Vol. 24 No. 2 Summer 2009

The Canadian Journal of INFECTION CONTROL

Revue canadienne de PRÉVENTION DES INFECTIONS

The official journal of the Community and Hospital Infection Control Association – Canada • Association pour la prévention des infections à l'hôpital et dans la communauté – Canada

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* *Surface Disinfectants and Label Claims: Realistically can contact times be met to achieve antimicrobial efficacy? Canadian Journal of Infection Control, Spring 2008, Vol. 23, No. 1, Page49*

* *CDC – Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008; Contact Time for Surface Disinfectants (page 31)*

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1. Bleasdale SC, et. al., Skin Cleansing with 2% Chlorhexidine Gluconate (CHG): Infection Control and Clinical Benefits of Source Control. Presented at the 2006 Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC), Sep 2006, San Francisco, CA.

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FEATURES

2009 NATIONAL EDUCATION CONFERENCE

REVIEW

DEPARTMENTS

VISION

CHICA-Canada will lead in the promotion of excellence in the practice of infection prevention and control.

MISSION

CHICA-Canada is a national, multidisciplinary, voluntary association of professionals. CHICA-Canada is committed to improving the health of Canadians by promoting excellence in the practice of infection prevention and control by employing evidence-based practice and application of epidemiological principles. This is accomplished through education, communication, standards, research and consumer awareness.

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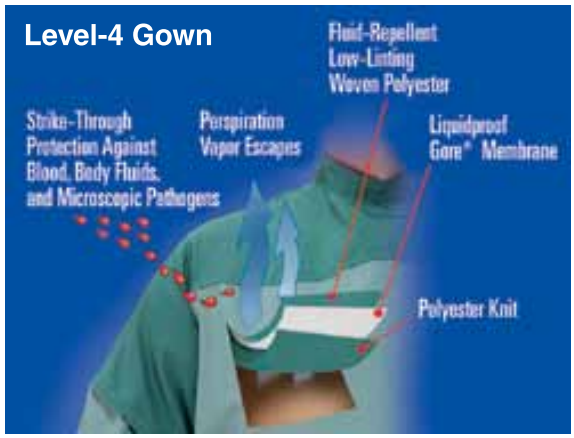

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in view of the Shifting Horizons

Pat Piaskowski, RN, HBScN, CIC
Clinical Editor, *Canadian Journal of Infection Control*

Congratulations to the National Scientific Program Committee and conference organizers for another excellent conference in St. John's. Although the weather blustered and blew on some days, the conference activities kept us warm inside the safe confines of the meeting rooms, exhibit halls and conference venue. Many participants also took advantage of the tremendous opportunities to enjoy the spectacular scenery and the warm hospitality of the Newfoundland people.

Even with the "shifting horizons" as we stood at the brink of a global pandemic of the novel H1N1 virus, Infection Control Professionals (ICPs) and our key corporate and professional partners from across Canada and elsewhere rose to the occasion and came together to learn, collaborate and connect. Someone once said that there is strength in numbers and we certainly saw that in play with the number of attendees at this year's conference.

> The CHICA conference provides those in attendance with a key opportunity to maintain and build on 'our solid foundations'."

For those who have weathered other "shifting horizons" such as ARO outbreaks, *C.difficile* outbreaks or the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak one knows how quickly ICPs can become absorbed into and mired in the activities in their agency or facility. With all this activity it is often difficult or nearly impossible for the ICP to get out and connect with their peers to learn and seek support. The CHICA conference provides those in attendance with a key opportunity to maintain and build on "our solid foundations".

As we face a fall and winter with H1N1, and other potential and emerging IPAC issues, we will need to continue to build on our solid foundations.

In the words of Yogi Berra, "The future ain't what it used to be."

Editor's note:
In the article "Rapid control of a methicilln-resistant *Staphylococcus Aureus* (MRSA) outbreak in a medical surgical intensive care unit (ICU)" in the Spring 2009 issue, Figure 2 was printed as a replication of Figure 1. Figure 2 should have been "Colonization Pressure in MSICU." We apologize for the error.

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Thank you, **volunteers**

Cathy Munford, RN, CIC
President, CHICA-Canada

The national education conference for 2009 was held in St. John's, Newfoundland-Labrador.

This year's conference theme "Solid Foundations ... Shifting Horizons" reflected the constant change that those within infection prevention and control face, looking at new technologies, new organisms and treatments, as well as environmental challenges. The theme also reflected the solid core that we maintain in our profession to prepare us to face healthcare changes.

I would like to thank the Conference Chairs: Joanne Laalo, Donna Moralejo and Jim Gauthier; the Scientific Program Committee: Dianne Roscoe, Molly Blake, Merlee Steele-Rodway, Lee Hanna, Marion Yetman, and Penny Ralph; and CHICA Newfoundland Labrador for putting together an exciting and informative week. No conference would be complete without the great work and guidance of our executive director and conference planner, Gerry Hansen, and the invaluable assistance of Kelli Wagner.

Our conference was well attended with 450 delegates from all over the world including Canada, USA, the UK, Kuwait, the Netherlands, and the UAE. Our industry partners and other exhibitors were well represented with exhibit areas filling quickly. The Industry Showcase offered new and exciting product and service information for attendees. Education sessions covered the areas of routine practices, additional precautions, and practices in microbiology, generational issues, and global initiatives.

The Board and Chapter Presidents spent two days at the beginning of the conference in a strategic planning process to identify the direction CHICA-Canada will take in the next five years. We very much appreciated the facilitation skills of Dr. David Sheridan. The 2010-2015 Strategic Plan, as identified by the working group and ratified by members, is published on page 127.

Other activities that the board has been working on include:

- Revised bylaws (see more information in the Executive Director message, page 102)
- Canadian Nursing Association – negotiating recognition of CIC exam
- Canadian Foundation for Infectious Diseases – collaborating on National Infectious Disease Day and efforts to influence government on initiatives re IP&C and ID
- Canadian Patient Safety Institute – collaborating on Standardized Definitions and Patient Safety Initiatives
- Accreditation Canada – continued collaboration re IP&C guidelines
- Canadian Council on Antibiotic Resistance – participation in Pan-Canadian AMR Consultations
- Public Health Agency – representation on Canadian National Infection Surveillance Program (CNISP)
- Safer Healthcare Now! – Co-Chaired IP&C Education Stream at Canada's Forum on Patient Safety and Quality Improvement
- AMMI – consulted on IP&C component of international congress on Chemotherapy and Infections (June 2009)

I would like to thank all those who volunteered their time and efforts with all the above initiatives as well as all who worked long and hard to make a successful conference. Without the tireless work of our volunteers, CHICA-Canada would not be able to give back to our members in the way that we do, so thank-you.

Merci à nos **bénévoles**

Cathy Munford, RN, CIC
Président, CHICA-Canada

Le congrès national de formation de 2009 a eu lieu à St. John's, Terre-Neuve-et-Labrador. Le thème retenu cette année était *Solid Foundations… Shifting Horizons*. L'idée de s'appuyer sur des bases solides tout en sachant s'adapter reflète bien les changements constants auxquels les professionnels du milieu de la prévention et du contrôle des infections font face. Il a été question de nouvelles technologies, de nouveaux organismes et traitements, ainsi que des difficultés que pose l'environnement. Le thème reflétait également le noyau fort que nous préservons au sein de notre profession pour nous préparer aux changements concernant les soins de santé.

J'aimerais remercier les coprésidents du congrès : Joanne Laalo, Donna Moralejo et Jim Gauthier; le comité du programme scientifique : Dianne Roscoe, Molly Blake, Merlee Steele-Rodway, Lee Hanna, Marion Yetman et Penny Ralph; de même que la section régionale CHICA Newfoundland Labrador pour avoir organisé une semaine à la fois captivante et instructive. Aucun congrès ne serait tout à fait au point sans le travail et les conseils formidables de notre directrice générale et planificatrice du congrès, Gerry Hansen, et l'aide indispensable de Kelli Wagner.

Notre congrès a été un succès; y ont assisté 450 délégués venus d'un peu partout dans le monde, y compris le Canada, les États-Unis, le Royaume-Uni, le Koweït, les Pays-Bas et les Émirats arabes unis. Nos partenaires de l'industrie et d'autres exposants ont été bien représentés et les stands se sont envolés rapidement. Au salon des exposants de l'industrie, les délégués ont pu trouver de l'information sur de nouveaux produits et services très intéressants. Les séances de formation ont porté sur des sujets comme les procédés de routine, les précautions supplémentaires et les pratiques en microbiologie, les problèmes générationnels de même que les initiatives déployées à l'échelle mondiale.

Au début du congrès, le conseil d'administration et les présidents des sections régionales ont consacré deux journées au processus de planification stratégique afin de déterminer l'orientation que prendra CHICA-Canada au cours des cinq prochaines années. Nous avons beaucoup apprécié les talents d'animateur de réunion du Dr David Sheridan. Le plan stratégique 2010-2015, tel qu'il a été élaboré par le groupe de travail et ratifié par les membres, est reproduit à la page 127.

Parmi les autres activités menées par le conseil, mentionnons :

- Révision du Règlement intérieur (pour plus d'information, voir le message de la directrice générale, page 102)
- Association des infirmières et infirmiers du Canada – négociation de la reconnaissance de l'examen CIC
- Fondation canadienne des maladies infectieuses – collaboration à la Journée nationale des maladies infectieuses et représentations auprès du gouvernement concernant des initiatives relatives à la prévention et au contrôle des infections et aux maladies infectieuses
- Institut canadien pour la sécurité des patients – collaboration à la préparation de définitions normalisées et d'initiatives relatives à la sécurité des patients
- Accréditation Canada – collaboration continue dans le dossier des lignes directrices en matière de prévention et de contrôle des infections
- Comité canadien sur la résistance aux antibiotiques – participation aux consultations pancanadiennes concernant la résistance aux antibiotiques
- Agence de la santé publique du Canada – représentation au sujet du Programme canadien de surveillance des infections nosocomiales (PCSIN)
- Des soins de santé plus sécuritaires maintenant! – Coprésidence du volet formation en prévention et contrôle des infections au Forum canadien sur la sécurité des patients et l'amélioration de la qualité
- AMMI (Association pour la microbiologie médicale et l'infectiologie Canada) – consultation pour le volet prévention et contrôle des infections du congrès international sur la chimiothérapie et les infections (juin 2009)

J'aimerais remercier tous ceux qui ont consacré temps et énergie à l'une ou l'autre des initiatives ci-dessus et à tous ceux qui ont travaillé fort pour faire du congrès une réussite. Sans ces bénévoles infatigables, CHICA-Canada ne serait pas en mesure d'en offrir autant à ses membres. Alors, encore une fois merci.

CHICA-Canada **bylaw revisions**

Gerry Hansen, BA
Executive Director, CHICA-Canada

Since its incorporation in 1976, CHICA-Canada has grown its membership, adapted to change and provided strategic direction and excellent education for its members and the public. One thing that hasn't changed significantly is its bylaws. The current bylaws and governance structure were established for an organization vastly different from the one it has become. As a result, a rigorous review process was implemented which identified changes necessary for the CHICA-Canada of today and tomorrow. These changes will strengthen the organization by developing a skilled leadership group with broad representation and experience. In addition, Corporations Canada has implemented revisions to the corporate bylaw protocol and these have been included in the current revisions.

The revisions of Bylaw Number 5 are the culmination of careful and thorough review by the CHICA-Canada Board of Directors and the Executive Director, with guidance from legal counsel and input from membership. It is important to note that these revisions are the legal governance of the organization. The CHICA-Canada Policy Manual provides the guiding rules of the organization. The new CHICA-Canada Strategic Plan, which was also adopted in St. John's, may impact on the policies but it is not likely that the legal governance will change.

