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No financial support has been provided by Virox Technologies Inc. to authors of articles included in this newsletter.

Environmental Cleaning Resources and Activities in Canadian Acute Care Hospitals

KEITH SOPHA, PRESIDENT OF THE CANADIAN ASSOCIATION OF ENVIRONMENTAL MANAGEMENT (CAEM), FOUNDER OF CLEANLEARNING



Environmental cleaning interventions have increased cleaning effectiveness and reduced antibiotic-resistant organisms in hospitals. There is considerable evidence that environmental surface contamination by pathogens in hospitals is a cause of patients contracting infections. In a recent study (*Am J Infect Control*. 2014 May;42(5):490-4) we examined the state of environmental cleaning resources and practices in Canadian acute care hospitals. This is the first study of its kind and will provide a benchmark for Canadian healthcare facilities.

The environmental cleaning resources and activities of environmental services (EVS) in Canadian medium to large acute care hospitals were quantitatively assessed as part of the Canadian Hospitals Environmental Services Studies (CHESS). In 2012 and the first half of 2013, the manager most responsible for EVS completed a lengthy and exhaustive online survey that assessed the cleaning resources and activities in their hospital in 2011. The CHESS project also included a separate online survey that assessed the working relationships of infection prevention and control programs and EVS in acute care hospitals.

Most hospitals (93%) report that EVS managers and supervisors are employed directly by the hospital, and 24% had some external contracted EVS management. Fewer than half of the respondents report that EVS have enough personnel to satisfactorily clean their hospital to the required standards, and only 5% strongly agree that they had sufficient personnel. Managers most responsible

Fall / Winter 2014 Virox Update

Infection Prevention through Education

The Virox Technologies Scholarship provides financial assistance to eligible infection prevention and control practitioners to attend the IPAC-Canada National Education Conference.

Since inception in 2003, over 130 Infection Prevention and Control Professionals from across Canada have received scholarships to attend the annual conference. Virox Technologies has committed \$20,000 for the 2014 Virox Scholarship Fund to ensure ICP's have access to the education they deserve.

AHP® Wipes Donation to Health Partners International of Canada

In order to support the fight against Ebola in Africa, Virox has donated supplies of our Accelerated Hydrogen Peroxide® (AHP®) disinfectant wipes to Health Partners International of Canada (HPIC).

"Our team is passionate about emerging pathogens and in helping in the control and prevention of them in every community," said Randy Pilon, CEO and President of Virox. "As experts in chemical disinfection for infection prevention, donating disinfectants for fighting the war against Ebola is the least we can do." For more information on the Health Partners International of Canada (HPIC) and how you can donate, please visit www.hpicanada.ca

Congratulations 2014 Virox Scholarship Winners!

Virox would like to congratulate the 2014 IPAC Scholarship winners. Sixteen Infection Prevention & Control Practitioners from across Canada were chosen by the IPAC-Canada Board of Directors.



This year's winners are: Asha Sheikh, Sherry Palmer, Kate Hoogenboom, Kim Rafuse, Michael Rotstein, Jodi-Marie Black, Melisa Avanes, Yasmine Chagla, Nancy Peddle, Sally MacInnis, Anne Bialachowski, Merlee Steele-Rodway, Natalie Marcello, Heidi Pitfield, Jacqueline Hlaji, Heather Candon.

Who's Who

Each year, Infection Control Today magazine invites members of the infection prevention and control community to submit nominations for ICT's 2014 Who's Who in Infection Prevention issue which is designed to salute outstanding individuals who are working hard to advance the infection prevention and control agenda. We are excited to announce that our very own Nicole Kenny was nominated and accepted as one of ICT's 2014 Who's Who!

To read Nicole's nomination and find out who else was among the list please use the following link:

<http://www.infectioncontrolday.com/Galleries/2014/06/2014-Whos-Who-in-Infection-Prevention.aspx>

Talk Clean To Me Blog Round Up

Thank you everyone for your ongoing support. It has been an amazing year of themes for the Talk Clean To Me Blog. In 2015, the Professional and Technical Services Team look forward to continuing our education efforts and our mission to fight the spread of pathogens and save lives!

