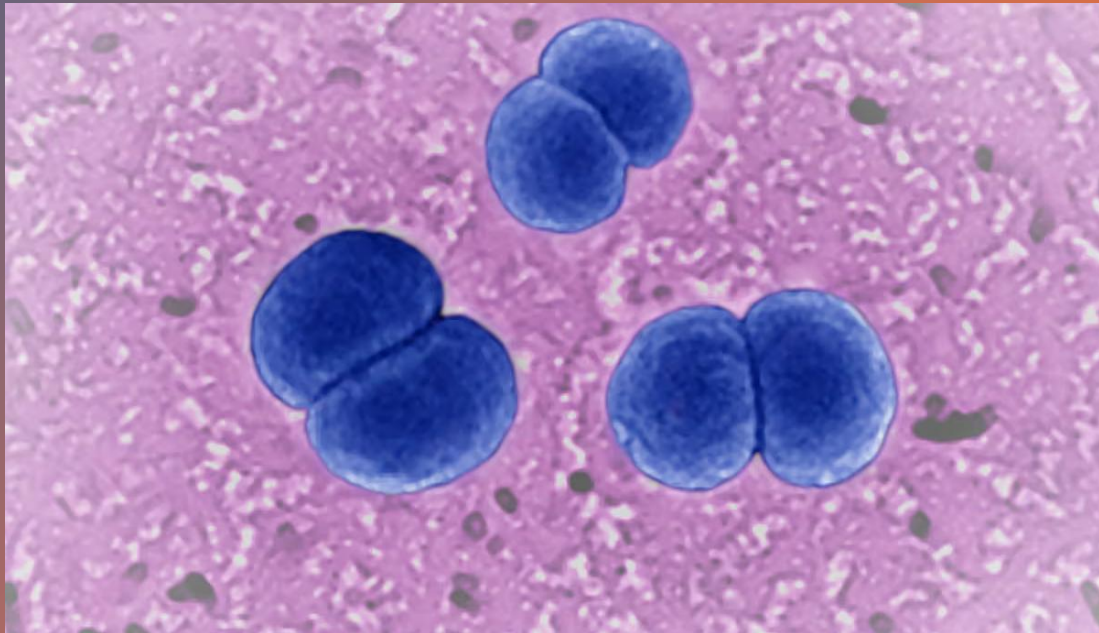




Meningococcal Infection – Management and Preventive Strategies

Dr. Mike KWAN

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- Board Member (ASPID), World Society for Pediatric Infectious Diseases (WSPID)
- Standing Committee Member (East Asia), Asia Pacific Pediatric Association (APPA)



Disclaimer:

- Declare No Conflict of Interest
- Received no honorarium from pharmaceutical company in giving this talk
- All information presented is merely of education and information purposes, it is not intended as a substitute for professional advice.

Session Outline



- 1. Diseases & Complications**
- 2. Emerging Epidemiology**
- 3. Prevention**
- 4. International Advocates**

[News](#) > [UK](#) > [Home News](#)

University student and sixth-form pupil die after outbreak of ‘invasive’ meningitis in Kent

At least 13 cases of the virus have been reported to health officials

Nicole Wootton-Cane & Dan Haygarth

Monday 16 March 2026 13:17 GMT



14 Comments

2 Deaths in 8 days – Unprecedented Men B outbreak in UK

酒吧群組擴大引發打針潮
英爆發B型腦膜炎
奪兩命英急推疫苗



細菌主要透過親密接觸傳播
如接吻或共用電子煙

圖片來源: Getty

All cases confirmed to be serogroup B

8
days

21
Confirmed
cases

9
ICU
admissions

2
deaths

- The outbreak predominantly affected adolescents and young adults. All cases were aged **18-27 years (median age: 19 years)**.
- The outbreak was described by the **UK Health Secretary** as **'unprecedented'** in its pace and scale
- UKHSA stated that none of the cases would have been eligible for MenB vaccination through the UK childhood programme introduced in 2015

May 2026 – Readings, UK

Sixth-form student dead and two others being treated after new UK meningitis outbreak



1 died
4 students infected

A young person has died, and two others are being treated as part of a new outbreak of meningitis in Oxfordshire. *Picture: Getty*

What is Invasive Meningococcal Disease (IMD)?

Pathological agent

Neisseria meningitidis (Nm)

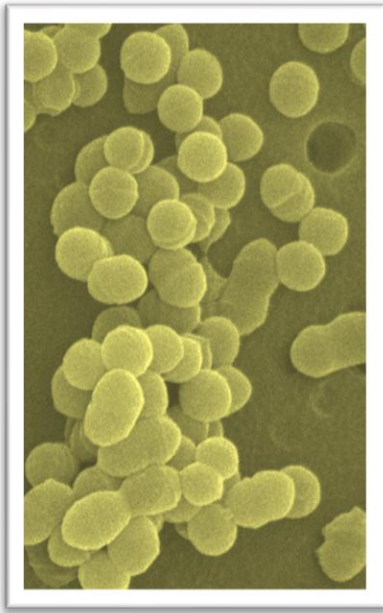
Transmission^{7,8}

- Respiratory secretions
- Direct contact
- Incubation period: 2–10 days

Asymptomatic carriage is common⁸

- **Carrier prevalence: 10%–20%⁸**

The majority of invasive meningococcal infections are caused by **serogroup A, B, C, W or Y** capsular polysaccharides



There are **2 main clinical forms** of IMD:

Meningococcal meningitis

is the most common presentation of IMD, occurring **in 40–50% of cases^{1,2}**

- occurs after bacteria cross into the central nervous system (i.e. cross the blood-brain barrier)^{3,4}

Meningococcal septicaemia

is presented in **~20–30% of IMD cases^{1,2}**

- Infection and multiplication of *N. meningitidis* in the blood⁵

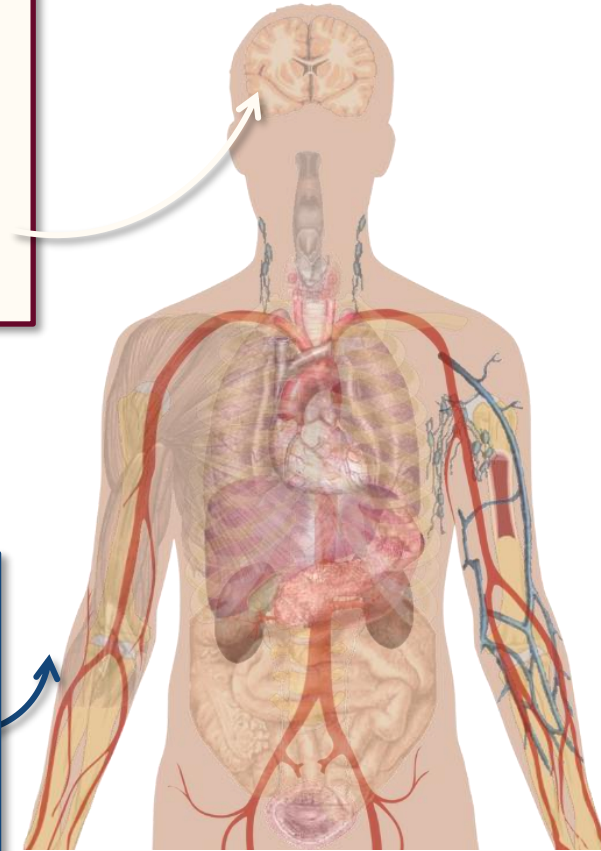


Image courtesy of Wikimedia Commons <https://upload.wikimedia.org>

Invasive Meningococcal Disease: Rapidly Progressive and Often Fatal

~16–24 hours^{1,2}

May progress from non-specific symptoms to death within 24 hours:

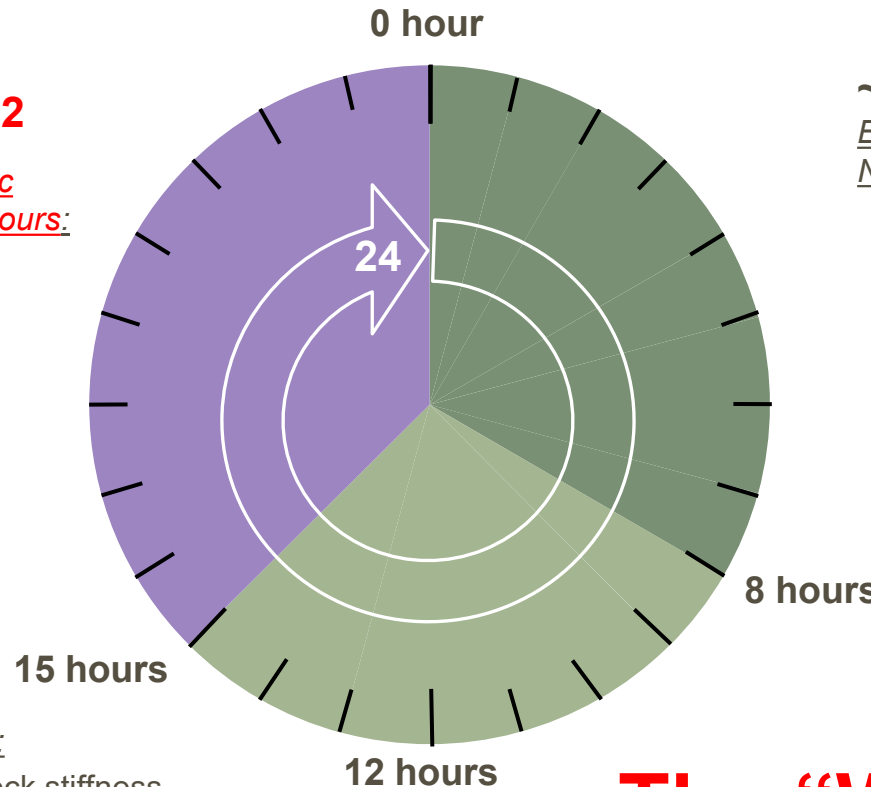
- Confusion/Delirium
- Unconsciousness
- Seizure
- Septic shock
- Multisystem failure

• **Death**

~9–15 hours¹

Classic meningitis symptoms:

- Cold hands/feet
- Neck stiffness
- Haemorrhagic rash*
- Photophobia
- Meningism
- Bulging fontanelle (Infants <1 year of age)



~0–8 hours¹

Early signs and symptoms:

Non-specific and flu-like

- Irritability
- Loss of appetite
- Fever
- Nausea/vomiting
- Sore throat, coryza
- General aches (Older children/adolescents)
- Leg pain (Infants/young children)
- Drowsiness
- Floppy muscle tone (Infants <1 year of age)

**The “Window of Detection”
is very narrow**

*May be present as petechial rash or purpura fulminans.

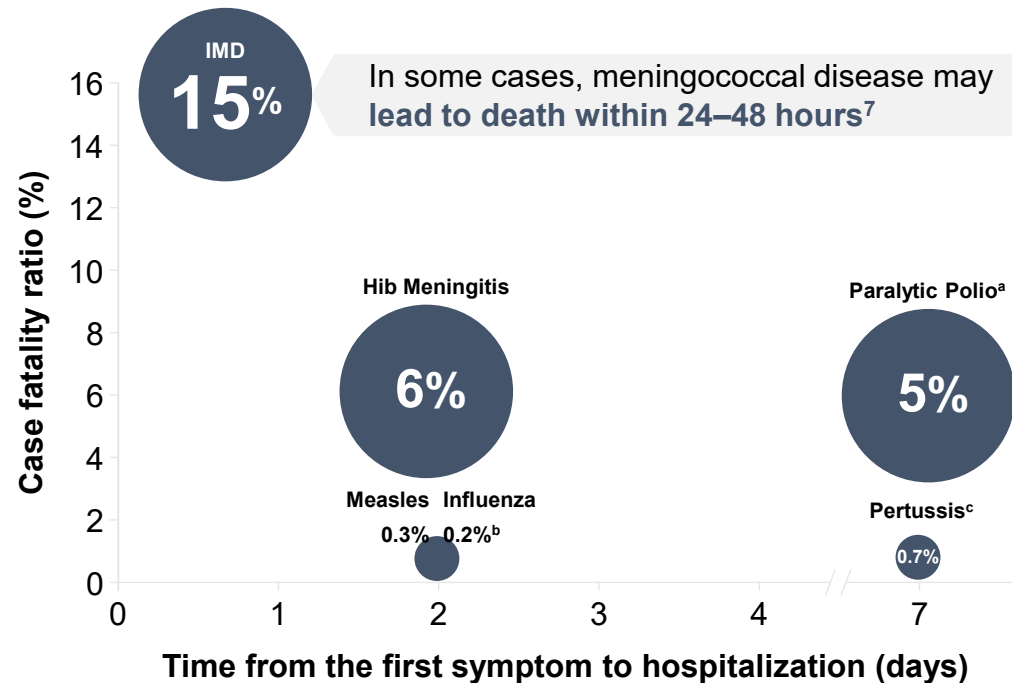


Invasive meningococcal disease (IMD)

