Shingles/Men B Vaccine Update
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Disclaimer

Please note that medical information is constantly changing. The topics discussed during this presentation were researched and reviewed, but are not intended to represent the only, nor necessarily the best approach to patient care.

Please use your best clinical judgment when applying the material discussed during this presentation.
Disclosures

• Drs. Isaac Bennett & Megan McQuarrie and advisor, Dr. Erin Kavanaugh have no financial conflicts of interest to disclose relevant to this activity.
Learning Objectives

• Review the history/importance of vaccines

• Review the clinical significance of Meningococcal and Varicella-Zoster Infections

• Review updates on the Varicella-Zoster and Meningococcal Serotype B Vaccines
10 Health Advances that Changed the World³

- Vaccines
  - Surgical Anesthetic & Antiseptic
  - Clean Water and Improved Sanitation
  - Antibiotics and Antivirals
  - The Birth Control Pill
  - Improvements in Heart Surgery & Cardiac Care
  - Randomized Control Trials
  - Radiological Imaging
  - Advancements in Childbirth
  - Organ Transplantation
History of Vaccines
1600s
History of Vaccines

1794
History of Vaccines

• In 1800, Benjamin Waterhouse, a Harvard professor of medicine, performed the first U.S. vaccinations on his children
• 1894- diphtheria antitoxin used
• 1922- schools required smallpox vaccinations
• 1945- first influenza vaccine was approved for military use
• 1948- World Health Organization was established
• 1963- Measles vaccine licensed
• 1969- Rubella vaccine licensed
• 1974- Meningococcal Polysaccharide vaccine licensed
• 1977- pneumococcal vaccine licensed
• 1980- Smallpox eradicated
• 1986- Hepatitis B recombinant vaccine licensed
• 1995- Varicella vaccine licensed
• 2000- pneumococcal conjugate vaccine for children was licensed
• 2006- HPV vaccine licensed
• 2006- Hepatitis A vaccine and rotavirus recommended for all children
• 2014- Group B meningococcal outbreaks at multiple universities, vaccine approved
Varicella-Zoster
Pathogenesis of VZV
Clinical Manifestations of Shingles

**Shingles**: Caused by reactivation of the varicella zoster virus in the dorsal root ganglion.

~1 out of 3 people in the U.S. will develop shingles during their lifetime

Symptoms: 3 phases

- **Pre-eruptive**: sensory phenomenon in a dermatomal distribution that lasts ~48 hours

- **Acute eruptive**: grouped vesicles that eventually rupture, crust and involute; resolves within 10-15 days

- **Chronic/post-herpetic neuralgia**: persistent or recurring pain after all lesions have crusted; slower resolution of pain common in the elderly

Treatment:

- If <72 hours from onset, can use **antivirals**, such as acyclovir, valacyclovir, or famciclovir

- **Analgesics**: NSAIDs, lotions, narcotics, TCAs, and anticonvulsants (gabapentin, pregabalin)
Complications

• Postherpetic neuralgia- most common (~13%)
• Herpes zoster ophthalmicus (~10%)
• Bacterial superinfection
• Cranial Nerve palsies
• Meningoencephalitis
• Pneumonitis
• Pancreatitis
• Hepatitis
The Shingles Vaccine

Created to prevent Shingles

2006: Zoster Vaccine Live (Zostavax®) approved; single dose live attenuated virus for healthy Americans age 60 and older

2017: Zoster Vaccine – Recombinant, Adjuvanted (Shingrix®) approved; 2-dose recombinant adjuvanted vaccine given at 0 and 2-6 months to healthy adults age 50 and older

Oct 2017: CDC gave preference to use Shingrix over Zostavax
AAFP Recommendations

- For patients age 50 years or older, *Shingrix* should be offered *within* 5 years of receiving Zostavax

- Offer *Shingrix* vaccine regardless of previous herpes zoster

- Offer *Shingrix* vaccine in patients who report never having chickenpox as a child
Special Populations

- In patients with **severe immunocompromising conditions**:
  - *Zostavax* is contraindicated
  - Use of *Shingrix* is under review

- In patients who are **pregnant**:
  - *Zostavax* is contraindicated
  - Consider delaying *Shingrix* until after pregnancy, if indicated
Varicella-Zoster Vaccine Take Homes

**Varicella Zoster Vaccine**

1. Adults ≥ 50 = Zoster Vaccine – Recombinant, Adjuvanted (*Shingrix*)
   **2-dose series at 0 and 2-6 months**

2. *Shingrix* preferred over Zoster Vaccine Live (*Zostavax*)
NEISSERIA MENINGITIDIS
Neisseria Meningitidis: Clinical Manifestations

