

Meningitis: Contact Investigation and Response

Presented by Cambridge Public Health
Department Staff to MHOA



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Outline

- Epidemiology of *Neisseria Meningitidis*
- Case Presentation
- Communicable Investigation
 - Public Health Response
 - Post-Exposure Prophylaxis (PEP)
 - Final Follow-Up
- Strengths & Challenges
- Proposals for improvement
- Discussion and questions



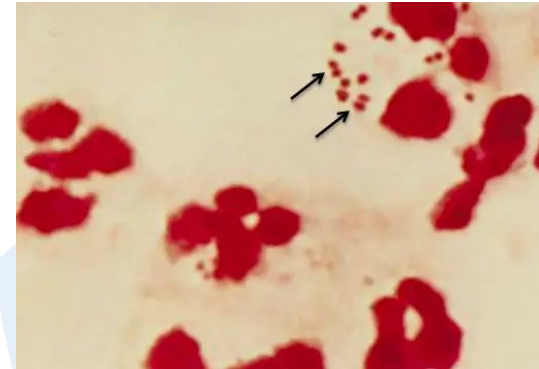
Epidemiology of Neisseria Meningitidis



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Neisseria meningitidis

- Gram negative diplococci
- Exclusively infects humans
- Inhalation of aerosolized particles containing meningococci can lead to nasopharyngeal carriage
- Through various virulence factors can evade our immune response and invade human epithelial and endothelial cells
- Symptoms can range from transient fever and bacteremia to fulminant disease with death within hours of symptom onset
 - “The case-fatality rate of IMD is estimated between 10% and 15%, and 20% of individuals who survive infection have lifelong disabilities, including vision and hearing loss, neurological deficits, and limb loss”¹
- Thus, one of the most feared microorganisms in the world!



Source: Microbe Online



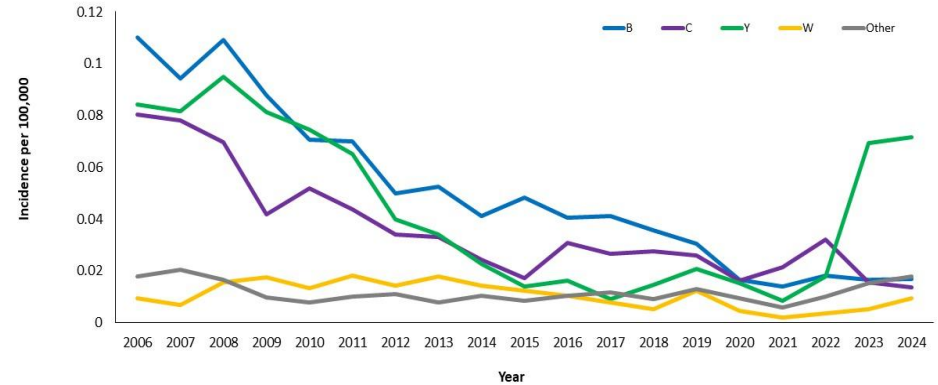
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¹Cascante-Vega, Jaime, et al. “Inference of Transmission Dynamics and Retrospective Forecast of Invasive Meningococcal Disease.” *PLOS Computational Biology*, vol. 19, no. 10, Oct. 2023, p. e1011564, <https://doi.org/10.1371/journal.pcbi.1011564>.

Epidemiology of *Neisseria Meningitidis*

- **Meningococcal disease is increasing in the US:**
 - 2023: There were **437 cases** in and **46 deaths (10.5%)**
 - 8.8% of these cases were associated with an outbreak
 - 2024: **503 cases** (*preliminary reporting*)¹
 - Highest case count since 2013.
 - Increase is mainly attributable to *N. meningitidis* serogroup Y
- **Disproportionate impact of increase:**
 - People between the ages of 30 and 60 years
 - Black or African American people
 - Adults with HIV

Trends in Meningococcal Disease Incidence by Serogroup – United States, 2006–2024*



Source: NNDSS data with additional serogroup data from Active Bacterial Core surveillance (ABCs), state health departments, and isolates received and tested by the Bacterial Meningitis Laboratory at CDC
*2024 data are preliminary



Neisseria meningitidis - Spread and Prevention

- Spread by large respiratory droplets or direct contact with respiratory secretions
 - “Close Contact” is not well defined, but generally considered those who, in 7 days prior to the source patient’s symptom onset, had either;
 - Prolonged contact (> 8 hrs) of close proximity (within 3 ft)
 - Direct exposure to oral secretions
- Primary prevention: Vaccination
- Secondary prevention: Post-exposure Prophylaxis (PEP)
 - Give as early as possible to close contacts following exposure
 - Options include: Ciprofloxacin, Rifampin, Ceftriaxone