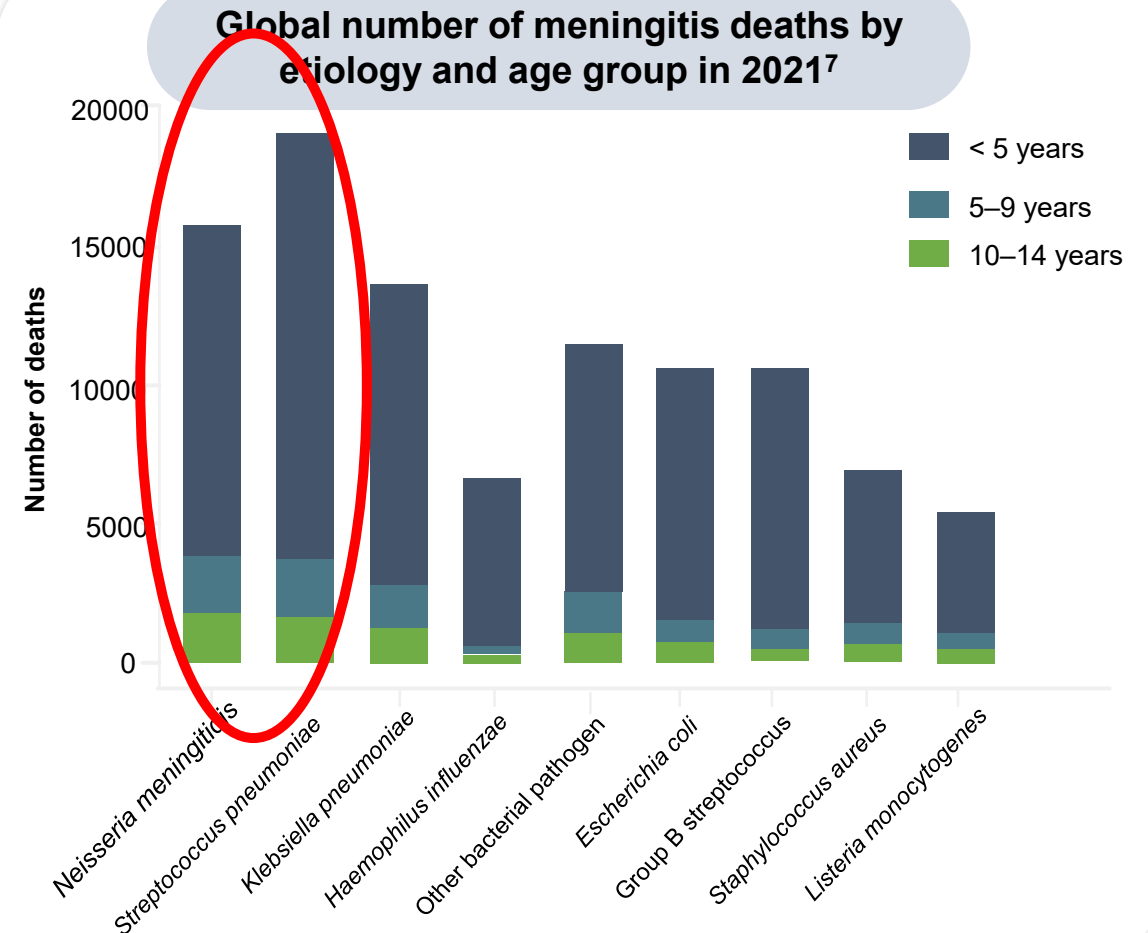
- Imposes a heavy burden of **mortality** and life-long **sequelae** on infected individuals and has devastating impacts on their family members.
- 

IMD has high case fatality rate with *N Meningitidis* as the one of the leading causes of bacterial meningitis among children

IMD carries **substantial lethality**, with **10%–15%** case-fatality rate vs other vaccine-preventable diseases in children < 5 years¹⁻⁶



The values in the graph are the upper limit values.



^a These are children's data; ^b This value represents the average percentage, and it pertains to the influenza associated deaths; ^c This refers to the case fatality rate of pertussis among children younger than 5 years globally; ^d Values are absolute numbers of incident cases expressed in thousands; ^e As the data is till 2019, a potential shift may have occurred since then.
Hib, *Haemophilus influenzae* type b; IMD, invasive meningococcal disease.

Sporadic incidence, high consequence

Up to **1 in 5 survivors** of IMD have **permanent sequelae**^{1,2} Infants and children suffer from more sequelae, and **more severe sequelae** than adolescents or adults³



Psychological/Behavioral

- Anxiety disorders
- Behavioral disorders
- Other mental/emotional/behavioral disorders (e.g. depression, ADHD and post-traumatic stress)



Physical

- Dermatological conditions (e.g. skin scarring, skin necrosis, psoriasis, eczema)
- Musculoskeletal deficiencies (e.g. **amputation**, limb deficiency/deformities, arthralgia)
- Kidney disease (e.g. kidney failure, renal insufficiency)
- Cardiovascular disease (e.g. venous thrombosis, vasculitis)



Neurological



system defects (e.g. hearing loss)
deficits (e.g. cerebral palsy, decreased
tion, muscle weakness)
al disability (e.g. mental retardation*
& decline†, learning impairment,
deficits)
brain activity (e.g. seizures)
ication barriers

IMD, invasive meningococcal disease. * Mental retardation: IQ < 70. † mild IQ decline: IQ 70-85

1. Meningococcal meningitis factsheet No 141. World Health Organization website. <http://www.who.int/mediacentre/factsheets/fs141/en/> 2. Rosenstein NE, et al. N Engl J Med. 2001; 344:1378-1388. 3. Olbrich KJ, Müller D, Schumacher S, Beck E, Meszaros K, Koerber F. Infect Dis Ther. 2018;7(4):421-438.

Children with invasive meningococcal disease (IMD) have average verbal IQ, performance IQ, and full-scale IQ scores that are 7 to 8 points lower compared to control groups



Comparison study of IMD in the UK (UK Meningococcal Registry)

- From May 2008 to September 2010
- matched analyses using generalised estimating equations (GEE).

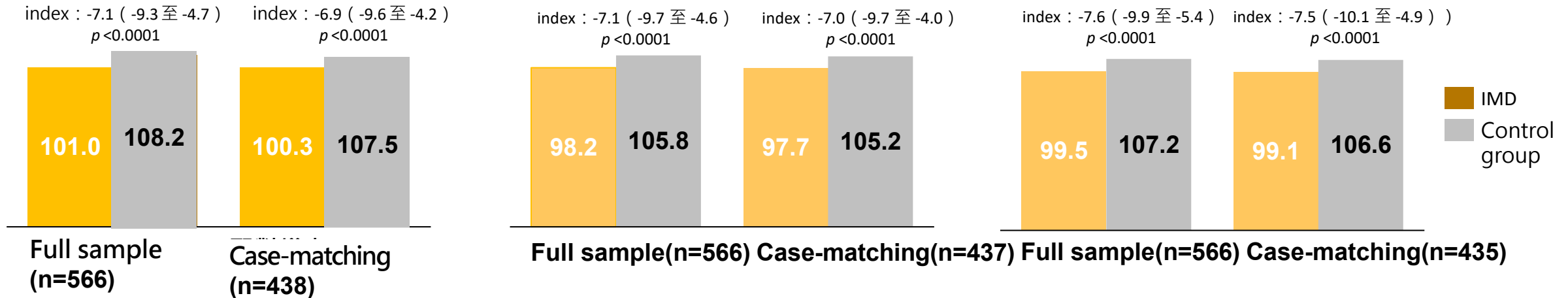


- Serogroup B IMD (1 month to 13 years old at the time)
- IMD (n=245) ; Control group (n=328) ; Case-match matching (n=221)

Verbal IQ (Average score)

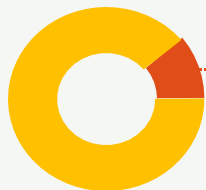
Performance IQ (Average score)

Full scale IQ (Average score)



Adapted from table 4.

IMD Child
survivors(IQ)



11% IQ is marginal (Full scale IQ <85)
(25/238)

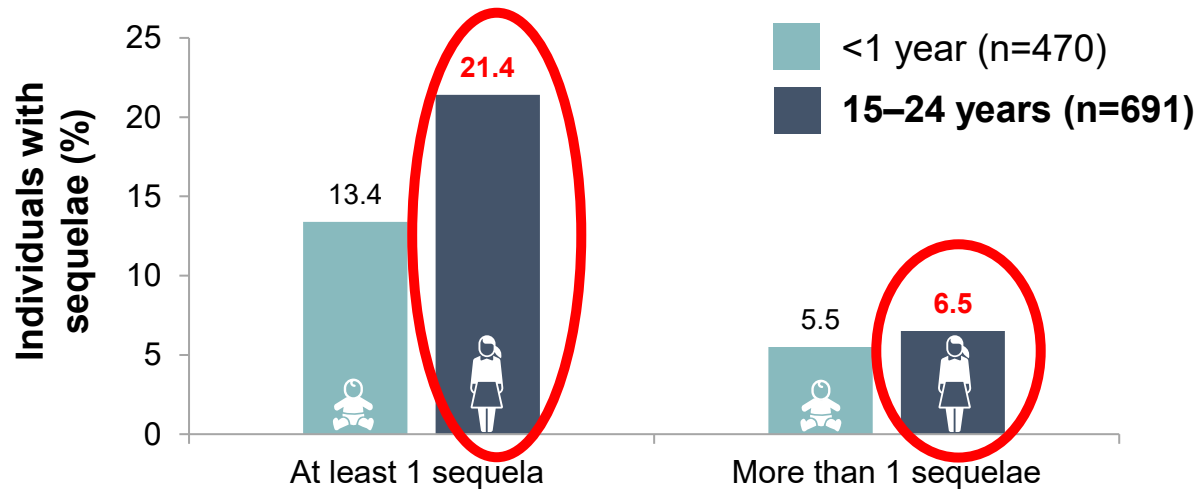
• associated with an increased need for educational support, as well as educational, vocational and mental health outcomes during adolescence and adulthood

vs. Control group 4%
(13/323), matched OR 2.4, p=0.02

Rates of sequelae following IMD are **higher in adolescents and young adults** compared with infants

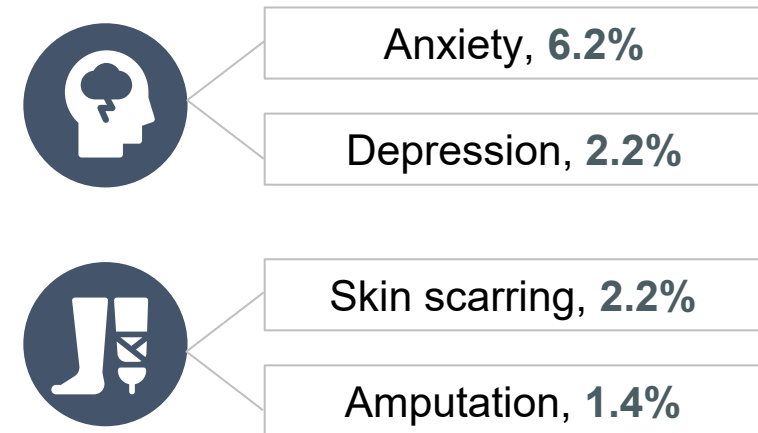
A study from France characterized sequelae frequency in patients hospitalised for IMD across age groups, 2012–2017

Frequency of sequelae (aged <1 year vs 15–24 years)



Across age groups, cases with sequelae were frequently re-hospitalised (55% of cases with 1 sequela and 71% with multiple sequelae)

Frequency of selected* sequelae (aged 15–24 years)



