STOP THE SWAP!

Catherine M. Kelleher R.N.
Suzanne Bornschein M.D.
Providence College
28 October 2015
Objectives

1. Explain the steps needed to be taken once a confirmed case of meningitis occurs on a college campus.

2. Discuss how a vaccination program was instituted at Providence College.

3. Outline the “Stop the Swap Campaign” at Providence College.

4. Discuss how a student presents with signs and symptoms of meningitis.
How Health Services Responded

Day 1: February 1, 2015

• 3:00pm- College was notified of suspected case of bacterial meningitis

• 3:15pm- Director of Health Services notified

• Name, YOG, residence of student
• Contacted Emerson Hospital
• Parents of Case #1 contacted
• College chaplain notified
• Called MGH
Signs and symptoms:

- 1 week coryza like illness
- Headache for 12 hours prior to hospital admission
- Restlessness and severe headache on morning of hospitalization
Day 1: February 1, 2015....continued

- Fielded calls from parents of dorm/classmates
- Contacted hall director on duty
- Informed campus EMT’s of case
- Contacted Health Services M.D.
Day 1: February 1, 2015....continued

• Floor meeting in Health Services
• Individual confidential interviews of close contacts
• Prophylaxis of contacts with Cipro
• ”Know the Facts About Meningitis”
• The Perfect Storm.................
Day 2: February 2, 2015

SNOW DAY!

• Contacted RIDOH- 9am sharp!

• Continuous updates to VPSA and Dean of Students

• Need to know updates to Campus Public Relations

• Fielded non stop calls from parents

• Additional interviews of close contacts
Day 2: February 2, 2015....continued

- Campus wide Health Advisory distributed via email
- Public relations coordinated with RIDOH on first press release
- First media inquiry by RI Public radio station
- Updated website
Day 3: February 3, 2015

• Email update from family of Case #1
• Fielding calls from students, parents, pcp’s
• Updates to VPSA
• Communication with DOH
• Informed academic dean
Day 4: February 4, 2015

- Surveillance site for 21 days
- Updates to website
- Remained in contact with parent of Case #1
- Calm before storm......
Day 5: February 5, 2015

Case #2 Presentation

• 9:15am - Mother contacted health services
  • 9:00pm 2/4/15: abrupt onset of chills, malaise, coryza
  • 3:00am 2/5/15: vomiting and diarrhea

• 9:45am - Student evaluated in Health Services
  • PE: BP 70/p  HR 150  Temp 98.0  O2 sat 94%
  • Purpura on arms and trunk
  • Lethargic
Day 5: February 5, 2015....continued

• Assessment of septicemia; likely Neisseria meningitidis

• 911 called

• Health Services waiting area cleared

• RIH ER contacted
Day 5: February 5, 2015....continued

- Contacted student’s mother

- Contacted VPSA

- Contacted RIDOH

- Contacted chaplain
Day 5: February 5, 2015....continued

- 10:00am- Contacted roommate
- Roommate evaluated/prophylaxed at Health Services
- Contacted Res Life
- Roommate relocated to another residence
- Sibling/PC student was contacted by mother to report to Health Services for eval/prophylaxis
- Sibling brought to RIH by PC chaplain
Day 5: February 5, 2015....continued

• Director of campus emergency management notified

• 11:35am- Contacted by College president

• Medical staff prophylaxed

• Close contacts notified

• Individual confidential interviews
Day 5: February 5, 2015....continued

• DOH confirms Case #1 Serogroup B

• Plans for mass vaccination clinic announced

• Princeton University contacted

• Website updated

• DOH/PC news release
Day 5: February 5, 2015....continued

- 8:00pm- DOH Medical Director information session on campus
- Second campus wide Health Advisory
- Multiple media inquiries
- Health Services extends hours 24/7
Day 6: February 6, 2015

• Case #2 critical condition RIH ICU

• Case #1 family contacts Health Services with update

• Additional EMT coverage

• Phone bank set up/standard response

• 3 students sent to RIH for evaluation
Day 6: February 6, 2015....continued

- STOP THE SWAP campaign!
- Posters
- Email to faculty /staff
- Clinic preparations
STOP THE SWAP

Your risk for meningococcal meningitis increases if you are exposed to the bacteria that causes it. Sharing things like lip balm, kisses, common source punch bowls, food, eating utensils, water bottles, cups, cigarettes, or any other type of saliva transference can spread the meningococcal disease. A person can be a carrier of meningitis without any symptoms, so remember to

STOP the SWAP.

