

Finding the Key to Your Population

Shelter-based Meningococcal Disease: Working together to vaccinate, treat, and investigate

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Boston Health Care for the Homeless Program

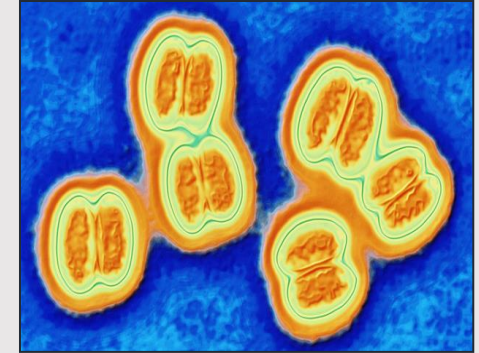
10 April 2018



Disclosures

- We, Denise De Las Nueces and April Donahue, have been asked to disclose any significant relationships with commercial entities that are either providing financial support for this program or whose products or services are mentioned during my presentations.
- We have no relationships to disclose.
- We may discuss the use of vaccines in a manner not approved by the U.S. Food and Drug Administration but in accordance with ACIP recommendations.

Meningococcal Disease



- ❑ Rare, vaccine-preventable disease
- ❑ Caused by *Neisseria meningitidis*, a gram negative diplococcus
- ❑ Most common clinical presentations:
 - ❑ Meningitis, meningococemia, pneumonia
- ❑ Signs and symptoms:
 - ❑ High fever, headache, stiff neck, confusion, rash
- ❑ 10-20% case-fatality ratio¹
- ❑ Up to 20% permanent sequelae²
 - ❑ Cognitive deficits, hearing loss, or amputations



1. Cohn AC, MacNeil JR, Harrison LH, et al. Changes in *Neisseria meningitidis* disease epidemiology in the United States, 1998–2007: implications for prevention of meningococcal disease. Clin Infect Dis 2010;50:184-91

2. Pace D, Pollard AJ. Meningococcal disease: clinical presentation and sequelae. Vaccine 2012;30:B3-9

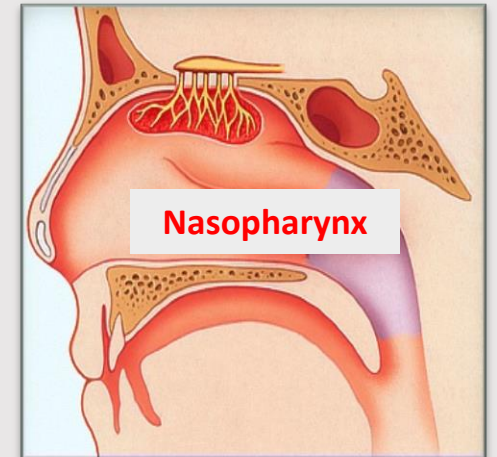
Photo by D. Scott Smith, MD, taken at Stanford University Hospital (<http://emedicine.Medscape.com/article/221473-clinical>)

Meningococcal Conjugate Vaccine and Recommendations

- ❑ Meningococcal conjugate vaccines
 - ❑ Protection is serogroup-specific
 - ❑ Conjugate vaccine introduced in 2005
 - ❑ Specific for 4 serogroups (A, C, W, Y) - MenACWY
- ❑ MenACWY routine recommendations:
 - ❑ Adolescents aged 11-18 years
 - ❑ All persons $\geq$ 2 months of age at increased risk including during outbreaks

Meningococcal Transmission

- ❑ Humans are only reservoir
- ❑ Asymptomatic nasopharyngeal carriage of the bacteria
- ❑ Spread through close contact
 - ❑ Respiratory or oral secretions
 - ❑ Ill or asymptomatic carriers
- ❑ Incubation period
 - ❑ Ranges 1-10 days
- ❑ Infectious period
 - ❑ 7 days before onset of disease until 24 hours after initiation of appropriate antibiotic therapy



