FY19 Epi-Tech Surveillance Training

Friday, October 05, 2018 - Monday, September 30, 2019
DCS, APG, MD

Provided By
U.S. Army Medical Command

Activity ID        Course Director        CME Planner
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Accreditation Statement
This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of U.S. Army Medical Command and ARMY PUBLIC HEALTH CENTER. The U.S. Army Medical Command is accredited by the ACCME to provide continuing medical education for physicians.

Credit Designation
The U.S. Army Medical Command designates this Live Activity for a maximum of 5 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

This is a required handout. It must be disseminated to each learner prior to the start of the activity.
Statement of Need/Gap Analysis

The purpose of this CME activity is to address the identified gap(s):

1. Disease identification - verification of disease by established case definitions have been utilized by the local health departments, Centers for Disease Control and Prevention, World Health Organization, and the Department of Defense. With the every changing list of reportable medical events and new emerging infections, case definitions change rapidly. Army epidemiologist conduct verification studies that monitor the efficiency of reporting by local public health experts and have concluded that completeness percentages for reportable medical events range as low as 35% for select diseases.

2. Outbreak reporting - Recent evidence have demonstrated that outbreak reporting and communication between public health agencies is poor. In fact, the Army failed to report six outbreaks in the DRSi between June 2016 and September 2016.

3. Surveillance techniques - Surveillance of common communicable diseases continues to be a problem among local MTFs. In fact, cases of campylobacter were not investigated in 2015 for PACOM MTFS, while 2016 cases of salmonella were not investigated. Civilian public health agencies are required to conduct investigations into all reportable medical events. However, DoD facilities often do not take initiative to conduct this investigation.

Learning Objectives

1. Based on case presentation, enhance your ability to improve case finding and surveillance practices within your local MTF.

Target Audience / Scope of Practice

Target Audience: The intended audience for this educational activity includes preventive medicine physicians, community health nurses, public health nurses, and epidemiology technicians.

Scope of Practice: This activity will improve the performance of preventive medicine personnel who conduct surveillance activities in inpatient and outpatient settings.
Disclosure of Faculty/Committee Member Relationships
It is the policy of the U.S. Army Medical Command that all CME planning committee/faculty/authors disclose relationships with commercial entities upon invitation of participation. Disclosure documents are reviewed for potential conflicts of interest and, if identified, they are resolved prior to confirmation of participation.

**Faculty Members**
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- Graham-Glover, Bria - No information to disclose.
- Kebisek, Julianna - No information to disclose.
- Russell, Jamaal - No information to disclose.
- White, Duvel - No information to disclose.
- Ruiz, Stefani - No information to disclose.

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- Ambrose, John - No information to disclose.
- Brown, Jodi - No information to disclose.
- Eng, Mimi - No information to disclose.
- Gibson, Kelly - No information to disclose.
- Graham-Glover, Bria - No information to disclose.
- Holbrook, Victoria - No information to disclose.
- Kebisek, Julianna - No information to disclose.
- Riegodedios, Asha - No information to disclose.
- Rudiger, Courtney - No information to disclose.

**Acknowledgement of Commercial Support**
There is no commercial support associated with this educational activity.
• To register for the Monthly Disease Surveillance Trainings:
  – Contact your service surveillance HUB to receive monthly updates and reminders
  – Log-on or request log-on ID/password: https://tiny.army.mil/r/zB8A/CME
  – Register at: https://tiny.army.mil/r/EQk1/EpiTechFY19

• Confirm attendance:
  – Please enter your full name/email into the DCS chat box to the right or email your service hub
  – You will receive a confirmation email within 48 hours with your attendance record; if you do not receive this email, please contact your service hub

• Reminder:
  – Mute your phones by pressing the mute button or pressing *6
  – DO NOT press the “hold” button as the rest of the conference will hear the hold music
How to Investigate Gastrointestinal Illnesses

STEFANI RUIZ, EPIDEMIOLOGIST
USAFSAM/PHR APRIL 30, 2019
Objectives

• Be familiar with the epidemiology of organisms that cause GI illness

• Identify appropriate times to use a GI questionnaire and describe when and how to collect an exposure history

• Norovirus epidemiology and control
Epidemiology of Gastrointestinal Organisms

• Knowing the epidemiology of the organism can provide clues to what the organism is:
  • Incubation period
  • Mode of transmission
  • Number of ill over time
  • Clinical signs/symptoms
  • Duration of symptoms

• The epidemiology can drive next steps and actions to mitigate further disease spread

Guidelines for Confirming Cause of Foodborne Disease Outbreaks

<table>
<thead>
<tr>
<th>Etiologic Agent</th>
<th>Incubation Period</th>
<th>Clinical Syndrome</th>
<th>Confirmation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A</td>
<td>15-50 days; median: 28 days</td>
<td>Jaundice, dark urine, fatigue, anorexia, nausea</td>
<td>Detection of immunoglobulin M antibody to hepatitis A virus (IgM anti-HAV) in serum from two or more persons who consumed epidemiologically implicated food</td>
</tr>
<tr>
<td>Norovirus (NoV)</td>
<td>12-48 hrs (median 33 hours)</td>
<td>Diarrhea, vomiting, nausea, abdominal cramps, low-grade fever</td>
<td>Detection of viral RNA in at least two bulk stool or vomitus specimens by real-time or conventional reverse transcriptase-polymerase chain reaction (RT-PCR) OR Visualization of viruses (NoV) with characteristic morphology by electron microscopy in at least two or more bulk stool or vomitus specimens OR Two or more stools positive by commercial enzyme immunosorbent assay (EIA)</td>
</tr>
</tbody>
</table>