Case Presentation



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Case Presentation

- Non- Cambridge resident in their 30s presented to an area health center
- Symptoms: mild diarrhea and abdominal discomfort for one day
- Transported to a local hospital with rapid progression to multi-system organ failure.
- Blood culture positive for *N. meningitidis*. No CSF obtained.
- Unfortunately, died two days after symptom onset.
- Case employed at a local Cambridge establishment

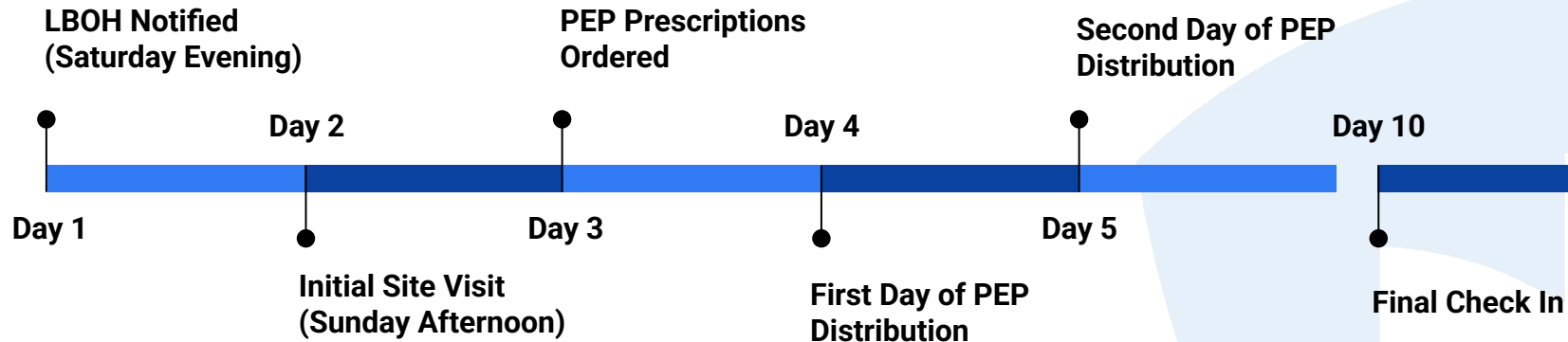


Communicable Investigation

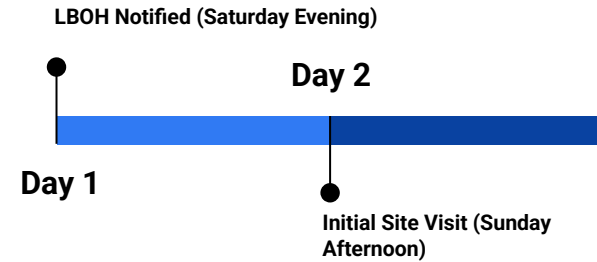


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Response Timeline



Public Health Response



- Epidemiologist On Call (EOC) notified LBOH by phone on Saturday evening about *N. meningitidis* exposure at Cambridge restaurant.
- Immediate investigation required.
- Ongoing communication and planning with State EOC, Inspectional Services, restaurant owner, and LBOH team over the weekend.
- PHNs met with the restaurant owner in-person on Sunday.
 - Provided education
 - Identified close contacts (based on LBOH site visit and findings)
 - Obtained names and phone numbers for close contacts



Day 3

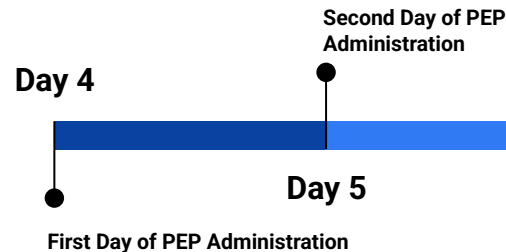
Post-Exposure Prophylaxis Pre-Work

- Tracking sheet developed by Epi
- Phone calls were made (PHNs/Epis/per-diem staff) to each contact utilizing Cambridge Health Alliance (CHA) interpreter service
 - Multiple calls; health education; building trust
- LBOH case investigators registered individuals with CHA EMR (Epic)
- LBOH Medical Director ordered individual prescriptions
- Scheduled dates and times with the restaurant owner for onsite PEP distribution
- CHA outpatient pharmacy filled prescriptions for PEP