Historic Risk Factors for Meningococcal Disease

☐ Age¹

☐ Infants <5 years, adolescents and young adults 16–21 years, adults ≥65 years

☐ Crowded living conditions^{2,3}

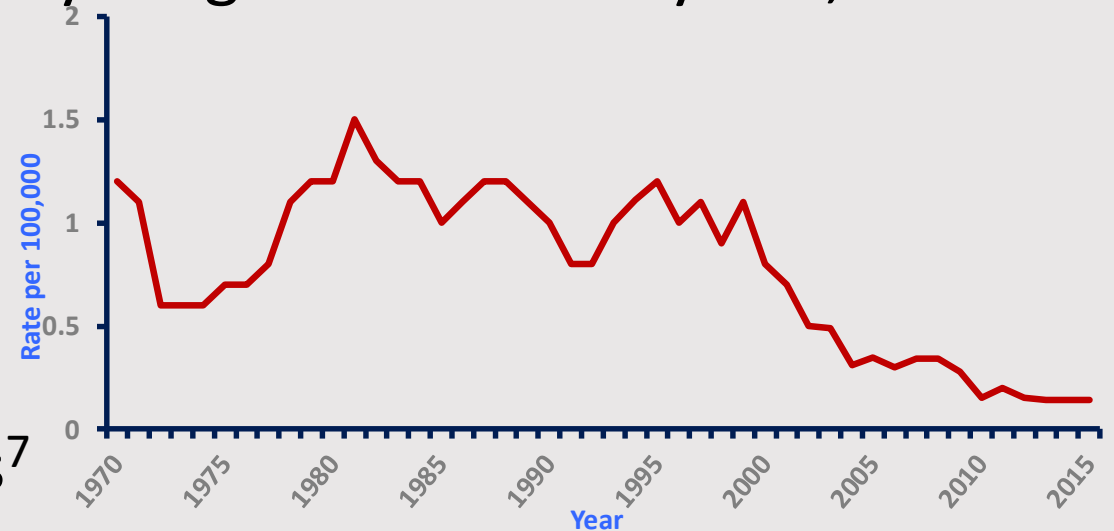
☐ Certain medical conditions

☐ asplenia,⁴ HIV^{5,6}

☐ Recent upper respiratory infections⁷

☐ Certain behaviors

☐ Smoke exposure,⁸ >1 kissing partner⁹



1. Rosenstein NE, et al. J Infect Dis. 1999 2. Brundage JF, et al. Clin Infect Dis. 2002 3. Bruce MG, et al. JAMA. 4. Francke EL, et al. Surg Clin North Am 1981 5. Miller L, et al. Ann Intern Med 2014 6. Stephens DS, et al. Ann Intern Med. 1995
7. Cartwright KA, et al., Lancet. 1991 8. Coen PG, et al. Int J Epidemiol 2006 9. Tully J, et al., BMJ 2006 Photos: <http://rollingout.com/2016/05/06/cdc-expert-states-hiv-rate-in-atlanta-as-bad-as-african-countries/> and <http://www.iconarchive.com/show/coffee-shop-icons-by-musett/Cigarette-icon.html>