#PCbeatmeng
Clinic Preparations:

Forms:
- Meningitis/vaccine information
- Vaccine administration record
- Consent/Declination
- Under 18

Logistics:
- Facility
- Medicine refrigerator
- Food
- Volunteers
- DMAT
Meningococcal Vaccination Waiver Form
Fall, 2015

Name: ___________________________ Student ID: ___________ Class Year: ___________

Last First MI

Email: ___________________________ Phone: ___________________________ Date of Birth: ____________

mm/dd/yyyy

The information below includes the risk factors and dangers of the diseases as well as the information on the availability and effectiveness of the respective vaccines for persons who are at risk for the diseases. The information concerning these diseases is from the Rhode Island Department of Health (HEALTH) and the Centers for Disease Control and Prevention (CDC).

What causes meningococcal disease and how does the disease spread?

Meningococcal meningitis is an infection of the lining that surrounds the brain and spinal cord. The bacterial infection is spread through direct secretions from the nose or mouth through activities such as kissing, or sharing food, drinks, water bottles, toothbrushes, eating utensils, or cigarettes. Meningococcal disease can be treated with antibiotics, but quick medical attention is extremely important.

What are the symptoms?

Meningitis may present as sudden onset of fever, headache, and stiff neck. It will often have other symptoms, such as nausea, vomiting, increased sensitivity to light and altered mental status and/or a skin rash. The symptoms of bacterial meningitis can appear quickly or over several days. Typically they develop within 3-7 days of exposure.

Is there a vaccination?

Yes, there are several; however, the Rhode Island Department of Health (HEALTH) and the Center for Disease Control and Prevention (CDC) Health officials notified the College that the meningitis vaccination, which most students received prior to coming to campus in September 2014, is not effective in protecting against the Serogroup B strain of meningitis.

Election to Receive the Meningococcal Meningitis, Serogroup B Vaccination

I hereby certify that I have read the above information and I have elected to receive the vaccine for Meningococcal Meningitis, Serogroup B.

I hereby certify that I have read the above information and I have elected NOT to receive the vaccine for Meningococcal Meningitis, Serogroup B.

Signature of Student (or Parent/Guardian if student is under 18): ___________________________

Date: ____________

For more information about Meningococcal Meningitis, go to www.cdc.gov or www.health.ri.gov
**Providence College**
**Meningococcal B Vaccine (Trumeba®) Administration Record and Consent**

**PATIENT INFORMATION**

| Name: (Last) | (First) | Date of Birth: ___/___/______
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<td>MM DD YYYY</td>
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</table>

Sex: ☐ Male ☐ Female

☐ Undergraduate student ☐ Graduate student ☐ Faculty or staff ☐ Other: __________

Permanent Home Address:

<table>
<thead>
<tr>
<th>Street</th>
<th>City</th>
<th>State</th>
<th>Zip Code</th>
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Current Local Address: (Include Residence Hall Information):

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Phone Numbers:

<table>
<thead>
<tr>
<th>Cell: (<em><strong>)</strong></em>-__________</th>
<th>Email Address:</th>
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<tr>
<th>Home: (<em><strong>)</strong></em>-__________</th>
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</thead>
</table>

Emergency Contact Name: ____________________________

Relationship to you: ____________________________

Phone number: (___)___-__________

**MEDICAL SELF-ASSESSMENT/SCREENING**

Please complete the self-assessment on the reverse side.
Both you and a clinical staff member will review this document prior to receiving the vaccine.