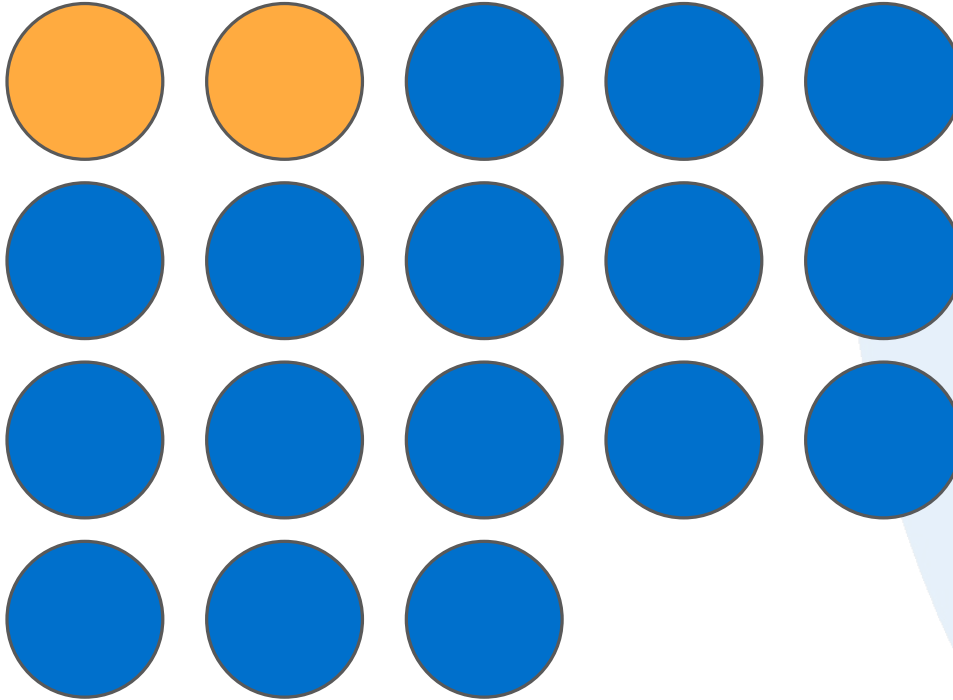
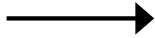
PEP Administration

- Process
 - PEP was administered onsite over 2 days, directly observed therapy
 - Health education provided by PHN/Epi to each contact prior to administering PEP in their respective languages.
 - Contraindications, questions about medication, questions about the disease, side effects, etc.
- By the numbers
 - 18 contacts received PEP
 - 16 from LBOH, 2 from their PCPs
 - 14/18 (78%) had no PCP, or PCP status was unknown
 - 11/18 (61%) used restaurant as listed address
 - 9/18 (50%) required interpreter services/multilingual staff
 - Cost of PEP was covered by LBOH (\$25/dose = \$400)



Post-Exposure Prophylaxis

Received PEP
from PCP



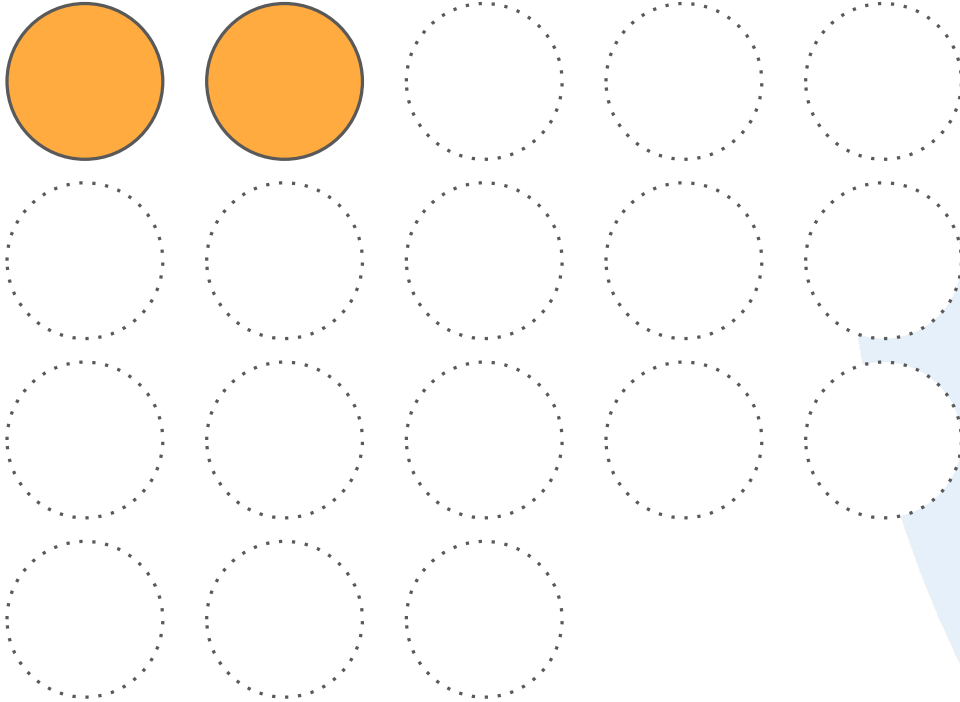
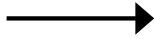
Received PEP
from LBOH



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If we just told people to go to their PCP...