https://www.cdc.gov/foodsafety/outbreaks/investigating-outbreaks/confirming_diagnosis.html
<table>
<thead>
<tr>
<th>ORGANISM</th>
<th>COMMON NAME OF ILLNESS</th>
<th>ONSET TIME AFTER INGESTING</th>
<th>SIGNS &amp; SYMPTOMS</th>
<th>DURATION</th>
<th>FOOD SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bacillus cereus</em></td>
<td>B. cereus food poisoning</td>
<td>10-16 hrs</td>
<td>Abdominal cramps, watery diarrhea, nausea</td>
<td>24-48 hours</td>
<td>Meats, stews, gravies, vanilla sauce</td>
</tr>
<tr>
<td><em>Campylobacter jejuni</em></td>
<td>Campylobacteriosis</td>
<td>2-5 days</td>
<td>Diarrhea, cramps, fever, and vomiting; diarrhea may be bloody</td>
<td>2-10 days</td>
<td>Raw and undercooked poultry, unpasteurized milk, contaminated water</td>
</tr>
<tr>
<td><em>Clostridium botulinum</em></td>
<td>Botulism</td>
<td>12-72 hours</td>
<td>Vomiting, diarrhea, blurred vision, double vision, difficulty in swallowing, muscle weakness. Can result in</td>
<td>Variable</td>
<td>Improperly canned foods, especially home-canned vegetables, fermented fish, baked potatoes in</td>
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<td>respiratory failure and death</td>
<td></td>
<td>aluminum foil</td>
</tr>
<tr>
<td><em>Clostridium perfringens</em></td>
<td>Perfringens food poisoning</td>
<td>8–16 hours</td>
<td>Intense abdominal cramps, watery diarrhea</td>
<td>Usually 24 hours</td>
<td>Meats, poultry, gravy, dried or precooked foods, time and/or temperature-abused foods</td>
</tr>
<tr>
<td><em>Cryptosporidium</em></td>
<td>Intestinal cryptosporidiosis</td>
<td>2-10 days</td>
<td>Diarrhea (usually watery), stomach cramps, upset stomach, slight fever</td>
<td>May be remitting and</td>
<td>Uncooked food or food contaminated by an ill food handler after cooking, contaminated drinking</td>
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<td>relapsing over weeks</td>
<td>water</td>
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<td>to months</td>
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<tr>
<td><em>Cyclospora cayetanensis</em></td>
<td>Cyclosporiasis</td>
<td>1-14 days, usually at</td>
<td>Diarrhea (usually watery), loss of appetite, substantial loss of weight, stomach cramps, nausea, vomiting,</td>
<td>May be remitting and</td>
<td>Various types of fresh produce (imported berries, lettuce, basil)</td>
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<td></td>
<td>least 1 week</td>
<td>fatigue</td>
<td>relapsing over weeks</td>
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<td>to months</td>
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<tr>
<td><em>E. coli (Escherichia coli)</em></td>
<td><em>E. coli</em> infection (common cause of</td>
<td>1-3 days</td>
<td>Watery diarrhea, abdominal cramps, some vomiting</td>
<td>3-7 or more days</td>
<td>Water or food contaminated with human feces</td>
</tr>
<tr>
<td><em>E. coli</em> O157:H7*</td>
<td><em>travelers’ diarrhea</em>)</td>
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</tbody>
</table>

https://www.fda.gov/food/foodborneillnesscontaminants/foodborneillnessesneedtoknow/default.htm
Question

• How do you know if you need to investigate GI illness?
• Do all GI cases need to be investigated?

Answer is based on:

a) if the organism is known or unknown and
b) if the case is isolated or part of an outbreak
GI Questionnaire for Known Organism
GI Questionnaire – **KNOWN Organism**

- Air Force (isolated organism)

**PH Kx Epidemiology Toolbox**
https://kx2.afms.mil/kj/kx7/PublicHealth/Pages/content.aspx#/Comm/CommHealth

**USAFSAM Investigative Recommendations:**
- Anthrax - Investigation Recommendations | Investigation Form
- Campylobacter - Investigation Recommendations | Investigation Form
- Cryptosporidiosis - Investigation Recommendations | Investigation Form
- E. coli STEC - Investigation Recommendations | Investigation Form
- Hepatitis A - Investigation Recommendations | Investigation Form
- Legionellosis - Investigation Recommendations | Investigation Form
- Measles - Investigation Recommendations | Investigation Form
- Meningococcal Disease - Investigation Recommendations | Investigation Form
- Mumps - Investigation Recommendations | Investigation Form
- Salmonellosis - Investigation Recommendations | Investigation Form

