Retrospective Evaluation of *Clostridium difficile* Infection Risk Factors and Management at a University Teaching Hospital in Northern BC.

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Disclosure

I, or any of the primary researchers, have no actual or potential conflict of interest in relation to this presentation

Background

- ***Clostridium difficile* (*C. diff)*** is the primary cause of healthcare associated diarrhea
  - Major threat to patient safety worldwide
  - Often preventable

Background

- ***Risk factors for developing CDI:***
  - Antimicrobial therapy *
    - broad spectrum, long duration
  - Advanced age (>65 years)
  - Extended hospital stay
  - Poor infection control in healthcare facilities*
  - Cancer chemotherapy
  - Gastrointestinal surgery or manipulation of gastrointestinal tract
  - Proton pump inhibitors (PPIs) and to a lesser extent histamine-2 receptor antagonists (H2RAs)*

Background

- ***Reducing the rate of CDI requires a multifaceted approach involving:***
  - Infection prevention and control measures to minimize transmission of infection
  - Minimizing modifiable risk factors
  - Antimicrobial stewardship measures to eliminate unnecessary or prolonged antimicrobial exposure

Background

- In **2013** the Provincial Infection Control Network of British Columbia (PICNet) developed an evidence based toolkit for CDI that included treatment algorithms

- In **2014** *Brown et al.* found that guideline concordant therapy for CDI management was associated with a significant reduction in complications

Background

- During the **2013/2014** fiscal year the rate of hospital-associated CDI acquired at the UHNBC ***increased by 35%*** from the year previous

- **No standard of policy or protocol for treatment of CDI at UHNBC** *(or within Northern Health entirely)*

Objectives

Primary:

Determine if the management of CDI at UHNBC complies with provincial and national standards in the absence of a standard policy.

Objectives

Secondary:

- Identify the proportion of CDI patients who had potentially modifiable pharmacological risk factors for CDI
  - *Includes antimicrobials, PPI, H2RA*

- Identify patient outcomes including length of hospital stay, mortality rate and recurrence rate.

Methods

Study Design	Retrospective, observational chart review
Time Period	April 1st, 2010 to March 31st, 2016
Population	**Inclusion criteria:** • Diagnosis of health-care associated CDI at UHNBC *Definition:* *Patients with positive stool sample collected >72 hours after admission* OR *Patients with positive stool sample collected < 72 hours after admission but with a recent discharge from UHNBC within the previous 4 weeks* **Exclusion criteria:** • Children < 18 years old

Methods: Comparator Treatment Guidelines

Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults: 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA) **2010**

Stuart H. Cohen, MD; Dale N. Gerding, MD; Stuart Johnson, MD; Ciaran P. Kelly, MD; Vivian G. Loo, MD; L. Clifford McDonald, MD; Jacques Pepin, MD; Mark H. Wilcox, MD

PICNet **2013**
PROVINCIAL INFECTION CONTROL NETWORK OF BRITISH COLUMBIA
A program of the Provincial Health Services Authority