Received PEP
from PCP

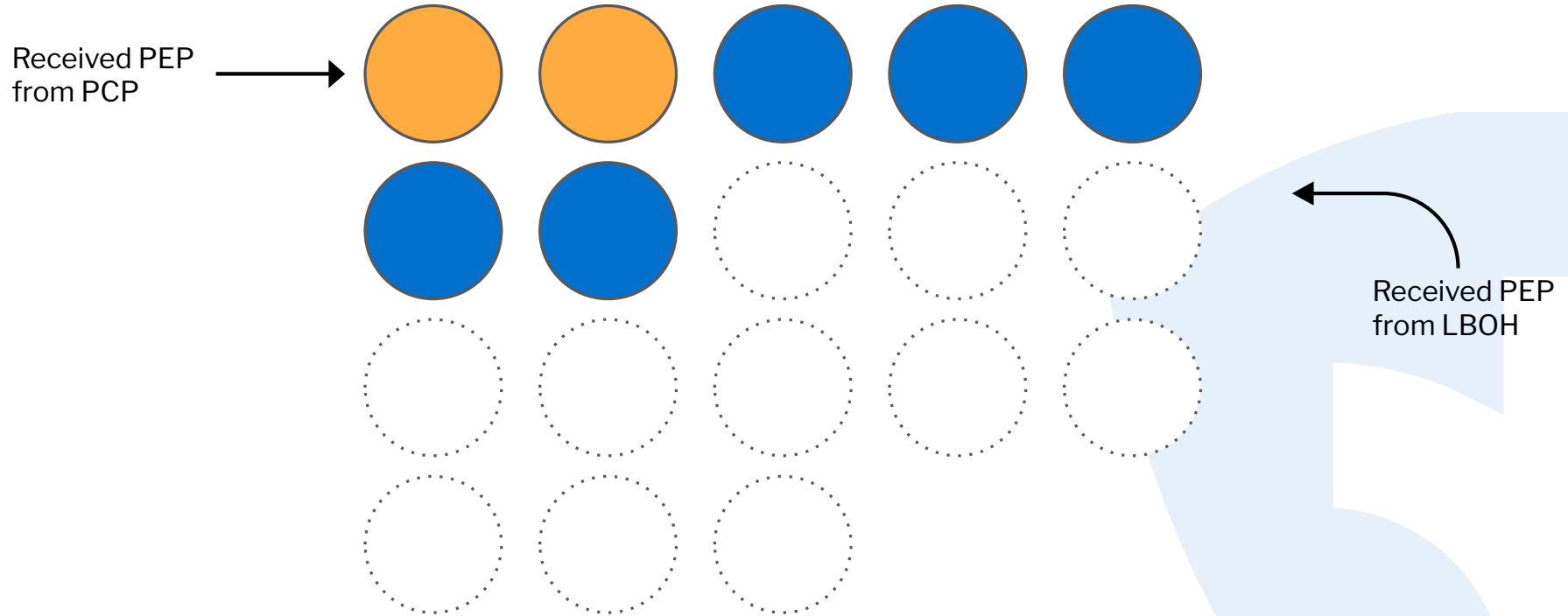


Received PEP
from LBOH



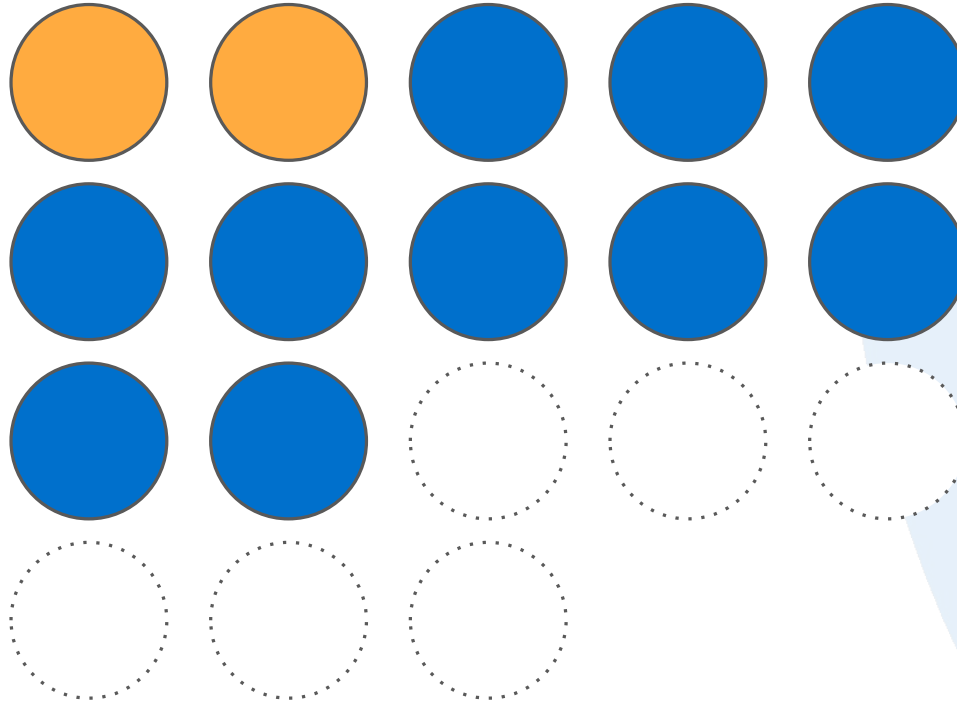
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And did one day of PEP administration...



