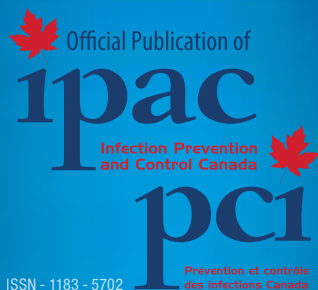


WINTER 2015

CJTIC

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NEWS:
Elections

INSIDE

-
- 213 The influence of patient room type, cleaning procedure, and isolation precautions on room cleaning times in Canadian acute care hospitals
-
- 218 Northern healthcare students' perceptions of hand hygiene in community practice
-
- 225 Pandemic preparedness of B.C. paramedics
-
- 232 Preventing infections in mother-baby care units
-
- 237 Cleaning verification in medical device reprocessing: Is this required?
-



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 Toronto, Ontario M6A 2E1
 Tel: 416-785-2500 Ext. 2981 Fax: 416-785-2503
 Email: editor-in-chief@ipac-canada.org

WEB COMMUNICATIONS MANAGER

Shirley McDonald, ART, CIC webmaster@ipac-canada.org

POSTING EMPLOYMENT

OPPORTUNITIES/OTHER INFORMATION
 IPAC Canada Membership Services Office
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PUBLISHER

3rd Floor, 2020 Portage Avenue
 Winnipeg, MB R3J 0K4
 Tel: (204) 985-9780 Fax: (204) 985-9795
 www.kelman.ca E-mail: info@kelman.ca

EDITOR - Cheryl Parisien

DESIGN/PRODUCTION - Jackie Magat

MARKETING MANAGER - Al Whalen

ADVERTISING COORDINATOR - Stefanie Hagidiakow

Send change of address to:

IPAC Canada
 P.O. Box 46125, RPO Westdale,
 Winnipeg, MB R3R 3S3
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- 225 Pandemic preparedness of B.C. paramedics
- 232 Preventing infections in mother-baby care units
- 237 Cleaning verification in medical device reprocessing: Is this required?

IPAC CANADA NEWS

- 247 President's Message
- 249 Message de la présidente
- 251 From the Executive Desk
- 253 CIC® Graduates
- 254 Elections
- 257 2016 National Education Conference
- 259 Bring in a New Member
- 261 Ecolab Poster Contest

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Ramona Rodrigues, RN BSc MSc(A) CIC CNS
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Phone: 514-934-1934 Ext: 42047
Fax: 514-934-8427
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3560 Bathurst Street
Toronto, ON M6A 2E1
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Web Communications Manager
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Tel: 204-775-8975
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Membership Services Office

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Deliveries only:
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Kelli Wagner
Tel: 204-488-5027 Fax: 204-488-5028
Toll-Free: 1-855-488-5027
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¹Alfa, M.J., Lo, E., Olson, N., MacRae, M., Buelow-Smith, L. Use of a daily disinfectant cleaner instead of a daily cleaner reduced hospital-acquired infection rates, *Am J Infect Control* 2015; 43: 141-6

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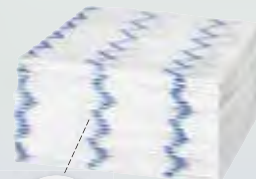
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The influence of patient room type, cleaning procedure, and isolation precautions on room cleaning times in Canadian acute care hospitals

Dick E. Zoutman, MD, FRCPC¹, B. Douglas Ford, MA², Keith Sopha, C.E.M.³, Brock Wylie, MA, C.E.M.⁴

¹School of Medicine, Queen's University, Tel: 613-969-7400 ext 2371 F: 613-969-0486, zoutmand@queensu.ca

²School of Medicine, Queen's University, Tel: 613 542-1992, bdford42@gmail.com

³President, Canadian Association of Environmental Management; President, CleanLearning, Fergus, ON, Tel: 519 993-2590, keithsopha@cleanlearning.org

⁴Consultant, Clean Measures, Cambridge, ON, brock.wylie@gmail.com

KEY WORDS:

Acute care hospitals; environmental services; environmental cleaning; isolation precautions

ABSTRACT

Background: There are few benchmarks available for times taken to clean hospital rooms. What data exists is not specific regarding hospital room type, cleaning procedure, and isolation precautions. This study determined benchmarks for terminal and daily routine cleaning of private, semi-private, and ward rooms, with and without isolation precautions.

Methods: The times needed for cleaning of patient rooms were assessed by means of an online survey completed by senior managers most responsible for Environmental Services in Canadian acute care hospitals.

Results: The response rate to the survey was 30 %; 72 surveys were received from 241 eligible facilities. Bonferroni multiple comparisons of daily routine and terminal cleaning times by patient room type and isolation precautions indicated that for all three room types, cleaning times were significantly longer when there were isolation precautions excluding *C. difficile* and due to *C. difficile* in place. Daily routine cleaning of occupied private rooms without isolation precautions took a median of 15 minutes whereas with isolation precautions in place due to *C. difficile* it took 33 minutes ($P < .0001$). Terminal cleaning of private rooms without isolation precautions took a median of 30 minutes whereas with isolation precautions in place due to *C. difficile* it took 58 minutes ($P < .0001$).

Conclusions: This study is the first to assess the added time spent to clean patient rooms when isolation precautions are in place. There is the need for further research to determine whether the reported room cleaning times allow for patient rooms to be sufficiently cleaned for infection prevention and control purposes.

INTRODUCTION

Hospital environmental cleaning and disinfection performed to the standards are important for prevention and control of healthcare-acquired infections (1-3). Almost 40 % of Canadian acute care hospitals were judged to be insufficiently clean for infection prevention and control purposes and a majority of Environmental Services/Housekeeping department managers reported they did not have enough staff to satisfactorily clean their hospitals (4-5). To aid in the determination of Environmental Services/Housekeeping staffing levels necessary to clean hospital rooms to standards, there is a need to know how long it takes to satisfactorily clean a hospital room. There are few benchmarks available for the time necessary to clean a hospital room to standard and these are not specific with regard to room type, cleaning procedure, and whether isolation precautions are present (6-7). Antibiotic resistant organisms are endemic in our hospitals and often necessitate more frequent and extensive cleaning activities (1-3, 8). The proposed study will determine benchmarks for the time needed to perform the cleaning and disinfection of patient rooms in Canadian healthcare facilities. Benchmarks will be determined for terminal and daily routine cleaning of private, semi-private, and ward rooms without isolation precautions and when under isolation precautions. The cleaning methods used will also be examined.

METHODS

The times needed for the cleaning of patient rooms to standards and the cleaning methods used in Canadian healthcare facilities were assessed with an online survey. Healthcare facilities that operated predominantly in English were eligible for inclusion in the study. The survey was completed by the senior manager most responsible for Environmental Services/Housekeeping. Respondents were asked how long it took to perform daily routine cleaning of occupied and terminal cleaning procedures for unoccupied private, semi-private, and ward rooms. Terminal cleaning, also known as discharge cleaning, refers to the comprehensive, deep cleaning of a patient room when the patient is discharged or transferred. Cleaning times were assessed for patient rooms without isolation precautions and for rooms under additional isolation precautions excluding *C. difficile* and for rooms under additional isolation precautions due to *C. difficile*. The times taken to remove and replace privacy curtains were also assessed. The methods used for the daily routine cleaning of floors and the manual cleaning of surfaces in patient rooms were examined. The cleaning methods and disinfectants used were assessed for patient rooms with additional isolation precautions due to *C. difficile*.

TABLE 1: Time to perform daily routine by patient room type and isolation precautions

	Private room (Mean [SD], Median)	Semi-private room (Mean [SD], Median)	Ward room (Mean [SD], Median)
No isolation precautions	17.3 (5.5), 15.0	27.9 (15.2), 25.0	34.2 (18.3), 30.0
Additional isolation precautions excluding <i>C. difficile</i>	23.8 (7.4), 20.0	37.0 (18.3), 30.0	44.6 (23.4), 40.0
Additional isolation precautions due to <i>C. difficile</i>	36.7 (13.2), 32.5	54.2 (28.8), 45.0	67.1 (41.7), 55.0

N = 34 to 46

Table 2: Effect of isolation precautions on time to perform daily routine cleaning

	Private Room (Mean Difference, p-value)	Semi-private Room (Mean Difference, p-value)	Ward Room (Mean Difference, p-value)
Isolation Precautions Excluding <i>C. difficile</i> vs No Isolation Precautions	10.6, P = .0005	13.2, P = .0005	17.6, P = .011
Isolation Precautions Due to <i>C. difficile</i> vs No Isolation Precautions	16.9, P <.0001	20.8, P <.0001	30.5, P <.0001
Isolation Precautions Due to <i>C. difficile</i> vs Isolation Precautions Excluding <i>C. difficile</i>	6.3, P = .04	7.6, P = .05	12.9, P = .07

Comparisons in this table are not significant unless the p-value is less than .017. N = 34 to 46

Respondent email addresses were obtained from the Canadian Association of Environmental Management and a commercial opt-in database. Respondents were contacted by email and second invitations to participate were sent to non-responders. Descriptive statistics were used to present the cleaning times and the cleaning methods used. Analysis of variance (ANOVA) with post hoc comparisons was used to test for cleaning time differences between patient rooms without isolation precautions and rooms under isolation precautions for private, semi-private, and ward rooms for terminal and daily routine cleaning procedures. The conservative Bonferroni multiple comparison test was used because it decreases the incidence of false-positive results.

RESULTS

The survey response rate was 30 %; 72 surveys were received from 241 eligible facilities. The majority of responding facilities were acute care hospitals with 50 surveys completed.

Long-term care facilities accounted for 16 completed surveys, mental health facilities five, and one was from a rehabilitation facility. Most acute care hospitals (84 %, 42 of 50) reported always cleaning patient care areas to published standards such as the Ontario Provincial Infectious Diseases Advisory Committee (PIDAC) recommendations or similar published best cleaning practices and the remaining 16 % (8 of 50) reported often cleaning to standards (1). The majority of non-acute care hospital healthcare facilities (73 %, 16 of 22) reported always cleaning resident care areas to published best cleaning practices, 5 % (1 of 22) reported often cleaning to standards and 23 % (5 of 22) reported sometimes cleaning to standards.

Almost all healthcare facilities (70 of 72) used past experience when determining cleaning time requirements for patient and resident care rooms. Half (53 %, 38 of 72) of facilities conducted time and motion studies, a third (33 %, 24 of 72) used individual task times, a third (32 %, 23 of 72) aggregated industry time standards, and a quarter (25 %, 18 of 72) used published standards.

Table 3: Time to perform terminal cleaning by room type and isolation precautions

	Private room (Mean [SD], Median)	Semi-private room (Mean [SD], Median)	Ward room (Mean [SD], Median)
No isolation precautions	30.4 (9.4), 30.0	46.7 (22.1), 40.0	58.4 (26.1), 52.5
Additional isolation precautions excluding <i>C. difficile</i>	39.2 (10.8), 40.0	60.5 (28.7), 55.0	74.9 (33.8), 60.0
Additional isolation precautions due to <i>C. difficile</i>	58.6 (23.1), 57.5	84.5 (37.8), 75.0	110.0 (60.5), 90.0

N = 22 to 42

Table 4: Effect of isolation precautions on time to perform terminal cleaning

	Private Room (Mean Difference, p-value)	Semi-private Room (Mean Difference, p-value)	Ward Room (Mean Difference, p-value)
Isolation Precautions Excluding <i>C. difficile</i> vs No Isolation Precautions	16.3, P = .001	21.3, P = .0007	25.9, P = .02
Isolation Precautions Due to <i>C. difficile</i> vs No Isolation Precautions	28.0, P <.0001	35.8, P <.0001	51.5, P <.0001
Isolation Precautions Due to <i>C. difficile</i> vs Isolation Precautions Excluding <i>C. difficile</i>	11.7, P = .03	16.7, P = .04	25.5, P = .04

Comparisons in this table are not significant unless the p-value is less than .017. N = 22 to 42

18 of 72) used workload software with standard task times. Respondents could indicate more than one method of determining cleaning time requirements.

DAILY ROUTINE CLEANING TIMES

There were only sufficient data to present meaningful results for the cleaning times for patient rooms in acute care hospitals. Patient room type and whether isolation precautions were present influenced the time to perform the daily routine cleaning of patient rooms in acute care hospitals (Table 1). It took the longest (Median 55.0 minutes) to perform the daily routine cleaning of a ward room with additional isolation precautions due to *C. difficile* and the shortest time (Median 15.0 minutes) to perform daily routine cleaning for a private room without isolation precautions. Post hoc comparisons of daily routine cleaning times by patient room type and whether isolation precautions were present indicated that for all three room types, the time it took to perform daily routine

cleaning was significantly less when there were no isolation precautions (Table 2). There were no significant differences for daily routine cleaning times between additional isolation precautions excluding *C. difficile* and additional isolation precautions due to *C. difficile*.

TERMINAL CLEANING TIMES

Patient room type and the presence of isolation precautions influenced the time to perform terminal cleaning of patient rooms in acute care hospitals (Table 3). It took the longest (Median 90.0 minutes) to perform terminal cleaning of a ward room with additional isolation precautions due to *C. difficile* and the shortest time (Median 30.0 minutes) to perform terminal cleaning for a private room without isolation precautions. Post hoc comparisons of terminal cleaning times indicated that for private and semi-private rooms, the time it took to perform terminal cleaning was less when there were no isolation precautions (Table 4). For ward rooms, it took

less time for terminal cleaning without isolation precautions than it did when there were isolation precautions due to *C. difficile*. There were no significant differences in terminal cleaning times between rooms with additional isolation precautions excluding *C. difficile* and rooms with additional isolation precautions due to *C. difficile*.

HOSPITAL CLEANING METHODS

The most frequent method used for the daily routine cleaning of floors was dry mop followed by damp mop (2-step) for 82 % (28 of 34) of hospitals and the dry/damp mop combined (1-step) method was used in 18 % (6 of 34). For dry mopping, when practiced separately, 65 % (22 of 34) of hospitals used microfiber flat mops and 26 % (9 of 34) used cotton/ rayon treated or electrostatic mops. For the wet/damp cleaning of floors, the string mop and bucket/wringer combination was used by 41 % (13 of 32) of hospitals and flat mops with pre-treated solution reservoir on carts by 31 % (10 of 32). The techniques for manual cleaning and disinfection of surfaces for the daily routine cleaning of patient rooms most frequently used were solution reservoir and cloth (pre-treated cloths discarded when soiled) (37 %, 10 of 27), solution dispenser and cloth (moisten cloth and discard cloths when soiled) (37 %, 10 of 27), and solution, bucket and cloth (dunk, rinse cloth, change soiled solution and discard cloth at end of room clean) (26 %, 7 of 27). Natural fiber (e.g., cotton) cloths were used most frequently for the daily routine cleaning of patient rooms in 59 % (20 of 34) of hospitals and microfiber in 38 % (13 of 34). At most hospitals (93 %, 41 of 44) ladders were used to remove and replace privacy curtains. The mean time it took to remove privacy curtains was 8.5 (SD 4.4) minutes with a median of 10.0 minutes. The mean time it took to replace privacy curtains was 11.3 (SD 6.5) minutes also with a median of 10.0 minutes.

Respondents were queried as to whether their hospital was testing any new technologies for disinfecting patient rooms. Ultraviolet light was being tested in 20 % (10 of 50) of hospitals, steam in 14 % (7 of 50), and hydrogen peroxide vapor or mist in a single hospital.

CLEANING ROOMS WITH ADDITIONAL ISOLATION PRECAUTIONS DUE TO *C. DIFFICILE*

The cleaning of patient rooms with additional isolation precautions due to *C. difficile* was performed twice a day in 79 % (34 of 43) of acute care hospitals and daily in 21 % (9 of 43). The cleaning and disinfecting in one step “one clean” method was used for patient rooms with additional isolation precautions due to *C. difficile* in 56 % (24 of 43) of hospitals. When the cleaning and disinfecting in one step method was used for patient rooms with additional isolation precautions due to *C. difficile*, sporicidal activated hydrogen peroxide (63 %, 15 of 24) and hydrogen peroxide (42 %, 10 of 24) were the disinfectants most frequently used. Respondents could indicate more than one disinfectant for both the one clean and double clean methods. The cleaning step followed by disinfecting step “double clean” method was used in

44 % (19 of 43) of hospitals. When the first step of the double clean method was performed, sporicidal activated hydrogen peroxide (47 %, 9 of 19) was the disinfectant most frequently used. For the second step of the double clean method, sporicidal activated hydrogen peroxide (29 %, 7 of 24) and chlorine (21 %, 5 of 24) were the disinfectants most frequently used.

