The Cost-effectiveness of a Potential Pentavalent Meningococcal Conjugate Vaccine (Men ABCWY) versus the Current Men ACWY and Men B vaccines for US Adolescents

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Disclaimer: *The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.*

Conflict of Interest

CDC/NCIRD collaborators: **All collaborators, No conflict of interest**

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- Samuel James Crowe
- Lucy Alexandra McNamara

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Overview

- **Policy question:** Should the pentavalent vaccine (Men ABCWY) be considered as an option for Men ACWY/Men B vaccination in people currently recommended to receive both vaccines?

Current vaccination	
First dose	**Second dose**
At 11-12 yrs old with MenACWY	At 16 yrs old with MenACWY
At 16 yrs old with Men B	At 16 yrs old with Men B

Potential vaccination strategies			
First dose	**Second dose**	**Third dose**	**Key Label**
At 11-12 yrs old with MenACWY	At 16 yrs old with MenABCWY	At 16 yrs old with MenB	Q-P-B
At 11-12 yrs old with MenABCWY	At 16 yrs old with MenABCWY	None (N)	P-P-N
At 11-12 yrs old with MenACWY	At 16 yrs old with MenABCWY	At 16 yrs old with MenABCWY	Q-P-P
At 11-12 yrs old with MenABCWY	At 16 yrs old with MenABCWY	At 16 yrs old with MenABCWY	P-P-P

Men ABCWY = Potential pentavalent vaccine (P) with serogroups A, B, C W Y
Men ACWY = currently recommended quadrivalent vaccine (Q) for serogroups A, C, W, Y,
Men B =currently recommended monovalent vaccine for serogroup B

Economic analysis

Question: Is vaccinating adolescents 11-16 years old with Pentavalent vaccine series to prevent Invasive Meningococcal Disease in adolescents *cost-effective*?

Comparator

MenACWY vaccine: one dose at 11-12 years and one dose at 16 years. (Q-Q)
MenB vaccines: two doses at 16 years. (B-B)

↔

Interventions

Use of Pentavalent MenABCWY vaccine combined either as
Q-P-B
P-P-N
Q-P-P
or P-P-P

Base-case scenario: What is the *Incremental cost-effectiveness* of vaccinating healthy adolescents 11-12 and 16 years old with Pentavalent vaccine relative to *using* Men ACWY and Men B vaccines ?

Methods: Study question

Objectives:

- To analyze the impact of each meningococcal vaccination strategy for the prevention of Invasive Meningococcal Disease-related medical care, long-term sequalae and deaths among US adolescents.
- To compare the health and cost impact associated with the use of pentavalent meningococcal vaccine vs. current quadrivalent Men ACWY and Men B meningococcal vaccines, to estimate *cost-effectiveness* in terms of health-related quality of life, based on currently available data.

Perspective

- Base case is presented from a societal perspective, including
    - Quality-of-life impact to cases and indirect costs in the form of productivity loss and lifetime lost earnings due to a IMD-related acute disease, long-term sequelae or death.

Methods: Time frame and analytic horizon

Time frame and analytic horizon:

- **Intervention time frame:** cohort of 11yrs followed until 25yrs of age
  - Meningococcal serogroup specific cases annually for 15 years
  - Long term sequelae and death for 15 years

- **Analytic horizon:**
  - Outcomes counted annually or cumulative for 15 year
  - IMD disease long-term sequelae complications counted annually or cumulative for 15 years
  - Lifetime medical and indirect cost of disabilities and deaths

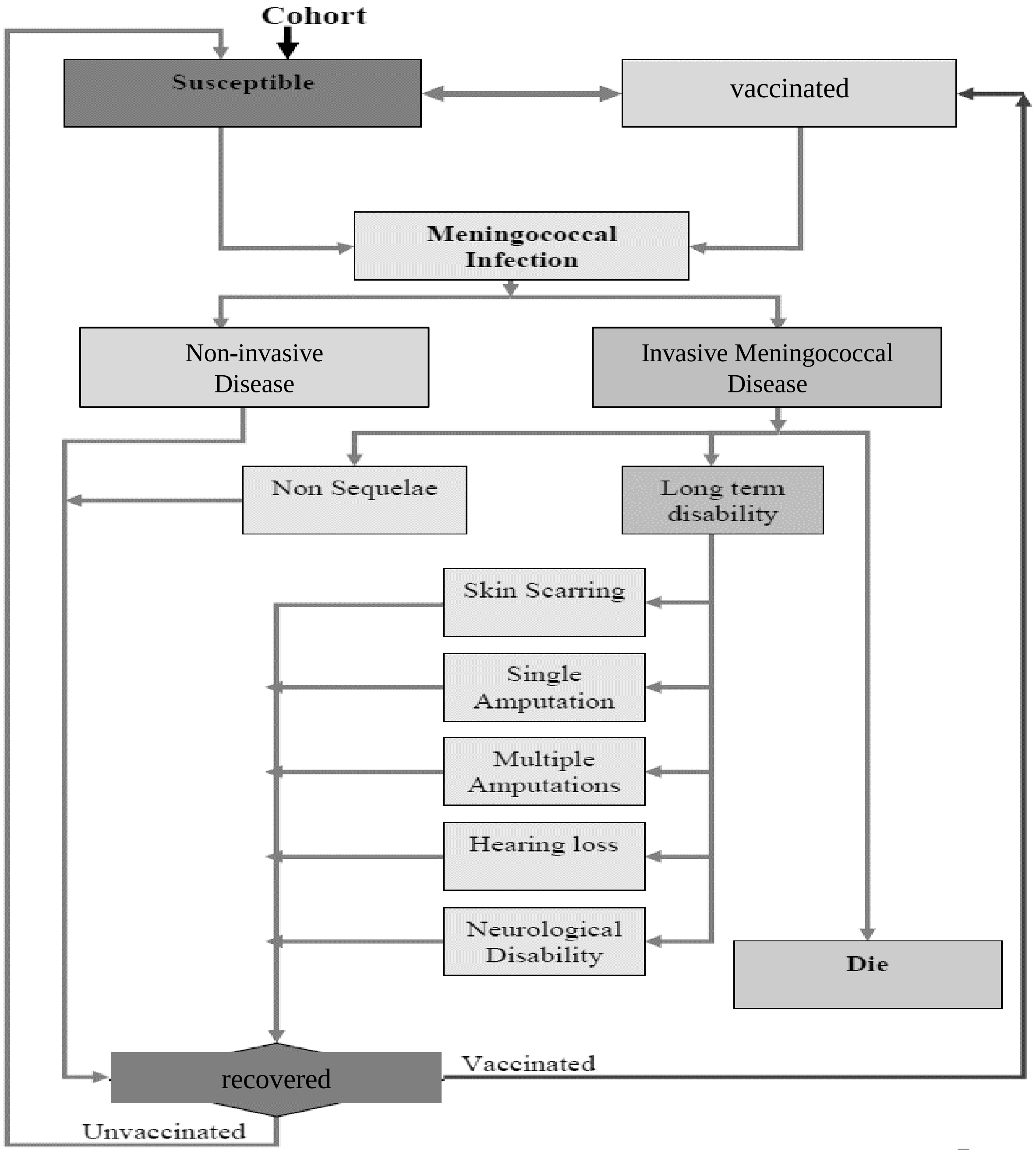
Discounting:

- 3% annual discount rate applied to cost and health outcomes.

