Draft surveillance indicator definition

Clostridium difficile as an indicator organism for infection control and surveillance purposes

Professor Tom Riley, on behalf of the AICA National Advisory Board, has developed the following draft definitions for consideration. The aim is to provide a reliable and practical approach to surveillance.

Please disseminate this information to your colleagues to elicit their feedback. It is vital that the consultation process involves all interested professionals.

Feedback can take two forms:

- *A letter posted to the AICA Secretariat, PO Box 322 Wilston Qld 4051*
- *An e-mail to the AICA secretariat posted on the AICA website: www.aica.org.au*

Deadline for feedback: 1 November 2002

Rationale

Clostridium difficile is the most common cause of diarrhoea in health care facilities in developed countries[1]. *C. difficile*-associated diarrhoea (CDAD) adds significantly to health care facility costs, with patients on average staying an extra 18 days[2].

The two most important risk factors for the development of CDAD are exposure to the organism and exposure to antibiotics, particularly third generation cephalosporins. Surveillance for nosocomial CDAD is important because the occurrence of this infection, especially in clusters, could be considered a surrogate for a lack of compliance with basic infection control procedures that should prevent transmission of *C. difficile*. *C. difficile* is not part of the normal flora of the gastrointestinal tract in non-hospitalised individuals and is usually acquired after admission, suggesting a breakdown in infection control. In addition, increasing rates of CDAD may indicate a problem with antibiotic prescribing in the health care facility.

In Australia, third generation cephalosporins represent the most important antibiotic risk factor, with good ecological evidence of a relationship between increased numbers of cases of CDAD and increased use of third generation cephalosporins[3].

Finally, there are striking similarities between the ecology of *C. difficile* and that of vancomycin resistant enterococci (VRE). Both of these nosocomial problems are characterised by the same epidemiological features, including asymptomatic gastrointestinal carriage and contamination of the environment.

The risks of infection with either of these organisms are increased length of hospital stay, advanced age, severity of underlying illness and prior use of antimicrobials, particularly third generation cephalosporins. Similar control and prevention strategies have been used, including barrier type precautions to prevent horizontal transmission and controls on antibiotic prescribing. Thus surveillance to detect CDAD may forecast a VRE problem.

Key points

- It must be emphasised that these definitions are for the purposes of 'surveillance' and not designed to identify every infection. It is better to be approximately right most of the time rather than completely right occasionally. They are designed to 'flag' problem areas requiring further detailed investigation.
- The definitions are not designed for diagnostic purposes.
- Comparison of infection rates between facilities is strongly discouraged. Surveillance data should be used for the purposes of implementing appropriate interventions to improve quality of care and not for benchmarking. Should area authorities want to ascertain the scope of the problem

Definition of terms/glossary

New: A detection of *C. difficile* that occurs at least 48 hours after admission to the health care facility.

Forty eight hour rule: Consistent with the previously established AICA definition (Auricht et al., 2000) healthcare-associated events (ie those acquired during hospitalisation and not present or incubating on admission) are defined as those that occur more than 48 hours after hospital admission or within 48 hours of discharge.

across a number of facilities, they must ensure that all of the facilities in question are using the same methodology.

- All documents require review. Similarly, these definitions will be reviewed over time and revised, through consensus, following extensive use. Comments can be submitted to the AICA Secretariat via www.aica.org.au.

Surveillance indicator definitions

This surveillance indicator is designed for *C. difficile*. During the health care process, *C. difficile* can colonise patients who remain asymptomatic or cause a range of diarrhoeal symptoms from mild to the potentially fatal pseudomembranous colitis (PMC). Most patients do not progress to PMC because of increased awareness amongst health care workers. Colonised patients have a decreased risk of developing CDAD [4]; however, both colonised and symptomatic patients can contaminate the environment with *C. difficile* spores, leading to spread of infection to other patients.

Thus, for surveillance purposes, trying to decide whether a patient is colonised or has disease is irrelevant. *C. difficile* can colonise neonates and children less than 2 years of age at a high rate and with no disease. Although these children can be a source of organism for other more susceptible children, such as might be found in a haematology/oncology unit, until the role of *C. difficile* in this age group is better defined, children 2 years of age or less should be excluded from the indicator.