DISCUSSION

This study demonstrated that cleaning times for hospital rooms in Canadian acute care hospitals were dependent on the type of patient room, the cleaning procedure, and whether isolation precautions were in place. As would be logically expected, it took longer to perform the cleaning of wards versus semi-private rooms and longer to clean semi-private than private rooms. Also as expected, it took longer to perform terminal cleaning which involves a greater number of tasks than the daily routine cleaning of occupied rooms. It was demonstrated that it took longer to perform both daily routine and terminal cleaning of patient rooms when isolation precautions were present than in rooms without isolation precautions. The present study has provided Environmental Services/Housekeeping managers and hospital administrators with benchmarks of the time taken to perform the cleaning and disinfection of patient rooms in acute care hospitals. This study was the first to assess the added time necessary to clean patient rooms when isolation precautions were in place. These benchmarks will aid in determining cleaning staff levels in order that patient rooms are cleaned and disinfected with the necessary frequency and completeness for infection prevention and control purposes.

Respondents were asked to provide the time taken to clean hospital rooms under various conditions to standards; however, there is the question of whether they provided the time needed to adequately clean the room or the time allotted for the task. The time taken to clean a room is not necessarily associated with the cleanliness of the room (9). A minority of hospitals (16 %) in the present study reported that they did not always clean to standards. An examination of cleaning methods also indicated that patient rooms were not always cleaned to standards. A fifth of hospitals only cleaned rooms with isolation precautions due to *C. difficile* once a day instead of the recommended twice a day (1). It is also recommended patient rooms with isolation precautions due to *C. difficile* be disinfected with sporicidal agents and a fifth of hospitals did not follow this practice (1). To answer whether the times provided were adequate to clean patient rooms to standards, the cleaning of rooms needs to be audited. The need for Canadian acute care hospitals to conduct more cleaning audits was previously identified (5).

The times reported for the daily routine cleaning of occupied rooms by survey respondents in the present study are longer than the times assessed by direct observations of the daily routine cleaning of occupied

rooms in Canadian acute care hospitals (10). The observed daily routine cleaning time of a private occupied room was a mean of 11.5 minutes and the mean was 17.3 in the present study and the mean observed daily routine cleaning time of a semi-private occupied room was 14.0 minutes while in the present study it was 27.9 minutes. The mean time of 30.4 minutes for the terminal cleaning of a private room in the present study was in line with the observed mean of 28.5 minutes. It is reasonable to expect that cleaners being observed and aware they were being observed would work faster than normal. The use of cameras to make many observations over an extended length of time would provide a more accurate picture of cleaning times.

One limitation of this study is that only acute care hospital response was included in the data analysis. Another limitation is only fifty acute care hospitals completed the survey, yielding the response rate of only 30 %. Potential respondents were contacted by email. While the use of email can expedite and reduce the cost of research, it would be a better choice for future projects to combine the use of email and standard mail survey invitations.

The room cleaning times benchmarks presented in this study have limitations and might be best considered as preliminary estimates of the times needed for the terminal and daily routine cleaning of private, semi-private, and ward rooms without isolation precautions and when under isolation precautions. There is the need for further research to validate the benchmarks presented in this paper, to determine whether the reported room cleaning times allow for patient rooms to be sufficiently cleaned for infection prevention and control purposes.

REFERENCES

1. Ontario Agency for Health Protection and Promotion, Provincial Infectious Diseases Advisory Committee. Best Practices for Environmental Cleaning for Prevention and Control of Infections in All Health Care Settings. 2nd Revision. Toronto: Queen's Printer for Ontario; 2012.
2. Dancer SJ. The role of environmental cleaning in the control of hospital-acquired infection. *J Hosp Infect.* 2009; 73:378-85.
3. Donskey CJ. Does improving surface cleaning and disinfection reduce health care-associated infections? *Am J Infect Control* 2013; 41:S12-19.
4. Zoutman DE, Ford BD, Sopha K. The working relationships of infection prevention and control programs and environmental services and associations with antibiotic-resistant organisms in Canadian acute care hospitals. *Am J Infect Control.* 2014; 42:349-352.
5. Zoutman DE, Ford BD, Sopha K. (2013). The state of environmental services in Canadian acute care hospitals: Cleaning resources and activities. *Am J Infect Control.* 2014; 42:490-4.
6. Association for Healthcare Environment (2009). Practice Guidance for Healthcare Environmental Cleaning, Second Edition. Chicago: American Hospital Association.
7. International Sanitary Supply Association (2015). ISSA 540 Cleaning Times. Retrieved from <https://www.parish-supply.com/pdf/ISSA-Cleaning-Times.pdf>
8. Zoutman DE, Ford BD. 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. *Am J Infect Control* 2008; 36: 711-717.
9. Rupp ME, Adler A, Schellen M, Cassling K, Fitzgerald T, Sholtz L, Lyden E, Carling P. The time spent cleaning a hospital room does not correlate with the thoroughness of cleaning. *Infection Control and Hospital Epidemiology.* 2013; 34:100-102.
10. Wylie B, Sopha K. Time Standards. Abstract presented at the Canadian Association of Environmental Management Annual Meeting, Collingwood, Ontario, September 2014. 🍁

Northern healthcare students' perceptions of hand hygiene in community practice

Stephanie Vendetti-Hastie, RN, BScN, CIC¹, Shannon Dowdall-Smith, PhD, RN², Phyllis Montgomery, RN, PhD³

¹Public Health Nurse, Sudbury & District Health Unit, 1300 Paris Street, Sudbury, Ontario, Canada, hasties@sdhu.com, 705-522-9200, ext. 366, Fax: 705-677-9624

²Foundational Standard Specialist, Sudbury & District Health Unit, Paris Street, Sudbury, Ontario, Canada

³Professor, School of Nursing, Laurentian University, Ramsey Lake Road, Sudbury, Ontario, Canada

KEY WORDS

hand hygiene, undergraduate students, perceptions, q methodology

ABSTRACT

Background: While there is some literature addressing healthcare student hand hygiene practices in acute care settings, less is known of students' hand hygiene practices in community healthcare settings. This study describes undergraduate healthcare students' perspectives of hand hygiene at the beginning of their public health clinical placement in northeastern Ontario.

Methods: Using Q methodology, 57 students from three health discipline programs sorted 34 statements about hand hygiene perceptions and practices. These statements were developed from a scoping review of student-sampled hand hygiene evidence published after 2007. Q analysis was used to identify correlations between students who held similar and different perspectives concerning hand hygiene.

Results: The results yielded three discrete perspectives about priorities for engaging in hand hygiene. These included perceived protection; personal- and empirical-informed assessment; and availability of traditional hand hygiene supplies. Common across these perspectives was consensus that illness prevention and health protection influenced students' intention to engage in hand hygiene in community healthcare settings.

Conclusions: These findings have the potential to inform the development of a healthcare student orientation curriculum in the public health or community healthcare setting specifically regarding infection prevention and control and hand hygiene.

INTRODUCTION

One of the most significant practices in the prevention and control of the spread of infection is hand hygiene (HH). Despite the volume of literature demonstrating the association between poor HH practices and transmission of pathogens in acute healthcare settings, healthcare provider (HCP) compliance with HH recommendations is generally low (1,2). As there is a scarcity of HH statistics particular to the community healthcare setting it is assumed that compliance among community healthcare providers would be similarly low.

Infection prevention and control strategies specially aimed at increasing HH compliance have been implemented with limited sustainability and although improvements are being made, there continues to be many challenges (3). This may be due in part to numerous constraints, particularly those relating to the very infrastructure and resources required to enable attention to turn to HH improvement (4), as well as the importance of social norms and culture for compliance with HH guidelines (2). To achieve more pronounced, successful and sustainable outcomes more information is needed to understand the behavioural determinants of HH compliance (5). It is imperative that the enablers and barriers to HH be assessed and addressed in order to support the health care provider and promote compliance (3). Programs to improve HH compliance must take into account the major barriers

to altering an individual's pre-existing HH behaviour (4). As most healthcare providers do not begin their careers until their early twenties, improving compliance means modifying a behaviour pattern that has already been practiced for decades and continues to be reinforced in community situations (3,4). Sustained alteration to this ritualized behaviour is difficult to achieve (3).

The HH practices of healthcare students are an important area to examine as they are the future healthcare workforce and are an important part of/have a contributory role in the healthcare environment throughout their practicum. While students' self-reported intention to engage in HH practice may be typically ranked as high, their observed behaviour in accordance with recommended guidelines is generally low (6,8). The gap between intention to and enactment of HH is attributed to diverse inherent and non-inherent HH practices (3). Additionally, external factors such as workload, insufficient time, interference with HCW/patient relationship, forgetfulness and lack of role models have been described as factors for poor adherence (4).

Although HH behaviours of healthcare providers have been reported in the literature, there is little evidence regarding the behaviours of healthcare students, particularly in the context of community healthcare. The relative importance of these behaviours influencing HH practice has also not been widely documented. As students will bring their pre-established

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patterns of HH behaviour into the healthcare setting, there is a need to further explore the HH perceptions, attitudes and beliefs of healthcare students that may influence their practice of HH within the healthcare setting.

This study reports on undergraduate healthcare students' perspectives about HH practices within a community healthcare learning context. Exploration of student HH perspectives may guide community clinicians as they endeavour to improve the science and art of infection prevention and control education. Study results can theoretically and empirically inform the offering of future education sessions about infection prevention and control and in turn influence community healthcare students' enactment of HH.

METHODS

Design

The design of this study is Q methodology, an approach that allows for the operationalization of participants' perceptions about a phenomenon for the purpose of yielding a theoretical understanding (9, 10). Researchers from numerous health disciplines use this design, including those with a public health orientation. For example, Akhtar-Danesh and associates used Q methodology to investigate Canadian parents' shared and diverse perceptions concerning the causes, impact and prevention of childhood obesity (11). To explore diverse and contrasting points of view, a mixed group of 40 to 60 participants is optimal for Q methodology (9, 12). The reliability and validity of Q methodology has been verified in multiple studies (11, 12).

Setting and sample

This study received ethical approval from the Research Ethics Review Committees of the participating clinical and educational partner institutions. The study's setting was a single public health unit in Northeastern Ontario, Canada. It employs over 200 health professionals and services a population of approximately 194,620 urban and rural residents distributed across a geographical region of over 46, 550 square kilometres. Given the unit's centrality to a variety of undergraduate institutions, it is a common site for the placement of students from nursing, medicine, dental hygiene and other health-related programs. At the initiation of a student placement, students must attend an orientation forum which includes an instructional session on infection control. This interactive session provided a venue for students to process their HH perceptions.

Participants for this study were recruited during three infection control orientation forums for students. The students had professional affiliations to nursing, medicine, or dental hygiene programs. Year of study in each respective program ranged from first to final year. The total number of student registrants was 57. Inclusion criteria were students registered in a post-secondary health program and willingness to provide informed consent.

Data collection

One of the researchers with extensive public health background and infection control knowledge led each orientation session. At each session, there was the opportunity for all students to

Table 1: List of Q Statements

Assigned number	Q Statement
1	How busy I am
2	The overall appearance of the client and environment
3	Personal habits
4	The need to protect health
5	Awareness of evidence that shows hand hygiene protects my health
6	How much time I have
7	Personal discretion
8	The emphasis of hand hygiene in my program
9	Awareness of evidence that shows hand hygiene protects me/my family
10	The need to 'fit in' with others
11	The skin integrity of my hands
12	Competing priorities
13	Access to water
14	Access to clean linen to dry my hands
15	My hands appear dirty
16	My level of energy
17	Access to soap
18	Placement-specific policies/procedures
19	Posters reminding me to do so
20	Proximity of a sink
21	Access to alcohol based hand rub
22	The role modeling of senior staff
23	Use of gloves
24	Knowledge about hand hygiene techniques
25	Access to disposable towels
26	How easy it is to perform
27	The need to prevent disease
28	Whether I'm being evaluated
29	Familiarity with a client
30	Being shown "how to" during this placement
31	The need to role model for others
32	Having direct contact with a client's environment
33	Having direct contact with a client
34	The risk of transmitting infection

designed to contain 34 empty boxes, one per statement, arranged as a pyramid with two endpoints labeled as Least Important (-4) to Most Important (+4). There is one box at each end of the distribution with the greatest number of boxes available in the centre or “Neutral” column of the distribution. This ‘quasi-normal distribution’ is to encourage students to consider each statement systematically (9) and to visualize their perspectives (11) about HH.

The prompt above the inverted pyramid was, “Factors influencing my HH practices are ...” Prior to the placement of a Q statement into the Q template box, students were instructed to begin by reading all the 34 statements, and initially sort them into three piles: least important, neutral, and most important. Next, from the most important pile, the students were asked to select one statement that they identified as being the most important factor and place it in the far right column (+4) of the Q template. Then, students were directed to identify one statement from the least important pile as being the least important factor and place it in the far left column (-4). Students continued the process of sorting and placing each statement card remaining from the three piles onto the Q template. Once all the cards were placed on the Q template, students were asked to review their sorting to ensure that their perceptions of HH were accurately represented. Students then recorded the number on the back of each statement card on the corresponding box of the Q template. This 20-minute activity was followed by an instructor facilitated group discussion concerning students’ rationale for their assigned ranking of statements. At the end of the discussion, students had the option

to submit a signed consent, their Q template for Q analysis, and a study designed demographic form of seven items. Upon signing the consent, students became study participants.

Data analysis

Descriptive analysis was used to tabulate the demographic information. Q analysis was undertaken using a combination of centroid factor analysis and varimax rotation within the program PQ Method 2.11 (16). As Watts and Stenner explain, Q analysis is a by-person factor analysis identifying groups of respondents who share similar or dissimilar perspectives in relation to a particular set of statements (10). No one perspective is superior or objective. Rather breadth and diversity of perspectives are valued in Q methodology (17). The Q analysis of 57 Q sorts yielded three discrete and one consensus perspective. Each perspective was discussed and theoretically interpreted by the researchers. Based on their interpretation, each perspective was assigned a descriptive label to capture the factor influencing student HH practices in the community healthcare setting.

RESULTS

The Q analysis yielded three discrete perspectives and one consensus perspective. The three discrete perspectives were labeled perceived protection; personal- and-empirical-informed assessments; and availability of traditional HH supplies. The consensus across the three perspectives was labeled illness prevention and health protection, a collective understanding that aligns with the public health mandate.

Table 2: Perceived protection

Item	Ranking
Need to protect health	3
Awareness of evidence that shows hand hygiene HH protects me/my family	3
Awareness of evidence that shows hand hygiene protects my client	3
Personal habits	2
The emphasis of hand hygiene in my program	1
Placement specific policies/procedures	1
The need to role model for others	1
The overall appearance of the client and environment	1
Use of gloves	0
Access to alcohol based hand rub	0
Competing priorities	0
Being shown “how to” during this placement	-1
Proximity of a sink	-1
Whether I’m being evaluated	-3

Perspective 1: Perceived Protection

The first perspective was labeled perceived protection. It was comprised of 14 statements (Table 2) that received rankings from 3 to -3. Protection of self, family, and client, informed by different types of knowing, was perceived as most influential in students' intention to engage in HH practices. Sources of knowledge ranked as somewhat important and were personal, clinician, educational, and policy in nature. The statements addressing use of gloves, access to alcohol based hand rub and competing priorities received a neutral ranking. Of less importance were the demonstration of HH skills and distance from a sink. Of least importance to their intention to enact HH practices was the evaluative component of their learning.

Perspective 2: Personal- and empirical-informed assessment

The second perspective, labeled as personal- and empirical-informed assessment, was composed of 15 statements that received rankings ranging from 4 to -4 (Table 3). Students' overall assessment of the client and environment had the highest influence on their intention to perform HH. This assessment was confounded by time constraints, the skin integrity of their hands, and client familiarity. Organization of priorities and the use of gloves were somewhat important in their assessment of the situation. Students' assigned a neutral ranking to being evaluated as learners, being busy, or personal HH practices. Of lesser importance was academic and procedural knowledge as well as role modelling of HH by clinicians. The statement identified as having the

least influence on their intention to perform HH was a demonstration of this skill particular to community health.