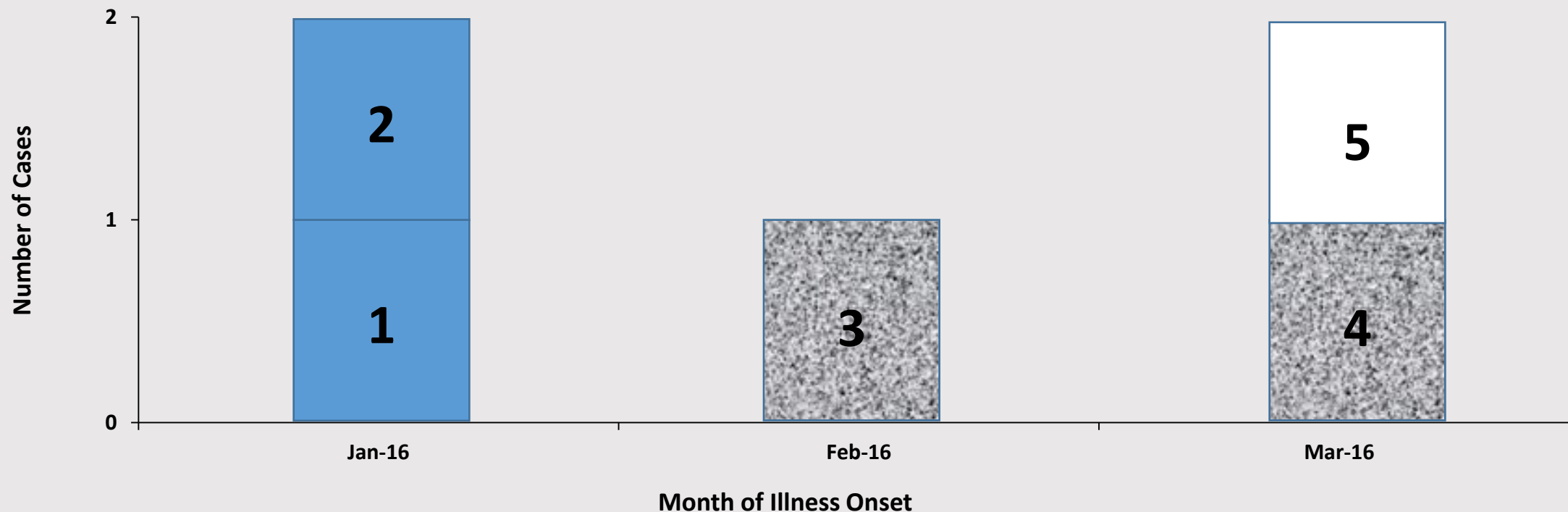
Meningococcal Disease Outbreaks

- ❑ Outbreak definition
 - ❑ 3 cases of the same serogroup in <3 months;
 - ❑ Same community, affiliation or organization, but no close contact
 - ❑ Attack rate of 10 per 100,000
- ❑ Only ~2-5% of U.S. cases are outbreak related
- ❑ State/local health departments investigate cases and declare outbreaks

