

Ministry Update on C. difficile and Public Reporting

This document is current to June 26, 2008, and is not updated. It was prepared at a time when PIDAC reported directly to the Minister of Health and Long-Term Care and Chief Medical Officer of Health. Note that effective April 1, 2011, the responsibility for and functions of the Provincial Infectious Diseases Advisory Committee ("PIDAC") were transferred to the Ontario Agency for Health Protection and Promotion ("Agency"), and that PIDAC now reports to that Agency. You may wish to consult www.pidac.ca or the Agency's website at www.oahpp.ca for more information.

Ministry Update on *C. difficile* and Public Reporting

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Ministry of Health and Long-Term Care
June 26, 2008

Ministry Update on *C. difficile*

Public Reporting

- Sept 30, 2008: *C. difficile*
- Dec 31, 2008: MRSA; VRE; HSMR
- Apr 30, 2009: VAP; CLI; SSI;
Hand Hygiene

Ministry Update on *C. difficile*

Reporting on cases of *C. difficile*

- Aggregate number of cases - [diarrhea; positive toxin; or pseudomembrane]
- Timing – before or after 72 hours
- Total patient days for the month

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Collection and Reporting of Data

- Upload to web site
- Central check of data fields
- Posting on hospital's public web site
- Posting on Ministry's public web site

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Recognizing and Reporting an Outbreak

- Definition: (still under review)

e.g. * Higher than baseline (times “x”)

* A number per standard ward

* A cluster

- Hospital notifies Public Health Unit

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Controlling an Outbreak

- Public Health Unit and Medical Officers of Health
- Evaluation, instruction and supervision as appropriate
- PIDAC guidelines

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Some Distinctions:

- “Cases”: Mandatory public reporting of aggregate data
- “Surveillance”: Infections Control data for analysis by experts
- “Outbreak”: Public Health concern requiring key control measures

Ministry Update on *C. difficile*

Who is responsible and accountable?

- The Chair and members of the Hospital Board
- The CEO
- The health care team members

Best Practices for Management of *Clostridium difficile* in all health care settings

Mary Vearncombe, MD, FRCPC
Chair, PIDAC Subcommittee on Infection Prevention
and Control

June 26, 2008

Outline: the *C. difficile* "bundle"

1. Prompt identification and isolation of cases
2. Laboratory testing
3. Hand hygiene
4. Environmental cleaning
5. Antimicrobial stewardship (Dr. Dick Zoutman)
6. Surveillance (Sandra Callery)

Prevention is always preferable over control

- Early identification of patients, i.e. syndromic surveillance
- Empowering front-line staff to institute Contact Precautions at onset of symptoms
- Daily surveillance reporting to IP&C
- IP&C resources appropriate to the facility

Clostridium difficile

- Gram positive, anaerobic, spore-forming bacillus
- Widely distributed in environment; colonizes 3-5% adults
- Commonest cause of diarrhea in hospitalized patients
- *C. difficile* associated disease:
 - diarrhea, pseudomembranous colitis, toxic megacolon
- Incidence and severity of illness appear to be increasing
- Presence of NAP1 strain does not change IP&C Best Practices

Prompt identification and isolation

- Initiate contact precautions at onset of diarrhea
do not wait for 24 hours of loose stool
do not wait for laboratory results
- Contact precautions should be initiated by the health care professional who first identifies new onset diarrhea
single room with toilet preferred; gown and gloves for room entry
- Notify IP&C of case
- Contact precautions remain in place until *C. difficile* is ruled out, or if *C. difficile* confirmed until at least 48 hours after symptoms resolved
- Only IP&C should discontinue precautions
- If transfer is medically necessary before symptom resolution, receiving department/unit/facility must be advised and be able to comply with precautions

Laboratory testing for *C. difficile*

- Detection of cytotoxins A and B
- Stool specimen collection should be done ASAP after onset
- Quick TAT, e.g. within 24 hours, should be available and pre-arranged with the microbiology laboratory
- All positive tests should be reported to IP&C
- Single negative test should not be relied on to rule out *C. difficile*; if first test negative, a second test should be sent
- Do not test formed stools
- Do not test infants (normal flora)
- Do not do “test of cure”

