

13

Meningococcal Infection

Group C vaccine introduced 2000

Group B vaccine introduced 2016

Group MenACWY introduced 2019

NOTIFIABLE

In some circumstances, advice in these guidelines may differ from that in the product Summary of Product Characteristics (SmPC). When this occurs, NIAC advises that the recommendations in these guidelines, which are based on current expert advice from NIAC, are followed.

13.1 Introduction

Meningococcal infections are caused by *Neisseria meningitidis* and range from asymptomatic colonisation to serious invasive disease including septicaemia, meningitis, septic arthritis and endophthalmitis. Meningococci are Gram-negative diplococci. They are divided into 12 antigenically distinct serogroups (A, B, C, E H, I, K, L, W (formerly W135), X, Y, and Z). Most disease-associated strains belong to serogroups A, B, C, W and Y. In Ireland serogroup B and C strains accounted for over 99% of all meningococcal disease prior to the introduction of serogroup C conjugate vaccine in 2000.

The significance of the meningococcus as a pathogen lies in the potential severity of the illness, the absence of effective vaccines against all meningococcal serogroups, the unique ability of the organism to cause outbreaks or epidemics, and the public anxiety that may follow a case or outbreak. In Ireland most cases of meningococcal infection are sporadic.

13.2 Epidemiology

N. meningitidis is a human-only pathogen transmitted by respiratory droplets or by direct mucosal contact with the respiratory secretions of a carrier. Approximately 10% of the population are asymptomatic nasal or rarely throat carriers, and most develop immunity. Carriage is uncommon in infancy and early childhood; peak carriage rates (up to 25%) occur in the 15-19 year age group.

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A small minority of individuals develop invasive disease after an incubation period of 3-4 days (range 1-10 days). Factors that increase the risk of invasive infection include young age (incidence is highest in infants, followed by children < 5 years of age), active or passive smoking, a preceding respiratory tract infection (particularly influenza A), and living in closed or semi-closed communities such as military barracks or halls of residence, often in the setting of dormitory accommodation.

Meningococcal disease occurs in all countries. The infection is endemic in Northern Europe, with a background incidence of 2-3 culture confirmed cases per 100,000 per annum in the pre vaccine era. Periodic upsurges in meningococcal activity occur and can result in a hyperendemic disease state. These upsurges are usually associated with the introduction of novel subtypes and/or hypervirulent strains into the community.

Epidemic disease is characterised by an increased case-attack rate and altered age distribution, with increased case numbers in adolescents and adults. Examples include large epidemics, involving serogroup A or W strains, in sub-Saharan Africa and in association with the annual pilgrimage (Hajj) to Mecca.

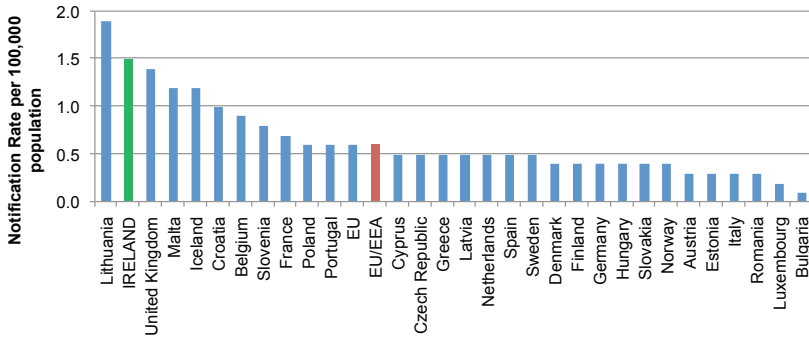
The highest burden of disease, due mainly to serogroup A or W, is in the 'meningitis belt' of sub-Saharan Africa, with attack rates of up to 1/100 and reported mortality rates up to 40%. Epidemic disease with serogroup B strains has also occurred in Norway in the 1970s and in New Zealand from 1991 to 2006.

Certain medical conditions and treatments (see page 13) result in an increased risk of invasive and/or recurrent meningococcal disease. Those with C3 defects are at risk of severe infection with any meningococcal strain. Meningococcal disease in those with C5-C8 deficiencies is almost always caused by serogroup W, Y or E, and is typically recurrent.

In Ireland most meningococcal infections occur in winter and early spring. Meningococcal disease may occur at any age but sporadic infection is most common in infancy and early childhood, with a second smaller peak of incidence in adolescents and young adults.