**MENINGOCOCCAL B VACCINE (TRUMEBÁ®) ADMINISTRATION CONSENT**

☐ I have read the Meningococcal B Vaccine (Trumeba®) vaccine information form created by Pfizer (v. 11-2014)

☐ I have had the opportunity to review the full prescribing information for Meningococcal B Vaccine (Trumeba®) (v. 10-2014)

☐ I have had the opportunity to ask questions about Meningococcal B Vaccine (Trumeba®) that were answered to my satisfaction

☐ I understand that three doses of Meningococcal B Vaccine (Trumeba®) are required to complete the recommended series

☐ I understand the potential benefits and risks of receiving the Meningococcal B Vaccine (Trumeba®) vaccine and request that it be given to me

Patient/Guardian Signature: ____________________________ Date: ____________________________

**VACCINE ADMINISTRATION (To be completed by clinical staff only)**

Manufacturer: Pfizer Lot Number: ____________________________ Expiration Date: ___/___/______

| Administration site: Delroy R L Time: ___:____ AM/PM |
|---|---|
|   |   |

Name of Vaccine Administrator: ____________________________

Print: ____________________________ Signature: ____________________________ Date: ___/___/______

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</table>
Time Given

Meningitis B Vaccination
Providence College

Name: ____________________________________________

Date of Birth: ____________________________________

Vaccine: Trumenba  Manufacturer: Pfizer

<table>
<thead>
<tr>
<th></th>
<th>Dose 1</th>
<th>Dose 2</th>
<th>Dose 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lot number</td>
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<tr>
<td>Expiration date</td>
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<td></td>
<td></td>
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<tr>
<td>Vaccine information statement provided?</td>
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</tbody>
</table>

You will not be fully vaccinated against meningitis B until you receive three doses of vaccine. Please share this information with your healthcare provider.

***Please see back of card for common side effects***
Today you received Trumenba which is a vaccine indicated for active immunization to prevent disease caused by Neisseria meningitidis serogroup B.

**COMMON adverse reactions to vaccines are:**
* pain/swelling/redness at the injection site
* fatigue
* headache
* muscle pain
* low grade fever/chills

While these are NORMAL reactions and to be expected for approximately 24-72 hours post vaccination, feel free to contact health services (401-865-2422) or the EMT's (401-865-2888) with any questions or concerns.

**REMEMBER:**
Health Services hours of operation are Monday-Friday (8am-5pm)
EMT's are available Monday-Friday (4:30pm-8:30am) and Saturday and Sunday (24 hours)
On Sunday, August, 30 and Saturday, September 5th, health services will be OPEN 24 hours

For additional information please visit:
www.trumenba.com
www.cdc.gov
www.health.state.ri.us
http://www.providence.edu/health-center/meningitis
Day 6: February 6, 2015....continued

• Campus wide email from VPSA to students/parents/faculty/staff

• NBC-10 local nightly news filming on campus

• 4:00pm- DOH Medical Director comes to campus for faculty/staff

• Vaccination planning committee meeting

STOP THE SWAP!
Day 7: February 7, 2015

• Per diem admin support in health services

• Schedule for vaccination clinic posted: email/website/residence halls/ Twitter, PC Facebook

• Public relations communications: television/radio/newspaper

• 3:00pm- DOH Medical Director comes again! Q/A for students

STOP THE SWAP!
Day 8: February 8, 2015

POD staffing:

- Dir. Of Emergency Management
- Health Services staff; Director and M.D.
- Volunteers; faculty and staff
- Vaccinators; DMAT and DOH
- DMAT
- DOH
- Pharmaceutical representative

STOP THE SWAP!
Day 8: February 8, 2015....continued

POD set up:

- Swipe in
- Paperwork
- Forms reviewed
- Vaccination
- Post vaccination waiting area/check out
- Observation area

STOP THE SWAP!
Day 8: February 8, 2015....continued

Men B clinic #1:

• 4:00am- Clinic set up

• 8:00am- Briefing (DMAT, DOH, Health Services)

• 8:30am- Briefing (Volunteers)

STOP THE SWAP!
Those eligible to receive the vaccine:

• 2,860 students living on campus
• 763 students living off campus
• 141 commuter students
• 76 grad students under age 25
• 26 faculty/staff under age 25
• Less 121 study abroad

• TOTAL...3,745 eligible to be vaccinated

STOP THE SWAP!
Day 8: February 8, 2015....continued

Men B clinic #1

- Vaccination, no cost to students
- Assigned clinic arrival times
- 9:00am-6:00pm clinic in recreation center
- Vaccinated 3,061
- Largest one day clinic ever held in the state

STOP THE SWAP!
Day 8: February 8, 2015….continued

Post vaccination clinic:

• Very busy in Health Services

• Common adverse reactions to vaccine

• VAERS forms

STOP THE SWAP!
### Vaccine Adverse Event Reporting System

**Patient Name:**

**Vaccine administered by:**

**Form completed by:**

**Last**  |  **First**  |  **M.L.**  |  **Reasonable Physician**  |  **Relation**  |  **VAERS Number**  |  **Date Received**
---|---|---|---|---|---|---

**Address:**

**City**  |  **State**  |  **Zip**  |  **Telephone no.**
---|---|---|---

**State**  |  **County where administered**  |  **Date of birth**  |  **Patient age**  |  **Sex**  |  **Date form completed**
---|---|---|---|---|---

**Describe adverse event(s) (symptoms, signs, time course) and treatment, if any:**

**Check all appropriate:**
- [ ] Patient died (date: __/__/__)
- [ ] Life threatening illness (date: __/__/__)
- [ ] Required hospitalization (days: __)
- [ ] Resulted in prolongation of hospitalization
- [ ] Resulted in permanent disability
- [ ] Name of the above

**Prev. recovered:**  [ ] YES  [ ] NO  [ ] UNKNOWN

**Relevant diagnostic tests/laboratory data:**

**Enter all vaccines given on date listed in no. 10:**

<table>
<thead>
<tr>
<th>Vaccine (type)</th>
<th>Manufacturer</th>
<th>Lot number</th>
<th>Route/Site</th>
<th>No. Previous doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td></td>
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<td>b</td>
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</table>

**Any other vaccinations within 4 weeks prior to the date listed in no. 10:**

<table>
<thead>
<tr>
<th>Vaccine (type)</th>
<th>Manufacturer</th>
<th>Lot number</th>
<th>Route/Site</th>
<th>No. Previous doses</th>
<th>Date given</th>
</tr>
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<tbody>
<tr>
<td>a</td>
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<td>b</td>
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</tbody>
</table>

**Vaccinated at:**
- [ ] Private doctor's office/hospital
- [ ] Military clinic/hospital
- [ ] Public health clinic/hospital
- [ ] Other/unknown

**Illness at time of vaccination (specify):**

**Pre-existing physician-diagnosed allergies, birth defects, medical conditions (specify):**

**Have you reported this adverse event previously?**
- [ ] No
- [ ] To health department
- [ ] To doctor
- [ ] To manufacturer

**Birth weight:**

**No. of brothers and sisters:**

**Adverse event following prior vaccination (specify all applicable):**

<table>
<thead>
<tr>
<th>Event</th>
<th>Cause</th>
<th>Type</th>
<th>Date</th>
<th>Vaccine</th>
<th>In series</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**In patient:**
- [ ] YES
- [ ] NO

**In family:**
- [ ] Initial
- [ ] Follow-Up

---

**Health care providers and manufacturers are requested by law 21 U.S.C. 351-354 to report reactions to vaccines listed in the Table of Reportable Events Following Immunization.**

**Reports to reactions to other vaccines are voluntary except when related to a condition of immunization grant programs.**
Day 9: February 9, 2015
SNOW DAY

• All offices on campus closed

• Classes cancelled

• Health Services open

• Statewide email from DOH

• Multiple television and radio inquiries to P.R.