And did a second day of PEP administration...

Received PEP
from PCP

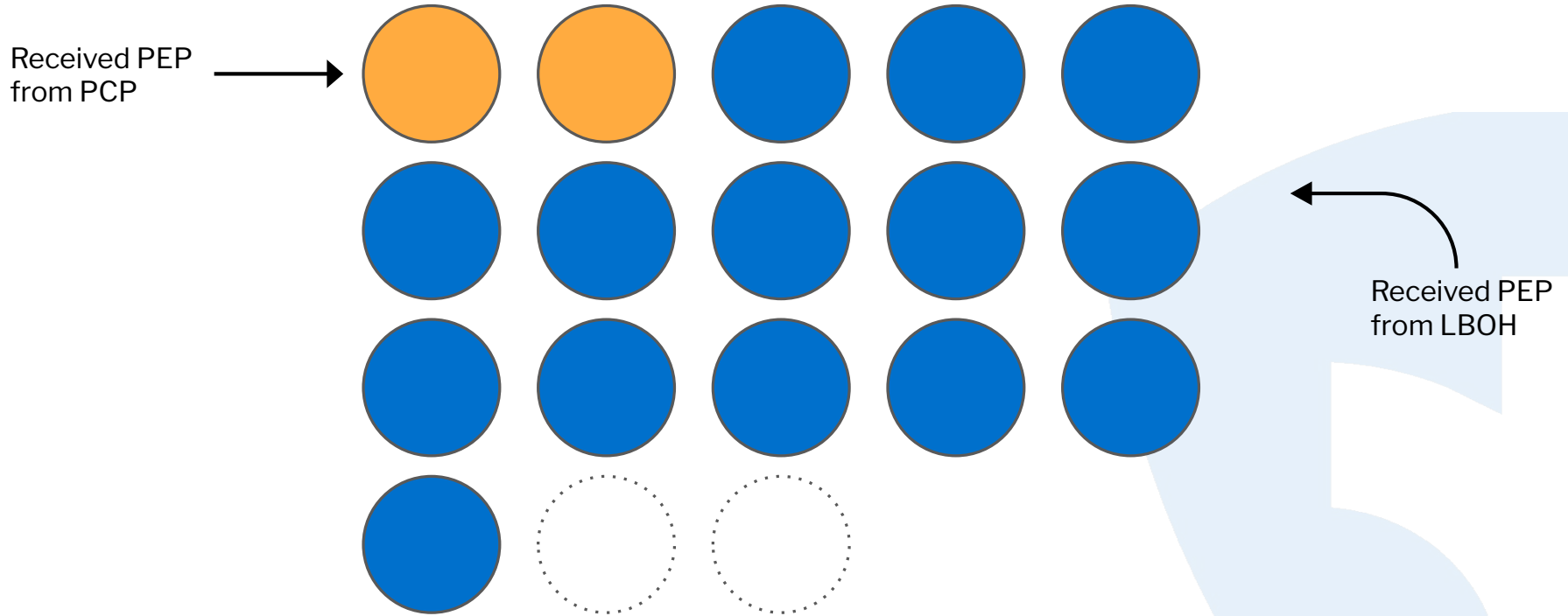


Received PEP
from LBOH



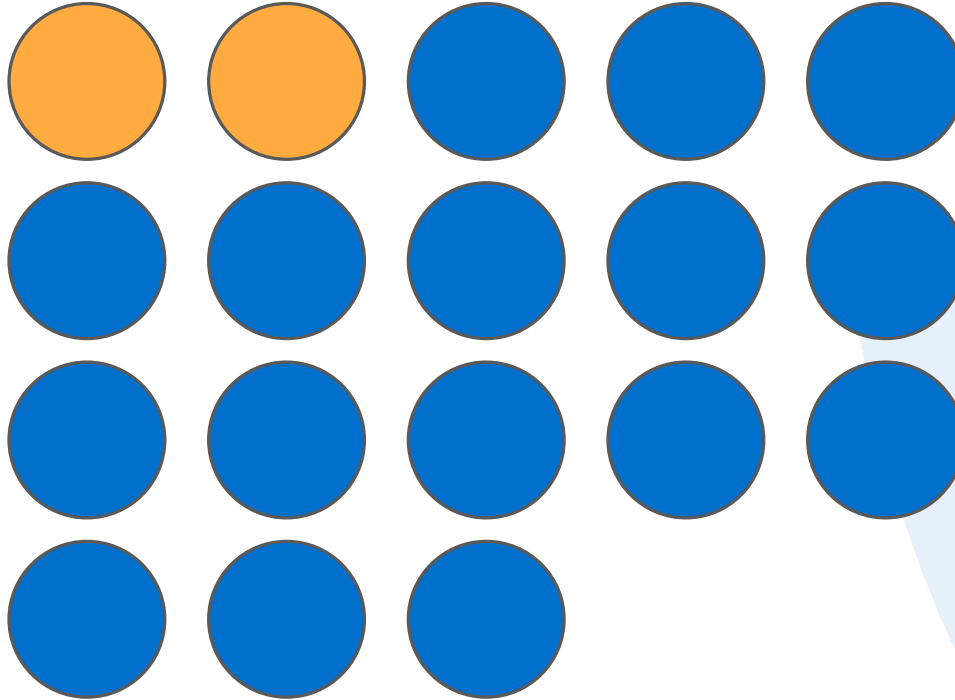
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And identified more contacts and contact info in person...



And ordered backup doses

Received PEP
from PCP



Received PEP
from LBOH



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Final Follow Up

- Email with restaurant owner on Day 10
- No report of staff with symptoms
- No sick calls

Day 10



Final Check In



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Strengths & Challenges



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Strengths of response

- Response time to immediate mobilization during weekend hours
- Staffing:
 - Nursing staff for in person site visit and health education
 - LBOH epidemiology team for tracking and support
 - Multilingual staff
- Collaboration with partner organizations:
 - State, ISD
 - CHA: Interpreter service, pharmacy, medical director in house, EPIC access & registration
- PEP medication paid for and hand delivered (not just a verbal recommendation)
- Prevention of Emergency Room utilization



Challenges

- Access for people without health insurance and PCPs (were able to mitigate)
- Distrust of medical systems, fear of sharing addresses (able to use workplace address)
- Cost of medication (\$25/script)
- Contact → PHN → Epi On Call → Physician at the state: a lot of room for error for missing high risk contacts