Figure 13.1 Notification rates of invasive meningococcal disease in Europe based on confirmed cases in the EU/EEA, 2011- 2015.

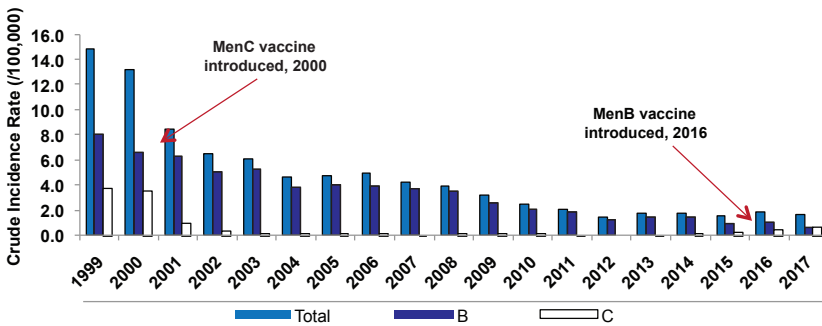
Source: HPSC



Ireland has one of the highest notification rates of confirmed invasive meningococcal disease (IMD) in Europe (Figure 13.1). Prior to the introduction of the meningococcal C conjugate (MenC) vaccine, Group C strains were a major cause of meningococcal outbreaks in Ireland. Between 1999 and 2012, the incidence of invasive meningococcal disease (IMD) fell steadily, from 14.8/100,000 in 1999 to 1.4/100,000 in 2012 (Figure.13.2).

Figure 13.2. Crude incidence rate of IMD in Ireland, 1999-2017.

Source: HPSC

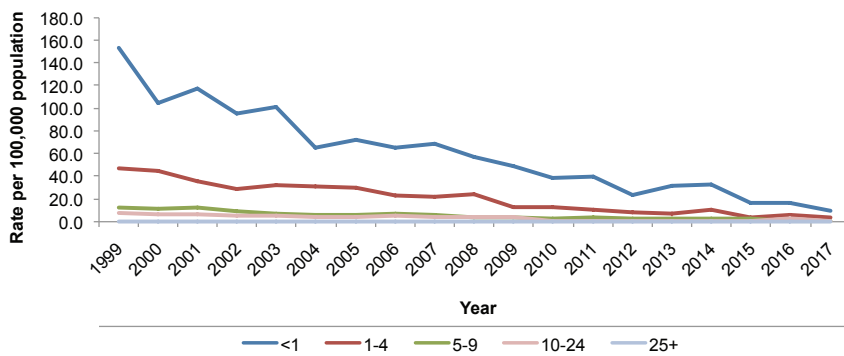


The highest age specific incidence of meningococcal disease is in infants followed by children < 5 years of age, (Figure 13.3).

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Figure 13.3. Age specific incidence rate of invasive Meningococcal B disease in Ireland, 1999-2017.

Source: HPSC

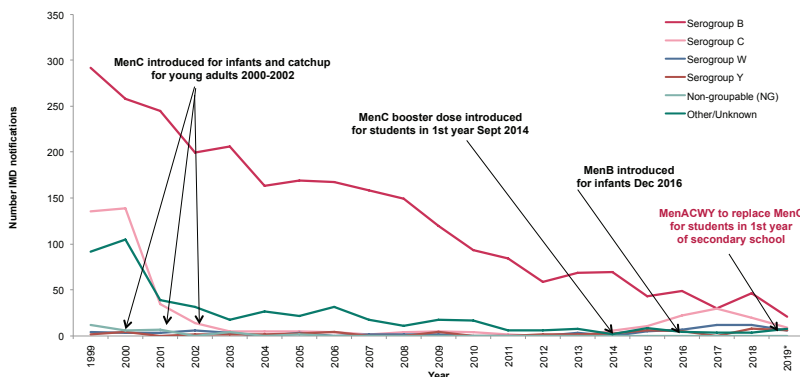


Since the introduction of MenC vaccine in 2000, the numbers of cases of MenC and MenB decreased significantly. From 2014 the number of MenC cases increased up to 30 cases in 2017 and decreased to 20 cases in 2018.