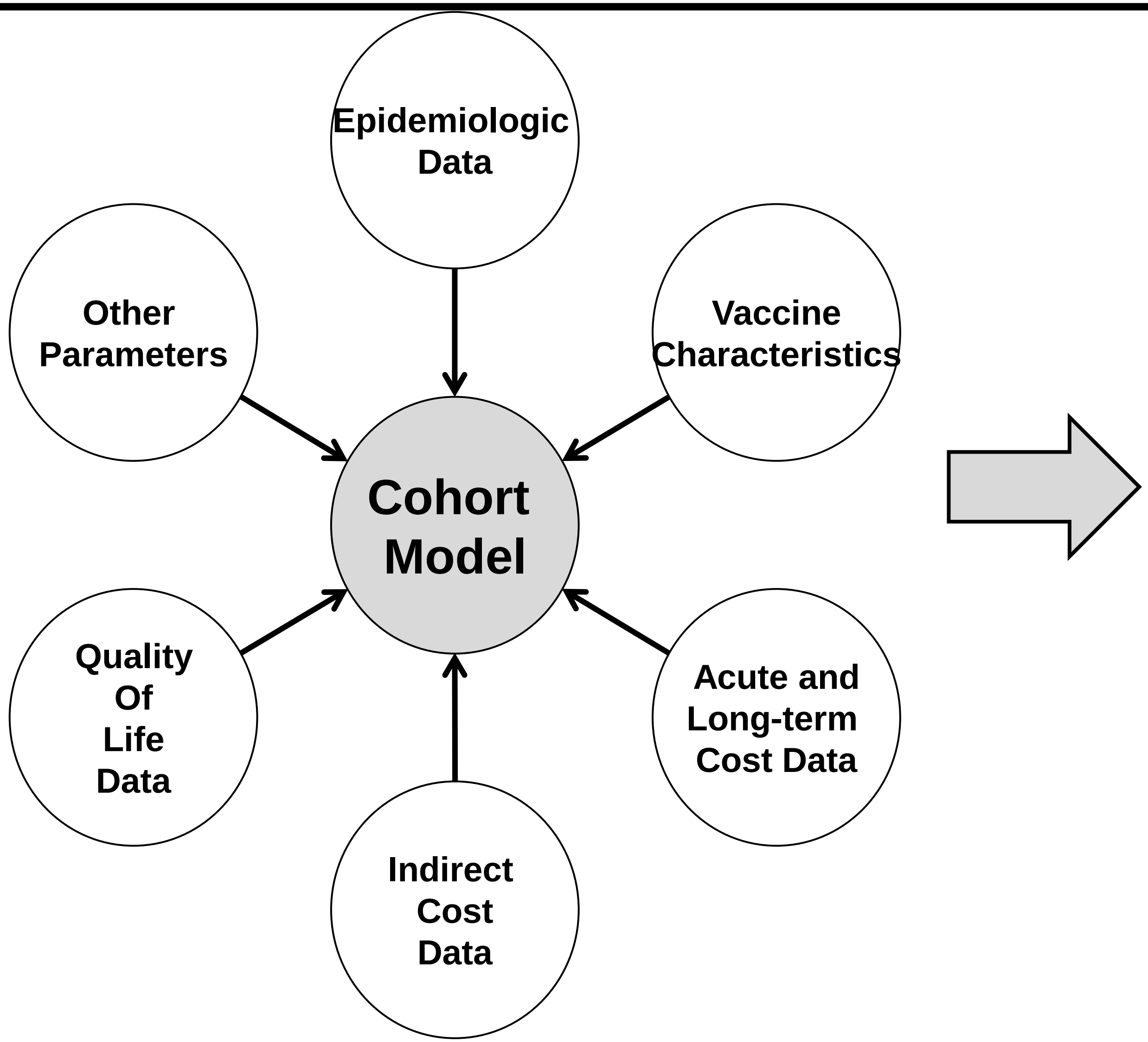
Methods: the model

Static decision analytic model

- Able to track 11-year-olds cohort yearly with states that transition from susceptibility, infected IMD, recovered or death
- Monte Carlo simulations for uncertainty and probabilistic sensitivity analyses
- Allowing pairwise incremental comparison of hypothetical strategies versus the standard of care
- Aggregating the associated IMD health outcomes and costs
- With specific vaccination program effectiveness, safety and costs
- For a cohort of 11-year-olds followed for 15 years



Methods: Inputs and main outcomes



Prevention of:
- IMD cases
- Associated sequelae
- Associated deaths

QALYs saved
$/Life year saved
$/QALY saved

NNV avert a:
- IMD case
- Complication
- Death

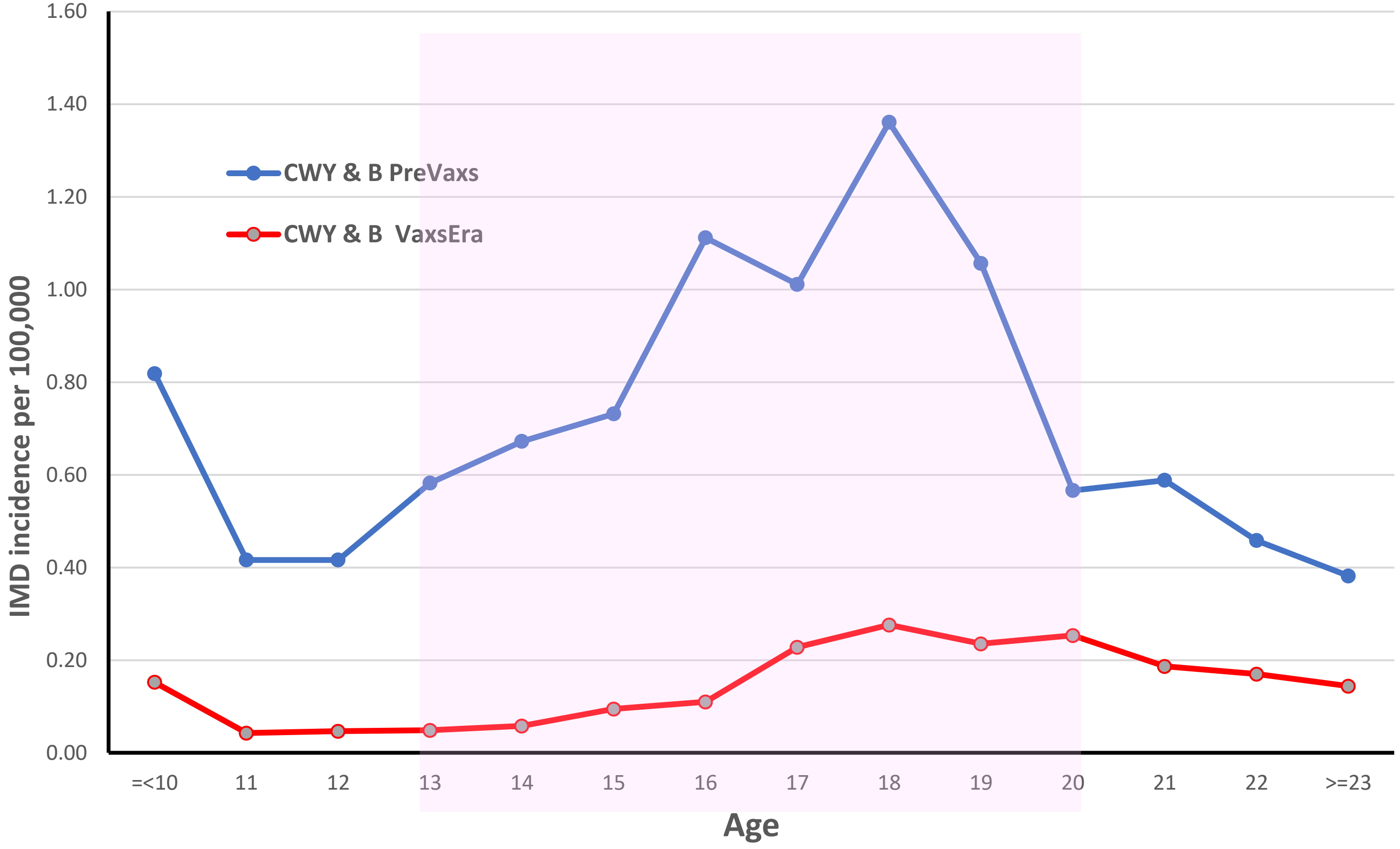
Epidemiologic Data

- Age- year- and B+C+Y+W serogroup-specific pre-vaccine and vaccine era incidence rates
  - 1996-2005 (pre-vaccine) and 2006-2020 (“vaccine era” for serogroups CWY)
  - 1994-2013 (pre-vaccine) and 2017-2020 (“vaccine era” for serogroup B)

- Age- and serogroup-specific case fatality ratios

- Proportion of survivors with sequelae by condition

Changes in the Average Annual Incidence in Vaccine Serogroups BCYW by Age per 100,000



- Rates of IMD disease remain relatively higher in late adolescence, but in general rates have been declining for all age groups.
- Overall, IMD incidence rates are one sixth of those from recent pre-vaccine era

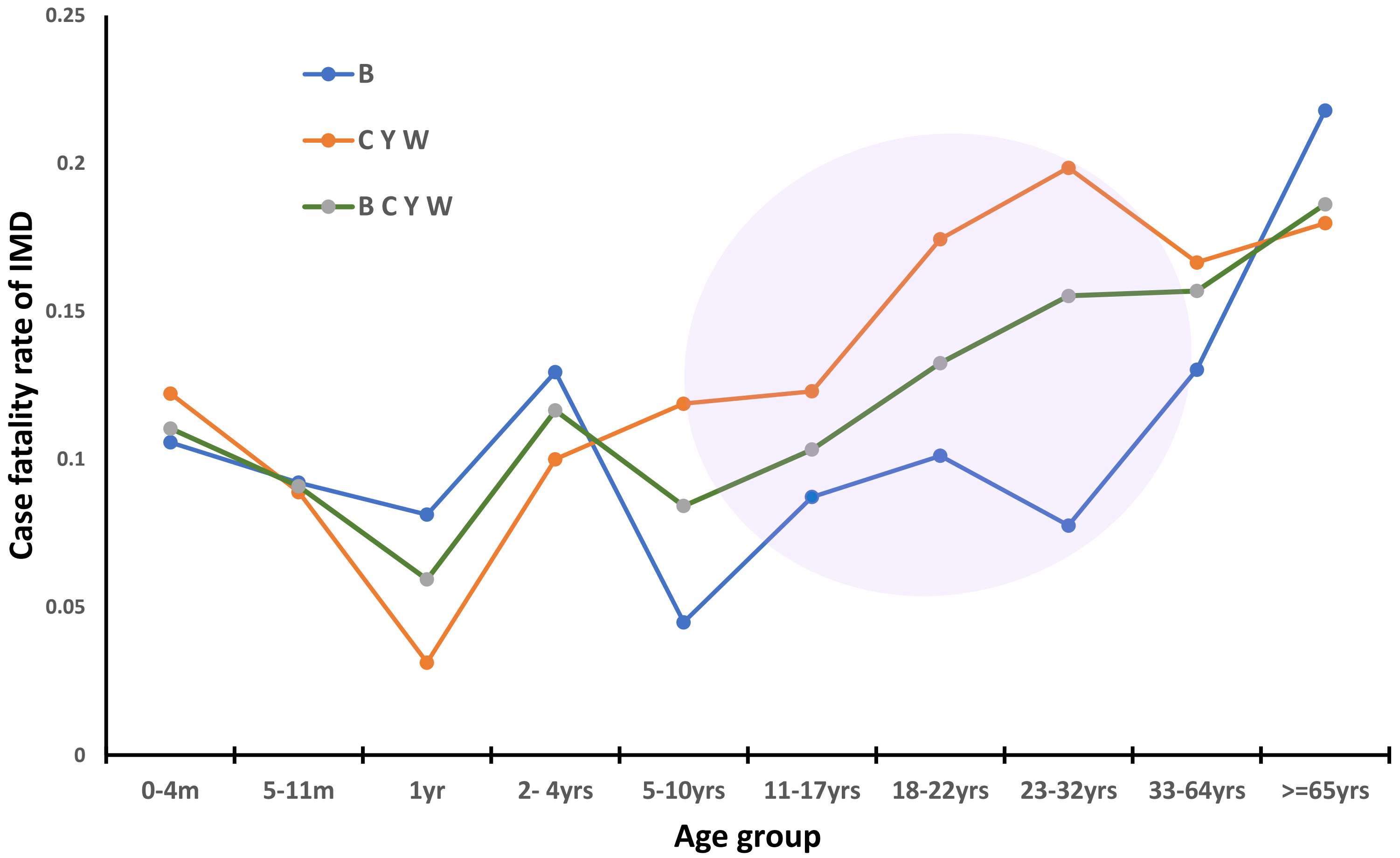
Source: Data from ABC Core Surveillance and NNDSS

