

**Pandemic & Infectious Disease Planning:  
What Colleges Need to Know**

## Today's Discussion

- Public Health System
- Infectious Diseases 101
- Hosts Defenses and Prevention Strategies
- Disease Sampler
- Pandemic Influenza
- Advice: for Individuals and Colleges

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## Local Public Health Systems

- Public health is constitutionally a state matter
- State health agencies: technical assistance, policy guidance, lab support, field assistance, resources (vaccines, drugs, ...)
- County health departments in the State of Florida are organized by counties, but they are state agencies

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## Local Health Department

- Responsibility and authority to investigate all epidemics, outbreaks, and issues of public health concern
- CHD Director is the local PH Officer
- Epidemiologist – Disease Detective
- Surveillance: Over 100 Reportable Diseases
- Initial Outbreak Investigation

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## Goal of Investigation: Prevention

*This is the source of urgency for PH staff*

- Find and fix ongoing point source (like contaminated water supply)
- Close location until fixed
- Take food product off the market
- Find, isolate, and treat infectious people
- Find exposed people, give them prophylactic treatment or vaccine, and/or quarantine them

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## Categories of Intervention

- Efforts directed at source of infectious agent
  - Vehicle
  - Vector
- Efforts directed at people at risk

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## Interventions Directed at Source

- Eliminate / treat source
  - Dispose of contaminated food, shock-chlorinate contaminated water
- Isolate / treat infected persons
  - Prevent further exposures by minimizing susceptibles' risk of exposure to infectious persons
- Close contaminated sites / sources
  - Protect susceptibles by minimizing risk of exposure from infected sites / sources

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## Interventions Directed at People at Risk

- Reduce risk of exposure in susceptible people – e.g., by educating on how to avoid exposure
- Directly protect at-risk people
  - Vaccinate
  - Post-exposure treatment with medicines or vaccines to prevent or lessen illness

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### 'Police Powers'

- Inspect or close premises
- License and discipline health professionals and facilities
- Limit the movements of people (quarantine)
- Require vaccination, testing, or treatment
- Seize, embargo, impound food and other hazardous substances, or stop their sale
- Board planes, trains, buses, and ships as part of disease control
- Review medical, hospital etc. records
- Interview whoever and whenever information is needed for investigation of a public health problem

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### Definitions: Quarantine

- Separation and restriction of movement of *well* persons presumed to have been exposed to contagion
  - often at home or residential facility
  - may be voluntary or mandatory

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### Definitions: Isolation

- Separation and restricted movement of *ill* persons with contagious disease
  - Often in a hospital setting
  - Primarily individual level, may be applied to populations
  - Often voluntary, but may be mandatory
  - Fundamental, commonly used public health practice

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### Legal Authority For Quarantine

381.0011 FLORIDA STATUTES THE LEGISLATURE GIVES THE DEPARTMENT OF HEALTH THE AUTHORITY TO:

DECLARE  
ENFORCE  
MODIFY



A QUARANTINE

## Quarantine: Statutory Authority

- Intrastate quarantine power
  - Local or state public health officials have authority for quarantine when an infectious disease outbreak confined within state border
  - Considered a police power-- an inherent authority to protect health and welfare of citizens
  - Reserved to states (10<sup>th</sup> Amendment)

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## Executive Order 13295: Revised List Of Quarantinable Communicable Diseases

- (a) Cholera; Diphtheria; infectious Tuberculosis; Plague; Smallpox; Yellow Fever; and Viral Hemorrhagic Fevers (Lassa, Marburg, Ebola, Crimean-Congo, South American, and others not yet isolated or named)
- (b) Severe Acute Respiratory Syndrome (SARS)
- (c) Influenza caused by novel or reemergent influenza viruses that are causing, or have the potential to cause, a pandemic

*President George W. Bush*  
April 1, 2005



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## Principles of Modern Quarantine

A collective action for the common good predicated on aiding individuals infected or exposed to infectious agents while protecting others from the dangers of inadvertent exposure



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## Writ of Habeas Corpus

*"you should have the body"*

The detainee has his day in court with his attorney to decide if the department's quarantine order is legally binding.