Cases in Boston Homeless Shelters

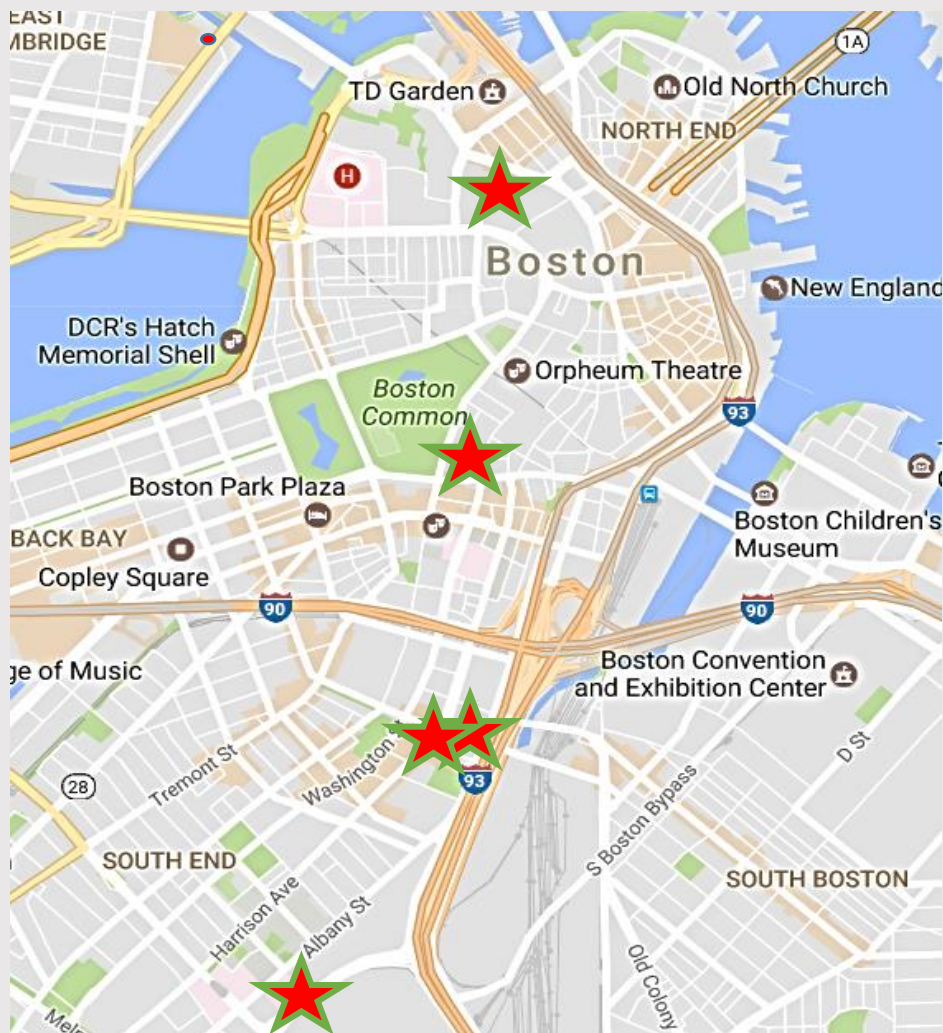


Cases of Meningococcal Disease Among Adults Experiencing Homelessness Boston, 2016



■ Serogroup C ■ Deceased Case
□ Serogroup Y

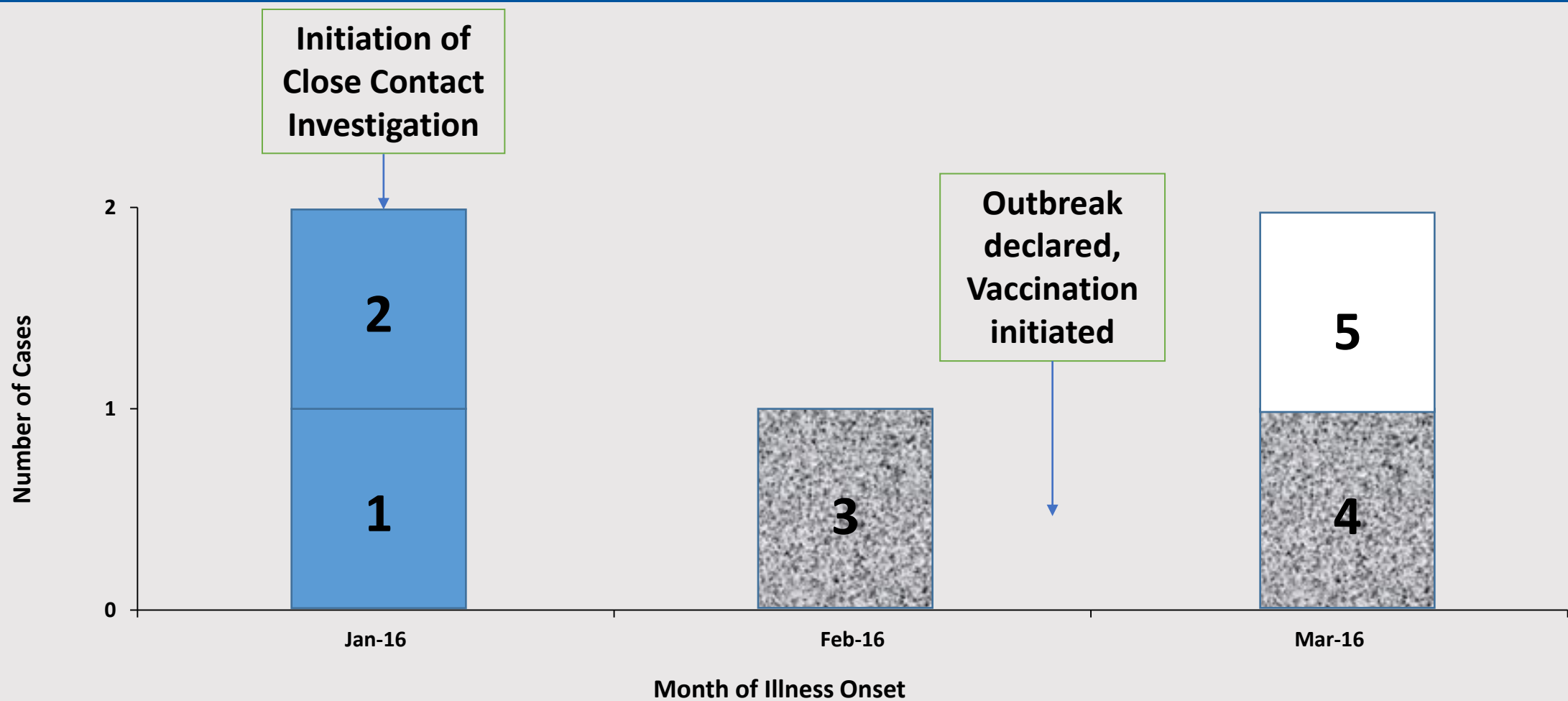
Subsequently learned of an earlier case, case 0, which occurred in April 2015 and was Serogroup C disease of the same molecular strain as the 2016 C cases.