Sequelae following IMD can be disabling, costly and require lifetime management

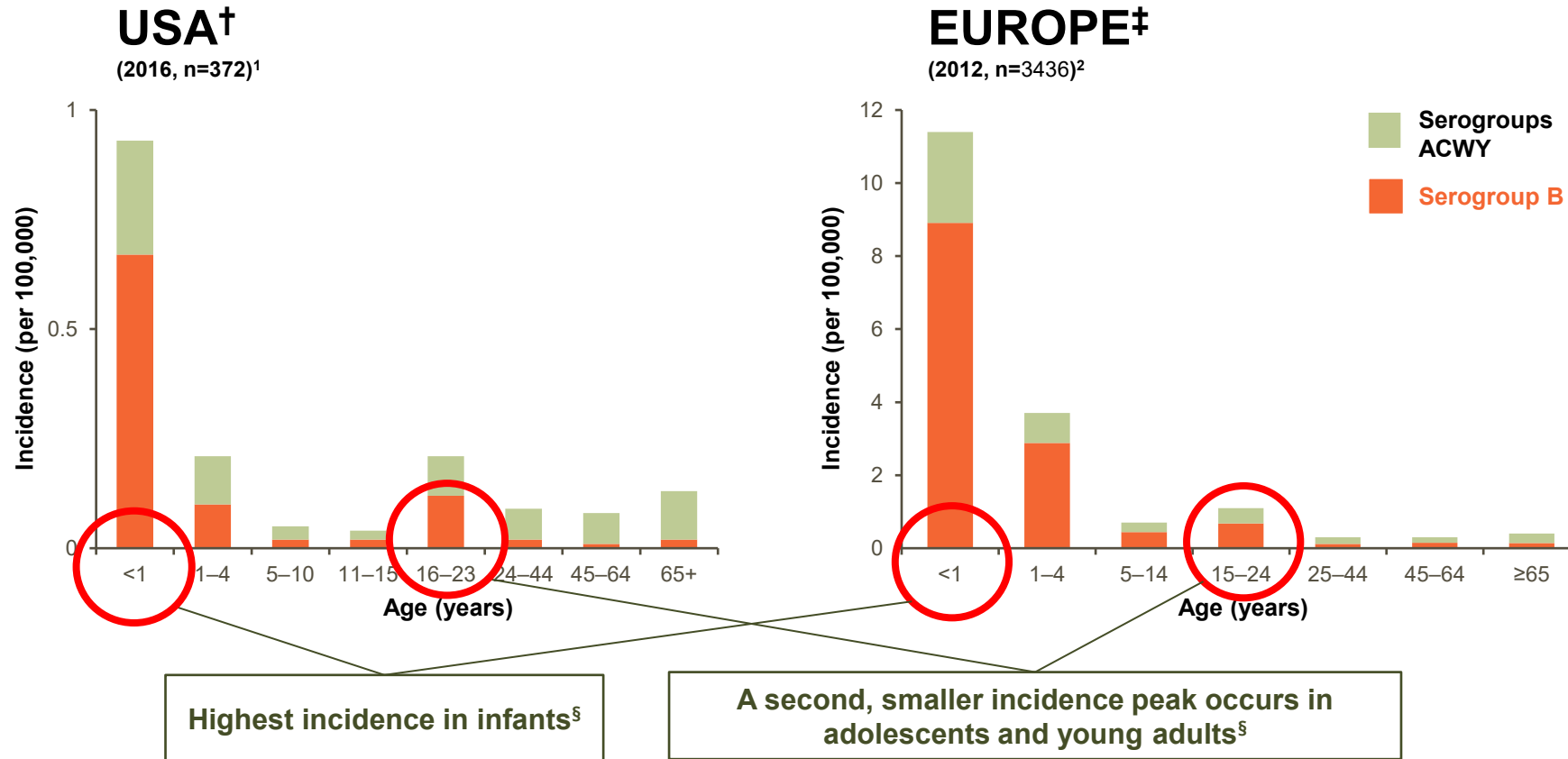
The same results were first published in Weil-Olivier C *et al. Hum Vacc Immunother* 2022. The graph has been independently created by GSK from the original data. *Other sequelae include epilepsy, motor deficits, speech or communication problems and hearing loss. IMD, invasive meningococcal disease

Weil Olivier C *et al. Hum Vaccin Immunother* 2022;18:2021764

A world map in a dark teal color, overlaid with a network of white lines and circular nodes. The nodes are positioned at various geographical locations, including North America, Europe, Africa, and Asia, connected by thin white lines. The overall aesthetic is modern and technological.

Incidence – Age

MenB incidence is generally highest in infants and young children, with a smaller peak in adolescents



The same results were first published in CDC, 2017. <http://www.cdc.gov/meningococcal/surveillance/> (left figure) and the European Centre for Disease Prevention and Control (ECDC). Surveillance report, 2012. <http://ecdc.europa.eu/en/publications/Publications/Surveillance%20of%20IBD%20in%20Europe%202012.pdf> (right figure) [†]Unknown serogroup (20%) and other serogroups (5%) excluded; [‡]Contributing countries: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the UK. [§]In Europe, MenB risk is more than 10-times higher in infants than in adolescents and young adults²

Risk factors for IMD

Based on a systematic review and meta-analysis including 74 studies (various serogroups)

Risk factors for contracting IMD include (bold indicates topics specifically noted in Asia-Pacific epidemiology literature)¹:

- Age <5 years
- HIV positive status
- Active/passive smoking
- **Crowded living spaces (e.g. dormitories, colleges, military barracks)**
- **Underlying chronic diseases**
- Asplenia or complement pathway deficiencies
- **Participation in mass travel/religious gatherings (e.g., the Hajj pilgrimage to Mecca)**



Diagnostic test¹⁻³

- Blood:
 - ❖ Culture & Sensitivity - <5% after antibiotics.
- Cerebrospinal fluid (CSF):
 - ❖ Culture & Sensitivity. Negative as early as 15 minutes after antibiotics
 - ❖ Meningoencephalitis panel (multiplex polymerase chain reaction, PCR) - particularly in patients who receive antibiotics before cultures are obtained.
 - ❖ Latex agglutination (antigen detection tests) - No longer commonly used because of sensitivity and specificity.²
- Skin lesion (Petechial/ Purpuric scraping):
 - ❖ Positive up to 13 hours following antibiotics
 - ❖ Poor sensitivity: 34%-47%
- Nasopharyngeal culture & sensitivity – NOT diagnostic (could be part of flora).

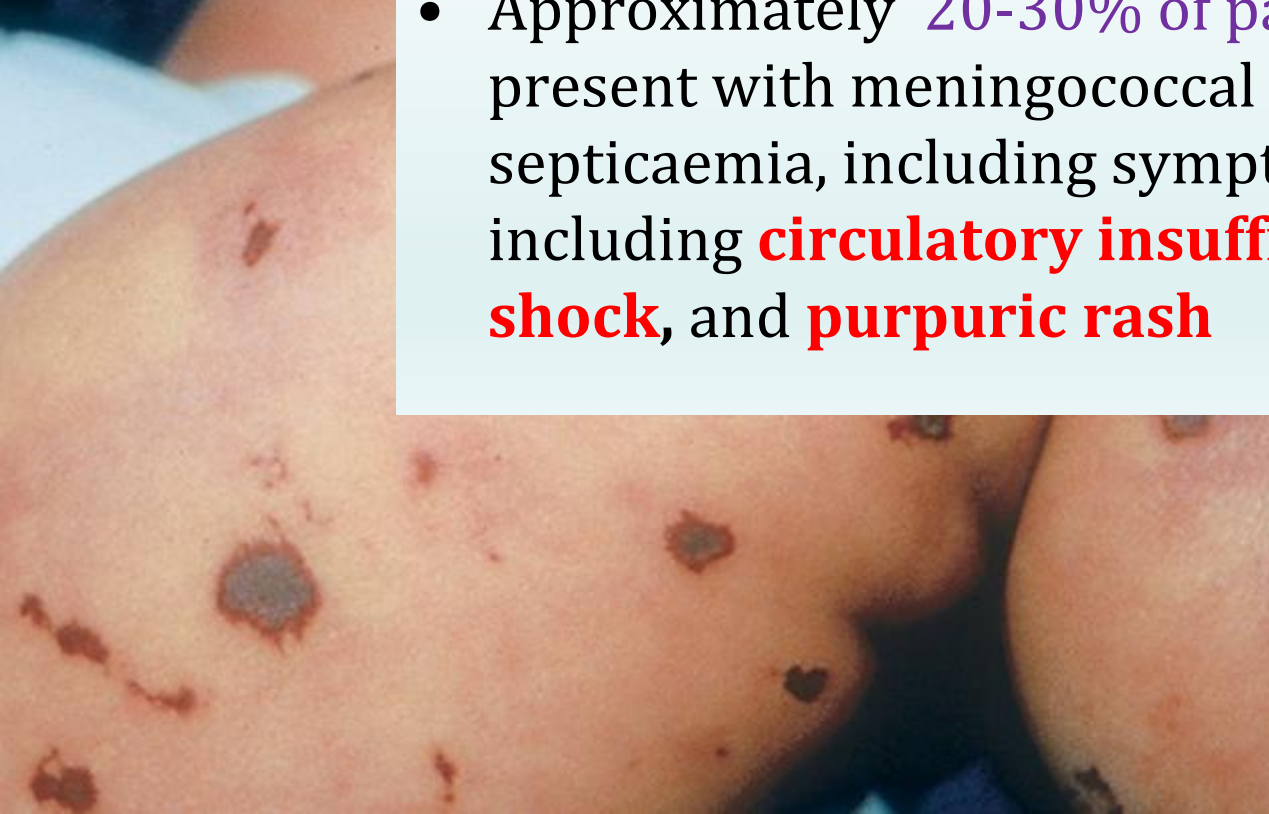
Rashes in Meningococcal Septicaemia

- A petechial rash: looks like pin-prick red or purple spots on the skin, and can resemble flea bites.
- A purpuric rash: looks more like bruising, showing up as reddish-purple areas on the skin.
- **A rapidly evolving petechial or purpuric 'rash' is a marker of very severe disease**



Meningococcal Septicaemia

- Approximately 20-30% of patients present with meningococcal septicaemia, including symptoms including **circulatory insufficiency**, **shock**, and **purpuric rash**





Pin point petechiae (< 2mm)



Purpura

Gun metal grey centers signifying necrosis

NE

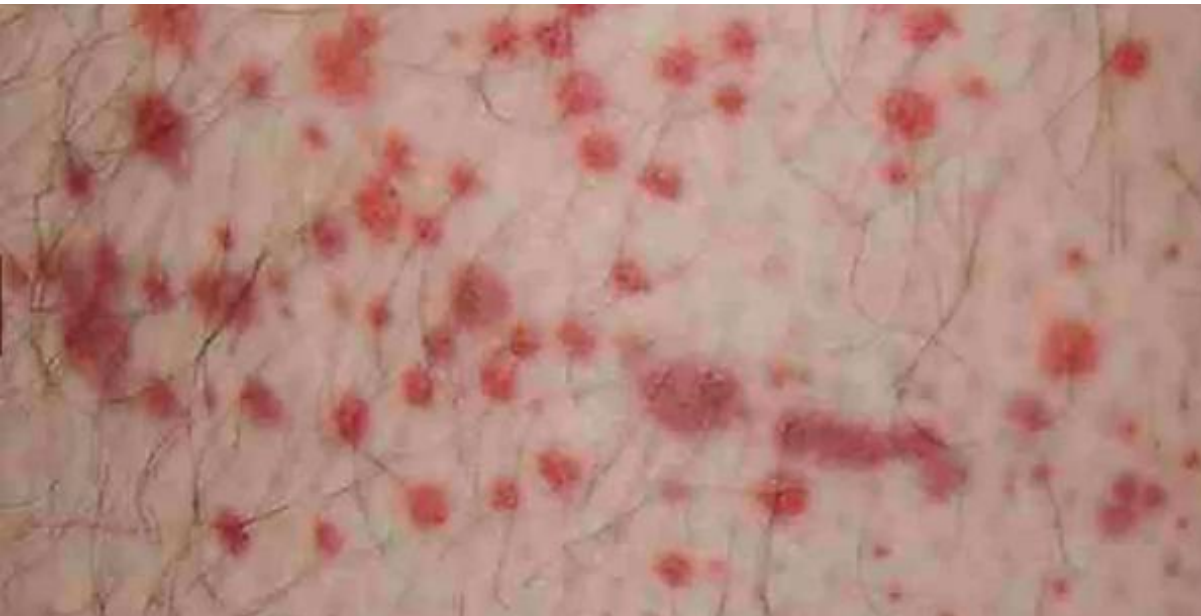
Meningitis Glass Test

Some bacteria that cause meningitis can also cause septicaemia. People with septicaemia can develop a rash of tiny red or 'pin-prick' marks which can develop into larger red or purple areas that look like bruises.



The rash does not fade under pressure.

The glass test can be used to check whether a rash fades under pressure. Someone with a fever together with a rash that does not fade under pressure needs urgent medical attention.