**Incubation**: 1-10 days *(usually <4)*

**Symptoms**: headache, fever, stiff neck, petechial rash, confusion, nausea, vomiting

**Diagnosis**: Blood, CSF cultures – plated immediately on Sheep and **Chocolate** agar
- Sensitive to cold temperature (incubated 35-37°C) – false negative
- Antigen testing rarely utilized in practice today
- **PCR sensitivity and specificity approaching 100%**
  - Essential early antibiotics increases utility

**Treatment (tx)**: IV antibiotics *(abx)* Ceftriaxone or Cefotaxime
- May narrow antibiotic coverage to Penicillin G/Ampicillin
  - rare resistance, consider culture data
- 5-7 day course usually adequate

**Significance**: Septicemia *(35-40%)*; Meningitis *(~50%)*
Death despite treatment ~15% *(higher in late adolescents/adults)*
Disability *(up to 19%)* post remission
Neisseria Meningitidis: Prevention

**Droplet isolation** precautions at least 24 hours after abx tx (nasopharynx sterile)^1^<sup>0</sup>

**Prophylaxis**<sup>5,10</sup>: High risk exposures only – public health consult if admin to low risk
1. Household contact, Direct Exposure, Childcare/preschool within 7 days
   - Especially children <2 years old
2. Passenger seated next to index case (>8 hour flight gate to gate)

**Tx:** Rifampin (4 doses) twice daily for 2 days *(can ↓ effect of OCPs/antiepileptics)*
   - Ceftriaxone IM (1 dose)
   - Ciprofloxacin (1 dose)
   - Azithromycin (1 dose)**<sup>***</sup> – Not routinely recommended

**Vaccination**
Neisseria Meningitidis

- 13 serotypes
  - A, B, C, Y, W135 (Rare outbreaks of X reported)
The Meningococcal Vaccine

1970s: Meningococcal polysaccharide vaccine licensed
2005: MenACWY-D (Menactra) quadrivalent meningococcal vaccine (A,C,Y,W135) approved
2010: MenACWY-CRM (Menveo)- conjugate quadrivalent vaccine approved
2014: MenB-FHbp (Trumenba) First Monovalent Serotype B vaccine FDA approved
2015: MenB-4C (Bexsero) Monovalent Serotype B vaccine FDA approved

Highest rates in children <60 month or 5 years
Among adolescents, ages 16-23 years old have the highest rates of meningococcal disease
MenB Vaccine Guideline Updates¹

Meningooccal Serotype B Vaccines FDA approved for patients aged 10-25 years old  
Per Advisory Committee of Immunization Practices (ACIP) age ≥ 10 years old

Feb 2015: ACIP recommended MenB vaccines in patients ≥ 10y/o at increased risk (pts with complement deficiencies, anatomic or functional asplenia, microbiologists exposed to isolates of Neisseria, travel/epidemic or endemic exposure, HIV/AIDS)

June 2015: The ACIP recommended MenB vaccines in children aged 16-23 years old (Grade B recommendation)

April 2016: MenB-FHbp (Trumenba) approved for 2-dose series
ACIP Meningococcal Routine Vaccine Schedule Children:
Quadrivalent conjugated or Tetravalent Vaccines
MenACWY-D (*Menactra*) or MenACWY-CRM (*Menveo*)

1st dose 11-12 years old
Booster 16-18 years old
For healthy/not at risk patients age 16-23

MenB- FHbp (Trumenba) - 2 dose series administered at 0 & 6 months
- If 2nd dose is given <6 months, then need to administer a 3rd dose 4 months later

MenB-4C (Bexsero) - 2 dose vaccine administered at 1 month apart

*Vaccines are not interchangeable*
*ACIP does not make evidence based recommendations for booster doses at this time*
*ACIP does not prefer one vaccine over the other*
Comparison/Trial Results

- **MenB-FHbp (Trumenba)**
  - Phase III trial 2 dose
  - ~54-73.5%\(^1\) after 1 month versus 83-85% 3 dose
  - US only

- **MenB-4C (Bexsero)**
  - 6 months after 2-3 dose series immunity sited at 91-100% versus 73-76% one dose series
  - European Trials demonstrate immunogenicity in children ≤12
    - Serotype B 2/3rds of cases ≤60 months? Future use
  - Available outside US
Pregnancy/Lactation

- Per ACIP no randomize control trials – use **NOT recommended**
  - Weigh risk benefits if at increased risk
Adverse Reactions