- Distribution of meningococcal disease cases among adults experiencing homelessness in Boston Metro Area, Massachusetts

BHCHP's Response





■ Serogroup C ■ Deceased Case
□ Serogroup Y

Response Efforts

- ❑ Massachusetts Department of Public Health (MDPH), Boston Public Health Commission (BPHC), and Boston Health Care for the Homeless Program (BHCHP):
 - ❑ Performed contact investigations
 - ❑ Developed education and awareness campaign
 - ❑ Provided antibiotic prophylaxis to close contacts
 - ❑ Initiated a mass vaccination campaign with MenACWY vaccine to adults experiencing homelessness and shelter staff in Boston

Close Contact Investigation



BHCHP clinical leadership notified by BPHC about case

BHCHP leadership contacted affected shelter and BHCHP clinicians at shelter clinic

BHCHP obtained bed roster to determine patient's bed assignments during infectious period

Close contacts (defined as shelter clients who slept within 4-bed-perimeter of index patient for each case) identified

Close Contact Investigation

Shelter directors notified to help locate close contacts, to place alert at point of shelter entry, and to help direct close contacts to shelter clinic



Pop-up alert placed in BHCHP EMR

Pharmacy leadership contacted to secure needed supply of antibiotics for prophylaxis

Patients screened by shelter clinicians, prophylaxis and vaccination administered if asymptomatic, patients referred to ER if red flag s/sx present

Meningococcal Vaccine Campaign

- ☐ Core clinical champions identified
- ☐ Vaccine supply secured
- ☐ Strategy to facilitate delivery of vaccine to patients developed
 - ☐ Standing order authorizing RNs to administer vaccine without need for direct presence of MD/NP/PA
 - ☐ Standardized screening form

Review of close contacts of meningococcal meningitis

Name _____

DOB _____

Date _____

Surgical mask should be worn within 3 feet of patient during screening.

Symptom check:

Have you had any of the following in the past 10 days?

(If the patient responds yes to any of the symptoms below, place a surgical mask on the patient and transfer to the ER for rule out of meningitis.)

- ☐ Fever > 100 degrees
- ☐ N/V
- ☐ Headache
- ☐ Neck stiffness
- ☐ Severe myalgias
- ☐ Pharyngitis
- ☐ Rash (bright red/purple)

Vital signs:

- ☐ Temp _____
- ☐ Pulse _____
- ☐ BP _____
- ☐ RR _____
- ☐ Sat _____

Allergies: _____

Prophylaxis:

- ☐ Preferred, Cipro 500mg orally x 1, administered
- ☐ Alternative, in case of allergy: Rifampin 600mg ~~po~~ BID x 2 days

Signature _____



Evaluation for Meningococcal Vaccination

Name _____

DOB _____

Allergies: _____

Date _____

Site _____

Staff ☐ YES ☐ NO

You have given me the opportunity to receive the meningococcal vaccine at no charge to myself. I have received, read and understand the information about the risks and benefits of the vaccine.

☐ I would like to have the meningococcal vaccine given to me.

Please answer the following questions:

1. Have you had a fever in the past 3 days? ☐ YES ☐ NO

(If yes, please defer vaccination until the illness resolves)

2. Are you pregnant? ☐ YES ☐ NO

(Pregnancy is not a contraindication for the vaccine; if a patient has concern, please advise that she discuss vaccination with her OB/GYN or primary care provider)

I hereby certify that the foregoing history is true and complete to the best of my knowledge.