Note: Trend and variability across years are used for range of uncertainties and sensitivity analyses

Background mortality and IMD Case Fatality Ratios by Age Group and Serogroups CYW, Serogroup B and Serogroups BCWY *

Age (years)	US mortality rates (per 100,000)
11	12.5
12	14.8
13	18.6
14	24.2
15	32.2
16	43.0
17	56.4
18	71.7
19	84.4
20	94.1
21	102.7
22	109.1
23	114.8
24	119.9
25	125.3
26	131.1

All other causes, all races, both sexes from 2020 Lifetables, Social Security Agency
https://www.ssa.gov/oact/STATS/table4c6.html



* CFR data is from NNDSS for 2008-2020

Percent of Survivor Cases with Sequelae by Type of Condition

Skin scarring	7.6 (0 - 19)	Included*
Single amputation	1.9 (0.5 - 10)	Included*
Multiple amputations	1.2 (0.02 - 6)	Included*
Hearing loss**	8.8 (2 - 20)	Included*
Significant long term neurologic disability***	2.1 (0.02 - 11)	Included*

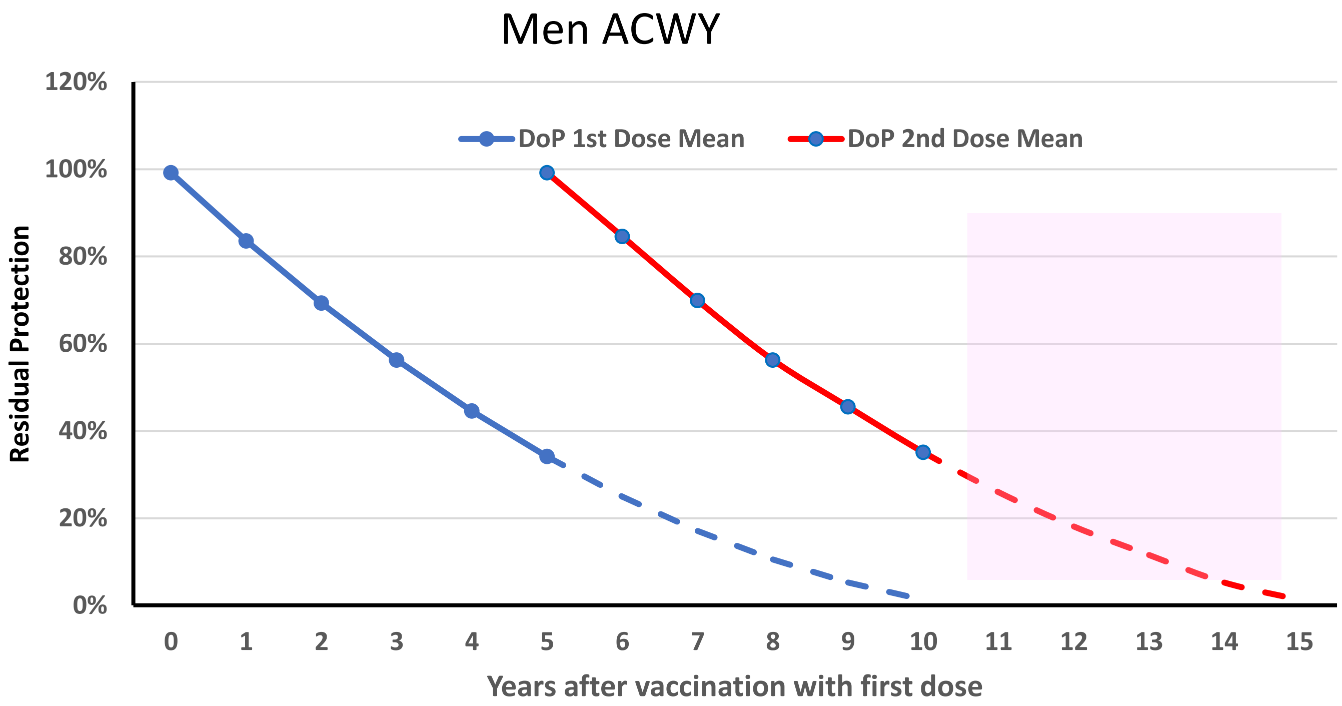
* Shepard *et al.* Pediatrics. 2005; 115:1220-1232 https://pubmed.ncbi.nlm.nih.gov/15867028/
Ortega-Sanchez IR *et al.* Clin Infect Dis. 2008;46:1-13 https://pubmed.ncbi.nlm.nih.gov/18171206/
**Edwards *et al*. J Pediatrics 1981; 99:540-5 https://pubmed.ncbi.nlm.nih.gov/7277093/
*** Baraff *et al*. PIDJ 1993;12:389-94 https://pubmed.ncbi.nlm.nih.gov/8327300/

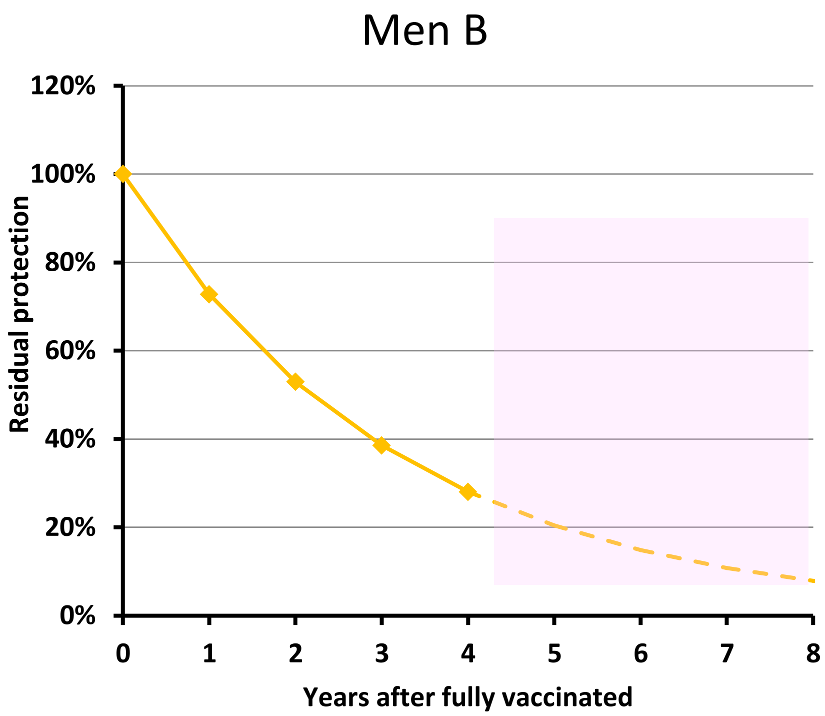
Initial vaccine effectiveness by vaccine and serogroup

	QUADRIVALENT			MEN B			PENTAVALENT		
	Base-case	**Low**	**High**	**Base-case**	**Low**	**High**	**Base-case**	**Low**	**High**
First DOSE Men ACWY	**93%**	73%	98%				**94%**	62%	96%
2nd + DOSE Men ACWY	**97%**	73%	98%				**97%**	94%	99%
First DOSE Men B				**60%**	--	--	**60%**		
2nd + DOSE Men B				**85%**	50%	99%	**88%**	79%	99%

Values and assumptions on initial protection are based on various sources:
Phase 3 noninferiority initial vaccine efficacy by single dose (at 11-12yrs) and second-dose (16yrs) of pentavalent (Men ABCWY) vaccine as reported by Pfizer (data on file).
Cohn AC, MacNeil JR, Harrison LH, et al. Active Bacterial Core Surveillance (ABCs) Team and MeningNet Surveillance Partners. Effectiveness and Duration of Protection of One Dose of a Meningococcal Conjugate Vaccine. Pediatrics. 2017 Feb;139(2):e20162193. doi: 10.1542/peds.2016-2193. PMID: 28100689; PMCID: PMC8353579.

Assumption: Residual protection by vaccine and serogroup





Assumptions on residual protection are based on various sources:

- Sero-protection is assumed to persist 4-5 years for a single dose of Men ACWY and Men ABCWY (based on hSBA sero bactericidal assay from Pfizer's clinical trials report)
- Duration of protection (DoP) for pentavalent Men ABCWY vaccines is assumed to follow Men ACWY
- Duration of protection (DoP) for Men B is after fully immunized with 2 doses
- The pink-shaded areas denote a higher level of uncertainty of the waning assumption beyond available surveillance or Phase 3 data
- Cohn AC, MacNeil JR, Harrison LH, et al. Active Bacterial Core Surveillance (ABCs) Team and MeningNet Surveillance Partners. Effectiveness and Duration of Protection of One Dose of a Meningococcal Conjugate Vaccine. Pediatrics. 2017 Feb;139(2):e20162193. doi: 10.1542/peds.2016-2193. PMID: 28100689; PMCID: PMC8353579.