At the Annual General Meeting held in St. John's on May 14, members ratified revisions to the bylaws. The major changes to bylaws are:

Board of Directors

- Reduces governance from 10 to nine directors
- Allows the appointment of additional ex-officio directors without prescribing the person or responsibility
- Limits terms of directors to no more than six (6) consecutive years
- Allows re-election or appointment to the board if a former board member has not been on the board for 10 months
- Allows a director to serve as an officer with compensation
- Changes age of majority to 18 from 21 years

Elections

- Defines the rules for voting by mail or by electronic means

Membership

- Decategorizes definitions of membership All individual members are considered to be active, voting members, including business members and honorary members, with the exception of student members and silver/retired members who are non-voting members
- Removes the category of "Patron Member" replacing it with "Industry Member"
- Changes age of majority to 18 years from 21 years

Chapters

- The name of any chapter must be in the form of CHICA-x, with x being the name of the chapter's geographical region.

Meetings

- Prescribes that 5% of the registry of members must be in attendance at an Annual General Meeting or other meeting of members in order to reach a quorum
- Allows for meetings to be held by video conference or other electronic means

Following approval of the revised bylaws by Corporations Canada, the bylaws will be translated to French. An announcement of the publication of the new bylaws will be made at that time.

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(1) *Zoutman, DE, Ford DB, Bryce E et al; The state of infection surveillance and control in Canadian Acute Care Hospitals; Am J Infect Control, 2003; 31:266-73.*
(2) *The Reduction of Vascular Surgical Site Infections with the Use of Antimicrobial Gauze Dressing; Robert G.Penn, MD. Sandra K Vyhlidal, RN, MSN, CIC, Sylvia Roberts, RN, Susan Miller, RN, BSN, CIC. Dept. of Epidemiology, Nebraska Methodist Hospital, Omaha, NE, USA.Observation of Nosocomial Surgical-Site Infection rates with Utilization of Antimicrobial Gauze Dressing in an Acute Care Setting: Mary Jo Beneke, RN BS, CWOCN: Josephine Doner, RN BSN MA CIC. Yuma Regional Medical Center, Yuma AZ.* **(3)** *Observation of Nosocomial Surgical-Site Infection Rates with Utilization of Antimicrobial Gauze Dressing in an Acute Care Setting Mary Jo Beneke, RN, BS, CWOCN; Josephine Doner, RN, BSN, MA, CIC Yuma Regional Medical Center, Yuma, AZ*

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Evaluation of knowledge and practice amongst nursing staff toward infection control measures in a tertiary care hospital in India

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ABSTRACT

Purpose: A study to assess the level of knowledge and practice of 100 staff nurses on infection control measures was carried out in a tertiary care center.

Method: A structured questionnaire was used to collect the data.

Results: The mean knowledge of staff nurses regarding infection control measures was 75.5% and the mean reported infection control practice was 57.5%. After conducting exhaustive lectures on infection control related topics, a significant decline in the hospital-acquired infection (HAIs) rates was seen in the high-risk areas.

Conclusion: Training of nursing staff is needed to improve knowledge and practice in infection control.

Keywords: Hospital-acquired infections, knowledge, practice

INTRODUCTION

Hospital acquired infections (HAIs) such as surgical site infections (SSI) are a major concern in the postoperative ward. GB Pant hospital is a tertiary care center which most frequently performs reconstructive operations, open-heart surgeries, cardiopulmonary bypasses, neurosurgery and gastrointestinal surgery. During their postoperative stay in the hospital, patients are prone to a variety of nosocomial infections. The World Health Organization (WHO) has described HAIs or nosocomial infections as one of the major infectious diseases having a huge economic impact (1). Hence, infection control is critical to the effective provision and management of healthcare services.

Nurses are in direct contact with the patients around the clock. They perform various nursing procedures and assist physicians and surgeons in various procedures. Nurses play an important role in preventing and controlling HAIs.

Therefore, there is a need for a high degree of awareness, knowledge and skill in nursing practice to prevent HAIs. Several studies to assess knowledge and practice in hospital infection control have been published (2-5).

The postoperative HAI rates at our hospital ranged from 7-8% for the past five years. In December 2007, there was an increase in the infection rate from 7.5% to 11.2% in January and 11.6% in February 2008. This sudden increase in the HAI rate was worrisome and led to an investigation of potential contributing factors.

This study was undertaken to investigate nurses' knowledge and practice of infection control measures in the postoperative wards and intensive care units (ICUs) with a view to identify the areas of knowledge and practice deficit and to strengthen those areas by establishing appropriate measures.

METHODS

A study was conducted from February to April 2008 at GB Pant Hospital, New Delhi, India. Subjects for the study were registered staff nurses working in postoperative surgical wards such as cardiovascular, neurosurgery, gastrosurgery, and ICUs. The subjects were selected by random sampling. One hundred nursing staff employed in postoperative wards and ICUs of the hospital were included in the study. A questionnaire comprised of three sections, with 37 questions in total, pertaining to personal data (five questions), knowledge of infection control (20 questions) (Table 3) and practice of infection control measures (12 questions) (Table 4), was developed and administered to the nurses. Our study questionnaire was based on the questionnaire used by Aarti Vij, Swapna. N. Williamson, Shakti Gupta in

their study (2). Our questionnaire was pilot tested with 10 staff nurses and analyzed to validate the degree to which questions were properly understood or misunderstood. The questions were modified for easy comprehension.

The questions to assess knowledge required yes or no answers. Questions to assess practice required descriptive answers. For the knowledge statements, a score of zero was given for incorrect answers and a score of one was given for correct answers. A knowledge score was calculated for each subject out of a potential total score of 20. For the practice assessment, a score of one was given for a correct practice and zero for an incorrect practice. A practice score was calculated for each subject out of a potential total score of 12.

After the results of the questionnaires were evaluated, lectures were conducted on all aspects of prevention and control of HAIs. Correct infection control principles and practices were discussed exhaustively at these lectures. The potential impact of this lecture program was evaluated by calculating postoperative HAI rate for the months of March and April 2008. Data entry and statistical analysis were performed using the Statistical Package for Social Science (SPSS) program.

RESULTS

Out of 100 staff included in this study, 76% were staff nurses and 24% were nursing sisters. Ninety-two per cent of nursing staff were diploma holders and 8% were graduates. None of the nurses were post-graduate. The majority (52%) of the nurses had 11 years or more of experience; 32 % had work experience of 0-5 years; and 16% had experience of 6-10 years. Only 8% had previously undergone infection control training such as inservice education, short-term courses, or a training program.

Based on the mean score distribution data, the graduate nurses were found to possess more knowledge and higher levels of practice than diploma nurses (Table 1).

Table 1: Mean score distribution of knowledge and practice of staff nurses in relation to professional qualification

Professional qualification	Knowledge		Practice	
	Range	Mean	Range	Mean
Diploma	3-19	15.10	3-12	6.93
Graduation	13-17	16.00	5-9	7.75

Table 2: Knowledge and practice of staff nurses in relation to years of experience

Years of experience	Mean score (Knowledge)	Mean score (Practice)
0-5 years	15.06	7.12
6-10 years	14.87	6.62
Above 11 years	15.42	6.88

Nursing staff with more than 11 years of experience showed a lesser level of practice of prevention and control of HAI compared to the freshly recruited nurses. However, the nursing staff having more than 11 years of experience showed better knowledge with regards to infection control measures as compared to the less experienced staff (Table 2).

Staff nurses correctly answered an average of 75.5% on questions pertaining to knowledge of infection control measures (Table 3). In the assessment of practice, staff nurses correctly answered an average of 57.5% of questions (Table 4).

Individual scores of the nurses related to knowledge, ranged from 3 to 19 with a majority of nurses (78) scoring between 13-17. Individual scores of the nurses related to practice, ranged from 3 to 12 with the majority of nurses scoring between 5 and 10. Pearson's coefficient of correlation between knowledge and practice level of staff nurses was 0.11361 (Table 5).

The HAI rate for the month of March was 8.1% and for April was 6.5%. This clearly showed a reduction in the infection rate in the postoperative wards.

DISCUSSION

Hawker (1999) conducted a survey of the implementation of health service guidelines on arrangements for infection control in health trusts. They reported that frequent education on infection control programs can lead to a reduction in HAIs which can cause considerable morbidity, mortality and cost (6).

As shown from the results of the knowledge questionnaire, there was a significant deficiency of knowledge regarding standard precautions and sterilization techniques. There was also lack of knowledge that sterile technique is not required for nasogastric feeding. Only 8% of nursing staff in the study had undergone infection control training such as in service education, short-term courses, and training programs. There is a need for continuing in-service education on HAIs for the health professionals who are responsible for direct patient care.

From the practice survey, nurses reported better compliance with standard precautions, particularly with regard to wearing gloves, changing gloves between patients and wearing gloves when there is potential for exposure to blood, however, nurses also reported poor compliance with sterilization and

disinfection practices. This is alarming as their misconceptions in this regard could adversely affect the sterilization of the critical devices/instruments used in critical care units and render these infection control procedures ineffective. Adherence to this correct protocol improves the sterilization and disinfection practices in healthcare facilities thereby reducing HAI rates (7).

Analysis of the data suggests that the graduate nurses are better equipped with knowledge and practice with regards to prevention and control of HAI than diploma nurses. This shows that personnel are more likely to comply with an infection control program if they understand its rationale.

We also found that nursing staff having more than 11 years' experience showed a lower level of practice of prevention and control of HAI as compared to the less experienced nursing staff. This study did not illustrate the reasons for this apparent decline in practice.

Table 3: Frequency and percentage of item pertaining to knowledge of nursing staff on infection control measures (N= 100)

Sl. No.	Knowledge of items	Correct response	Frequency of correct response	Percentage of correct responses (%)
1.	Hospital acquired infections are the result of self infection, cross infection & environmental infection	Yes	88	88
2.	The single most important measure for preventing HAI is hand washing	Yes	84	84
3.	The common causative organism of UTI is Escherichia coli	Yes	100	100
4.	HAIs are transmitted through body fluids, staff hands and reusable equipment	Yes	94	94
5.	Immunization is not a universal precaution	Yes	38	38
6.	Hemoglobin less than 11 gm % is not a sign of infection	Yes	78	78
7.	Patients receiving immunosuppressive therapy are more susceptible to HAI	Yes	76	76
8.	In case of UTI, bacterial count of 105 CFU/ml of Urine c/s is significant	Yes	14	14
9.	Sterilization is a process of killing of microorganism including spores	Yes	84	84
10.	Gluteraldehyde used for equipment is to be changed every 28 days	Yes	20	20
11.	HIV is transmissible via blood?	Yes	92	92
12.	Sterile technique is necessary for naso gastric feeding	No	48	48
13.	The most important factor involved in hand washing is friction	Yes	92	92
14.	HAI is synonymous to nosocomial infection	Yes	74	74
15.	Moisture enhances the trans-mission of micro-organisms	Yes	90	90
16.	Boiling is a method of sterilization	Yes	94	94
17.	Chemical disinfection is the best method of sterilizing surgical instruments	No	82	82
18.	If a person doesn't show sign and symptoms of disease, he can't transfer a disease	No	88	88
19.	Alcohol is an effective disinfectant when rubbed on skin	Yes	88	88
20.	UTI's are one of the most common forms of HAI	Yes	86	86
Mean correct response				75.5

CONCLUSION

Staff education should be a central focus of an infection control program. Also, disciplinary measures for poor compliance may be necessary to improve infection control in hospitals. The study has limitations that we could not determine whether reported practices reflected actual practices.

There is a positive relationship between knowledge and practice, as shown in Table 5. Similar results have been shown by other authors (1). With improved knowledge, we can also improve the practice of the nursing staff and other healthcare workers. Orientation sessions on infection control at the time of hire, in service education, refresher courses, and training programs on infection control measures should be systematically planned, regularly conducted and evaluated for staff nurses to keep them updated.

In view of the results several recommendations are made.

- Infection control departments should review their current infection control policies and procedures and should establish specific thresholds for compliance with these measures.
- Nurses must be educated in the basic principles of infection control to be able to apply them to various hospital policies and procedures.
- Orientation sessions should be planned for staff at the time of hire and in-service training in six monthly intervals.
- Regular training programs should be carried out by infection control at periodic intervals for staff from all disciplines.
- Re-evaluation should be done at regular intervals using questionnaires to see the impact of the program.
- It is also recommended that a program of remedial action be introduced based on the results of a regular evaluation program.
- Teaching may be formal or informal and supplemented by policies and guidelines.
- Seminars should be credited to their professional profiles.

