

Disease Surveillance



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Prevention Program



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Objectives

- Describe purpose of disease surveillance
 - Identify data sources & methods used
 - Discuss attributes of effective surveillance program
 - Participate in outbreak detection exercise
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- Informal poll: Currently working in Orpheus?



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Surveillance is

“Systematic ongoing collection, collation, and analysis of data and the timely dissemination of information to those who need to know so that action can be taken”

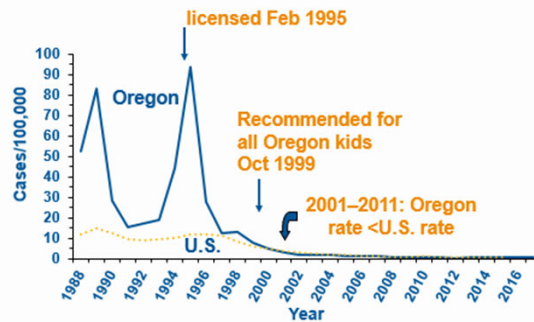
- World Health Organization

Purposes of Surveillance

- Monitor magnitude of diseases in community
- Identify populations at highest risk
- Develop appropriate interventions
- Improve understanding of specific diseases
- Identify outbreaks

Monitor Magnitude of Disease

Impact of prevention measure: hepatitis A vaccination

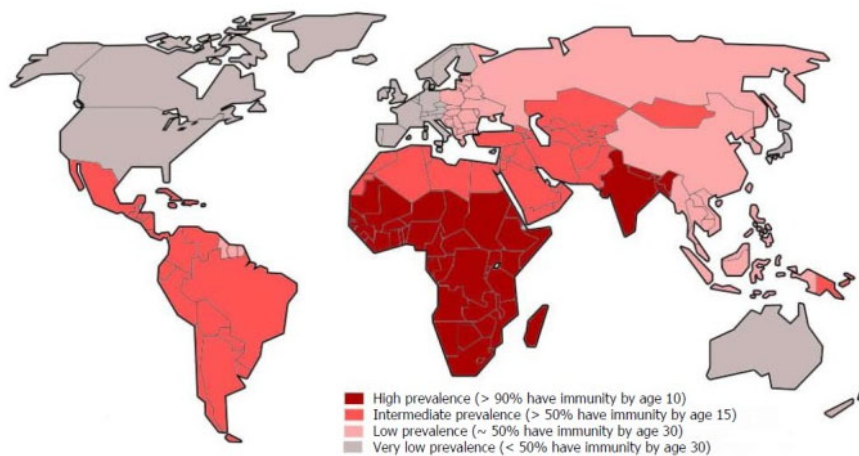


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Identify Those at Highest Risk Prevalence of hepatitis A virus by region

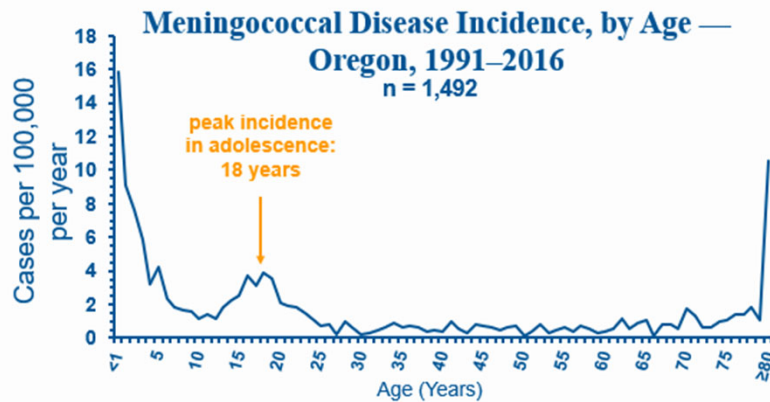


Source: Jacobsen KH. Globalization and the Changing Epidemiology of Hepatitis A Virus. Cold Spring Harb Perspect Med 2018 Mar 2 PMID: 29500305
Prevalence of hepatitis A