STOP THE SWAP!
Day 10: February 10, 2015

- Email from VPSA to all students/parents/faculty/staff
- Email to all Study Abroad Students
- Email to all SCE
- Per diem staffing 24/7 began today

STOP THE SWAP!
Day 11: February 11, 2015

- Make up clinic in 64 Hall (Student Union)
  - 444 vaccinated
  - 20 vaccinated in Health Services
  - TOTAL=464

- Health Service’s Staff schedule adjusted

STOP THE SWAP!
February 2015 Vaccination Clinics

- 3,061 vaccinated 2/8/15
- 444 vaccinated 2/11/15
- 20 vaccinated 2/11/15 in Health Services
  TOTAL=3,525

TOTAL eligible was 3,745
TOTAL vaccinated 3,525

94 % of those eligible were vaccinated!!!

STOP THE SWAP!
Day 17-21: February 17-21, 2015

• CDC on campus

• Carriage study
  • Total swabbed 717

• Voluntary

• Incentive

• CDC in Health Services during evenings

STOP THE SWAP!
UPDATES

Day 21: February 21, 2015
  • Health Services closes at 8:00am

Day 24: February 24, 2015
  • Debriefing by Emergency Management Committee

• Planning meeting to be scheduled for April clinic

STOP THE SWAP!
One shot provides only minimal protection.

The second dose of the vaccine to protect against the Group B strain of meningitis will be offered on

Sunday April 12, 2015

from 9am-6pm in Peterson. Anyone who received the first vaccine is eligible.

It takes 6 months for the course of vaccinations to take full effect. A person can be a carrier of meningitis without any symptoms, so remember to

STOP the SWAP

#PCbeatmeng
Two months later....April 2015

Those eligible to receive vaccine #2:

- 2,855 students living on campus
- 764 students living off campus
- 141 commuter students
- 76 graduate students < 25
- 26 faculty/staff < 25
- Less 121 study abroad

- TOTAL...3,741 eligible to receive the vaccine.

STOP THE SWAP!
April 2015 Men B #2 Vaccination Clinics

- 2,294 vaccinated 4/12/15
- 694 vaccinated 4/15/15

TOTAL eligible.... 3,741

TOTAL vaccinated.... 2,988

80% of those eligible were vaccinated

STOP THE SWAP!
STOP THE SWAP

Your risk for meningococcal meningitis increases if you are exposed to the bacteria that causes it. Sharing things like lip balm, kisses, common source punch bowls, food, eating utensils, water bottles, cups, cigarettes, or any other type of saliva transfer can spread the meningococcal disease. A person can be a carrier of meningitis without any symptoms, so remember to

STOP the SWAP.

#PCbeatmeng
April 10-15, 2015....CDC on campus

CDC at Men B vaccination clinics

• April 12, 2015 carriage study

• April 15, 2015 carriage study

  • Total swabbed 878

• Voluntary

• Incentive

STOP THE SWAP!
May 6-11, 2015

Health Services hours of operation extended

• Daily hours of operation extended through 8:00pm

• 5:00pm-8:00pm- Men B vaccinations offered

STOP THE SWAP!
STUDY ABROAD VACCINATIONS

- August 11, 2015
  - 15 vaccinated

- August 17, 2015
  - 16 vaccinated

- August 24-28, 2015
  - 27 vaccinated

- TOTAL vaccinated = 58

STOP THE SWAP!
AUGUST 2015

• DOH and CDC recommend vaccinating incoming freshmen
• Email Class of 2019
• Email Class of 2019 parents
• Clinic preparations
• Forms revised
  • “Have you ever received a vaccine for Serogroup B meningitis”

STOP THE SWAP!
Men B vaccination clinic #1 for class of 2019

TOTAL number eligible to be vaccinated....1,034

• August 30, 2015 Men B Clinic.... 717 vaccinated

• September 5, 2015 Men B clinic.... 136 vaccinated

• September 8, 2015 make up clinic.... 40 vaccinated

TOTAL vaccinated.... 893

86% of those eligible were vaccinated!!!

