Vaccine Preventable Diseases: Early ID & Management for School Nurses

Dr Caroline Hilbert, MD MPH
Nancy Napolitano, RN BSN

Williamson County & Cities Health District
Williamson County & Cities Health District
Agenda

1. Vaccination Introduction

2. Vaccine Preventable Diseases

3. Resources

4. Questions
Introduction
Vaccines save an estimated 42,000 lives every year in the U.S. alone.

3X more than seatbelts and child restraints combined.

Immunize. Prevent what’s preventable.

www.immunizeUSA.org
For every $1 spent on a vaccine in the US...

DTaP saves $27
MMR saves $26
Perinatal Hepatitis B saves $14.70
Inactivated Polio (IPV) saves $5.45
Varicella saves $2.73

...with routine vaccination the US saves $13.5 billion in direct costs and $68.8 billion in societal costs.
A new study, published February 2016 in the journal Health Affairs, puts a precise figure on the value of vaccinating children.

**IMMUNISATION**
A healthy return on investment

Saving in healthcare costs, lost wages and productivity due to illness

$16

RETURN ON INVESTMENT
FOR EVERY $1 INVESTED IN:

- IMMUNISATION
- PUBLIC INFRASTRUCTURE
- GOVERNMENT BONDS (10-YEAR)
- PRE-SCHOOL EDUCATION
- COMMUNITY HEALTH WORKERS
- CARDIOVASCULAR DISEASE RESEARCH

1. 1.5 million children die annually from vaccine-preventable diseases. Gavi, the Vaccine Alliance is dedicated to addressing this issue.

Immunisation not only saves lives, it contributes to the social and economic wellbeing of communities. More than US$ 586 billion in economic benefits for 94 of the world’s poorest countries (2011-2020).
Vaccine-Preventable Outbreaks in the U.S. in 2017

(Council on Foreign Relations 2017)

- measles
- mumps
- other
- whooping cough

*Outbreaks not to scale*
Nonmedical exemptions for K–12th grade students, TX

Martin Enserink/Science  Data: Self-Reported by Public ISDs and Accredited Private Schools, Annual Report of Immunization Status, DSHS, Immunization Branch
Whooping cough case confirmed at Cedar Park Middle School, district says

4th Measles Case Confirmed At Texas’ Southern Border

Mumps outbreak reported at Cedar Hill High School

ICE confirmed 51 facilities have reported investigations into mumps, chickenpox, and influenza

Texas investigating highly contagious whooping cough at state Capitol

Measles outbreak now reported in 30 US states

Measles Outbreak Continues in Oregon and Washington, With One New Case Reported Daily

Unvaccinated Child Gets Tetanus, Racks Up $800,000 in Costs
VPDs in School Settings

Objectives:
1) Recognize VPD symptoms
2) Report VPDs
3) Manage VPD Cases
VPDs on the rise:

• Pertussis
• Varicella
• Mumps
• Measles
VPDs on the rise:

- Pertussis
- Varicella
- Mumps
- Measles
Pertussis

- *Bordetella pertussis*
- Airborne
- Symptoms
  - Rhinorrhea
  - Fever
  - Cough
  - Apnea
Clinical Course (in weeks)

Communicable period
(onset to 3 weeks after start of paroxysmal cough)

Incubation period
(typically 5-10 days; max 21 days)

Catarrhal stage
(1-2 weeks)

Paroxysmal stage
(1-6 weeks)

Convalescent stage
(weeks to months)
Pertussis

- Major complications
  - Infants & Children:
    - Pneumonia
    - Convulsions
    - Apnea
    - Encephalopathy
    - Death
  - Teens & Adults:
    - Rib fracture

http://www.pkids.org/diseases/pertussis.html
Suspect Pertussis?