Here are some of our favorite blogs:

- IIPW- A time to celebrate and educate!
- Kids, Colds and Enterovirus D68
- Doors, Keys and Sledgehammers...
- Disinfection: It's than the juice you use!
- PEDv Pooping Pigs Pose Pharaonic Problems!
- Have Wheels? Will travel....including invisible hitchhikers!

To check out the full blogs go to the www.talkcleantome.com website and if you like what you read don't forget to subscribe to the blog! Most importantly, we love to hear your thoughts, questions and suggestions for new blog topics, so if you have some time, come TALK CLEAN TO ME.

Bugging Off! Nicole Kenny - Clean Freak

You can also follow our conversations on Twitter using #TCTM (or #TalkCleanToMe or #TalkCleanToMeBlog). If you're really interested in joining in the conversation about the safe and effective use of cleaners, sanitizers and disinfectants for hands, surfaces and devices join our LinkedIn Group - aptly named Talk Clean To Me!

The Virox Insights Blog Recap

The Virox Insights Blog written by Mikeisha Paul, Clinical and Technical Services Associate, continues to show you how cleaning and disinfection can be made easy with Accelerated Hydrogen Peroxide® (AHP®). In case you missed it, here are our latest blogs:

- Don't let Influenza Take the Spring Out of Your Step
- AHP and the Bugs
- Can you use AHP against Ebolavirus? The answer is YES!
- Enterovirus has you winded? Breathe a sigh of Relief with AHP!

To join our online community go to www.virox.com, scroll down to Virox Online Community and click subscribe!

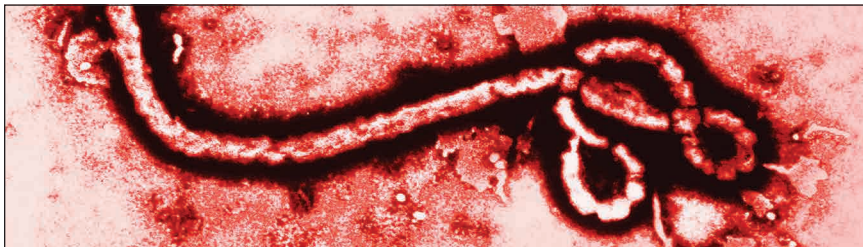
Insightfully yours,

Mikeisha Paul, Clinical and Technical Services Associate



Ebola Virus Disease

NICOLE KENNY, VIROX TECHNOLOGIES INC.



On August 26, 1976, a poor, rural farmer entered Yambuku Mission Hospital in Zaire, near the Ebola River (Zaire is now known as the Democratic Republic of Congo). Malaria was rampant in this area and the farmer was automatically treated with a course of chloroquine. Five days later his malarial symptoms had returned, and within a week several other patients, all of whom had been present with the farmer at that same mission hospital, were showing similar symptoms. By the end of October, 318 cases of what we now call Ebola Virus Disease (EVD) had been described, almost all of which resulted in the rapid death of those infected, including 11 of the 17 staff at Yambuku Mission Hospital.

That first EVD outbreak was eloquently described by an international commission in a 1978 World Health Organization bulletin. Many more outbreaks have since been declared, most of which have been confined to a country or region and each affecting as many as a few hundred people. What makes the current outbreak of Ebola so notable is that it has been found almost simultaneously in several countries, and more infected people than in all of the previous outbreaks combined.

Ebola has an environmental reservoir in the bodily fluids of infected animals such as chimpanzees, gorillas, fruit bats, monkeys, forest antelope, and porcupines that are found ill or dead or in the rainforest. EVD then spreads through human-to-human transmission via direct contact with the body fluids of infected people, and with surfaces and materials contaminated with these fluids (direct contact means that body fluids from an infected person have touched someone's eyes, nose, mouth or open cut, wound or abrasion). People remain infectious as long as their blood and body fluids, including semen and breast milk, contain the virus.