Continuous surveillance of HAIs in vulnerable high-risk areas is essential. Formulation of regulations should be effectively performed to take appropriate measures. It is hoped that this information will be of help to the health sector administrators and the infection control departments to design strategies to improve the knowledge and practice of health care workers (HCW) to ensure adequate infection control practices.

Table 4: Percentage of response to questions pertaining to practice on infection control measures (N=100)

Sl. No.	Practice	Frequency of correct response	Percentage of correct responses (%)
1.	Name the disinfectants mainly used to clean surfaces	14	14
2.	Name the disinfectants mainly used to sterilize instruments	66	66
3.	Name the hand disinfectant used	54	54
4.	Do you wash hands before handling patients?	76	76
5.	Do you wear gloves?	92	92
6.	Do you change gloves between patients?	84	84
7.	Do you wear gloves when there is potential for exposure to blood?	94	94
8.	Name the disinfectant used for thermometer	78	78
9.	Name the disinfectant used for bowls/ kidney tray	24	24
10.	Name the disinfectant used for cheatle forceps	68	68
11.	Name the sterilization method used for suction bottle	20	20
12.	Name the disinfectant used for suction tubing	20	20
Mean correct response			75.5

Table 5: Pearson's coefficient of correlation between knowledge and practice level of staff nurses

Variable	Observation	Mean	Std. Deviation
Knowledge (X)	100	15.22	2.85
Practice (Y)	100	6.92	1.90

Pearson's coefficient of correlation: 0.11361

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A comparison of infection control program resources, activities, and antibiotic resistant organism rates in Canadian acute care hospitals in 1999 and 2005: Pre- and post-Severe Acute Respiratory Syndrome

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ABSTRACT

Introduction: The Resources for Infection Control in Hospitals (RICH) project assessed infection control programs and rates of antibiotic-resistant organisms (AROs) in Canadian acute care hospitals in 1999. In the meantime, the Severe Acute Respiratory Syndrome (SARS) outbreak and the concern over pandemic influenza have stimulated considerable government and healthcare institutional efforts to improve infection control systems in Canada.

Methods: In 2006, a version of the RICH survey similar to the original RICH instrument was mailed to infection control programs in all Canadian acute care hospitals with 80 or more beds. Chi-square, ANOVA, and analysis of covariance analyses tested for differences between the 1999 and 2005 samples for infection control program components and ARO rates.

Results: 72.3% of Canadian acute care hospitals completed the RICH survey for 1999 and 60.1% for 2005. Hospital size was controlled for in analyses involving AROs and surveillance and control intensity levels. Methicillin-resistant *Staphylococcus aureus* (MRSA) rates increased from 1999 to 2005 ($F = 9.4$, $P = 0.003$). In 2005, the MRSA rate was 5.2 (SD 6.1) per 1,000 admissions and in 1999 was 2.0 (SD 2.9). *Clostridium difficile*-associated diarrhea (CDAD) rates, trended up from 1999 to 2005 ($F = 2.9$, $P = 0.09$). In 2005, the mean CDAD rate was 4.7 (SD 4.3) and in 1999 it was 3.8 (SD 4.3). The proportion of hospitals that reported having new nosocomial Vancomycin-resistant Enterococcus (VRE) cases was greater in 2005 than in 1999 ($X = 10.5$, $P = 0.001$). In 1999, 34.5% (40 of 116) hospitals reported having new nosocomial VRE cases and in 2005, 61.0% (64 of 105) reported new cases. Surveillance intensity index scores increased from 61.7 (SD 18.5) in 1999 to 68.1 (SD 15.4) in 2005 ($F = 4.1$, $P = 0.04$). Control intensity index scores, trended upwards slightly from 60.8 (SD 14.6) in 1999 to 64.1 (12.2) in 2005 ($F = 3.2$, $P = 0.07$). ICP full time equivalents (FTEs) per 100 beds increased from 0.5 (SD 0.2) in 1999 to 0.8 (SD 0.3) in 2005 ($F = 90.8$, $P < 0.0001$). However, the proportion of ICPs in hospitals certified by the Certification Board of Infection Control (CBIC) decreased from 53% (SD 46) in 1999 to 38% (SD 36) in 2005 ($F = 8.7$, $P = 0.004$).

Conclusions: Canadian infection control programs in 2005 continued to fall short of expert recommendations for human resources and surveillance and control activities. Meanwhile, Nosocomial MRSA rates more than doubled between 1999 and 2005 and hospitals reporting new nosocomial VRE cases increased 77% over the same period. While investments have been made towards infection control programs in Canadian acute hospitals, the rapid rise in ICP positions has not yet translated into marked improvements in surveillance and control activities. In the face of substantial increases in ARO rates in Canada, continued efforts to train ICPs and support hospital infection control programs are necessary.

INTRODUCTION

The Resources for Infection Control in Hospitals (RICH) project surveyed the state of infection control programs in Canadian acute care hospitals in 1999 (1,2). This Canada-wide survey identified widespread deficits in infection control program resources, surveillance and control activities (1) and provided national rates of methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile*-associated diarrhea (CDAD), and vancomycin-resistant Enterococcus (VRE) (2). Since 1999, the outbreak of Severe Acute Respiratory Syndrome (SARS), worldwide increasing rates of antibiotic-resistant organisms (AROs), and the specter of pandemic influenza continue to underscore the critical need for effective infection control programs (3-5). We examined the extent to which infection control program resources and activities improved from 1999 to 2005 in Canadian acute care hospitals and whether ARO rates have changed during the same time frame.

METHODS

In March of 2006, all acute care hospitals in Canada with 80 or more beds were mailed a bilingual cover letter and the 2005 version of the RICH survey regarding the state of infection control in their facility. A list of 233 eligible hospitals was compiled from the 2005 Canadian Health Facilities Directory. The staff member most responsible for the infection control program was asked to complete the survey. If an infection control program was responsible for multiple hospitals within a larger health organization, aggregated data were accepted if data for individual hospitals were not available. Advertisements in the *Canadian Journal of Infection Control* and on the CHICA-Canada Website (www.chica.org), memos to CHICA-Canada chapter presidents were used to optimize response and non-responders were sent a second survey.

The 2005 version of the RICH survey incorporated the original RICH instrument (1), allowing for the calculation of surveillance and control index scores and the assessment of infection control program resources (Table 1). The survey items that assessed program resources and comprised the surveillance and control indices were identical in the 1999 and 2005 versions of the survey. The 23 items in the surveillance index assessed the collection and dissemination of infection data and the 44 items in the control index measured the activities and policies directed towards the reduction of infections in hospitals. Scores of 100 on the surveillance and control indices indicated that all effective activities were being conducted. Respondents were asked to provide the number of any and all (colonized and infected) new nosocomial cases of MRSA, VRE, and CDAD for 2005 in their hospital. The identical method was used to assess MRSA, VRE, and CDAD rates in Canadian acute care hospitals in 1999 (2).

STATISTICAL ANALYSIS

Data were analyzed with use of StatView Version 5.0 (SAS Institute, Cary NC). ANOVA analysis was used to test for differences between the 1999 and 2005 samples for hospital size. Chi-square analysis was used to test for differences between the 1999 and 2005 samples for hospital teaching status and regional representation. If differences in composition between the 1999 and 2005 samples were found for hospital size, hospital teaching status, or regional representation, regression analyses were used to test their association with dependent variables.

ANOVA or analysis of covariance (ANCOVA), depending on the regression analysis, were used to test for differences between the 1999 and 2005 samples for MRSA and CDAD rates, surveillance and control index scores, physician and doctoral level professionals and secretarial service hours, and infection control professional (ICP) hours, ICP experience in infection control, and ICP infection control certification levels. Multiple t-tests with the Bonferroni correction were used to examine for regional differences between 1999 and 2005 for MRSA and CDAD rates, surveillance and control index scores, and ICP staffing levels (6). The conservative Bonferroni correction decreases the incidence of false positives when conducting multiple comparisons by decreasing alpha levels as the number of comparisons rises.

The VRE dependent variable was dichotomized as hospitals with and without new nosocomial VRE cases, because in 1999 two-thirds of hospitals in the RICH sample did not have any new nosocomial VRE cases. Logistic regression analysis was used to test for differences between the 1999 and 2005 samples for the presence VRE, hospitals with secretarial support, hospitals with physician and doctoral level professionals providing service, hospitals with physician and doctoral professionals with formal infection control training, and computer resources. Chi-square analysis with Bonferroni correction was used to test for regional differences between 1999 and 2005 for the presence of new nosocomial VRE cases.

RESULTS

The response rate for the 2005 survey was 60.1%; 113 surveys were received, representing 140 of 233 eligible facilities. Eighteen surveys were received from larger organizations that represented up to four eligible hospitals. One survey was returned without identifying the respondent or the hospital, and two were not included because of incomplete information. The response rate for the 1999 survey was 72.3% (1).

Sample characteristics

The size of the respondent hospitals increased in the six years between surveys ($F = 4.5$, $P = 0.03$). Mean hospital size in 1999 was 292.4 (SD 237.6) beds with a median of 230.0. Mean hospital size in 2005 was 363.1 (SD 292.9) beds with a median of 289.0. An examination of the proportion of hospitals in the 1999 and 2005 samples for three size categories, hospitals with less than 200 beds, hospitals with 200-399 beds, and hospitals with 400 plus beds, indicated a trend for hospital size category differences between the samples ($X = 5.7$, $P = 0.06$). The post hoc cell contributions showed hospitals with less than 200 beds comprised a greater proportion of the 1999 sample than the 2005 sample ($Z = 2.3$, $P = 0.01$).

The proportion of teaching hospitals participating in the survey did not differ between 1999 and 2005 (X = 0.5, P = 0.5). In 1999, 23.4% (34 of 145) of the sample was comprised of teaching hospitals and in 2005, 27.3% (30 of 110) of the sample was teaching hospitals.

Hospitals were grouped into four geographic regions: the West region consisted of hospitals in British Columbia, Alberta, Saskatchewan, and Manitoba, the provinces of Ontario and Quebec were each separate regions, and the Atlantic region consisted of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Regional representation did not differ between the 1999 and 2005 samples (X = 2.6, P = 0.5).

Association of hospital size with dependent variables

Larger hospitals were associated with higher MRSA rates (r = 0.19, P = 0.005), higher CDAD rates (r = 0.22, P = 0.003), and with more new nosocomial VRE cases (X = 31.5, P < 0.0001). Higher surveillance index scores (r = 0.23, P = 0.0002) and higher control index scores (r = 0.34, P < 0.0001) were associated with the number of hospital beds. Hospitals size was not associated with ICP FTEs per 100 beds (r = -0.01, P = 0.9) nor with the proportion of ICPs CBIC certified (r = 0.04, P = 0.5) nor with years of infection control experience of ICPs (r = 0.08, P = 0.2). The percentage of infection control programs with physician and or doctoral level professionals providing service was positively associated with hospital size (X = 18.6, P < 0.0001) as was whether physician and or doctoral level professionals had infection control training or expertise (X = 3.7, P = 0.05). Physician and doctoral level professionals hours per 250 beds were not associated with hospital size (r = -0.11, P = 0.2). Hospital size was associated with having secretarial support (X = 20.6, P < 0.0001) nor with the number of secretarial hours (r = -0.03, P = 0.7). Whether infection control programs used computers to generate infection reports was correlated with hospital size (X = 16.2, P < 0.0001) and hospital size was not associated with whether statistical or specialized infection control software was used (X = 2.1, P = 0.1).