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**Disease Form** | **Last Updated** | **Synced w/ Orphus?**
--- | --- | ---
Anaplasmosis - CDC form | 06/2003 | No
Animal Bites and Rabies | 04/2013 | No
Anthrax | 04/2013 | No
Babesiosis - CDC form | 04/2015 | No
Botulism | 05/2013 | No
Brucellosis - CDC form | 06/2016 | No
Campylobacteriosis | 09/2016 | Yes
Carbapenem-resistant *Enterobacteriaceae* | 05/2017 | No
Chikungunya - Draft form | 07/2014 | No
Cholera - See *Vibrio* infection, below
Cryptococcosis - Valley Fever - CDC form | 08/2016 | No
Colorado tick fever - CDC form | 11/2016 | No
Confidential Oregon Morbidity Report | 06/2017 | No
Cryptosporidiosis | 07/2018 | Yes
Cyclosporiasis | 12/2004 | No
Diphtheria | 06/2003 | No

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GI Questionnaire – **KNOWN** Organism

• Navy (isolated organism):
  • Collect as much information as possible in AHLTA/CHCS
  • Identify if high risk situation (food handler, day care attendee, close living environment like ship or recruit training)
  • Refer to local/state civilian case forms or CDC case forms if high risk
  • Contact your NEPMU to determine next steps if
    • Potential outbreak
    • High risk exposure has occurred
  • Work closely with civilian counterparts
GI Questionnaire – KNOWN Organism

• Army (isolated organism):
  • Contact APHC for fact sheets/investigation forms
  • Collect as much information as possible in AHLTA/CHCS
  • Work closely with Preventive Medicine department
  • Contact local health department for additional guidance
  • DO NOT contact Centers for Disease Control
GI Questionnaire – **KNOWN** Organisms

- **Systematically** ask about all exposures a minimum of 1 incubation prior to illness
  - This means that if you are investigating *E. coli*, you will not do a standard 3 day exposure history because *E. coli*’s incubation period can extend up to 7-10 days.

**Shiga toxin producing *E. coli* (STEC)**

![INFECTION TIMELINE](image)

Enter onset date in heavy box. Count back to figure the probable exposure period. Ask the below risk questions pertaining to this time period.

- Days from onset: -7, -4, -1
- Communicable: 1-4 weeks; sometimes more
- Calendar dates: Ask about exposures between these dates
GI Questionnaire – **KNOWN** Organisms

- **Systematically** ask about *all* exposures a minimum of 1 incubation prior to illness
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**Shiga toxin producing *E. coli* (STEC)**

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*INFECTION TIMELINE*

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*Ask about exposures between these dates*
• Systematically ask about all exposures a minimum of 1 incubation prior to illness
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**INFECTION TIMELINE**

Enter onset date in heavy box. Count back to figure the probable exposure period. Ask the below risk questions pertaining to this time period.
GI Questionnaire – **KNOWN** Organisms

**POSSIBLE SOURCE(S) OF INFECTION DURING EXPOSURE PERIOD**

Provide ancillary details (names, locations, details) about possible sources and risk factors. Ask about any leftovers including packaging or containers in the trash, collect some for testing. Contact USAFSAM/PHR for details.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unk</th>
<th>HIGH RISK FOODS</th>
<th>Yes</th>
<th>No</th>
<th>Unk</th>
<th>OTHER POTENTIAL SOURCES</th>
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<tr>
<td></td>
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<td></td>
<td>Ground beef handling or cooked in home</td>
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<td>Food at restaurants, fast food, vendors</td>
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<td>Any ground beef</td>
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<td>Food at other gatherings (potlucks and events)</td>
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<td>Raw/rare meat</td>
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<td>Work exposure to human or animal excreta</td>
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<td>Raw milk</td>
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<td>Contact with diapered children or adults</td>
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<td>Queso fresco/raw milk cheese</td>
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<td>Recreational water exposure (pools, lakes, rivers, water parks, backyard splash pools, etc.)</td>
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<td>Venison or other game</td>
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<td>Livestock or farm exposure</td>
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<td>Dried meat (salami, jerky, etc.)</td>
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<td>Petting zoos, county fairs, 4H</td>
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<td>Fresh spinach, lettuce or leafy greens</td>
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<td>Sprouts (alfalfa, clover, bean)</td>
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<td>Unpasteurized juice or cider</td>
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</tbody>
</table>

**Y N TRAVEL**

- ☐ ☐ CONUS to __________________________
- ☐ ☐ CONUS to __________________________

Provide details about all travel:

- Departure __/__/__ Return __/__/__
- Departure __/__/__ Return __/__/__

**OTHER FOLLOW-UP. Provide details as appropriate.**

- Yes | No | Unk |
- ☐ | ☐ | ☐ | Does the patient know anyone with a similar illness? |
- ☐ | ☐ | ☐ | Does the patient work or attend daycare? |
- ☐ | ☐ | ☐ | Are other children/staff ill? |
- ☐ | ☐ | ☐ | Daycare/work restriction for patient? |
- ☐ | ☐ | ☐ | Daycare inspection as part of investigation? |
- ☐ | ☐ | ☐ | Prepared food for public/private gatherings? |
- ☐ | ☐ | ☐ | Restaurant inspection? |
- ☐ | ☐ | ☐ | Water supply testing? |

Shiga toxin producing *E. coli* (STEC)
GI Questionnaire – **KNOWN** Organisms

If the organism is reportable:
- Interview **all isolated cases**
- Do not wait until you have an outbreak before interviewing
- Might take a month to exceed the baseline
- Very difficult to go back to the first case and ask about exposures from a month ago

- Depth of interview dependent upon:
  - Organism
  - Isolated case vs. outbreak
  - State requirements
GI Questionnaire – KNOWN Organisms

Investigating isolated cases

• At *minimum* obtain the following:
  • Epi data
    • Symptoms, onset date, exposure date (if known), duration of illness, etc.
  • Sensitive occupation: case/ household contacts
    • Food handling, day care, school, group living, healthcare, training center, or ship
    • Highly protected population that can not get sick: Special Ops/ Special Forces, etc.