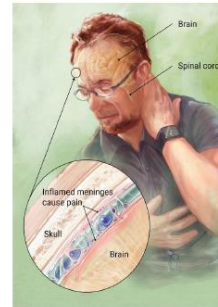
Signature: _____ Date: _____

Vaccine Name	Menactra (MCV4)
Ordering Provider	Denise De Las Nueces, MD
Manufacturer	Sanofi
VIS Date	10/14/11
Route	IM
Lot	
Expiration	
Site (circle)	L Deltoid R Deltoid
Dose	0.5ml

Meningococcal Vaccine Campaign

- ❑ Key stakeholders to whom to target communication identified
 - ❑ Consumers
 - ❑ Shelter partners
 - ❑ BHCHP staff
 - ❑ Shelter staff
- ❑ Stakeholder communication strategy developed

MENINGITIS ALERT



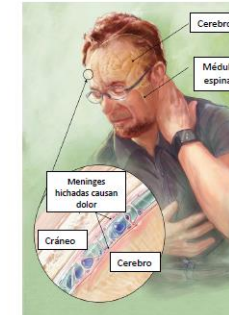
There have been a rising number of cases of meningitis among homeless individuals in Boston in recent weeks. This disease can infect the blood or the lining of the brain and spinal cord.



The infection can be deadly, but it is preventable.

GET VACCINATED TODAY

ALERTA DE MENINGITIS



Han habido varios casos de meningitis entre las personas sin hogar en Boston en las últimas semanas. Esta enfermedad puede infectar la sangre, el cerebro y la médula espinal.

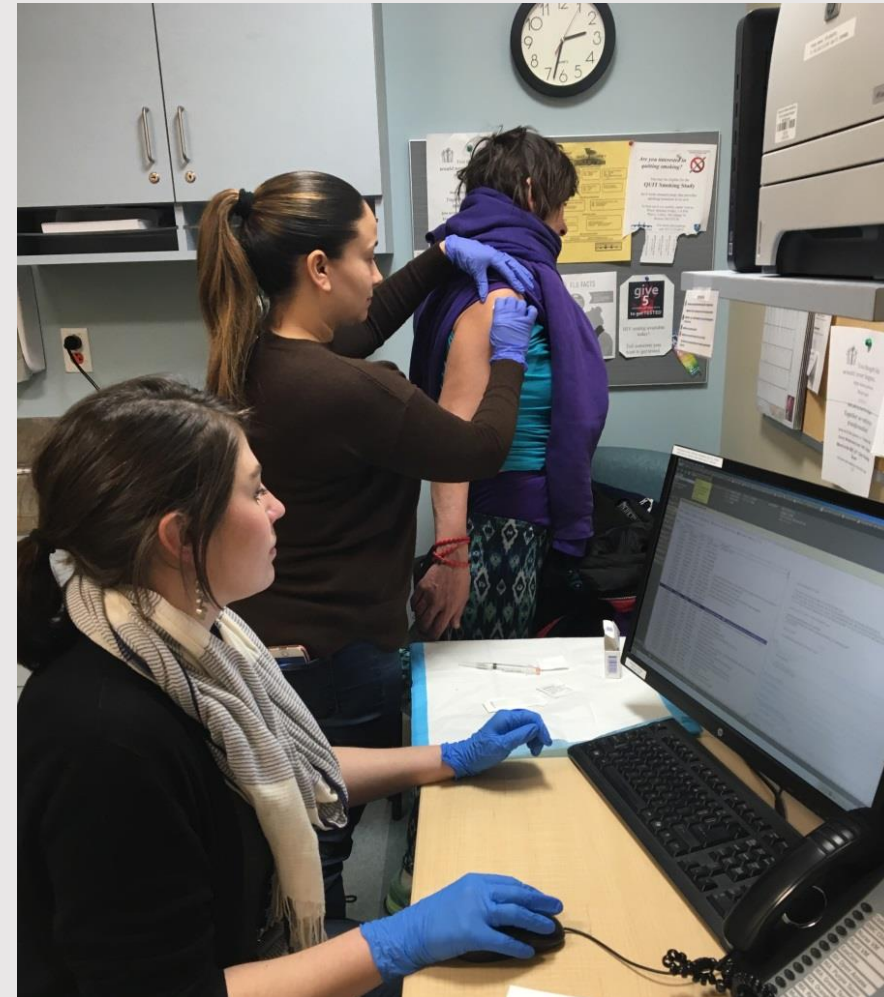


La infección puede ser fatal, pero se puede prevenir.