感染腦膜炎雙球菌可能
會導致皮膚出現紅疹

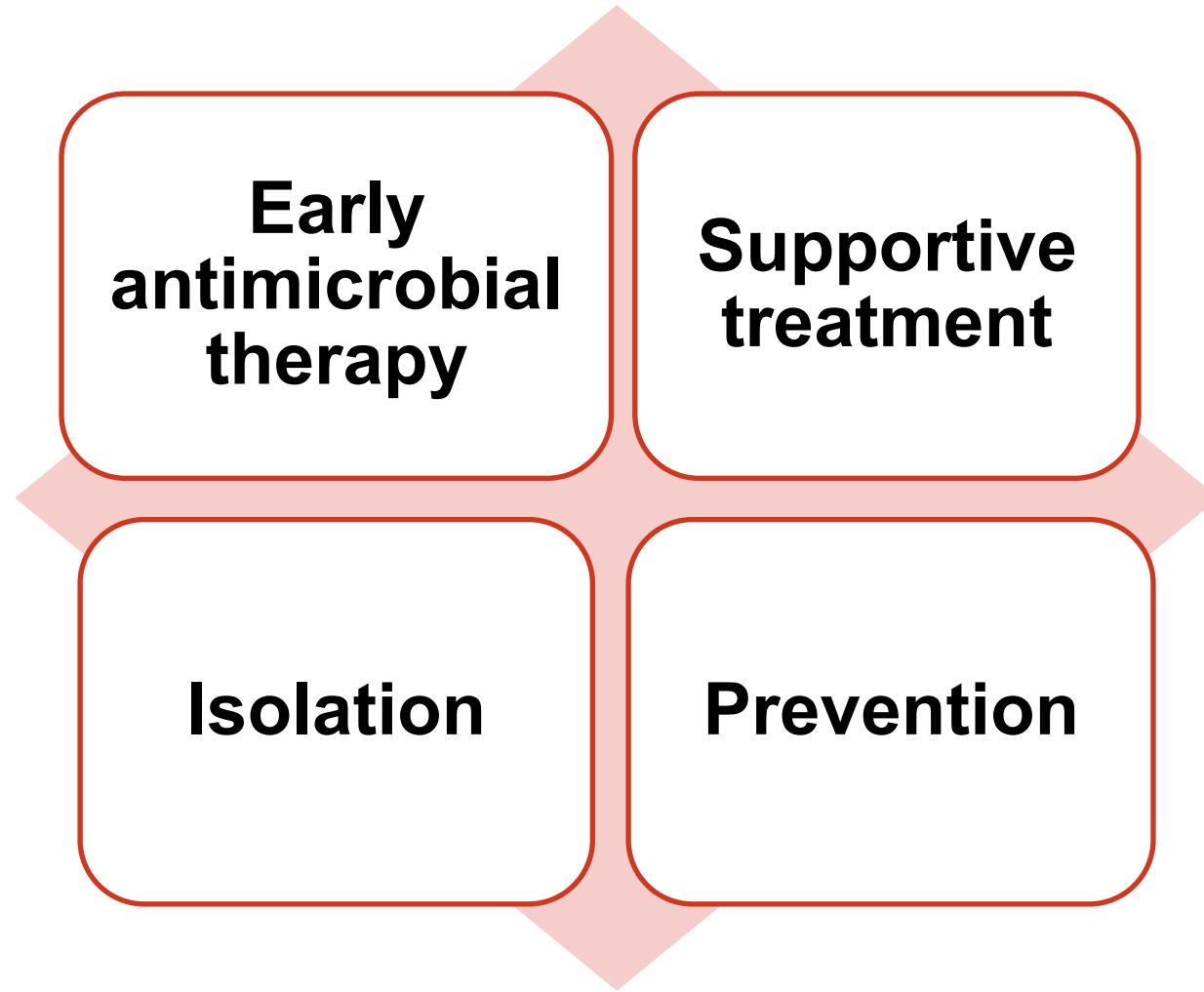


Clinical Diagnosis of Childhood Exanthematous Illness

- Acute Exanthematous Illness in Children (Part 1)
 - https://www.youtube.com/watch?v=qi4Q7T3u_zs&t=2516s
- Acute Exanthematous Illness in Children (Part 2)
 - <https://www.youtube.com/watch?v=w0OnGXd13ks>



Management



Management

Nice Guideline – Pre-hospital Antibiotics

likelihood of obtaining a positive blood culture result. Based on the evidence and their clinical knowledge and experience the committee recommended that pre-hospital intravenous or intramuscular antibiotics should only be given where meningococcal disease is strongly suspected. However, given the rapid progression and seriousness of meningococcal disease, the committee agreed that where meningococcal disease is strongly suspected pre-hospital antibiotics should be given at the earliest opportunity irrespective of transfer time (unlike for bacterial meningitis, see evidence review C1, where pre-hospital antibiotics for



Management (Acute Presentation)¹⁻⁶

Meningococccemia: Treatment of **shock** (early & rapid fluid resuscitation, inotropic & ventilator support)

Meningitis: **Raised ICP**

Empirical therapy:
Cefotaxime or Ceftriaxone

C & S +: **Cefotaxime, ceftriaxone, penicillin G, or ampicillin**

**Duration of antibiotics:
Consult ID / PID Specialists**

References: 1. McGill F, Heyderman RS, Michael BD, et al. The UK joint specialist societies guideline on the diagnosis and management of acute meningitis and meningococcal sepsis in immunocompetent adults. J Infect. 2016;72(4):405–438. doi:10.1016/j.jinf.2016.02.017 2. Oztürk S, Saraçoğulları A, Başbuğ N. Lack of sensitivity of the latex agglutination test to detect bacterial antigen in the cerebrospinal fluid of patients with culture-negative meningitis. J Clin Pathol. 1972 Dec;25(12):1079–1082. doi:10.1136/jcp.25.12.1079 3. NSW Health. Meningococcal disease control guidelines. Available from: <https://www.health.nsw.gov.au/Infectious/controlguideline/Pages/meningococcal-disease.asp> 4. McGill F, Michael BD, Hogg G, et al. Management of the critically ill child with sepsis. Continuing Education in Anaesthesia, Critical Care & Pain. 2017;17(2):65–70. doi:10.1093/bjaed/mkw067 5. Oztürk S, Saraçoğulları A, Başbuğ N. Lack of sensitivity of the latex agglutination test to detect bacterial antigen in the cerebrospinal fluid of patients with culture-negative meningitis. J Clin Pathol. 1972 Dec;25(12):1079–1082. doi:10.1136/jcp.25.12.1079 6. NSW Health. Meningococcal disease control guidelines. Available from: <https://www.health.nsw.gov.au/Infectious/controlguideline/Pages/meningococcal-disease.aspx> 7. McGill F, Michael BD, Hogg G, et al. Management of the critically ill child with sepsis. Continuing Education in Anaesthesia, Critical Care & Pain. 2017;17(2):65–70. doi:10.1093/bjaed/mkw067

Management

Children (> 1 month old)	Dose
Cefotaxime	300mg/kg/day in 3-4 divided doses.
Ceftriaxone	50mg/kg/dose BD (max 2gm)
C-penicillin	300,000 units/kg/day in 4-6 divided doses
Ampicillin	200mg/kg/day in 6 divided doses



Meningitis (bacterial) and meningococcal disease: recognition, diagnosis and management

NICE guideline
Published: 19 March 2024

www.nice.org.uk/guidance/ng240

WHO Guidelines on Meningitis Diagnosis, Treatment and Care

WHO EPI-WIN Webinar
May 28th, 2025

Nicolò Binello, MD MSc DTMH
Health Emergencies Programme
World Health Organization

Use of Corticosteroids

- Corticosteroid dexamethasone **did not significantly reduce the death rate** (17.8% versus 19.9%).
 - Patients treated with corticosteroids had **significantly lower rates of**
 - **severe hearing loss** (6.0% versus 9.3%),
 - **any hearing loss** (13.8% versus 19.0%) and
 - **neurological sequelae** (17.9% versus 21.6%).
- An analysis for different bacteria causing meningitis showed that
 - patients with meningitis due to **Streptococcus pneumoniae** (S pneumoniae) treated with corticosteroids had a **lower death rate** (29.9% versus 36.0%), while
 - no effect on mortality was seen in patients with Haemophilus influenzae (H influenzae) and Neisseria meningitidis (N meningitidis) meningitis.
- Corticosteroids **decreased the rate of hearing loss** in children with meningitis due to **H influenzae** (4% versus 12%), but not in children with meningitis due to other bacteria

Meningococcal disease

1.8.6 Do not routinely give corticosteroids to people with meningococcal disease.

1.8.7 Consider low-dose replacement corticosteroids for people with meningococcal septic shock that is not responding to high-dose vasoactive agents.

Isolation & Control Measures¹⁻²

- **Isolation:**
 - ❖ Standard precautions.
 - ❖ **Droplet precautions (until 24 hours after initiation of effective antimicrobial therapy).**
- **Postexposure Chemoprophylaxis:**
 - ❖ Regardless of immunization status, close contacts should receive chemoprophylaxis.
 - ❖ Throat and nasopharyngeal cultures are not recommended.

Isolation & Control Measures¹⁻³

High Risk Chemoprophylaxis recommended
Household contact
Child care/ Preschool contact (7 days before onset of illness)
Direct exposure to secretions (sharing toothbrushes/ eating utensils)
Mouth-to-mouth resuscitation, unprotected contact during endotracheal intubation

Low Risk Chemoprophylaxis NOT recommended
Casual contact (school or work) with no history of direct exposure to the secretions
Indirect contact (contact with high-risk contact)
Healthcare personnel without direct exposure to secretions (PPE)

Isolation & Control Measures - **Postexposure Chemoprophylaxis**

Age	Dose	Duration	Cautions
Rifampicin < 1 mo ≥ 1 mo	5mg/kg/dose BD 10mg/kg/dose BD (max 600mg)	2 days	Drug-drug interaction Not recommended for pregnant people
Ceftriaxone < 15 yr ≥ 15 yr	125mg IM 250mg IM	Single dose	Dilute 1% lidocaine (reduce pain)
Ciprofloxacin ≥ 1 mo	20mg/kg (max 500mg)	Single dose	Not recommended in pregnancy. Beware of the resistant strain
Azithromycin	10mg/kg (max 500mg)	Single dose	Not recommended routinely

Prevention

- **Vaccination**
 - Target groups (Children, adolescents, at-risk individuals).
- **Chemoprophylaxis**
 - **Contacts**
- **Public health measures**
 - Notification.
 - Surveillance.
 - Education & public awareness.



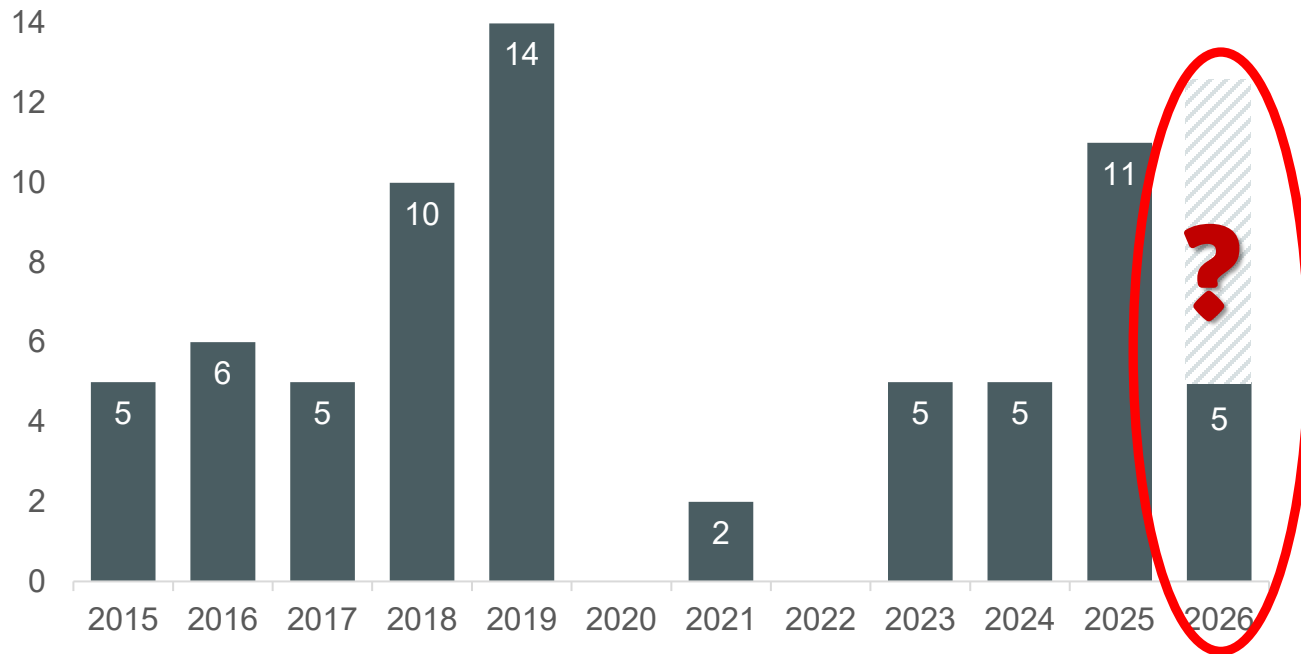
A stylized world map in a dark teal color, overlaid with a network of white lines and circular nodes. The nodes are positioned at various geographical locations, including North America, Europe, Africa, and Asia, connected by thin white lines to form a global network. The text 'Hong Kong and IMD' is displayed in white on a semi-transparent teal rectangular background in the lower-left corner.