Cost of vaccination per vaccine type, cost per dose* and vaccine administration setting

	Quadrivalent (Q)	Men B (B)	Pentavalent (P)
public sector cost for vaccine	$105.6	$141.84	$230.0
public sector admin cost	$15.0	$15.0	$15.0
private sector cost for vaccine	$156.0	$211.32	$250.0
private sector admin cost	$30.0	$30.0	$30.0
% vaccine purchased at public sector price	53.75%	53.75%	53.75%
% vaccine purchased at private sector price	46.25%	46.25%	46.25%
% vaccinations obtained from public health clinics	22%	22%	22%
% vaccinations obtained from private sector providers	78%	78%	78%
% vaccine waste	4.5%	4.5%	4.5%
Weighted cost per dose + administration	**$162.61** **($128 - $191)**	**$ 209.70** **($155 - $250)**	**$277.92*** ($255 - $290)**

* 2023 public and private sector cost per dose; VFC Current CDC Vaccine Price List, CDC. Although not included in these costs, rates and costs of moderate and severe adverse event were taken from the UK experience with MCC

Trotter et al., *BMJ* 2002; Ortega-Sanchez et al., *CID* 2008. They were applied to all vaccines

**Proportions of vaccine purchased at public and private sector and procurement from either private or private providers were based on difference sources (i.e., Glazner et al., Pediatrics 2009)

*** Calculated using a hypothetical range of prices as released by Pfizer Inc. for Men ABCWY.

Other Benchmark Elements

- Meningococcal disease incidence under vaccination
- Direct and Indirect costs of meningococcal disease
  - Acute phase costs and long-term costs
  - Productivity loss to deaths and sequelae
- Health related quality-of-life scores for estimating QALYs lost to sequelae

Program impact and cost-effectiveness then calculated by considering

Incremental Cost-effectiveness ratios
Monetary and quality-of-life costs associated with health outcomes
Cost of vaccination program including AEs
Quality of life outcomes

Sources: Shepard *et al.* Pediatrics. 2005; 115:1220-1232 https://pubmed.ncbi.nlm.nih.gov/15867028/
Ortega-Sanchez IR *et al.* Clin Infect Dis. 2008;46:1-13 https://pubmed.ncbi.nlm.nih.gov/18171206/

Components of cost of illness calculation

Outcome	Acute phase*			Lifetime	
	Med care (mening)	Parents' Work-Loss	Med care sequelae	Lifetime care (rehab, long term care)**	Productivity Loss
No Sequelae (acute phase	√	√			
Death	√	√			√
Skin scarring	√	√	√		
Single amput	√	√	√	√	
Multi amput	√	√	√	√	√
Hearing loss	√	√		√	√
Neuro seq	√	√		√ ***	√

* Includes caregivers' work time loss and public health response in outbreaks

** Includes special education for neurologic disability, prosthesis & rehabilitation for amputations, etc.

*** Significant neurologic disability lifetime medical costs were calculated and then annualized

Sources: Shepard et al. Pediatrics. 2005; 115:1220-1232 https://pubmed.ncbi.nlm.nih.gov/15867028/

Ortega-Sanchez IR et al. Clin Infect Dis. 2008;46:1-13 https://pubmed.ncbi.nlm.nih.gov/18171206/

Selected Cost of Meningococcal-Associated Events*

Event / Cost	Base-case	Range for SA
Invasive meningococcal disease		
Medical costs	$48,983	$24,459 - $87,790
Public health response costs	$13,547	$1,791 - $16,008
Value of work time lost by caregivers (acute phase)	$4,160	
Skin scarring		
Medical care	$7,436	$6,849 - $11,153
Single amputation		
Medical care	$23,050	$11,525 - $34,575
Other (prosthesis & rehabilitation)	$180,446	$90,222 - $270,668
Value of permanent disability	Age-specific	
Multiple amputations		
Medical care	$27,662	$13,830 - $41,491
Other (prothesis & rehabilitation)	$216,535	$108,267 - $324,802
Value of permanent disability	Age-specific	
Hearing loss		
Medical care	$89,566	$26,190 - $113,441
Value of permanent disability	Age-specific	
Long-term neurologic disability		
Residential care	$2,704,703	$923,013 - $3,288,152
Special education	$204,014	$123,350 - $245,230
Value of permanent disability	Age-specific	
Premature death		
11-17 yrs	$1,657,326	
18-24 yrs	$1,734,664	

* Costs were in 2022 US dollars and were adjusted for their social constant value in the economy using the Gross Domestic Product (GDP) deflator.
Sources: various source and some unit costs were obtained after sequalae specific intermediate estimations

Productivity Loss

- Incurred in cases with premature death or permanent sequelae:
  - Acute phase
    - Time of work missed — Caregiver
  - Death
    - Labor market earnings + household production* — Patient
  - Neurologic sequelae
    - Labor market earnings* — Patient & caregiver
  - Multiple amputations
    - 30% of labor market earnings** — Patient
  - Hearing loss
    - 33% of labor market earnings** — Patient

* Reported in Grosse SD, *et al*. J Med Econ. 2019 Jun;22(6):501-508.. https://pubmed.ncbi.nlm.nih.gov/30384792/
Values were adjusted to 2022 US$. Age-specific values, US population, 3% discount rate

** Shepard et al. Pediatrics. 2005; 115:1220-1232 https://pubmed.ncbi.nlm.nih.gov/15867028/
Ortega-Sanchez IR et al. Clin Infect Dis. 2008;46:1-13 https://pubmed.ncbi.nlm.nih.gov/18171206/

Health-related Quality of Life QALY Scores*

	Base case	High	Low
Baseline utilities 11-25 years old **	**0.92**		
Survivor of IMD without sequalae (first year only) ***	**0.91**	0.88	0.94
Death	**0**		
Skin scarring	**0.95**	1.00	0.80
Single amputation	**0.70**	0.80	0.31
Multiple amputations	**0.61**	0.71	0.31
Hearing loss/cochlear implants	**0.72**	0.82	0.64
Neurologic disability	**0.06**	0.39	0.00

* Several sources cited in: Shepard et al. Pediatrics. 2005; 115:1220-1232 https://pubmed.ncbi.nlm.nih.gov/15867028/
Ortega-Sanchez IR et al. Clin Infect Dis. 2008;46:1-13 https://pubmed.ncbi.nlm.nih.gov/18171206/
** Age-dependent EQ-5D-5L Utilities from Jiang, R. et al. Quality of Life Research, 2020:30, 803 - 816. https://pubmed.ncbi.nlm.nih.gov/33025373/
*** Assumption based on hospitalization scores (unpublished data from a JIVE Covid utilities study. University of Michigan)
Note: Among survivors, except those without sequelae, the specific score' reduction is applied for the remaining lifetime of survivor

Disease Incidence Under Vaccination

For each age group and for each vaccination strategy

$$MDI_{vacc} = MDI_{no\ vacc} * [1 - VE * DoP_t * Vcov]$$

Where:

- MDI_{vacc} = Meningococcal disease incidence under vaccination for each type of vaccine
- $MDI_{no\ vacc}$ = Meningococcal disease incidence without vaccination
- *VE* = Initial vaccine efficacy from each vaccine and dose
- DoP_t = Duration of protection factor (*t* = time in years after vaccination)
- *Vcov* = Vaccination coverage for each vaccine and dose

Economic evaluation

Number needed to vaccinate (NNV) ratio:

$$NNV = \frac{\#\, Vaccinees}{\#\, HO_{saved}}$$

Where:

- ***# Vaccinees =*** Number of individuals vaccinated against IMD during the time frame of the intervention
- ***#*** $\boldsymbol{HO_{saved}}$ **=** Number of health outcomes saved or prevented with vaccination, ex.,
  - Acute IMD cases prevented
  - Life-years prevented
  - lives saved

Incremental cost-effectiveness ratio (*ICER*) **:**

$$ICER = \frac{NC_{penta} - NC_{SoC}}{HO_{SoC} - HO_{penta}}$$

Where:

- $\boldsymbol{NC_{penta}}$ **=** *Net* Cost of IMD disease with new interventions (vaccine program costs)
- $\boldsymbol{NC_{SoC}}$ **=** Net Cost of IMD disease costs under Standard of care
- $\boldsymbol{HO_{penta}}$ **=** Health outcome using pentavalent (ex., QALYs)
- $\boldsymbol{HO_{SoC}}$ **=** Health outcome of Standard of Care (ex., QALYs)

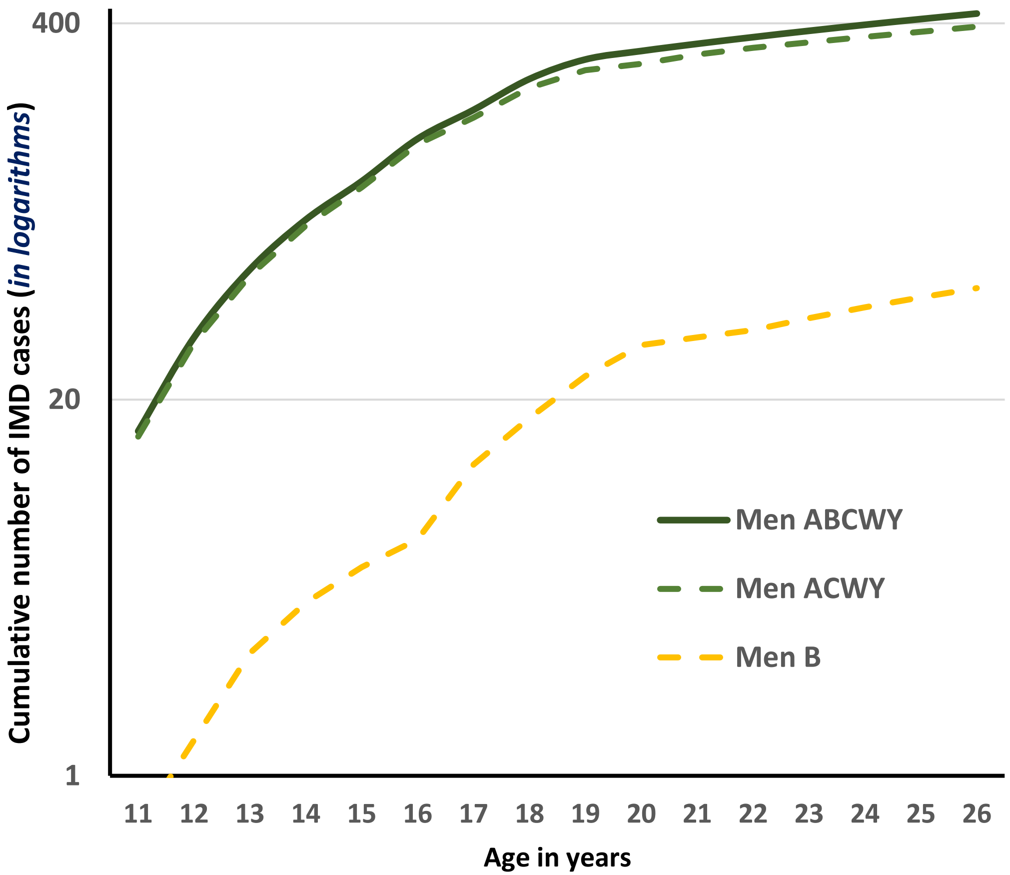
Both Cost and QALYs are discounted using:

