

Misconceptions around Invasive Meningococcal Disease and Meningococcal Vaccines

Jenny O'Connor¹, Julie Thornton², Catherine Heffernan³, Emily Edmundson⁴, Sarah Goffin⁵

1. Goring and Woodcote Medical Practice, 2. Essex Partnership University NHS Foundation Trust, 3. London School of Health and Tropical Medicine, 4. Hounslow and Richmond Community Healthcare NHS Trust, 5. Sanofi Pasteur UK

Abstract

Meningococcal meningitis is a subset of Invasive Meningococcal Disease (IMD) that affects 1.2 million per annum globally,¹ with children under 5 years old being the most likely to contract IMD.² Whilst IMD caused by meningococcal strains A, B, C, W and Y can be prevented through vaccination, common public misconceptions regarding both meningitis and meningococcal vaccination have been shown to have a negative impact on vaccine coverage rates (VCRs).³

Herein we discuss some of the common misconceptions around meningitis and meningococcal vaccines, as well as strategies that healthcare professionals (HCPs) can utilise to help support public understanding of these topics and help improve VCR's.

MYTH *There is just one type of meningitis*

The biggest challenge with this myth is that people may believe that a single meningococcal vaccination may protect against **all types** of meningitis, including all of the different bacterial sub-strains. Whilst meningitis serves as an umbrella term, it can be caused by viruses, bacteria, fungi or parasites (see 'Table 1').

Pathogen	Examples
Bacteria	<i>Neisseria meningitidis</i> , <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> type b
Viruses	Herpes Simplex Virus, Human Immunodeficiency Virus, Mumps Virus
Fungi	Cryptococcus, Candida, Blastomyces
Parasites	Angiostrongylus cantonensis, Baylisascaris procyonis

Table 1. Pathogens that can cause meningitis⁴

Meningitis can be caused by a variety of different pathogens (Table 1). Of the 12 identified *N meningitidis* serogroups, 5 serogroups (A, B, C, W and Y) are responsible for most cases of IMD and currently are preventable with vaccination.⁵

Numerous vaccines help prevent common pathogens. The measles, mumps, rubella (MMR) vaccine helps protect against meningitis due mumps virus.⁶ Mumps cases doubled in the last few years due to vaccine hesitancy (nhs.uk).⁷ In addition, before the pneumococcal vaccine, 50 children under the age of 2 years old died each year, with one-third of these deaths as a result of meningitis.

While some meningitis types currently have no specific vaccines, preventive measures such as good respiratory hygiene and minimising overcrowding could help reduce the likelihood of contracting the non-vaccine strains of meningococci, pneumococci, and *Haemophilus influenzae*.

MYTH *A rash is always present with meningitis*

Whilst many individuals may be familiar with the characteristic non-blanching rash that is associated with meningitis, a rash is a very late sign and is associated with septicaemia (blood poisoning).

It is important not to wait for this and instead seek urgent medical attention as soon as symptoms develop (e.g. fever, severe headache, confusion) to ensure that the individual receives prompt treatment. Meningitis can kill in less than 24 hours⁸ and is associated with long-term sequelae in up to 20% of survivors.⁹

MYTH *Meningitis is easy to diagnose*

Whilst meningitis may have certain characteristics such as the photophobia and non-blanching rash that may aid diagnosis, these are not present in all cases and thus patients and carers may not seek treatment. 'Table 2' indicates typical CSF findings for both viral and bacterial meningitis as an example of biochemical differentiation. Early stages can be hard to recognise and often gets mistaken for flu with fever and headache.¹⁰ In addition, the symptoms can overlap with COVID-19.¹¹

Seek medical help urgently if you suspect meningitis.

Cause of meningitis	White blood cell count (x10 ⁶ cells/L)	Predominant cell type	CSF: serum glucose (normal ≥0.5)	Protein (g/L) normal (0.2-0.4)
Viral	50-1000	Mononuclear (may be neutrophilic early in course)	>0.5	0.4-0.8
Bacterial	100-5000	Neutrophilic (mononuclear after antibiotics)	<0.5	0.5-2.0

Table 2. Typical CSF findings in infectious meningitis¹²

MYTH *Meningococcal vaccine can cause meningococcal disease*

A common misconception is that vaccines can cause the disease they are meant to prevent. However, it is not possible to get meningitis from a vaccine. This can be an ideology feeding into vaccine hesitancy, which the WHO have cited as a top-10 threat to world health.¹³

Vaccines can cause mild side effects, including pain and swelling around the injection site. However, these are minor compared to the severe outcomes of meningitis. Although meningitis is relatively rare, it can result in death in 8-15% of people who contract it.¹⁴ In those who survive, up to 20% can have long-term health problems.⁹

Since the introduction of the Men C vaccination programme, IMD cases due to capsular group C reduced dramatically by 90% in all age groups immunised.¹⁵ In addition, cases in other age groups fell by approximately two-thirds, which might be due to decreased carriage rates.

MYTH *Meningitis is always fatal*

Most people will survive, however it is worth noting that rapid diagnosis and treatment is key, given that meningitis can be fatal within 24 hours.¹⁶ For those who experience complications (up to 20%), these can be severe such as amputation or deafness, and may require lifelong management.¹⁷

What can Healthcare Professionals do to Support Their Patients?

To ensure that the public is fully aware of the key aspects of meningitis, visual aids and education leaflets should be made available for parents and carers as well as adolescents and adults being vaccinated. HCPs also require adequate training on early detection of meningitis and access to early referral and treatment.

Work could also be done to support schools to send letters if cases occur, to assist parents with early detection and prevent uninformed rumours, as well as providing text messages with link to NHS information. Parents and teenagers need to be fully informed in order to consent to vaccination.

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Abbreviations

MMR: measles, mumps and rubella
PCV13: pneumococcal conjugate vaccine
Hib: *Haemophilus influenzae* type B
CSF: Cerebrospinal Fluid
WHO: World Health Organisation
IMD: Invasive Meningococcal Disease
HCPs: Healthcare Professionals
VCR: Vaccine Coverage Rates