Since 2015 an emergence of serogroups W and Y has occurred. Prior to 2015 the annual number of cases of both serogroups (between 1999 and 2014) was two per year. Between 2015 and 2018, a total of 36 serogroup W and 20 serogroup Y cases were reported, giving an average annual notification rate of 9 cases per year of serogroup W and 5 cases per year of serogroup Y (Figure 13.4).

Figure 13.4. Meningococcal notifications, by serogroup and year, 1999-2019 and introduction of meningococcal vaccination programmes

Source: HPSC



* to June 2019

13.3 Clinical Manifestations

The onset of disease may be fulminant, with abrupt onset of fever, a rapidly progressing purpuric rash, prostration, shock and death; or it may be insidious, with a mild upper respiratory prodrome for 2 or 3 days duration. In an infant or young child the common early symptoms (reluctance to feed, fever and irritability) are non-specific and difficult to differentiate from other minor infections. Although a non-blanching petechial or purpuric rash is characteristic of meningococcal infection, early manifestations can include a non-specific erythematous maculopapular blanching rash without petechiae.

Most children admitted to hospital have non-specific symptoms in the first 4-6 hours. Early symptoms of sepsis (leg pains, cold hands and feet, abnormal skin colour) present at a median time of 8 hours. The classic features of haemorrhagic rash, meningism and impaired consciousness develop later (median onset 8-10 hours in young children, 13-22 hours in older children). The signs and symptoms of meningococcal meningitis are indistinguishable from those of bacterial meningitis caused by other pathogens, with the exception of the rash which is present in some 40% of patients.

Mortality rates are from 5 to 15%, with 10-15% suffering permanent disability. Mortality rates are higher in individuals with septicaemia than in those with meningitis alone. Complications in survivors include skin scarring, digit and/or limb amputation, seizures, hearing loss, intellectual deficits and chronic renal failure.

13.4 Meningococcal vaccines

Authorised conjugate meningococcal vaccines are:

- Meningococcal B vaccines (MenB)
- Meningococcal C vaccines (MenC, Hib/MenC)
- Meningococcal ACWY vaccines (MenACWY)

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.

Co-administration with other vaccines

All meningococcal vaccines can be given at the same time as other live and non-live vaccines. MenB vaccine should be given in a separate limb.

All meningococcal vaccines should be stored at +2 to +8°C.

An up-to-date list of authorised vaccines and SmPCs can be accessed on the HPRA website at www.hpra.ie

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A list of the vaccines currently available from the National Cold Chain Service can be found at www.immunisation.ie

13.5 Recommendations

13.5.1 Bexsero®:

Primary and booster vaccination

The course consists of 3 doses, at 2, 4 and 12 months of age.

Catch up vaccination

For details see Table 13.1.

Although there are no data on its use in adults older than 50 years of age, it is recommended for at-risk persons aged over 50 years (see Chapter 3).

Table 13.1 Bexsero® vaccine catch up schedule

Age at Initiation	No. of doses	Timing
3 to <10 months*	3	2 doses 2 months apart 3rd dose at ≥12 months >2 months after dose 2
10 months - < 2 years	2	2 months apart
2 years and older	2	1 month apart

*Bexsero® given at age 2 and 4 months (or up to 12 months) should be given with paracetamol, and in a different limb from the other childhood vaccines

Prophylactic use of liquid infant paracetamol with MenB vaccine

There is a high incidence of fever $>39^{\circ}\text{C}$ when MenB vaccine is given with other childhood vaccines to infants aged <12 months of age. Prophylactic use of paracetamol is recommended when Men B vaccine is given at 2 or 4 months as part of the primary childhood immunisation schedule. Paracetamol reduces the incidence and degree of fever in these infants by up to 50%.

Infants should be given three doses of liquid infant paracetamol 4-6 hours apart after MenB vaccine at 2 and 4 months (Table 13.2). The first dose (2.5 ml / 60 mg) is recommended at, or just after, the vaccine is given. If a fever $>39^{\circ}\text{C}$ persists a fourth dose (2.5 ml / 60 mg) may be given 4-6 hours after the third dose.

Prophylactic paracetamol is only recommended when MenB vaccine is administered under 12 months of age and concurrently with other parenteral vaccines.