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## Purpose of Quarantine

- Range of community containment strategies for infectious diseases
- Applied to persons exposed but *not ill*, i.e., contacts (not cases)
- Designed to meet two objectives
  - Facilitate early recognition of symptoms of a contagious disease, should they develop
  - Reduce risk of transmission before progression to disease has been recognized

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## Quarantine of Individuals

- Some individuals may cooperate & understand need to self isolate
- Others may require legal/judge's order to cooperate
- Where will the individual be quarantined?

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## Key Questions before Decision to Quarantine

- **Is there public health and medical justification?**
  - Infectious agent, communicability, risk of fatality
- **Are implementation and maintenance of quarantine feasible?**
  - Define who is to be quarantined and for how long, and availability of resources
- **Do potential benefits of quarantine outweigh adverse consequences?**
  - Determine health risks for those quarantined, consequences of quarantine disobedience, and effect on commerce

JAMA, Dec 5,2001-vol 286, No 21:2711-2717

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## Principles of Community Containment

Containment measures are appropriate when:

- A person or group of people has been exposed to a highly *dangerous* and *contagious* disease
- Exposed *well* persons are separated from *ill* cases
- Resources are available to implement and support interventions
  - Provide essential goods and services
  - Monitor health status (active vs. passive)
  - Provide immediate triage & medical care / isolation

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## Principles of Community Containment

Containment measures encompass a range of strategies:

- “Snow days” or “shelter-in-place”
- Suspension or restrictions on group assembly
- Cancellation of public events
- Closure of mass public transit
- Closing of public places
- Restriction or scaling back of nonessential travel
- *Cordon sanitaire*

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## TB “Quarantine”

- This involves specific set of legal procedures
- Used with patients who are noncompliant and have or are likely to infect others affected disease, especially multiple drug-resistant TB
- Involves established procedure with court & judge

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## Sources of “Germs”

- External
  - Environment: dirt, sea water,
  - Vectors: encephalitis
  - Person to Person: STD, pink eye, HAV
- Internal
  - Normal Flora: URI, UTI,
  - Transient Colonization: MRSA, meningitis

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## Contagious Diseases

- Tuberculosis; Chickenpox
- Influenza; Meningitis; Pertussis
- Hepatitis A; MRSA; STDs
- Hepatitis B; Hepatitis C; HIV

## Disease Stages

- Exposure
- Colonization
- Infection
- Illness

## Incubation Period

- Time interval between initial infection and onset of clinical features of disease
  - Very short: influenza, colds (12-36 h)
  - Short: salmonella (24-72 h)
  - Long: measles (10-14 d), hepatitis A (2-6 wks)
  - Very long: hepatitis B (6 w – 6 mo), TB (mos – yrs)
- Key concept in disease transmission and control
- For some diseases, people are infectious during part of the incubation period

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## Exposure Routes

- Inhalation
  - Mucous membranes
- Ingestion
- Contact
  - Touch
  - Bites

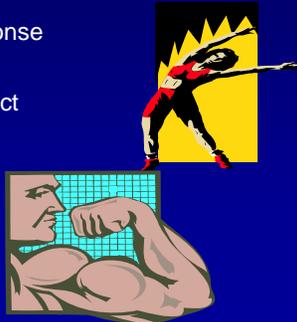
## Person-to-Person

- Direct contact
  - HIV, Sexually transmitted diseases, smallpox
- Indirect contact
  - Fecal-oral
  - Shared towels, combs or toys
- Face-to-face via droplets
  - Coughing, sneezing

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## Host Resistance

- Normal immune response
- Intact skin
- Normal respiratory tract
- GI tract acidity
- Normal flora



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## Immunizations

- Tdap: Tetanus, Diphtheria, Pertussis
- Neisseria meningitidis (entering HS or college)
- Hepatitis A virus (recently, 1 yo)
- Hepatitis B (0-6 months)
- Measles, Mumps, Rubella (preschool)
- Chickenpox (preschool)
- Exemptions: Religious or medical; foreign students

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## Personal Protection Strategies

- Universal: Hand washing; Vaccination
- Contact: Gloves:
  - Cover wounds and "avoid touching fluids"
- Droplet: 3 foot rule, mucous membranes
- Airborne: N 95 mask

## Prevention

- Policies
- Education
- Environmental rounds
- Construction/renovation projects
- Sharps management
- Disinfection monitoring

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## Hand-washing Alternatives

- Waterless hand gel
  - Ok if no visible secretions
  - Works quickly – small amount



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## Respiratory Hygiene/ Cough Etiquette

- Post visual alerts at facility entrances instructing the public not to enter if they have symptoms of a respiratory infection.
- Signs should instruct those with symptoms to follow recommendations for respiratory hygiene/cough etiquette.

