



Revising the Adolescent Meningococcal Vaccine Schedule: Term of Reference and Considerations

Sarah Schillie, MD, MPH, MBA

February 29, 2024

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Outline

- Vaccine recommendations and coverage
- Epidemiology
- Duration of vaccine-induced protection
- Options for changing the immunization schedule

Adolescent Meningococcal Vaccine Recommendations

Table 1 Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, United States, 2024

These recommendations must be read with the notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars. To determine minimum intervals between doses, see the catch-up schedule (Table 2).

| Vaccine and other immunizing agents | Birth | 1 mo | 2 mos | 4 mos | 6 mos | 9 mos | 12 mos | 15 mos | 18 mos | 19–23 mos | 2–3 yrs | 4–6 yrs | 7–10 yrs | 11–12 yrs | 13–15 yrs | 16 yrs | 17–18 yrs |
|--------------------------------------------------------|-------|------|-------|-------|-------|-------|--------|--------|--------|-----------|---------|---------|----------|----------------------|-----------|----------------------|-----------|
| Meningococcal (MenACWY-CRM ≥2 mos, MenACWY-TT ≥2years) | | | | | | | | | | | | | | 1 st dose | | 2 nd dose | |
| Meningococcal B (MenB-4C, MenB-FHbp) | | | | | | | | | | | | | | | | | |

Range of recommended ages for all children
 Range of recommended ages for catch-up vaccination
 Range of recommended ages for certain high-risk groups
 Recommended vaccination can begin in this age group
 Recommended vaccination based on shared clinical decision-making
 No recommendation/ not applicable

- MenACWY:
 - Dose #1: 11–12 years
 - Dose #2: 16 years
- MenB* (shared clinical decision-making)
 - 2- or 3-dose series between 16–23 years of age (preferred range: 16–18 years)
- MenABCWY:
 - Recommended when both MenACWY and MenB indicated at same visit