Please document if the patient works in, lives in, or attends a high risk transmission setting (food handling, daycare, school, healthcare, training center, ship, etc.)
GI Questionnaire – **KNOWN** Organisms

Ohio Examples (isolated cases)

- Organisms that only require identifying epi data and sensitive occupation/high risk transmission setting:
  - e.g., Campylobacter, Shigella, Norovirus, Salmonella, Giardia, Amebiasis
  - If none, the interview is over and no further work up is needed

- Organisms that require completion of the entire questionnaire:
  - e.g., Hepatitis A
GI Questionnaire
Unknown Organisms
GI Questionnaire – **UNKNOWN** Organisms

• You will not interview everyone with unknown GI illness, only those who:
  
  a) exceed the **baseline** for GI illness

  b) meet the **case definition** that you define (we don’t have an organism yet, so this is not the RME case definitions)
GI Questionnaire – **UNKNOWN** Organisms

**Baseline:**

- What’s your daily/weekly (non-outbreak) baseline of GI disease?
  - For operational settings: Medical should monitor sick call log/binnacle list to track daily increase
  - For fixed MTFs: Use ESSENCE to identify baseline
  - For Day Cares: Simple excel spreadsheet to track daily illness
- Important to track illness on a routine basis (before an outbreak)
- You don’t know you have an increase if you don’t know your baseline.
GI Questionnaire – **UNKNOWN** Organisms

- General shipboard sick call log/binnacle list
- Collect routinely (regardless if there is an outbreak)
- Can be used as the beginning of your line list

<table>
<thead>
<tr>
<th>Last name</th>
<th>First name</th>
<th>Company</th>
<th>Date</th>
<th>SIQ</th>
<th>Symptoms</th>
<th>Provider</th>
<th>COMMENTS</th>
</tr>
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</tbody>
</table>
GI Questionnaire – **UNKNOWN** Organisms

- General sick (absence) log for Day Cares
- Reason can be a pre-defined list of syndrome categories (GI, rash, respiratory, etc.)
- PH collects this weekly (regardless if there is an outbreak)
  - Frequent contact helps maintain a relationship

<table>
<thead>
<tr>
<th>CDC Exclusion Log</th>
<th>Week Date Range: __________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Private Information</em></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Child Name: Last, First</th>
<th>Child’s age</th>
<th>Child’s room</th>
<th>Parent Name: Last, First</th>
<th>Parent Unit</th>
<th>Reason of illness</th>
</tr>
</thead>
</table>
GI Questionnaire – **UNKNOWN** Organisms

If an increase is noted:

- Summarize data from sick log/binnacle list
  - Any commonalities in symptoms, age, onset date, berthing/dorm room, or Day Care classroom
- Talk to providers
  - What are they seeing and for how long, what do they think the organism is, what are the most common symptoms, how long are they issuing quarters, are they treating with IV fluids, is there blood in the stool, is there vomiting or fever
  - This is the *beginning* of your outbreak case definition
GI Questionnaire – **UNKNOWN** Organisms

- Goals of an outbreak investigation influence next steps

- Nature of the organism, context (deployed, not deployed, amount of resources on hand, number of cases, etc), and goals of the outbreak will direct amount of time spent interviewing

- Goals of outbreak have to match resources available
GI Questionnaire – **UNKNOWN** Organisms

If your goals are to:

1) **Stop the outbreak (not identify source):**
   - Limit interviewing, spend more time controlling the spread

2) **Identify the source:**
   - Spend more time interviewing; Complete full exposure assessment and entire questionnaire

3) **Stop the outbreak and identify the source**
   - Time and resources must be balanced with interviewing and controlling the spread
GI Questionnaire – UNKNOWN Organisms

Instruct providers to:

1. Test patients who meet the case definition
   • As soon as a common organism is identified [5-8 samples], testing can stop (unless there’s a reason to continue)

2. Send patients who meet the case definition to PH/PM for interviewing
   • In operational settings PH/PM may not be co-located with the unit; providers may need to do their own interviewing and communicating with each other about illness upticks and case definitions.