Table 13.2 Liquid infant paracetamol use for MenB vaccine

Liquid Infant Paracetamol (120mgs/5ml)		2 month visit	4 month visit
Dose 1	2.5mls (60mg)*	At the time of injection	At the time of injection
Dose 2	2.5mls (60mg)*	4-6 hours after dose 1	4-6 hours after dose 1
Dose 3	2.5mls (60mg)*	4-6 hours after dose 2	4-6 hours after dose 2

*A child weighing less than 3.5kg at the 6-week check should be reweighed at the time of vaccination. A child weighing less than 4kg should be given paracetamol, 15 mg /kg.

13.5.2 Trumenba®

There are no data on the use of Trumenba® in individuals aged <10 or > 55 years, but it may be given to at-risk persons aged > 55.

The primary series (10 years and older) consists of either 2 doses (0.5 ml each) at 0 and 6 months, or 3 doses (0.5 ml each) at 0, 1 and 6 months.

The 3-dose series is intended for those who require rapid induction of immunity to serogroup B meningococci (e.g. some international travellers).

A booster dose should be considered in individuals at continued risk of exposure to meningococcal disease.

13.5.3 Vaccination of those at increased risk of meningococcal infection because of a medical condition or treatment

See 13.9.8 and Chapter 3.

13.5.4 Occupational exposure

Laboratory personnel potentially exposed to *N. meningitidis* should receive two doses of MenB vaccine 1 month apart, in addition to MenACWY vaccine. (see Chapter 4).

13.5.5 Index cases

MenB vaccine is recommended for index cases of any age who have not previously received Men B vaccine. If the index case is in an at-risk group,

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MenACWY vaccine may be indicated (see Section 4 and Chapter 3).

13.5.6 *Contacts of cases*

In addition to chemoprophylaxis, immunisation with **MenB vaccine** is recommended for all previously unimmunised household-type contacts of cases of meningococcal B disease. Close contacts who are partially immunised should complete the vaccination course. If the contact is in an at-risk group, MenACWY vaccine may be indicated (see Section 4 and Chapter 3).

HCWs exposed to confirmed cases of non-B meningococcal disease do not require vaccine immunoprophylaxis.

13.5.7 *Clusters/Outbreaks*

MenB vaccine may be used to control clusters or outbreaks of meningococcal B disease.

Contraindications

Anaphylaxis to any of the vaccine constituents, including latex.

The Bexsero[®] syringe tip-cap may contain natural rubber latex; those with non- anaphylactic latex allergies may be given Bexsero[®].

Precautions

Acute severe febrile illness, defer until recovery.

Pregnancy and breastfeeding:

MenB vaccines may be given to pregnant or breastfeeding women.

Adverse reactions

A full list of adverse reactions may be found in the Summary of Product characteristics (SmPC). The following are common or very common adverse reactions:

Local: Injection site pain, swelling, hardness, erythema

General: fever, loss of appetite, sleepiness, unusual crying, diarrhoea, vomiting, rash, irritability, myalgia and arthralgia.

No significant safety concerns emerged after use of *Bexsero*[®] in approximately 1.3 million UK infants.

13.6 Meningococcal C conjugate vaccines (MenC)

Menitorix[®] (Hib/MenC) contains Hib and MenC polysaccharides conjugated to tetanus toxoid.

Menjugate[®] and **Meningitec**[®] contain meningococcal C oligosaccharide conjugated to CRM-197 protein.

NeisVacC[®] contains meningococcal C polysaccharide conjugated to tetanus toxoid. As Meningitec[®] is less immunogenic, the other vaccines are preferred.

Menjugate[®], Meningitec[®] and NeisVacC[®], are interchangeable.

13.7 Recommendations

13.7.1 Primary vaccination

The primary schedule consists of 1 dose at 6 months of age.

13.7.2 Booster vaccination

Vaccination is recommended at 13 months (as *Hib/MenC*) and 12-13 years of age (as MenACWY vaccine)

13.7.3 Catch up

Unvaccinated children and adults up to 23 years of age should be vaccinated (see Table 13.3). If the individual is in an at-risk group, MenB and MenACWY vaccines may be indicated (see Section 4 and Chapter 3).

Table 13.3. Meningococcal C vaccine catch up schedule

Schedule	Age at Initiation	No. of doses to complete immunisation	Timing
Catch up	7 to <12 months	2-3 ¹	2 doses ≥2 months apart 2 nd dose at ≥13 months 3 rd dose at 12-13 years
	1 year to <23 years	1-2	Doses ≥1 month apart

¹Number of doses depends on previous vaccine history

13.7.4 Vaccination of those at increased risk because of a medical condition or treatment

See Section 4 and Chapter 3 for further details.