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## Respiratory Hygiene/ Cough Etiquette continued

- Signs should instruct people to:
  - Cover the nose and mouth when coughing or sneezing.
  - Use tissues to contain respiratory secretions.
  - Dispose of tissues after use.
  - Perform hand hygiene after contact with respiratory secretions or contaminated materials (e.g. tissues).

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## Respiratory Hygiene/ Cough Etiquette continued

- Facilities should ensure that there are adequate supplies of:
  - Tissues
  - No-touch waste receptacles
  - Alcohol based hand rubs or hand washing supplies.

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## Significant Organisms

- Blood borne pathogens
- MRSA
- Hepatitis A
- Norovirus
- *Neisseria meningitidis*
- *Influenza*



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## Blood Borne Pathogens

- Risk of transmission
  - 6-30% HBV
  - 1-7% HCV
  - 0.09 -<0.3% HIV
- Hepatitis B vaccine - mandated 1991
- HCW cases **fell from 17,000~400/yr**

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## How Do Injuries Occur?

- Handling sharp instruments – hand to hand
- Improperly disposing of sharps
- Handling an injury
- Clean up after an injury

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## *Staphylococcus aureus*

- Ubiquitous bacterial organism
- Nasal and skin carriage
- Nasal colonization in 25 to 30% of the population
- Colonization vs. Infection
- **Colonization** - when the bacteria are present, but not causing an infection
- **Infection** - bacteria are present and causing infection
- Common cause of mild skin infections (i.e.. Pimples, stys, and boils) and severe infections (i.e.. pneumonia, surgical wound infections, and bloodstream infections)
- **MRSA**: Methicillin-resistant *Staphylococcus aureus* is the name used for the drug resistant strains



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## MRSA Transmission

- Most commonly spread through close, physical contact with a colonized or infected person
- Touching/sharing objects (towels, razors, clothes) contaminated with MRSA
- Hands contaminated with MRSA play a large role in spreading the bacteria
- MRSA is not spread through the air
- Swimming or fishing in the ocean does not put people at higher risk for skin infections or MRSA than being on land

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## Clinical Presentation

- MRSA infections can present in many ways, including:
  - Infected Laceration (pre-existing cut/ that becomes infected)
  - Carbuncle/"Boils"/pimples
  - Abscess (pus-filled "boil")
  - Cellulitis (inflammation of the skin)
  - Impetigo (blistered lesions)
  - Folliculitis (infected hair follicle)

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## BS Bite versus Furunculitis



Fagan, et al, Surgical Infections 4:311, 2003

## Diagnosis

- Laboratory testing is necessary to determine if a person is infected with MRSA
- A culture of the skin lesion (and/or fluid/pus) is collected for laboratory testing
- Laboratory testing will determine the antibiotics appropriate for treating the infection

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### CA-MRSA: PVL+ Necrotizing Pneumonia



- Report of 4 cases at Johns Hopkins<sup>1</sup> with severe CAP, shock
- 1 death; 2/4 with bilateral LE limb loss from profound shock
- (+) PVL genes
- 20 previous cases<sup>2,3</sup> reported in world literature w/many fatalities

1. Francis JS, et. al. CID 2005;40:1378-9.
2. Hunt SC, et.al. JAMA. 1999.
3. Gillet Y, et. al. Lancet. 2002;359:753-9.

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## Prevention

- Antibiotics should be taken according to directions and should be taken to completion
- Clean (with soap and water) all wounds and breaks in the skin immediately
- Keep all infections covered with clean, dry bandages or finger cots
- Anyone changing the bandages of another individual should also wash their hands frequently

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## Prevention, cont.