Hong Kong and IMD

Hong Kong – Sporadic incidence

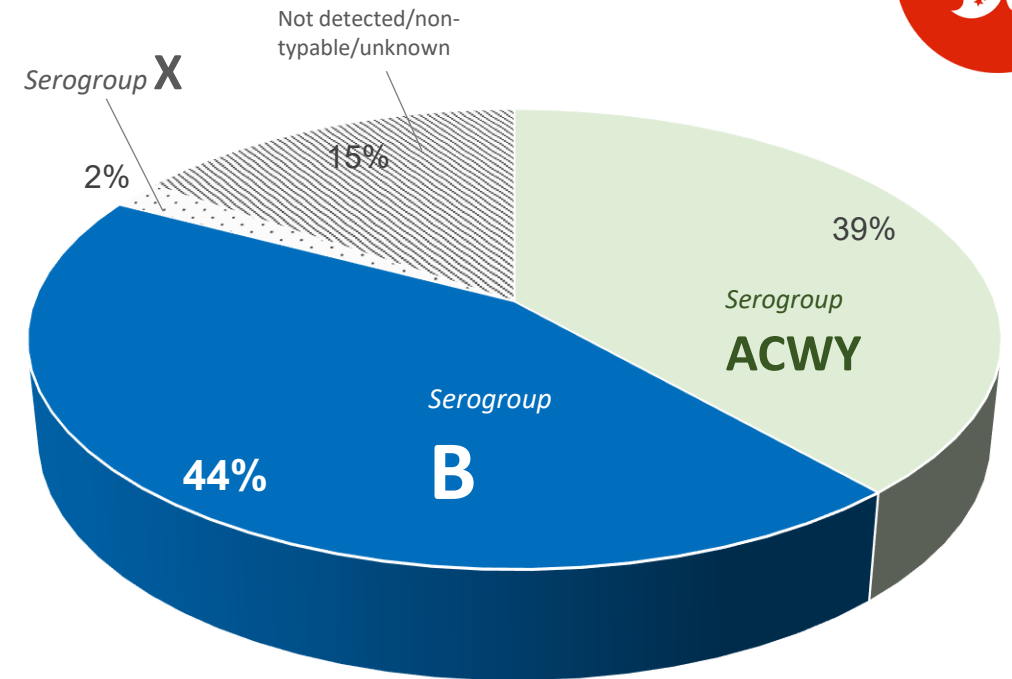


Number of IMD cases and annual incidence rate in Hong Kong, 2015 to 2026 (as of June 2026)



Based on 2015 to 2024 cases,

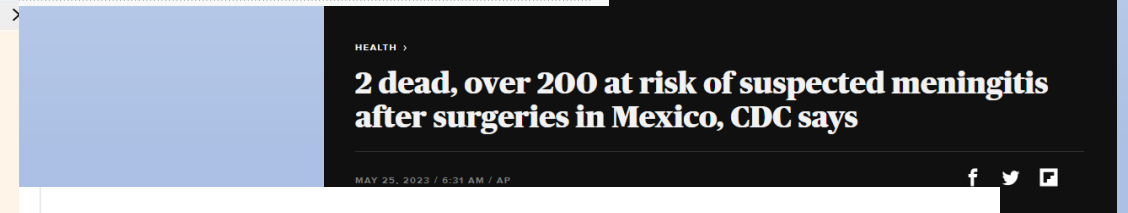
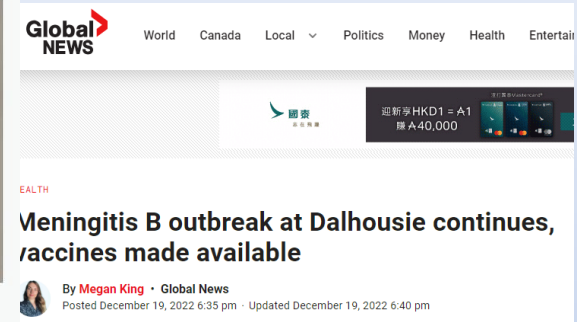
- Annual incidence rate of 0 to 0.19 per 100 000 population; case-fatality rate of 11.5%
- patients' ages ranged from one month to 97 years, with about two-thirds being male
- 58% clinically presented with septicemia



Serogroup distribution of IMD cases in Hong Kong, 2015-2024

- **Serogroup B was the dominating serogroup** (23 cases; 44%), followed by Y (nine cases; 17%), C (7 cases; 14%), W (4 cases; 8%) and X (1 case; 2%)

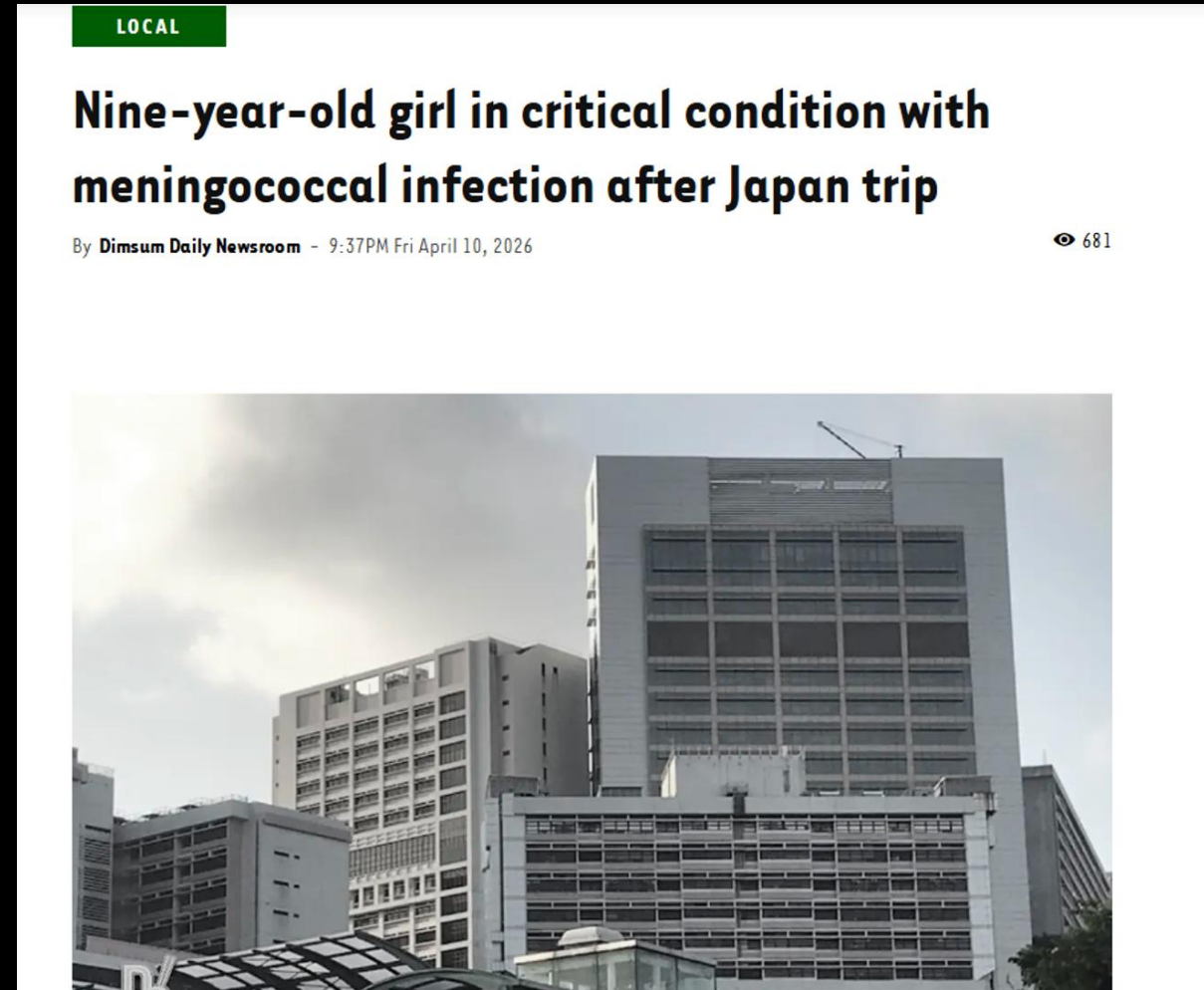
Beware of Meningococcal Meningitis During Your Overseas Travels



Man, 36, dies from invasive meningococcal disease in South Australia

Posted Fri 21 Jul 2023 at 4:42pm, updated Sat 22 Jul 2023 at 7:45am

However, many Hong Kong families enjoy travel and consider overseas study for their children...

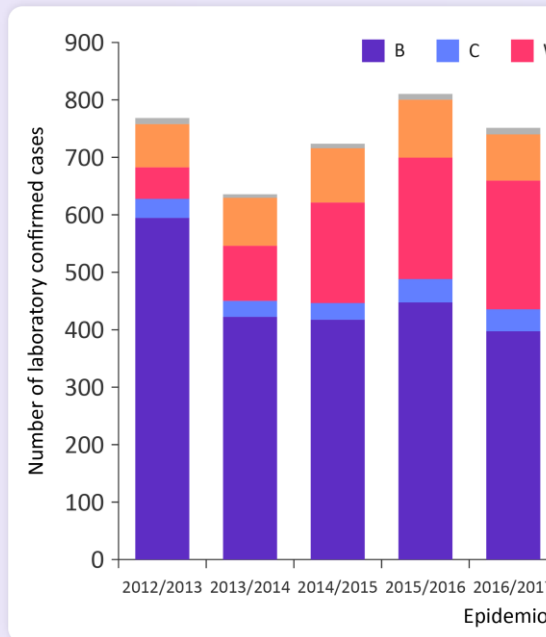


Epidemiology of meningococcal disease

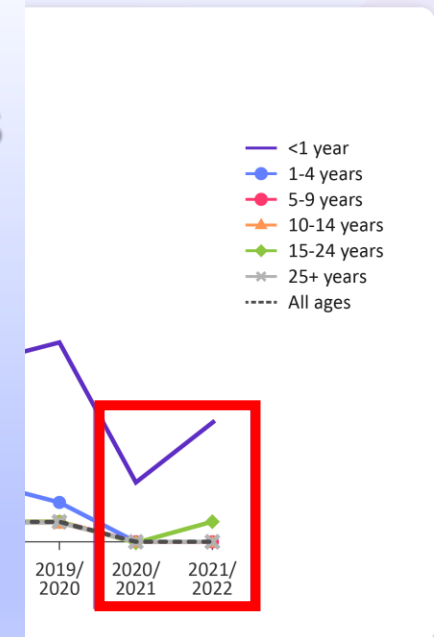
- **Varies by geography** and has also **evolved in response to the availability of vaccines** against the five major disease-causing serogroups (MenA, MenB, MenC, MenW, and MenY).
- **International data** show that meningococcal vaccination programmes have reduced IMD incidence and **changed the serogroup distribution** of the disease.