13.7.5 Index cases

Unimmunised or partly immunised index cases should complete the recommended vaccine schedule.

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Those who completed a course more than 12 months before exposure should be offered a booster dose of **MenC vaccine**.

If the index case is in an at-risk group, MenB and MenACWY vaccines may be indicated (see Section 4 of this chapter and Chapter 3).

13.7.6 Contacts of cases

MenC vaccine is recommended for all previously unimmunised household-type close contacts of MenC cases from 6 weeks of age in addition to chemoprophylaxis. Close contacts who are partially immunised should complete the vaccination course.

Those who completed a course more than 12 months before exposure should be offered a booster dose of **MenC vaccine**.

13.7.7 Cluster/Outbreaks

Immunisation with **MenC vaccine** may be used to control clusters or outbreaks of meningococcal C disease.

Contraindications

Anaphylaxis to any of the vaccine constituents.

Precautions

Acute severe febrile illness, defer until recovery.

Latex allergy: None of the four MenC vaccine syringes or needle caps contain latex.

Pregnancy and breastfeeding:

MenC vaccines may be given to pregnant or breastfeeding women.

Adverse reactions

A full list of adverse reactions may be found in the Summary of Product characteristics (SmPC). The following are common or very common adverse reactions.

Local: injection site pain, induration, erythema, and swelling.

General: irritability, reduced feeding, and sleep disturbance. Headache, nausea, rash, myalgia, arthralgia and malaise are common in children and adults.

13.8 Meningococcal ACWY vaccine (MenACWY)

Two conjugate MenACWY vaccines containing group A, C, W and Y capsular oligo- or polysaccharides are available. They are conjugated to CRM197 (**Menveo**[®]) or tetanus toxoid (**Nimenrix**[®]). One to three doses are recommended (see Table 13.4).

Licensed indications

Menveo[®]: immunisation of children from 2 years of age and adults at risk of exposure to *N. meningitidis* groups A, C, W and Y, to prevent invasive disease. One dose is recommended (see Table 13.4).

Nimenrix[®]: immunisation of children from 6 weeks of age and adults against invasive meningococcal diseases caused by *N. meningitidis* group A, C, W and Y. One to 3 doses are recommended (see Table 13.4 for schedule)

In the event that one brand is unavailable, the other vaccine may be used (see Table 13.4)

Table 13.4 Meningococcal ACWY vaccine schedule

Age	Vaccine	
	Menveo [®]	Nimenrix [®]
6 weeks to <12 months ^{1,2}	Not licensed for this age group	2 doses, 2 months apart, and booster age ≥12 months, at least 2 months after 2 nd dose
1 to <2 years		1 dose
≥2 years	1 dose	1 dose

¹ In the event that Nimenrix[®] is not available, Menveo[®] may be used from 6 weeks of age (schedule as for Nimenrix[®]).

² If MenACWY vaccine is indicated it can replace routine MenC vaccine. If MenC vaccine has been given, leave at least a 2 month interval before giving MenACWY vaccine

Immunocompromised persons may need additional doses to achieve adequate protection. For details see Chapter 3.

Polysaccharide meningococcal ACWY vaccines produce a lower and shorter-lasting immune response than conjugate meningococcal vaccines, and are no longer recommended for persons who are immunocompromised. Those who received a polysaccharide vaccine should receive a dose of a conjugate meningococcal vaccine, if continued protection is required (e.g. travel or at risk condition).

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13.9 Recommendations

13.9.1 Booster vaccination

Aged 12-13 years, as part of the adolescent booster programme. Either **MenACWY vaccine** can be administered at the same time as HPV and Tdap vaccines.

13.9.2 *Those at increased risk because of a medical condition or treatment*

See Section 4 of this chapter, and Chapter 3.

13.9.3 *Index cases*

MenACWY vaccine is recommended for index cases with A, W or Y disease, even though recurrent meningococcal infection is rare. For an index case who received MenACWY vaccine more than 12 months previously a booster dose may be indicated (consult with a relevant specialist).

13.9.4 *Contacts of cases*

MenACWY vaccine is recommended for unvaccinated close household-type contacts of a case of A, W or Y disease, in addition to chemoprophylaxis. Depending on the age of the contact one to three doses are indicated (Table 13.4).