STOP THE SWAP!
Men B vaccination clinic #3 for Upperclassmen

September 5, 2015:
• 1655 vaccinated

September 8, 2015:
• 643 vaccinated

Health Services:
• 83 vaccinated

TOTAL=2381

STOP THE SWAP!
September 5, 2015

- CDC at Men B vaccination clinic
- September 5, 2015 Carriage Study
  - Total swabbed 617
- Voluntary
- Incentive

STOP THE SWAP!
# Self-Assessment Screening Questions for Meningococcal B Vaccination

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever received a vaccine for serogroup B meningitis?</td>
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<tr>
<td>If yes, which of the following:</td>
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<tr>
<td>Trumena: Bessera:</td>
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<tr>
<td>Are you older than 25 years old?</td>
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<tr>
<td>Are you sick today?</td>
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<tr>
<td>Do you have allergies to any of the following? If yes, please describe.</td>
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<td>Medications:</td>
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<tr>
<td>Food:</td>
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<tr>
<td>A vaccine component</td>
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<tr>
<td>Latex (rubber material that is found in gloves or other products)</td>
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<tr>
<td>Have you ever had a serious reaction after receiving a vaccine?</td>
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<tr>
<td>Do you have any long term health problems (for example asthma, diabetes,</td>
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<tr>
<td>seizure disorders)?</td>
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<tr>
<td>Do you have cancer, leukemia, HIV/AIDS, a non-functioning or absent spleen, or any other immune system problem?</td>
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<tr>
<td>In the past 3 months, have you taken medications that weaken your immune system, such as cortisone, prednisone, other steroids, or anticancer drugs? Or have you had radiation treatments?</td>
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<tr>
<td>For women:</td>
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<tr>
<td>Are you pregnant, think you could be pregnant or planning to become pregnant?</td>
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<tr>
<td>Are you breastfeeding?</td>
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</tbody>
</table>

Form Completed By: ______________________  Date: ________________

Form Reviewed By: ______________________  Date: ________________

Version 2-7-2015
All sophomore, junior, and senior students who have received at least one dose of the serogroup B vaccine on campus have received the TRUMENBA vaccine. Please answer question #1 as follows:

<table>
<thead>
<tr>
<th>Self-Assessment Screening Questions For Meningococcal B Vaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever received a vaccine for serogroup B meningitis?</td>
</tr>
<tr>
<td>Yes ✗ No ☐ Don’t Know ☐</td>
</tr>
<tr>
<td>If YES, which of the following:</td>
</tr>
<tr>
<td>Trumenba:</td>
</tr>
<tr>
<td>Yes ✗ No ☐ Don’t Know ☐</td>
</tr>
<tr>
<td>Bexsero:</td>
</tr>
<tr>
<td>Yes ☐ No ✗ Don’t Know ☐</td>
</tr>
</tbody>
</table>

If you are a FRESHMAN, TRANSFER STUDENT, returning STUDY ABROAD, or this is your FIRST serogroup B vaccination, you must be able to answer the above questions prior to getting in line to receive the vaccine. It is your responsibility to contact your family and or PCP with questions.
STOP THE SWAP

One shot provides only minimal protection.

It takes 6 months for the course of vaccinations to take full effect. A person can be a carrier of meningitis without any symptoms, so remember to

STOP the SWAP

Don't share:
Lip balms
Water bottles
Dishes/eating utensils
Cups/glasses
Etc.

#PCbeatmeng
The Meninges
Bacterial meningitis

Bacterial first recognized in 1805

1805 to early 1900’s bacterial meningitis >70% fatal

Case-fatality rate for adults 25%

Transient or permanent neurological morbidity 21-28%
Bacterial meningitis

Community acquired - Streptococcus pneumoniae, Neisseria meningitidis

Age>60 - Listeria monocytogenes

Healthcare associated-staphylococci, aerobic gram negative bacilli
Neisseria meningitidis

12 different meningococcal groups

5 of which cause the majority of disease (A, B, C, Y, and W).
Rate of Meningitis 1970-2010 Cases/100,000
Outbreaks of Serogroup B 2013-2015

• University of California, Santa Barbara: Four cases in 2013.

• Princeton University: Nine cases from March 2013 through March 2014.

* One Drexel University student who was in contact with Princeton students died.

• University of Oregon: Seven cases from January to June 2015. One student died.