Perspective 3: Availability of traditional HH supplies

The third perspective, availability of traditional HH supplies, was composed of 13 statements addressing resources for HH typically accessed in a healthcare setting. These received rankings from 3 to -3 (Table 4). Intention to perform HH was most likely with access to soap, water, clean linen, and gloves. Personal practices, programmatic expectations, and access to disposable towels were somewhat important. HH competency in relation to the setting's procedural policies neither strengthened nor weakened their HH performance intentions. Of less importance for HH was the appearance of the client and environment and contextual influences such as competing priorities. The least important HH influence was being evaluated as a learner.

Consensus: Illness prevention and health protection

A consensus perspective was identified based on the similar ranking of seven statements across the above three discreet perspectives (Table 5). These received rankings from 4 to -4. This agreement, labeled illness prevention and health protection, represents students' cognitive congruency with the mandate of individual and public safety. Students consistently identified personal discretion as neutral, neither promoting nor hindering HH practices. Their sense of belonging to the community healthcare setting was ranked least important with regards to their intention to engage in HH.

Table 3: Personal- and empirical-informed assessment

Item	Ranking
The overall appearance of the client and environment	4
How much time I have	3
The skin integrity of my hands	2
Familiarity with a client	2
Competing priorities	1
Use of gloves	1
Whether I'm being evaluated	0
How busy I am	0
Personal habits	0
My level of energy	-1
Knowledge about hand hygiene techniques	-1
The emphasis of hand hygiene in my program	-3
Placement specific policies/procedures	-3
The role modeling of senior staff	-3
Being shown "how to" during this placement	-4

DISCUSSION

The available evidence to support HH as an efficient and effective infection control practice is plentiful. Evidence has been used to inform HH practice recommendations including the development of indications for HH; product choice and efficacy; use of barriers such as gloves; etc. (3, 4). Studies of adherence have been completed among various categories of healthcare providers to inform our understanding of compliance (4, 5). HH knowledge, beliefs and practices have been studied among some multidisciplinary healthcare providers to help inform our understanding of these complex subjective influences (2, 4, 5), however, much more research is needed in this area. Additionally, there are gaps in evidence pertaining to the HH practices, knowledge, beliefs and attitudes of healthcare students. This is significant as it has been reported that a lack of compliance with HH standards

among healthcare students leads to poor compliance among healthcare professionals in praxis (18).

In this study, factors that influenced the intention of students to engage in HH could be grouped into three discreet perspectives: protection of self, family, and client; assessment of the client and environment; and access to HH supplies. The students' perspective that demonstrated the highest impact on intention, as it crossed each of the three discreet results, was the consensus to protect health and prevent illness. These results provide insight into the intentions of healthcare students in northeastern Ontario.

The results in this study were similar to many of the themes within the HH literature that have been identified as influencing HH practice of healthcare providers/students including knowledge, access to HH supplies, application of theoretical knowledge, and the external motivation of protecting self and/or others.

Table 4: Availability of traditional HH supplies

Item	Ranking
Access to soap	3
Access to water	3
Use of gloves	3
Access to clean linen to dry my hands	3
Personal habits	1
The emphasis of hand hygiene in my program	1
Access to disposable towels	1
Being shown "how to" during this placement	0
My hands appear dirty	0
Placement specific policies/procedures	0
The overall appearance of the client and environment	-1
Competing priorities	-1
Whether I'm being evaluated	-3

Table 5: Consensus: illness prevention and health protection

Item	Frequent Ranking
The risk of transmitting infection	+4
The need to prevent disease	+4
Having direct contact with a client	+2
Personal discretion	0
How easy it is to perform	-1
Posters reminding me to do so	-2
The need to "fit in" with others	-4

There were several factors described in the literature as influencing the HH practice of healthcare providers/students that did not rank high among students in our study. Contrariwise, they were ranked as low/least important across both discrete and consensus viewpoints. For the purposes of our study, these factors were themed as “workplace/environmental culture” and include such concepts as socialization; social support; “fitting in” to the workplace/environment; role models; the importance or priority placed on HH by the workplace; support from superiors; education and training programs; and feedback on HH practice. These factors have been described in the literature as having importance in positively influencing the HH behaviour of healthcare providers. Workplace culture has also been reported in the literature as a factor that influences healthcare students’ HH compliance and that students follow the HH practices of their mentors to maintain a positive relationship and to be accepted as part of the [nursing] team (19). As such, these concepts are reflected in international, national and provincial HH best practice guidelines and are included as key components of many HH programs being offered in healthcare facilities. Much further exploration of this incongruence of local findings regarding workplace culture influences is needed to better understand its impact, if any, on HH compliance of students on placement in healthcare settings.

CONCLUSION

Healthcare students receive theoretical and practical education and training on HH from a variety of sources. This education is provided as part of the program specific curriculum; as well as through formal and informal learning opportunities within clinical placements. HH educators and influencers are academic professors, clinical instructors, staff preceptors/mentors and other health care workers to whom students are exposed.

Although presented as a simple, mechanical procedure, compliance associated with HH is in fact very complex and incorporates knowledge and behaviours at many levels (8). While some studies are available to inform knowledge regarding the beliefs of healthcare students concerning HH, there is a gap in available Canadian literature to inform our understanding of the beliefs of local students. HH promotional programs should focus on factors known to influence behaviours (3). Having local evidence is integral to developing relevant orientation for students new to community health.

This study suggests that there are diverse perspectives on the factors known to influence the HH behaviour of healthcare students. It is imperative that the enablers and barriers to HH are assessed and addressed in order to support the health care provider and promote compliance (3). As such, it is important that educators and preceptors explore student perspectives regarding HH and adapt teaching strategies to address divergent perspectives. Doing so will improve the science and art of providing infection prevention and control education to healthcare students.

REFERENCES

- 1 Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Best Practices for Hand Hygiene in All Health Care Settings (3rd edition). 2010. Toronto, ON: Queen’s Printer for Ontario.
- 2 Erasmus V, Brouwer W, van Beeck EF, Oenema A, Daha TJ, Richardus JH, et al. A qualitative exploration of reasons for poor HH among hospital workers: Lack of positive role models and of convincing evidence that HH prevents cross-infection. *Infect Cont Hosp Ep* 2009; 30(5): 415-419.
- 3 Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Best Practices for Hand Hygiene in All Health Care Settings (4th edition.). 2014. Toronto, ON: Queen’s Printer for Ontario.
- 4 World Health Organization. WHO guidelines on hand hygiene in health care: First global patient safety challenge. Clean care is safer care. 2009. Retrieved November 5, 2014 from http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf
- 5 Erasmus V, Daha TJ, Brug H, Richardus JH, Behrendt M, Vos M, vanBeek EF. Systematic review of studies on compliance with hand hygiene guidelines in hospital care. *Infect Cont Hosp Ep* 2010; 31(3):283-294.
- 6 Waltman PA, Schenk LK, Martin TM, & Walker J. Effects of student participation in HH monitoring on knowledge and perception of infection control practices. *J Nurs Educ* 2011; 50(4): 216-221.
- 7 Celik S, Kocaslil S. Hygienic hand washing among nursing students in Turkey. *Appl Nurs Res* 2008; 21: 207-211.
- 8 Cole M. Exploring the HH competence of student nurses: A case of flawed self-assessment. *Nurse Educ Today* 2009; 29(4):380-388.
- 9 McKeown B, Thomas D. Q methodology. Newbury Park, CA: Sage. 1988.
- 10 Watts S, Stenner P. Doing Q methodology: Theory method and interpretation. *Qual Res Psychol* 2005; 2:67-91.
- 11 Akhtar-Danesh N, Dehghan M, Morrison KM, Fonseka S. Parents’ perceptions and attitudes on childhood obesity: a q-methodology study. *J Am Acad of Nurse Pract* 2011; 23:67-75.
- 12 Dziopa F, Ahern F. A systematic literature review of the applications of Q-technique and its methodology. *Methodology* 2011; 7(2):39-55.
- 13 Arksey H., & O’Malley L. (2005). Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19-32.
- 14 Davis k, Drey N, Gould D. What are scoping studies: A review of nursing literature. *Int J Nurs Stud* 2009; 46(10): 1386-1400.
- 15 Levac, D., Colquhoun, H., & O’Brien, K. (2010). Scoping studies: Advancing the methodology. *Implementation Science*, 5, 69.
- 16 Schmolck P. PQMethod (Version 2.11) [Computer software]. Neubiberg: University of the Bundeswehr Munich. 2002. Retrieved from <http://www.lrz-muenchen.de/~schmolck/qmethod/downpqx.htm>
- 17 Brown S. Political subjectivity: Applications of Q methodology in political science. New Haven CT: Yale University Press. 1980
- 18 Kelcikova S, Skodova Z, Straka S. Effectiveness of hand hygiene education in a basic nursing school curricula. *Public Health Nurs* 2012; 29(2): 152-159.
- 19 Barrett R, Randle J. Hand hygiene practices: nursing students’ perceptions. *J Clin Nurs* 2008; 17(14): 1851-1857. 🌸

ORIGINAL ARTICLE

Pandemic preparedness of B.C. paramedics

Kerry Alexander Roberts, MA, BSc., PCP¹, Elizabeth Bryce, MD, FRCPC²

¹Kerry Alexander Roberts, 6495 Central Road, Hornby Island, BC V0R 1Z0, kerryroberts@telus.net

²Vancouver Coastal Health and University of British Columbia

KEY WORDS

pandemic, preparedness, emergency, health, paramedic, infection prevention, infection control, surge capacity, disaster and emergency management.

ABSTRACT

Pandemics are an imminent threat to the operability and continuity of emergency health services (EHS). This research examined the pandemic preparedness levels of paramedics, their infection prevention and control (IPC) practices and EHS surge capacity. A cross-sectional convenience sample of paramedics from a Canadian EHS agency were surveyed to examine their knowledge of IPC practices, compliance with procedures, and intent and willingness to report for duty during a pandemic. Data from the surveyed respondents suggested that specific knowledge was marginal, compliance with practices moderately low, and confidence in EHS pandemic preparedness less than optimal. Despite these results, the majority of respondents have the intent and willingness to report for work during a pandemic. Recommendations on improving pandemic preparedness and meeting surge capacity expectations for EHS agencies are presented.

INTRODUCTION

Pandemic preparedness is a necessary and vital process to ensure healthcare systems are equipped and organized for pandemics, and consistent with globally and locally developed policies and procedures. The World Health Organization (WHO) (1) and specifically for Canada, the Public Health Agency of Canada (PHAC) (2;3) have guidelines that encourage the creation of provincial guidelines and policies. This federal and provincial guidance provides the framework for pandemic preparedness plans of health authorities, such as EHS. Effective pandemic response hinges on the proper field application of this framework. As part of the evaluation process, expected practices of a preparedness plan should be examined to ensure that guidelines are understood and policy is both appropriate and adhered to.

The purpose of this research was to examine the overall pandemic preparedness levels of paramedics through a cross-sectional survey. The multiple factors that contribute to preparedness and workers' intentions to comply with reporting for work were collected with emphasis on infection prevention knowledge, actual practices and compliance with existing guidelines, policies and procedures.

METHODS

This research examined the overall pandemic preparedness levels of paramedics and the multiple factors that contribute to it. Preparedness was categorized into the following specific domains: a) competency and knowledge of infectious disease and IPC practices; b) compliance and intent to comply with procedures, and; c) intent and willingness to report for work. Current benchmark guidelines from government health care and disease control agencies (1-3), and the EHS

agency's infection control manual were referenced for questionnaire development. Further revision occurred after consulting with content-experts, reviewing similar survey-style research in this area (4-6), and by testing drafts among a sample population of paramedics.

Participants and questionnaires: Using cross-sectional convenience sampling, paramedics employed by a Canadian EHS program were emailed a link to an internet-based questionnaire with 64 questions. The responses from the questionnaire were answered using a five-point Likert scale, a checklist of items, multiple-choice questions of four possible answers, or a ranking question. The survey program was active from April 24, 2012 to May, 7 2012, available 24 hours a day. This permitted the questionnaire to be accessed by fulltime and part time paramedics working different shift patterns. The survey program was monitored in real-time to maintain the ability to mitigate any technical difficulties. Upon closing of the survey, questionnaires missing responses from three or more sections, missing demographic responses, or an EMA level that did not meet the inclusion criteria were excluded from data analysis.

Statistical analysis: Inferential statistics were used to further the response variables based on the descriptions of data. Relationships between variables were analyzed using cross tabulation to display multivariate frequency distributions. Fisher's exact test was used to measure the association between variables using an online data analysis tool (7). Two-sided (two-tailed) p values were reported (8). Correlation coefficients were calculated to show the strength in relationships between pairs of response variables. The potential for relationships was examined between knowledge and compliance,

Table 1: Demographics of survey population

Characteristics	n (%)
Sex	370
Female	120 (32%)
Male	250 (68%)
Age	370
19 to 25 years	30 (8%)
26 to 35 years	87 (24%)
36 to 45 years	103 (28%)
46 to 55 years	103 (28%)
> 55 years	47 (13%)
EMA level/Certification	370
Emergency Medical Responder (EMR)	42 (11%)
Primary Care Paramedic (PCP)	288 (78%)
Advanced Care Paramedic (ACP)	28 (7.6%)
Critical Care Paramedic (CCP)	9 (2.4%)
Other	3 (<1%)
Work Location	365
Metropolitan Area(s)	143 (39%)
Rural Area(s)	222 (61%)
Employment Status	370
Fulltime	166 (45%)
Part Time	204 (55%)
Years Worked (Current EHS)	367
< 1 year	30 (8.2%)
1 to 5 years	71 (19%)
6 to 15 years	117 (32%)
16 to 25 years	89 (24%)
> 25 years	60 (16%)
Years Worked (other EHS)	370
N/A	271 (73%)
< 1 year	28 (7.6%)
1 to 5 years	34 (9.2%)
6 to 15 years	23 (6.2%)
16 to 25 years	10 (2.7%)
> 25 years	4 (1.1%)

confidence and intent/willingness to report to work, and compliance and intent/willingness to report to work. Response frequencies from various questions were also compared to assess for relationships. Data from ranking questions were assessed based on the frequency of responses being selected first. Relevant results from the reviewed literature were used to determine if any similar trends or consistencies existed.

RESULTS

Upon survey closure, 370 completed and partially completed questionnaires were available for data analysis. The overall response rate was 9.5% and 65% of participants that started the questionnaire either completed it or partially completed it to meet the inclusion criteria as described in the methods. Table 1 displays demographics and Table 2 summarizes the knowledge questions and the percent of correct answers to each. Table 3 documents the percent self-reported compliance with infection control practices.

Two knowledge questions asked specifically about where pandemic information is generated and where it can be referenced. When asked which department within the agency is responsible for updating and communicating preparedness plans to staff the most frequent answers were Occupational Health and Safety (48%, 175/367) and Emergency Management (36%, 133/367). Respondents most frequently answered correctly to the specific name of the infection control document (38%, 139/365). Forty-five percent (165/366) of respondents strongly disagreed with the statement asking whether they were aware of their agency's pandemic preparedness plan. In regards to confidence, of 370 respondents, 154 (42%) were "not confident" and 83 (22%) "mildly confident" in their EHS agency's pandemic preparedness levels. Of 370 respondents, 81 (22%) and 104 (28%) indicated that they were "not confident" and "mildly confident", respectively, with their own personal pandemic preparedness. The most frequent response for confidence in personal preparedness was "moderately confident" at 29% (108/370).

Knowledge and competency was also evaluated by asking respondents the activities and content of training sessions and yearly N95 respirator fit testing. When asked if their employer had organized yearly N95 respirator fit tests for them 81% agreed (219 "strongly agree" + 110 "somewhat agree" = 310/369). Forty-eight percent of respondents disagreed (92 "strongly disagree" + 86 "somewhat disagree" = 178/369) to the subsequent statement, "During my most recent fit test I was informed on how the N95 respirator will protect me from infectious disease."