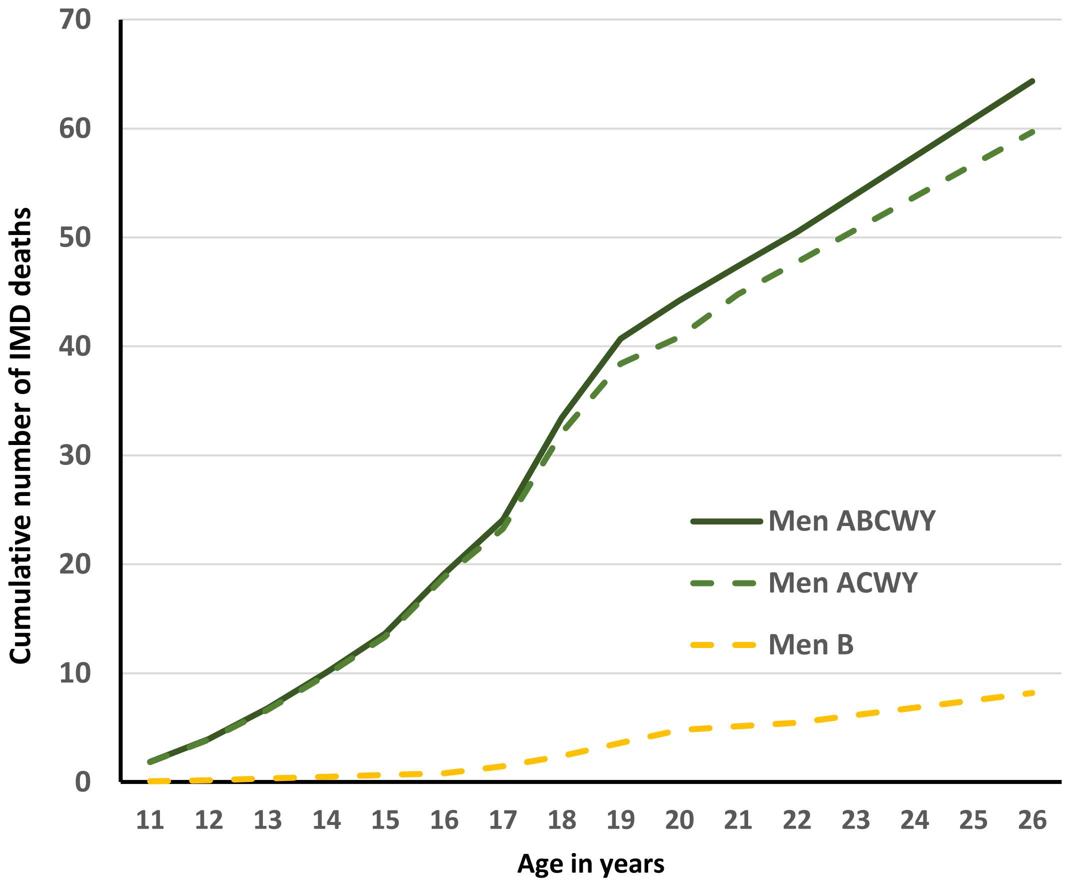
- ***t =*** time years after immunization *(t=0, 1, 2,…, T)*
- ***r*** **=** discount rate (3%)
- ***T =*** Analytical horizon (age-specific, in years)

Results*

**** Preliminary***

Expected Cumulative Annual IMD Cases* and Deaths** *without* vaccination in 11–25-years old*

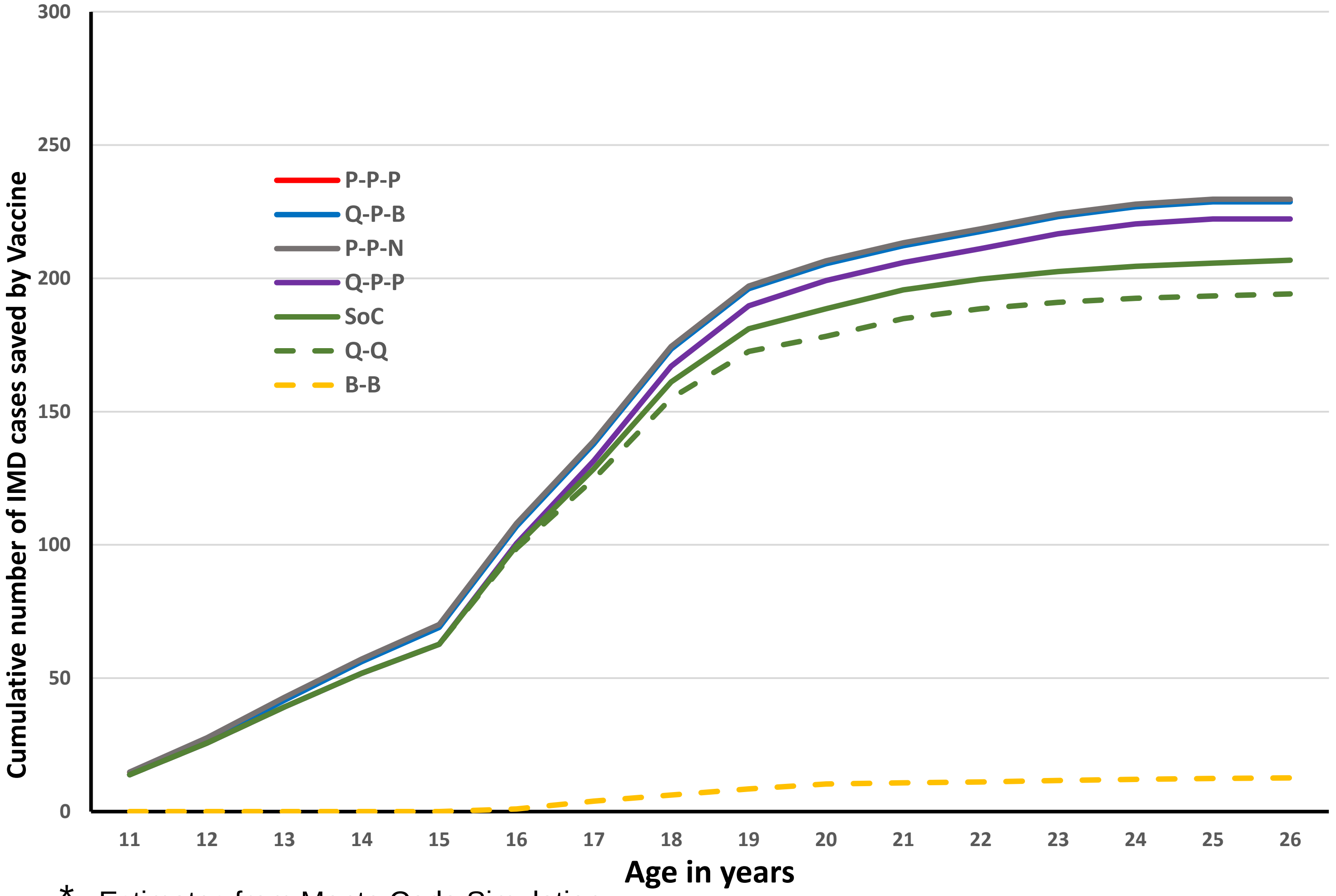




* Using IMD incidence data from 1996-2005 (pre-vaccine) for serogroups CWY and 1994-2013 (pre-vaccine) for serogroup B