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Develop Interventions



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Improve Understanding

- Increase knowledge of emerging diseases (e.g., novel influenza strains, SARS-CoV-2)
- Monitor changes in infectious agents
 - Antibiotic resistance



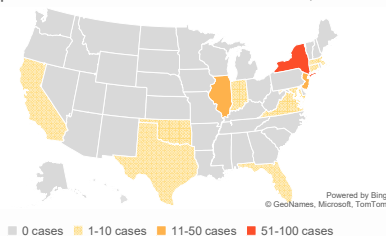
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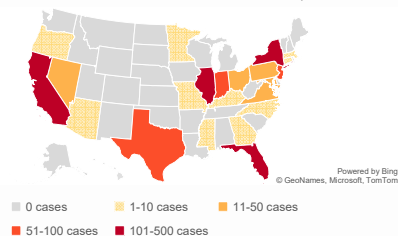
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Candida auris: first Oregon cases reported in 2021

Reported clinical cases of *Candida auris*, 2017



Reported clinical cases of *Candida auris*, 2021



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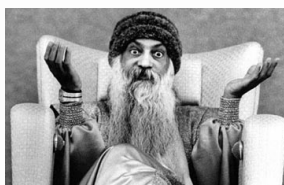
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Source: CDC

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Detecting Outbreaks

- Detect changes in disease patterns in community
 - increase in cases (sudden or gradual)
 - disease affects certain demographic group
 - disease in previously unaffected geographic area



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Some Surveillance Data Sources

- Lab results
- Case (morbidity) reports
- Mortality reports (death records)
- Health care data (hospital discharge, outpatient, ED)
- Disease specific (influenza, FoodNet)
- Others...

What Diseases are Reportable?

- Council of State and Territorial Epidemiologists (CSTE) makes recommendations - www.cste.org
 - Each state determines list of reportable conditions
- Range in US: 35 – 130 conditions per state



Reportable Healthcare-associated Organisms in Oregon

Organism	Reportable?
Pan non-susceptible (panNS) organisms	YES
Carbapenem-resistant Enterobacterales (CRE)	YES
Carbapenem-resistant <i>Acinetobacter</i> species (CRA)	Started end of 2023
Carbapenemase producing organisms (CPO)*	Started end of 2023
<i>Candida auris</i> *	Started end of 2023
Carbapenem-resistant <i>Pseudomonas aeruginosa</i> (CRPA)**	NO, unless CPO or panNS

*Previously reportable under the "outbreaks and uncommon illnesses"

** some labs voluntarily report CRPA to OHA,



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Passive Disease Surveillance

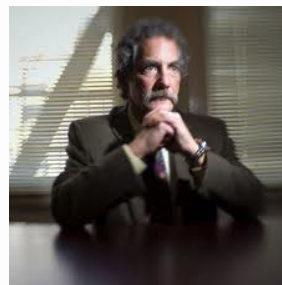
Monitoring patterns of key diseases

- Mandated by State rules (OAR)
- Relies on providers and labs

Advantage: Cost-effective

Limitations:

- Underreporting
- Changes in definitions
- Reporting delays
- Variations among reporters