13.9.5 *Clusters/Outbreaks*

Immunisation with **MenACWY vaccine** may be considered to control clusters or outbreaks of meningococcal A, W or Y disease.

13.9.6 *Occupational exposure (see Chapter 4 for more details)*

Laboratory personnel potentially exposed to *N. meningitidis* require one dose of **MenACWY vaccine**.

13.9.7 *Travel (see Chapter 5 for more details)*

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

Booster doses

A child who has had MenACWY vaccine at 10 years or older does not need an adolescent booster because adequate levels of antibody should persist until adulthood.

There is currently no information on the need for booster doses for those who received conjugate MenACWY vaccine more than 12 months previously, other than for those at high risk (see section 4 and Table 13.5).

Contraindications

Anaphylaxis to any of the vaccine constituents.

Precautions

Acute severe febrile illness, defer until recovery.

Latex allergy:

Neither the tip cap nor the rubber plunger of the syringes of *Menveo*[®] or *Nimenrix*[®] contain latex.

Pregnancy and breast feeding

MenACWY vaccines may be given to pregnant or breastfeeding women.

Adverse reactions

A full list of adverse reactions may be found in the Summary of Product Characteristics (SmPC) and are accessible through the HPRAs website at www.hpra.ie

The following are common or very common adverse reactions.

Menveo[®]:

Local: injection site pain, erythema, induration and pruritus.

General: headache, nausea, rash and malaise.

Nimenrix[®]

Local: injection site pain, erythema, and swelling.

General: irritability, drowsiness, headache, nausea, and loss of appetite.

13.9.8 Vaccination of those at increased risk of meningococcal infection because of a medical condition or treatment (see Chapter 3 for more details)

Persons with the following medical conditions are at increased risk of meningococcal infection and require **MenACWY and MenB vaccines**:

- Asplenia or hyposplenia (including haemoglobinopathies and coeliac disease)
- Defects in or deficiency of complement components, including factor H, factor D and properdin
- Haematopoietic Stem Cell Transplant recipients (HSCT)
- HIV positive
- Immunodeficiency due to disease or treatment (particularly Eculizumab (Soliris))

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The number of doses depends on age, clinical condition and whether or not person is at ongoing risk of infection. A booster dose on MenB may be considered for those at continuing risk of MenB infection.

Vaccination should ideally be completed at least 2 weeks before splenectomy, transplant or commencement of immunosuppressant treatment.

Table 13.5. Recommended meningococcal vaccines for those at increased risk¹

Age at diagnosis of risk status	Vaccine	Primary course	Interval between doses ²	Booster
2 – <12 months	Men ACWY ³ (Nimenrix [®])	2 doses	2 months	Age ≥12months, at least 2 months after last dose, then every 5 years
	Men B ⁴ (Bexsero [®])	2 doses (1 dose if aged 10-<12 months)	2 months	Age ≥12months, at least 2 months after last dose
12-<24 months	Men ACWY ³ (Nimenrix [®])	2 doses	2 months	Every 5 years
	MenB (Bexsero [®])	2 doses	2 months	May be considered
2 – <10 years	Men ACWY ⁵ (Nimenrix [®] or Menveo [®])	2 doses	2 months	Every 5 years
	Men B (Bexsero [®])	2 doses	1 month	May be considered
10 – <55 years	Men ACWY ⁵ (Nimenrix [®] or Menveo [®])	2 doses	2 months	Every 5 years
	Men B (Bexsero [®] or Trumenba [®]) ⁵	2 doses	1 or 6 months	May be considered
≥55 years	Although data are limited both MenACWY and MenB vaccines may be considered			

¹ Those post HSCT require an additional dose of MenACWY vaccine (see Chapter 3)

² If accelerated immunisation is needed an interval of 4 weeks may be used.

³ MenACWY vaccines can replace routine MenC. If MenC has been received, defer MenACWY for at least 2 months.

⁴ Only if not previously received.

⁵ The same vaccine brand should be used to complete a course.

National guidance on the management of meningococcal infection can be accessed on the HPSC website at www.hpsc.ie.

13.10 Management of suspected cases, contacts, carriers and in outbreaks

13.10.1 Initial management of suspected cases

Primary care

In view of the often rapid progression and high mortality rate of meningococcal disease, immediate transfer to hospital should be arranged. Early treatment of suspected cases with penicillin (unless contraindicated) may be life-saving; this should not delay transfer.

