WHO WANTS TO BE A DISEASE DETECTIVE?
ENVIRONMENTAL EPIDEMIOLOGY:
EASY QUESTIONS, DIFFICULT ANSWERS

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PRESENTATION OBJECTIVES

• Discuss the key components of environmental epidemiology

• Use examples of disease detectives at work

• Discuss the role of communities in environmental health research
EXAMPLE:
INFECTIOUS DISEASES
COMMUNICABLE DISEASES

• Spread from one person to another or from an animal to a person
• Often via airborne viruses or bacteria, but also through blood or other bodily fluid
• Synonyms: infectious and contagious diseases
Influenza Viruses

- Influenza A and B (human)
- Subtyping Influenza A - based on surface glycoproteins

16 hemagglutinins (HA) and 9 neuraminidases (NA)
Current human subtypes: H1N1, H3N2
SEASONAL INFLUENZA – A MAJOR INFECTIOUS DISEASE

• Certain groups: severe, secondary complications
  • Worsening of chronic conditions, e.g. heart failure or chronic lung disease
  • New bacterial infections, e.g. pneumonia or ear infections
  • Less common (but often very severe) complications

• Complications may lead to hospitalization and death, particularly among the elderly, the young, and those with certain chronic conditions.
PERCENTAGE OF OUTPATIENT VISITS FOR INFLUENZA-LIKE ILLNESS (ILI)* REPORTED TO CDC, BY SURVEILLANCE WEEK — U.S. OUTPATIENT INFLUENZA-LIKE ILLNESS SURVEILLANCE NETWORK (ILINET), NATIONAL SUMMARY, UNITED STATES, 2017–18† INFLUENZA SEASON AND SELECTED PREVIOUS INFLUENZA SEASONS

INFLUENZA SEASON SEVERITY CLASSIFICATION,*
BY AGE GROUP AND SEASON — UNITED STATES,
2003–04 THROUGH 2017–18 SEASONS†

DEVELOPING THE VACCINE

• Trivalent (2 Influenza A and 1 Influenza B)
• Now: quadrivalent (2 Influenza A and 2 Influenza B)
• Vaccine production: 6-9 months
PANDEMIC INFLUENZA
THREE CONDITIONS

• An influenza pandemic is a global outbreak of disease that occurs when:

• A new influenza A virus sub-type emerges in the human population, and

• It infects humans and causes serious illness, and

• It spreads easily from person to person worldwide and be sustained among humans (continues without interruption)
## Herd Immunity Thresholds for Selected Vaccine-Preventable Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>Herd Immunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria</td>
<td>85%*</td>
</tr>
<tr>
<td>Measles</td>
<td>83-94%</td>
</tr>
<tr>
<td>Mumps</td>
<td>75-86%</td>
</tr>
<tr>
<td>Polio</td>
<td>80-86%</td>
</tr>
<tr>
<td>Rubella</td>
<td>83-85%</td>
</tr>
<tr>
<td>Smallpox</td>
<td>80-85%</td>
</tr>
</tbody>
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*4 doses
INFLUENZA:
GROUP 1 EXERCISE

• https://www.cdc.gov/flu/about/disease/index.htm
• How is influenza spread?
• Who is at highest risk of getting influenza?
• Why get the influenza vaccine?
EXAMPLE:
ENVIRONMENTAL HEALTH
LEAD EXPOSURE
GROUP EXERCISE


- What is lead?
- How can lead damage your health?
- What are the key findings of the review article
ENVIRONMENTAL JUSTICE

- **Environmental Justice**: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

- **Environmental Racism**: refers to socially marginalized racial minority communities which are subjected to disproportionate exposure of pollutants, the denial of access to sources of ecological benefits (such as clean air, water, and natural resources), or both.

- **Environmental Equity**: the proportionate and equitable distribution of environmental benefits and risks among diverse economic and cultural communities.”
WARREN COUNTY, NORTH CAROLINA (1982)

- Most important event to shape the environmental justice movement
- Landfill constructed in community 84% African American
- PCB contaminated waste dump
- Led to an assessment of all hazardous waste site locations in U.S.
CASE STUDY: FLINT, MICHIGAN

- Demographics:
  - 56.6% African American and 37.4% White
  - Approximately 25-30% under poverty line

- Many organizations have stated that this is an example of disproportionate exposure to polluted environment (water in this case)
CASE STUDY: CHEF MENTEUR LANDFILL
CASE STUDY: CHEF MENTEUR LANDFILL

- Located a half mile up the road from Vietnamese American community of New Orleans East
- 2006: hastily opened under Executive Order for debris from hurricanes Katrina and Rita
  - As a construction and demolition landfill, it was not required to have a liner, leachate collection or groundwater monitoring wells
- City zoning procedures and Clean Water Act
  - requirements were suspended as an emergency measure post-Katrina
  - allowed the landfill to be created without city council approval or a waste permit
- Opposition: Vietnamese community & environmental groups concerned about the adjacent Bayou Sauvage wetlands
CHEF MENTEUR LANDFILL: A VICTORY FOR THE COMMUNITY

  - Residents and supporting community groups filed suit against the city to have the landfill closed

- Landfill closed on August 14, 2006, the day the Mayor’s Executive Order expired

- Victory for Vietnamese community and landfill closed
ENVIRONMENTAL JUSTICE:
GROUP EXERCISE

- Flint case: E justice, Env racism, environmental equity?
- Chef menteur case: E justice, Env racism, environmental equity?
- Justify your answer