- Maintain good personal hygiene, especially washing your hands frequently with soap and warm water (alcohol based hand sanitizers are also good)
- DO NOT share personal items (towels, clothes, razors, linens)
- Wash linens and clothes with hot water and laundry detergent. Dry in a hot dryer, rather than air drying
- Clean common-use areas/objects with a bleach-water solution or commercial cleaning products

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## Risk of MRSA Spread

- Risk of acquisition of MRSA for HCW's working in a MRSA endemic setting is low
- Study of 200 HCW's at a tertiary care hospital
- Infect Cont Hosp Epidemiol 2007;28:1404
- 28% colonized with MSSA
- 2% MRSA colonized

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## Decolonization

- Widespread use is not recommended because:
  - 1) Expensive
  - 2) Resistance
  - 3) Short lived (most are recolonized during the next few months)
- Mayo Clin Proc 2007;82:1463-67

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## Infectious Hepatitis

- Hepatitis A
- Hepatitis B
- Hepatitis C
- Hepatitis D
- Hepatitis E

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## Alphabet Soup

- Hepatitis A



Feces

- Hepatitis E



## Hepatitis A - One Tough Virus

- Unaffected by stomach acid
- Survive on unwashed hands Water: survives 12 weeks to 10 months
- Resists heat as high as 60 cel. For 1 hr
- Not destroyed by freezing
- Dried, remains active at least 1 month

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## Hepatitis A - Tricky Virus

- Incubation Period: App. 1 month
  - Most infectious time
  - No signs or symptoms
  - People unknowingly transmit

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## Hepatitis A - Symptoms

- Nausea / vomiting
- Fever / chills
- Diarrhea
- Malaise / fatigue
- Abdominal pain
- Decreased appetite
- Jaundice / yellow eyes
- Pale Stool

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## Hepatitis A - Transmission

- Most common: fecal-oral route
- How?
  - Person to person (poor hygiene)
  - Sleeping and living in overcrowded situations
  - Needle sharing
  - Daycare
  - Food prepared by a contagious person
  - Contaminated water
  - Shell fish
  - Recreational waters

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## Hepatitis A Not spread by ...

- Coughing
- Sneezing
- Shaking hands
- Saliva
- Urine
- Sweat

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## Hepatitis A - Outbreaks

- Source no longer infectious
- Identify anyone exposed in past 2 weeks
- Immunoglobulin intramuscularly
- Vaccination

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## About Norovirus

- Viral gastrointestinal illness characterized by diarrhea and vomiting, low-grade fever
- Incubation 12-50 hours
- Duration 24-60 hours
- Transmission: fecal-oral (food and waterborne, fomites), aerosolized from vomit
- Susceptibility: nearly everyone
- Antiseptic cleaning of the environment

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## Mystery Illness That Sickened Volleyball Team Is Identified

POSTED: 2:31 p.m. PDT April 22, 2003

- SEATTLE -- Medical experts have identified what type of illness made dozens of people, including members of a Seattle-area volleyball team, sick in Reno last weekend. It was the Norovirus, similar to the Norwalk virus that has hit several cruise ships. More than 80 volleyball players, coaches and parents reported symptoms similar to the flu or food poisoning at a volleyball tournament in Reno.
- About 25 of them were sent to hospitals.
- [More on Noroviruses at CDC.gov](#)

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## Recommendations

- 3 players should not come to tournament
- Only paper cups should be used with bottled water dispensers
- More frequent environmental cleaning of bottled water dispensers
- Emphasize hand washing

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## Neisseria Meningitis

- Source: Person, 5-10% carrier
- Route: respiratory droplet via close contact
- Incubation period: 1-10 days (<4)
- Illness: 1/100,000 & 4/100,000 dorms
  - Abrupt fever, malaise, headache, RASH
  - Seizure or stroke
  - 1/10 die

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## Neisseria Meningitis Exposure

- Identify anyone exposed in past week
- Close contacts:
  - Roommates
  - Kissing, sharing cigarettes or cups
  - Sneezed or coughed on
- No Quarantine
- Antibiotics & Vaccination

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EVERYONE  
IS WORRYING  
ABOUT  
INFLUENZA

(KIDS,  
PARENTS,  
TEACHERS...)

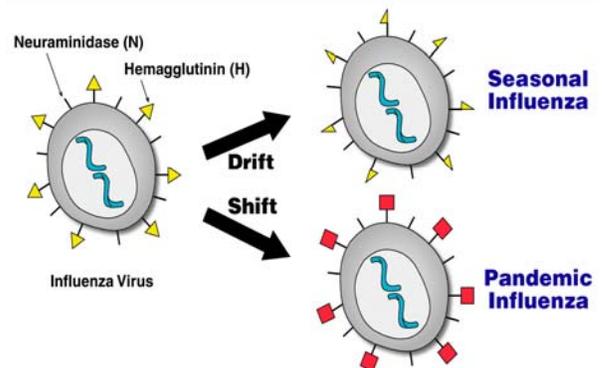
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## What Is a Pandemic?