- Not all LBOHs are affiliated with hospital system to have ready access to meds
- Increasing drug resistance:
 - No resistance info available for index case, but was serogroup Y
 - Massachusetts data
 - 59 serogroup Y cases were reported. 49 (83.1%) had isolates available for characterization at the CDC; of those, 5 (10.2%) were found to be ciprofloxacin- and penicillin-resistant, and 7 (14.3%) were found to be penicillin-resistant only.
- CDC instability - no recent data & updates



Proposals for improvement



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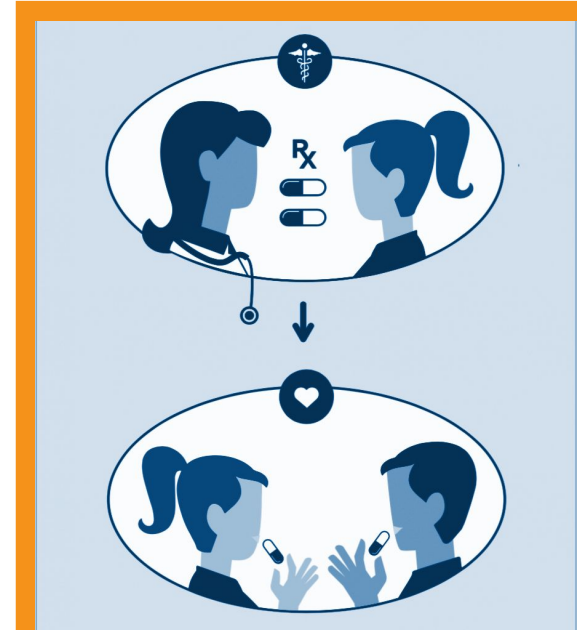
Proposals for improvement

- 1) **Local level:** create an after hours & weekend point of contact and response plan
- 2) **State level:** We need to coordinate with the State when there is a need for PEP medication distribution in the future



Call To Action

- Expedited Partner Therapy (EPT) allows health care providers to prescribe or distribute medication for the treatment of chlamydia, gonorrhea, or trichomonas to their patients to give to their partners without requiring a medical visit of the partner
- Initially recommended by the CDC in 2006, it is now a common and well-established practice throughout the USA
- EPT addresses the common barrier of partners being unable or unwilling to seek timely medical care
- Helps to decrease spread of sexually transmitted infections



Call To Action

Order Search

EPT

BrowsePreference ListFacility ListDatabase

Panels

(No results found)