3. How to order in CHCS (for fixed MTFs)
GI Questionnaire – UNKNOWN Organisms

Need to have good communication with providers:

ALCON:

Public Health and ER Physicians have identified a potential outbreak of hemorrhagic diarrhea. Currently there are 6 suspect cases. These patients have been preliminarily linked to the Tough Mudder race held in the Las Vegas area October 6 and 7. We are currently still within the incubation period of most causes of hemorrhagic diarrhea and may see more patients within the next few days or week. If you attend to a patient that has diarrhea and their history includes attending the Tough Mudder race or if you see any cases of hemorrhagic diarrhea please collect a stool sample and contact information for teammates. Refer patient and contact information to Public Health. Thank you for your time and consideration.
GI Questionnaire – UNKNOWN Organisms

Navy Case Intake Form:

• Providers document symptoms, epi data, sensitive occupation when the patient is in the clinic

• Helps standardize data collection across multiple providers

• Requires additional exposure questionnaire:
  • Check with your NEPMU; they can help you compile a questionnaire
GI Questionnaire – UNKNOWN Organisms

Air Force:

• Use a 7-day exposure questionnaire
  • On the Air Force PH Kx under Epidemiology Toolbox: ([https://kx2.afms.mil/kj/kx7/PublicHealth/Pages/content.aspx#/Comm/Comm Health](https://kx2.afms.mil/kj/kx7/PublicHealth/Pages/content.aspx#/Comm/Comm Health))
  • Once an organism has been identified, switch to disease specific questionnaires

Outbreak Response Tools:

  • Outbreak Response Kit
  • School/CDC Norovirus Outbreak Kit + School/CDC Norovirus Line L
  • GI Outbreak Questionnaire + Summary Doc (excel) + Directions
GI Questionnaire – UNKNOWN Organism

- If each patient is electronically entered in the PDF as you are interviewing:
  - Adobe is set up in the background to automatically create an Excel line list (merges all PDF questionnaires together)
  - Separate Excel summary sheet automatically summarizes all responses for each question
  - Huge time savings: only enter data once (while you are interviewing)
GI Questionnaire – UNKNOWN Organisms

Army Case Investigation Form:

- Standardized form that asks about all exposures from past 7 days
Reporting in DRSi

Outbreak case definition

Reporting in DRSi

• Report **ALL** outbreaks in the DRSi outbreak module
  • Even if the causative agent is **NOT ON** the RME list
    • Example: Hand, foot, and mouth disease; scabies; rotavirus; unknown organism, etc.
Reporting in DRSi

IF outbreak is **ON** the RME list:

Air Force and Army:
- Report the outbreak in the DRSi outbreak module **AND**
- Report each individual case who meets the RME case definition

Navy:
- Only need to report the outbreak in the DRSi outbreak module
Special Considerations:

Norovirus (NoV)
Special Considerations: NoV

• Leading cause of GI outbreaks
• DO NOT treat norovirus like any other GI organism
• Norovirus is **SPECIAL**
  • Multiple modes of transmission
    • Person to person, fomite, fecal-oral, vomit-oral, food, water, droplet through aerosolized virus from vomit
  • **HIGHLY** contagious
    • An extremely low infectious dose – as low as 18 virus particles.
• Profuse shedding of billions of viruses even among those who are asymptomatic.
• Prolonged shedding of virus even after symptoms have resolved.
Special Considerations: NoV

• **Prolonged survivability in the environment on hard surfaces (2 weeks).**
  • i.e., virus particles on fomites can remain alive and infect someone for up to 2 weeks.

• **Resistant to common disinfectants** (including bleach if too low of a concentration or too short of contact time).
  • It is one of the most difficult viruses to kill.
  • If one family member has it, the whole household usually gets it.

• Resistant to heat up to 145º F (63º C).
  • It can survive the laundry or dish washer (and contaminate everything in the same load) if the temperature does not exceed 145º F (63º C).

• Short-lived immunity which lasts only up to 14 weeks;
  • Therefore, an individual can get re-infected easily if the environment is still contaminated.
Special Considerations: NoV

To summarize why NoV is special:

If it’s on your ship or in your Day Care or training center, it can impact the entire mission
Special Considerations: NoV

• If you think it’s NoV, do not wait for labs to come back before responding

• Typical symptoms:
  • Diarrhea, typically watery and without blood
  • Vomiting
  • Nausea
  • Abdominal cramps/ stomach pain
Special Considerations: NoV

• When to suspect NoV without lab support:
  • If all of the following are present, high likelihood it’s norovirus (Lively criteria):
    • More vomiting than fever and <10% with bloody diarrhea and > 25% with vomiting
  • Note that an outbreak can still be NoV even if not all of the criteria are met
  • Navy’s criteria:
    • Equal distribution of both vomiting and diarrhea
    • Illness lasting 12 – 60 hrs
    • Public vomiting
    • Very little fever
    • High attack rate (and case numbers)
    • If training center, IV fluid intervention is often required
Special Considerations: NoV Control

Control efforts should be multi-faceted and should center on all modes of transmission

• Exclusion from sensitive occupations/ high transmission settings
  • Food handling, day care, school, group living, healthcare, training center, or ship
  • Highly protected population that can not get sick: Special Ops/ Special Forces, etc.

• Remove source (food/ water if food/ waterborne)
• Close any self service food lines (e.g., salad bar)
• Cohort: toilets, dorms/berthing sections, exam rooms, Child Care classrooms
• PPE and barrier protection: mask and gloves
Special Considerations: NoV Control

Control efforts (continued)

• Communicate to physicians, affected units, patients, Day Cares Directors, parents, Services, Contracting

• On Navy ships, communication is huge since norovirus can sweep through an entire ship in no time
  • PM should post signage in bathrooms instructing proper hand washing and notification to medical if **any** vomiting/diarrhea.
  • PM should ensure entire chain of command is on board with control recommendations

• Frequent hand washing

• **Environmental cleaning**
Special Considerations: NoV Questionnaire

• Because it’s so communicable, NoV management is about time management
  • Interviews vs. controlling the spread of disease
  • Goes back to the goals and context of the outbreak
Special Considerations: NoV Questionnaire