*Both (all) doses must be from same manufacturer

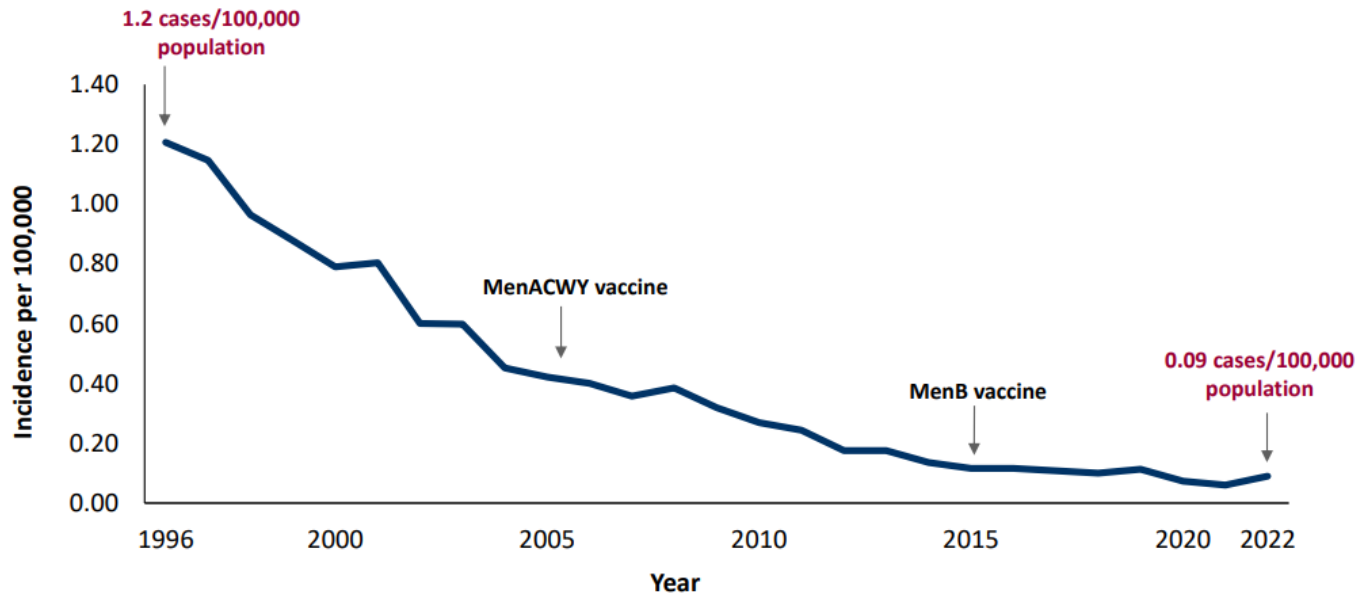
2022 Meningococcal Vaccine Coverage

- MenACWY
 - ≥ 1 dose at 13 years: 84.5% (81.3%-87.2%)*
 - ≥ 1 dose at 16 years: 89.8% (87.4%-91.8%)
 - ≥ 2 doses at 17 years: 60.8% (57.5%-63.9%)**
- MenB
 - ≥ 1 dose at 17 years: 29.4% (26.5%-32.4%)
 - ≥ 2 doses at 17 years: 11.9% (10.0%-14.1%)

*Coverage varies by metropolitan statistical area, poverty status, race/ethnicity, and health insurance status, although confidence intervals largely overlap

**Does not include adolescents who received 1st dose of MenACWY vaccine at age ≥ 16 years

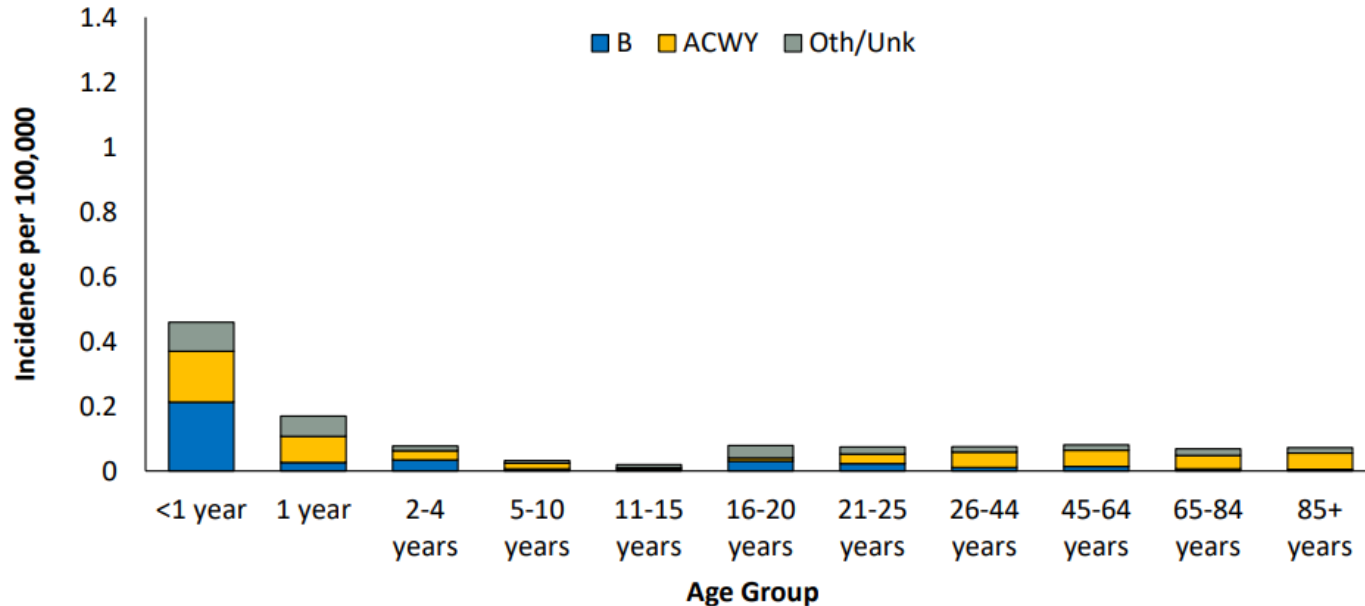
Meningococcal Disease Incidence — United States, 1996-2022*



Abbreviations: MenACWY vaccine = quadrivalent conjugate meningococcal vaccine against serogroups A, C, W, Y; MenB vaccine = serogroup B meningococcal vaccine
Source: 1996–2022 NNDSS Data.

