Working with Public Health in Outbreak Management in the School Setting

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Overview
- Explain the Role of Public Health in outbreak response
- Identify respiratory control measures for the school setting
- Plan control measures for GI illness management in the school setting

Natural history for infection and disease

The Chain of Infection
- **Microorganism** (sufficient quantity to cause disease)
- **Carrier** (patient, staff member, visitor)
- **Susceptible Person** (low or no resistance)
- A **Way Out** (coughs, sneezes, fecal and oral)
- A **Way to Travel** (hands, dirty items)
- A **Way into Another Person** (breathe, cuts and vectors)

Infectious diseases are transmitted...
- **Airborne** - Breathe 'Em In
- **Bloodborne** – Needlesticks, Cuts & Splashes
- **Contact** - Touch 'Em
- **Droplet** - Sneezes & Coughs
- **Vector** - Transmitted by an animal or insect

Public Health
Public Health Role in Infectious Disease Investigation

Mission:
Is to prevent illness, disability and death caused by infectious diseases in New Hampshire residents.

Bureau of Infectious Disease Control

Staff:
• Nurses
• Physicians
• Epidemiologists
• Health educators
• Other Professionals

Activities:
• Surveillance
• Investigations
• Provide Responses
• Prevention
• Ensuring care

Can I Give you this Information? Yes.

HIPAA
• http://www.hhs.gov/ocr/hipaa/publichealth.pdf

Administrative Rules - RSA 141-C:6
He-P-31.03 Reporting of Communicable Diseases.
(a) Any physician or other health care provider who assesses, diagnoses, or treats a person believed by him to be a case or suspect case of a reportable disease shall immediately report the same to the department by telephone, mail or electronic transmission on forms provided by the commissioner.

Disease Control Monitors Disease:
• Receive all reports of infectious disease
• Receive reports of unusual illness or clusters of disease
• Outbreak case and data management
• Tuberculosis case management and contact investigations
• Rabies recommendations
• Food borne illness investigations
  And...
• 58 other infectious diseases

Investigation of Illness:
• Develop and implement investigation protocols (Syndromic and/or disease specific)
  • Gastrointestinal illness
  • Respiratory illness

Development and Implementation of Interventions:
• Implement isolation and quarantine as appropriate
• Tuberculosis cases/suspect smallpox or variola cases
• Vaccine reportable diseases such as varicella, measles
• Evidence based and local experience in the management of clusters or outbreaks
• Facility based approach
• Development and implementation of mass preventative and/or treatment strategies (smallpox, meningitis, hepatitis A)
• Best practices (protocols) for state based actions
  • HIV/HEV
  • Respiratory or Gastrointestinal illnesses
• Science and evidence based recommendations for individual cases
Respiratory Infections in the School Setting

We will examine:

- Respiratory Illness in the school setting
- Review Influenza
- Review control measures for prevention of respiratory illness
- Review what is available in the Toolkit for Respiratory illness in the School

Characteristics of Disease in a Public Setting

- Diseases caused by a microorganism or a virus
- Significant cause of illness and death worldwide
- Old diseases but new ones continue to emerge
- Increased world travel make infectious disease a global concern (disease is a plane ride away)
- ~70% are zoonotic (transmitted from animals to people)

What Might be Causing Respiratory Illness in the School Setting?

Bacterial Causes of Respiratory Illnesses

- Diptheria
- Haemophilus influenza
- Streptococcus pneumonia
- Neisseria meningitidis
- Pertussis
- Tetanus
- Tuberculosis

Respiratory Viruses in the School Setting

- Parainfluenza virus, types 1-3
  - Croup, bronchitis, pneumonia, bronchiolitis and febrile upper respiratory illness
- Respiratory Syncytial Virus (RSV)
  - Most common in the first 2 years of life
  - Major cause of bronchiolitis, can cause croup, bronchitis, otitis media, and upper respiratory pneumonia
- Adenovirus different types
  - Most aggressive virus in young children and major cause of mortality in children

Respiratory viruses continued

- Cocksackievirus type A and B
  - Hand, Foot and Mouth is a Type B
- Echoviruses
  - Viruses of the gut often referred to as enteroviruses
- Rhinoviruses and Coryza
  - Common Cold
- Influenza
Pertussis
Bacterial Cause of Respiratory Illness

- Organism - *Bordetella pertussis*
- Also known as Whooping Cough
- Incubation period 9-10 days (6-20 days average)
- Vaccine Preventable Disease with boosters available
- Occasionally called the 100 day cough
- Infectious 21 days from onset of illness
- No longer infectious after 5 days of appropriate antibiotics
- Contact investigations are important to stopping transmission

Pertussis Outbreak in a New Hampshire High School

- May be misdiagnosed initially, bronchitis, asthma etc.
- Several provider visits
- May – June 2018
  - 46 cases of pertussis at a New Hampshire High School
  - 361 contacts to the cases were identified and recommended antibiotics

Influenza

What is Influenza?