The remaining scores were either in agreement or undecided. As noted by Table 2, the most frequent response to the multiple choice question asking about

Table 2: Summary of correct responses to knowledge questions

Correct Responses	Total responses	Percent Correct
N95 respirators filter 0.3 microns 95% of the time	368	57%
ABHR may cause less skin irritation compared to soap and water	368	14%
Hand hygiene is the single most important thing you can do to prevent infections	370	80%
Eye protection needs to be worn with respirator use	370	85%
PPE removal sequence - Remove gloves, remove fluid resistant gown, hand hygiene, remove eye protection, remove N95 respirator, hand hygiene	368	13%
Correct selection of PPE for diarrhea and vomiting scenario	369	65%
Correct selection of PPE for influenza like illness scenario	368	38%
Correct selection of PPE for tuberculosis illness scenario	367	68%
Bleach is not a cleaning agent	363	8%
Medical equipment used during a call should be cleaned after the call	358	98%
N95 respirators are designed to protect the user from inhaling airborne or aerosolized hazards	366	15%
Surgical masks are designed to prevent contamination due to the ejection of contagious droplets from the wearer.	367	83%

Table 3: Self-reported compliance with infection control practices

Practice	Frequency of compliance with activity				
	0 %	1 - 25 %	26 - 50 %	51 - 75 %	76 -100%
Perform hand hygiene between patient contacts. (n = 370)	0.00	2.7% (10)	2.7% (10)	13% (48)	82% (303)
Wear gloves when attending to patients. (n = 370)	0.00	2.7% (10)	6.0% (22)	23% (86)	68% (252)
Remove gloves after completing a patient specific task. (n = 369)	0.8% (3)	1.4% (5)	7.3% (27)	29% (108)	61% (226)
Clean and disinfect the ambulance and the stretcher after transporting a non-infectious patient. (n = 368)	4.6% (17)	14% (52)	23% (85)	29% (106)	29% (108)
Clean and disinfect the ambulance and the stretcher after transporting a patient with a suspected infectious disease. (n = 369)	0.00	1.36% (5)	1.4% (5)	6.0% (22)	91% (337)
Wear a N95 respirator when a patient has a tuberculosis-like illness (hemoptysis and fever). (n = 367)	0.8% (3)	1.4% (5)	4.4% (16)	15% (54)	79% (289)
Wear gloves and a gown when a patient has infectious diarrhea.(n = 368)	4.1% (15)	7.1% (26)	14% (52)	27% (98)	48% (177)
Wear gloves and eye protection when a patient has influenza-like symptoms. (n = 368)	3.8% (14)	10% (37)	13% (48)	33% (122)	40% (147)
Perform a fit check after applying a N95 respirator. (n = 369)	14% (50)	10% (38)	11% (40)	20% (74)	45% (167)
Clean my hands before I remove my N95 respirator and eye protection. (n = 368)	18% (67)	19% (70)	16% (58)	21% (79)	26% (94)
Wear a N95 respirator when conducting an aerosol-generating medical procedure on a patient with influenza-like symptoms. (n = 368)	12% (44)	14% (51)	15% (54)	21% (77)	39% (142)

how the N95 works, 57% (209/367) correctly indicated “Filtering particles 0.3 microns or larger 95 percent of the time.” Two questions also asked respondents about being instructed in proper selection and removal of PPE for both droplet, and airborne precautions during their last N95 fit testing session, of which 38% (141/367) and 39% (143/369) indicated they “strongly disagreed,” respectively. The most frequent response to the statement “During my most recent fit test I was instructed on how and when to perform a N95 fit check,” was “somewhat agree” (30%, 112/370).

Knowledge versus compliance and confidence with infection prevention activities. There was very little correlation between knowledge, compliance and confidence with the various infection prevention activities that mitigate exposure risk. For example, responses to the following statement, “how confident are you in your ability to correctly select and remove the appropriate Personal Protective Equipment (PPE) when required?” were compared to the question that asked participants to choose the best sequence for removing PPE after attending to a patient who required droplet precautions. Of more “confident” respondents, 61% (159/262) chose an incorrect sequence that could lead to cross contamination and occupational exposure during a patient contact. Interestingly respondents who indicated they had lower confidence in selecting and removing PPE selected the incorrect answer 54% (43/80) of the time. The most frequent (59%, 218/368) – and one of the three deemed incorrect – answer to this question was the following sequence for removing PPE: remove fluid resistant gown, eye protection, N95 respirator, gloves, then perform hand hygiene.

Performing a “fit check” after donning an N95 mask is indicated both in the EHS agency’s infection control plan and provincial guidelines. Fifty percent of respondents indicated that “During my most recent fit test I was instructed on how and when to perform a N95 fit check.” Despite this 50%, 81% indicated incorrectly that “N95 fit checks must be conducted yearly.” Compliance questions on respirator use illustrated that 50% (186/370) reliably performed a fit check, and only 38% self-reported the highest level of compliance (“76-100%”) with respirator use specifically during aerosol generating medical procedures. This latter observation is in contrast to respirator use when caring for a patient with hemoptysis where 79% (289/367) of paramedics indicated regular compliance (“76-100%”).

In regards to hand hygiene prior to removing N95 respirators and eye protection, 26% (94/368) of respondents indicated they clean their hands before they remove their N95 respirator and eye protection “76 to 100%” of the time. Responses from this question were compared to a question asking the best sequence for removing PPE after attending to a patient who required droplet precautions. The only answer choice that involved cleaning hands before removing a N95 respirator was

selected by only 13% (48/369) of participants. Of 93 respondents that indicated they cleaned their hands “76-100%” of the time prior to removing an N95 respirator, 22% (n=20) chose the correct PPE removal sequence.

The appropriateness of choosing to wear a N95 respirator when a patient has a tuberculosis-like illness (hemoptysis and fever) indicated that 79% (289/347) of respondents would wear one (“76 to 100%” of the time). When filtered with a question asking respondents to choose the PPE they would wear if a patient had the signs & symptoms of a tuberculosis-like illness (hemoptysis and fever), 81% (280/347) that indicated they would wear a N95 respirator for this clinical presentation.

Reporting for work during a pandemic. Of respondents, 43% (157/368) indicated there was a moderate likelihood that a pandemic could significantly impact their province and 40% (145/368) indicated that it is extremely likely. A majority anticipated that their agency would expect them to report to work for regular scheduled shifts (85%, 312/368) and extra shifts (71%, 261/368) during a pandemic. There was a weak correlation between confidence in the employer and the intent of respondents to report for scheduled shifts (*Pearson r* = 0.31) and willingness to report for work for extra shifts (*Pearson r* = 0.37) during pandemics. There was also a very weak to negligible correlation between self-reported compliance with following infection control procedures and respondents’ intent to report for work during a pandemic. Based on the sampled paramedics, over 80% (199 “strongly agree” + 96 “somewhat agree” = 295/367) will report for regularly scheduled shifts during a pandemic. Eighty-two percent of fulltime employed paramedics (93 “strongly agree” + 42 “somewhat agree” = 135/164) and 79% of part-time employed paramedics (106 “strongly agree” + 53 “somewhat agree” = 159/201) agreed that they intend on reporting for regular scheduled shifts during a pandemic. No significant differences were observed between employment status and intent on reporting for scheduled shifts (*p* = 0.53; two-sided Fisher’s exact test). Respondents most frequently selected “strongly agree” (33%, 120/367) when asked their intent in reporting for extra shifts during a pandemic. When asked their intent in reporting for extra shifts during a disaster, other than a pandemic (e.g., earthquake, flood, fire, etc.) 66% (244/367) most frequently selected “strongly agree”. Of part time respondents, 72% (83 “strongly agree” + 61 “somewhat agree” = 144/201) indicated their intent to report to work for extra shifts during a pandemic, whereas 46% of fulltime (37 “strongly agree” + 39 “somewhat agree” = 76/164) indicated their intent to report. Analysis showed a significant difference between fulltime and part time respondents (*p* = 0.00000020; two sided Fisher’s exact test). Regarding potential barriers to reporting for work during a pandemic, these included concerns over family safety (34%,104/315) and

personal safety (24%, 71/299), lack of confidence in EHS preparedness (20%, 72/356), and lack of PPE availability (19%, 62/319).

DISCUSSION

This research suggests that paramedic knowledge and competencies in IPC practices, compliance with adhering to those practices, and intent and willingness to report for duty during a pandemic could be considerably strengthened. The moderately low self-reported compliance, relative lack of confidence in employer preparedness and in their own training was in contrast to the intent of the majority to report to work during a pandemic. This intent to report for duty, while admirable, must be complemented by an assurance of protection while working in the field.

During a pandemic, paramedics are often the first point of contact for the general public, providing initial treatment and transport of infected persons. In the Greater Toronto Area (GTA) during SARS, paramedics were among the first health care providers to become exposed, and provided care to four of the initial nine cases (9). The overall toll on health care workers in the GTA was extremely high with more than 100 probable or suspected SARS cases of which three succumbed to their illness (10). Compared to the GTA, the Greater Metropolitan Vancouver Area (GMVA) had significantly fewer SARS cases and no reported SARS related deaths. This occurred despite a significantly higher volume of flights arriving to the GMVA direct from mainland China (11), where SARS is expected to have originated (12). It has been suggested that the SARS response in the GMVA is an example of how baseline preparedness and well-coordinated precautionary efforts can lead to a reduction in probable cases (11). However, evaluating baseline preparedness in the inter-pandemic period is vital to determine the current status of paramedics and how best to evolve infection control levels to project efforts that are truly well coordinated.

Knowledge of pandemics preparedness and infection prevention and control. Knowledge is a powerful attribute of paramedics who are required to make imperative decisions under stress and time constraints and yet there were clearly opportunities to improve this as illustrated in the study results. These inadequacies in the ability to recognize the potential for infection transmissibility may lead to occupational exposure amongst paramedics, thus reducing the response capacity of an EHS. Paramedics who become infectious then become vectors in the disease process, further propagating spread in the general population. Having strong practical knowledge helps with the identification of contagious patients and the proper use of protective barriers (13). The compliance with paramedics wearing proper PPE could also set the stage for correct handover of a patient to the Emergency Department (ED), encouraging ED staff to follow suit and don appropriate PPE. Excellence in knowledge can increase the confidence

of paramedics to operate safely and comply with procedures during a pandemic and this should be fostered during preparedness planning and training (14).

It is clear from the results that EHS needs to increase efforts in training paramedics in both theoretical and practical components of IPC. This research highlighted shortcomings in content comprehension, such as IPC practices, required PPE items and the removal sequences, and general knowledge of policies and documents. These shortcomings may be due to a multitude of reasons, including variable levels of paramedical staff motivation to learn and follow expected practices and the EHS agency's level of investment in focused and effective training. Disinterest or noncompliance may stem from the fact that risks are not visually or immediately evident and the consequences of noncompliance (i.e. infection) delayed as well. Numerous respondents used the comments section on the questionnaire to indicate their realization that there were gaps in their own knowledge and how the survey enabled that realization. Furthermore some suggested that they needed to read over their pandemic preparedness and infection control manual more frequently. Many of the knowledge questions in the survey were derived directly from the current edition of the agency's infection control document, suggesting that the content was accessible to paramedics. This self-recognition of knowledge gaps is an important first step in increasing compliance.

Alternatively lack of knowledge may also be a reflection on the EHS agency's current allocation of resources to train paramedics and measure and evaluate the efficacy of that training. The lower level of confidence of paramedics in their agency's preparedness levels and variation in answers on knowledge questions as observed in this research supports the shortcoming in training and preparedness.

Updating training programs and augmenting current training with emerging evidenced-based medicine is integral but should not overshadow measuring the effectiveness of that training. An evaluation of which training methods (and their frequency) are associated with increased compliance is essential to a good training program. For instance, sporadic or brief training prior to a pandemic period may not arm paramedics with the knowledge to recall the correct practices in the field. As shown by Fernandez et al. (15) increased training time is strongly correlated with greater perceived disaster preparedness. Importantly, training that promotes resilience is more successful and relevant if supported by the executive management levels (16). Annual fit testing (N95) sessions could be the venue for these efforts and could be expanded to include other learning modalities. This could include practice exercises and frequent testing of plans through simulation exercises (real or paper-based) (17), to reinforce the theoretical and

practical knowledge base. This training should be focused on ensuring that paramedics know their organization's policies, procedures and expectations (4).

Inter-pandemic preparation and pandemic response expectations need to be well defined and documented within an EHS agency. In this survey there was difficulty in specifying the appropriate document and where it can be referenced.

Compliance with infection prevention and control. Compliance with PPE use is often low among healthcare workers, including paramedics (5,6,18-20). Factors such as varying attitudes, beliefs, and knowledge among paramedics (5); PPE availability (6,21), judgment of non-necessity or technical difficulties (6); and low tolerance to wearing it (22) contribute to poor levels of compliance. As reported, only 38% of respondents chose the required combination of PPE for an influenza-like illness, i.e. gloves, gown, N95, and eye protection, as per the EHS agency's infection control manual. Further analysis of the data revealed that the gown was the limiting factor that produced a lower compliance percentage. There was especially high compliance for wearing gloves and moderately high compliance with N95 respirators and eye protection. The percent of respondents choosing three of the four required, i.e., gloves, N95, and eye protection was over 60%, which still suggests opportunity to improve upon compliance for PPE selection.

Increased compliance with PPE is also associated with whether the patient has a definite diagnosis of infectious disease (23). This was observed in the high percentage of respondents correctly choosing a N95 respirator for a patient that has a tuberculosis-like illness (hemoptysis and fever) and the high frequency of those respondents indicating compliance with wearing N95 respirators for this clinical presentation. Tuberculosis may have triggered a heightened awareness of the necessity to protect against this known airborne transmitted disease.

Limitations of this survey include the ability to assess only self reported compliance. While intent to comply is still a valid indicator of future performance (4), direct observations are recommended to complement future surveys that assess pandemic preparedness. In addition, this survey did not address the causes for non-compliance and this requires further exploration potentially through the lens of individual, organizational and engineering controls that may foster or alternatively inhibit intent- to comply.

Reporting for work during pandemics. As indicated in our research, while the majority of respondents will report for work during a pandemic, it is important to address the concerns of the minority. Paramedics' confidence levels in their EHS agency's and intent to comply with infection control practices do not appear to be indicators of intent to report for work. Both part time and fulltime paramedics intend on reporting for

regular scheduled shifts, however, part-time paramedics were more likely to indicate their intent to report for extra shifts compared to fulltime paramedics. This can possibly be attributed to part time paramedics being more available for extra shifts due to their part time status and the normalcy of obtaining extra shifts on a regular basis. Nonetheless part time paramedics are an essential resource to meet surge capacity demands during a pandemic. Concerns over the safety of family members, personal safety, and varying confidence in EHS preparedness levels were apparent. Many of these concerns are consistent with other studies on paramedic intent to report for work during disasters and pandemics. (24,25,26). Other examples of preparedness, in addition to a well-trained workforce, include ensuring appropriate levels of equipment, designing phased staffing plans, and collaboration between hospital and emergency management staff in patient handovers and communication.

CONCLUSION

Despite inconsistencies in knowledge and procedures, perceptions of inadequate preparedness planning and direction within the EHS agency, the majority of paramedics surveyed will report to work during a pandemic. This research suggests that continuous assessment and refinement of preparedness policies and procedures is required to enhance resilience in EHS. This is vitally important in maintaining the surge capacity. This survey also highlighted opportunities to reinforce infection prevention skill sets and emphasized the importance of regular training to build confidence and promote incorporation of prevention principles in everyday practice.

REFERENCES

- 1 World Health Organization. Emergency preparedness for the health sector and communities: Challenges and the way forward. *Prehospit and Disaster Med* 2007; 22:s188-s197.
- 2 Public Health Agency of Canada. (2009b). Canadian Pandemic Influenza Plan for the Health Sector Pandemic Influenza Psychosocial Annex, retrieved from http://www.phac-aspc.gc.ca/cpip-pclcpi/pdf-e/annex_p-eng.pdf
- 3 Public Health Agency of Canada. (2009c). Guidance: Infection Prevention and Control Measures for Prehospital Care. Retrieved from <http://www.phac-aspc.gc.ca/alert-alerte/h1n1/hp-ps/pc-sp-eng.php>
- 4 Yassi A, Lockhart K, Copes R, et al. Determinants of healthcare workers' compliance with infection control procedures. *Healthcare Quarterly* 2007; 10: 44-52.
- 5 Visentin LM, Bondy SJ, Schwartz B, & Morrison LJ (2008). Knowledge, attitudes, and behaviour of paramedics regarding personal protective equipment for communicable respiratory disease outbreaks. Annual Meeting of the National Association of EMS Physicians. Naples, FL
- 6 Visentin LM, Bondy SJ, Schwartz B, & Morrison LJ. Use of personal protective equipment during infectious disease outbreak and non-outbreak conditions: a survey of emergency medical technicians. *Can J Emerg Med* 2009; 11:44-56.

