

# Anatomy of a *C. difficile* Outbreak

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# Objectives

Provide overview of an Outbreak:

- Case Definition
- Identifying Cases
- Declaring an Outbreak
- Control Measures
- Communication & Reporting
- Evaluation
- Terminating an Outbreak

# What is *C. difficile*?

- Clostridium *difficile* is a gram positive spore-forming anaerobic bacillus
- Widely distributed in the environment
- Certain strains can produce toxins
  - toxin A and B which are responsible for diarrhea
- Spread due to inadequate hand hygiene and environmental cleaning

# What is Diarrhea?

Diarrhea is defined as:

- loose/watery stool (i.e. if the stool were to be poured into a container, it would conform to the shape of the container)

**AND**

- the bowel movements are *unusual* or *different* for the client / patient / resident

**AND**

- there is no other recognized etiology for the diarrhea (e.g. laxative use)



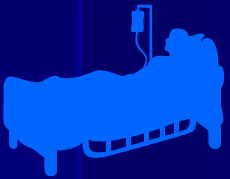
# Background

- Local Acute Care Academic Facility
- 33 Bed Medical Surgical Intensive Care Unit
- November 2010



# November 2010

Nov  
11



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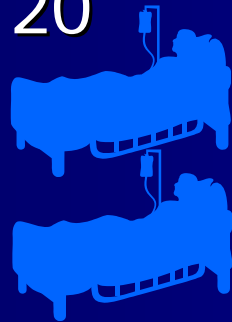
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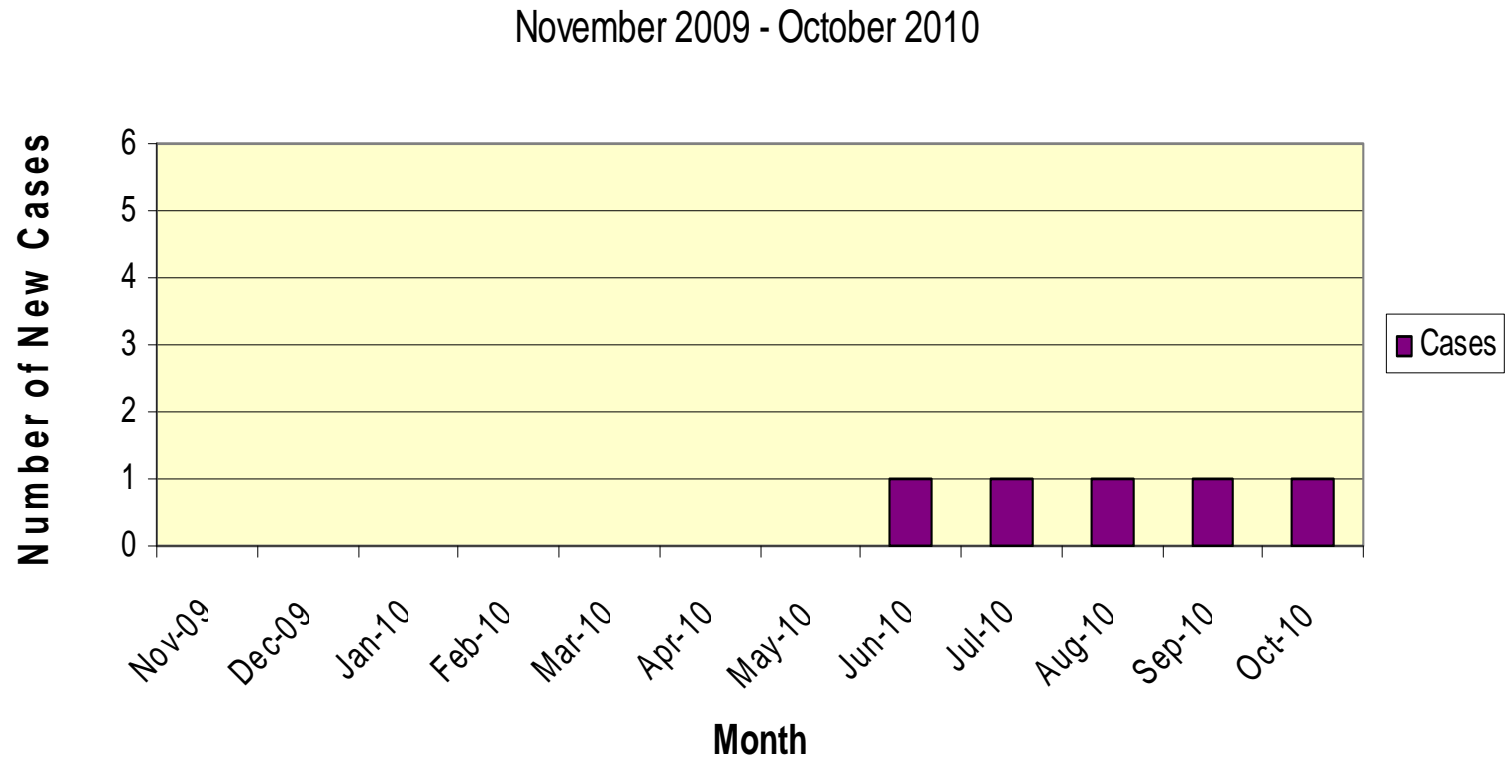
- Preliminary Outbreak Investigation Implemented