The incubation period, the time interval from infection with the virus to symptom onset, is between 2 and 21 days, and humans are not infectious until symptoms start to appear. The first symptoms are usually sudden onset of fever, fatigue, muscle pain, headache and sore throat. This is followed by vomiting, diarrhea, rash, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding. The disease was originally known as Ebola Viral Hemorrhagic Fever because of the shocking blood loss from the infected patient's gums, eyes, and anus.

The management of small and large outbreaks of EVD relies on applying a package of interventions, namely case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilization. Raising awareness of risk factors for Ebola infection and protective measures that individuals can take is an effective way to reduce human transmission, so engaging the local communities is key.

In the 2014 outbreak, as in the original 1976 outbreak, healthcare workers have died as a result of EVD infection. Healthcare workers should always take standard precautions when caring for patients, regardless of their presumed diagnosis. Those caring for patients with suspected or confirmed Ebola virus should apply extra infection control measures to prevent contact with the patient's blood and body fluids and contaminated surfaces or materials such as clothing and bedding. When in close contact (within 1 metre) of patients with EVD, healthcare workers should wear face protection

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IPAC Canada 2015 Conference



The Professional & Technical Services (PTS) team is a Virox consulting resource for Infection Control Professionals, Public Health Inspectors and Nurses, Environmental Services Personnel and our Distributor Sales Reps. We are huge fans of all manner of infection prevention and control education, and one of our favorite events each year is the IPAC Canada conference.

In 2015 the conference will be held in the spectacularly beautiful west coast setting of Victoria, British Columbia.

Conference planners have arranged for a keynote lecture by the amazing Michael Grinder, who will speak on "The Power of Influence" and also give a half-day workshop on presentation skills. If you've never experienced a Michael Grinder presentation, you won't want to miss this. Also Prof. Shaheen Mehtar will come from Cape Town, South Africa to give three presentations, including a plenary session on infection prevention and control resources in Africa in the age of Ebola.

Dr. Gary Garber, Dr. Bonnie Henry, and a couple of extremely funny physicians called "The Wisequacks" (Doctors Without Boredom!) will also give important sessions.

Plan to come

For a copy of the Preliminary Program, refer to the IPAC Canada web site – www.ipac-canada.org



Bacterial Resistance to Quaternary Ammonium Compound Disinfectants

PROF. ROBERT R. BRAGG, DR. ARINA JANSEN, MARISA COETZEE, WOUTER VAN DER WESTHUIZEN AND DR. CHARLOTTE BOUCHER
DEPT. OF MICROBIAL, BIOCHEMICAL & FOOD BIOTECHNOLOGY, FACULTY OF NATURAL AND AGRICULTURAL SCIENCES,
UNIVERSITY OF THE FREE STATE, SOUTH AFRICA