IMD epidemiology after the COVID-19 pandemic

IMD cases in England by serogroup
2012/2013 to 2021/2022



IMD incidence in England by age group
2012/2013 to 2021/2022



The resurgence of IMD, especially serogroup B, highlights how pandemic-driven immunity gaps and delayed vaccination amplified vulnerability once social restrictions were lifted post-pandemic

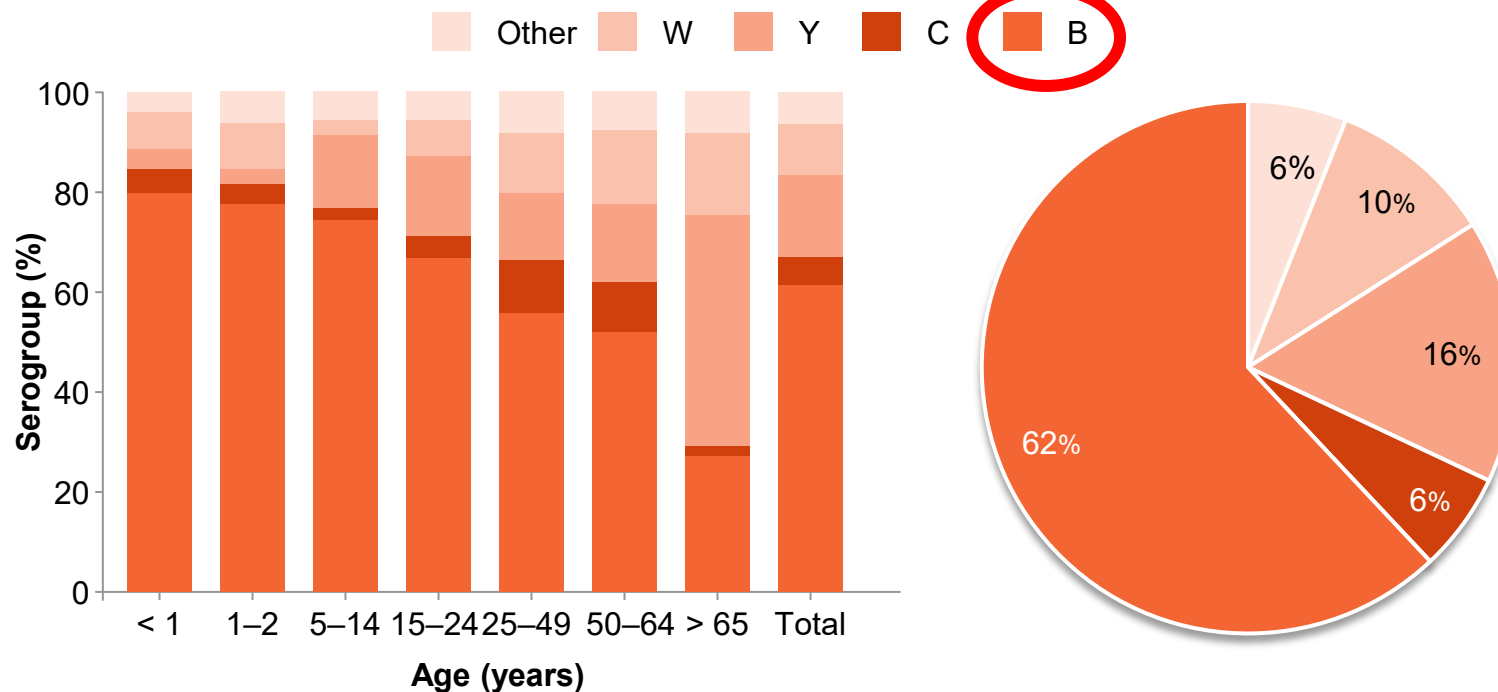
- In **England**, there has been a resurgence in IMD following the COVID-19 pandemic¹
- Similar trends have been seen in **New Zealand** (82% MenB)², **Australia**³, **France** (predominantly MenB)⁴, and the **USA**⁵

1. UK Health Security Agency. meningococcal disease in England: annual laboratory confirmed reports for epidemiological year 2021 to 2022. Available at: <https://www.gov.uk/government/publications/meningococcal-disease-laboratory-confirmed-cases-in-england-in-2021-to-2022/invasive-meningococcal-disease-in-england-annual-laboratory-confirmed-reports-for-epidemiological-year-2021-to-2022>; 2. ESR (Institute of Environmental Science and Research). Meningococcal disease monthly report October 2022. Available at: <https://www.esr.cri.nz/digital-library/meningococcal-disease-monthly-report-october-2022/>; 3. Australian Government Department of Health and Aged Care. National Notifiable Diseases Surveillance System (NNDSS) public dataset – meningococcal disease (invasive). Available at: <https://www.health.gov.au/resources/publications/national-notifiable-diseases-surveillance-system-nndss-public-dataset-meningococcal-disease-invasive?language=en>; 4. Deghmane AE, et al. *Microorganisms* 2022;10:907; 5. Florida Health. Vaccine-Preventable Disease Surveillance Report – March 2023. Available at: https://www.floridahealth.gov/Diseases-and-Conditions/vaccine-preventable-disease/_documents/2023-march-vpd-surveillance.pdf. All links accessed March 2024.

MenB remains dominant in EU

Serogroup B accounted for **62%** of serogroup-documented cases overall and **was predominant** in all age groups < 65 years¹

Serogroup Distribution of Confirmed Cases of Invasive Meningococcal Disease by Age Group, EU/EEA, 2022¹



The graphs has been independently created by GSK from the original data.
"Other" refers to all cases reported as serogroup A, X, Z, 29E, non-groupable, or "other".

Serogroup B accounted for the majority of IMD cases in 2022 (62%), with smaller contributions from Y, W, and C, highlighting its predominance across age groups below 65 years.¹

- Serogroup B remains the predominant cause of IMD across multiple regions and age groups
- Highest burden observed in infants and young children, followed by adolescents.
- These findings underscore the critical need for targeted MenB vaccination strategies to prevent IMD across age groups²

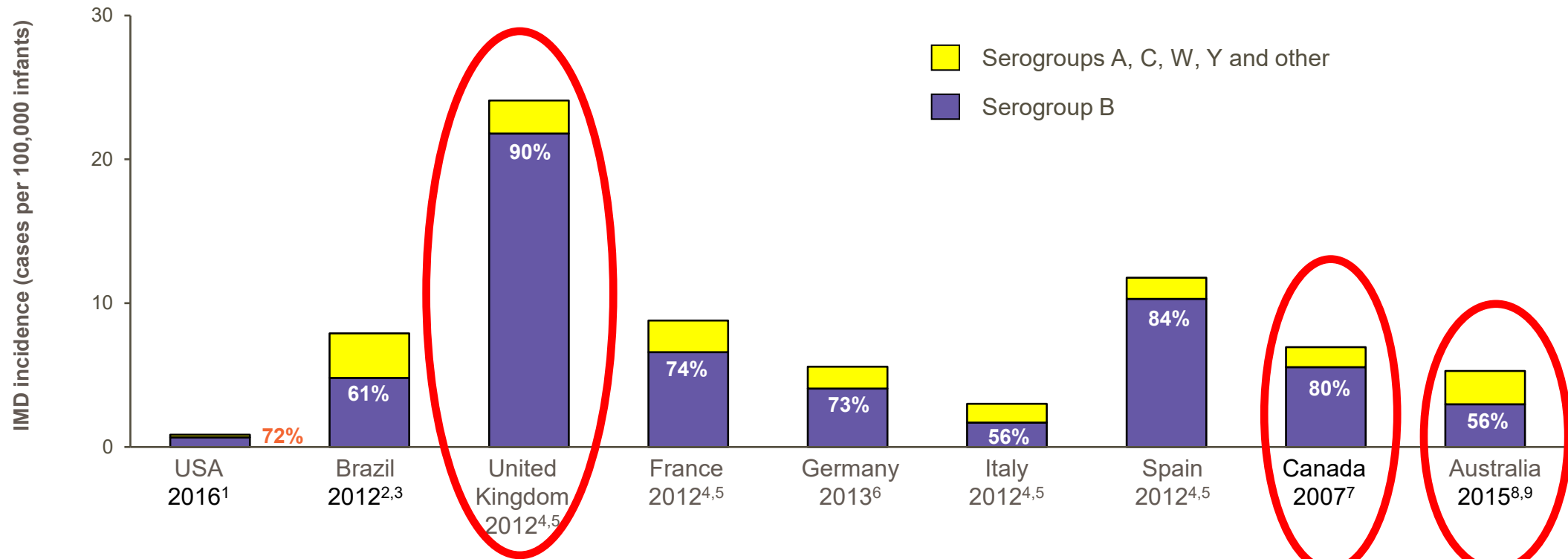
Serogroup B dominating in key travel, work, and study destinations¹⁻⁹

Study Abroad		Tourists		Country	Situation	Serogroup
✓				America 	MenB remains relevant for high-risk groups, outbreak settings, and shared clinical decision-making in adolescents/young adults ⁴	Main group is Y, followed by B , and C ⁴
				England 	MenB is the dominant current serogroup: 313/378 IMD cases (82.6%) in England 2024/25; all 15–19-year-old cases were MenB ⁵	Mainly is B (88.3%) ⁵
		✓		Japan 	IMD per 100,000 individuals was low (0.001–0.039) during 2014 to 2022. The case fatality rate was 12% ⁶	The most frequent serogroups were Y and B ⁶
✓				Australia 	Meningococcal disease can occur sporadically or in epidemics. In Australia, most cases occur during winter and early spring. ⁷	Mainly is B (83%) ⁷
✓	✓			China 	Incidence of meningococcal meningitis caused by <i>N. meningitidis</i> B showed an upward trend in general population and young children from 2006 to 2023 ⁸	B (No MenB vaccine in China)
		✓		Taiwan 	Annual incidence ranging from 0.009 to 0.204 per 100,000 people ⁹	B was most predominant (81.2%) in 2003 to 2020 ⁹

4. Accessed Jun2026. 5. <https://www.gov.uk/government/publications/meningococcal-disease-laboratory-confirmed-cases-in-england-2024-to-2025/invasive-meningococcal-disease-in-england-annual-laboratory-confirmed-reports-for-epidemiological-year-2024-to-2025> Accessed June2026. 6. Kobayashi M, Kamiya H, Fukusumi M, et al. Euro Surveill. 2024;29(46):2400136. 7. The Department of Health and Aged Care, Commonwealth of Australia. Meningococcal disease. <https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/meningococcal-disease> Accessed 11 Feb 2025. 8. Zhou JJ, Li MS, Zhang Q, et al. Zhonghua Liu Xing Bing Xue Za Zhi. 2024;45(9):1197-1203. 9. Chioi CS, Liao YS, Chen BH, et al. Microbiol Spectr. 2022;10(4):e0088222.

MenB is the leading cause of IMD in infants across several countries

Data shown for infants (≤ 1 year of age)*



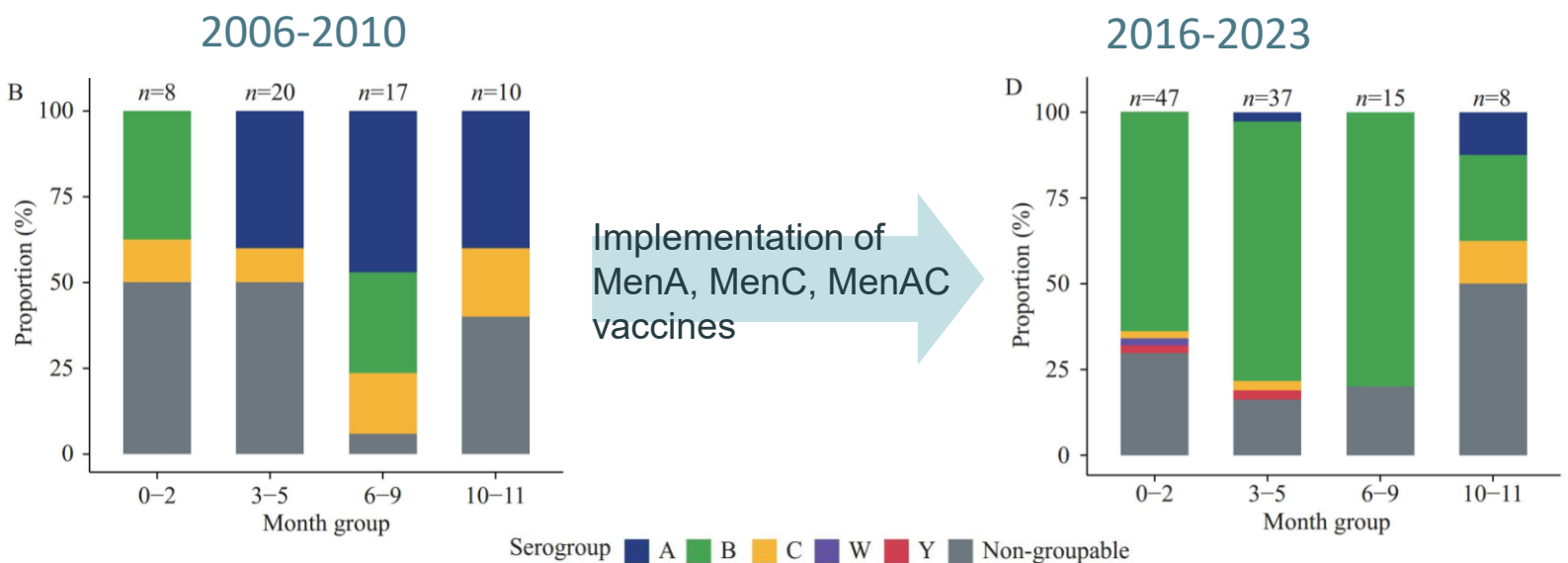
*Data shown were calculated from the original data in the references
IMD, invasive meningococcal disease; MenB, meningococcal B