# First thing Infection Control must do?

Verify the diagnosis and confirm the outbreak:

- Determine whether the number of cases is unusual
  - *Does the observed number of cases appear to exceed the expected number of cases?*
- Verify the diagnosis

# Baseline Data



# Identifying Cases

Outbreak Surveillance at this institution:

- **Confirmed** cases-lab based (*C. difficile* report)
- **Suspected** cases are identified
  - patients on isolation precautions
  - discussions with front line staff (e.g. rounds, phone calls)

# Identifying Cases

Contact precautions initiated by staff if ***2 or more*** unexplained diarrhea episodes within 24 hrs.

- Don't wait for lab report
  - (can take up to 5 days in some labs)
- Driven by symptoms

# Establish Case Definition

- This is done early in the investigation
  - Helps identify the extent of the problem and the population affected
  - Consistency and standardization

## Nosocomial:

- onset of symptoms > 72 hours after admission  
**OR**
- the infection is present at the time of admission but is related to a previous admission to your facility within the last 4 weeks.

# Case Definition

Clostridium difficile Infection (CDI):

- Laboratory confirmation of a positive toxin assay for *C. difficile* together with diarrhea\*

**OR**

- Visualization of pseudomembranes on sigmoidoscopy or colonoscopy

**OR**

- Histological/pathological diagnosis of pseudomembranous colitis

**OR**

- Diagnosis of toxic megacolon



# Preliminary Investigation

- Next .....
- Broaden investigation for complete case findings
  - Stool specimens collected on all symptomatic patients
  - review stool patterns on all patients
- Notify Public Health
- Set up Outbreak Committee
- Confirm Outbreak
- Initiate Control Measures



# Declaring an Outbreak

## Cluster Reporting Threshold

(for wards/units with >20 beds):

- 3 cases of nosocomial CDI identified on one ward/unit, within a 7 day period
- or 5 CDI cases within a 4 week period
  
- CDI occurring at a rate exceeding the normally expected baseline rate for the health care setting (or unit, floor, ward) during a specified period of time should be considered as an outbreak. This varies between institutions.

## ICU outbreak:

- Initially following as cluster of 3 cases within 10 day period
- Then increased by 2 cases to 5 within 14 day period

# Declaring an Outbreak

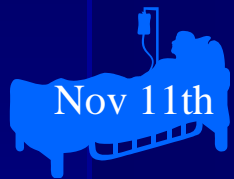
- **Clusters of cases in one unit or area should be investigated**
- Need to consider endemic or baseline rate as compared to peer hospitals and other hospitals in their region.
- CDI outbreaks are reportable by long-term care homes as institutional outbreaks of gastroenteritis.