1. Isolate
2. Assess Immunity
3. Report
# Texas Notifiable Conditions

Report confirmed and suspected cases. Unless noted by *, report to your local or regional health department using number above or find contact information at [http://www.dshs.state.tx.us/diou/investigation/conditions/sbcontacts/](http://www.dshs.state.tx.us/diou/investigation/conditions/sbcontacts/)

<table>
<thead>
<tr>
<th>Y</th>
<th>A</th>
<th>When to Report</th>
<th>When to Report</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>AIDS (Acquired immune deficiency syndrome)</em></td>
<td>1</td>
<td>Within week</td>
<td>Cell/View Immediately</td>
</tr>
<tr>
<td><em>Amoebiasis</em></td>
<td>2</td>
<td>Within week</td>
<td>Costello Immediately</td>
</tr>
<tr>
<td><em>Amebic meningitis and encephalitis</em></td>
<td>3</td>
<td>Within week</td>
<td>Leptospirosis</td>
</tr>
<tr>
<td><em>Anaerobic infections</em></td>
<td>4</td>
<td>Within week</td>
<td>Listeria monocytogenes</td>
</tr>
<tr>
<td><em>Anthrax</em></td>
<td>5</td>
<td>Call Immediately</td>
<td>Leptospire, horse</td>
</tr>
<tr>
<td><em>Arboviral infections</em></td>
<td>6</td>
<td>Within week</td>
<td>Malaria</td>
</tr>
<tr>
<td><em>Asbestosis</em></td>
<td>7</td>
<td>Within week</td>
<td>Measles (rubella)</td>
</tr>
<tr>
<td><em>Ascaris</em></td>
<td>8</td>
<td>Within week</td>
<td>Measles (rubella)</td>
</tr>
<tr>
<td><em>Aspergillosis</em></td>
<td>9</td>
<td>Within week</td>
<td>Meningococcal infection, invasive (Neisseria meningitidis)</td>
</tr>
<tr>
<td><em>Botulism</em></td>
<td>10</td>
<td>Within week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Brucellosis</em></td>
<td>11</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Candidiasis</em></td>
<td>12</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Cayman disease</em></td>
<td>13</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Disseminated intravascular coagulopathy (DIC)</em></td>
<td>14</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>15</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Feline</em></td>
<td>16</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Francisella</em></td>
<td>17</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Gastroenteritis</em></td>
<td>18</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Gonococcal infections</em></td>
<td>19</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Hantavirus</em></td>
<td>20</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>HIV disease (Acquired immune deficiency syndrome)</em></td>
<td>21</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Human immunodeficiency virus (HIV)</em></td>
<td>22</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Influenza</em></td>
<td>23</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Lyme disease</em></td>
<td>24</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Malaria</em></td>
<td>25</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Meningococcal infection, invasive (Neisseria meningitidis)</em></td>
<td>26</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Mumps</em></td>
<td>27</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Multidrug-resistant Acinetobacter (MDR A. baumannii)</em></td>
<td>28</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Nontuberculous mycobacterial infections</em></td>
<td>29</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Parasitism</em></td>
<td>30</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Plague</em></td>
<td>31</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Poliovirus infection, non-paralytic</em></td>
<td>32</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Poliovirus infection, paralytic</em></td>
<td>33</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Rabies</em></td>
<td>34</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Rickettsial infections</em></td>
<td>35</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Salmonella</em></td>
<td>36</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Shigellosis</em></td>
<td>37</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Shiga toxin-producing Escherichia coli (STEC)</em></td>
<td>38</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>39</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Streptococcus pneumoniae</em></td>
<td>40</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Tetanus</em></td>
<td>41</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Trichomoniasis</em></td>
<td>42</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Typhus</em></td>
<td>43</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Vibrio cholerae</em></td>
<td>44</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Viral hemorrhagic fever (Including Ebola)</em></td>
<td>45</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
<tr>
<td><em>Yellow fever</em></td>
<td>46</td>
<td>Within 1 week</td>
<td>Multidrug-resistant Acinetobacter (MDR A. baumannii)</td>
</tr>
</tbody>
</table>

*See condition-specific footnote for reporting contact information

D93-11134 (Rev. 1/17) Expires 1/31/18 — Go to [http://www.dshs.state.tx.us/diou/investigation/conditions/](http://www.dshs.state.tx.us/diou/investigation/conditions/) or call your local or regional health department for updates.
Suspect Pertussis?