Hand Hygiene

- All health care facilities should have a hand hygiene program, i.e. PIDAC Best Practices for Hand Hygiene and *Just Clean Your Hands*
- Observe meticulous hand hygiene with either alcohol-based hand rub (ABHR) or soap and water
- Soap and water is theoretically more effective in removing spores than ABHR
- When a hand washing sink is immediately available, wash hands after glove removal
- When a hand washing sink is not immediately available, clean hands with ABHR after glove removal
- Do not use patient sink for hand hygiene
- Educate and assist patients in hand hygiene

Environmental Cleaning: it's all about the spores

- Advise Environmental Services of cases
- Cleaning must be thorough and adequately resourced
- All horizontal surfaces must be cleaned with a hospital grade disinfectant twice daily; pay particular attention to “high touch” items, patient bathroom, toilet/commode/bedpan
- Audit cleaning practices

Environmental Cleaning

- If ongoing transmission of *C. difficile*, consider use of hypochlorite-based products after hospital-grade disinfectant, or other product with sporicidal claim, e.g. higher concentration accelerated hydrogen peroxide
- Discharge/transfer cleaning must be done at resolution of CDAD symptoms or when patient moved from the room; maintain Contact Precautions until cleaning complete

Education and Empowerment

- All direct care providers should receive education on *C. difficile*, including measures to control spread and their responsibility to identify and act on new onset diarrhea
- Reinforce that health care providers are not at risk with consistent use of Routine Practices and safe work practices, i.e. no eating or drinking in patient care areas

Outbreak Management

- Definition: Depends on the endemic (baseline) rate for the facility; an outbreak should be declared when there is evidence of transmission of *C. difficile* from patient to patient or when the endemic rate for *C. difficile* is exceeded or higher than peers – know your baseline
- Place all symptomatic patients on Contact Precautions
- Report outbreak to Public Health
- Review and audit IP&C and cleaning practices
- If measures not controlling spread, consider closing affected unit to admissions
- Outbreak may be declared over when no further transmission and return to baseline level for *C. difficile*

Program Evaluation

- The facility *C. difficile* IP&C program should be evaluated on a regular basis
- Make improvements based on new literature, standards, facility trends
- Periodic audits of environmental cleaning should be done by IP&C in collaboration with environmental services

Resource

Best Practices Document for the Management of *Clostridium difficile* in all health care settings, PIDAC, November 2007

[http://www.health.gov.on.ca/english/providers/
program/infectious/diseases/ic_cdif.html](http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_cdif.html)

OR www.PIDAC.ca

Best Practices for Prevention of *Clostridium difficile*: Antimicrobial Stewardship

Dick Zoutman, MD, FRCPC

Co-Chair

Provincial Infectious Diseases Advisory
Committee (PIDAC)

June 26, 2008

Antibiotic Utilization

- antimicrobials account for upwards of 30% of hospital pharmacy budgets
- up to 50% of antimicrobial use is unnecessary
- 75-100% of ICU patients on at least one antibiotic
- 40% or more of all patients in hospital on an antibiotic



Causal Association Between Antibiotic Use & Resistance

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Antibiotics and *C. difficile*



- Intestinal contents of humans loaded with a wide variety of bacteria
- This represents a complex ecological niche that is overall protective
- Taking an antibiotic disrupts the normal bowel flora and the capacity of the normal flora to resist being over taken by a pathogen such as *C. difficile*
- *C. difficile* takes advantage of the opportunity and over grows the bowel flora and begins to produce toxins

Antibiotics and *C. difficile* Infection

- Both formulary restriction and preauthorization requirements for use of clindamycin during nosocomial outbreaks of *C. difficile* have led to prompt cessation of the outbreaks
 - Quale et al CID 1996
- Patients given fluoroquinolones have 3.4 times the risk of developing CDAD than those patients not given this class of antibiotic
 - Pepin J CID 2005
- Virtually all classes of antibiotics associated with increased risk of CDAD

Less Antibiotics = Less *C. difficile*

- Antibiotic restriction reduces CDAD rates
- 60% of studies find a significant reduction of CDAD with reduced antibiotic use
 - Davey P, Cochrane Review 2005
- Reduced cephalosporin use at an Irish hospital led to a reduction in risk of CDAD by 30%
 - O'Connor K, QJM 2004
- Cefotaxime use reductions on a geriatric medical unit in UK hospital resulted in 52% decrease in CDAD
 - Wilcox JM, JAC 2004

