Vaccine-preventable disease update

- Pneumococcal disease
- Rota virus disease
- Human papilloma virus disease

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Pneumococcal disease

- Caused by bacteria *Streptococcus pneumoniae*
- 90+ serotypes ("strains")
- Often colonizes upper respiratory tract
  - Asymptomatic infection
  - Rates of colonization vary by age
    - School children 20% – 60%
    - Adults (without children) 5% - 10%
- Transmission by respiratory droplet spread
  - Coughing, sneezing
- Common cause of ear infection (not considered invasive)

Invasive pneumococcal disease

- **Pneumonia**
  - Adults - Pneumococcal pneumonia is most common type of pneumococcal disease in adults
  - ~36% of community acquired pneumonia
  - Children – pneumonia w/bacteremia accounts for ~15% of pneumococcal invasive disease < 2 y.o.
- **Bacteremia** - >12,000 cases/year in US
  - Overall case fatality rate 20%; higher in elderly
  - Most common type of invasive pneumococcal disease in children < 2 y.o.
- **Meningitis**: 3,000 – 5,000 cases/year.
  - Responsible for 50% of all bacterial meningitis.
  - Leading cause of bacterial meningitis in children < 5 y.o.

Pneumococcal vaccination in US

- **PPSV** (polysaccharide vaccine)
  - 1977 14 serotypes; 1983 23 serotypes
  - Adults > 65 y.o. routinely
  - Other younger adults with risks
- **PCV** (conjugated vaccine)
  - 7-valent licensed in 2000
  - Replaced by 13 valent in 2010
  - Routine vaccination in infancy/childhood, and routine for 65+ y.o. since 2014
  - Also for older children and adults with certain conditions

Progress against pneumococcal disease

- Between 1998 and 2013:
  - Overall invasive disease incidence declined from 24 per 100,000 to 11 per 100,000 (54%↓)
  - Adults ≥65 y.o. - from 61 per 100,000 to 31 per 100,000 (50%↓)
  - Children <2 y.o. – from 188/100,000 to 15 per 100,000 (90%↓)

Source: CDC

Note: The presentation may include slides not included in this handout and the order may be changed.
Rotavirus disease

- Viral infection
- Illness can vary:
  - asymptomatic infection;
  - mild self-limited diarrheal illness;
  - fever, severe diarrhea, vomiting
- Common infection in infancy/early childhood
- Winter-spring seasonality

About rotavirus

- Short incubation period: under 48 hours
- Transmission by fecal-oral route; easily spread
- Shed/spread before & after symptoms
- Virus environmentally stable
- 5 main virus strains accounted for ~90% of disease
- Vaccination: 1st generation 1998 (withdrawn); 2nd generation 2006/2008
  - Targeted to infants, prior to 8 months of age

Historic burden of rotavirus

- In U.S. rotavirus annually caused
  - >400,000 office visits
  - >200,000 emergency room visits
  - 50,000 - 70,000 admissions
  - 20 - 60 deaths in children < 5 y.o.
- Globally:
  - ~450,000 deaths annually

Rotavirus surveillance

- Not nationally reportable
- Not reportable disease in Michigan
- Surveillance based on lab test monitoring
  - network of US clinical laboratories

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Decline in HPV prevalence
• Among teen females 14-19 years old
  • 71% decline
  ▪ 11.5% in 2003-06
  ▪ to 3.3% in 2011-14
• Among young adult females 20-24 years old
  • 61% decline
  ▪ 18.5% in 2003-06
  ▪ to 7.2% in 2011-14

J Infect Dis 2017;216:593-603.

Summary:
Invasive Pneumococcal Disease; rotavirus; HPV
• Evidence of declines in
  – Invasive pneumococcal disease incidence overall
  – Rotavirus disease and related health care utilization in young children
  – HPV infection prevalence rates in teen and young adult females

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