first MMR a third MMR should be given at 4-5yrs of age.
[4] For health care workers born in Ireland since 1978 or born outside Ireland; and for adults from low resource countries, without evidence of two doses of MMR vaccine
[5] Only one dose of Tdap/IPV is required due to likely previous exposure to pertussis infection

Table 3.5 Vaccinations for children with primary immunodeficiency

Condition	Routine Inactivated Vaccines	Routine Live Vaccines	Additional Vaccines	Contraindicated vaccines
Ataxia Telangiectasia	Yes	No	Influenza	All live vaccines
Brutons agammaglobulinaemia (XLA -X linked agammlobulinaemia)[1]	Yes	Consider MMR	Consider varicella	BCG[2] Live typhoid vaccine Yellow fever
Chronic/cyclic neutropoenia	Yes	Yes	Influenza	None
Chronic granulomatous disease (CGD)	Yes	Yes except BCG	Influenza	BCG[2] Live typhoid vaccine
Chronic mucocutaneous candidiasis (APECED syndrome)	Yes	For some	Influenza	BCG[2] Live typhoid vaccine Yellow fever
Complement deficiency	Yes	Yes	Influenza, MenACWY 2 doses, PPV at ≥2 yrs, at least 2 months post 2 doses PCV	None
Common variable immunodeficiency (CVID) & other antibody deficiencies	Yes	For some	Influenza, PPV at ≥2 yrs, at least 2 months post PCV.	BCG[2] Live typhoid vaccine Yellow fever
DiGeorge syndrome (22q11 deletion)[3]	Yes	MMR if CD4 count > 400 x 10^6/L	Influenza	BCG[2] Live typhoid vaccine Yellow fever
Down syndrome	Yes	Yes	Influenza, MenACWY 2 doses, MenB 2 doses PPV at ≥2 yrs, at least 2 months post 2 doses PCV	None
Isolated IgA deficiency[1] **IgG subclass deficiency**[1]	Yes	Yes	Influenza Can receive varicella	BCG[2] Yellow fever
SCID[4]	Yes	No	No	All live vaccines
Wiskott Aldrich	Yes	No	Influenza	All live vaccines

[1] All vaccines are likely to be effective but immune response may be suboptimal
[2] Often have received BCG prior to diagnosis. Main groups at risk for BCG related complications include SCID, CGD and advanced HIV infection.
[3] Effectiveness depends on degree of immune suppression. Most children with DiGeorge syndrome have efficient immune systems
[4] Severe combined immunodeficiency syndrome

3. Meningococcal group B Vaccine (rDNA) (Bexsero) (MenB)

This is a recombinant multicomponent meningococcal B vaccine.It is indicated for active immunisation of individuals from 2 months of age and older against invasive meningococcal disease caused by *Neisseria meningitidis* group B. There are no data on its use in adults older than 50 years of age.

Table 13.2 Meningococcal B vaccination schedule by age

Age group	Primary Immunisation	Minimum Interval	Booster[2]
2 – <6 months	Three doses[1]	1 month	1 dose at 12 months of age
6 – <12 months	Two doses	2 months	1 dose over 12 months of age at least 2 months after the primary series
12 - <24 months	Two doses	2 months	1 dose 12 to 23 months after the primary series
2 – <11 years	Two doses	2 months	
11 years and older	Two doses	1 month	

[1] Minimum age of first dose 8 weeks

Dose and Administration

The dose of all meningococcal vaccines is 0.5 ml, given by intramuscular injection in the anterolateral thigh or the deltoid region.

Indications

1. Those aged 2-13 months

MenC vaccine is recommended as part of the primary immunisation schedule at 4 and 6 months with a booster at 13 months of age.

MenB vaccine is not included as part of the childhood immunisation schedule. Parents may choose to have their healthy children vaccinated.

2. Those aged 1 to < 23 years

MenC vaccine (1 dose) is recommended for all those who are unvaccinated.

3. ***Those aged 1 year and older at increased risk due to disease or treatment***

See Chapter 3.

Vaccination should be completed at least two weeks prior to starting treatment or transplant.

3.1 MenACWY vaccine is recommended for:

- Those with functional or anatomic asplenia or hyposplenism (including splenectomy, haemoglobinopathies, and coeliac disease)
- Those with Complement or properdin deficiency
- Those with Down syndrome
- Those with immunodeficiency due to disease or treatment (including Eculizumab (Soliris))
- ~~Transplant patients~~

• Haematopoietic Stem Cell Transplant (HSCT) recipients
• Solid organ transplant (SOT) candidates and recipients

The number of doses depends on the age at time of first administration of vaccine, the condition, whether at continued risk of infection, and brand of vaccine.

Functional or anatomic asplenia or hyposplenism
Children < 2 years of age should, in addition to all routine immunisations, receive MenACWY ≥2 months after the 13 months MenC dose.
Individuals >2 years at presentation, should receive two doses of MenACWY two months apart, regardless of meningococcal vaccination history.