1. Isolate
2. Assess Immunity
3. Report

1. Assess Risk
2. Assess Immunity
3. Exclude
4. Implement prevention efforts
Pertussis Management

• If case confirmed...
  • Child must complete 5 days of antibiotic before returning to school

• 1 case – school determines how/if inform parents
• 2+ cases – DSHS recommends sending letters to parents
• 3+ cases - Unimmunized children should stay home 21 days from exposure date

• Post-exposure prophylaxis: Household contacts

• Observe close contacts for >14 days after last contact with exposed person.
  • Persistent cough needs to be evaluated by MD.
VPDs on the rise:

- Pertussis
- Varicella
- Mumps
- Measles
Varicella

• *Human herpesvirus 3 (VZV)*
• Spread via direct contact and respiratory secretions
• Symptoms
  • Rash
  • Fever
  • Fatigue
  • Loss of appetite
Varicella

- Major complications
  - Bacterial infection of lesions
  - Pneumonia
  - Encephalitis
  - Cerebellar ataxia
  - Hemorrhagic complications
  - Sepsis
  - Dehydration
  - Death
Suspect Varicella?

1. Isolate
2. Assess Immunity
3. Report
Suspect Varicella?

1. Isolate
2. Assess Immunity
3. Report

1. Assess Risk
2. Assess Immunity
3. Exclude
4. Implement prevention efforts
Varicella Management

• If case confirmed...
  • Child may return to school when the rash has crusted
    • 24 hrs passed with no new lesions occurring
  • 3+ cases - Unimmunized children should stay home 21 days from exposure date
  • Post-exposure immunization may prevent disease.
  • Observe close contacts for >21 days after last contact with exposed person.
VPDs on the rise:

• Pertussis
• Varicella
• Mumps
• Measles
Mumps

- *Mumps rubulavirus*
- Transmitted via saliva or respiratory droplets
- Symptoms
  - Fever
  - Headache
  - Myalgia
  - Malaise
  - Loss of appetite
  - Parotitis
Mumps

• Major Complications
  ▪ Unilateral or bilateral parotitis
  ▪ Orchitis
  ▪ Pancreatitits
  ▪ Oophoritis
  ▪ Meningitis
  ▪ Encephalitis
  ▪ Deafness
Suspect Mumps?
Suspect Mumps?

1. Isolate
2. Assess Immunity
3. Report
Suspect Mumps?

1. Isolate
2. Assess Immunity
3. Report

1. Assess Risk
2. Assess Immunity
3. Exclude
4. Implement prevention efforts
Mumps Management

• If case confirmed...

• Child may return to school 9 days after parotitis onset

• 3+ cases - Unimmunized children should stay home 26 days from parotitis onset in last student
  • Can be readmitted immediately after vaccinated with one dose

• Persons with 2 doses should receive a 3rd dose during an outbreak
VPDs on the rise:

- Pertussis
- Varicella
- Mumps
- Measles
Measles

- *Measles morbillivirus*
- Transmitted via respiratory droplets
- Symptoms
  - Fever
  - Koplik spots
  - Cough
  - Coryza
  - Conjunctivitis
  - Descending rash
Measles

• Major complications
  • Diarrhea
  • Pneumonia
  • Encephalitis
  • Respiratory and neurological complications
  • Low-birth-weight
  • Fetal demise
Suspect Measles?
Suspect Measles?

1. Isolate
2. Assess Immunity
3. Report
Suspect Measles?

1. Isolate
2. Assess Immunity
3. Report

1. Assess Risk
2. Assess Immunity
3. Exclude
4. Implement prevention efforts
Measles Management

• If case confirmed...
  
  • Child may return to school 4 days after rash onset

  • 1+ case – Unimmunized children **must** stay home 21 days from exposure date
    • Can be readmitted immediately after 1 dose

• Vaccination of un(der)vaccinated persons within 72 hours of exposure may provide protection.
Vaccination Resources
Texas Vaccines for Children

- Low cost vaccines for:
  - Uninsured
  - Medicaid
  - CHIP
  - Native American/Alaska Native

- Adult Safety Net
ImmTrac

Texas registry for children, adults, first responders

No cost service

Consolidates immunization records

Restricted access only to authorized entities

Opt-in System

Parental consent required for children <18 years

Consent required for 18+ years
Questions?

Nancy Napolitano

Nancy.napolitano@wilco.org

Dr. Caroline Hilbert

Caroline.Hilbert@wilco.org