Recommended initial dose of Benzyl penicillin

Children <1 year	300 mg
Children 1-9 years	600 mg
Adults and children >10 years	1,200 mg

This should be given intravenously. It can be given IM, but is not as effective in shocked patients.

Hospital care

Each acute hospital should have readily available guidelines in place for the management of suspected invasive meningococcal disease.

Advice should be sought from the local Department of Public Health for management of contacts and suspected outbreaks.

13.10.2 Chemoprophylaxis

Close contacts of all individuals with invasive meningococcal disease are at increased risk of developing infection. This risk is highest in the first 7 days following onset of symptoms in the index case, and decreases during the following weeks. If prophylaxis is not given, the absolute risk to an individual in the same household in the 30 days after an index case becomes ill is about one in 300.

The aim of chemoprophylaxis is to eliminate carriage, and thus reduce spread of the organism. Chemoprophylaxis should be given as soon as possible after notification of the index case, preferably within 24 hours of diagnosis. It can be given up to 1 month later if a contact is not immediately identified or traced. Contacts, even if previously vaccinated with a meningococcal vaccine, should also be given chemoprophylaxis, as vaccine failure or waning antibody levels could render them susceptible to infection.

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The following should be given chemoprophylaxis:

- The index case, unless treated with ceftriaxone. Chemoprophylaxis should be commenced before discharge from hospital.
- Those who, in 7 days prior to the onset of illness of the index case:
 - shared living or sleeping accommodation with the index case; this includes child-minders and baby-sitters
 - had mouth-kissing contact with the index case
 - were in the same nursery/crèche as the index case, where the nature of contact is similar to that of household contacts. This includes adult carers.
- Health care workers (HCWs) whose mouth or nose is directly exposed to large particle droplets/secretions from the respiratory tract of a probable or confirmed case of meningococcal disease during acute illness until the case has completed 24 hours of systemic antibiotics. Such exposure only occurs among staff not wearing a mask or other mechanical protection while working close to the face of an index case. Close facial contact with droplets/ secretions is unlikely to occur unless suctioning an airway, inserting an airway, intubating, or if the patient coughs into a carer's face.
- Educational establishments: When two or more cases are reported from the educational setting, public health should undertake a careful and rapid assessment of the apparent cluster.

HCWs should wear face-masks (surgical or shield as appropriate) when in contact with an infectious case prior to and for 24 hours after antibiotic treatment is started.

- Special consideration is required when an index case has attended a house party for four or more hours in the preceding 7 days, especially if pre- school children were present. If chemoprophylaxis is appropriate it should be given to all attendees, both adults and children.
- Special consideration is also required when greater than usual interaction occurs between members of an extended family and an index case, particularly where overcrowding or adverse environmental living conditions exist.

The following *do not* require chemoprophylaxis:

- Health care workers (HCWs) not directly exposed to large particle droplets/secretions from the respiratory tract of a case within the period of infectivity.
- Classmates of an index case *unless* a number of cases occur during the same term.
- Those who shared the same transport vehicle (e.g. plane, boat, bus, and car)

13.11 Prophylactic antibiotics

All close contacts should be advised that infection can occur even if prophylaxis is given; the antibiotic may not be effective if the contact is incubating disease, or the contact may become recolonised and then develop the disease. Contacts should be advised to seek medical advice if concerned.

Rifampicin or ciprofloxacin can be used in most circumstances, unless contraindicated. Recipients should be informed about possible adverse reactions. Ceftriaxone and azithromycin are alternate antibiotics for chemoprophylaxis.

Rifampicin

Dose

Children 0-<12 months	5 mg/kg 12 hourly for 2 days
Children 1-12 years	10 mg/kg 12 hourly for 2 days
All over 12 years	600 mg 12 hourly for 2 days

Ciprofloxacin

Dose

Children <5 years	Single oral dose of 30mg/kg up to max of 125mg
Children 5-12 years	Single oral dose of 250mg
All over 12 years	Single oral dose of 500mg

Ciprofloxacin is the preferred chemoprophylaxis agent for

- women on the contraceptive pill (rifampicin may interfere with efficacy)
- women who are pregnant

For more details see Guidelines for the Early Clinical and Public Health Management of Bacterial Meningitis (including Meningococcal Disease) available at

<http://www.hpsc.ie/a-z/vaccinepreventable/bacterialmeningitis/guidance/File,12977,en.pdf>

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