Table 1. Items included in the resources for infection control in hospitals (RICH) survey questionnaire

Hospital characteristics:
Bed numbers
Admissions
New Nosocomial Cases of Antibiotic-resistant organisms:
Methicillin-resistant Staphylococcus aureus (MRSA)
Vancomycin-resistant enterococci (VRE)
Clostridium difficile-associated diarrhea (CDAD)
Infection Control Program Resources:
ICPs:
Time devoted to infection control and specific activities
Professional category
Certified by Certification Board of Infection Control
Physicians/doctoral professionals:
Time devoted to infection control and specific activities
Infection control training
Secretarial support provided to infection control program
Laboratory:
Access to daily reports on cultures
Surveillance cultures for evaluating possible outbreaks
Computers:
Computers used for tabulation of infection data and infection reports
Use of statistical software to analyze data collected
References:
Infection control journals and texts
Internet access
Current Health Canada guidelines on preventing nosocomial infections
Surveillance/case finding of infections:
Denominator data collected
Specific statistics collected for infections on wards, units, or service
Infections involving particular anatomic sites or medical devices
Specific statistics collected for MRSA, VRE, CDAD
Surgical site infections calculated and reported to surgeons
Case-finding methods used to detect new cases of nosocomial infections
Infection control activities:
Infection control teaching activities
Communicated hospital's infection data to patient care staff
Circulated scientific information on infection control to patient care staff
Infection control authority:
Direct authority to close wards or units to further admissions
Direct authority to have patients placed in isolation
Infection control policies:
Isolation precautions for patients with VRE
Isolation precautions for patients with MRSA
Insertion, maintenance, and changing of IVs, tubing, and solutions
Respiratory precautions for tuberculosis and other airborne infections
Aseptic insertion and maintenance of closed drainage of Foley catheters
Routine system for changing breathing circuits on patients undergoing ventilation
Isolation precautions for patients with diarrhea associated with *C difficile*
The indications, drug choices, timing, and duration of perioperative antibiotics

Antibiotic-resistant organisms

MRSA rates, controlling for the number of hospital beds, increased from 1999 to 2005 (F = 9.4, P = 0.003). In 2005, the MRSA rate for all responding hospitals across Canada was 5.2 (SD 6.1) per 1,000 admissions while the MRSA rate in 1999 was 2.0 (SD 2.9). MRSA rates increased in Quebec (t = 3.6, P = .0009) and the Atlantic region (t = 3.4, P = .002) from 1999 to 2005 (Table 2).

CDAD rates, controlling for the number of hospital beds, trended up from 1999 to 2005 (F = 2.9, P = 0.09). In 2005, the mean CDAD rate was 4.7 (SD 4.3) per 1,000 admissions and in

Table 2. Unpaired means comparisons for MRSA and CDAD rates in 1999 and 2005 by Canadian region

Region	Mean MRSA Rate/ 1000 admissions (SD)		P-Value*	Region	Mean CDAD Rate/ 1000 admissions (SD)		P-Value
	1999	2005			1999	2005	
West (n=59)	1.6 (2.9)	3.6 (3.5)	.02	West (n=49)	3.3 (3.3)	4.5 (4.7)	.3
Ontario (n=85)	2.8 (2.9)	3.8 (3.4)	.1	Ontario (n=71)	4.2 (4.0)	3.6 (2.1)	.4
Quebec (n=37)	2.8 (3.8)	11.2 (9.6)	.0009	Quebec (n=27)	7.9 (7.5)	8.6 (6.2)	.8
Atlantic (n=37)	0.2 (0.3)	5.1 (6.6)	.002	Atlantic (n=31)	1.7 (1.2)	3.3 (3.4)	.08
Overall (n=222)	2.0 (2.9)	5.2 (6.1)	.003	Overall (n=182)	3.8 (4.3)	4.7 (4.3)	.09

*Due to the Bonferroni correction, regional comparisons in this table are not significant unless the corresponding p-value is less than .0125.

1999 it was 3.8 (SD 4.3). Regional CDAD rates did not differ from 1999 to 2005 (Table 2).

The proportion of hospitals that reported having new nosocomial VRE cases, controlling for the number of hospital beds, was greater in 2005 than in 1999 ($X = 10.5$, $P = 0.001$). In 1999, 34.5% (40 of 116) hospitals reported having new nosocomial VRE cases and in 2005, 61.0% (64 of 105) hospitals reported having new nosocomial VRE cases. The proportion of hospitals in Quebec with new nosocomial VRE cases increased from 1999 to 2005 from 21.1% (4 of 19) hospitals to 72.2% (13 of 18) ($X = 9.7$, $P = 0.002$) (Table 3). In 2005, the mean VRE rate across Canada was 1.0 (SD 1.8) per 1,000 admissions and in 1999 the overall rate was 0.4 (SD 1.5).

Surveillance and control indices

Overall, surveillance index scores, controlling for the number of hospital beds, increased only slightly from 61.7 (SD 18.5) in 1999 out of a maximum of 100, to 68.1 (SD 15.4) in 2005 ($F = 4.1$, $P = 0.04$). In Ontario, however, surveillance index scores increased in a significant fashion from 63.5 (SD 15.9) in 1999 to 72.4 (SD 12.7) in 2005 ($t = 2.9$, $P = 0.004$) (Table 4).

Control index scores, controlling for the number of hospital beds, trended upwards slightly from 60.8 (SD 14.6) out of a maximum of 100 in 1999 to 64.1 (12.2) in 2005 ($F = 3.2$, $P = 0.07$). In Quebec, control index scores increased significantly from 53.3 (SD 15.7) in 1999 to 64.5 (SD 10.0) in 2005 ($t = 2.7$, $P = 0.01$) (Table 4).

Human resources

ICP FTEs per 100 beds increased from 0.5 (SD 0.2) in 1999 to 0.8 (SD 0.3) in 2005 ($F = 90.8$, $P < 0.0001$). ICP FTEs per 100 beds increased in Ontario ($t = 6.9$, $P < 0.0001$), Quebec ($t = 7.8$, $P < 0.0001$), and the Atlantic region ($t = 3.1$, $P = 0.004$) from 1999 to 2005 (Table 5). The proportion of ICPs in hospitals certified by the Certification Board of Infection Control (CBIC) decreased from 53% (SD 46) in 1999 to 38% (SD 36) in 2005 ($F = 8.7$, $P = 0.004$). The mean years of infection control experience of ICPs decreased from 9.0 (SD 5.8) in 1999 to 7.2 (SD 5.2) in 2005 ($F = 6.2$, $P = 0.01$).

The percentage of infection control programs with physician and or doctoral level professionals providing service, controlling for hospital size, was similar in 1999 (71.7%) and 2005 (70.9%) ($X = 1.0$, $P = 0.3$). In hospitals with physician and doctoral level professionals providing service to infection control programs, physician and doctoral level professionals hours per 250 beds were similar in 1999 (6.8 SD 8.0) and 2005 (8.5 SD 11.2) ($F = 1.4$, $P = 0.2$). The percentage of infection control programs with physician and or doctoral level professionals who had infection control training, controlling for hospital size, was similar in 1999 (81.7%) and 2005 (88.5%) ($X = 0.7$, $P = 0.4$).

Table 3. Comparisons of new nosocomial cases of VRE in 1999 and 2005 by Canadian region

Region	Proportion of Hospitals with New Nosocomial VRE Cases		P-Value*
	1999	2005	
West	13/34 (0.38)	12/25 (0.48)	0.5
Ontario	19/41 (0.46)	31/45 (0.69)	.03
Quebec	4/19 (0.21)	13/18 (0.72)	.002
Atlantic	4/22 (0.18)	8/17 (0.47)	.05
Overall	40/116 (0.35)	64/105 (0.61)	.001

*Due to the Bonferroni correction, regional comparisons in this table are not significant unless the corresponding p-value is less than .0125.

Table 4. Unpaired means comparisons for Surveillance and Control Index scores in 1999 and 2005 by Canadian region

Region	Mean Surveillance scores (SD)		P-Value*	Mean Control scores (SD)		P-Value
	1999	2005		1999	2005	
West (n=69)	64.2 (18.1)	64.4 (16.6)	.96	63.0 (16.9)	60.3 (11.7)	.5
Ontario (n=91)	63.5 (15.9)	72.4 (12.7)	.004	61.8 (12.6)	67.5 (13.3)	.04
Quebec (n=42)	46.3 (22.5)	61.0 (17.9)	.03	53.3 (15.7)	64.5 (10.0)	.010
Atlantic (n=37)	70.2 (9.7)	70.2 (14.4)	.98	62.7 (9.9)	60.0 (10.1)	.4
Overall (n=244)	61.7 (18.5)	68.1 (15.4)	.04	60.8 (14.6)	64.1 (12.2)	.07

*Due to the Bonferroni correction, regional comparisons in this table are not significant unless the corresponding p-value is less than .0125.

The percentage of infection control programs with secretarial support, controlling for hospital size, was similar in 1999 (69.0%) and 2005 (67.3%) ($X = 1.4$, $P = 0.2$). Among those hospital infection control programs with secretarial support, secretarial hours per 250 beds to was greater in 2005 than in 1999 ($F = 4.6$, $P = 0.03$) with 12.5 (SD 9.2) hours per 250 beds and 9.1 (SD 10.7) for 2005 and 1999 respectively.

Table 5. Unpaired means comparisons for ICP staffing levels in 1999 and 2005 by Canadian region

Region	Mean ICP FTEs per 100 beds (SD)		P-Value*
	1999	2005	
West (n=70)	0.43 (0.17)	0.55 (0.24)	.02
Ontario (n=95)	0.49 (0.21)	0.87 (0.33)	<.0001
Quebec (n=42)	0.33 (0.12)	0.73 (0.21)	<.0001
Atlantic (n=39)	0.54 (0.27)	0.84 (0.35)	.004
Overall (n=251)	0.45 (0.21)	0.77 (0.32)	<.0001

*Due to the Bonferroni correction, regional comparisons in this table are not significant unless the corresponding p-value is less than .0125.

Computer resources

A significantly greater percentage of infection control programs in 2005 used computers for the purposes of tabulating infection data and preparing reports of infections, controlling for hospital size, than in 1999 ($X = 17.3$, $P < 0.0001$). In 1999, 67% (97 of 145) of infection control programs used computers for tabulating and reporting infection data and by 2005, 93% (102 of 110) did. Among those infection control programs that used computers for the purposes of tabulating infection data and preparing reports of infections, the use of statistical or specialized infection control software decreased from 1999 to 2005 ($X = 8.2$, $P = 0.004$). In 1999, 56% (54 of 97) of infection control programs used statistical or specialized infection control software and in 2005, 35% (36 of 102) did.

DISCUSSION

There have been two major events in Canada since 1999 that put hospital infection prevention and control under the spotlight in a very public way. The SARS outbreak in 2003 in Toronto, Ontario and the *Clostridium difficile* associated diarrhea outbreak in several cities in Quebec between 2002 and 2004. Both of these outbreaks that affected Canadian hospitals have been the subject of public commissions or inquiries as well as intense media scrutiny (7-12). The SARS Commission in Ontario and the National Advisory Committee on SARS and Public Health among others placed high emphasis on resources being placed into infection prevention and control programs in Canadian hospitals. It was against this backdrop that we conducted the present study to evaluate the state

of infection control programs and ARO rates in Canadian acute care hospitals and compare them to those of our previous study of 1999 (1, 2). The similar methodology used in both studies allowed for direct comparisons between infection control programs and ARO rates in 1999 and 2005. Further, the response rates of the 1999 and 2005 surveys indicated both samples were representative of Canadian acute care hospitals with 80 or more acute care beds.

Antibiotic-resistant organism rates are increasing in Canada and many jurisdictions around the world (13-17). The overall nosocomial MRSA rates for Canadian acute care hospitals participating in our survey more than doubled between 1999 and 2005 and the number of hospitals reporting new nosocomial VRE cases in Canada increased 77% over the same period. The MRSA and VRE rates of the present study are in line with the nosocomial MRSA and VRE rates reported for large Canadian teaching hospitals (16-17). We did not find national or regional increases in nosocomial CDAD between 1999 and 2005. This may have been due to infection control efforts directed towards CDAD that resulted from the numerous deaths associated with outbreaks of the hyper-virulent NAP1 strain in Quebec between 2002 and 2004 (10). Nevertheless, CDAD rates were higher in Quebec than the rest of Canada in 1999 ($t = 3.4$, $P = 0.001$) and 2005 ($t = 4.7$, $P < 0.0001$).

Surveillance scores increased roughly 6% and control scores trended up from 1999 to 2005. Despite the minor increases in surveillance and control intensity, 15% of hospitals in our 2005 sample scored less than 50 on the surveillance index, indicating they conducted less than half of the recommended surveillance activities. Only 27% of infection control programs conducted greater than 80% of recommended surveillance activities. The findings are similar for control activities, 10% of infection control programs scored less than 50 on the control index and only 11% scored greater than 80%.