- 7 Sullivan KM, Dean AG, Pezzullo JC, Martin D, Simons R, Dean AG, et al. OpenEpi: Open Source Statistics for Public Health. [Online Software]. Available from <http://www.openepi.com/Menu/OpenEpiMenu.htm>
- 8 McKinney W, Young MJ, Hartz A, & Lee M. The Inexact Use of Fisher's Exact Test in Six Major Medical Journals. *JAMA* 1989; 261: 3430-3433.
- 9 Verbeek PR, McClelland IW, Silverman AC, & Burgess, RJ. Loss of paramedic availability in an urban emergency medical services system during a severe acute respiratory syndrome outbreak. *Acad Emerg Med* 2004; 11:973-8.
- 10 Public Health Agency of Canada. (2004b). Learning from SARS - Renewal of Public Health in Canada - Executive Summary. Retrieved from <http://www.phac-aspc.gc.ca/publicat/sars-sras/pdf/exsum-e.pdf>
- 11 Skowronski DM, Petric M, Daly P et al. Coordinated response to SARS, Vancouver, Canada. *Emerg Infect Dis* 2006; 12:155-8.
- 12 Xu R, He J, Evans M, et al. Epidemiologic clues to SARS origin in China. *Emerg Infect Dis* 2004; 10:1030-1037.
- 13 Mencl F, Birkle M, Blanda M & Gerson LW. EMS's Knowledge Regarding Transmission of Infectious Disease. *Prehospital Emergency Care* 2000; 4: 57-61.
- 14 Cadeddu C, Di Thiene D, Ricciardi W, Boccia A, & La Torre G. Knowledge about pandemic flu among Italian health care workers (HCWs): an Italian survey. *J Prev Med Hyg* 2011; 52:127-30.
- 15 Fernandez A, Studnek J, Margolis G, Mac Crawford J, Bentley M & Marcozzi D. Disaster preparedness of nationally certified emergency medical services professionals. *Academic Emergency Medicine: Official Journal Of The Society For Academic Emergency Medicine* 2011; 18: 403-412.
- 16 Aiello, A, Khayeri M, Raja S, et al. Resilience training for hospital workers in anticipation of an influenza pandemic. *J Continuing Educ In The Health Professions* 2011;31:15-20.
- 17 Nelson C, Lurie N, Wasserman J & Zakowski S. Conceptualizing and defining public health emergency preparedness. *Am J Pub Health* 2007; 97: S9-s11.
- 18 Eustis TC, Wright SE, Wrenn KD, Fowle EJ, & Slovis CM. Compliance With Recommendations for Universal Precautions Among Prehospital Providers. *Ann Emerg Med* 1995; 25: 512-515.
- 19 Moore D, Gamage B, Bryce E, Copes R, Yassi & other members of The BC Interdisciplinary Respiratory Protection Study Group. Protecting health care workers from SARS and other respiratory pathogens: Organizational and individual factors that affect adherence to infection control guidelines. *Am J Infect Control* 2005; 33:88-96. Annual Meeting of the National Association of EMS Physicians. Naples, FL
- 20 Hammond JS, Eckes JM, Gomez GA, & Cunningham DN. HIV, trauma, and infection control: universal precautions are usually ignored. *J Trauma* 1990; 30: 555-61.
- 21 Gershon RRM, Vandelinde R, Magda LA, Pearson JM, Werner A, & Prezant D. Evaluation of a Pandemic Preparedness Training Intervention for Emergency Medical Services Personnel. *Prehosp and Disaster Med* 2009; 24:508-511.
- 22 Radonovich LJ, Cheng J, Shenal BV, Hodgson M, & Bender BS. Respirator tolerance in health care workers. *JAMA* 2009; 301:36-38
- 23 Shigayeva A, Green K, Raboud JM, et al. Factors associated with critical-care healthcare workers' adherence to recommended barrier precautions during the Toronto severe acute respiratory syndrome outbreak. *Infect Control and Hosp Epidemiol* 2007; 28:1275-1283.
- 24 Qureshi K, Gershon RRM, Sherman MF, Straub T, Gebbie E, McCollum, Erwin MJ & Morse SS. Healthcare worker's ability and willingness to report to duty during catastrophic disasters. *J Urban Health* 2005; 2(3):378-388.
- 25 DiMaggio D, Markenson D, Loo GT, & Redlener I. The willingness of U.S. emergency medical technicians to respond to terrorist incidents. *Biosecur Bioterror* 2005; 3(4):331-337.
- 26 Archer F, Burkle F, Morgans A, Qureshi K & Smith E. Paramedics' perceptions of risk and willingness to work during disasters. *Australian J of Emergency Management* 2009; 24(3): 21-27. 🌸

REVIEW ARTICLES

Preventing infections in mother-baby care units

Alex Studemeister, MD, FIDSA, CIC

Stanford University Medical School, Department of Medicine, Division of Infectious Diseases and Geographic Medicine
O'Connor Hospital, San Jose, CA

Corresponding author: **Alex Studemeister**, MD, FIDSA, CIC

105 North Bascom Ave, Suite 202
San Jose, CA 95128
408-993-1500
Fax: 408-358-8676
bayareaid@gmail.com

The mother-baby care unit presents unique challenges to healthcare personnel, who must encourage early and frequent contact between the mother and her newborn baby, yet protect both from contagious infectious diseases. Newborns are more susceptible to infections because their immune system is not fully mature (1). They are not fully immunized yet, and may come in close contact with siblings and other family members who may have contagious diseases. The Canadian Provincial Infectious Diseases Advisory Committee (PIDAC) provides a useful best practices document applicable to infection prevention during obstetrical and newborn care (2). The following review assembles referenced excerpts from the literature, as well as from the Centers for Diseases Control (CDC) and PIDAC guidelines, and may serve as a guide to produce a policy document for the prevention of infections in the hospital mother-baby care unit.

HAND HYGIENE IN THE MOTHER BABY UNIT

The most important method to prevent infections in the mother-baby care unit is performing hand hygiene. The importance of hand hygiene was demonstrated over 150 years ago by Ignaz Semmelweis, known as “the father of infection control”, who

observed that washing hands prevented maternal death from Streptococcal sepsis (3). All caregivers, the mother, her spouse, and any visitors to the mother-baby care unit should be instructed how to perform hand hygiene, reminding them that contaminated hands can transmit dangerous pathogens, such as *Staphylococcus aureus*. The mother should be reminded to perform hand hygiene after using the bathroom, before eating, and before handling her baby. Placement of alcohol-based hand gel, and soap dispensers in each patient room, instructional postings regarding the importance of hand hygiene, and regular educational sessions for all caregivers are essential elements of an effective hand hygiene program.

Hands must be cleaned before and after patient contact, or contact with potentially contaminated environmental surfaces or equipment. They should always be cleaned before and after glove removal (4). Alcohol-based solutions, which are more effective than soap and water in removing germs, are preferred as they require less time to perform, cause less dryness and skin irritation, and improve adherence rates. Performing hand hygiene with soap and water, which

Table 1: Personal protective equipment in the mother-baby care unit

	When to use	Example
Nonsterile gloves	When touching blood, body fluids, mucous membranes, non-intact skin or contaminated items	Insertion of urinary catheter
Mask and face shield or goggles	During procedure or patient care activity likely to generate splash or spray of blood, body fluid or secretions	Oral suctioning
N95 respirator or powered air purifying respirator	Caring for someone with airborne transmissible agent	Caring for mother with pulmonary tuberculosis
Impermeable gown	When anticipating contact of clothing with blood, body fluids or secretions	Caring for mother with diarrhea
Head cap and boot or shoe covers	When splash or spray of infectious body fluid may contaminate scalp or shoes	Caring for mother with viral hemorrhagic fever

physically removes sticky spores attached to hands, is preferred for preventing transmission of *Clostridium difficile* (4).

Healthcare personnel working in mother-baby care units should check their facility's policy regarding the use of artificial nails, jewelry and rings. They should not wear artificial fingernails or extenders, which may harbor pathogenic bacteria and fungi, when caring for mothers or newborns (2). Natural nails should be less than a quarter inch long and polished nails should be chip-free when caring for patients at high risk of infection (4). Rings and bracelets should not be worn by those with direct contact with mothers or newborns (2).

PERSONAL PROTECTIVE EQUIPMENT IN THE MOTHER BABY UNIT

Gloves, gowns, masks, and eye protection (goggles or face shields) are the essential components of personal protective equipment (PPE) in the mother-baby care unit (Table 1). Any visitor to the mother-baby care unit should be taught the proper way to don and remove PPE. The appropriate PPE should be stored immediately outside of the mother's room, in order to allow for donning of the PPE before entry. PPE should be removed and discarded inside the patient room before exiting, followed by hand hygiene outside the room (5).

PPE generally is worn only once, and discarded as routine waste. Any PPE contaminated with blood or body fluids must be discarded according to infection prevention guidelines. Nursing staff should receive annual competency training on the use of PPE. Monitoring and reporting the compliance of the use of PPE amongst nursing staff improves the level of adherence to their use (6).

Gloves must be worn before touching blood, body fluids, secretions, excretions and contaminated items, as well as before touching mucous membranes and non-intact skin. They should be available in every patient room of the mother-baby care unit. Hand hygiene should precede the donning of gloves and repeated after their removal.

Healthcare personnel should wear a gown when the mother or baby is under droplet or contact isolation, or when anticipating contact with contaminated clothing, blood, body fluids, secretions or excretions. The routine use of gowns in the mother-baby care unit is not recommended. Masks, face shields and goggles protect the eyes, nose and throat from any splash or spray of blood, body fluid or airway secretions. An N95 respirator or powered air-purifying respirator (PAPR) is required for care of patients under airborne isolation. Personnel should be trained for the use of these respirators, and fit-tested for the N95 respirator. Enhanced protective measures with the use of apron, cap and boot or shoe covers are generally reserved for unusual infections such as Ebola virus disease (Table 2) (5).

ISOLATION PRECAUTIONS IN THE MOTHER BABY UNIT

Knowledge of the different types of transmission-based isolation precautions and their corresponding PPE is essential for healthcare personnel (Table 2). Routine practices or standard precautions, which are applied to all patients cared for in the mother-baby care unit, include performing hand hygiene, using appropriate PPE depending on the expected type of exposure risk, employing safe injection practices, and adhering to respiratory etiquette (5). No food or drink should be allowed in any patient care area, the nursing station and front desk. Examination equipment, such as stethoscopes and ophthalmoscopes, should be reserved for use with one patient or decontaminated with alcohol or appropriate disinfectant between patients.

Visitors to the mother-baby care unit should be screened by for any active infection and recent exposures prior to their visit. Anyone with any transmissible infection, as well as any non-immune person who may have had recent exposure to chickenpox, measles or rubella, should not be allowed to visit the mother-baby care unit. Unit personnel need to check the hospital's visitation policy with regards to age limit.

Table 2: Transmission-based precautions in the mother-baby care unit

Precaution	PPE	Examples of infectious diseases
Routine practices or standard	Depending on anticipated exposure risk	All cases
Contact	Gloves and gown	Congenital rubella, draining abscess, enterovirus, herpes simplex, multidrug-resistant organism (eg MRSA), RSV
Droplet	Mask	Pertussis, meningococcal meningitis (first 24 hours only), Adenovirus, Parvovirus B19
Airborne	N95 respirator or	
PAPR	Tuberculosis	
Contact and droplet	Gloves, gown and mask	Common cold, influenza, RSV, acquired rubella
Contact and airborne	Gloves, gown, eye protection, and N95 respirator or PAPR	Chickenpox (varicella), disseminated zoster, measles, SARS, MERS

PPE: personal protective equipment, CMV: cytomegalovirus, HIV: human immunodeficiency virus, MRSA: methicillin-resistant *Staphylococcus aureus*, RSV: respiratory syncytial virus, PAPR: powered air purifying respirator, SARS: Severe Acute Respiratory Syndrome, MERS: Middle East Respiratory Syndrome

Table 3: Isolation precautions for infections encountered in mother-baby care unit

Disease	Isolation precautions*	Comments and breastfeeding precautions
Breast abscess	Contact	Avoid breastfeeding from affected breast
Chagas disease	Routine	Avoid breastfeeding if mother has acute Chagas disease or with fissures and bleeding nipples (18)
Chickenpox or disseminated zoster	Contact & airborne	Mother with chickenpox may room in with her baby. Avoid breastfeeding if breast lesions
<i>Clostridium difficile</i> colitis	Contact	Use soap and water for hand hygiene
Congenital rubella syndrome	Contact	During stay in mother baby unit and hospital
Cytomegalovirus	Routine	Avoid direct exposure to urine or saliva from infected young infants
Dengue fever	Routine	Breastfeeding allowed although dengue virus particles have been detected in breast milk
Erythema infectiosum (Human Parvovirus B19)	Contact	Avoid breastfeeding if breast lesions
Gonococcal neonatal ophthalmia	Contact	For 24 hours from initiation of antimicrobial therapy
Group A Streptococcus, skin	Contact	Avoid breastfeeding from affected breast
Group B streptococcal sepsis of newborn	Contact	
Hepatitis A	Routine	Consider immune globulin for exposed infant
Hepatitis B	Routine	Breast feeding allowed
Hepatitis C	Routine	Avoid breast feeding if cracked or bleeding breast
Hepatitis E	Routine	Avoid breast feeding if high maternal viral load (19)
Herpes simplex virus (HSV)	Routine	Avoid breastfeeding if active breast herpetic lesions. Newborn with HSV should remain in contact precautions.
Human Immunodeficiency Virus (HIV)	Routine	Avoid breastfeeding
Influenza	Contact & droplet	Unvaccinated mothers should be offered influenza vaccine
Listeriosis (<i>Listeria monocytogenes</i>)	Contact	Cross-contamination in nursery reported (20)
Maternal viral upper respiratory tract infection	Contact & droplet	
Measles	Contact & droplet	Avoid breastfeeding if breast lesions
Meningococcal meningitis	Droplet	For 24 hours from initiation of antimicrobial therapy
Middle East Respiratory Syndrome (MERS)	Contact and airborne	
Multidrug-resistant organism	Contact	
<i>Mycoplasma pneumonia</i>	Droplet	
Roseola (exanthema subitum)	Contact	Avoid breastfeeding if breast lesions present
Rotaviral enteritis	Contact	
Respiratory Syncytial Virus (RSV)	Contact & droplet	
Severe Acute Respiratory Syndrome (SARS)	Contact and airborne	Use goggles or face shield. Infant does not need to be separated from mother. Breastfeeding is allowed.
Shingles with intact immune system with lesions that can be contained or covered	Routine	Avoid breastfeeding if breast lesions
Syphilis	Contact	For 24 hours from initiation of antimicrobial therapy
Tuberculosis	Airborne	Separate mother and baby until no longer contagious. Mother may offer expressed milk.
West Nile Virus	Routine	Breastfeeding allowed
Whooping cough (<i>Bordetella pertussis</i>)	Contact & droplet	Offer acellular pertussis vaccine to all unvaccinated caretakers of the newborn

*Routine refers to routine practices or standard precautions

Transmission-based precautions apply to selected patients depending on clinical diagnosis or suspected infection (Table 3). The three principal categories of transmission-based precautions are contact, droplet and airborne precautions. Some infections, such as active tuberculosis, require the physical separation of the infected mother from her baby until the mother is determined to be non-infectious. In such cases, support from the nursing and social services staff should be provided to the mother and her family to cope with the separation of the mother from her newborn.