• If the outbreak is a point source (food/waterborne), your goal is to find and remove the source
  • Spend most of your time interviewing and data analysis
  • Complete the entire questionnaire; collect a full exposure history on all cases
    • Will need to interview controls as well
• NoV is so communicable, if it begins as foodborne, it won’t stay that way.
Special Considerations: NoV Questionnaire

• Once it transitions to person-to-person/fomite, your goal is to stop the spread of disease
  • Shorten the interview to collecting epi data (symptoms, onset, duration) and ascertain high transmission setting. Do not need to collect a food history
  • Navy: Medical can do this for you (GI case intake form)
  • Spend most of your time managing the environment
Environmental Management of Norovirus
List G is EPA’s 4 page list of registered disinfectants that can kill norovirus

https://www.epa.gov/sites/production/files/201804/documents/list_g_disinfectant_list_3_15_18.pdf
NoV Environmental Management: Sanitizing

• Choosing a NoV cleaning product:
  • Does the product label say 5.25% or greater hypochlorite (aka: chlorine/bleach/sodium hypochlorite) or
  • Does the product label say it’s effective against norovirus, non-enveloped viruses, or feline calicivirus or
  • Is the product listed on EPA List G
• If yes to any, it’s effective against NoV (at the right concentration for the right contact time)
• If no to all, need a different product
• Beware of faulty label claims
• Iodine and green products are ineffective against NoV
NoV Environmental Management: Sanitizing

• Choosing a NoV cleaning product:
  • Air Force and Army:
    • Bleach at 5.25% or greater hypochlorite is your 1st go-to
    • List G is your back-up
  • Navy:
    • List G is your 1st go-to
    • Liquid chlorine is a hazardous material; it’s use is controlled on ships.
    • Solid form of chlorine is available shipboard (as High Test Hypochlorite); subject to chain of command approval
NoV Environmental Management: Sanitizing

Use of trade names and commercial sources is for identification only and does not imply endorsement by the US Air Force.
NoV Environmental Management: Bleach

Though bleach is the standard disinfectant, NoV is generally resistant to bleach

**BUT**

- Bleach at the *right concentration* for the *right contact time* can kill norovirus

- The physical mechanics of removing bleach from a surface by scrubbing and wiping will remove remaining norovirus particles that bleach does not kill.
NoV Environmental Management: Bleach

Though bleach is the standard disinfectant, NoV is generally resistant to bleach

BUT

• Bleach at the *right concentration* for the *right contact time* can kill norovirus

• The physical mechanics of removing bleach from a surface by scrubbing and wiping will remove remaining norovirus particles that bleach does not kill.

10 minutes
NoV Environmental Management: Bleach Dilutions

• For **hard non-porous** *(non-food prep)* surfaces, bleach concentration should be 1,000 – 5,000 ppm

• Use 5,000 ppm for highly contaminated *(non-food prep)* surfaces

• If using liquid bleach with a starting base strength of 5.25%:
  • Surfaces must be free of visible vomit/diarrhea prior to bleaching
  • 1/3 cup bleach to a gallon water = 1,000 ppm
  • 1 2/3 cups bleach to a gallon water = 5,000 ppm
NoV Environmental Management: Bleach Dilutions

- For **food prep surfaces**, bleach concentration should be 200 ppm

- If using liquid bleach with a starting base strength of 5.25%:
  - Surfaces must be free of visible debris prior to bleaching
  - 1 TBS bleach to a gallon water = 200 ppm

- After sanitizing, rinse with water
NoV Environmental Management: Bleach Dilutions

- Can use any on-line calculator to calculate dilutions
- Verify with extra high level chlorine test strips
NoV Environmental Management: Bleach Dilutions

• Need to have extra high level test strips that go up to 5,000 – 10,000 ppm

• Most test strips to detect free available chlorine only go up to 200 – 400 ppm
NoV Environmental Management: Bleach Dilutions

• Bleach procured from other countries has different starting base strengths
• See the Army Technical Information Paper if using bleach from other countries

Preparation and Measuring High Chlorine Concentration Solutions for Disinfection

Technical Information Paper No. 13-034-1114
The Army Technical Paper lists the base strength of bleach from many countries and tells you how to dilute it to get the right concentration.