The situation is mixed as to whether human resources available to infection control programs improved from 1999 to 2005. Physician, doctoral professionals, and secretarial support to infection control programs changed little from 1999 to 2005 while ICP FTEs per 100 beds increased 60% overall. However, even with increased ICP staffing, less than a quarter (22.6%) of hospitals had the recommended one FTE ICP per 100 beds in 2005 (18). The proportion of ICPs with CBIC certification actually decreased from 1999 to 2005. This decrease in certification levels may be due to the requirement for recently hired ICPs to practice in infection control for two years with a minimum of 800 hours experience before being eligible to write the CBIC certification exam (www.cbic.org). On average, ICPs had almost two years less experience in infection control in 2005 when compared to ICPs in 1999, reflecting recent entrants into the field.

A greater percentage of ICPs used computers for tabulating infection data and preparing reports of infections in 2005 than in 1999; however, the overall use of statistical or specialized infection control software decreased from 1999 to 2005. The decrease in the use of statistical or specialized infection control software might be because fewer of the recently hired ICPs have received training to use these programs and or there is a lack of resources for the software and more use of spreadsheet and database programs that are available on many hospital computer systems.

Crises appear to drive increases in infection surveillance and control resources and activities. Increases in ICP staffing and the intensity of control activities in Quebec coincided with the CDAD outbreak in Quebec. Similarly, increases in ICP staffing and the intensity of surveillance activities in Ontario coincided with the SARS outbreak of 2003. Despite these crises motivated influxes of resources, Canadian infection control programs in 2005 continue to fall short of expert recommendations with respect to the intensity of surveillance and control activities and infection control program human resources (18-20). Taking into account hyper-virulent *C. difficile* strains, the predicted influenza pandemic, and increasing rates of MRSA and VRE, there continues to be great need for ongoing investment in infection control programs (3-5, 21). If Canada is to achieve widespread control of infections in acute care hospitals, increased investments in infection control human resources are required in the form of more infection control practitioners, their training, and certification with CBIC. Infection control programs also require physicians trained in infection control, surveillance tools, and support staff to mount effective control programs and to report on nosocomial infection rates. The size and scope of the ARO problem is increasing yet there is accumulating evidence that properly designed and executed infection control programs are highly effective and cost beneficial (21). To not continue to make these investments now is very short sighted and suggests we may have already forgotten the lessons we were to have learned from the outbreaks of SARS and hyper-virulent *C. difficile*.

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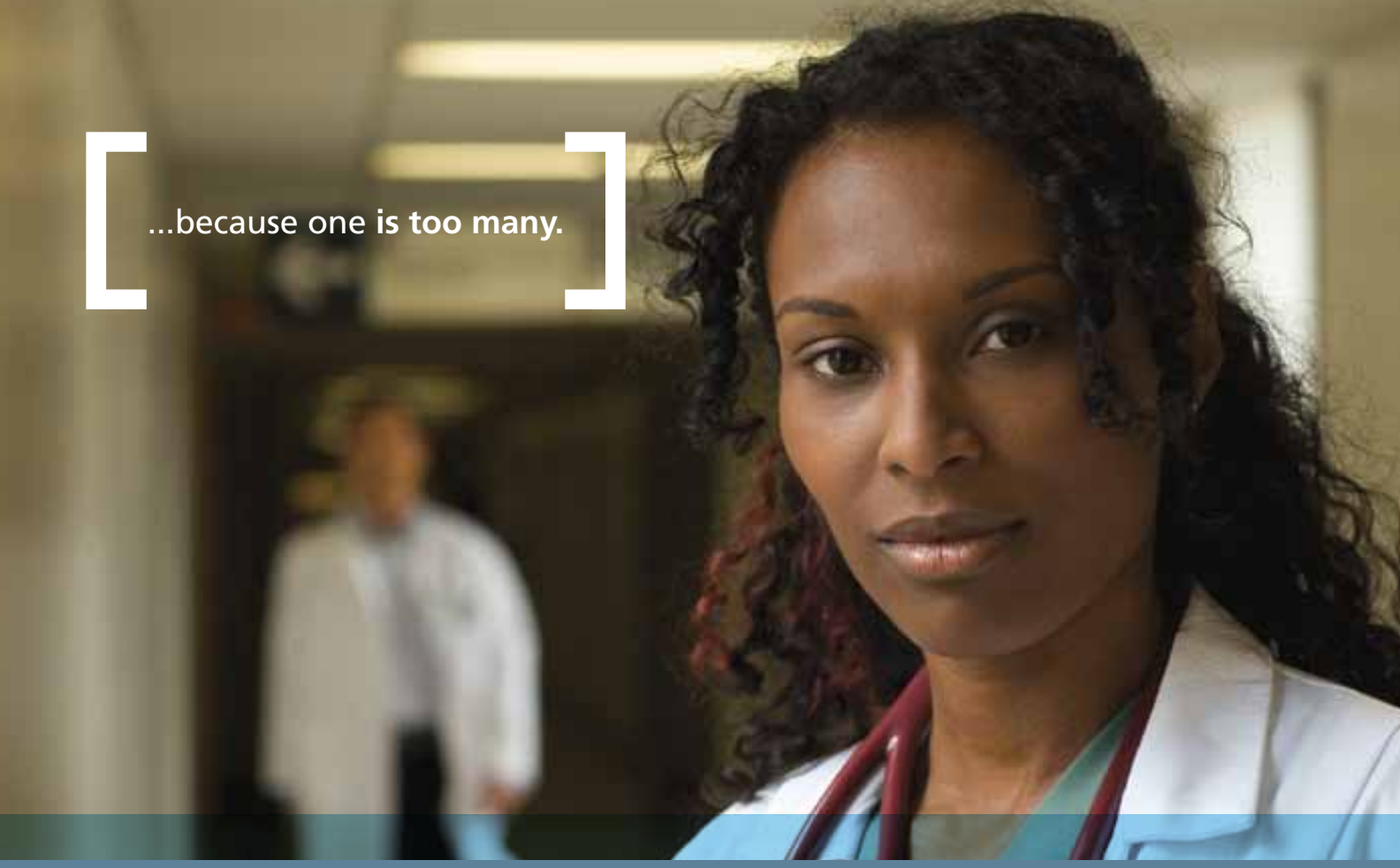

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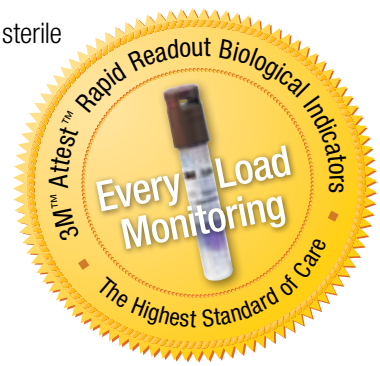

Utility of environmental sampling for the prevention of transmission of vancomycin resistant enterococci (VRE) in hospitals

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ABSTRACT

Background: Although vancomycin resistant enterococci (VRE) have been shown to contaminate environmental surfaces in the room of a patient infected or colonized with VRE there is limited evidence that links environmental contamination with acquisition.

Objectives: To determine whether a policy of environmental sampling and room closure is more effective than cleaning and visual inspection of the room without culturing, in preventing the transmission of VRE to the next admitted patient.

Methods: The rooms of consecutive patients with VRE were alternatively managed according to either Protocol I (terminal cleaning, inspection and admission of new patient(s)) or Protocol II (terminal cleaning, environmental cultures and closing of the room pending negative results). The next admitted patient to all rooms had rectal swabs obtained for VRE within 24 hours of admission, three to five days after admission and upon discharge from the room and/or the facility. The proportion of patients who acquired the same strain of VRE after being admitted to rooms handled according to either Protocol I or Protocol II was compared.

Results: The risk of acquisition of VRE by patients admitted to a room managed according to Protocol I (1/19) was not significantly different than for patients admitted to a room managed according to Protocol II (0/12) (p=0.99). At least one positive environmental culture was obtained in 8/14 (57.1%) rooms managed according to Protocol II.

Conclusions: Although VRE may be detected in the hospital environment there is insufficient evidence to conclude that routinely obtaining negative environmental cultures from the room of a patient infected or colonized with the organism is more effective in preventing VRE transmission to subsequent patients, provided the room is adequately cleaned and disinfected.

Keywords: Vancomycin Resistant Enterococci, Environment, Transmission

INTRODUCTION

Vancomycin resistant enterococcus (VRE) is an important nosocomial pathogen in Canada and worldwide. From 1999 to 2005 the Canadian Nosocomial Infection Surveillance Program (CNISP) reported an increase in the incidence of VRE from 0.37 to 1.32 cases per 1,000 patients admitted in participating hospitals (1). A similar increase was reported for Ontario, with a majority of patients (94%) determined to have acquired VRE in an acute care hospital (2).

Identified patient risk factors for VRE acquisition include, severity of underlying illness, presence of invasive devices, antibiotic exposure, length of hospitalization, and colonization pressure (3-5). The most common mode of transmission of VRE in a healthcare setting is via the transiently colonized hands of healthcare workers (5). The hospitalized patient with gastrointestinal carriage is the major institutional reservoir of VRE and healthcare workers hands become colonized through direct contact with a colonized or infected patient or handling contaminated elements of the environment (5).

Table 1: Environmental specimens obtained from hospital rooms of patients testing positive for VRE

Swab Number	Environmental Site	Specifications
1	Toilet Area	To include flusher, call bell, safety rail and toilet seat
2	Bathroom Sink	To include taps
3	Door Knobs and Light Switches	All within the room
4	Bed	To include rails and mattress
5	Telephone and Television	
6	Bedside Cabinet and Overbed Table	To include handles and levers
7	Blood Pressure Cuff and Stethoscope	
8	Head Wall	To include oxygen supply and suction canister
9	Call Bell	
10	Chair, Wheelchair and/or Walker	As available

Frequently contaminated objects in the environment of patient colonized or infected with VRE include patient beds, tables, sinks, toilets, commodes, doorknobs, and blood pressure cuffs, in some cases even after terminal cleaning (6-8). Environmental contamination with VRE is of particular concern due to the ability of the organism to remain viable on surfaces for an extended period of time. Experimentally, VRE has been shown to survive for five to 58 days on counter tops, 24 hours on bed rails, and up to 16 weeks on polyvinyl chloride (9-11). Currently the Ontario Provincial Infectious Diseases Advisory Committee (PIDAC) recommends that facilities ensure the existence of a stringent protocol for daily cleaning of rooms contaminated with VRE and a process to ensure that adequate cleaning and disinfection of rooms and medical equipment occurs upon the discharge of a patient colonized or infected with VRE (12). The Healthcare Infection Control Practices Advisory Committee (HICPAC) does not recommend routine environmental sampling but notes that it could be useful in determining the effectiveness of cleaning and disinfecting procedures when VRE contamination is suspected (13).

Although the ability of patients colonized or infected with VRE to contaminate their environment has been demonstrated there remains limited evidence directly linking environmental contamination with acquisition. Previous studies have demonstrated that, in the intensive care setting, patient placement in a room previously occupied by a patient infected or colonized with VRE or a room with a history of positive environmental cultures is associated with an increased risk of acquisition but the overall contribution of room contamination to overall VRE transmission is unknown (8,14,15). Similarly, in an intensive care unit, environmental cleaning measures were important in controlling the spread of VRE (16).

The objective of this study was to determine whether a policy of environmental sampling and room closure is more effective than visual inspection without culturing, in preventing the transmission of VRE to the next admitted patient.

METHODS

Setting and study population

The study was conducted at Sunnybrook Health Sciences Centre, a 1,200-bed tertiary-care university affiliated teaching hospital located in Toronto, Canada. All acute care inpatient units were included in the study with the exception of the intensive care units. From June 2006 to December 2007, rooms used by patients admitted for greater than 24 hours and who were found to be colonized or infected with VRE on that admission were eligible for inclusion.