** Using CFR data is from NNDSS for 2008-2020

Cumulative Number of IMD Cases Saved: Vaccination strategy- and age-specific*

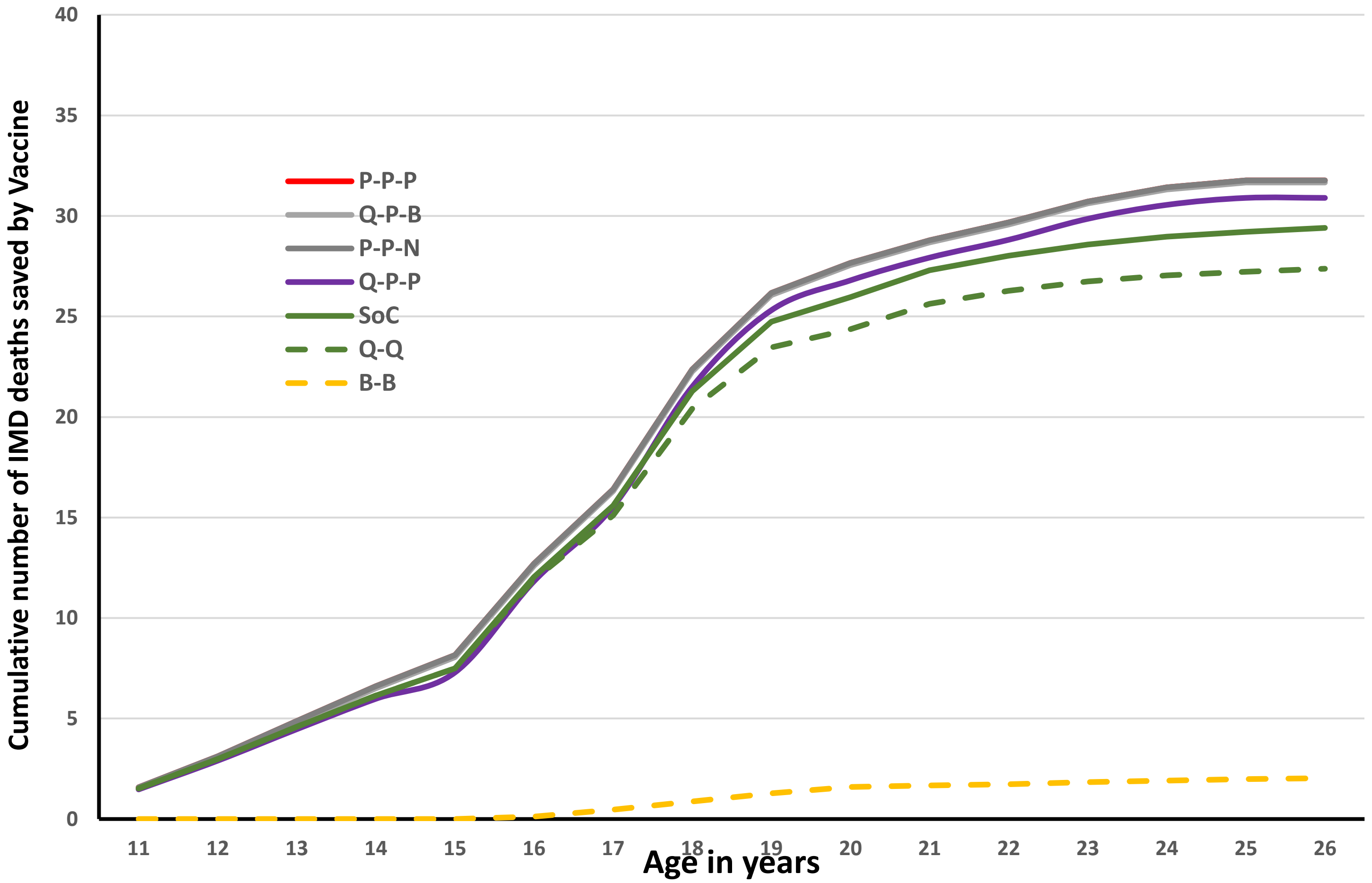


Strategy	Mean** (5th & 95th percentiles)
P-P-P	229 (191 – 273)
Q-P-B	228 (190 – 278)
P-P-N	229 (189 – 276)
Q-P-P	226 (185 – 270)
SoC	207 (163 – 252)
Q-Q	194 (156 – 241)

* Estimates from Monte Carlo Simulation

** Rounded to the nearest whole number

Cumulative Number of IMD deaths prevented: Vaccination strategy- and age- specific*



Strategy	Mean** (5^{th}, 95^{th} percentiles)
P-P-P	32 (25 – 40)
Q-P-B	32 (25 – 40)
P-P-N	32 (25 – 41)
Q-P-P	31 (25 – 40)
SoC	30 (23 – 37)
Q-Q	27 (21 – 36)

* Estimates from Monte Carlo Simulation
** Rounded to the nearest whole number

Number needed to vaccinated to prevent a case, save a life, a life-year or a quality-adjusted life year

	With Men ACWY (Q-Q)	With Men B (B-B)	Q-P-B	P-P-P
A IMD Case	19,034	292,559	16,144	16,085
A Death	133,981	1,810,451	115,450	115,086
A Life-year	4,644	63,695	4,763	4,745
A QALY	2,609	38,169	2,694	2,682

* Estimates from Monte Carlo Simulation
Men ABCWY = Potential pentavalent vaccine (P) with serogroups A, B, C ,W and Y
Men ACWY = Quadrivalent vaccine (Q) for serogroups A, C, W, and Y,
Men B =Meningococcal serogroup B vaccine (B)

Baseline of SoC: Health outcomes, Vaccine and Net Costs per ~4M Cohort, Mean (5th ,95th Percentile)*

	No Vaccine BCWY	Prevention with Men ACWY (Q-Q) Vaccine & Net Costs	Prevention with Men B (B-B) Vaccine & Net Costs	SoC
IMD Cases	**428** (296 - 604)	**194** (156 – 241)	**13** (7 – 21)	**207**
Deaths	**68** (44 - 95)	**28** (21 – 36)	**2** (1 – 4)	**30**
Life years ***	**1,938** (1252 - 2,701)	**796** (592 – 1,035)	**58** (31 – 98)	**854**
QALY's ***	**3,306** (3,084 - 4,513)	**1,416** (1,090 – 1,800)	**97** (53 – 164)	**1,513**
Vaccination program costs (in Millions $)	0.0	**$1,120.4** (826.9 – 1,471.5)	**$1,492.7** (1,061.2 – 2,18.6)	**$2,613.0**
Total net cost of illness (in Millions $) ***	**$270** ($178-$379)	**$997.5** (667.0 – 1,325.5)	**$1,485.0** (1,053.8 – 2.011.3)	**$2,482.5**

* Estimates from Monte Carlo Simulation

** Health outcomes were rounded to the nearest whole number

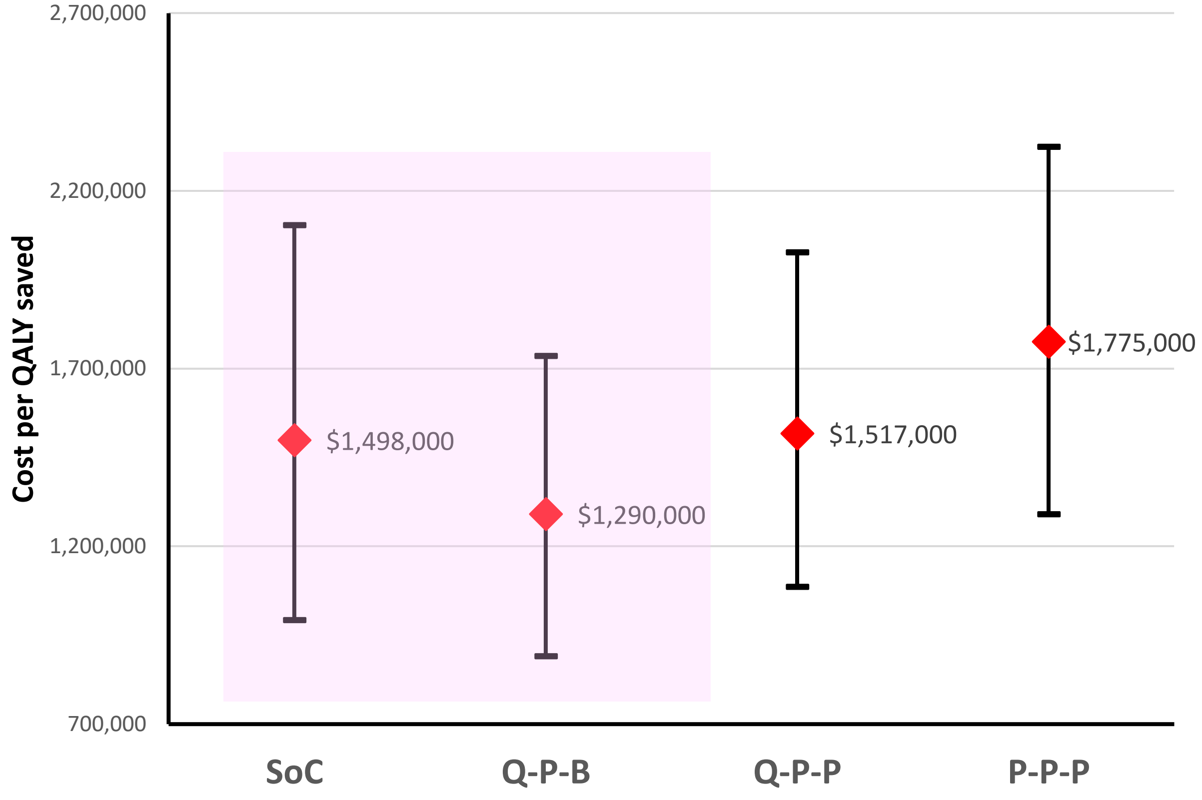
** Discounted at 3%

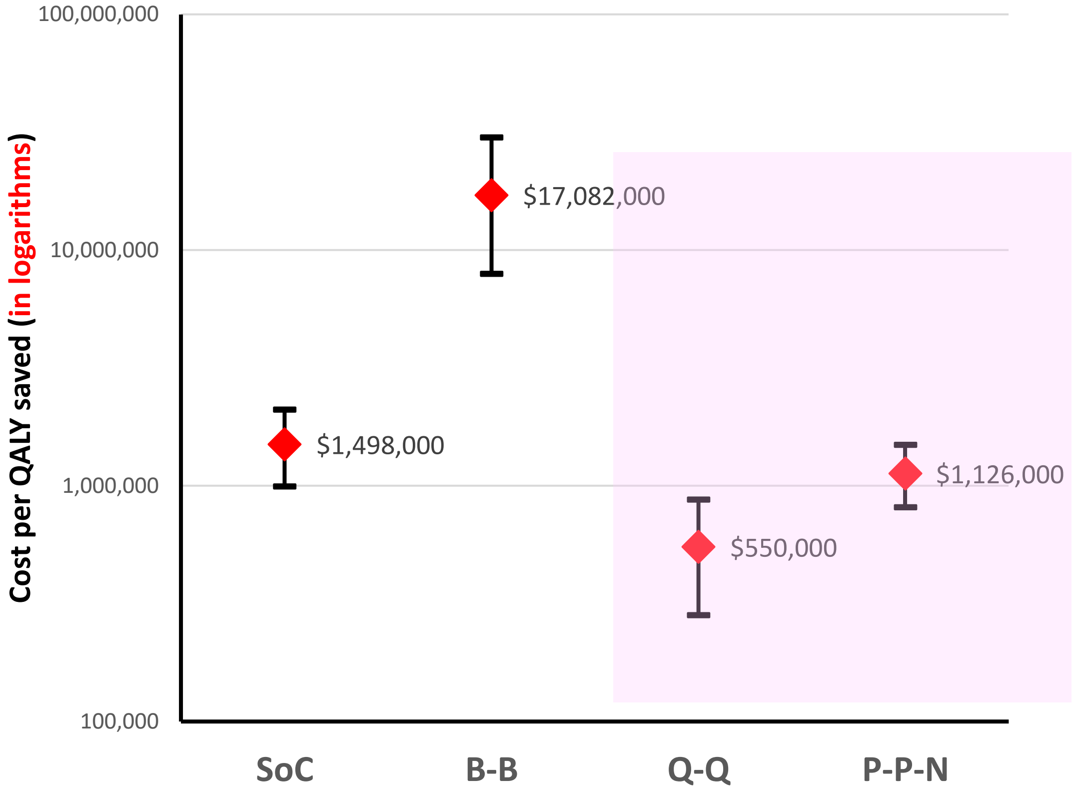
Health outcomes saved and Net Cost per 4M Cohort of 11yrs followed until 25yrs: Mean (5th, 95th Percentile)*