Some cases require more than one isolation category, such as chickenpox and measles, which call for both airborne and contact precautions (Table 2). The infection control practitioner, as well as the local health department, should be contacted immediately in cases of highly contagious or unusual infections, such as tuberculosis and Ebola virus, which may require special handling of the mother and baby. Enhanced precaution procedures, cohorting and decolonization of carriers may be applied if a cluster of similar cases, such as methicillin-resistant *Staphylococcus aureus* (MRSA) skin abscesses, occur within a short time in the mother-baby care unit.

CONTACT PRECAUTIONS IN THE MOTHER BABY UNIT

Contact precautions require the donning of gown and gloves upon entering the mother's room. Infections caused by MRSA and *Clostridium difficile* are examples that require contact isolation. These can be spread not only by the patient's hands or body fluids, but also by contaminated high-touch surfaces in the patient's immediate environment, such as bed railing and clothing. Whenever possible, dedicated or disposable medical equipment, such as stethoscope and blood pressure cuff, should be used when examining the patient.

A mother under contact precautions may handle or breastfeed her baby as long as she dons gown and gloves while handling her baby and does not have contraindications for breastfeeding. A baby under contact precautions may share the room with his or her mother, but anyone entering the room or handling the baby, including the mother, should wear gown and gloves.

A mother with herpes simplex or zoster lesions should cover these until crusted. Infants born to women with active genital herpes are at high risk for being infected with *Herpes simplex*, and should be placed under contact precautions (7). Mothers and infants with enterovirus infection are placed under contact precautions with emphasis on hand washing techniques; isolation or cohorting of patients may be necessary to prevent spread (8). An infant born to mother with acute viral hepatitis A is maintained under contact precautions with meticulous attention to hand hygiene when handling soiled diapers (9). Infants with congenital rubella syndrome should be maintained in contact isolation while hospitalized (10). Infants with gonococcal ophthalmia should be placed on contact precautions for twenty-four hours after initiation of antibiotic therapy (11).

Infected infants and adults with infectious syphilis lesion should be placed in contact isolation for the first twenty-four hours of therapy. All persons, including hospital personnel, who

have had unprotected close contact with a patient with early congenital syphilis before identification of the disease or within the first 24 hours of therapy should be examined clinically for the presence of lesions two to three weeks after contact. Close unprotected contact is defined as skin contact (intact or abraded) with infectious bodily fluids (12, 13).

DROPLET PRECAUTIONS IN THE MOTHER BABY UNIT

Droplet precautions protect from infections that are spread by talking, coughing or sneezing, as well as by aerosols generated during some medical procedures, such as suctioning of airway. In the mother-baby care unit droplet precautions are always combined with contact precautions, including the donning of gloves and gown. Mother and baby can share a room but anyone entering the room or handling the baby, including the mother, should wear a mask, gown and gloves. The mother should wear a mask when transported out of her room.

A pregnant woman with suspected or confirmed influenza should be placed in a private room on droplet precautions. A mother with possible or confirmed influenza should be separated from her newborn following delivery. The optimal length of separation has not been established. Guidelines from the 2009 H1N1 pandemic recommended separation until the mother received antiviral therapy for over 48 hours, was afebrile for over 24 hours and was able to control her cough and respiratory secretions. The mother may express her milk for feeding her infant during the separation. Droplet precautions for the mother should continue until at least seven days after maternal illness onset (14).

AIRBORNE PRECAUTIONS IN THE MOTHER BABY UNIT

Airborne precautions are applied to infections transmitted by droplet nuclei which remain suspended in the air, such as pulmonary or laryngeal tuberculosis (TB). A patient under airborne precautions should be roomed in a negative air-pressure airborne infection isolation room (AIIR). The door to the room must be kept closed at all times. Hospital personnel entering the room should wear an N95 respirator or a PAPR. The patient should wear a mask when transported out of the room.

The infection control practitioner and the local public health officer should be notified as soon as possible for any suspicion of TB. The mother with possible TB should remain separated from her baby until she is no longer considered contagious. A baby with congenital TB should be placed in an AIIR until he or she is determined not to be infectious (15). Direct contact with the baby under airborne precautions is allowed as long as the mother wears an N95 respirator or PAPR. If a mother with a positive tuberculin skin test is well and her chest radiograph is normal, no separation of the mother and infant is required. If the chest radiograph is abnormal, the mother and infant should be separated until the mother has been evaluated thoroughly for active TB.

Chickenpox, disseminated zoster and measles require both airborne and contact precautions as these infections can also be spread by aerosol and by direct contact with infected vesicular fluid. If the patient has any of these infections, non-immune persons should not enter the room. Mothers or

newborns with chickenpox should be placed on airborne and contact precautions for a minimum of five days after onset of rash and until all lesions are crusted (16). Hospitalized infants born to mothers with chickenpox within 16 days before delivery and two days afterward should be placed in airborne and contact isolation for 21 days. All hospitalized infants given varicella zoster immune globulin (VZIG) should also be placed in airborne and contact isolation until 28 days after the exposure. A mother with chickenpox lesions does not need to be isolated from her own infant, and should be encouraged to breastfeed unless lesions are on or near her nipple (17). If the mother develops chickenpox within five days before or two days after delivery, the newborn should receive VZIG (17).

VACCINATIONS IN THE MOTHER BABY UNIT

If not given before delivery, all mothers should be offered the influenza vaccination following delivery. Newborns remain vulnerable to influenza as the soonest they may be vaccinated is at six months of age. Children under twelve months of age have the highest overall incidence and mortality from whooping cough (pertussis). Tetanus, diphtheria, pertussis vaccine (Tdap), which protects against whooping cough, should be administered after delivery if the mother has not received Tdap in the past. Likewise, any caretaker or family member who will be in contact with the newborn should be immunized against both influenza and whooping cough.

Any mother with a history of smoking or asthma, as well as any medical risk factor for pneumococcal disease, should be vaccinated against pneumococcus. If the mother is known to lack immunity against measles or chickenpox, she should receive measles, mumps and rubella vaccine (MMR) or varicella vaccine following delivery, respectively. She should be reminded to receive a second varicella vaccine four to eight weeks later.

Hepatitis B (HepB) vaccine is universally given to all newborns. Mothers with hepatitis B virus infection can transmit hepatitis B virus to their newborn at the time of delivery. Therefore, both HepB vaccine and hepatitis B immune globulin (HBIG) should be given to the newborn of a hepatitis B carrier mother within twelve hours of birth. If the mother's hepatitis B surface antigen (HBsAg) status is unknown, HepB vaccine should be given to the baby within twelve hours of birth. In this case, the mother's HBsAg status should be determined as soon as possible and, if positive, HBIG should be administered to the baby no later than one week of age. The mother should be reminded to complete her child's hepatitis B vaccination series following discharge (10).

Pregnant women with acute viral hepatitis A within two weeks before delivery and one week after delivery may transmit hepatitis A virus to her newborn during delivery. Exposed infants may receive immune globulin as soon as possible after delivery, although efficacy has not been established (10).

Neonatal tetanus, which often involves contamination of the umbilicus stump, is prevented by maternal vaccination for tetanus and proper care of umbilicus stump of the newborn infant. Healthcare personnel working in the mother-baby care unit need to be up to date with their routine vaccinations, including Tdap, MMR and chickenpox, and receive influenza vaccine yearly.

CONCLUSION

The mother-baby care unit provides unique infection prevention challenges to the healthcare personnel who must protect both the mother and her newborn from infectious diseases. Developing comprehensive policies and procedures dedicated to the mother baby unit is essential to provide high-quality and safe care of the mother and her newborn.

REFERENCES

- 1 Brady MT. Health care-associated infections in the neonatal intensive care unit. *Am J Infect Control* 2005; 33(5):268-75.
- 2 Ontario Agency for Healthy Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Best Practices for Infection Control in Perinatology, first revision: February 2015. Toronto, ON: Queen's Printer for Ontario; 2012. Available from: https://www.publichealthontario.ca/en/eRepository/IPC%20in%20Perinatology_English_Final_2012-05-25%5B1%5D.pdf
- 3 Best M, Neuhauser D. Ignaz Semmelweis and the birth of infection control. *Qual Saf Health Care*. 2004;13(3):233-4.
- 4 Centers for Disease Control and Prevention. Guidelines for hand hygiene in healthcare settings. *MMWR*.2002;51(RR-16):1-56.
- 5 Siegel JD, Rhinehart E, Jackson M, et al. 2007 Guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings. <http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf>
- 6 Hennessy KA, Dynan J. Improving compliance with personal protective equipment use through the model for improvement and staff champions. *Clin J Oncol Nurs*.2014;18(5):497-500.
- 7 Sanchez PJ, Siegel JD. Herpes simplex virus. In: McMillan JA, ed. *Oski's Pediatrics*. Lippincott Williams and Wilkins; 2006.
- 8 Lebel MH. Enterovirus. In: McMillan JA, ed. *Oski's Pediatrics*. Lippincott Williams and Wilkins; 2006.
- 9 Sanchez PJ, Siegel JD. Hepatitis viruses. In: McMillan JA, ed. *Oski's Pediatrics*. Lippincott Williams and Wilkins; 2006.
- 10 Raszka WV. Rubella. In: McMillan JA, ed. *Oski's Pediatrics*. Lippincott Williams and Wilkins; 2006.
- 11 Sanchez PJ, Siegel JD. Neisseria Gonorrhoeae. In: McMillan JA, ed. *Oski's Pediatrics*. Lippincott Williams and Wilkins; 2006.
- 12 Kollman TR, Dobson SRM. Syphilis. In: Wilson VN, Maldonado YA, Remington JS, Klein JO, ed. *Remington and Klein's Infectious Diseases of the Fetus and Newborn Infant*. Elsevier Saunders; 2016.
- 13 Woods CR. Syphilis in children: congenital and acquired. *Semin Pediatr Infect Dis*. 2005;16(4):245-57.
- 14 Centers for Disease Control and Prevention. Guidance for the prevention and control of influenza in the peri- and postpartum period. www.cdc.gov/flu/professionals/infectioncontrol/peri-post-settings.htm.
- 15 Hanerom WA, Lunley L, Nuttall J, Hawn TB. Tuberculosis. In: Wilson VN, Maldonado YA, Remington JS, Klein JO, ed. *Remington and Klein's Infectious Diseases of the Fetus and Newborn Infant*. Elsevier Saunders; 2016.
- 16 Pickering LK, Baker, CJ, Kjmberlin DW, et al, editors. *Red Book: 2009 report of the committee on infectious diseases*. 28th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009.
- 17 Raszka WV. Neonatal varicella-zoster virus. In: McMillan JA. *Oski's Pediatrics*. Lippincott Williams and Wilkins; 2006.
- 18 Cevallos, AM, Hernandez R. Chagas' disease: pregnancy and congenital transmission. *Biomed Research International*, vol. 2014; Article ID 401864, 10 pages, 2014. Available from: <http://dx.doi.org/10.1155/2014/401864>
- 19 Chibber RM. Should HEV infected mothers breast feed? *Arch Gynecol Obstet*. 2004;270(1):15-20.
- 20 Colodner R, Sakran W, Miron D, et al. Listeria monocytogenes cross-contamination in a nursery. *Am J Infect Control*. 2003;31(5):322-4. *

CONCISE REPORTS

Cleaning verification in medical device reprocessing: Is this required?

Moi Lin LING, MBBS, FRCPA, CPHQ, MBA¹, Joo Tin Lim², Meh Meh Goh³

¹Director, Infection Control, Singapore General Hospital, Outram Road, Singapore 169608

²Theatre Sterile Supplies Unit, Singapore General Hospital, Outram Road, Singapore 169608

³Deputy Director, Nursing, Operating Theatre Services, Singapore General Hospital, Outram Road, Singapore 169608

Corresponding author: **Dr Moi Lin LING**, MBBS, FRCPA, CPHQ, MBA

Director, Infection Control

Singapore General Hospital

Singapore 169608

Tel: 65 – 63213891

Fax: 65 – 622 60106

Email: ling.moi.lin@sgh.com.sg

ABSTRACT

Decontamination and cleaning activities are vital to the success of reprocessing of surgical instruments. The aim of this study was to validate cleaning process of Ronguer, long forceps, power tools and hollow suction tubes. Besides visual inspection with lighted magnifying glass, ATP and protein residual were determined from swabs of surfaces and suction channels. In contrast to visual inspection giving 100% cleanliness, the ATP test showed that only 92% of instruments were clean. Thus, cleaning validation is best done with visual inspection combined with ATP test, as these methods assess cleanliness of both external surfaces and inner channels of medical devices.

INTRODUCTION

Rutala (1) and Saito et al (2) demonstrated significant microbial load on the surfaces of reprocessed surgical instruments, with added potential of these acting as fomites for pathogens of surgical site infection. Hence, proper decontamination during re-processing is critical as its inadequacy has been associated with outbreaks (3-5). Validation of the decontamination step is a critical step in the reprocessing of surgical instruments, especially endoscopes.

The aim of this study was to determine an effective and practical indicator for characterizing cleanliness status of surgical instruments.

METHODS

This study was conducted at the Singapore General Hospital; a 1,750-bed inpatient facility with 79,000 surgical procedures performed annually. A total of 240 surgical instruments (Ronguer, long forceps, powered tools and hollow suction tubes) were pre-cleaned by soaking in a commercial enzymatic cleaning agent with multi-enzyme concentrate (3M, Singapore) for five minutes before washing in automatic washer-disinfector (five minutes at 60°C) for all instruments except for powered tools/handpieces, which were washed manually. Pre- and post-cleaning adenosine triphosphate (ATP) levels were assessed using the test device – an ATP luminometer (3M, Singapore).

The threshold value for determining surgical instrument cleanliness was first determined from ATP values taken from

120 instruments cleaned with current enzymatic agent (a neutral pH detergent) and commercial enzymatic cleaner.

The second part of the study evaluating the cleanliness of 120 of each instrument type was conducted using visual inspection, inspection with magnifying glass, use of ATP test, and protein residue test following a washer-disinfector or manual wash.

The washing process of the suction tubes was optimised with an additional pre-cleaning ultrasonic wash cycle before the mechanical decontamination wash. Following a review of the manual washing of the powered tools, pictorial step-by-step guide on cleaning was posted at decontamination station. Emphasis was placed on the use of the correct brushes and attention to cleaning the inaccessible parts of the powered instrument. After they were cleaned and dried with a clean towel, the instruments were then disinfected with alcohol wipes.

RESULTS

A cut off of 150 relative light units (RLU) for ATP values was adopted as a threshold value for surgical surface cleaning in our study.

Before and after cleaning, higher ATP values were noted in the handpiece compared to the Ronguer (Table 1). The commercial enzymatic cleaner had a higher \log_{10} reduction of 2.7 [95% CI (2.3-3.06)] as compared to \log_{10} reduction of 2 [95% CI (1.6-2.5)] for current enzymatic agent used.

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Table 1: ATP (RLU) before surgical instrument cleaning

Instrument type	N	Mean	Std Dev	95% CI for mean
Ronguer	30	24474	36013	11026 - 37921
Long forceps	30	63641	118584	19361 – 107921
Suction tubes	30	94173	166787	31894 - 156453
Powered tools (handpiece)	30	142505	164008	81263 - 203746

Table 2: ATP (RLU) after surgical instrument cleaning with different detergent

Cleaner type	N	Mean	Std Dev	SE Mean	95% CI
Current enzymatic cleaner	30	244.2	427.1	78	84.7- 403.7
Commercial Enzymatic cleaner	30	91.3	114.1	20.8	48.7-133.9

Cleaning with the commercial enzymatic cleaner showed a more effective cleaning with a lower ATP value of 91RLU [95% CI 48-133] (Table 2). The mean protein residual value was 3.6 [95% CI 3-4.4], where a cut off of 5 μ g has been adopted as a threshold value for surgical surface cleaning. On visual inspection and inspection with magnifying glass, 100% (60/60) of the instruments appeared clean; whilst the ATP test showed that only 92% (55/60) were clean.

DISCUSSION

The most common method used in cleaning verification is a visual inspection, sometimes involving the use of a lighted magnifying glass. However, residual organic soil and microbial contamination might be present on an accessible surface even though the device “looks clean.” Visual inspection has been known to be unreliable as it is highly subjective and prone to errors as shown by Lipscomb’s study (6).

Previous studies of the ATP luminometer tool had shown its value in assessing cleanliness (7) and it compares favorably with other assessment methods, such as fluorescent marking and aerobic colony counts (8).