Environmental cleaning and specimen collection

Upon discharge of a patient identified as colonized or infected with VRE the room was closed, a sign was posted on the door and environmental services was contacted to begin the cleaning and disinfection process. All rooms used by patients with VRE were cleaned and disinfected according to the specific terminal cleaning procedure of the facility (Figure 1). Contact precautions were maintained by environmental services staff throughout the cleaning process. Prior to beginning cleaning, the privacy curtain was removed, contaminated supplies, waste and sharps were disposed of and the mattress and pillows were inspected and replaced if not intact. The first cleaning step was performed using a liquid quaternary ammonium compound, A-456-N Germicidal Detergent™, with a new cleaning cloth for each entry into the disinfectant solution and a contact time of 10 minutes. Cleaning was done in a clockwise direction from top to bottom and included the surfaces of all furniture and medical equipment within the room ending with a wet mop of the floor. A similar process was then repeated in the patient bathroom. Once the room was dry the terminal cleaning procedure was duplicated with a 1:20 dilution of bleach. Upon completion of each step in the terminal cleaning process the responsible environmental services staff member signed and dated the cleaning completion sign on the door.

Rooms of consecutively discharged patients positive for VRE were alternatively managed according to Protocol I or Protocol II. According to Protocol I, rooms were terminally cleaned, inspected by Infection Prevention and Control (IP&C) and immediately reopened for subsequent admissions. The visual inspection included a determination by a member of IP&C that the privacy curtain and any contaminated supplies had been disposed of, there was no damaged furniture or equipment that may be resistant to cleaning, and nothing in the room was visibly soiled with special attention being paid to high touch items in the patient environment. If the room was determined by IP&C not to pass visual inspection the two-step terminal cleaning procedure was repeated.

Rooms managed according to Protocol II received an identical terminal clean, environmental specimens were obtained and the room remained closed to subsequent admissions pending

negative culture results. If one or more environmental specimens tested positive for VRE the cleaning process was repeated. Environmental specimens were obtained from the sites summarized in Table 1. Specimens 4-10 were obtained from each patient bedspace in multi-bed rooms such that a total of 10, 17 and 24 specimens were obtained from each private, semi-private and ward room, respectively. Environmental specimens were collected by rubbing sterile gauze moistened with saline over the surface followed by immersion in Letheen broth.

Patient follow-up

A rectal swab was obtained within 24 hours of admission from the next patient(s) admitted to a room previously occupied by a patient with VRE. Subsequent rectal swabs were obtained three to five days after admission and weekly thereafter while in hospital. Rectal swabs were also obtained when the patient(s) was discharged from the room and at the time of discharge home or transfer to another unit or facility.

Figure 1: Terminal cleaning procedure for hospital rooms of patients testing positive for VRE

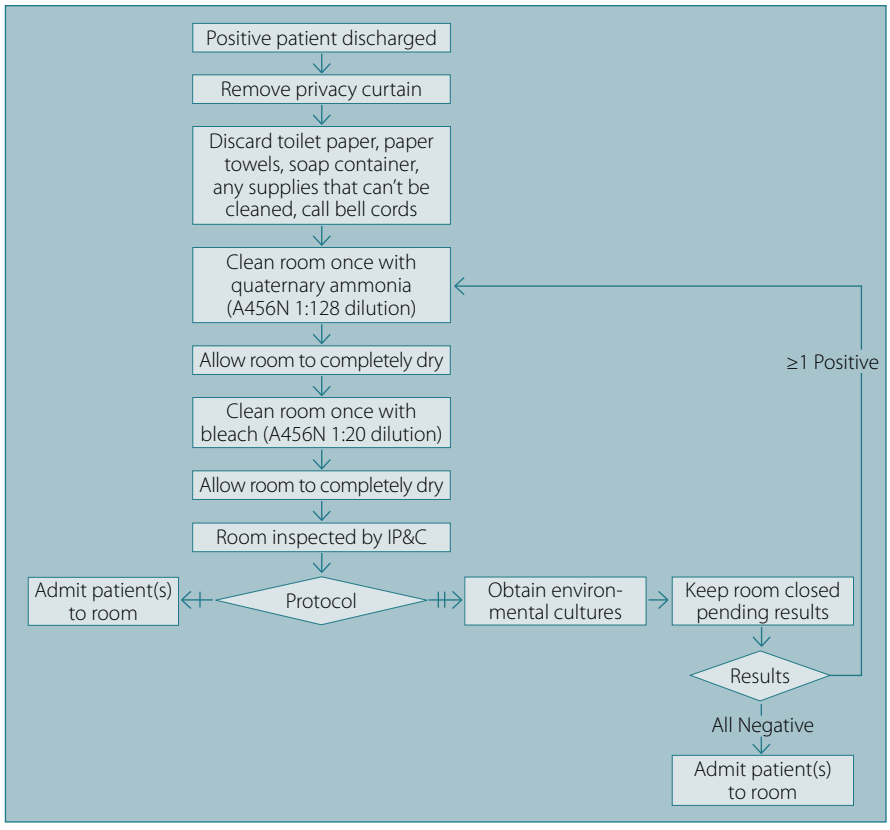
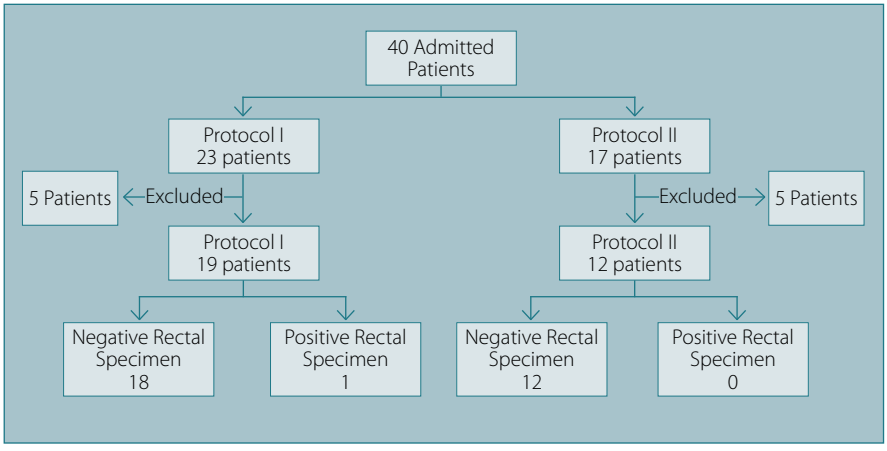


Table 2: Positive environmental specimens obtained from hospital rooms of patients testing positive for VRE

Environmental Site	Number of Positive Specimens
Toilet Area	4
Bathroom Sink	4
Door Knobs and Light Switches	4
Bed	3
Telephone and Television	3
Bedside Cabinet and Overbed Table	3
Chair, Wheelchair and/or Walker	3
Head Wall	2
Call Bell	1
Blood Pressure Cuff and Stethoscope	0

Figure 2: Follow-up of patients admitted to rooms managed according to Protocol I and II



Microbiological methods

Specimens for detection of VRE were inoculated onto Enterococcosel Agar (Becton Dickinson Microbiology Systems, Sparks, MD) with 6μg/mL vancomycin and incubated aerobically for up to 48 hours. VRE was identified using standard laboratory methods (17). Environmental specimens were incubated in Letheen broth for 18-24 hours prior to being inoculated onto Enterococcosel Agar and VRE detected as described above. Molecular typing was done on patient isolates by pulsed-field gel electrophoresis (PFGE) (18). Polymerase chain reaction (PCR) was used to determine the presence of the vanA, vanB, or vanC1-C3 genes (19, 20).

Data analysis

The proportion of patients who acquired the same strain of VRE after being admitted to rooms handled according to either Protocol I or Protocol II were calculated and compared using Fisher's exact test with p≤0.05 being considered statistically significant. The mean number of days that rooms managed by each protocol were closed was calculated and compared using the *t* test. Statistical analyses were performed with SAS statistical software, version 9.1 (SAS Institute Inc, Cary, NC).

RESULTS

From June 2006 to December 2007, 29 inpatient rooms were identified as eligible for inclusion in the study, 15 managed according to Protocol I and 14 managed according to Protocol II. A total of 266 environmental specimens were obtained according to Protocol II. 2/15 (13.3%) rooms managed according to Protocol I required additional cleaning after inspection by IP&C. 8/14 (57.1%) rooms managed according to Protocol II had one or more VRE positive environmental specimen(s) (27/266 or 10.2%) and required a second terminal cleaning. Positive sites are listed in Table 2. All 27 environmental specimens positive for VRE were part of the 173 specimens obtained after the first terminal cleaning and no VRE was detected from the 93 specimens obtained after the second terminal cleaning of the 8 rooms with ongoing contamination.

Rooms managed according to Protocol II were closed to admission significantly longer than rooms managed according to Protocol I, mean 11.6 days ± 7.9 versus 2.9 days ± 1.4, $p=0.001$. 40 patients were admitted to a room that previously housed a patient identified as infected or colonized with VRE, 23 to a room managed according to Protocol I and 17 to a room managed according to Protocol II (Figure 2). A total of nine patients, four (17.4%) from Protocol I and five (29.4%) from Protocol II were excluded from analysis as they did not have a rectal swab obtained for VRE within 24 hours of admission and/or any of the designated follow-up swabs. VRE was detected in 1/19 (5.2%) patients admitted to a room managed according to Protocol I, which was not a significantly increased risk of VRE transmission as compared to the detection of VRE in 0/12 (0%) patients admitted to rooms managed according to Protocol II, $p=0.99$. The VRE obtained from the one patient testing positive after admission to a room managed according to Protocol I was the same organism as that of the room's previous occupant, *Enterococcus faecium* vanA and was the same type as determined by PFGE.

DISCUSSION

This study demonstrates that VRE can be detected on environmental surfaces even after terminal cleaning of an inpatient room, but obtaining environmental specimens prior to permitting admission to a room previously used by a patient colonized or infected with VRE does not significantly decrease the risk of VRE transmission when compared to visual inspection.

More than half of the rooms cleaned and disinfected according to our facility's terminal cleaning procedure and managed according to Protocol II had at least one positive environmental specimen obtained and required repeat cleaning. The environmental surfaces most frequently demonstrating persistent contamination with VRE included the sink and toilet within the patient's bathroom, high touch areas such as door knobs and light switches, and items in the patient's immediate environ-

ment such as the bed and overbed tables. These findings are in agreement with previous studies that have demonstrated environmental contamination of the rooms of patients colonized or infected with VRE under a number of different circumstances including when the patient is still occupying the room, patients with and without diarrhea and after terminal cleaning (6-8, 21). Our finding of 10.2% of environmental specimens testing positive for VRE corresponds with previous investigations of environmental contamination which found VRE in 7% to 37% of samples obtained from rooms currently or previously housing a patient positive for VRE (20). Specifically, Montecalvo et al. detected VRE in 8% of environmental specimens obtained post-terminal cleaning (22).

Adherence to the terminal cleaning procedure was not measured to ensure that it was applied equally to all rooms included in the study. This would be mitigated to a certain degree by the inspection of all rooms by IP&C prior to opening the room to subsequent admissions to ensure that all items were disposed of where appropriate and that rooms appeared clean or by the acquisition of environmental specimens. In addition, the terminal cleaning procedure used was developed in consultation with environmental services and disseminated to all cleaning staff prior to the start of the study. Bias may have been introduced into the study as a number of people from the IP&C department were involved in room inspection and the acquisition of environmental specimens and they may have demonstrated variation in their definition of clean or the method used in obtaining specimens. Although a specific checklist was not employed by IP&C members performing visual inspections, all staff members participating were familiar with the cleaning protocol. A procedure for obtaining environmental specimens was also developed and followed by all IP&C members involved in the study.

The risk of VRE acquisition after admission to a room previously used by a patient infected or colonized with VRE was not significantly decreased in our patient population when environmental specimens were obtained prior to reopening a room as compared to relying solely on visual inspection. VRE transmission was only detected in one study patient who was admitted to a room managed according to Protocol I. The role of the environment in this patient's nosocomial acquisition of VRE is unclear as at the time that the positive rectal specimen was obtained there were two additional patients on the same unit colonized with an identical strain of VRE. The possibility exists that VRE acquisition by the study patient was the result of transmission of the organism on the transiently colonized hands of a healthcare worker with one of the other patients acting as the reservoir. Previous studies have experienced similar difficulty in attributing VRE acquisition to environmental contamination when considering the contribution of other risk factors including other potential sources of cross-transmission and other confounding factors such as antibiotic exposure and hospital length of stay (8, 16, 23).