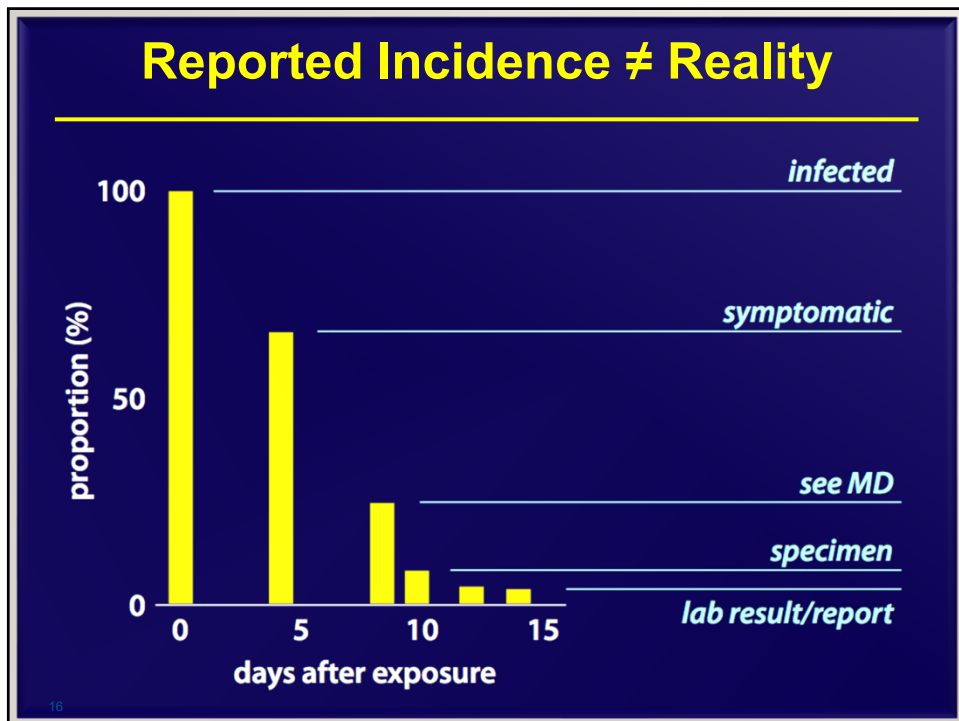


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Active Disease Surveillance

- **Outreach** to reporting sources

- Personal visits
- Telephone calls
- Alerts



- Typically for limited duration

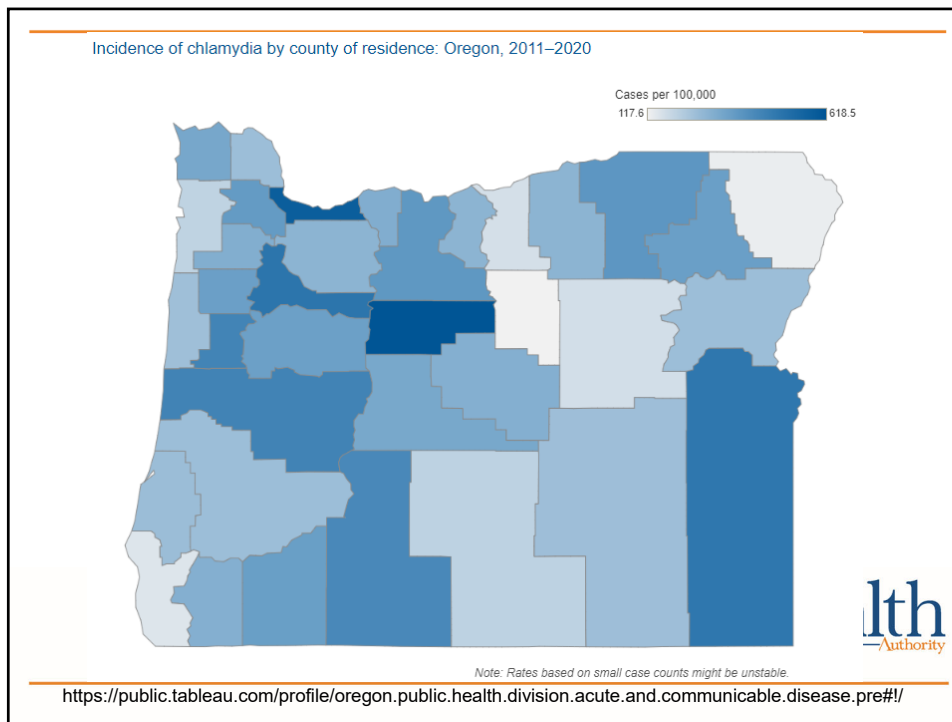
Advantage: Obtain more accurate disease information

Disadvantage: Expensive, time-consuming

Analysis of Surveillance Data

- Analysis — key to communicable diseases control
- Useful to maintain chart with 5 years of case frequencies — see Orpheus reporting features*
- Simple statistics (counts, rates) can be examined
 - compare my county with Oregon?
 - compare Oregon with the United States?