- **Common Reactions:**
  - Pain/erythema at site of injection
  - Fatigue
  - Headache
  - Myalgias

- **Less Common**
  - Fever/Chills
  - Syncope (up to 10% of adolescents w/ Menveo/Menactra)

- **Guillain-Barré Syndrome (GBS)**
  - Listed on vaccine packaging
  - Multiple large studies no increase risk
  - Some observe 0-1.5 additional cases per million
High Risk Groups
High risk groups: Occupation

- Military Recruits
- Microbiologist
  - N. Meningitidis exposure
High risk groups: Living/Travel

1. Meningitis Belt⁶: Sub-Saharan Africa, Dry Season Dec – June

2. Mecca, Saudi Arabia – Hajj: Vaccination prior to pilgrimage for Muslim patients⁶
Risk for Severe Infection

- Functional or Anatomic Asplenia
Risk for Severe Infection

1. **Complement Deficiencies** (Testing CH50 & AH50)\textsuperscript{10} properdin, factor D, factor H, and late complement component (C5- C9)\textsuperscript{6} C3\textsuperscript{10}

2. **Eculizumab (Soliris)** - monoclonal Ab binds to C5
   Induced complement deficiency
   Tx: Atypical hemolytic uremic syndrome, Generalized myasthenia gravis, paroxysmal nocturnal hemoglobinuria

3. **Men who have sex with men (MSM)** exposed to other MSM in New York/Los Angeles (epidemic areas)\textsuperscript{6,8}

4. **HIV/AIDS population**

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**Morbidity and Mortality Weekly Report (MMWR)**
Notes from the Field: Serogroup C Invasive Meningococcal Disease Among Men Who Have Sex With Men — New York City, 2010-2012

*Weekly*

January 4, 2013 / 61(51);1048-1048
Meningococcal Quadrivalent Vaccine High Risk Review

• **Primary Series** *(Men ACWY-D – *Menactra* or Men ACWY-CRM – *Menveo)*
  - Age <2 yrs
    - *Menveo* 2, 4, 6, 12-15months
    - *Menactra* 2 doses 12 weeks apart (age 9-23months)
      - *AAP >4* weeks after PCV series in asplenic
  - Age ≥ 2 yrs
    - 2 doses of *Menveo* or *Menactra* 8-12 weeks apart

• **Booster**
  - <7yrs (3 years after primary series)
  - ≥ 7rs = every 5 years while at risk
Meningococcal B Monovalent Vaccine
High Risk

ACIP Recommends:
Primary series of MenB-FHbp (*Trumenba*)
3 doses (0,1-2, 6 months)
or
MenB-4C (*Bexsero*) 2 dose (0, 1 month)

*Vaccines are not interchangeable*
*ACIP does not make evidence based recommendations for booster doses*
*ACIP does not prefer one vaccine over the other*
The Bottom Line

Varicella Zoster Vaccine
1. Adults ≥ 50 = Zoster Vaccine – Recombinant, Adjuvanted (Shingrix)
   **2-dose series at 0 and 2-6 months**

2. Shingrix preferred over Zoster Vaccine Live (Zostavax)

Meningococcal Monovalent Serotype B Vaccine
1. For patients at Increased Risk:
   Administer Primary Series of Quadrivalent Vaccine:
   [Men ACWY-D(Menactra) or Men ACWY-CRM (Menveo)] + Booster (every 5yrs if >7yrs)
   + MenB-FHbp (Trumenba) 3 doses (0,1-2, 6 months)
   or
   MenB-4C (Bexsero) 2 dose (0, 1 month)

*age ≥ 10 years for Trumenba and Bexsero*

2. For Healthy/Not at risk Patients age 16-23 (Grade B recommendation)
   Administer 2 dose MenB series (Trumenba or Bexsero)
   (In addition to routine Quadrivalent Series)
What Questions Do You Have?
Contact

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3. Childs, Dan & Susan Kansagra“10 Health Advances that Changed the World” abc News https://abcnews.go.com/Health/TenWays/story?id=3605442&page=1&page=1


8. MMWR: Notes from the Field: Serogroup C Invasive Meningococcal Disease Among Men Who Have Sex With Men — New York City, 2010–2012 Weekly January 4, 2013 / 61(51);1048 <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6151a4.htm?s_cid=mm6151a4_w>


10. AAP Redbook 2018 31st edition: Meningococcal Infections


The majority of the images were obtained from Microsoft powerpoint clipart.
The Challenges of Vaccination
The Christiana Care Way

We serve our neighbors as respectful, expert, caring partners in their health. We do this by creating innovative, effective, affordable systems of care that our neighbors value.