*2021-2022 NNDSS data are preliminary

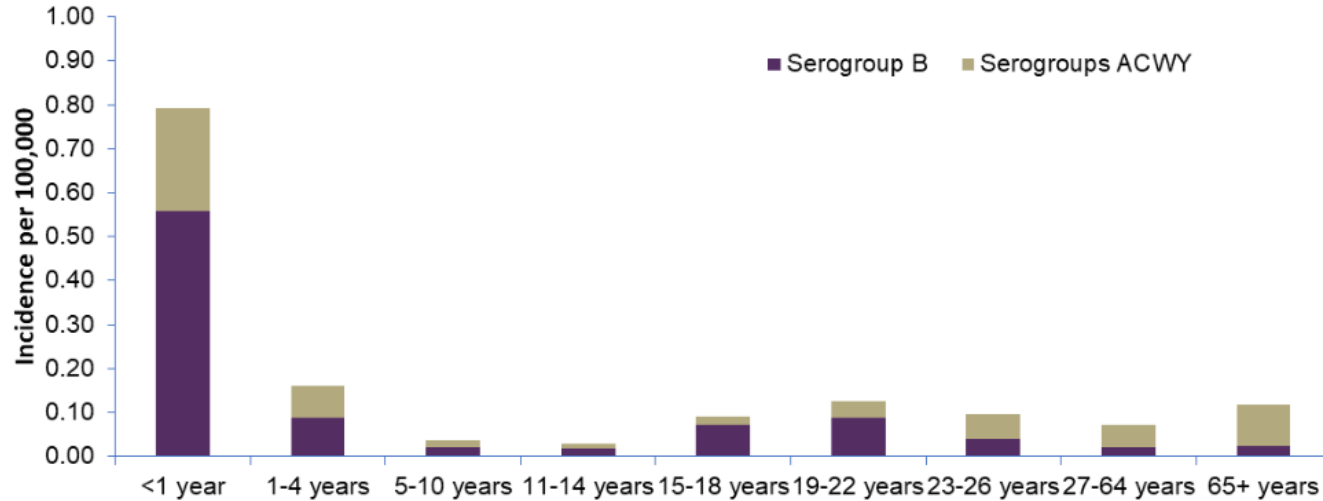
Average Annual Meningococcal Disease Incidence by Age-Group and Serogroup — United States, 2020-2022*



Source: NNDSS data with additional serogroup data from ABCs and state health departments

*2021 and 2022 data are preliminary

Average Annual Meningococcal Disease Incidence by Age-Group and Serogroup — United States, 2012-2021*



* Unknown serogroup (12%) and other serogroups (9%) excluded

SOURCE: CDC; National Notifiable Diseases Surveillance System with additional serogroup data from Active Bacterial Core surveillance and state health departments

Increasing Case Counts

- Preliminary data indicate 416* cases in 2023
 - Highest number of cases since 2014
- Rates of disease greatest in children <1 year of age
- Second peak in adolescence; among cases in 2021:
 - 19 of 210 (9.0%) total cases in 11-23 year-olds