- Influenza (aka “flu”) is an illness caused by a virus
- There are several strains of flu viruses
- The flu virus causes symptoms we think of as a cold
- There are many other viruses capable of causing cold-like symptoms
How is the Virus Transmitted?

- Droplet spread
- Direct contact
- May persist for hours in the environment

Flu Review

- Enveloped, RNA virus
- Orthomyxoviridae
  - Types
    - A
    - B
    - C
  - Subtypes
    - H (hemagglutinin)
    - N (neuraminidase)

Flu Review

- Antigenic drift
  - Changes in proteins by genetic point mutation and selection
- Antigenic shift
  - Changes in proteins through genetic reassortment
- Epidemic
  - Number of cases in a geographic area substantially exceeds what is "expected"
- Pandemic
  - Worldwide epidemic

Impact of Influenza

- Influenza can be far more serious for some people:
  - Elderly
  - Young children
  - Persons with serious medical conditions
- Each year ~30 - 40,000 persons in the U.S. die from influenza or it's complications
- In NH ~ 200 people die from influenza each year
Influenza Can be Prevented

• Vaccination is a primary way to prevent or minimize cases of influenza
• Staying home if sick
• Practicing good hand hygiene
• Covering coughs

Tool to Help Schools Control Respiratory Illness

Respiratory Illness cases in New Hampshire

The “Respirable Communicable Diseases in New Hampshire” includes the following information on reportable respiratory illnesses during the last five years: YTD January 1, 2018-December 31, 2018.

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Benefits of Voluntary Reporting Absenteeism and Influenza-Like Illness in School

- Option to track one indicator or both
- Establish a baseline tracking system for the nurses
- Determine if influenza like illness is climbing in the school
- At the end of school year you can request a report of your entries to help you understand trending in your school

Monitor Absentee rates in school

- Watch for increases in absences
- Determine reason for increase (specific disease syndrome)
- Identify the immunocompromised students
- Notify Public Health
- Prepare to follow Public Health recommendations depending on the syndrome
- Daily updates in absentee rates to Public Health
- Specific interventions may be warranted

Collaborate with Public Health

- Public Health Nurses may call you
- You may call to report the increase in respiratory illness to public health
- We will work with you to gather information
- We will give specific measures to you to help control the spread of disease
- We will collaborate with the school in drafting public information for parents—it is important to call public health in advance before notification to assist in framing the messaging

Posters for the School

- Cleaning Information for Facilities Staff
- Handouts to send to Parents with any communication that is developed
Gastrointestinal Illness caused by Bacteria or Viruses

Examples of Bacterial Causes of GI Illness

Bacterial Causes
- Salmonella
- Shiga Toxin Producing E. Coli 057:H7
- Campylobacter

Protozoan or Spore Causes
- Cryptosporidiosis
- Cyclospora
- Giardia

Viral Causes of Gastrointestinal Illnesses

- Rotavirus
  - Often seen in infants and children
- Enteric adenoviruses
- Astroviruses
- Caliciviruses such as Norwalk-Like Virus (Norovirus)

Norovirus-Mixed Outbreak

- Point source with some person-to-person
- Example: Norovirus in a facility

Norovirus

- Most common cause of non-bacterial diarrheal illness
- Calicivirus
- Probably Fecal-oral transmission
- Incubation 24-48 hours (range of 10-50 hours)
- There has been literature that has shown that Norovirus may be aerosolized during the process of cleaning of the act of vomiting
- Spreads quickly

Toolkit for Schools:
Prevention and Management of Acute Viral and Bacterial Gastrointestinal Illness
Call to Public Health

- Starting to see an increase in absences for students and staff
- Determine why the students are out
- Instruct facility or maintenance staff on cleaning, especially vomitus
- Virus is often spread on fomites, such as door handles, desks, handle on toilets etc.

Control Measures

- Protect susceptible persons keep students away until cleaned
- Remove source
  - Ill people
- Separation of sick students or staff
  - Isolation for infected persons-Send sick children to the nurses office for pick up, send staff home

Control Measures for Gastrointestinal Illness include cleaning and disinfection

Sample letters for Parents and Staff to help the School get the information out
Posters and resources for schools to use for information

In Summary
• Discussed Respiratory and Gastrointestinal Illnesses that happen in the school setting
• Examined specific pathogens that may cause illness in the school setting
• Introduction of the Respiratory and Gastrointestinal Toolkit for Schools to help examine how to control outbreaks of infectious disease

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Web Access for the School Toolkits
• https://www.dhhs.nh.gov/dphs/cdcs/forms.htm

Thank you..to all the School Nurses who keep the children safe each day.
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