Complement or properdin deficiency
Two doses of MenACWY are recommended two months apart regardless of meningococcal vaccination history.

Immunodeficiency due to disease such as HIV/AIDS or treatment
One dose of MenACWY is recommended for all patients.
Those who have received MenC, should be given one dose of MenACWY at least two months later.

Down syndrome
Two doses of MenACWY are recommended two months apart regardless of meningococcal vaccination history.

Patients on Eculizumab (Soliris)
Those who have received MenC, should be given one dose MenACWY at least two months later.
Those who have not received Men C vaccine should be given two doses of MenACWY two months apart.
Those who have previously received MenACWY polysaccharide vaccine should be given two doses of MenACWY at least 12 months later.

~~*Transplant patients*~~
Haematopoietic Stem Cell Transplant (HSCT) recipients
Three doses of conjugate MenACWY are recommended at two month intervals following bone marrow transplant with at least 2 months between doses (see Table 3.3 in Chapter 3).

Solid organ transplant (SOT) candidates and recipients
Pre-transplant- patients should ideally receive MenACWY at least 2 weeks pre-transplant.
Those who received MenACWY pre-transplant should be re-immunised no sooner than 6 months post transplant.
Those who did not receive MenACWY pre-transplant should be immunised post-transplant with three doses with at least 2 months between doses.
~~The need for booster doses has not yet been determined.~~

3.2 MenB vaccine is recommended for:
• Those with functional or anatomic asplenia or hyposplenism (including splenectomy, haemoglobinopathies, and coeliac disease)
• Those with complement or properdin deficiency
• Those with Down syndrome
• Those with immunodeficiency due to disease or treatment (including Eculizumab (Soliris))

• Haematopoietic Stem Cell Transplant (HSCT) recipients
• Solid organ transplant (SOT) candidates and recipients

(See Table 13.2 for number of doses)

4. Index cases

4.1 Serogroup C disease
MenC vaccine is recommended for index cases unless they have an increased risk of disease, in which case MenACWY may be indicated.

4.2 Serogroup A, W or Y disease
MenACWY vaccine is recommended for index cases to provide protection against all four groups, even though recurrent meningococcal infection is rare. See Table 13.1 for detail on vaccine and dose.
For an index case who received MenACWY vaccine more than 12 months previously a booster dose may be indicated (consult a relevant specialist).

5. Contacts of cases
Close contacts of cases of meningococcal infection have an increased risk of developing the disease in subsequent weeks and so should be given appropriate vaccination as below:
5.1 Serogroup C disease
MenC vaccine is recommended for all previously unimmunised close contacts (of all ages), in addition to chemoprophylaxis. Close contacts who are partially immunised should complete the course of vaccine.
Those who completed a course more than one year before should be offered a booster.

5.2 Serogroup A, W or Y disease
MenACWY vaccine is recommended for all previously unimmunised close contacts of any age, in addition to chemoprophylaxis. Depending on the age of the close contact one or two doses may be indicated (Table 13.1).
Those who received conjugate MenACWY vaccine more than 12 months previously may be considered for a booster dose if at ongoing risk of meningococcal infection.

5.3 Serogroup B disease
In addition to chemoprophylaxis, immunisation with ***MenB vaccine*** is recommended for all previously unimmunised close contacts of meningococcal B disease.

6. Cluster/outbreaks
Immunisation has been shown to be effective in controlling outbreaks in institutions (e.g. schools) and communities, reducing the incidence of infection.
6.1 Serogroup C disease
In the event of a cluster/outbreak of serogroup C disease, ***MenC vaccine*** is recommended for all unimmunised or partially immunised close contacts. Close contacts of any age who were only immunised in infancy and those who completed the recommended immunisation course (including the 13 month booster) more than one year previously should be offered an extra dose of MenC vaccine.

6.2 Serogroup A, W and Y disease

In the event of a cluster/outbreak of serogroup *A, W or Y* disease ***MenACWY vaccine*** is recommended for all close contacts that have not been immunised with a conjugate MenACWY vaccine. Depending on the age of the close contact one or two doses are indicated (Table 13.1).

There is currently no information on the need for booster doses for anyone who received conjugate MenACWY vaccine more than 12 months previously.

6.2 Serogroup B disease
Immunisation with ***MenB vaccine*** may be considered to control clusters or outbreaks of meningococcal B disease.

7. Travel (refer to Chapter 5 for further details)
MenACWY vaccine is indicated for immunisation of individuals travelling to high risk areas where epidemics or hyperendemic disease with serogroup A, C, W or Y infection occur. At present these areas include sub-Saharan Africa and the Kingdom of Saudi Arabia (for the latter, MenACWY vaccination is a visa entry requirement).

For those 2-<12 months of age: give a dose of Menveo instead of MenC if the timing coincides with the normal Men C vaccination. If two MenC vaccine doses have already been administered, give one dose of Menveo vaccine at least 4 weeks after MenC and a booster dose one month later.