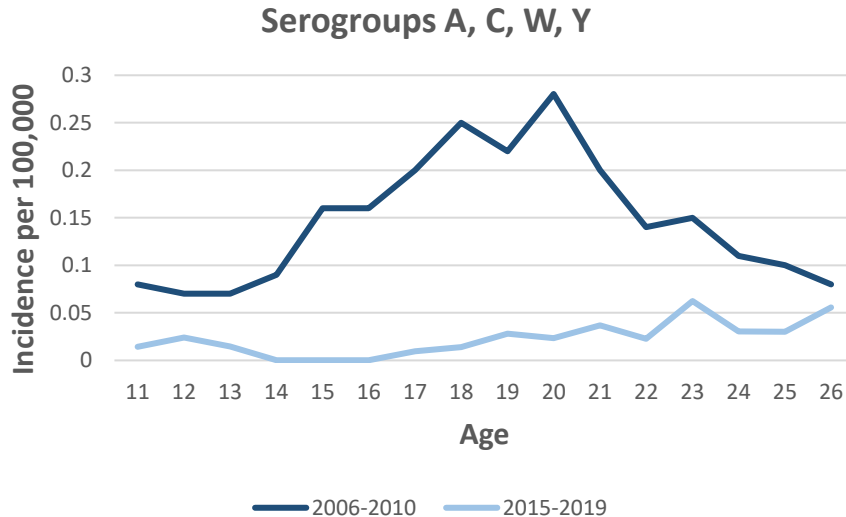
*Confirmed and probable cases

Cases Averted Due to Vaccination

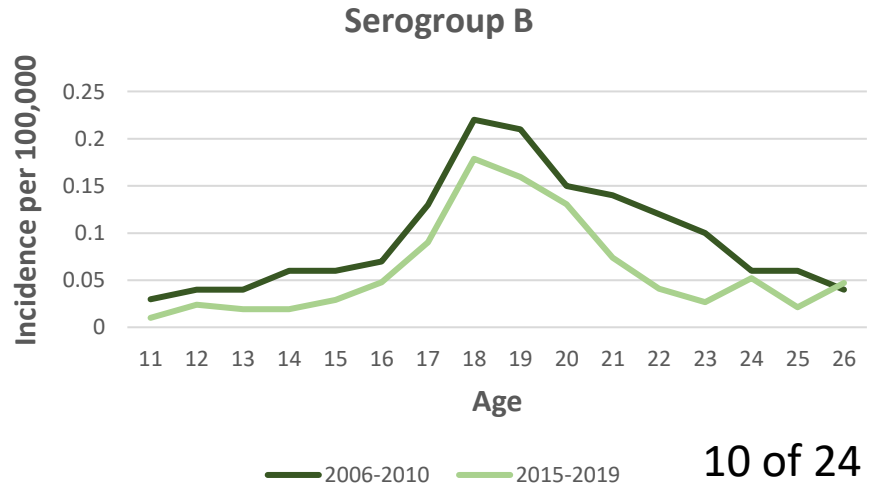
- Among adolescents 11-15 years old, incidence decreased:
 - 16.3% (12.1%-20.3%) during prevaccine period
 - 27.8% (20.6%-34.4%) during post-primary dose period
- Among adolescents 16-22 years old, incidence decreased:
 - 10.6% (6.8%-14.3%) during post-primary dose period
 - 35.6% (29.3%-41.0%) during post-booster dose period
- Estimated 222 cases of serogroup C,W,Y disease averted through vaccination of adolescents from 2006-2017

Incidence of Meningococcal Disease by Serogroups Following MenACWY Vaccine Implementation