Search panels by user

Medications

Name	Code	Type	Dose	Frequency	Disp...	Ref	End Dte	Pref List	Copay	Coverage	Formulary	Drug Type
doxycycline (VIBRA-TABS) tablet 100 mg (EPT - Expedi...	3120	Medic...	100 mg	2 TIMES DAILY	14	0	S+7	CHA OU...	T2/3 (Any Ph...	Other Cover...	Preferred Le...	Generic Rx

Procedures

(No results found)

Broaden My Search

Select And StayAcceptCancel

Generic script without requiring patient information

Dx Association

Edit Multiple

Providers

Options

Orders and OutPt Prescriptions

doxycycline (VIBRA-TABS) 100 MG tablet
 Take 1 tablet by mouth in the morning and 1 tablet before bedtime.
EXPEDITED PARTNER TX - REPLICATE SCRIPT. Do all this for 7 days.
E-Prescribe, Disp-14 tablet, R-0
Ok to dispense capsules or tablets.

CHA OUTPT PHARMACY-CAMBRIDGE HOSP, CAMBRIDGE, MA - 1493
CAMBRIDGE ST 617-665-1438



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Call To Action

- Propose establishing a similar low barrier process for PEP against *N. meningitidis*
- Generic scripts or “coupons” for 1 dose of ciprofloxacin (or rifampin x 4 doses as an alternative) that can be filled by the patient or by the provider/health department to distribute directly to patients
- Allergies and drug-drug interactions can be checked at the point of distribution
- State funded to eliminate any financial barriers
- Accepted at all routine pharmacies in MA to eliminate access issues
- Eliminate the need for patient registration, an established primary care provider, and health insurance
- Improve equity
- Risk of PEP is very low compared to the risks of delaying or missing the window for PEP against *N. meningitidis*



Acknowledgement

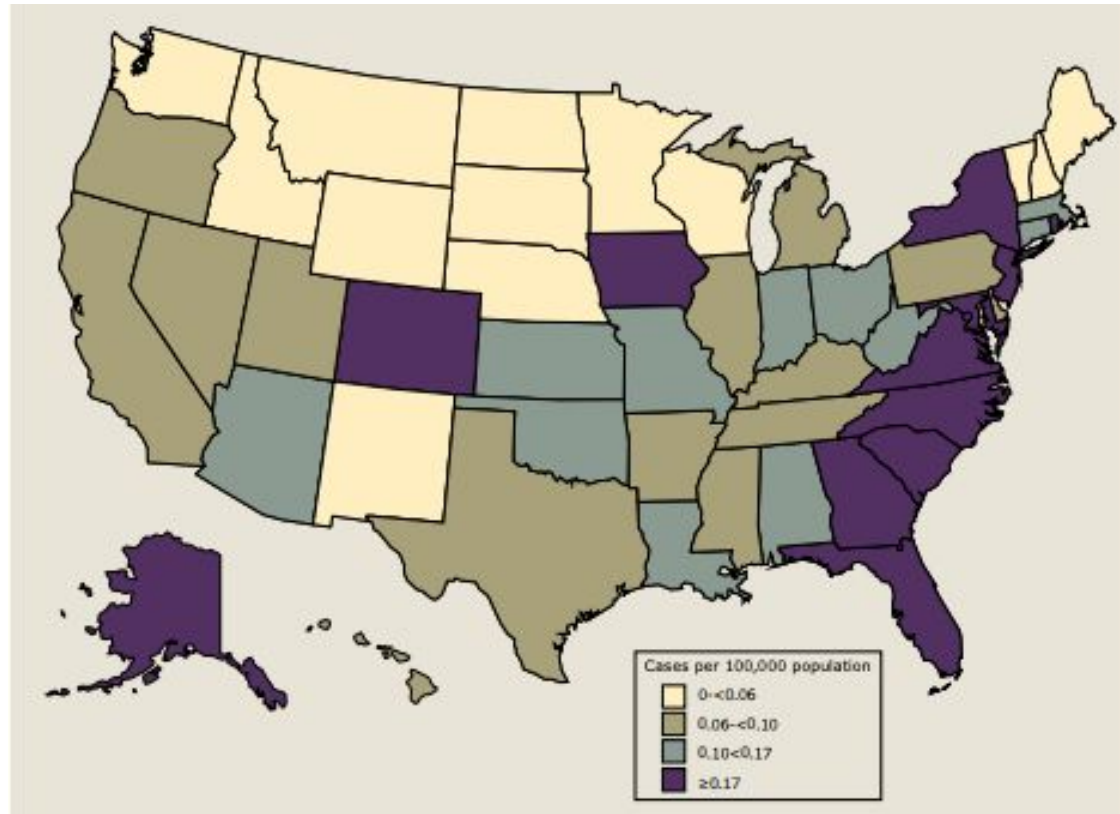
- Massachusetts Department of Public Health (MDPH)
- Cambridge Public Health Department (CPHD)
- Inspectional Services Department (ISD) - City of Cambridge
- Cambridge Health Alliance: Outpatient Pharmacy and interpreter services
- Restaurant staff

Discussion

- What if this happened in your city/town/regional collaborative?
 - What resources are available?
 - What has been your town's experience with PEP?
 - What have been the strengths and challenges of the response?
 - What are you able to do for contacts who are uninsured, or face other barriers?
- Would a program similar to EPT available from the state help you respond to communicable disease scenarios like this one?
 - What are the potential challenges with generic scripts?
-other questions, comments, ideas?