For those > 12 months: only one dose of either Menveo or Nimenrix is recommended.

For those in a medically at risk group who have had one dose of conjugate MenACWY an additional dose is recommended if travelling to a high-risk area, at least 4 weeks (preferably 8 weeks) after the first dose.

From time to time, meningococcal disease outbreaks occur in various parts of the world. When such outbreaks are due to vaccine-preventable strains, vaccination may be recommended for some travellers to the affected areas. The advice of an appropriate Specialist in Public Health Medicine or Infectious diseases should be sought.
Note: Visa entry requirements should be checked in good time prior to travel to individual countries.

Booster doses
MenC vaccine
A booster dose is routinely recommended at 13 months of age for children vaccinated in the first year of life.
Conjugate MenACWY vaccine
A booster dose is recommended for children vaccinated in the first year of life who are at continued risk of infection. For vaccinated individuals at increased risk of meningococcal disease due to asplenia or splenic dysfunction, complement or properdin deficiency or other immunodeficiency, a booster is recommended. A booster dose is recommended for travel in individuals previously vaccinated with polysaccharide MenACWY vaccine
See Table 13.1
MenB vaccine
The need for further booster doses has not yet been determined.

Contraindications
Anaphylaxis to any of the vaccine constituents.

Precautions
Acute severe febrile illness, defer until recovery.

Pregnancy and breastfeeding: Meningococcal vaccines may be given to pregnant or breastfeeding women when indicated.
The potential risk of vaccination with MenB vaccine in pregnancy is unknown. Vaccination should be considered where there is a risk of exposure to meningococcal infection.
Although insufficient clinical data on the use of MenB vaccine during breast-feeding are available, it is unlikely that secreted antibodies in milk are harmful when ingested by a breastfed infant. Therefore, MenB vaccine may be used during breast feeding.

The tip cap of the MenB syringe may contain natural rubber latex. Although the risk for developing allergic reactions is very small, healthcare professionals should consider the benefit-risk prior to administering this vaccine to subjects with known history of hypersensitivity to latex.

Co-administration with other vaccines
Due to an increased risk of fever, local reactions, change in eating habits and irritability when MenB vaccine is co-administered with other vaccines it may be preferable to administer this vaccine with an interval of 1 week before or after other vaccines.

Adverse reactions
MenC vaccine
Local: Pain, erythema, induration, pruritus, and swelling
General: Headache, nausea, rash and malaise. Infants and younger children may develop irritability, reduced feeding and sleep disturbance.

MenACWY vaccine
Local: Very common or commonly reported reactions include injection site reactions, pain and erythema.

General: Very common or common reactions include headache, and nausea.
Infants and younger children may develop irritability, reduced feeding and sleep disturbance.

Men B vaccine
Local: Tenderness, pain, swelling, hardness and redness at the injection site are very common.

General: Children up to 10 years of age: fever*, loss of appetite, sleepiness, unusual crying, diarrhoea, vomiting, rash and irritability are very common.
Adolescents and adults: headache, nausea and malaise, myalgia and arthralgia.

* Prophylactic use of paracetamol at the time of or closely after vaccination may reduce the incidence and severity of significant fever in children under 2 years of age and may be considered in this age group.

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Table 16.1 Clinical Risk Groups who require pneumococcal vaccination

Group A Those at highest risk	**Group B** Children at lesser risk (risk still greater than general population),	**Group C** Adults at lesser risk (risk still greater than general population),
• Functional or anatomic asplenia (including splenectomy, sickle cell disease, haemoglobinopathies, and coeliac disease)[1]. • Complement deficiency (particularly C1-C4). • Immunosuppressive conditions (e.g. some B- and T-cell disorders, HIV infection, leukaemia, lymphoma, Hodgkin's disease) and those receiving immunosuppressive therapies[2]. Ideally give prior to starting treatment • CSF leaks (congenital or complicating skull fracture or neurosurgery). • Intracranial shunt • Candidates for, or recipients of, a cochlear implant. • Post allogeneic bone marrow transplant • Solid organ transplant – ideally pre transplant	• Chronic renal disease or nephritic syndrome • Chronic heart, lung, or liver disease, including cirrhosis. • Diabetes mellitus requiring insulin or oral hypoglycaemic drugs. • Down syndrome • Under 5 years of age following invasive pneumococcal disease	• Chronic renal disease or nephritic syndrome • Chronic heart, lung, or liver disease, including cirrhosis. • Diabetes mellitus requiring insulin or oral hypoglycaemic drugs. • Smokers and alcoholics • Individuals with occupational risk due to exposure to metal fumes (i.e. welders)

[1] require 2 doses of PCV 2 months apart

[2] individuals with primary immunodeficiency may have a suboptimal response to all vaccines. Pneumococcal vaccines are unlikely to be immunogenic in children with certain primary immune deficiencies involving significant B cell compromise who are receiving regular IVIG replacement therapy. However vaccination should be given as it may have some benefit.