• Providence College: Two cases within a week at Providence College in early February 2015.
Predisposing Factors  Bacterial Meningitis

● Recent exposure to someone with meningococcal meningitis

● Recent infection (especially respiratory or otic infection)

● Recent travel to areas with endemic meningococcal disease, such as sub-Saharan Africa

● Penetrating head trauma

● Cerebrospinal fluid (CSF) otorrhea or CSF rhinorrhea

● Cochlear implant devices

● Anatomic defects (recent neurosurgical procedure, ventricular shunt placement)
Clinical Features of Bacterial Meningitis

Two patterns of presentation:

Meningitis develops progressively over one or several days and can be preceded by Februaryrile illness

Meningitis course is acute and fulminant: Sepsis and meningitis develop rapidly over several hours
Clinical Features of Bacterial Meningitis

Classic triad: fever, nuchal rigidity, mental status change

Headache is common and not easily confused with a normal headache

Triad more common with strep pneumoniae than neisseria

Neisseria meningitidis has characteristic skin manifestation
Examination for nuchal rigidity

Inability to place chin on chest

Brudzinski sign- spontaneous flexion of hips with passive flexion of neck.

Kernig sign-inability or reluctance to allow full knee extension when hip is flexed 90 degrees.
Atypical Presentation

Most dramatic predictor of death is absence of fever at presentation

Lack of headache

Lack of neck stiffness

Look for leg pain, cold hands/feet, abnormal skin color (pallor/mottling)
Systemic complications

- Septic shock
- Disseminated intravascular coagulation
- Myocardial involvement
- Purpura fulminans
Neurologic Complications

- Impaired mental status
- Increased intracranial pressure and cerebral edema
- Seizures
- Focal neurologic deficits (e.g., cranial nerve palsy, hemiparesis)
- Sensorineural hearing loss
- Cognitive impairment
Case #1 Presentation 2/1/15

Signs and symptoms:

• 1 week coryza like illness

• Headache for 12 hours prior to hospital admission

• Restlessness and severe headache on morning of hospitalization
Bacterial meningitis is... a medical EMERGENCY

Immediate steps must be taken to establish specific cause and initiate effective therapy.

Avoidance of delay of antimicrobial therapy is critical.

Most common causes of delay are atypical presentation and delay due to imaging.

Effects of delay include increase in adverse outcomes and mortality.
Management algorithm for adults with suspected bacterial meningitis

Suspicion for bacterial meningitis

- Immunocompromise, history of CNS disease, new onset seizure, papilledema, altered consciousness, or focal neurologic deficit

No

- Blood cultures and lumbar puncture STAT
  - Dexamethasone* + empiric antimicrobial therapy
  - CSF findings consistent with bacterial meningitis
    - No
      - Consider alternative diagnosis
      - No
        - Continue dexamethasone* + empiric antimicrobial therapy
    - Yes
      - Positive CSF Gram stain
      - Continue dexamethasone* + targeted antimicrobial therapy

Yes

- Blood cultures STAT
  - Dexamethasone* + empiric antimicrobial therapy
    - Perform CT scan of the head
      - Contraindication for lumbar puncture
        - No
          - Continue therapy for bacterial meningitis
        - Yes
          - Perform lumbar puncture
            - Continue therapy for bacterial meningitis or consider alternative diagnosis
Where does meningococcal meningitis come from?

Lives naturally at the back of the nose and throat.

Human beings are the only site where meningococcal bacteria can live.

One in ten people carry the bacteria

Most of us have natural resistance.

Fragile - cannot survive for more than a few moments outside the human body.
Carriage

Five to ten percent of adults are asymptomatic nasopharyngeal carriers.

Adolescents and young adults have the highest rates of meningococcal carriage.

Few carriers develop invasive disease.
Transmission of Illness

-Nasopharyngeal carriage plays an important role in transmission

- Spontaneous loss and acquisition of carriage is common.

- Recurrent colonization may occur after prophylaxis.