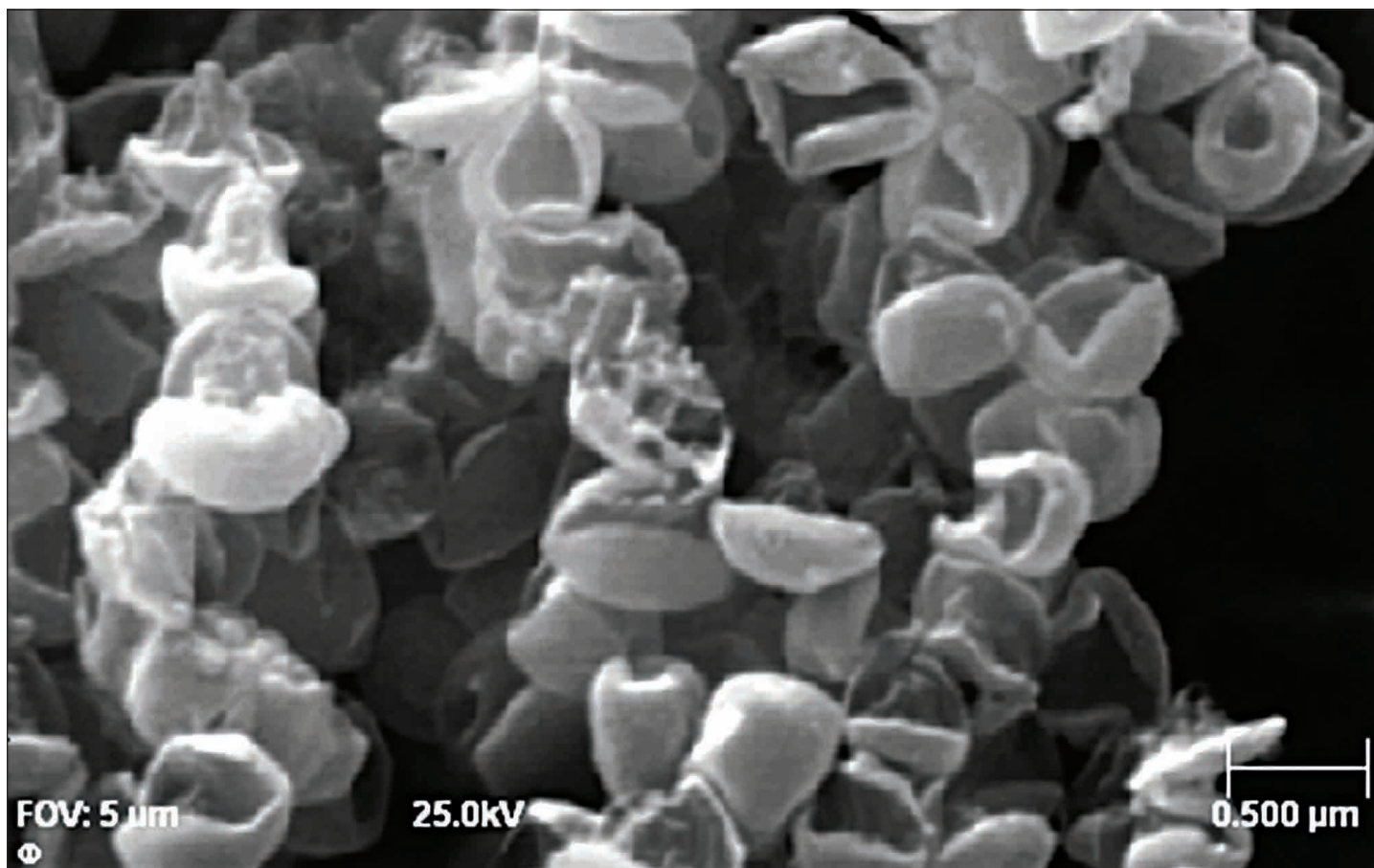
We have come a long way since 1867, the days when Joseph Lister first suggested that good biosecurity in a hospital is essential for control of bacterial infections. Surgeons no longer take pride in the blood stains on unwashed operating gowns, and washing of hands is now mandatory. The question is, has much improved since 1867? Unfortunately, the answer to this question must be "Not much." Nosocomial infections currently are the fourth leading cause of disease, and a significant cause of premature patient death in developed countries. With the ever-increasing problems with antibiotic resistance in bacteria, it is high time that disinfection and biosecurity in the hospital environment received a much needed overhaul.

Resistance in Bacteria to Disinfectants

Microorganisms differ in their response to antimicrobial agents due to differences in their cellular structures, composition, and physiology. In literature, two major mechanisms of resistance to disinfectants are described, namely intrinsic

and acquired resistance. Intrinsic resistance is the natural ability of the bacterial cells to have decreased sensitivity to a specific agent. Intrinsic resistance is mostly demonstrated by Gram-negative bacteria. The second mechanism is named acquired resistance which result from mutations of normal cellular genes, or the acquisition of foreign genetic information that allows the microorganism to survive harsh environments.

A disinfectant is only effective if it can reach and interact with its bacterial target site(s). Therefore, a disinfectant must cross the outer layers of the cell. The nature and composition of the outer layers may act as a permeability barrier, reducing the uptake of the disinfectant. Gram-positive bacteria seem to be generally more susceptible to biocide action than gram-negative bacteria due to the lack of an outer membrane. Another form of intrinsic resistance is the formation of biofilms by some bacterial cells, resulting in reduced sensitivity toward the disinfectant. One possibility of the decrease in sensitivity could be based on a



chemical interaction between the disinfectant and the biofilm, modulating of the microenvironment, production of degradative enzymes and neutralizing chemicals, or genetic exchange between cells in a biofilm.