Our study showed that enhanced cleaning verification is achieved when visual inspection is combined with ATP test, allowing the assessment of both external surfaces and inner housing and channels of medical devices. Objective cleaning monitors like the ATP test are able to document compliance with cleaning of instruments, especially the flexible endoscopes, as highlighted in a review by Alfa (9). The validation of the cleaning process is a critical step in the re-processing of instruments, as highlighted in recent reports on outbreaks of carbapenem resistant *Enterobacteriaceae* associated with reprocessing of the endoscopes with its complex features (4-5).

CONCLUSION

Our study demonstrates that quality assessment tools, such as the ATP luminometer, can be used at the point of cleaning to improve cleaning performance. This cleaning verification method is now used daily on a random selection of reprocessed surgical instruments.

REFERENCES

- 1 Rutala WA, Gergen MF and Weber DJ. Microbial Contamination on Used Surgical Instruments. *Infect Control Hosp Epidemiol* 2014; 35(8):1068-1070.
- 2 Saito Y, Kobayashi H, Uetera Y, Yasuhara H, Kajiura T, Okubo T. Microbial contamination of surgical instruments used for laparotomy. *Am J Infect Control* 2014; 42: 43-7.
- 3 Southworth PM. Infections and exposures: reported incidents associated with unsuccessful decontamination of reusable surgical instruments. *Journal of Hospital Infection* 2014; 88:127-131.
- 4 Epstein L, Hunter JC, Arwady MA, Tsai V, Stein L, Gribogiannis M et al. New Delhi Metallo- β -Lactamase–Producing carbapenem-resistant *Escherichia coli* associated with exposure to duodenoscopes. *JAMA*. 2014;312(14):1447-1455. doi:10.1001/jama.2014.12720.
- 5 Lawrence F Muscarella. Risk of transmission of carbapenem-resistant *Enterobacteriaceae* and related “superbugs” during gastrointestinal endoscopy. *World J Gastrointest Endosc* 2014 October 16; 6(10): 457-474.
- 6 Lipscomb IP, Sihota AK and Keevil CW. Comparison between visual analysis and microscope assessment of surgical instrument cleanliness from sterile service departments. *J Hosp Infection* 2008; 68:52-58.
- 7 Boyce JM, Havill NL, Dumigan DG, Golebiewski M, Balogun O, Rizvani R. Monitoring the effectiveness of hospital cleaning practices by use of an adenosine triphosphate bioluminescence assay. *Infect Control Hosp Epidemiol* 2009; 30:678-84.
- 8 Boyce JM, Havill NL, Havill HL, Mangione E, Dumigan DG, Moore BA. Comparison of fluorescent marker systems with 2 quantitative methods of assessing terminal cleaning practices. *Infect Control Hosp Epidemiol* 2011; 32: 1187-93.
- 9 Alfa MJ. Monitoring and improving the effectiveness of cleaning medical and surgical devices. *Am J Infect Control* 2013; 41: S56-S59. 🌟



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Kristin Vondrak, Vice President and Chief
Quality Officer, Baptist Health System,
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1. Nagaraja A, et al., Westchester Medical Center in AJIC 2015, *C. diff* reductions in ICU.
2. Levin J, et al., Cooley Dickinson in AJIC 2013, 41:746-748.
3. Simmons S, et al., Cone Health System in JIP 2013.



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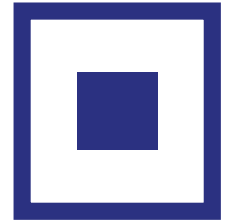
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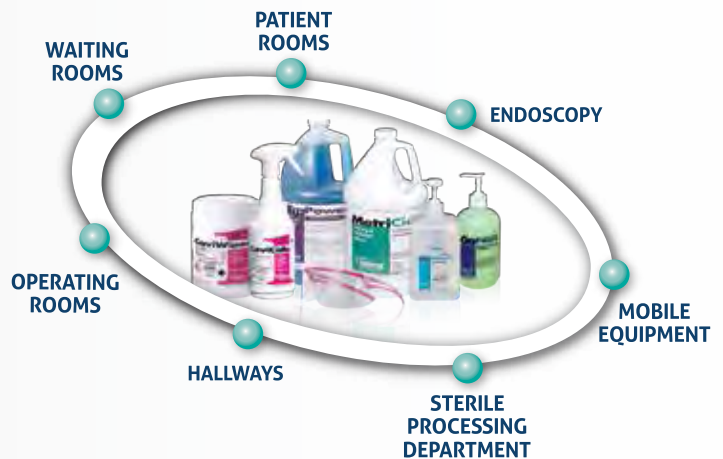
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INSIDE:

247 President's Message

249 Message de la présidente

251 From the Executive Desk

253 CIC® Graduates

254 Elections

257 2016 National Education Conference

259 Bring in a New Member

261 Ecolab Poster Contest





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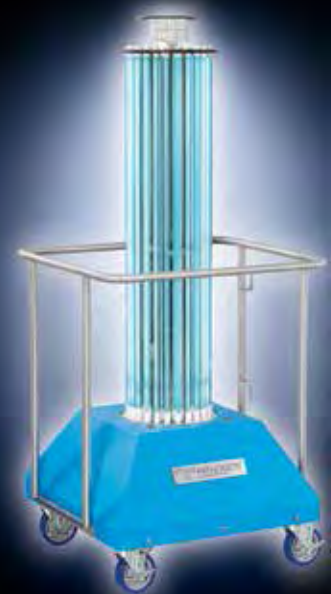
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Suzanne Rhodenizer Rose, RN, BScN, MHS, CIC

President, IPAC Canada

Building collegial bridges

Lisa Young, a wonderful colleague of mine in British Columbia, recently commented on how much she enjoyed my last president's message, and forwarded along an interesting white paper out of the National Health System in the U.K. The paper's title, *The new era of thinking and practice in change and transformation: A call to action for leaders of health and care*, authored by Helen Bevan and Steve Fairman (2014), immediately caught my attention; it appealed to my desire to evoke seismic change in approaches to infection prevention and control practice and healthcare professionals' behaviours.

We hear so much lately about how we, as healthcare leaders, must innovate, innovate, innovate! Bevan and Fairman (2014) tell us that breakthrough ideas don't necessarily require large-scale cognitive leaps, but instead come about with many "small incremental steps in thinking, building on and interpreting existing ideas and learning from others." They also speak of society solidly in the throes of the digital age which has created a society that is extremely connected and subsequently more complex (those who know me joke of how unconnected I am given my complete lack of Twitter-savviness). More specifically, "this increasing

complexity of the work environment is eroding hierarchical management structures and styles. The most effective leaders of change are those who can build and use networks to create relationships. In fact, research suggests that being an effective change agent is less to do with hierarchical power or positional authority and more to do with ability to influence through a network" (Bevan and Fairman, 2014).

I have spent over 15 years in this field and, from where I sit, can attest to the profound connectivity of the infection control community. We know as much about each other's outbreaks and practice challenges as we know about each other's kids and what they are up to on their summer vacations. We are truly connected, but do we leverage that connectivity? As IPAC Canada president, I have the privilege and unique opportunity to grow my networks provincially, nationally, and also globally. By the time this goes to print, I will have made a trek to Tasmania, Australia to participate in the Australasian College for Infection Prevention and Control's 2015 Conference and reconnected with my colleagues from Australia and the UK who I met last May at our IPAC Canada national education conference in Victoria, BC. I realize how important

it is to work through preexisting hierarchal barriers to achieve transformational change and to use those networks to move the meter of our own influence. How often have I heard infection control professionals state that they have no real influence in their organization whether it comes to procuring, or driving practice change, or building a sustainable culture of infection prevention? Too often I have heard these comments and the hair on my neck stands up, every time. If infection control professionals can't influence that which impacts patient safety through infection prevention and control best practices, then who can?! It's time to realize the evidence-informed stick, pardon my Neanderthalism, that we can wield, and start building and leveraging our collective wisdom, passion, and purpose to play a key role in moving healthcare in the right direction.

We all have tonnes of literature to read, however, I strongly encourage you to check out the Bevan and Fairman white paper and ask yourself how you can start building collegial bridges for generating real change! Paper can be found at: <http://www.nhs.uk/resources/publications/white-paper.aspx> *

"I have spent over 15 years in this field and, from where I sit, can attest to the profound connectivity of the infection control community."

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Suzanne Rhodenizer Rose, IA, B.Sc.Inf., MHS, PCI

Présidente, PCI Canada

Jeter des ponts entre collègues

Lisa Young, une merveilleuse collègue de Colombie-Britannique, m'a récemment complimentée sur mon dernier message, et elle m'a transmis un livre blanc intéressant sur le système de santé du Royaume-Uni. Signé par Helen Bevan et Steve Fairman (2014), ce rapport s'intitule *The new era of thinking and practice in change and transformation : A call to action for leaders of health and care*. Il a tout de suite capté mon attention compte tenu de mon désir d'évoquer le changement radical dans les pratiques de prévention et de contrôle des infections, de même que dans les comportements du personnel médical.

On entend tellement parler, ces temps-ci, de l'importance pour les cadres de la santé d'innover sans cesse ! Bevan et Fairman (2014) nous rappellent que les idées révolutionnaires ne nécessitent pas forcément des pas de géant, mais plutôt une série « d'avancées modestes qui s'appuient sur les idées admises et sur les leçons de nos collègues ». Ils expliquent comment l'ère numérique a créé une société extrêmement connectée et par conséquent plus complexe (mes proches me taquinaient à propos de mon ignorance complète des us et coutumes de Twitter). Plus précisément, « cette complexité

croissante de l'environnement de travail érode les structures et les styles de gestion hiérarchiques. Les agents de changement les plus efficaces sont ceux qui savent bâtir et utiliser des réseaux pour établir des relations. L'efficacité d'un agent de changement a moins à voir avec le pouvoir ou l'autorité hiérarchique qu'avec la capacité d'influencer les gens à travers un réseau » (Bevan et Fairman, 2014).

Après 15 ans dans le domaine, je peux attester de la profonde connectivité du milieu de la lutte contre les infections. Nous en savons autant sur les éclosions et difficultés rencontrées par nos collègues que sur leurs enfants et ce qu'ils ont fait de leurs vacances d'été. Nous sommes vraiment connectés, mais pouvons-nous tirer parti de cette connectivité ? En tant que présidente de PCI Canada, j'ai la chance de développer mes réseaux à l'échelle provinciale, nationale et même mondiale. Au moment où paraîtra cet article, je serai de retour de la province australienne de Tasmanie où j'aurai participé au congrès 2015 de l'Australasian College for Infection Prevention and Control et renoué avec des collègues de l'Australie et du Royaume-Uni que j'ai rencontrés en mai dernier lors du congrès éducatif national de PCI Canada à Victoria, C.-B.

Je me rends compte de l'importance de surmonter les obstacles hiérarchiques pour obtenir un changement transformationnel et utiliser ces réseaux pour accroître notre influence. Combien de fois ai-je entendu les professionnels de la lutte contre l'infection déplorer leur manque d'influence qu'il s'agisse de procurer ou de promouvoir les changements de pratiques, ou d'établir une culture de la prévention durable ? J'ai trop entendu ce genre de commentaires et ils me hérissent inmanquablement. Si les professionnels de la lutte contre les infections ne peuvent pas influencer la sécurité des patients par les meilleures pratiques de prévention et de contrôle, alors qui le peut ? Il est temps de brandir la massue de données probantes – pardonnez cette référence néanderthalienne – et commencer à utiliser notre sagesse collective et notre passion pour jouer un rôle clé.

Nous avons tous des tonnes de documents à lire, cependant, je vous encourage fortement à consulter le livre blanc de Bevan et Fairman et à vous demander comment vous pouvez commencer à jeter des ponts pour produire un réel changement ! Vous trouverez le rapport à : <http://www.nhs.uk/resource-search/publications/white-paper.aspx> ✨

« Après 15 ans dans le domaine, je peux attester de la profonde connectivité du milieu de la lutte contre les infections. »

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Gerry Hansen, BA

Executive Director, IPAC Canada

Are Numbers Important?

Membership statistics are always calculated as of November 1. The November 1, 2015 charts (see below) show a slight decrease in membership in the past year. The loss of 25 members was quickly reversed in November with new memberships. However, IPAC Canada membership has remained stagnant for several years and certainly membership numbers must be carefully monitored to avoid a significant downward trend.

Why has our membership not increased is a response to two scenarios: 1) reduction of healthcare budgets; 2) IPAC Canada is not a 'household name.' What can we do about this?

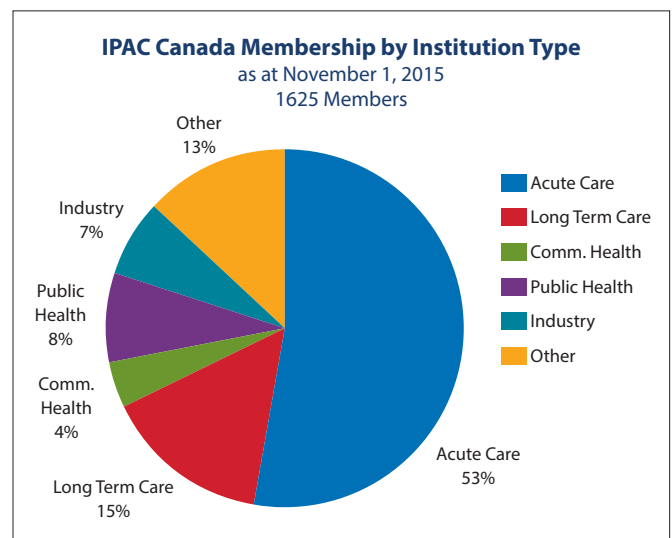
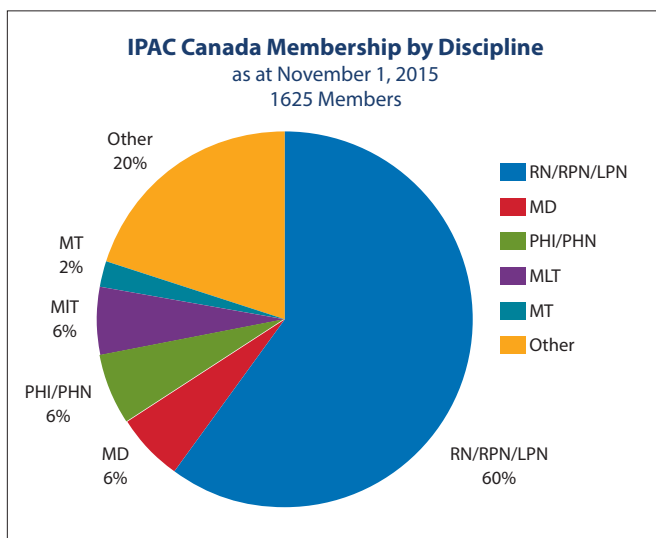
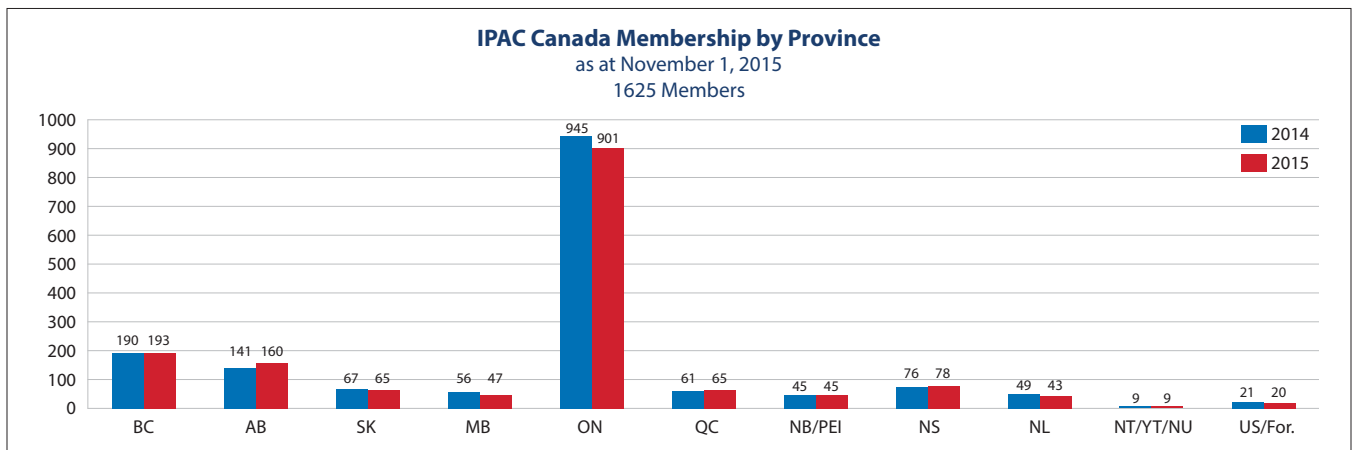
The resolution to the problem of membership numbers has to be addressed by switching these scenarios: increase IPAC Canada's national and international profile; influence decision makers.