The small sample size of the study would have impacted the power to detect a statistically different difference in VRE acquisition between the two protocols. The ability to identify rooms eligible for inclusion in the study was limited by the low prevalence of VRE in our facility. In addition, patient flow issues resulted in a few rooms with VRE patients being eliminated from the study as admission of subsequent patients occurred before all elements of the protocol could be implemented. The number of follow-up patients available for inclusion was also small. 17.4% and 29.4% of patients admitted to rooms managed according to Protocol I and II, respectively, and eligible for inclusion, were excluded from analysis as they were not in the room for a sufficient length of time, low staff compliance with obtaining either admission or follow-up rectal specimens or patients' refusal to participate. The necessary sample size to detect statistical significance between the two protocols, based on the facilities nosocomial VRE acquisition rate of 0.08 per 1,000 patient days for 2006-07, would be too large to be obtained within a feasible timeline. Another limitation of the study was the limited follow-up time available for patients admitted to rooms previously used by patients colonized or infected with VRE. The mean length of stay for follow-up patients, from admission to a room eligible for inclusion in the study to discharge from the healthcare facility, was 15.5 days and ranged from four to 93 days. As a result of the short follow-up, only one or two rectal swabs were obtained from 25/31 (80.6%) patients after the initial admission screen and patients may have been discharged before VRE colonization would have been detectable.

Our data do not support the use of routine environmental cultures for VRE as part of the management of endemic VRE in the healthcare settings. This practice is not currently recommend by PIDAC or HICPAC and has the potential to negatively impact on patient flow and may add a significant cost to VRE management strategies (12, 13). On average rooms managed according to Protocol II were closed 8.7 days longer than rooms managed according to Protocol I (11.6 days versus 2.9 days). During this time between one and three beds would be closed on a unit depending on the type of room and the unit would be unable to admit patients from the emergency department, or accept transfers from other facilities or units. On a number of occasions, rooms had to be excluded from the study as there was an urgent need to admit a patient. Instead of depending on the costly and time consuming practice of obtaining routine environmental specimens, the focus should be on ensuring there is a stringent protocol in place for daily cleaning of rooms contaminated with VRE and a process to ensure that adequate cleaning and disinfection of rooms and medical equipment occurs upon the discharge of a patient colonized or infected with VRE (12). The use of environmental specimens may be useful in an outbreak setting or as a tool for monitoring the effectiveness of cleaning and disinfecting procedures when VRE contamination is suspected (13).

In conclusion, VRE has the ability to contaminate the rooms of patients who are colonized or infected with the organism and survive for long periods of time on environmental surfaces even after terminal cleaning. Obtaining environmental specimens and keeping a room closed pending negative results prior to admitting a patient to a room previous used by a patient testing positive for VRE does not significantly decrease the risk of acquiring VRE in comparison to a protocol based on visual inspection.

Acknowledgement and references on page 124

Acknowledgement

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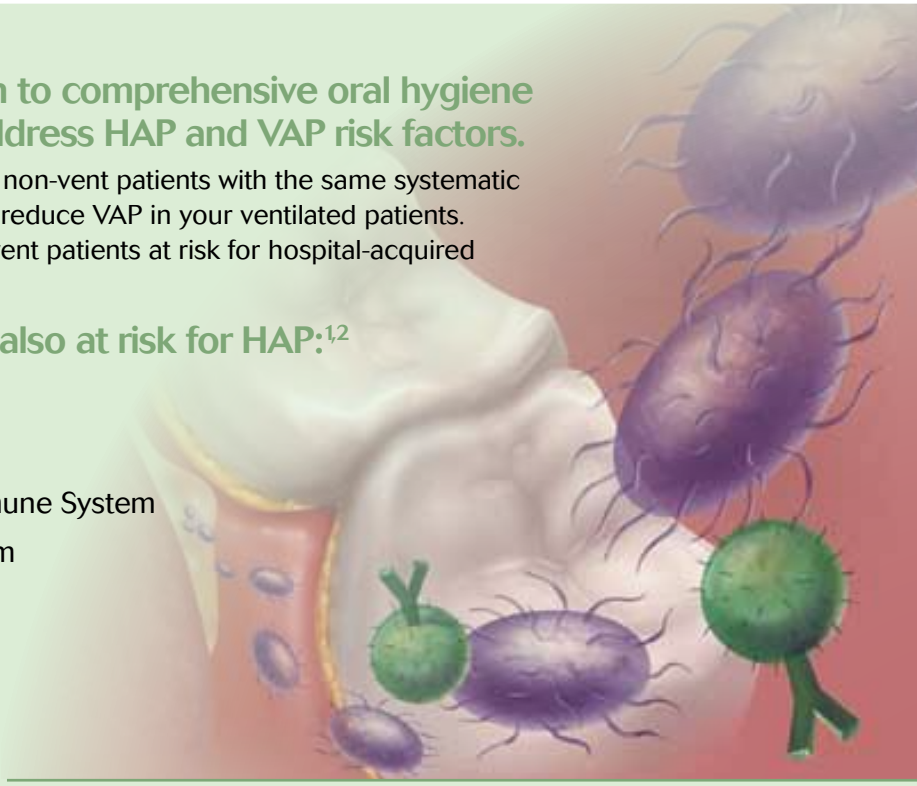

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Strategic Plan for 2010-2015

Approved by CHICA-Canada Board of Directors, May 10, 2009

The Community and Hospital Infection Control Association (CHICA-Canada) has completed a strategic planning process to review its role and establish future goals and priorities. The new plan was developed with the involvement of board members, chapter presidents, and staff with input from the CHICA-Canada membership and external stakeholders. Planning steps carried out included the following:

- The board established project terms of reference and selected an external consultant to facilitate the process. The work plan was then finalized at a board meeting on November 28, 2008.
- The consultant reviewed relevant documents and conducted 23 telephone interviews with representatives drawn from selected stakeholder groups including committees, interest groups, industry sponsors, government officials and related associations. Questions focused on views of the association, perceptions about significant external factors, feedback on programs and services and views on priorities and future directions for CHICA-Canada.
- An online survey was distributed to all CHICA-Canada members in March 2009. Questions addressed members' high level views of CHICA-Canada and its priorities as well as their responses to specific association products, services and activities. 264 responses were received by the mid-April deadline, representing a good cross-section of practice areas, disciplines and locations.
- On May 7 and 8, 2009 a two-day strategy development session with the board, chapter presidents and staff was held as a pre-conference event at the National Education Conference in St. John's, Newfoundland. Session participants reviewed and expanded the environmental scan information, refined the mission, vision and values statements and developed draft strategic goals and objectives. A draft plan was circulated to the planning session participants and revised based on input received.
- The final strategic plan was approved by the Board of Directors on May 10, 2009 and presented to the membership at the Annual General Meeting on May 14, 2009.

CHICA-Canada is on the cusp of an expanded leadership role and its new strategic plan will be used to guide association growth and development over the coming challenging and exciting years.

Attached: **The Environmental Context** • **Mission, Vision and Values** • **Goals** • **Objectives** • **Preliminary Strategies**

THE ENVIRONMENTAL CONTEXT

The following "SWOT" analysis (strengths, weaknesses, opportunities and threats) was assembled from the environmental scan information and stakeholder feedback.

Strengths:
Passion and dedication to infection control and prevention (IPAC)
Wide range of expertise represented
Current and useful resources
Educational offerings
Evidence-based approach
Solid partnerships
National network
Highly respected in the field
Growing in size and influence
Well organized and efficiently run

Weaknesses:
Low visibility
Slow decision making processes
Advocacy effectiveness
Hospital focus
Geographic challenges
Funding levels
Competing priorities and demands on members
Succession planning
Small infrastructure with limited administrative resources

Opportunities:
Increasing importance of the profession
Rising public knowledge of IPAC issues
IPAC is on the government agenda
Inclusion of other sectors
Expanding partnerships
International recognition
Use of new technologies
ICP certification more valued
Revenue generation

Threats:
The current economic situation
Funding challenges
Costs of prevention measures
Potential for media miscommunication
Unknown impact of regional health networks
Lack of trained Infection Control Professionals (IPCs)
Broadening workload and increased demands

Any strategic initiatives undertaken by CHICA-Canada will need to build on strengths, rectify weaknesses, capitalize on opportunities and address threats. The board will review and update the SWOT analysis throughout the course of the strategic plan.

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MISSION, VISION AND VALUES

Vision Statement

A vision statement is a description of the "preferred future" of an organization and its stakeholders. The vision for CHICA-Canada is:

CHICA-Canada will be a major national and international leader and the recognized resource in Canada for the promotion of best practice in infection prevention and control.

Mission Statement

A mission statement should describe the purpose and mandate of an organization. The CHICA-Canada mission statement appears below:

CHICA-Canada is a national, multidisciplinary association committed to the wellness and safety of Canadians by promoting best practice in infection prevention and control through education, standards, advocacy and consumer awareness.

Values Statement

Organizational values are formal statements of beliefs that guide an organization in its relationships with its stakeholders as it discharges its mission in pursuit of its vision. CHICA-Canada ascribes to the following values:

Professional Integrity: To be principled, forthright and ethical, upholding the highest standards in all of our activities.

Critical Thinking: To employ critical thinking in our decision making to do the right thing for the right reasons.

Accessibility: To be accessible to our members and stakeholders.

Responsiveness: To be responsive and creative in meeting the membership's needs.

Innovation: To be resourceful and inventive in advancing infection prevention and control knowledge and practice.

Diversity: To respect and embrace national and international social and cultural differences.

Advocacy: To advance practices which protect consumers.

Excellence: To pursue excellence in all our endeavours.

GOALS, OBJECTIVES AND PRELIMINARY STRATEGIES

Goal One: Raise the profile of the association and its activities

1.1 Actively and effectively promote the role of ICPs as per CHICA-Canada professional practice standards
- Review current standards and clarify roles of the ICP
- Obtain recognition from the Canadian Nurses Association
- Provide CIC preparation assistance/CHICA-Canada endorsed courses
- Ensure standards and guidelines are built into job descriptions

1.2 Raise visibility within the membership and other health care communities
- Expand the e-newsletter and increase circulation
- Increase communication with chapter executives and interest group leaders
- Promote "CHICA Connections" as a tool for questions and answers

1.3 Establish a strong and ongoing relationship with government
- Develop key messaging and act in a proactive manner
- Identify and train key CHICA-Canada representatives to communicate with government
- Conduct regular consultative discussions with federal, provincial and territorial politicians

1.4 Continue to develop the CJIC as a worthy and cited peer reviewed journal
- Dedicate CJIC to scientific information and field material
- Migrate non-scientific components to other communication venues
- Promote CJIC as a peer-reviewed citable journal to membership, committees, academics, chapters and interest groups

Attainment of the profile goals will lead to CHICA-Canada being recognized globally as a leader in infection prevention and control.

Goal Two: Enhance the mix of products and services

2.1 Create a recognizable brand for all CHICA-Canada products
- Retain a marketing/branding consultant
- Align chapters with national branding efforts

2.2 Establish a national CHICA-Canada standard for IPAC programs
- Develop documents outlining the components, activities and outcomes of an effective IPAC program, incorporating geographic and cultural differences
- Develop training tools and templates
- Provide evaluation methodologies

2.3 Institute new technology-based service delivery modes
- Survey member technology capacities and preferred delivery methodologies
- Evaluate current system capabilities
- Implement necessary adjustments/upgrades to current systems
- Maintain a leading edge web portal

2.4 Develop fee-based consulting services for other organizations
- Develop a business plan and consult legal counsel
- Enlist ICPs with demonstrated skills and knowledge
- Establish accountability statements, operating procedures and a fee schedule
- Develop a CHICA-Canada "one voice" messaging platform for sessions
- Provide training for consultants around CHICA-Canada messaging
- Advertise services to various stakeholders
- Develop CHICA-Canada branded educational tools for use by consultants

On achievement of these goals, association members will be able to access a comprehensive inventory of CHICA-Canada products and services.