Core data set

Numerator dataset – *C. difficile*

• Field name	Accepted data values
• Facility	Name of facility
• Specialty unit, service or ward (place of acquisition)	As per structure of institution
• Same-day (Day only) patient	Y/N
• Medical record number	
• Specimen date	Date of first isolate or isolate associated with an infection
• New acquisition	Y/N
• Admission date, discharge date	
• Acquisition	Healthcare/community
• Laboratory name and laboratory specimen number	(Optional)

Denominator dataset – *C. difficile*

• OBD (acute care)	Monthly, quarterly or yearly OBD for whole hospital and each service or ward

As usual, for surveillance purposes there must be a clear and consistent definition. Close liaison with the microbiology laboratory is of utmost importance. Surveillance across areas using multiple laboratories must ensure that a common definition is used.

Most CDAD occurs within the health care facility; however, community-acquired CDAD has been reported [5]. Therefore, it is important that only acquisition within the health care facility is being recorded. To achieve this, only specimens collected 48 hours after admission should be surveyed.

AICA will be liaising with other professional groups to promote the adoption of common definitions.

C. difficile surveillance indicators

C. difficile *incidence*

- Count all new *C. difficile* +ve patients
- Use equation:

$$\frac{\textit{Number of new C. difficile+ve patients for the surveillance period}}{\textit{Total OBD for the surveillance period}} \times \frac{10{,}000}{1}$$

C. difficile *prevalence (optional)*

- Count all known *C. difficile* +ve patients (new or old)
- Use equation:

$$\frac{\textit{Total number of C. difficile +ve patients for the surveillance period}}{\textit{Total OBD for the surveillance period}} \times \frac{10{,}000}{1}$$

General notes

- Detection of *C. difficile* may be by culture, cytotoxin detection in tissue culture or enterotoxin using a commercial kit; however, a consistent approach is imperative.
- The first infection for an admission is to be counted. However, apparent relapses of CDAD are usually reinfections with either the same strain or a different strain of *C. difficile* [6]. Therefore infections that occur greater than 4 weeks after the first episode should be counted again.
- Infections or colonisations that occur or are detected more than 48 hours after admission are health care facility acquired.
- This determination should make use of the definitions previously determined by the National Advisory Board [7]. Allocation of a place (ward or other facility) of acquisition is difficult and subject to bias. The 48 hour rule can be used; however, the ICP may need to allocate the patient on a consistent 'best guess' basis.

Denominator

OBDs has been chosen as the denominator as it is consistent with other similar indicators and is the choice of many hospital epidemiologists. In most facilities where numbers of patients are relatively stable, for practical purposes the absolute count of *C. difficile* positive patients is as accurate as a rate determination. OBDs (acute) can also be used if the facility has a mix of long term

and acute care patients. In most cases, ward/service stratification should automatically take this into account.

Comparison of rates

Intra-health care facility (i.e. within own facility) comparison:

- It is inevitable that health care facilities will compare rates between distinct surveillance periods. The health care facility should ensure that the microbiological method for detecting *C. difficile* has remained consistent for the periods in question.

Inter-healthcare facility (between facilities) comparisons:

- These should not be undertaken unless methods of detection and definitions are identical.

Analysis of data

Monthly, quarterly or annual rates can be calculated. Alternatively, control charts can be used to display both absolute numbers and rates, stratified by ward or service depending upon the organisational structure of the facility.

References

1. Riley TV. *Clostridium difficile*: a pathogen of the nineties. Eur J Clin Microbiol Infect Dis 1998; 17:137-141.
2. Riley TV. Antibiotic-associated diarrhoea: a costly problem. PharmacoEconomics 1996; 10:1-3.
3. Riley TV, O'Neill GL, Bowman RA & Golledge CL. *Clostridium difficile*-associated diarrhoea: epidemiological data from Western Australia. Epidemiol Infect 1994; 113:13-20.
4. Johnson S & Gerding DN. *Clostridium difficile*-associated diarrhoea. Clin Infect Dis 1998; 26:1027-36.
5. Riley TV, Cooper M, Bell B & Golledge CL. Community-acquired *Clostridium difficile*-associated diarrhea. Clin Infect Dis 1995; 20(Suppl 2):S263-S265.
6. O'Neill GL, Beaman MH & Riley TV. Relapse versus reinfection with *Clostridium difficile*. Epidemiol Infect 1991; 107:627-635.
7. Auricht E, Borgert J, Bulter M, Cadwallader H, Collignon P, Eades M *et al.* Introduction to Australian surveillance definitions: surgical site and bloodstream infections. Aust Infect Cont 2000; 5:25-31.