- Antimicrobial prophylaxis has no proven clinical efficacy outside of an outbreak.
Methods for Prevention

Antimicrobial chemoprophylaxis following identification of an index case

Use of droplet precautions for 24 hours after institution of effective antibiotics in patients with suspected or confirmed *Neisseria meningitidis* infection

Vaccination prior to exposure

Avoidance of risk factors
### Recommended chemoprophylaxis regimens for protection against meningococcal disease — Advisory Committee on Immunization Practices (ACIP), United States, 2012

<table>
<thead>
<tr>
<th>Drug</th>
<th>Age group</th>
<th>Dose</th>
<th>Duration and route of administration*</th>
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<tr>
<td>Rifampin^†</td>
<td>Children aged &lt;1 month</td>
<td>5 mg/kg every 12 hours</td>
<td>Two days</td>
</tr>
<tr>
<td></td>
<td>Children aged ≥1 month</td>
<td>10 mg/kg every 12 hours</td>
<td>Two days</td>
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<tr>
<td></td>
<td>Adults</td>
<td>600 mg every 12 hours</td>
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<tr>
<td>Ciprofloxacin^△</td>
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<td>Children age &lt;15 years</td>
<td>125 mg</td>
<td>Single IM dose</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>Adults</td>
<td>250 mg</td>
<td>Single IM dose</td>
</tr>
</tbody>
</table>
Risk Factors

• Adolescents and young adults
• Infants less than one year old
• Persistent complement component deficiency or anatomic/functional asplenia
• People living in crowded settings like college dorms or military barracks
• People traveling to certain areas outside the U.S. such as the meningitis belt in Africa
• Laboratory personnel who are routinely exposed to meningococcal bacteria
• Those who might have been exposed to meningococcal disease during an outbreak
Which meningococcal vaccines are available?

In the U.S.:

Meningococcal conjugate vaccine (MCV4), (Menactra, MenHibrix, and Menveo).

Meningococcal polysaccharide vaccine (MPSV4), (Menommune).

Serogroup B meningococcal vaccine (Trumenba and Bexsero).
CDC Recommendation for A,C,W,Y Meningococcal Vaccine?

All children ages 11-18 or certain younger high-risk children

First-year college students living on campus

Anyone exposed to meningitis during an outbreak

Anyone traveling to or living where meningitis is common, such as in sub-Saharan Africa/Military recruits

People with immune disorders/asplenia
CDC Recommendations for Serogroup B Vaccine?

In June 2015: the CDC’s Advisory Committee on Immunization Practices (ACIP)

Permissive use of meningococcal serogroup B vaccine:
- ages 16-23,
- preferred age 16-18,
- high risk persons and during outbreaks.

MMWR, 10/22/15: the ACIP recommendations for the Use of Serogroup B Meningococcal Vaccines in Adolescents and Young Adults were published.
MenB vaccines might be an important step for controlling serogroup B meningococcal disease. P

Protect against the majority of currently circulating strains.

Not expected to provide protection against disease caused by all serogroup B strains circulating in US.

Additional studies assessing breadth of strain coverage are ongoing.

Immune responses following MenB vaccination were studied.

No data are available on vaccine effectiveness against clinical disease endpoints or duration of protection.

No concerning patterns of serious adverse events have been reported for MenB vaccines.
Additional safety data and postlicensure safety surveillance data are needed.

ACIP “a preference to administer the MenB series in later adolescence exists, preferably at age 16-18 years, to maximize the likelihood that protection would last into the highest age-related risk period.”

“insufficient evidence exists to make a routine public health recommendation that all adolescents be vaccinated with MenB vaccine.”
A MenB vaccine series may be administered to adolescents and young adults aged 16-23 years to provide short-term protection against most strains of serogroup B meningococcal disease. The preferred age for MenB vaccination is 16-18 years (recommendation Category B).

The two MenB vaccines are not interchangeable; the same vaccine product must be used for all doses. MenB-FHbp or MenB-4C may be administered concomitantly with other vaccines indicated for this age, but at a different anatomic site, if feasible.

Additional information for health care providers and parents can be found on the CDC website at http://www.cdc.gov/meningococcal.