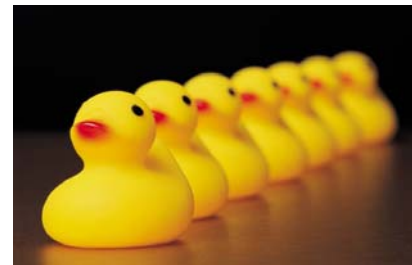
Antimicrobial Stewardship Support

- Senior Administration
- Medical Advisory Committee
- Quality and Utilization Improvement Committee
- Pharmacy & Therapeutics Committee
- Infection Control Committee



Essentials for Stewardship Success

- Senior management & medical staff buy in and support essential-corporate committment
 - Funding: view as an investment with substantial pay back
- Good infection control program so the resistant organisms don't spread
- Stewardship program to reduce selection of resistant organisms
- With out these you will be wasting your time



Antimicrobial Stewardship Team

- Infectious Diseases Specialist
- Medical Staff Representatives
 - House staff
- Medical Microbiologist
- Pharmacist
- IT Specialist
- Infection Control Professionals



Formulary Restriction



- formulary limitation of antibiotics
- or requirement of preauthorization and justification
- is also an effective (best?) method of achieving the process goal of controlling antimicrobial use
- Harder to link to better outcomes

Formulary restrictions and preauthorization

- Formulary restrictions work quickly but are a blunt instrument
 - Useful in an outbreak of *C. difficile* vs clindamycin
- Pre-authorization has less proven benefits and may “squeeze the balloon” instead of reducing its overall size

Who Gives the Recommendations Matters

- effectiveness of a preauthorization program depends on who is making the recommendations
- approval from chief resident or attending had no impact on use
- Recommendations from an antimicrobial management team
 - ID pharmacist & ID physician
- increased appropriateness, increased clinical cure, and improved economic outcome
 - DeVito et al Arch IM 1985
 - and Gross et al CID 2001



Antibiotic Order Forms

- Antimicrobial order forms can be effective part of antimicrobial stewardship and can facilitate implementation of practice guidelines, but not alone
- Particularly effective for pre-op prophylactic antibiotics in surgery
- Automatic stop order at 24 hours post-op
 - Durbin et al JAMA 1981
- Also proven to work for general antibiotic prescribing in hospitals
 - Echols et al JID 1984



Oral Step Down

- A program for parenteral to oral conversion of antimicrobials with good bioavailability, when the patient's condition allows, can decrease length of hospital stay
- and health care costs substantially
- Development of clinical criteria and guidelines allowing conversion to use of oral agents can facilitate implementation at the institutional level
- Requires ID pharmacists and well developed criteria

De-escalation Review of Antimicrobial Therapy

- Start broad, end narrow!
- Review by a pharmacist and an infectious diseases physician of 625 patients receiving combination antimicrobial therapy led to streamlining recommendations in 54% of antimicrobial courses over 7 months
- resulting in a projected annual savings of \$107,637
 - Briceland et al Arch IM 1988
- Regular review and de-escalation is very effective in hospitals and can be computerized
 - Glowacki et al CID 2003

Audit and Feedback

- house staff randomized to receive either no intervention or one-on-one education by a clinical specialist (academic detailing) on a patient-specific basis
- emphasizing microbiologic data, local resistance patterns, & literature, for either levofloxacin or ceftazidime
- resulted in a 37% reduction in the number of days of unnecessary levofloxacin or ceftazidime use
 - decreased duration of therapy and new starts
 - Solomon et al Arch Int Med 2001

Education Alone is Weak



- study compared prescribing practices for surgical prophylaxis after distribution of an educational handbook with those after the introduction of an antibiotic order form for pre-op antibiotics
- the educational handbook led to a marginal improvement in compliance (from 11% to 18%)
- whereas introduction of the order form led to significantly improved compliance (from 17% to 78%)
 - Girotti et al Can J Surg 1990
- **education is important so that the expected behaviors are clear however!**