### Table 2. Liquid Base Strength Bleach by Brand or Country of Origin

| Bleach Brand; Country Manufactured or Used | % Active Chlorine (base strength) | Volume of Water Added to 1 Part Bleach to Prepare a 5,000 ppm Concentration
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>8 °chlorum b</td>
<td>2.4%</td>
<td>4</td>
</tr>
<tr>
<td>JIK (Kenya, Liberia)</td>
<td>3.5%</td>
<td>6</td>
</tr>
<tr>
<td>Ajax (Jamaica)</td>
<td>3.6%</td>
<td>6</td>
</tr>
<tr>
<td>Bref Javel (Senegal)</td>
<td>4%</td>
<td>7</td>
</tr>
<tr>
<td>Eau de Javel (France)</td>
<td>5%</td>
<td>9</td>
</tr>
<tr>
<td>Household bleach (USA, Indonesia, Canada)</td>
<td>5.25%</td>
<td>9</td>
</tr>
<tr>
<td>ACE (Turkey)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blanquedor, Cloro (Mexico)</td>
<td>6%</td>
<td>11</td>
</tr>
<tr>
<td>Household bleach (USA) (Clorox® and other brands)</td>
<td>8.25%</td>
<td>15</td>
</tr>
<tr>
<td>Blanquedor (Mexico)</td>
<td>8%</td>
<td>15</td>
</tr>
<tr>
<td>Lavindina (Bolivia)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloros (UK)</td>
<td>10%</td>
<td>19</td>
</tr>
<tr>
<td>La Croix Eau (Guinea)</td>
<td>14%</td>
<td>27</td>
</tr>
<tr>
<td>Chloros (UK)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrait de Javel (France)</td>
<td>15%</td>
<td>29</td>
</tr>
<tr>
<td>48 °chlorum b</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Reads as one part (e.g., cup or liter) concentrated bleach to x parts water (e.g., for JIK mix 1 cup bleach with 6 cups water for a total of 7 cups).

b. In some countries the concentration of sodium hypochlorite is expressed in chlorometric degrees (°chlorum); one °chlorum is approximately equivalent to 0.3% available chlorine.

c. Chlorine bleach manufacturers in the United States are moving away from a 5.25% base strength and are now producing products with an 8.25% base. The product strength is indicated on the label.
Sanitizing Specific Things against Norovirus
NoV Environmental Management

- **Contact time:** 10 minutes! (spray and walk away)
- Make fresh bleach dilutions *daily* from a bottle of undiluted bleach that has been opened for *less than 30 days*
  - Chlorine decomposes over time and at increased temperatures
  - Test chlorine concentration using test strips prior to each use
- Disinfect after every episode of vomiting or diarrhea
- Disinfect the facility twice a day
  - Clean from the areas of lowest to highest contamination (i.e., sinks to toilets)
- Disinfect frequently touched items 3 times a day
- Disinfect at *home* the same way
NoV Environmental Management: Laundry

• Sanitizing laundry/clothing/bedding/plush toys:
  • Do not hand wash; temperature will not get high enough to kill NoV
  • Use a pre-wash cycle with bleach using the hottest temperature setting
    • Do not agitate (can aerosolize virus)
  • Then wash items in a regular cycle with bleach and detergent using the hottest temperature and maximum cycle length
  • Dry items on the hottest setting at a temperature greater than 170° F
    • Do not air-dry
  • If the item will not tolerate bleach and high temperatures, discard.
NoV Environmental Management: Carpet

- Sanitizing carpet:
  - Pick up all visible vomit/diarrhea (without scrubbing/aerosolizing virus)
  - Steam clean 212°F for 1 minute
  - DO NOT VACUUM carpet
NoV Environmental Management: Shared Equipment

• Shared equipment (gas masks, helmets, pugil sticks, etc.):
  • Best not to share anything if there is NoV
  • Sanitize the item by wiping contact surfaces with as high of a concentration of bleach as the item will allow
    • May need to test a small portion first
    • Wipe with water afterwards
NoV Environmental Management: Toys

Sanitizing toys en-masse

• Aim for a minimum of 1,000 ppm
  • Fill 50 gallon (unused) trash bin ½ way with water
    • Add 1 gallon (5.25%) bleach
    • Stir with a stick (e.g., broom handle)
    • Add toys
  • Make sure all toy surfaces are immersed for 10 minutes: Stir so toys don’t float
Sanitizing toys en-masse (continued)

- Rinse (**critical if toys could be mouthed**)
  - Can drape a hose in trash bin and let it run/overflow for 20 min
  - Indoor alternative: use a 2 trash bin process:
    - 1\textsuperscript{st} trash bin is bleach solution
    - 2\textsuperscript{nd} trash bin is rinse water
    - Must use test strips to make sure rinse water does not exceed 50 ppm chlorine

- Do not need to scrub toy surface
NoV Environmental Management: Toys

Grand Forks PH
CDC NoV Outbreak (Jan 2019)

Hurlburt PH
CDC NoV Outbreak (Nov/Dec 2017)
NoV Environmental Management

• Discard things that can not be sanitized

• Additional cleaning details are in the USAFSAM Norovirus Outbreak Toolkit
NoV Environmental Management

- Navy Fleet Norovirus Resources
Norovirus and Contracting
Contracting

• If a separate cleaning contract will be written, PH/PM should liaise with the affected unit, Services, and Contracting to assure the correct wording is included in a contract

• Do not leave it up to the contract company to decide what chemical agents to use and how to clean; the contract must specify it directly

• Contract should spell out in detail:
  • Appropriate cleaning agent (5.25% bleach or product on EPA’s List G)
  • Concentration of bleach (1,000 – 5,000 ppm for non food prep surfaces; 200 ppm for food prep surfaces) and how it should be made
Contracting

- Contract should spell out in detail (continued):
  - Frequency of making fresh bleach solutions (minimum daily or as often as the ppm falls below the desired concentration; can be multiple times a day in deployed locations due to hot temperatures)
  - How bleach concentration will be tested (extra high level test strips that go up to 5,000 – 10,000 ppm)
  - Frequency of testing (every time a fresh solution is made and throughout the day in hot environments)
  - Duration of bleach contact time (10 minutes)
Contracting

• Contract should spell out in detail (continued):