*<https://public.tableau.com/profile/oregon.public.health.division.acute.and.communicable.disease.pre#!/>




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Data Dissemination

- OHA ACDP resources:
 - Oregon Communicable Disease Data:
<https://www.oregon.gov/oha/PH/DISEASES/CONDITIONS/COMMUNICABLEDISEASE/DISEASESURVEILLANCEDATA/Pages/index.aspx>
 - CD summary:
<https://www.oregon.gov/oha/PH/DiseasesConditions/CommunicableDisease/CDSummaryNewsletter/Pages/index.aspx>





Who are consumers of CD data in your jurisdiction?



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Attributes of an Effective Surveillance Program

- Sensitivity
- Specificity
- Many others.....

Sensitivity

Ability to detect cases of communicable disease that system is meant to detect

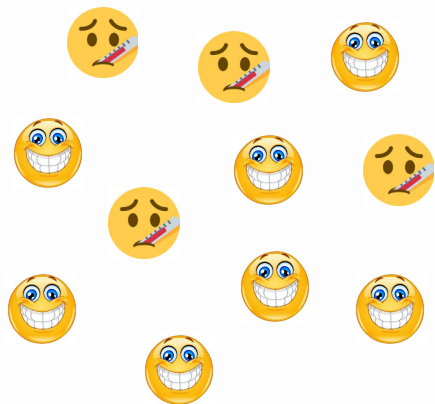
- Able to detect an **outbreak** or sudden change?
- Sensitive enough to identify disease problems in your community?

Specificity

The **ability to detect only true cases**

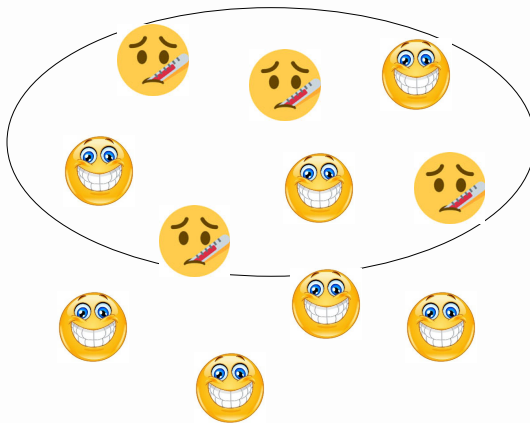
- Does excessive “background noise” generate false alerts?

Sensitive vs. specific in outbreaks



- Consider a hypothetical group of people who might be included in an outbreak investigation
- Thermometer = true case
- Smiling = non-case

Sensitive



Sensitive case definition:

More likely to include true cases

Might incorrectly include non-cases

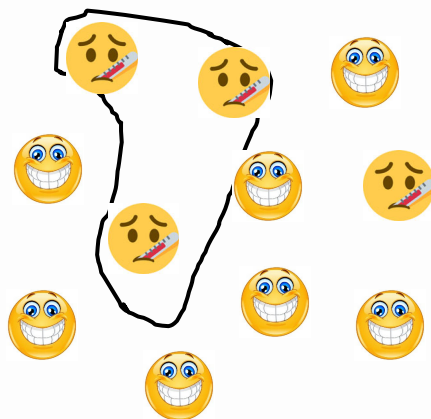
- Thermometer = true case
- Smiling = non-case

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Specific



Specific case definition:

More likely to correctly exclude non-cases

Risks missing true cases (if they don't meet narrow case definition)

- Thermometer = true case
- Smiling = non-case

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Definition of Disease Outbreak

- A disease outbreak defined as:
 - Occurrence of **two or more cases**
 - With the same clinical illness
 - Affects people from different households
 - Cases share common exposure (setting, activity, medical procedure, food item etc.)
- Informal poll: Current role in outbreak investigations?

Is this an outbreak... or something else?

- All reported increases in communicable disease should be examined.
- Disease reports may increase for several reasons:
 - populations change
 - provider awareness
 - case definition change
 - new diagnostic tests

Questions?

Disease Surveillance Exercise

- Handout: CD 303 Exercises (pages 1 and 2)
- Work in groups
- Complete each question before proceeding to next question
- Review questions together at end