The Board of IPAC Canada has recently engaged Impact Public Affairs of Ottawa to mentor the Board in government

advocacy and media relationships. The result of this engagement will result in IPAC Canada having more influence on government at all levels and increased awareness by healthcare professionals and the public.

The new federal government has indicated that science is back. With educated and connected professionals, healthcare-associated infections will be significantly reduced.

Numbers will tell the story. 🌸



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New and recertified CICs from a variety of healthcare settings have spent hours studying, digesting facts, and reading current literature. This information and life experience, along with a successful completion of the CIC® examination, ensure the infection prevention and control professional deserves to place a CIC® after their name. Congratulations to the following November 2014-September 2015 graduates.

First-time Certifiers

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 Michelle A. Alexander, BSc, CCRC, CIC
 Joyce Balcom, CIC
 Arpita Bhattacharya, BScH, RRT, CIC
 Laurel Biluk, RN, BN, CIC
 Lynn P. Boutilier, RN, CIC
 Beverley Susan Brown, RRT, CIC
 Margaret L. Cameron, MLT, BHA, ASQ, CIC
 Shaun D. Chaimovitz, CPHI(c), BAsC, CIC
 Sheila R. Chartrand, RN, CIC
 Chibuike H. Chizea, MD, MPH, CIC
 Jean E. Clark, RN, CIC
 Heather B. Clouthier, RN, CIC
 Adella (Adel) Rose Coulter, RPN, CIC
 Mark Daniw, CIC
 Christine M. Drummond, RN, BN, CIC
 Sandra A. Dunford, RN, BScN, CIC
 Brenda P. Earles, RN, BN, CIC
 Katherine A. Ellis, BScN, RN, CIC
 Samantha Erskine, CIC
 Erhuvwu J. Eruvwetaghware, MPH, CIC
 Philippe Fournier, CIC
 Candace A. Fraser, CIC
 Kasey A. Gambeta, RN, MN, CIC
 Angela Gaudin, MLT, CIC
 Lindsay Gembicki, CPHI(C), CIC
 Elizabeth M. Gulyas, RN, MSn, BAS, CIC
 Kelly A. Halsall, BSc, MLT, CIC
 Katherine R. Hoogenboom, BScN, RN, CIC
 Kimberley F. Houde, RN, CIC
 Elaine Hunter Gutierrez, RN, CIC
 Danielle R. Huston, MLT, BSc, CIC

Amira Imamovic-Buljubasic, RN, CIC
 Trevor S. Johnson, A-EMCA, CIC
 Shara Junaid, CIC
 Lauren M. Kim, CIC
 Christine M. Knaus, CIC
 Dione Kolodka, CIC
 Donna P. Lahey, RNBSn, CIC
 Grace Lamarche, RN, CIC
 Sheila L. Lee, RN, CIC
 Camille Lemieux, MD CCFP LLB MPH CIC
 Ronny P. Leung, RN, CIC
 Danielle M. Marx, MSc, CIC
 Sarah McBride, RN, CIC
 Marlene Grace Montgomery, RN, CIC
 Danusia F. Moreau, BScN, RN, CIC
 Daphne D. Murray, RN, CIC
 Julie Orton, CIC
 Michael Paetzold, RN, CIC
 Manish M. Patel, ICP, CIC
 Diane L. Paynter, MLT, CIC
 Maria Ralph, RN, CIC
 Jennifer G. Regier, RN, CIC
 Michelle Science, MD, MSc, CIC
 Benjamin Shaw, BScN, RN, CIC
 Naureen Siddiqui, MHSc, CIC
 Natalie D. Smith, RNBn, CIC
 Cheryl A. Smith, MLT, CIC
 Lin Tang, MBBS, MHA, MSBME, CIC
 Laurie G. Teather, MLT, CIC
 Eslyn Thomas, CIC
 Lori E. Totten-Scopie, MLT, CIC
 Rachael M.R. Welch, RN, CIC
 Sarah E. Wells, BAsC, CPHI(C), CIC
 Valerie L. Wood, CIC
 Mary M. Woodwark, RN, CIC
 Leanne Wyman, CIC
 Giovanna Zinken, CIC

Recertified

Chingiz M. Amirov, MPH, CIC
 Joanne Archer, CIC
 Clare Barry, RN, CIC
 Noel Belcourt, CIC
 Elizabeth A. Bialachowski, RN, BN, MS, CIC
 Seema Boodoosingh, MHA, BSc., MLT, CIC

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Elections to Board of Directors

The Nominating Committee of the Board of Directors of IPAC Canada is charged with the responsibility of ensuring continuity by nominating a slate of officers for positions open in 2015 (Policy 12.10). These are nominations only. **Additionally, nominations for any of the available board positions are welcomed from members of IPAC Canada.** Serving on the board of IPAC Canada is an excellent way to participate at the national level. This offers the opportunity to meet a wide range of IPAC Canada members, network with allied professional groups, and work with other motivated and experienced board members.

Timelines for Election of Officers and Directors:

February 12, 2016: Deadline for additional nominations from membership.

February 26, 2016: Announcement of final slate of candidates for election at 2016 AGM.

May 18, 2016: Elections to be held at the Annual General Membership Meeting, Niagara Falls.

May 18, 2016: Newly elected and returning Board Orientation, Niagara Falls.

The Nominating Committee of the Board of Directors of Infection Prevention and Control Canada (IPAC Canada) has put forth the following candidates for positions open as of May 18, 2016. Candidate profiles are available at www.ipac-canada.org (Headlines)

DIRECTOR (three-year term)



(Programs and Projects)

Mandy Deeves, BScN, RN, CIC
Network Coordinator, Public Health Ontario
North Simcoe Muskoka
Infection Control Network
Orillia, Ontario

DIRECTOR (three-year term)



(Standards & Guidelines)

Tara Donovan, BHSc, MSc
Epidemiologist
Fraser Health
Surrey, British Columbia



PUBLIC REPRESENTATIVE (three-year term)

IPAC Canada requires a Public Representative to serve on its Board of Directors. Public Representatives are not associated with healthcare in a professional capacity and may include individuals who are serving on a voluntary basis on the Board of a healthcare institution. A Public Representative will be chosen for their awareness and knowledge about patient safety or other healthcare issues, and their ability to bring a public perspective, not as representatives or advocates of the organizations with which they may be affiliated. The Public Representative position will provide broader perspectives and a different lens to discussions and actions of the Board of Directors and IPAC Canada.

A Public Representative will be selected according to one or more of the following criteria:

- Is not associated with healthcare in a professional capacity.
- Demonstrated commitment to volunteerism and knowledge of health-related issues.
- Previous experience as a Board Director.
- Absence of a current professional or financial interest in either the delivery or sale of products or related to patient safety.
- Candidate diversity.

For additional information, see policy 2.11.

Additional nominations from the membership of IPAC Canada will be accepted until **February 12, 2016**. Position descriptions (Section 2 Board of Directors, Policy) and nomination forms (Form 3 and 3C) may be obtained from the Membership Services Office (info@ipac-canada.org) or are available in the Members Area of the IPAC Canada website (Policies and Forms).

Signatures of two active members are required for each nomination. ❄️

Send completed nomination forms to:

Marilyn Weinmaster, IPAC Canada Secretary

Email: info@ipac-canada.org

Fax: 1-204-895-9595

Deadline for nominations:

February 12, 2016

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200,000

patients get infections every year while receiving healthcare in Canada; **more than**

8,000

of these patients die as a result

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in preventing infection can reduce the risk of some infections to

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80%

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Stay informed!



2016 Annual General Meeting

NOTICE IS HEREBY SERVED that the Annual General Meeting (AGM) of Infection Prevention and Control Canada will be held on Wednesday, May 18, 2016 at the Scotiabank Convention Centre, Niagara Falls, Ontario. Breakfast will be served at 0715. Registration will open at 0715. IPAC Canada members must register and pick up a voting card before entering the AGM. The AGM will commence at 0745. Registration will close at 0745 and the doors will be closed. After the doors are closed, attendees may enter the AGM, but may not vote unless registered.

Members may vote on business arising at the AGM by proxy using Form #15 2016 which must be submitted to the IPAC Canada Secretary at the IPAC Canada office no later than Thursday, May 12, 2016. The AGM Agenda, Rules of Order and Proxy Form #15 2016 will be posted to the website in early 2016 and an announcement made of their availability. *

Marilyn Weinmaster, Secretary
IPAC Canada
Email: executivedirector@ipac-canada.org
Fax: 1-204-895-9595



Wisdom Begins With Wonder

IPAC CANADA

Registration Brochure and
Second Call for Abstracts available at
www.ipac-canada.org



2016 NATIONAL EDUCATION CONFERENCE
Scotiabank Convention Centre, Niagara Falls, Ontario
May 15 – 18, 2016

Wisdom Begins With Wonder
IPAC CANADA

Who Should Attend?
Infection Prevention and Control Professionals and healthcare providers interested in the prevention and control of infections in all healthcare settings.

For More Information:
IPAC Canada
Telephone: 1-866-999-7111
Email: info@ipac-canada.org
www.ipac-canada.org

Registration:
Will commence December 2015.
See www.ipac-canada.org for program information.

Education Highlights:

- Infection Control in Dialysis Settings – Half Day
- Infection Control in Dental Settings – Half Day
- Care Bundles to Multimodal Interventions
- One Health Initiative – Human and Animal Health
- Clostridium difficile
- Patients, Residents and Families – What should they know?
- Healthcare Facility Design

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A close-up photograph of a woman with dark hair, eyes closed, and a gentle smile, kissing a newborn baby on the forehead. The baby is wrapped in a white blanket and has its eyes closed. The background is softly blurred, showing a patterned surface.

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NEW DEADLINE DATE! NEW AWARD!

Membership has its benefits – education, collaboration and representation. The IPAC Canada website (www.ipac-canada.org) has so much information on the benefits of being a member. The annual member resource guide for finding other IPAC Canada members, links to infection control sites, audit tools...the list is extensive. Tell another infection prevention and control professional (ICP), tell an infection control or ID physician, tell your medical laboratory

technologist, tell environmental services, tell EMS, tell your designate, and tell your director about the benefits of joining our national organization.

If that person joins IPAC Canada by **March 15, 2016**, both you and the new IPAC Canada member will be eligible to win a complimentary 2016 conference registration (Monday-Wednesday, value \$625). You are eligible for the draw with every new IPAC Canada member that you get to sign up from

June 1, 2015 to March 15, 2016. Should the winning members have already paid their 2016 conference registration, a refund will be made to the person or the institution which has paid the fee. The New Member Contest form is available from www.ipac-canada.org or by contacting the IPAC Canada office. An announcement of the winners of this offer will be made by March 30, 2016. Membership applications can be found at www.ipac-canada.org/about_join.php.*

New member name _____

Email address _____

Sponsoring member _____

Email address _____

Send this form by fax or email to: IPAC Canada Membership Services Office | info@ipac-canada.org | Fax: 204-895-9595



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2016 ECOLAB poster contest



An annual poster contest is sponsored by Ecolab and supported by a chapter of IPAC Canada to give infection prevention and control professionals (ICPs) an opportunity to put their creative talents to work in developing a poster which visualizes the infection Control Week theme. 2016 National Infection Prevention and Control Week is October 17-21.

2016 is IPAC Canada's 40th anniversary, and the selected theme reflects the important job that infection prevention and control professionals do in all healthcare sectors.

THEME: ICPs – The Core of Infection Prevention and Control

PRIZE: Waived registration to 2016 IPAC Canada National Education Conference or \$500.

REMINDER: Posters should have meaning for the public as well as all levels of staff across the continuum of care. The poster should be simple and uncluttered, with strong visual attraction and minimal text.

Judging will be on overall content. Artistic talent is helpful but not necessary. The winning entry will be submitted to a graphic designer for final production. Your entry will become the property of IPAC Canada.

HOST CHAPTER: IPAC Simcoe-Muskoka

SUBMISSION: Submissions will only be accepted by email. Send submission to info@ipac-canada.org.

Email title: 2016 Ecolab Poster Contest

Submission format:

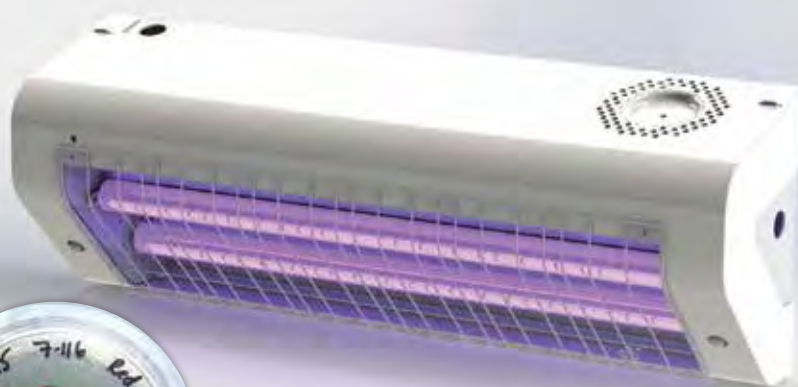
- Electronic file in Word or PDF format only.
- Files less than 5 MB preferred.
- File Size – must print out to 8.5"x11" paper.
- Name, address and telephone number must be included in the covering email.
- DO NOT include identifiers in the poster submission.

DEADLINE: January 31, 2016 🍁

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Our concern for the environment



is more than just talk

As we continue to deliver valuable information through the pages of this magazine, in a printed format that is appealing, reader-friendly and not lost in the proliferation of electronic messages that are bombarding our senses, we are also well aware of the need to be respectful of our environment. That is why we are committed to publishing the magazine in the most environmentally-friendly process possible. Here is what we mean:

- We use lighter publication stock that consists of recycled paper. This paper has been certified to meet the environmental and social standards of the Forest Stewardship Council® (FSC®) and comes from responsibly managed forests, and verified recycled sources making this a RENEWABLE and SUSTAINABLE resource.
- Our computer-to-plate technology reduces the amount of chemistry required to create plates for the printing process. The resulting chemistry is neutralized to the extent that it can be safely discharged to the drain.
- We use vegetable oil-based inks to print the magazine. This means that we are not using resource-depleting petroleum-based ink products and that the subsequent recycling of the paper in this magazine is much more environment friendly.
- During the printing process, we use a solvent recycling system that separates the water from the recovered solvents and leaves only about 5% residue. This results in reduced solvent usage, handling and hazardous hauling.
- We ensure that an efficient recycling program is used for all printing plates and all waste paper.
- Within the pages of each issue, we actively encourage our readers to REUSE and RECYCLE.
- In order to reduce our carbon footprint on the planet, we utilize a carbon offset program in conjunction with any air travel we undertake related to our publishing responsibilities for the magazine.

So enjoy this magazine...and KEEP THINKING GREEN.

REACH OUR ADVERTISERS

This journal would not be possible without the advertising support of the following companies and organizations. Please think of them when you require a product or service. You can also access the electronic version at www.ipac-canada.org.



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Sealed Air Diversey Care	244,250	800-558-2332	www.sealedair.com
Sodexo	258	905-632-8592	www.sodexo.ca
STERIS Canada Inc.	246	800-661-3937	www.steris.com
The Stevens Company Limited	241	800-268-0184	www.stevens.ca
Vernacare Canada Inc.	252	800-268-2422	www.vernacare.com
Virox Technologies Inc.	IFC,208	800-387-7578	www.virox.com
Wood Wyant	256	800-361-7691	www.woodwyant.com
Xenex Disinfection Services	239	888-764-2964	www.xenex.com

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