Clinical Pathways and Community Pneumonia

- RCT clinical pathway for pneumonia in 20 hospital ER's
- 1.7-day decrease in median length of hospital stay
- 18% decrease in the rate of admissions of low-risk patients
- 1.7 fewer mean days of intravenous therapy in the intervention group
- no increase in complications, readmissions, or mortality
 - Marrie et al JAMA 2000

Multi-Tool



- education alone, without incorporation of active interventions, is only marginally effective in changing antimicrobial prescribing practices and has not demonstrated a sustained impact
- use in combination with formulary restriction, Antibiotic handbook, pre-printed antibiotic order sets, audit and feed back

Conclusions

- Although reports describing the clinical and economic impacts of multidisciplinary antimicrobial management programs are limited to single-center longitudinal studies
- they consistently demonstrate a decrease in antimicrobial use (22%–36%)
- annual savings of \$200,000–\$900,000
 - which more than pays for the program
- in both larger academic hospitals and smaller community hospitals

Summary of Tools

- Works
 - Senior medical and management support
 - Multidisciplinary team
 - Tight link to Infection Control and Pharmacy
 - Medical Microbiology Laboratory reporting procedures
 - Formulary Restriction and Authorization
 - Antibiotic Order Forms
 - Education
 - Clinical Pathways and Guidelines
 - Dose Optimization
 - Step down to oral therapy
 - Audit and feed back
 - De-escalation
 - CPOE and Decision Support Technology



- Does Not Work
 - Antibiotic Cycling
 - Antibiotic Combination
 - Education Alone
 - Single Interventions

Based on: Dillett et al
CID Jan 2007

Best Practices for Management of Clostridium difficile: Surveillance in all health care settings

Sandra Callery RN MHSc CIC,
Chair, Surveillance Subcommittee
of PIDAC

June 26, 2008

Objectives of surveillance:

To know when you have a problem..

- Outbreak Detection

A tool for improvement of patient outcomes..

- Quality assurance/Risk Management
- To benchmark
- To evaluate the effectiveness of our interventions

Plan

- Who will collect the data?
- What will be collected?
- Where will we find the data (sources)?
- How will it be calculated?

Who will Collect the Data?

- Each facility should be conducting surveillance for *C. difficile* infection.
- Those collecting the data should be managed by trained and experienced professionals skilled in data collection procedures (e.g. Infection Prevention and Control).

Case Definition

The definition of *Clostridium difficile* infection is:

a) Positive toxin assay A or B together with diarrhea.

OR

b) Visualization of pseudomembranes on sigmoidoscopy or colonoscopy, or histological/pathological diagnosis of pseudomembranous colitis.

Case Definition

Diarrhea is defined as:

- Three or more loose/watery bowel movements (conform to the shape of the container) in a 24 hour period, and
- The bowel movements are *unusual* or *different* for the patient, and
- There is no other recognized etiology for the diarrhea (for example, laxative use, inflammatory bowel disease)

Case Definition

Nosocomial:

- The infection was not present on admission (i.e. 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 the same facility within the last 4 weeks.

Non-nosocomial:

- The infection was present on admission or appears within the first 72 hours of admission and there was no admission to the same facility within the last 4 weeks.

Case Finding for *Clostridium difficile* Infection

Data Sources

- “Sentinel reports”
- Daily syndromic surveillance
- Laboratory reports to Infection Prevention & Control

Data Collection ... What to collect

For in-hospital purposes:

- Name
- Medical Record #
- Date of Admission
- Previous Admission in last 4 weeks? (Y) (N)
- Type of symptoms and Date of onset.
- Laboratory confirmation report
- Treatment given
- Date symptoms resolved

Data collection

- **Numerator** – number of new cases of *C.difficile* infection by month.
- **Denominator** – number of patient days for that month. (Exclude infant days).

Calculation of Rates

Rates are calculated by the month.

of new *C.difficile* infections \div # of patient days

Multiply the results by 1000. This represents the incidence rate of *C.difficile* infection per 1000 patient days.

(e.g. $5 \text{ cases} \div 10,000 \text{ pt. days} = 0.0005 \times 1000 = 0.5 \text{ per } 1000 \text{ patient days}$).