ACWY disease incidence substantially **decreased** in adolescents

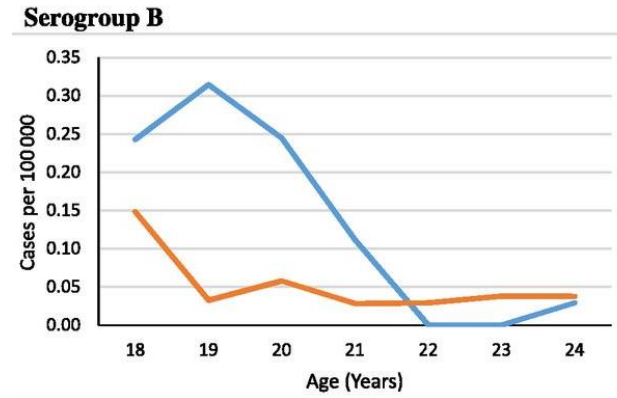
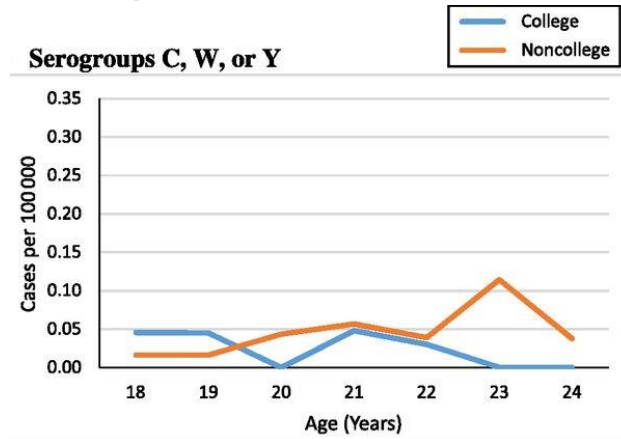


B disease incidence was **similar** in adolescents over time



Serogroup B Disease Risk is Higher among College Students

- College students have a 3.5-fold (95% CI: 2.2-5.4) higher risk of serogroup B disease than non-college students
- Serogroup B incidence peaks for 19 year-old college students and declines after age 20



Additional Factors Associated with Increased Risk among College Students

- 4-year college students had a **5.2-fold** (95% CI: 3.6-7.7) higher risk of serogroup B disease than non-undergraduates aged 18-24 years
 - Risk among 2-year college students was comparable to non-undergraduates (RR 1.0, 95% CI: 0.4-2.1)
- First-year students were at **3.8-fold** (95% CI: 2.4-6.0) higher risk of serogroup B disease than non-first-year students
- On-campus residents at **2.9-fold** (95% CI: 1.8-4.6) higher risk of serogroup B disease than off-campus residents
- Students participating in Greek life were at **9.8-fold** (95% CI: 4.6-21.2) higher risk of serogroup B disease than other students during outbreaks

Duration of Vaccine-Induced Protection

- MenACWY
 - Protection wanes 3 to <8 years postvaccination
 - <1 year: 79%
 - 1 to <3 years: 69%
 - 3 to <8 years: 61%
- MenB
 - Protection wanes 1-2 years following primary vaccination

Mbaeyi S, et al. MMWR Recomm Rep 2020 <https://www.cdc.gov/mmwr/volumes/69/rr/pdfs/rr6909a1-H.pdf>; Stephens D, et al. in Plotkin's Vaccines 8th edit 2024; Dretler A, et al. Hum Vacc & Immuno 2018; Cohn A, et al. Pediatr 2018

Effectiveness of Bexsero against Gonorrhoea

- Bexsero is recommended for prevention of serogroup B meningococcal disease
 - Some protection against gonorrhoea is also likely
- *N. meningitidis* and *N. gonorrhoeae* closely genetically related
 - ~80 to 90% sequence homology
- Potential for outer membrane vesicle (OMV)-containing MenB vaccines (e.g., Bexsero) to provide protection against *N. gonorrhoeae*

Revising the Adolescent Meningococcal Vaccine Schedule

- Revisions to the schedule should optimize protection against meningitis
- Considerations for meningitis protection include:
 - Ages at higher risk for meningitis
 - Recent meningitis epidemiology
 - Duration of vaccine-induced protection

Revising the Adolescent Meningococcal Vaccine Schedule, cont.