  • Frequency of sanitizing the environment (after every episode of vomiting/diarrhea; facility: twice a day; high touch items: three times a day)

  • Examples of specific items and surfaces that should be sanitized

  • A steam cleaner that reaches 212°F for carpets/upholstery

  • PPE including gloves, gowns, masks

  • Cleaning needs to meet Public Health standards
Contracting

• Provide the “USAFSAM Norovirus Outbreak Toolkit for Schools, Youth Programs and CDCs” or the “Norovirus Prevention & Control Guidance for U.S. Fleet” to affected units, Services, and Contracting for reference

• If the above language is not specified in the cleaning contract, it can be modified; PH should review any contract modification
Contracting

• PH/PM should observe cleaning and perform spot checks
  
  • Observe what chemicals are being used, proper contact time, correct bleach concentration, assure cleaning starts from areas of lowest contamination to highest, proper PPE, etc.

  • If cleaning happens at night, Services or the unit Commander (or designee) should be on site to observe that cleaning is being done according to NoV specifications.

    • PH should train them on what to look for.
Conclusion
Helpful NoV Resources

**Preventing and Measuring High Chlorine Concentration Solutions for Disinfection**

Technical Information Paper No. 13-034-1114

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**GUIDELINE FOR THE PREVENTION AND CONTROL OF NOROVIRUS GASTROENTERITIS OUTBREAKS IN HEALTHCARE SETTINGS**

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Healthcare Infection Control Practices Advisory Committee (HICPAC)4

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**Norovirus Outbreak Toolkit**

for Schools, Youth Programs, & Child Development Centers

December 2018

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**OSHA® Fact Sheet**

Navy and Marine Corps Public Health Center
Technical Manual NMCPC-TM 6221

Norovirus Illness Prevention & Control Guidance for the U.S. Fleet

Version: June 2015

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**US Environmental Protection Agency**

Office of Pesticide Programs

List G: EPA Registered Hospital Disinfectants Effective Against Norovirus (Norwalk-like virus)

June 16, 2016
To Conclude

Norovirus is resistant to bleach

Must use bleach at the *right concentration* for the *right contact time* (10 minutes)

and extra high level chlorine test strips
To Conclude: Here is What you Need to Do Following this Presentation

• Locate disease specific and generic 7-day questionnaires
  • Can use USAFSAM’s or your own installation specific
  • Identify state or service rules for which organisms require minimal questions and which require the entire questionnaire

• Implement daily surveillance in high transmission populations (training centers, deployed locations, Day Cares, ships, etc.)
  • Identify the baseline of GI illness
  • Analyze data weekly
To Conclude: Here is What you Need to Do Following this Presentation

• Learn about NoV \textit{NOW}
  • Do not wait until you have a NoV outbreak
  • Read all documents listed in the resources slide (homework)
  • Identify the percentage of hypochlorite you have access to. If outside the U.S. see the Army bleach guide to familiarize yourself with the dilution calculations – \textit{before an outbreak begins}
  • Identify how to procure cleaning agents from List G

• Visit high risk settings:
  • Implement daily surveillance for absences due to illness
  • Review cleaning contract with supervisors
  • Give the AF Norovirus Outbreak Toolkit for Schools, Youth Programs and CDCs, and for the Navy give the Fleet Norovirus Guide to ships
To Conclude: Here is What you Need to Do Following this Presentation

- Review cleaning contracts with Services
  - Do contracts specify the technical details of how to clean for NoV including the appropriate agent, concentration, contact time, etc.?
  - Is there language that specifies that cleaning needs to meet PH/PM standards?
- If not, visit Contracting Office and ask for a contract modification
- Give them the AF Norovirus Outbreak Toolkit for Schools, Youth Programs and CDCs or the Navy Fleet Norovirus Guide
- Include the technical details of NoV control to your Disease Containment Plan
Questions?
Contact Information

• **Army:** APHC – Disease Epidemiology Division
  Aberdeen Proving Ground – MD
  COMM: (410) 436-7605  DSN: 584-7605
  Email: usarmy.apg.medcom-aphc.mbx.disease-epidemiologyprogram13@mail.mil

• **Navy:** NMCPHC Preventive Medicine Programs and Policy Support Department
  COMM: (757) 953-0700; DSN: (312) 377-0700
  Email: usn.hampton-roads.navmcpubhlthcenpors.list.nmcphc-threatassess@mail.mil
  Contact your cognizant NEPMU
  NEPMU2:  COMM: (757) 950-6600; DSN: (312) 377-6600
  Email: usn.hampton-roads.navhospporsva.list.nepmu2norfolk-threatassess@mail.mil
  NEPMU5: COMM: (619) 556-7070; DSN (312) 526-7070
  Email: usn.san-diego.navenpvntmedufive.list.nepmu5-health-surveillance@mail.mil
  NEPMU6: COMM: (808) 471-0237; DSN: (315) 471-0237
  Email: usn.jbphh.navenpvntmedusixhi.list.nepmu6@mail.mil
  Email: NEPMU7@eu.navy.mil

• **Air Force:** Contact your MAJCOM PH or USAFSAM/PHR
  USAFSAM / PHR / Epidemiology Consult Service
  Wright-Patterson AFB, Ohio
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  Email: usafsam.phrepiservic@us.af.mil