Interpretation of Data

- Regular reporting to IP&C Committee, Medical Advisory Committee.
- IP&C should review and analyze information to identify trends and clusters and direct interventions as required.
- Benchmarking – internal *versus* external.
- Flag the patient's electronic record? No benefit.

Repeat tests, Relapse, Recurrences

- If results are negative but symptoms persist, then consider a second test.
- Screening all patients for *C.difficile*? There is no evidence to support toxin assay testing on asymptomatic individuals.
- The duration to determine relapse is unknown. Expert opinion is that If symptoms recur within 8 weeks consider this a relapse and do not record as a new case.
- Recurrence is Common – occurs in about 30% of cases

Outbreaks

- Cases are those that occur 72 hours after admission.
- It is an increase in number of cases that are related in space and time above the baseline.
- Any cluster of cases should spark an investigation.
- In an institution that has not had *C.difficile* infections in the past, the presence of any number of new cases could be considered a possible outbreak and should be reviewed carefully.

Summary:

Prevention is always preferable over control

- Syndromic surveillance for early identification of patients with daily reporting to IP&C.
- Laboratory results to be reported immediately to IP&C.
- Respond to first onset of symptoms (Contact Precautions)
- Know your baseline and monitor CDAD incidence rate.

Resource

- Best Practices for the Management of *Clostridium difficile* in all health care settings, November 2007
- http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_cdif.html
- OR www.PIDAC.ca
- International Infection Control Council, Global Consensus Conference. Infection Prevention and Control Practice, Clostridium difficile associated diarrhea (CDAD). Proceedings and Recommendations, August 23-24, 2007. Toronto Ontario.

Ontario Provincial Infectious Diseases Advisory Committee (PIDAC)