- Maintaining harmonization with existing adolescent vaccination platform
- Pentavalent vaccine provides opportunity to reduce number of injections

Options for Revising Adolescent Meningococcal Vaccine Schedule

- MenACWY
 - Possibly eliminate 11-12 year-old dose
 - Change recommended age given recent epidemiology
- MenB
 - Change recommended age to increase protection upon college entry
 - Routine or risk-based recommendation
 - If risk-based recommendation, include permissive language for vaccination of persons in age group requesting protection but who may lack risk factors such as college attendance (equity considerations)

Schedule Options for Further Consideration

| Option | ACWY Dose#1 | ACWY Dose#2 | B Dose#1 | B Dose#2 |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------------------------------------------|----------------------|
| Current recomm. | 11–12 yrs | 16 yrs | 16 yrs – 23 years (preferred 16–18 yrs) SCDM | |
| 1 | 11–12 yrs | 16 yrs | 16 yrs | 17–18 yrs |
| 2 | 11–12 yrs | 16 yrs | 16 yrs risk-based | 17–18 yrs risk-based |
| 3 | No dose | 16 yrs | 16 yrs risk-based | 17–18 yrs risk-based |
| 4 | 15 yrs | 17–18 yrs | 17–18 yrs | 17–18 yrs |
| Proposed recommendations are for routine vaccination unless specified as “risk-based”; option numbers do not represent ordering of preference | | | | |

Schedule Options for Further Consideration, etc.

| Option | ACWY Dose#1 | ACWY Dose#2 | B Dose#1 | B Dose#2 |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------------------------------------------|----------------------|
| Current recomm. | 11–12 yrs | 16 yrs | 16 yrs – 23 years (preferred 16–18 yrs) SCDM | |
| 1 | 11–12 yrs | 16 yrs | 16 yrs | 17–18 yrs |
| 2 | 11–12 yrs | 16 yrs | 16 yrs risk-based | 17–18 yrs risk-based |
| 3 | No dose | 16 yrs | 16 yrs risk-based | 17–18 yrs risk-based |
| 4 | 15 yrs | 17–18 yrs | 17–18 yrs | 17–18 yrs |
| Proposed recommendations are for routine vaccination unless specified as “risk-based”; option numbers do not represent ordering of preference | | | | |

Schedule Options for Further Consideration, etc.

| Option | ACWY Dose#1 | ACWY Dose#2 | B Dose#1 | B Dose#2 |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------------------------------------------|----------------------|
| Current recomm. | 11–12 yrs | 16 yrs | 16 yrs – 23 years (preferred 16–18 yrs) SCDM | |
| 1 | 11–12 yrs | 16 yrs | 16 yrs | 17–18 yrs |
| 2 | 11–12 yrs | 16 yrs | 16 yrs risk-based | 17–18 yrs risk-based |
| 3 | No dose | 16 yrs | 16 yrs risk-based | 17–18 yrs risk-based |
| 4 | 15 yrs | 17–18 yrs | 17–18 yrs | 17–18 yrs |
| Proposed recommendations are for routine vaccination unless specified as “risk-based”; option numbers do not represent ordering of preference | | | | |

Synthesis of Work Group Comments

- Variability in desire to keep vs. eliminate 11–12 year-old dose of MenACWY
 - Favor keeping: Has taken years to ingrain the 11–12 year-old platform, 11–12 year-old dose may have reduced carriage and ‘worked’
 - Favor eliminating: Epi seems to support starting series at 16 years
- Consider administering MenB dose #1 at age 15 years*
- Try to achieve acceptable efficacy for duration of disease incidence peak in young adulthood

*Not among 4 options for consideration

Synthesis of Work Group Comments, cont.

- Oppose SCDM recommendations
 - Poor uptake, missed opportunities, implementation challenges, lack of strong recommendation prevents many institutions from implementing policies, not understandable to clinicians
 - Interest in changing MenB to risk-based or routine recommendation
- Harmonization of MenACWY and MenB schedules may reduce number of injections
 - Extra antigen administration (as may occur with administration of pentavalent vaccine) has not been a concern before
- Change in schedule may impact school requirements

Discussion

- Does ACIP concur with the 4 schedule options for further assessment?
- What additional information will help ACIP determine the preferred option?

Acknowledgements

- Lucy McNamara
- Jennifer Collins
- Samuel Crowe
- Sancta St. Cyr