VACÚNESE HOY

Meningococcal Vaccine Campaign

- ☐ Vaccine Clinics held at several sites
 - ☐ Nursing-led
 - ☐ Flexible hours
 - ☐ Scheduled and as requested by shelters
 - ☐ Messaging to shelter clients and staff





CDC's Epi-Aid: Understanding Risk Factors for Disease Acquisition

Evaluation of Risk Factors

- ☐ Objective: To evaluate factors that may be contributing to increased risk for meningococcal disease among adults experiencing homelessness in Boston
- ☐ Matched case-control
- ☐ Population
 - ☐ Adults (≥ 18 years old) experiencing homelessness* in Boston metro-area
 - ☐ Registered patients of BHCHP
- ☐ 5 controls matched to each case by:
 - ☐ Sex
 - ☐ Age group (≤ 30 years old; > 30 years old)
 - ☐ Presence at the same homeless facility** during the same timeframe as the case during his/her infectious period (7 days prior the clinical onset of the disease symptoms)

* Individual who is living in a place not meant for human habitation, in emergency shelter, in transitional housing, or are exiting an institution where they temporarily resided

** Any facility including but not limited to shelter that provides any service to a population experiencing homelessness

Summary of Key Results

- ☐ One factor significantly associated with disease:
 - ☐ History of an immunosuppressive condition (HIV, lupus, or diabetes)
- ☐ Not statistically significant but compared to controls, a higher proportion of cases:
 - ☐ Were Black
 - ☐ Experienced homelessness for less than one year
 - ☐ Had ≥ 1 kissing partner
 - ☐ Had at least high school education
 - ☐ Slept in a room with ≥ 50 people
- ☐ No association of meningococcal disease with historic risk factors:
 - ☐ Crowded living conditions^{1,2}
 - ☐ Passive and/or active smoking³
 - ☐ Having >1 kissing partner

Discussion



Net Results of 2016 Response Efforts

- ❑ 307 close contacts were screened for the 5 cases, with 286 close contacts prophylaxed successfully.
- ❑ Reaching vaccine saturation
 - ❑ From 2/16/16 to 4/6/2016, a total of 3621 vaccines administered
 - ❑ More than total number of flu vaccines given during entire 2015-2016 flu season
- ❑ Halting meningococcal-related mortality
 - ❑ no more patient deaths after first 2 cases
- ❑ Deepened understanding of disease patterns in our patient population

Factors that Led to Success

- ☐ Partnerships
- ☐ Relationships
- ☐ Dedicated staff



Update: Emerging Cases

- Four cases of meningococcal disease in the adult shelter population emerged after the 2016 cluster of cases.
 - 5/2017: + N. meningitidis aspirated from synovial fluid of a homeless male veteran
 - 1/2018: Homeless man, client of a large Boston adult shelter, diagnosed with meningococemia
 - 2/2018: Homeless man, client of a small Quincy-based shelter, diagnosed with meningococemia
 - 3/2018: Homeless man who has sought care in a Boston-based adult shelter was diagnosed with meningococemia while staying in Chelsea
- All four isolates were found to be **Serogroup C**.
- The 2015-2016 cases and the 2017-2018 cases, all serogroup C disease, were caused by **different strains**.

Questions?



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Thank you

- **Centers for Disease Control and Prevention**
 - John Otshudiema
 - Anna Acosta
 - Jessica MacNeil
 - Monica Patton
 - Negar Aliabadi
 - Nelli Westercamp
- **Boston Public Health Commission**
 - Anita Barry
 - Julia Gunn
- **Massachusetts Department of Public Health**
 - Monica Bharel
 - Alfred DeMaria
 - Susan Lett
 - Stephen Fleming
- **BHCHP**
 - Pooja Bhalla
 - Barbara Giles
 - Casey Leon
 - Barry Bock
 - Jessie Gaeta
 - Jim O'Connell
 - Nurses, patients and staff
- **Boston Shelter Partners and patients**