Ontario Ministry of Health and Long-Term care

Dr David Williams
Acting Chief Medical Officer of Health



June 26, 2008

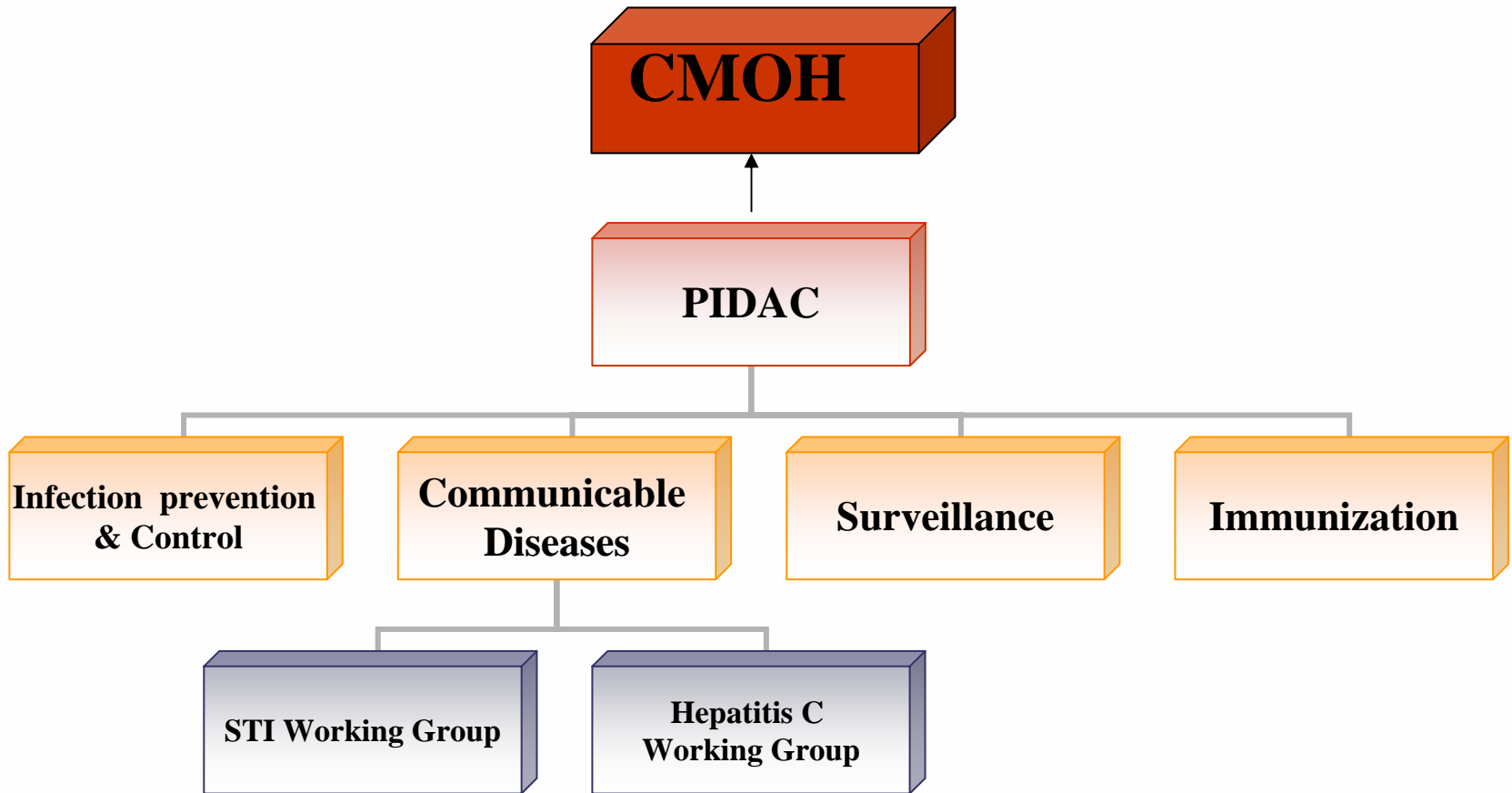
Mandate

- **In 2004, the ministry announced the establishment of the Provincial Infectious Diseases Advisory Committee, which was recommended in the Walker, Campbell and Naylor reports**
- **Comprised of 36 members appointed by the Chief Medical Officer of Health (CMOH)**
- **To advise and support the chief medical officer of health through the provision of scientific evidence on the prevention, surveillance and control measures necessary to protect the people of Ontario from infectious diseases, both ongoing and emerging**

Structure

- **PIDAC has established an inclusive and productive committee and subcommittee structure, organized into a main committee, four standing subcommittees (surveillance, communicable diseases, infection prevention and control, and immunization) and 2 working groups (Sexually transmitted infections; HEP C)**

PIDAC's Organizational Structure



To provide scientific advice and support to the CMOH

(not operational issues)

Since 2004 PIDAC has

- **been a standing expert body, with proven ability to provide sound evidence based guidance on IP&C issues**
- **published and maintains current, multiple credible Best Practice documents and fact sheets accessible on its website (www.PIDAC.ca)**
- **provided expert review and timely advice at the request of the CMOH on multiple IP&C issues**
- **hosted multiple educational sessions realizing the wide dissemination of its publications**
- **acquired and maintained members that are credible and recognized experts in their field**
- **established strong effective partnerships with the CMOH, RICN and ministry**

PIDAC publications & consultations

- ***C. difficile* web casts (2005, 2007, and June 26, 2008)**
- **Best Practices for the Management of *Clostridium difficile* (November 2007)**
- **Best Practices For Hand Hygiene In All Health Care Settings (June 10)**
- **Best Practices for Cleaning Disinfection and Sterilization (2006)**
- **Best Practices on Methicillin-Resistant Staphylococcus aureus (MRSA) and Vancomycin-Resistant Enterococci (VRE) (December 2006)**
- **Fact sheets for Hand Hygiene, Routine Practices and Flash Sterilization**
- **Flash sterilization web cast (December 2007)**

PIDAC publications & consultations cont'd

- **Sponsored the two-day International Infection Control Council's Consensus Conference on *Clostridium difficile* Associated Disease (CDAD), sponsored an Ontario-focused workshop on how to best manage CDAD in Ontario**
- **Participated in national "Community-acquired MRSA" two-day meeting to initiate the development of consensus guidelines, collaborated with partners to support publishing of national CAMRSA guidelines**
- **Participated in joint PHAC/ MOHLTC "Hand Hygiene Meeting" with collaborating global experts**
- **Hosted facility design workshop to raise awareness of IPC issues in health care settings**

PIDAC continues

- **To develop and provide sound evidence based guidance on IP&C issues with our featured presentation today....**