1. Centers for Disease Control and Prevention (CDC), 2017. Enhanced Meningococcal Disease Surveillance Report, 2016. <https://www.cdc.gov/meningococcal/downloads/NCIRD-EMS-Report.pdf>; 2. Sáadi M *et al.* *J Pediatric Infect Dis Soc* 2014;3:91–93; 3. Informe Regional de SIREVA II, 2012. http://www.paho.org/hq/index.php?option=com_docman&task=doc_details&gid=22372&Itemid=270&lang=en; 4. European Centre for Disease Prevention and Control (ECDC), 2015. Surveillance of invasive bacterial diseases in Europe, 2012. Stockholm. <https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/Surveillance%20of%20IBD%20in%20Europe%202012.pdf>; 5. Eurostat. Population demographics. <http://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-data/database>; 6. SurvStat @RKI. Robert Koch Institut. <https://survstat.rki.de/Content/Query/Create.aspx>; 7. National Advisory Committee on Immunization (NACI), 2013. <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/13vol39/acs-dcc-1/assets/pdf/acs-dcc-4-eng.pdf>; 8. Lahra MM *et al.* *Commun Dis Intell* 2014;40:E503–E511; 9. Australian Bureau of Statistics. Population by age and sex, Australian states and territories, June 2015. <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Jun%202015?OpenDocument> (all accessed April 2018)

China CDC listed IMD as Health Risk **ALERT**



Serogroup distribution of *Neisseria meningitidis* cases by age group



- Serogroup B cases were the most common
- **Serogroup B increased** from 14.55% to 67.29%
- Serogroup A cases decreased from 36.36% to 1.87%

No MenB vaccines available in China

- **Atypical symptoms in infant cases challenge timely diagnosis**
- Eligible infants should receive meningococcal vaccination timely
- Development of serogroup B meningococcal vaccines should be accelerated

中国疾病预防控制中心
CHINA CENTER FOR DISEASE CONTROL AND PREVENTION

首页 机构信息 党建园地 疾控应急 科学研究 教育培训 全球公卫 人才建设 健康数据 健康科普 学术期刊

当前位置: 首页 > 健康提示

CHINESE CENTER FOR DISEASE CONTROL AND PREVENTION
中国疾病预防控制中心

2026年5月健康风险提示

时间: 2026-05-09 字体: 大 小

中国疾病预防控制中心温馨提示: 5月份需关注手足口病、登革热、基孔肯雅热、寨卡病毒病、人感染禽流感、猴痘、发热伴血小板减少综合征、流行性脑脊髓膜炎。

A world map in a dark teal color, overlaid with a network of white lines and circular nodes. The nodes are positioned at various geographical locations, including North America, Europe, Africa, and Asia, connected by thin white lines. The overall aesthetic is modern and technological.

Prevention

The effectiveness and safety of **MenACWY** vaccines

MenACWY-TT, MenACWY-D and MenACWY-CRM have been evaluated in the settings of immunisation programmes (toddlers, adolescents/young adults, military recruits)

A case-control study estimates of vaccine effectiveness in these studies range from **69% to 94%**, with excellent safety profiles.

Vaccine	Country	Setting	Outcome
MenACWY-TT ⁴⁸	UK	National immunisation programme (adolescents and young adults)	94% MenW effectiveness 82% MenY effectiveness
	Netherlands	National immunisation programme (toddlers)	92% MenW effectiveness
MenACWY-D ⁴⁶	USA	Case-control evaluation for single dose at age 11 to 12 years	69% MenACWY effectiveness
MenACWY-CRM ⁴⁷	South Korea	Armed forces immunisation programme	88% IMD effectiveness

Table 2. Summary of selected real-world evaluations of MenACWY vaccines.⁴⁶⁻⁴⁸

Abbreviations: IMD, invasive meningococcal disease; MenACWY-CRM, meningococcal quadrivalent diphtheria cross-reactive material vaccine; MenACWY-D, meningococcal quadrivalent diphtheria toxoid conjugate vaccine; MenACWY-TT, meningococcal quadrivalent tetanus toxoid conjugate vaccine; UK, United Kingdom; USA, United States of America.

Summary of selected real-world evaluations of MenB vaccines

Vaccine	Country	Setting	Outcome
4CMenB ⁵⁵	UK	National immunisation programme (infant)	75% MenB disease reduction
4CMenB ⁴⁹	Italy	National immunisation programme (infant)	91–94% vaccine effectiveness in Venetia and Tuscany
4CMenB ⁵¹	Spain	Regional immunisation programme and private setting (infant)	71% vaccine effectiveness
4CMenB ⁵⁷	Portugal	Endemic setting (infant)	79% effectiveness
4CMenB ⁵²	Canada	Outbreak setting in the Saguenay–Lac-Saint-Jean region (2 months – 20 years)	96% MenB disease reduction
4CMenB ^{50, 59}	USA	College outbreak settings	No cases in vaccinated individuals
4CMenB ⁵⁶	Australia	State-wide study in adolescents (South Australia)	71% MenB disease reduction
MenB-fHBP ⁵⁸	Italy	Regional immunisation programme (adolescents ≥10 years) (2018–2021)	Safety data reported only; the most reported AEs of MenB-fHBP vaccine were fever, neurological symptoms and local reactions
MenB-fHBP ^{53, 54}	USA	College outbreak setting	No further cases in vaccinated individuals; the most reported AEs of MenB-fHBP vaccine were injection site pain, fatigue and headache

Table 3. Summary of selected real-world evaluations of MenB vaccines.⁴⁹⁻⁵⁹

Abbreviations: 4CMenB, 4-component meningococcal B vaccine; AE, adverse event; MenB-fHBP meningococcal B factor-H binding protein vaccine; UK, United Kingdom; USA, United States of America.

Effectiveness of MenACWY and MenB vaccines for IMD prevention

Real-world data confirm that the existing MenACWY glycoconjugate and MenB protein-based vaccines produce a **robust immune response in infants, adolescents and young adults, including in outbreak settings.**

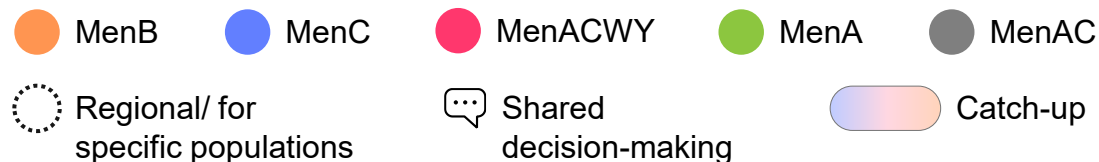
The effectiveness of **mass immunisation** for infants and targeted vaccination for adolescents in reducing serogroup B IMD is **supported by international evidence.**

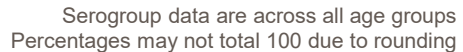
Inclusion of Meningococcal vaccinations in NIP by age group

Region	Country	Infant 6w – 12m	Toddler 13 – 23m	Child 2 – 10y	Teen/Adult 11 – 25y	Adult 26 – 64y
Europe	UK ⁴³	●	● ●		●	
	Italy ⁴²	●	● ●		●	
	France ²⁴	● ●	12m–24y			
	Spain ²⁶	● ●			13–18y ●	
	Germany ⁴⁵	●	13m–17y			
	Portugal ⁴⁶	Up to 5y		Up to 18y		
	Czech Republic ^{31,38}	6–11m, ●	12–23m, 24–59m ●	●	● ●	
	Belgium ^{35,36}		● ●		●	
	Ireland ²⁷	From 3m		7m–23y		
	Netherlands ³⁷		●		●	
	Lithuania ⁴⁷	●	●			
	Malta ²⁸	● ●	●		●	
	Austria ⁴¹	● ^a	● ^a ● ^a		●	

Region	Country	Infant 6w – 12m	Toddler 13 – 23m	Child 2 – 10y	Teen/Adult 11 – 25y	Adult 26 – 64y
North America	US ^{33,34,49}				● Up to 18y	
	Canada ^{32,40}	● ● ●	● ● ●	●	● ● ● Up to 3 rd y high school ^b	
South America	Brazil ^{50,51}	●	●	●	● ●	
	Argentina ^{30,52}	●	●		●	
	Chile ⁵³	●				
APAC countries	Australia ^{25,39}	● ●			● ●	
	New Zealand ^{54,55}	● ^c	13–59m ^c			
	China ^{56,57}	●	●	2–4y ^d		

- MenACWY are relatively **well-covered**
- MenB remains new** in APAC region, **gained importance in recent years**





The same results were first published in the sources listed in the notes. The graph has been independently created by GSK using data originally published in the sources

Invasive meningococcal disease (IMD)

- Newer data show that although the public health measures in response to the coronavirus disease 2019 (COVID-19) pandemic temporarily reduced the incidence of IMD, there has been a **resurgence** in the years since.
- In the Asia-Pacific (APAC) region, **many countries do not include meningococcal vaccines in their routine vaccination programmes**, and approaches to IMD surveillance are inconsistent.

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Epidemiology of IMD

- Estimates of IMD prevalence are available for many countries in the region, including:
 - **China (0.2/100,000),**
 - **South Korea (0.01–0.08/100,000), and**
 - **Vietnam (0.02/100,000),** with
- Several studies noting **higher prevalence in younger patients** (e.g. <5 years) or military recruits
- Seroprevalence data suggest that **group B exposure is predominant in many countries in APAC.**
- **In China, MenB seroprevalence has risen rapidly since 2015 to 52.4%; whereas MenA has declined.**
- Similarly, a study of IMD in army personnel in Vietnam found that MenB has been predominant since 2014 and accounted for all cases from 2019 to 2021.

Epidemiology of IMD

- Overall, serogroup B is the predominant cause of disease in the APAC region, followed by W and Y. However, serotype A has been a common cause of outbreaks in Asia from 1960–2005.
- Hospital data from some parts of the region, e.g. Bangladesh, suggest there may be a low level of endemic IMD of various serotypes, **but data from more economically developed areas such as Hong Kong, Japan and Singapore indicate a sporadic incidence of endemic IMD .**

Prevalence, predominant serotypes and vaccination programmes in selected Asia-Pacific locations

Country/ Region	IMD prevalence	Serotypes	Vaccination programmes
China	0.0078/100,000 ¹	C (49.7%) and B (30.2%); rapid increase in B post 2015 ¹	MenA-PV (infants/toddlers), MenAC-PV (children, catch up vaccine) are included in the routine vaccination programme
Japan	<0.02 /100,000 ³	Y (63%) and B (26%) ³	Not in the routine vaccination programme ³
Republic of Korea	0.01–0.08/100,000 ⁴	B (24.1%) ⁴	Not in the routine vaccination programme ⁴ - MenACWY-DT or MenACWY-CRM is recommended in high-risk groups, travellers, medical laboratory workers and for outbreaks. - College freshmen residing in dormitories are encouraged to receive vaccination.
Chinese Taipei	0.009–0.204/100,000 ⁵	B (81.2%) ⁶	- MenACWY vaccination is recommended for high-risk or travellers to endemic areas. 4CMenB recommended for high risk and high exposure risk populations, and in infants >2 months of age.
Vietnam	0.02/100,000 ⁷	B (86.7–100%) ⁸	Not in the routine vaccination programme ⁹ 4CMenB is recommended by local experts for infants >2 months¹⁰

IMD, invasive meningococcal disease.