	SoC	Q-P-B (for Pico 1)	P-P-P	Q-Q	P-P-N (for Pico 2)
IMD Cases	**207**	**229** (190 – 278)	**229** (191 – 273)	**194** (156 – 241)	**229** (189 – 276)
Deaths	**30**	**32** (25 – 40)	**32** (25 – 40)	**27** (21 – 36)	**32** (25 – 41)
Life years saved ***	**854**	**775** (585 – 1,000)	**777** (584 – 995)	**796** (590 – 1,035)	**778** (577 – 1,012)
QALY's saved***	**1,513**	**1,370** (1,059 – 1,728	**1,376** (1,065 – 1,762)	**1,417** (1,090 – 1,800)	**1,375** (1,058 – 1,742)
Vaccination program costs (in Millions $)	**$2,613.0**	**$2,129** (1,870 – 2,425)	**$2,788.8** (2,602.5 – 2,983)	**$1,120.4** (826.9 – 1,472)	**$1,915.9** (1,788 – 2,049)
Total net cost of illness (in Millions $) ***	**$2,482.5**	**$1,986.4** (1,695 – 2,265)	**$2,645.6** (2,469 – 2,847)	**$968.2** (703.0 – 1,348)	**$1,773** (1,643 – 1,906)

* Estimates from Monte Carlo Simulation
** Health outcomes were rounded to the nearest whole number
** Discounted at 3%

Incremental Cost per QALY saved by each vaccination strategy when compared to No vaccination*





* Estimates from Monte Carlo Simulation, numbers were rounded to nearest thousand

The pink-shaded areas highlight comparison that would corroborate the incremental analysis results

Incremental Cost-Effectiveness Analyses for QALYs and Life-years saved (*in thousands $*)

	Q-P-B vs. No vaccination	SoC vs No vaccination	P-P-P vs No vaccination
$/QALY saved*	**$1,256**	**$1,461**	**$1,730**
$/ LY saved	$2,563	$2,908	$3,401

	P-P-N vs. No vaccination	Q-Q vs. No vaccination
$/QALY saved*	**$1,096**	**$534**
$/ LY saved	$2,279	$1,254

	Q-P-B vs. SoC (Pico 1)	P-P-P vs. SoC
ICER QALY saved*	**Q-P-B is cost-saving (Cost <0)**	P-P-P is incrementally costly $1,455
ICER LY saved*	Q-P-B is cost-saving (Cost <0)	P-P-P ***could be*** cost saving (Cost ≤0)** (Range from cost-saving to costly)

	P-P-N vs. Q-Q (Pico 2)
ICER QALY saved*	**P-P-N Is incrementally costly** $2,936
ICER LY saved*	**P-P-N is incrementally costly** $4,563

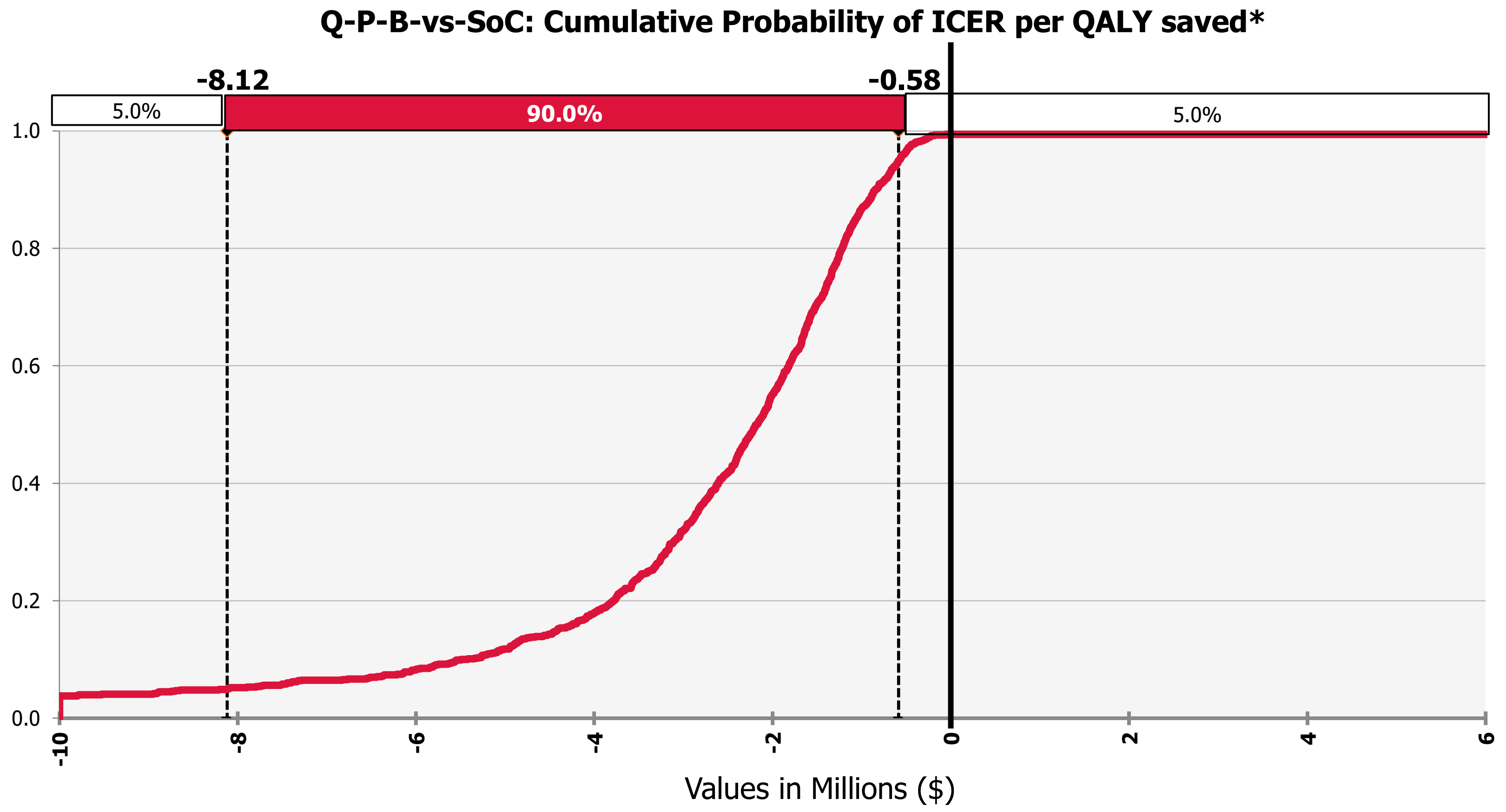
* Estimates from Monte Carlo Simulation (Discounted at 3%)

** the $/LY gained of P-P-N vs SoC strategy ***could be marginally*** cost-saving: Mean $/LY <0, but its 5th and 95th percentiles from simulation range from <0 to costly

Note: SoC = Standard of care = one quadrivalent dose 11-12yrs and second at 16yrs (= Q-Q) ***and*** 2 doses Men B at 16yrs (= B-B)

Cost-saving = a strategy could be said to be dominant when is cost-saving

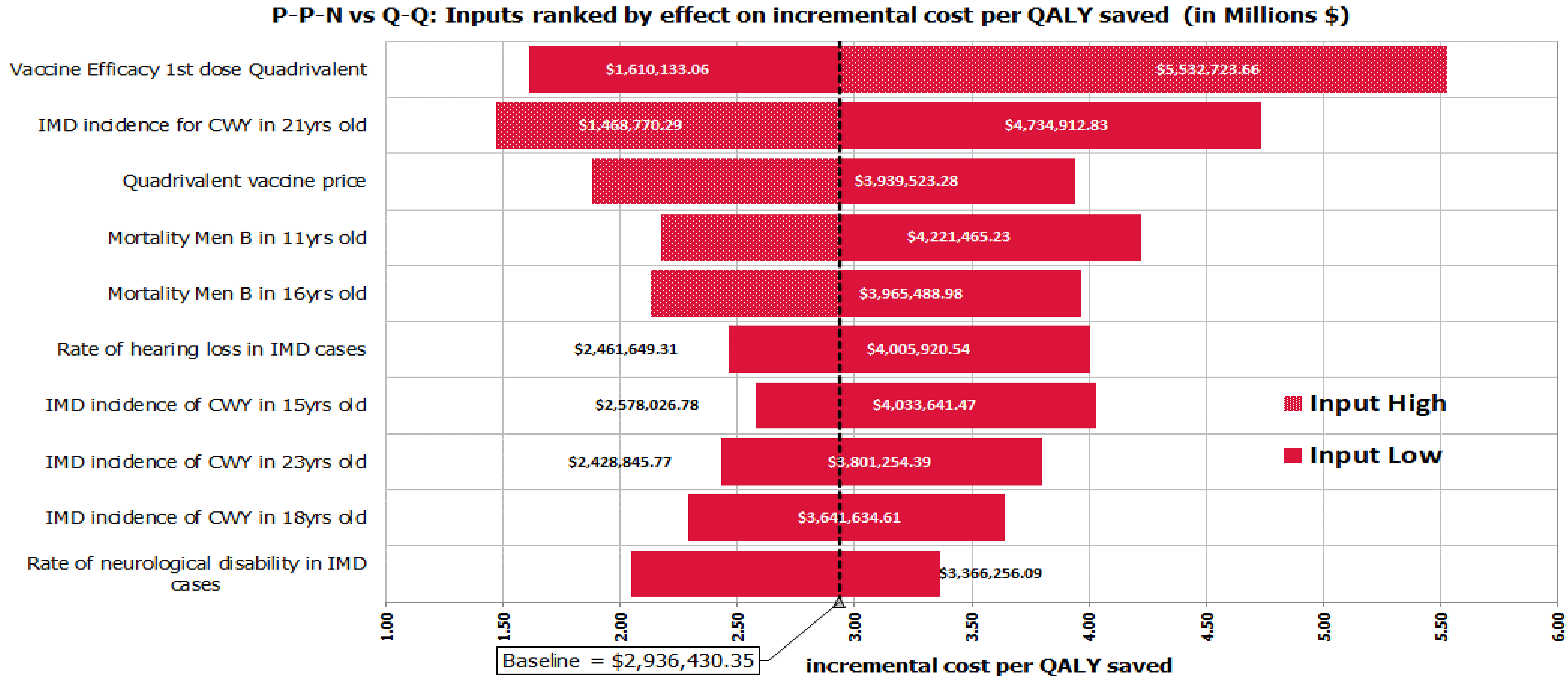
Probability of Incremental Cost-Effectiveness ratio per QALY saved: Q-P-B vs SoC: $/QALY<0 (Pico 1)