**Declaring outbreak involves notifying Public Health**

**CDI outbreaks also reportable to Ontario MOHLTC**

- Posted on MOH and local hospital websites

# ICU Nosocomial CDI Cluster



Week #1  
November  
8<sup>th</sup> -14<sup>th</sup>



Week #2  
November  
15<sup>th</sup> -21<sup>st</sup>



Feb 7

Week #3  
November  
22<sup>nd</sup>-28<sup>th</sup>



Week #4  
November 29<sup>th</sup>-  
December 1<sup>st</sup>

# Control Measures-Initiate Contact Precautions

- At onset of diarrhea with risk factors for CDI
  - antibiotics, protein pump inhibitors
  - antacid use
  - chemotherapy
  - recent bowel surgery
  - age
  - length of stay
  - immunocompromised
  - previous CDI
- Suspected or confirmed case of CDI
- Diagnosis toxic megacolon and pseudomembranous colitis

# Control Measures- Accommodation-Acute, Complex Care, and Rehab

- Single room + dedicated toileting facilities
  - private bathroom or individual commode chair is preferred
- Terminal cleaning bed space + bathroom on transfer to single room
- Limited number of single rooms- prioritize faecally incontinent to single rooms
- No single room, placement assessed by Infection Prevention and Control
  - laboratory-confirmed CDI cases should only share a room with other laboratory-confirmed CDI cases

# Control Measures- Accommodation-LTC

- Single room with dedicated toileting facilities
  - private bathroom or individual commode chair is preferred
  - may require limiting a shared bathroom to one resident
- Multi-bed room:
  - visible precaution signage
  - physical separation / draw privacy curtain to promote separation
  - accessible barrier supply cart
  - laundry hamper as close as possible to bed space
  - dedicate commode chair / personal care items

# Control Measures-Waste Management and Environmental Cleaning

Twice daily cleaning of precaution rooms with special attention to the washroom

- Consider change in cleaning product (sporicidal)
  - sodium hypochlorite (1000 parts per million)
  - accelerated hydrogen peroxide (4.5%)
  - peracetic acid (1.6%)
  - acidified nitrite
- Single use OR disposal bedpans
- Wands discouraged due to spraying



# Control Measures- Environment

- De-clutter patient care areas to facilitate cleaning
- Dedicate equipment, cleaning shared equipment / accessible Virox<sup>©</sup> wipes
- When precautions discontinued
  - Commodes / bedpans cleaned & disinfected before re-use
  - Discard cleaning items e.g. toilet brush

# Control Measures- Hand Hygiene

- Dedicated hand washing sinks
- Accessible ABHR
- Reinforcement of 4 Moments
- Focus on hand hygiene after glove removal

# Control Measures-Other

- Known of suspected CDI cases does not preclude from being transferred when medically appropriate
- Education to visitors should include hand hygiene
- Temperatures should not be taken rectally
- No eating or drinking in the room or bed space

# Communication & Reporting

Reporting rates of CDI are best expressed as:

- the number of cases per 1000 patient days; and/or
- the number of new cases per 1000 patient admissions

