



Infectious Diseases: Swine Flu

Saturday, November 14, 2009



BROWN

Essential Question: What is an infectious disease and how do we prevent it?

Objectives:

9/10/11/12 grade: Understanding basis of infectious disease.
Understanding of vaccines and other prevention methods

Grade Span Expectations:

Materials: Mentors – we'll actually be doing this demo with simple household items like aquarium pH indicator and lemon juice (which works just as well as using potentially hazardous NaOH)

- Bathroom sized disposable plastic cups
- 25 ml of 1M sodium hydroxide
- phenolphthalein solution
- dropper

Lesson Content

1. Handout 1:
 - Pass out handout
 - Give them 5-10 minutes to finish the hand out
 - Brief discussion with the group about answers and ask if they have further questions.
 - Tell them that the answers can be found throughout the lesson plan
 - At the end of the lesson, go over the handout answers.
2. Infectious Diseases (Go to <https://health.google.com/health/ref/index.html> to **research these diseases before the lesson** so that if students ask you about them, you can explain what they are and what causes them)
 - A. The agents of infectious diseases
 - i. Virus
 - Swine flu (Influenza A Virus)
 - AIDS (Human immunodeficiency virus)
 - Chickenpox (Varicella virus)
 - Ebola (Ebolavirus)
 - Smallpox
 - ii. Bacteria
 - Lyme disease (Borrelia burgdorferi)
 - Plague (Yersinia pestis)
 - Cholera (Vibrio Cholerae)
 - iii. Protozoa
 - Malaria (Plasmodium falciparum)
 - Amoebic dysentery (Entamoeba histolytica)

- American Sleeping Sickness (AKA Chagas)
 - iv. Fungi and yeasts
- Athlete's foot (Tinea pedis)
- Ring Worm
 - v. Metazoans
- Tape worms
- Filariasis (Wuchereria bancrofti)
 - vi. Prions
- Bovine spongiform encephalopathy (mad cow disease)
- Creutzfeldt-Jakob Disease
- 3. Transmission of Viral Infectious diseases
 - A. Direct Transmission: Touching, biting, kissing, sexual intercourse, direct projection (droplet spread), coughing, spitting, singing or talking
 - B. Indirect transmission:
 - i. Airborne: through respiratory tract
 - ii. vehicle borne: on inanimate objects
 - iii. vector borne: through animals
- 4. Swine Flu/ H1N1 (from CDC)
 - A. What is swine flu?

2009 H1N1 (sometimes called "swine flu") is a new influenza virus causing illness in people.
 - B. Why is it called the swine flu?

The Swine Flu shares many genetic similarities with the influenza viruses that affect pigs in North America. Interestingly, it also has genes from flu viruses among European and Asian pigs along with bird and human genes.

* Just like Swine Flu evolved/ changed from the influenza virus that affects pigs in North America, it can change to be resistant to the drugs that are used for treatment, which would be bad news. (can mention AIDs treatment)
 - C. How is swine flu spread?

Direct transmission and indirect transmission (airborne and vehicle borne)
 - D. What are the symptoms?

The symptoms of 2009 H1N1 flu virus in people include fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills and fatigue. Some people may have vomiting and diarrhea.
 - E. What's so special about the Swine Flu?

Each year, in the United States, on average 36,000 people die from flu-related complications. But over 90% of deaths and about 60 percent of hospitalization occur in people older than 65.

In the case of swine flu, it caused greater disease burden in people younger than 25 years of age than older people.

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5. Prevention methods

A. Prevention of you getting sick

- Wash your hands often (soap and water or Purell)
- Avoid touching eyes, nose or mouth
- Try to avoid close contact with sick people
- Vaccination:
 - i. What is it?
biological preparation that improves immunity to a particular disease (could go into the biological background and workings of vaccine)
 - ii. Myths about vaccines: Handout H1N1 Vaccine: Facts or Myths? Let the students do it first, then go over the answers as a big group. Discussions!

Videos:

Show video about vaccine shortage and vaccine-making process:

<http://video.nytimes.com/video/2009/10/26/us/1247465376214/vaccine-shortfall.html>

Optional video on Duke Swine Flu Research (students with flu-like symptoms get paid to be in a study): <http://www.youtube.com/watch?v=-MpzwocfaSg&NR=1&feature=fvwp>

B. Preventing others from getting sick

- Sneeze and cough into your sleeves (show some or all of video on <http://www.coughsafe.com/media.html>)
 - Wear a mask
 - Stay at home for at least 24 hours
6. Go over the handout that was completed at the beginning of lesson.

(15 minutes before the end of lesson)

7. Spread of Infectious Diseases through Bodily Fluids

Demo—Mentors do it too

We will say that the swapping of solution in the cups is akin to swapping bodily fluids (we won't say that this is like sex necessarily but will instead say it's like coming into contact with someone's saliva or droplets expelled from a person's mouth when coughing)

1. Call up a student demonstrate how to "trade" by pouring 1 cup into the other and then pouring back until each cup has an equal amount of fluid. This demo allows you to pour from your own cup, which has the NaOH in it. When the trade is demonstrated the student is know "infected."
2. Explain the rules for trading:
 - Students may trade with as many or as few partners as they like. (Students may choose to NOT trade with anyone.)
 - When you trade, introduce oneself to the other person.
 - Students must not force a trade if someone does not want to
 - Boys may trade with boys and girls with girls
 - When done trading, sit down.
3. After trading is complete, add a drop of phenolphthalein solution

4. After the trading is complete, I add a drop of the phenolphthalein solution. Those who have been infected will turn bright pink.

8. Discussion after the demo:

- i. Talk about who had the cup first. (one of the mentors should have the “infected” cup in the beginning) Try to track back the trading.
- ii. How can you prevent from turning bright pink?
STDs/AIDS: abstinence and safe sex
Other infectious diseases: Vaccination, washing hands, etc