- Both 5th and 95th percentiles are negative (i.e., cost saving)
- More than 95% of the iterations were negative (i.e., cost saving)

*Estimates from Monte Carlo Simulation using a sample of 1000 iterations (Costs were discounted at 3%)
Range are 5th and 95th percentiles

Sensitivity of Incremental Cost-Effectiveness ratio per QALY saved: P-P-N vs Q-Q $2.9M/QALY gained (Pico 2)



Strengths and Limitations

Strengths

- Complex modeling
- Explicit use of incidence and CFR surveillance data for Men BCWY vaccine-containing serogroups

Limitations

- Data on vaccine effectiveness from pentavalent Men BCWY are from clinical trials
- Hard to ascertain decrease in IMD incidence rates due to natural decline trend vs. vaccine induced decline
    - Variability of vaccine uptake per type of vaccine

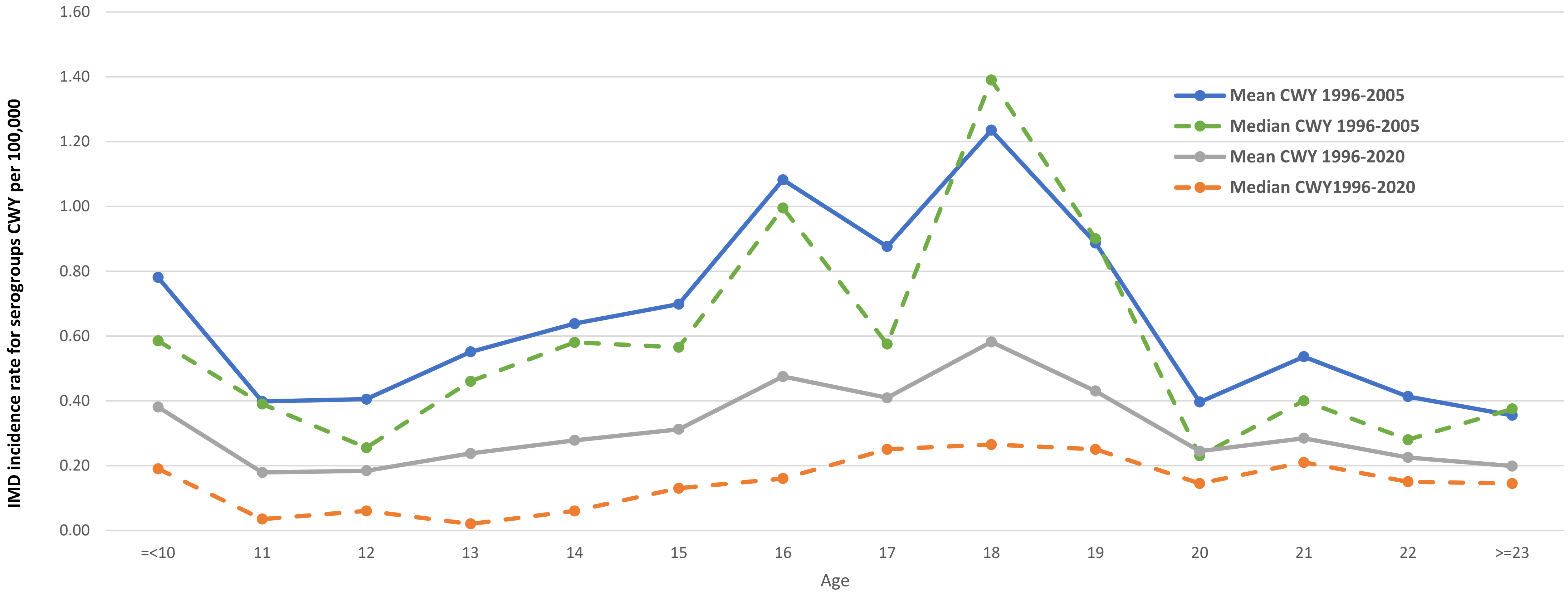
Conclusions

- Disease rates and vaccine cost drive the incremental analyses
- Although additional cases could be prevented by all vaccination strategies, they do it at different costs per health outcome
  - Most strategies with one or more doses of the Men ABCWY vaccine would save more or equal number of cases, but they do at a much higher costs per QALY saved when compared to the standard of care.
  - The exception is the Q-P-B, which included one dose of Men ABCWY in substitution of the second dose of Men ACWY and first dose of Men B.
    - Q-P-B could be incrementally cost-saving (ICER QALY <0) relative to the standard of care
- Using last 10 years of epidemiology data and current (or proposed) vaccine prices increase the cost of all strategies compared to previous analyses

End of Presentation

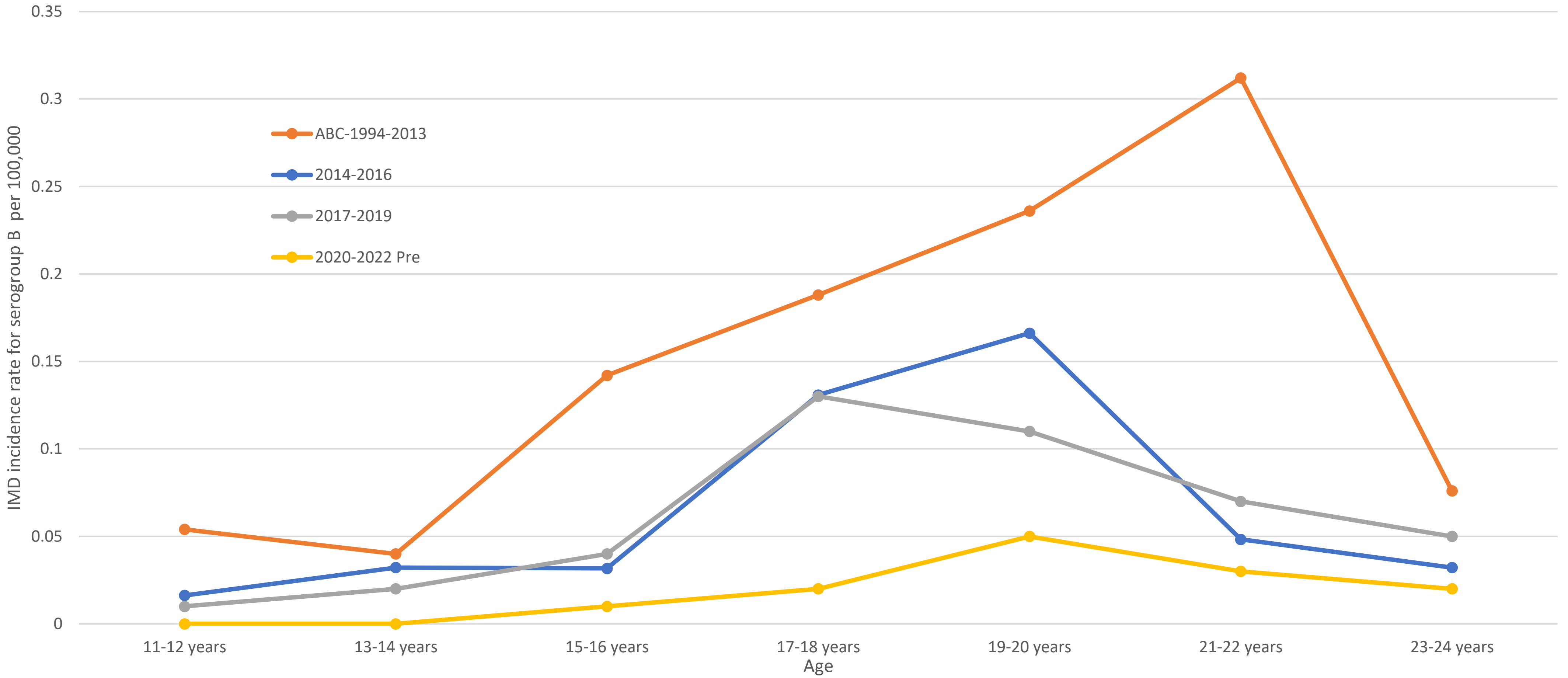
For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

Incidence rate of IMD for serogroups CWY 1996-2005 and 1996-2020 by age per 100,000



Incidence rates from 1996-2005 for the Pre vaccine Era are from the ABC core surveillance
Incidence rates from 1996 to 2020 combined data from ABC and NNDSS.

Incidence rate of IMD for serogroup B before and during vaccine era by age per 100,000



Data from 1994-2013 are from the ABC core surveillance, Data from 2014-2019 are from the NNDSS.
Data from 2020-2022 also from NNDSS is preliminary

Incidence rate of IMD for serogroups CWY before and during vaccine era by age per 100,000