## **Communication included:**

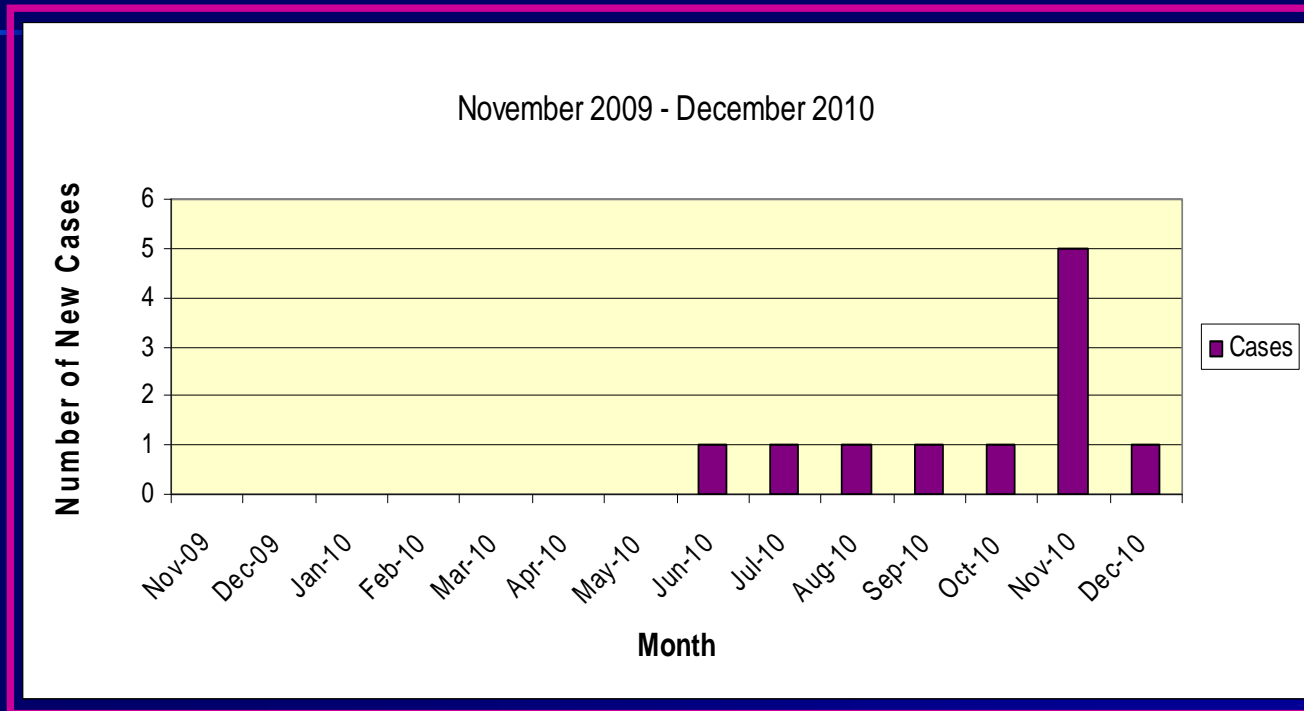
- Public Health Outbreak Team (line listing, site tour)
  - Hospital Administration (updates, outbreak summary report)
  - Front line staff (education, feedback)
  - Environmental services (strategies)
  - General public (various media releases)
  - Visitors instruction re reason & proper technique for hand hygiene.
- 
- Educational tools for patients / family regarding proper hand hygiene

# Evaluation

- Ongoing
    - Audit of compliance with hand hygiene
    - Environmental audit to guide practice suggestions
  - Final
    - Outbreak summary report
    - Sharing of lessons learned with front line staff
- ICU Outbreak:**
- ID Resident Education and Summary to staff
  - Written outbreak summary shared with management staff

# Terminating the Outbreak

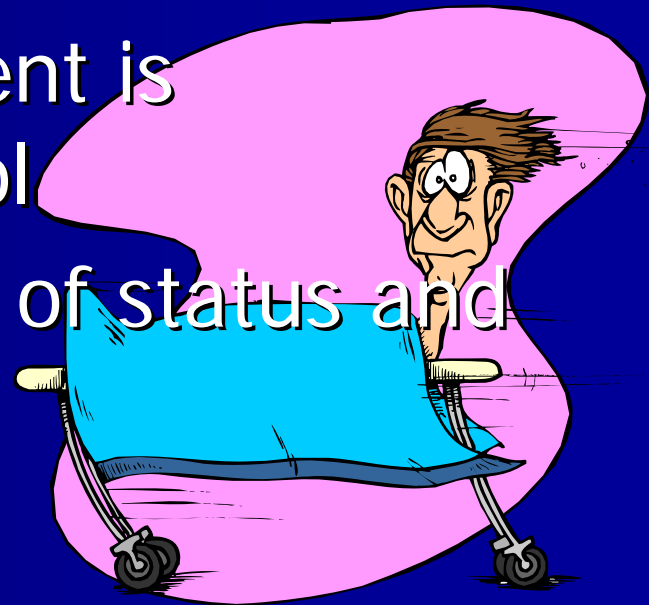
## January 3 , 2011



- No new cases identified since December 1, 2010
- Return to baseline
- No new cases identified within 4 week period
- Outbreak declared over

# Lessons Learned

- CDI is a moving target
- Baseline data is essential to identify an outbreak
- Proper waste management is necessary for CDI control
- Ongoing communication of status and education is essential



# References

- PIDAC Routine Practices and Additional Precautions
  - Annex C: Testing, Surveillance and Management of *Clostridium difficile* In All Health Care Settings
  - Ministry of Health and Long-Term Care May, 2010