Epidemiology of *Neisseria Meningitidis*



Pediatric Dosing

Drug	Age group	Dose	Duration and route of administration
Preferred regimens			
Rifampin	Infants age <1 month	5 mg/kg/ dose every 12 hours	2 days (4 doses) of oral therapy
	Infants and children age ≥ 1 month	10 mg/kg/ dose (maximum: 600 mg) every 12 hours	2 days (4 doses) of oral therapy
	Adults [¶]	600 mg every 12 hours	2 days (4 doses) of oral therapy
Ciprofloxacin	Infants and children age ≥ 1 month	20 mg/kg (maximum 500 mg) ^A	Single oral dose
	Adults	500 mg	Single oral dose
Ceftriaxone	Children age <15 years	125 mg	Single IM dose
	Adults and adolescents age ≥ 15 years	250 mg	Single IM dose



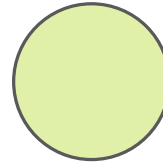
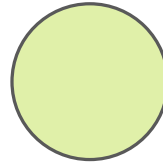
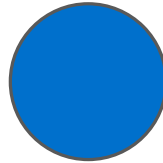
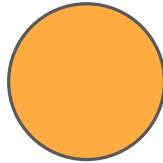
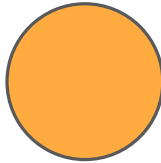
Adult Dosing

Antibiotic	Route/Dose	Duration
Ciprofloxacin	500mg PO	once
Rifampin	300 mg PO q 12 hr	4 doses
Ceftriaxone	250mg IM	once

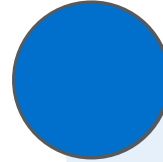
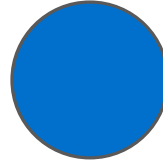
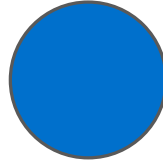
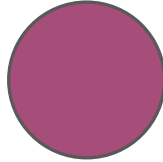
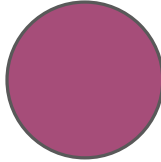
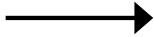


Post-Exposure Prophylaxis

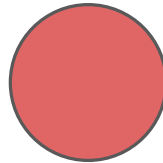
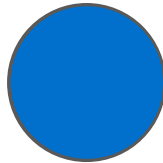
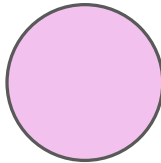
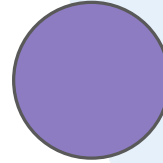
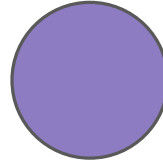
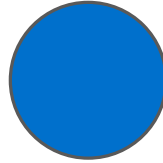
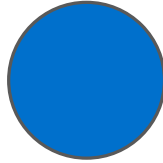
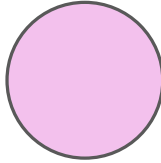
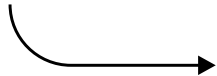
Received PEP
from PCP



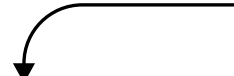
Unable to reach by
phone



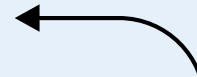
Hesitant or declined
PEP over the phone



Not initially
identified as
contacts



Received PEP
from LBOH



Not at first day of
administration



Planned to receive
PEP from PCP, ended
up asking for it from
LBOH



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Health Education

Meningococcal disease is a serious and potentially life-threatening infection caused by the bacterium *Neisseria meningitidis*.

Signs and symptoms of meningococcal disease include sudden onset of high fever, neck stiffness, confusion, nausea, vomiting, lethargy, and/or petechial or purpuric rash. Without prompt and appropriate treatment, the infection can progress rapidly and result in death.

- Meningococcal disease is serious and can be deadly in hours.
- Early diagnosis and antibiotic treatment are important.
- People spread meningococcal bacteria through close or lengthy contact with other people.
- Anyone can get meningococcal disease, but certain individuals are at increased risk.
- Vaccines offer the best protection against meningococcal disease

Reference - <https://www.cdc.gov/meningococcal/about/index.html>



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