Goal Three: Expand the association's education initiatives

3.1 Provide recommendations for basic and continuing competencies for ICPs
- Develop a CHICA-Canada endorsed list of ICP core competencies
- Finalize, disseminate and promote

3.2 Expand education programs and supports for ICPs
- Perform a needs assessment of ICP educational needs, technological capacities and preferred delivery methodologies
- Assemble an inventory of educational tools and programs in Canada
- Develop alternative education programs, webinars, local education, on-line continuing education, tools and modules for ICPs

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- Establish process for continual review and maintenance of Basic Infection Prevention and Control distance education course
- Roll out distance education Basic Infection Prevention and Control course to additional educational institutions
- Evaluate effectiveness of all programs

3.3 Ensure health care workers have the required knowledge and skills to practice IPAC competently within their specific roles
- Develop core competencies specific to different HCW groups
- Outline a curriculum and develop support materials
- Provide educators with standardized criteria and tools that can be customized to meet the needs of the learners
- Engage and support educators in implementation
- Evaluate program effectiveness

3.4 Develop a national IPAC orientation program
- Review current programs and resources in place
- Develop content, script and a variety of delivery methodologies
- Issue an RFP for possible delivery methods, including video
- Implement a marketing strategy

Once the education goals are met, CHICA-Canada will have implemented effective education programs that increase the knowledge and skills of ICPs, students and health care workers.

Goal Four: Expand and develop the membership base

4.1 Increase CHICA-Canada membership in targeted areas
- Continue focus on current target groups
- Identify and address new target groups
- Produce appropriate resources

4.2 Develop a mentorship program for new ICPs
- Scan mentoring programs already in use
- Develop a CHICA-Canada specific program
- Recruit mentors and support training through local chapters

4.3 Increase retention of retirees
- Promote associate membership for retirees
- Engage retirees in succession planning, project management and association activities

4.4 Promote membership opportunities and involvement
- Increase communication between chapter executives and the Board
- Prepare information packages for senior management
- Promote CHICA-Canada at other conferences and events

CHICA-Canada will gain a broader and stronger membership base through achieving these goals.

Goal Five: Provide national and international leadership

5.1 Strengthen association leadership
- Inform members of roles/responsibilities of board members and the process for nominations
- Update the board orientation manual
- Institute a succession plan for board and staff members

5.2 Expand our advocacy role by engaging other organizations
- Establish regular communication with like-minded organizations
- Assess opportunities for representation on national committees and boards
- Ensure CHICA-Canada representation on national surveillance committees
- Work with provincial and regional networks on mutually beneficial goals

5.3 Improve the ability of the organization to respond to issues in a thorough and timely manner
- Retain the services of a communications manager and other contract resources.
- Explore use of alternative technologies for rapid contact and communication
- Enhance industry partnerships

On completion of the leadership goals, CHICA-Canada will have the necessary infrastructure to influence decision making at the provincial, national and international levels.

Industry Relations Committee Appointed

The Industry Relations Committee has been re-appointed for three-, two- and one-year terms. This committee works closely with the Physician Director and Executive Director of CHICA-Canada to enhance the communication between CHICA-Canada and its Industry Partners, as well as to develop projects that mutually benefit all the partners. At its meeting held in St. John's, the committee identified the following projects to be considered during 2009/2010:

- Increase membership in the dental sector.
- Publish a regular e-newsletter specifically for industry.
- Schedule an annual meeting with Industry Members and the CHICA Board of Directors, at the time of the board's annual November meeting.
- Promote IP&C education to industry.
- Schedule a formal debriefing period for exhibitors at the annual conference.

Chica-Canada Industry Relations Committee

For three-year term expiring 2012	For two-year term expiring 2011	For one-year term expiring 2010
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Covidien	Deb Canada	Maxill Inc.
Ecolab Healthcare	LauraLine Skincare	3M Canada Company
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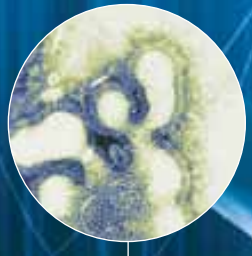

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Elizabeth Henderson

Receives Honourary Membership

CHICA-Canada Honourary Membership was bestowed on Dr. Elizabeth Ann Henderson during the Opening Ceremonies of the 2009 conference in St. John's. Her service to CHICA-Canada in the area of fulfilment of the educational needs of infection prevention and control professionals has gone well beyond what was expected of her in her role as CHICA-Canada's Director of Education (2002-2007). She has dedicated professional and personal time to the development of distance education learning programs, conference scientific program committees, and all the accompanying projects that have enhanced the educational opportunities now available to infection prevention and control professionals, most especially CHICA-Canada members.

Dr. Henderson is the epidemiologist for infection prevention and control at Alberta Health Services and is professor in the department of community health sciences in the faculty of medicine at the University of Calgary. She obtained a M.Sc. in medical sciences specializing in epidemiology and health care research in 1983 and a PhD in medical sciences specializing in infectious diseases and hospital epidemiology in 1989 from the Department of Community Health Sciences at the University of Calgary. She obtained a B.Sc. in microbiology from University of British Columbia in 1973 and a subject R.T. in Microbiology in 1975 at Vancouver General Hospital. She joined CHICA-Canada in 1989 and served on the CHICA-Canada board as the Director of Education from 2001 to 2007. Dr. Henderson specializes and does research in education of healthcare providers and infection control professionals and surveillance techniques used for infection control and infectious diseases.

In her role as an educator, Dr. Henderson became the program coordinator for the graduate program in healthcare epidemiology at the University of Calgary in 1993 where she was involved developing the program as well as coordinating courses in infectious diseases and healthcare epidemiology. She has supervised and mentored many graduate students at both the master's and the PhD level who are now contributing to the infection control community. As the Director of Education for the CHICA-Canada board, she co-ordinated the development of the CHICA-Canada Basic Infection Control course which was developed collaboratively by a dedicated group of contributors and began work on a Collaborative Graduate Training Program for Infection Control Professionals which will be a joint federal/provincial/territorial initiative to train a new generation of graduate-level infection control professionals who will have both the theoretical knowledge and the practical skills to explore innovative ways to prevent healthcare acquired infections.

Betty Ann Henderson (r) with Cathy Munford (l) and Donna Moralejo

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2009 ECOLAB® Poster Contest

Karen Clinker, CHICA Director of Programs & Projects, and Doug Hons of Ecolab Healthcare have announced the winner of the 2009 Ecolab Poster Contest. Kim Baker was awarded for her poster "The Power of One". Honourable Mention went to Andrea Groff. Copies of the poster are available for download from **www.chica.org**. Bulk purchases (50 or more) are available by contacting CHICA-Canada at **chicacanada@mts.net** or 1-866-999-7111. CHICA thanks Ecolab for their ongoing support of CHICA-Canada and for giving CHICA members an opportunity to use their creative talents to promote infection prevention and control practice.

Doug Hons, Kim Baker and Karen Clinker

2010 Board positions available for nomination

The Board of Directors of CHICA-Canada is seeking nominations for board positions that will be open in 2010. Being on the board of CHICA-Canada is an excellent way to participate at the national level. Personally and professionally, it offers the opportunity to meet a wide range of CHICA-Canada members, network with allied professional groups, and work with other motivated and experienced board members.

Nominations are invited for the following positions:
President Elect (1-year term)
Director, Programs & Projects (3-year term)
Director, Standards & Guidelines (3-year term)

These terms commence January 1, 2010. Position descriptions and nomination forms are found in the CHICA-Canada Policy and Procedure Manual, or may be obtained from the Membership Service Office or downloaded from www.chica.org (Members Login).

Signatures of two active members are required for each nomination. If you know someone who would be qualified and interested in one of the above positions, send a completed nomination form to:

Bern Hankinson, RN, BN, CIC
CHICA-Canada Secretary/Membership Director
c/o Membership Service office
PO Box 46125 RPO Westdale
Winnipeg MB R3R 3S3

Or by courier to:
Bern Hankinson, RN, BN, CIC
CHICA-Canada Secretary/Membership Director
c/o Membership Service office
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Deadline for nominations: August 15, 2009.

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Award winners at 2009 Conference

Congratulations to the following award winners who were announced in St. John's:

Best First Time Abstract Submission, prize of $500: Stefanie Ralph for her submission "Outbreak Pep Rally – A Good Communication Tool"

Best Oral Presentation Les enterprises Solumed – A 3M Canada Company, prize of $1,000: Tim Cronsberry for his presentation "Lights, Camera, Action! Creating an Educational Video About the Proper Use of Personal Protective Equipment in Long-Term Care"

Best Poster Presentation, prize of $500: Terry Murduff, Joanne Habib, and Debbie Rivett for "Come and Take a Walk with Me!!!"

Strut Your Stuff! Attendance Prize, 2010 Membership Fee (value $125): Krista Maxwell;
Early Bird Registration, 2010 Conference Registration: Lise Hébert

3M Chapter Achievement Award: CHICA HANDIC

2008 Editorial Award: Elizabeth Bryce, Annalee Yassi, Deirdre Maultsaid, Bruce Gamage, Margaret Landstrom, Justin LoChang and Chun-Yip Hon for their article *E-learning of infection control: it's contagious* (Canadian Journal of Infection Control, Vol. 23, No. 4, Winter 2008).

CHICA-Canada CIC Chapter Achievement Award, $750: CHICA British Columbia

Barbara Shea, President of CHICA HANDIC, accepts the 3M Chapter Achievement Award from Bern Hankinson.

Coleen Reiswig, CHICA British Columbia, accepts the first CHICA CIC Chapter Achievement Award from Bern Hankinson.

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Virox increases **support**

Virox Technologies Inc. has enhanced the annual Virox Technologies Partnership Scholarship Fund. Randy Pilon, President and CEO, Virox Technologies Inc. said, "Virox believes that education for the industry and infection prevention and control practitioners is critical and there is no better venue that the annual CHICA conference. It is with this in mind that after many successful years sponsoring ICPs that would not normally have the financial resources to attend this conference, and the overwhelming amount of applications received annually, Virox and its partners will increase the annual contribution to $20,000.00 from $15,000.00. Since inception over 70 recipients have enjoyed our sponsorship totalling in excess of $100,000 and we are proud to have initiated such a successful program."

CHICA-Canada thanks Virox and their partners, Deb Canada, JohnsonDiversey, Steris Corporation, and Webber Training for their generous support of CHICA-Canada members.

Watch for the 2010 Virox Technologies Scholarship application to be posted at **www.chica.org** in September 2009. The deadline for applications is February 1, 2010.

4th Annual **Run For IFIC**
— Fun 5Km Run And 2.5Km Walk

On behalf of the IFIC Board, I would like to express our appreciation to the organizers and runners who took part in the 4th Run for IFIC that was held in conjunction with the 2009 CHICA conference in St. John's, Newfoundland Labrador.

Thanks to your generosity and selflessness, more than $3,700 has been raised for the IFIC Scholarship Fund to allow delegates, mainly from limited resource environments, to attend this year's IFIC Congress in Lithuania in October 2009.

Michael A. Borg, M.D., M.Sc., DipHIC, PhD
IFIC Chair 2009

CHICA-Canada Board of Directors: Donna Moralejo, Anne Bialachowski, Cathy Munford, Bern Hankinson, Karen Clinker, Marion Yetman, Judi Linden. Inset: Bonnie Henry, Michael Gardam

Virox Technologies Scholarship Winners and Sponsors

CHICA-Canada Chapter Presidents

International Guests and Canadian Hosts: Back: Christine Nutty (APIC), Tracey Cooper (IPS), Cathy Munford (CHICA), Mary LeBlanc (CHICA), Jane Murphy (IFIC)
Front: Sharon Krystofiak (CBIC), Betty Ann Henderson (CHICA), Michael Borg (IFIC), Carol Goldman (CHICA/IFIC)

2009 Scientific Program Committee. Jim Gauthier, Merlee Steele-Rodway, Donna Moralejo, Joanne Laalo, Molly Blake, Penny Ralph, Diane Roscoe, Marion Yetman. Inset: Lee Hanna

Photos by Brian Ricks, St. John's.
See more conference photos at www.chica.org

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