1. Xu J, et al. *Hum Vaccin Immunother* 2022;30;18:2071077; 2. Taha MK, et al. *Hum Vaccin Immunother* 2023;19:2186111; 3. Takahashi H, et al. *Vaccine* 41:416-426; 4. Choi H, et al. *PLoS ONE* 2021;16:e0244716; 5. Kim JH, et al. *Korean J Pediatr* 2016;59:461–465;

6. Chiou CS, et al. *Microbiol Spectr*. 2022;10:e0088222; 7. Taiwan Centers for Disease Control. Available at: https://www.cdc.gov.tw/En/Category/ListContent/bg0g_VU_Ysrgkes_KRUDgQ?uaid=hGTBtXNBhzrIKQkRrVwHg; 8. The Nguyen PN et al. *Hum Vaccin Immunother* 2023;19:2172922; 9. World Health Organization. Available at: https://immunizationdata.who.int/global/wise-detail-page/vaccination-schedule-for-country_name?DISEASECODE=&TARGETPOP_GENERAL=-; 10. Nguyen PNT, et al. *Infect Dis Ther* 2024. doi:10.1007/s40121-023-00905-y; 11. Government of the Hong Kong Special Administrative Region. Press Release LCQ10: Neisseria meningitidis. Available at: <https://www.info.gov.hk/gia/general/202311/01/P2023110100527.htm>; 12. Department of Health, Government of the Hong Kong Special Administrative Region. Available at: https://www.fhs.gov.hk/tc_chi/main_ser/child_health/child_health_recommend.pdf. All links accessed March 2024.

Epidemiology and overview of IMD in Asia: Summary

Country/ Region	IMD prevalence	Serotypes	Vaccination programmes
Hong Kong SAR	<0.2 /100,000 ¹⁰	B (69.2%) ¹¹	Meningococcal vaccines are not in the routine vaccination schedule. Vaccination is recommended for travellers to high-risk areas.
Singapore	0.2/100,000 (overall)¹ 1.6/100,000 (infants aged 0–4 years)¹	B^{1,2} exact percentage unknown	Not in the routine vaccination schedule³ MenACWY vaccination (MenACWY-TT, MenACWY-D, MPSV-4 or MenC-CRM) and MenB (4CMenB or MenB-fHBP) are recommended for high-risk groups
Thailand	<0.10 per 100,000 (overall)⁴ higher in children aged 0–4 years⁴	B (50–80%) ⁴	Not in the routine vaccination schedule⁴ MenACWY conjugate vaccines are recommended for travellers or during outbreaks, and laboratory workers.
Malaysia	Unknown IMD is not one of the mandatory notifiable diseases⁴	B and W⁴ exact percentage unknown	Not in the routine vaccination schedule⁵ MenACWY vaccination (MenACWY-D, MenACWY-TT, MenC-CRM) is recommended for high-risk groups.
Indonesia	Unknown; incomplete national data due to lack of surveillance system; no cases reported since 2010	B (67–100%) W and Y	- MenACWY vaccines are no longer available due to religious concerns. - MenB vaccines are not yet available. - A vaccination programme has been implemented for Hajj and Umrah pilgrims and Indonesian migrant workers.

Epidemiology and overview of IMD in Asia: Summary

Country/ Region	IMD prevalence	Serotypes	Vaccination programmes
The Philippines	0.08–1 per 100,000 (overall), - predominantly aged 1–4 years - Nationwide cases 2019: 286 - Nationwide cases 2021:108	B (69%), W135 (15.4%), C 1.4%, Y 1.4%, 15.4% untypeable	Not in the routine vaccination schedule⁴ MenACWY vaccination (MenACWY-D, MenACWY-TT, or MenACWY-CRM) is suggested for high-risk groups.
Sri Lanka	Unknown: IMD is notifiable with approximately 2–12 sporadic cases nationwide every year	B 82% and C 18% (B n=9/11; C n=2/11) ¹⁹	Not in the routine vaccination schedule⁴ MenACWY vaccination (MenACWY-D or MenACWY-CRM) is recommended for high-risk groups and is mandatory for travellers to Hajj and Ramadan sites.¹⁸

IMD, invasive meningococcal disease.

1. Aye AMM, et al. *J Infect* 2020;81:698-711; 2. National Centre for Infectious Diseases. Available at: <https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/Meningococcal-Disease.aspx>; 3. Ministry of Health, Singapore. Available at: <https://www.moh.gov.sg/resources-statistics/nationally-recommended-vaccines>; 4. Thisyakom U, et al. *Hum Vaccin Immunother* 2022;18:2110759; 5. Immunise4life (Ministry of Health Malaysia). The Malaysian National Immunisation Programme (NIP). Available at: <https://immunise4life.my/the-malaysian-national-immunisation-programme-nip/>; 6. Malaysian Society for Infectious Disease & Chemotherapy. Guidelines for Adult Vaccination – Meningococcal Disease. Available at: <https://adultimmunisation.msdc.my/meningococcal-disease>. All links accessed March 2024.

The APAC Joint Consensus Statement

- Complement earlier expert opinion and review publications on IMD in APAC, and, where available, incorporate recent epidemiology data and insights on IMD in the post-pandemic era.
- In alignment with previous reports, we note that **considerable gaps in APAC surveillance data remain.**
- We urge national authorities to include IMD as a notifiable condition and suggest that expert groups in **APAC move towards a more uniform approach for testing and case definition.**



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Joint consensus on reducing the burden of invasive meningococcal disease in the Asia-Pacific region

Gang Liu, Maria Liza Antoinette M. Gonzales, Wai Hung Chan, Iqbal Ahmad Memon, Anggraini Alam, Hyunju Lee, Hetti Wickramasinghe, Quang Thai Pham, Rajeshwar Dayal, Michael Levin, Yhu-Chering Huang, Jim Buttery, Anna Lisa T. Ong-Lim & Mike Yat Wah Kwan

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Meningococcal vaccination policies and recommendations for APAC

- To address IMD, **Asian countries should consider including MenB and MenACWY vaccines in their immunisation schedules** guided by local serology data, local and international experts and regulatory agencies.
- **Nations facing a significant impact of serogroup B IMD among infants and children should consider including MenB vaccination in their infant or paediatric vaccination schedules.** Paediatricians and patient advocacy groups should be included when planning and implementing such a programme.
- **Where epidemiological data suggests there is a risk, vaccination efforts for MenB should extend to adolescents and young adults**, especially those in densely populated settings, to mitigate the risk of transmission.
- **Meningococcal vaccination should be encouraged for individuals travelling from Asia to high-risk areas e.g. trips to Saudia Arabia (e.g. Hajj or Umrah) or elsewhere in the Middle East.**

Meningococcal Epidemiology and Vaccine Prevention in the APAC Region, presented by

Dr. Lance Rodewald, Senior Immunization Advisor at China CDC

I am honoured that he quoted our article by the Asian Society for Pediatric Infectious Diseases (ASPID) during the talk





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Expert Consensus Recommendations for APAC Region 亚太地区专家共识建议

10.40

HUMAN VACCINES & IMMUNOTHERAPEUTICS
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REVIEW

Joint consensus on reducing the burden of invasive meningococcal disease in the Asia-Pacific region

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Medicine, Princess Margaret Hospital, Hong Kong, China

- Experts reviewed IMD epidemiology, prevention strategies, international practices, cost-effectiveness, and social barriers to vaccination
- Consensus evaluated with modified Delphi methodology
- 专家们回顾了IMD的流行病学、预防策略、国际实践经验、成本效益以及疫苗接种的社会障碍因素
- 采用改良德尔菲法对共识进行评估

Selected recommendations

- IMD should be a mandatory notifiable disease
- Countries should consider introducing MenACWY and MenB vaccine guided by local serology, experts, and regulators
- If there is significant serogroup B impact in infants and young children, consider adding MenB vaccine to pediatric schedule, in consultation with pediatricians
- Encourage healthcare providers to advocate for vaccination

选定推荐意见

- IMD应被列为法定报告传染病
- 各国应根据当地血清学数据、专家意见和监管机构指导,考虑引入MenACWY疫苗和MenB疫苗
- 若B群脑膜炎球菌对婴幼儿造成显著疾病负担,应与儿科医生协商,考虑将MenB疫苗纳入儿童免疫规划
- 鼓励医疗卫生专业人员积极倡导疫苗接种

et al. Hum Vaccin Immunother. 2025;21(1):2477965. doi: 10.1080/21645515.2025.2477965

中英混合

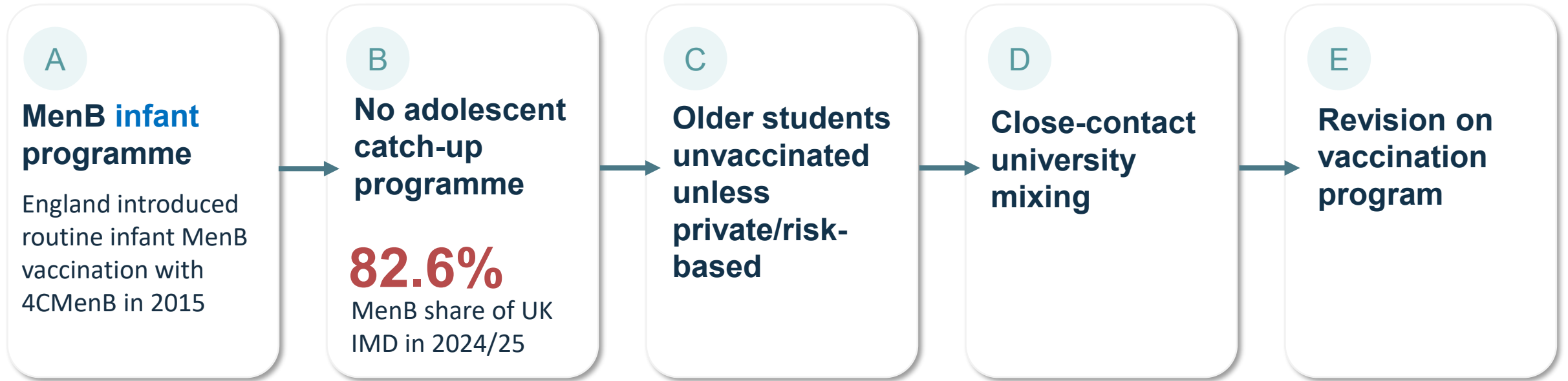
规划或大规模强化免疫活动。那些发病率低于
十万分之一的国家应该为他们的危险人群接种
疫苗。然后每个人都应该为免疫缺陷的人和可
能暴露的实验室工作人员接种疫苗。也是是
我们的下一个我们下一位演讲者是这篇精彩文
章的通讯作者。有一个会议来

中英混合

immuno deficiencies and laboratory
workers who could be exposed As well
Are very our next Our next speaker is the
corresponding author for this wonderful
article. There was a meeting to figure out
What should be done for the Asian region

AI 翻译

MenB infant programme success does not eliminate adolescent susceptibility in UK



2026 (announced on 12 June)



Press release

One-off MenB vaccination programme targeting Year 13 students and individuals under 25 entering university or residential ahead of the 2026 academic year



“International students under 25 entering their first year of university, should **receive their first dose** in their **home country** where possible.”

Recent review from Centre for Health Protection (CHP), updated on 20 March 2026

Based on the risk of infection, the SCVPD recommended the following individuals to receive meningococcal vaccinations as appropriate for personal protection.



Centre for Health Protection
Department of Health
The Government of the Hong Kong Special Administrative Region

- Travellers at **higher risk of exposure**
- Travellers to **other areas with reported meningococcal disease epidemics** or outbreaks should receive vaccine that aligns with the destination's prevalent serogroups;
- **Long-term travellers** (such as those studying abroad) should receive meningococcal vaccination per the recommendations by the health authorities in the destination country;
- Individuals with **immunodeficiency** (advanced HIV infection, terminal complement component deficiencies and asplenia); and
- **Laboratory workers** who are routinely exposed to isolates of *N. meningitidis*.

Key Messages

- **IMD - The “Window of Detection” is very narrow**
- Adolescents and young adults’ **social behaviors increase the risk of** N. meningitidis transmission, putting them at high risk for IMD, second only to infants and young children
- **Up to 1 in 5 survivors of IMD have long-term sequelae**, and rates of sequelae following IMD are higher in adolescents and young adults than in infants
- **IMD likely imposes a considerable burden on many nations in APAC**, but improvements in surveillance are needed to provide accurate and consistent data.
- **Serogroup B is becoming predominant in several nations within the region**, and post-pandemic data from outside APAC suggest that IMD incidence is rebounding after a temporary decline.
- **International studies support the effectiveness of vaccination with MenB and MenACWY vaccines in children, adolescents and young adults** in the context of national immunisation programmes and in response to outbreaks.
- **APAC nations should consider adding these vaccines to their immunisation programmes** informed by local epidemiological data and under the guidance of local and international experts.
- **Men vaccine is recommended to Travelers at higher risk of exposure**, Individuals with immunodeficiency by HKCHP

Thank you!!