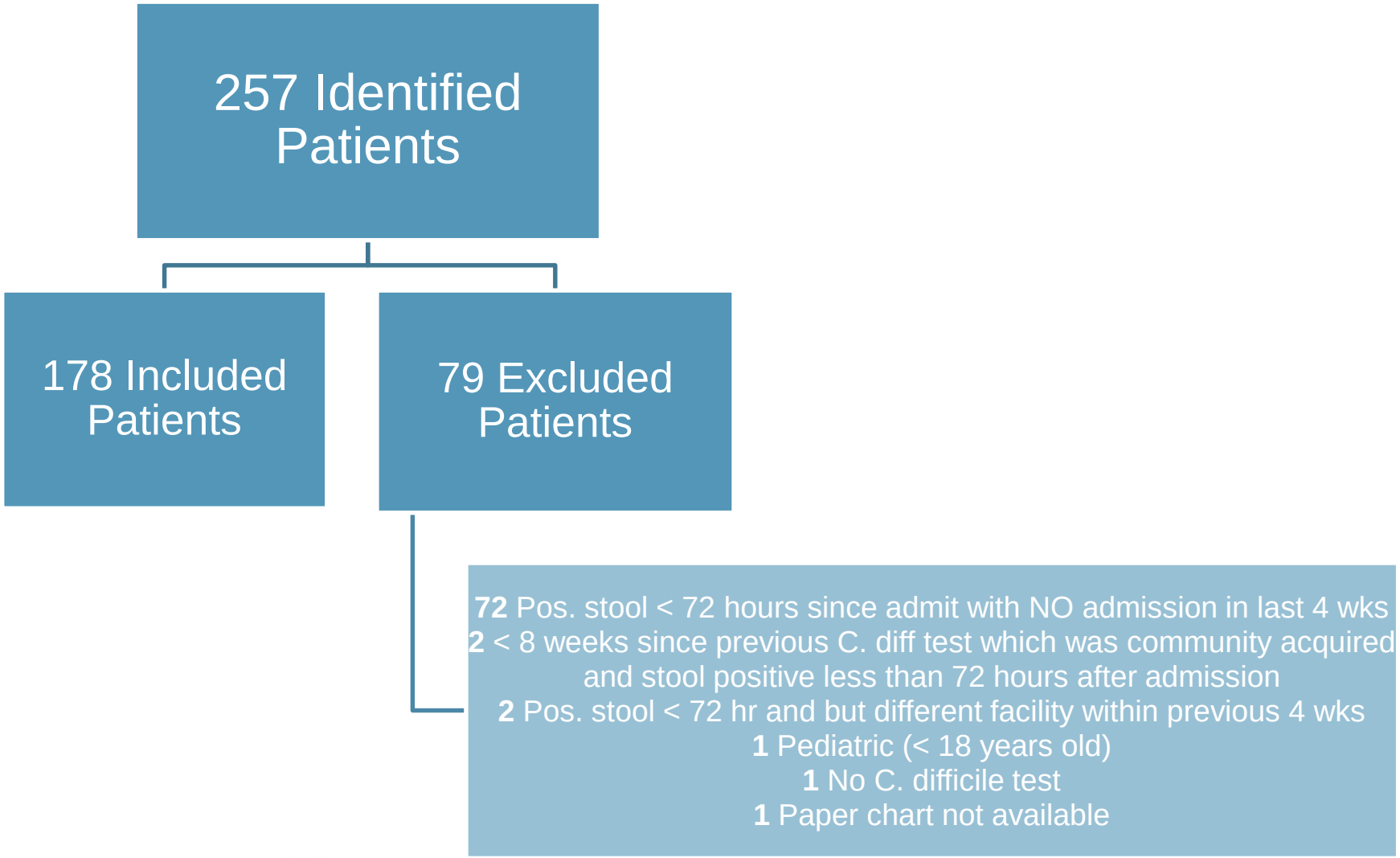
Toolkit for the Management of *Clostridium difficile* in Acute and Residential Care Settings

European Society of Clinical Microbiology and Infectious Diseases: update of the treatment guidance document for *Clostridium difficile* infection **2014**

S. B. Debast[1], M. P. Bauer[2], E. J. Kuijper[3], on behalf of the Committee*
1) Department of Medical Microbiology, Radboud University Medical Center, Nijmegen, Departments of 2) Infectious Diseases and 3) Medical Microbiology, Centre for Infectious Diseases, Leiden University Medical Centre, Leiden, the Netherlands

- *Acceptable compliance rate was defined as 80%*

Results: Inclusion and Exclusion



Results: Baseline Characteristics

Characteristic	Number (%) (n = 178)
Male	87 (49)
Age >65	89 (50)
Pregnancy	2 (1)
Chronic GI Co-morbidities	55 (31)
Concurrent Infection on admission	58 (33)
Previous C. difficile infection	25 (14)
Antibiotics within 30 days PTA	67 (38)
PPI or H2RA prior to admission	62 (35)
Patient with recorded antibiotic allergy **patients with allergy to metronidazole or vancomycin = 4*	51 (29)*
Severity of disease	
Mild/Moderate	117 (66)
Severe	49 (28)
Fulminant	11 (6)
Insufficient data	1

Results: Compliance with Guidelines

CDI Treatment Assessment	Number (%) (n=178)
Appropriate treatment	57 (32)
Inappropriate treatment* **No treatment received*	116 (65.2) *17 (9.6)*
Insufficient data	5 (2.8)

Results: Modifiable Risk Factors

Modifiable Risk Factors	Number (%) (n=178)
Antibiotics during admission *More than 1 antibiotic*	149 (84) *142 (80)*
PPI during admission	114 (64)
H_2RA during admission	29 (47)
Both PPI and H_2RA during admission	15 (8.4)

- 66% of antibiotic courses “broad-spectrum”
- Average duration of antibiotic course: 9.7 days (range 1 to 131)

Results Summary

- **Primary Outcome: Compliance with guidelines**
  - 32% compliance rate with provincial and national standards

- **Secondary Outcomes:**
  - ***Modifiable Risk Factors***: 96% of patients had at least 1 modifiable risk factor
  - ***Patient outcomes:***
    - *Average length of stay:* 9.7 days (median 23 days)
    - *Recurrence rate*: 13% recurrence after the study episode
    - *Mortality:* 14%

Conclusions

- Compliance rate with provincial and national standards ***below the pre-determine acceptable rate of 80%***
- ***Modifiable risk factors*** were identified for ***almost all patients***
- Future studies with more robust design are required to determine if modifiable risk factors affect length of hospital stay, recurrence rates and mortality rates

Considerations for the Future

- The results from this study support development and implementation of a CDI management protocol and order set at UHNBC

- Further research
  - Effect of order set implementation on compliance with treatment standards
  - Correlation of AMS program implementation and rates of *C.difficile*

Questions?

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