- Epidemics and Pandemics  
*EPI* = upon; *Demic* = "The people"  
*PAN* = "All over"; *Demic* = "The people"
- An epidemic is a disease that occurs with greater frequency than expected
- A pandemic is an epidemic that spreads all over the world, or a major region of the world (e.g., a continent)
- Well-known pandemics include AIDS, TB, Malaria (In all tropical regions) and the "Black Death" of the 14th Century (Bubonic/pneumonic plague)

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## Influenza: Antigenic Drift and Shift





## Influenza Transmission

- Occurs primarily by large respiratory droplets that are expelled from the respiratory tract during coughing or sneezing.
- Close contact, within 3 feet, is usually required for transmission.

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## Influenza

- Sudden Onset
  - High Fever
  - Cough
  - Chills
  - Muscle aches
- Several days sick, several weeks recovering
- Pneumonia
- Severe respiratory distress

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## Threat

*How does seasonal flu differ from pandemic flu?*

<u>Seasonal</u>	<u>Pandemic</u>
• Yearly	Rarely
• Familiar virus	New virus
• Mild/moderate symptoms	Severe symptoms
• Very young, very old, health problems	Healthy people
• Vaccine available	No vaccine

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## The Burden of Seasonal Influenza

- 250,000 to 500,000 deaths globally/yr
- 36,000 deaths and >200,000 hospitalizations/yr in U.S.
- \$37.5 billion in economic costs/yr in U.S. related to influenza and pneumonia
- Ever-present threat of pandemic influenza

Sources: CDC, WHO, Am. Lung. Assoc.

## What Is "Bird Flu"?

- "Bird Flu" is a slang term for Avian Influenza
- It is not a good term because:
  - 1) There is no such disease as "flu", a colloquial term for a variety of different stomach and respiratory upsets
  - 2) All human Influenza A viruses are descendants of Avian Influenza Viruses, but differ from them in having learned the trick of jumping into humans
  - 3) All Avian Influenza Viruses are adapted to their hosts - wild waterfowl (ducks and geese), and do not harm them
- H5N1 is one of many types of Avian Influenza (e.g., H7N7, H5N2) but is of interest because it has been spreading rapidly and killing chickens. Some experts fear it will turn into a pandemic by jumping from chickens to humans, but other experts doubt this will happen.

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## Exposure to Avian Influenza in Southeast Asia



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## Current Knowledge about Avian Influenza

- Evolving "story", changes daily
- No precedent for this
- How Influenza switches to humans is completely unknown
- The experts are unsure and do not agree on key points
- No good data on what will work to prevent or mitigate a pandemic



HOW DO  
AVIAN VIRUSES  
OF DUCKS & GEESE  
BECOME  
HUMANIZED?



### Expert Opinion

- 3 conditions needed
- A pandemic is inevitable
- Possibly H5N1 (Avian Influenza)
- May be muted or catastrophic
- Globalization
- Preparedness

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### How Does Your Community Plan To Address The Needs Created By An Influenza Pandemic?

- A. Call in FEMA
- B. We Have No Plan
- C. We Have Created A Plan Specifically For Avian Influenza.
- D. Not Sure

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## Pandemic Influenza Stages

- Prepare (Inter-pandemic)
- Alert (Avian influenza in birds – U.S./Florida)
- Immediate/Initial response (small clusters)
- Sustained response (large clusters/waves)
- Vaccine available (offense)

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## Overall Plan Goals

- Care for victims
- Control diseases spread
- Maintain societal structure and function

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## Key Strategies

- Keep general public informed so that they may make good medical decisions
- Efficiently manage resources
- Sustain Health & Medical system under stress

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## Local Health Department Actions Pandemic Influenza

- Preparedness and Communication
- Surveillance and Detection
- Response and Containment

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## Communication Key to Success

- Standardized messaging is key for county and region
- Tailored, standardized messaging for community at large
- Open communication and information exchange with medical community

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## Community Engagement Agency Level

- Focused meetings with key groups
  - Medical Advisory Group
  - First Responders
  - Local School Board
  - Universities

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## Community Engagement Citizen Level

- Educational presentations
  - Churches
  - Employee health fairs
  - Medical clinics
  - Law offices
  - Kiwanis groups

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## Medical Advisory Group

- Hospital CMOs
- Specialists: Pulm, ID, Critical Care, Peds
- Guide medical decision-making
- Improve Credibility
- Review plans: triage protocols and alternate medical treatment sites

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## Preparation Phase

- Local Public Health system
  - Hospitals, nursing homes, assisted living facilities, clinics
  - Governments, schools (public & private)
  - Churches, community-based organizations (CBOs)
  - Chamber of Commerce, employers
- Seasonal Influenza Plan
  - Prevention education
  - Surveillance: human & animal
  - Vaccination: High-risk populations and HCWs

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## Essential Needs

- Food
- Water
- Shelter
- Medical
- Communication
- Transportation

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## Response & Containment

- Non-pharmaceutical interventions will be key!
- Isolation of sick persons
- Quarantine
- Antiviral drugs may be useful for prophylaxis or treatment
- Vaccine trials are underway

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## Avoiding Influenza

- Wash hands frequently
- Cover your mouth when you cough or sneeze
- Stay home if flu symptoms appear
- Thoroughly wash eating utensils
- Avoid close contact with other family members

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## Continuity of Student Learning & Core Operations

- Develop and practice scenarios
- Develop alternate types of instruction (web-based, mailed lessons, local TV, etc.)
- Update or develop continuity of operations plan to keep essentials functions up

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## Infection Control Policies & Procedures

- Develop infection control policies in conjunction with health department
- Establish good hygiene practices among students and staff NOW
- Establish sick leave policies relating to a pandemic
- Plan for ways to triage ill students
- Masks ??

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## Is the educational environment conducive to good hygiene?

- Accessible soap, paper towels, and sinks
- Breaks for hand hygiene
- Incentives for hand hygiene
- Sanitary, health, and safety inspections of the school
- Healthy Schools, Healthy People: It's a Snap program [www.itsasnap.org](http://www.itsasnap.org)



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EXTENSIVE PUBLIC HEALTH EXPERIENCE WITH TB CONTROL HEAVILY INFLUENCED INFLUENZA PREVENTION EFFORTS IN THE U. S.

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## Communications Planning

- Develop and test platforms for communications (telephone trees, hotlines, dedicated websites, etc.)
- Update communication plans
- Identify spokespersons and ensure language, cultural, and reading level appropriateness of messages
- Disseminate factually correct information
- Counter misinformation

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## Preparedness



- Create and test an effective means of communication with staff, students, families, and the media
- Determine a mechanism on how to instruct students and staff on what to do
- Determine means of communication (cell phones, radios, intercoms, e-mails, etc.)
- Develop partnerships with media, community agencies and law enforcement

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## Personal Safety

- TB mask / eye wear??
- Handwashing
- Immunize i.e. flu, pneumonia
- Public gatherings?
- Self education
- Stockpile your own medications?
- Differentiate “flu” from cold

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## What Individuals & Families Can Do

- Have a supply of food and water
- Have a supply of your regularly prescribed medications
- Have supply of non-prescription medications
- Have a family plan to care for loved ones if they are sick
- Volunteer to help with emergency response

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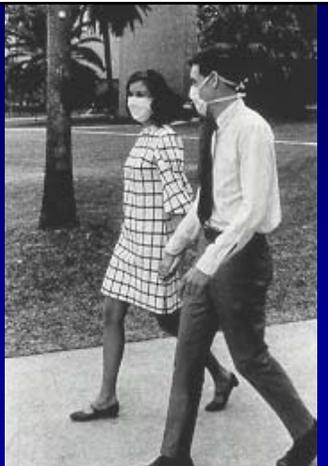
If it is *wet* and  
*Not* yours.....

***Don't*** Touch it !!!

"Knowing is not enough; we must apply.  
Willing is not enough; we must do."

-- Goethe

**QUESTIONS?**



## MRSA Outbreak

- The County Health Department calls to inform you that a local physician has reported treating 5 students attending your college in the past week for MRSA skin infections.
- What are the steps you would take?

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## Neisseria meningitidis

- The County Health Department calls to inform you that an 18 year old student attending your college has been admitted to a local hospital with meningitis.
- What are the steps you would take?

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