Acquired resistance can arise by either mutation or by the acquisition of genetic material in the form of plasmids or transposons. When microbial communities are exposed to either sub-inhibitory concentrations or long-term exposure to quaternary ammonium compounds (QACs) with low-chemical reactivity, more resistant clones can emerge with changes in their susceptibility. This can also cause changes in susceptibility to other antimicrobial agents. Although antimicrobial resistance can be obtained through mutations in the genes, it is proposed that antimicrobial resistance is mainly through the acquisition of antimicrobial resistance genes.

Acquired resistance against QACs is particularly seen in *Staphylococcus aureus*. Several QAC resistant genes have already been identified from bacteria isolated from various sources. It was found that these genes are generally plasmid-borne. They encode proteins responsible for the expulsion of hydrophobic drugs including QACs, intercalating dyes and other cationic biocides. These genes are found on mobile genetic elements and their location allows them to interact between various staphylococci species.

Efflux is the primary resistance mechanism of disinfectant resistance. This lowers the concentration of the antimicrobial agent inside the cell by pumping the agent out of the cell. Efflux pumps can either be substrate specific or have a wide range of substrates, such as the multidrug resistance pumps. The multidrug resistance (MDR) proteins confer resistance to a wide range of substrates including toxic compounds, antibiotics, and QACs. The antimicrobials are actively expelled out of the bacterial cell by these proteins. These efflux systems are capable to pump out a broad range of chemically and structurally unrelated compounds in an energy-dependant manner, without altering the compound.

In the literature, it is proposed that there is a link between antibiotic and disinfectant resistance. It was shown that some efflux pumps mediate cross-resistance since they export both QACs and other antimicrobial agents. Co-resistance also exists, due to the linkage of different resistance mechanisms on the same genetic unit such as the same plasmid, transposon or integron, or a combination of both. Some efflux systems are able to accommodate both QACs and antimicrobials, due to the resistance determinants being on the same genetic unit. The QACs is thus able to select for organisms expressing efflux systems. Therefore, resistance can also be toward antibiotics.

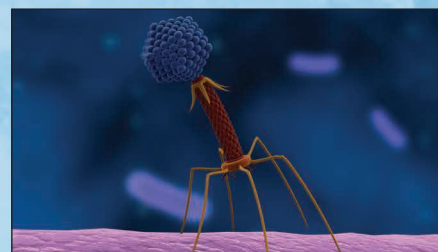
The presence of QAC and other resistance determinants on the same mobile elements may contribute to transfer of resistance to other bacteria. The integrons are collectors of resistance cassettes and can readily pick up new additional resistance determinants on plasmids. This is an efficient vehicle system to travel among different species.

Conclusions

With the ever-increasing concerns related to antibiotic resistance, there is a need to investigate alternatives to antibiotics for the control of bacterial diseases. One option is to improve on biosecurity and disinfection. This aspect is least well understood of the disease control options. The simple fact that there are astronomically high numbers of hospital-acquired infections in developed countries is a clear indication that biosecurity and disinfection is not up to the standard in the medical field.

As the use of disinfectants is probably the best option for disease control in a post-antibiotic era, every effort must be made to fully understand the mechanisms of resistance to disinfectants to ensure that man does not also misuse disinfectants to a point where the majority of bacterial species develop resistance to disinfectants as well as to antibiotics.

Bacteriophages as Potential Treatment Option for Antibiotic Resistant Bacteria



Another article that caught our attention recently is also from Prof. Bragg and his team in South Africa. He published some of the outcomes of the First International Conference on Infectious Diseases and Nanomedicine on the increasing problems with antibiotic resistance, and it highlighted the important work of one of our favorite Canadian microbiologists from history.

“An ideal therapy to cure bacterial diseases must be highly effective while having no toxic effects to the host. Bacteriophages have shown no toxic effects in hosts, except for some rare, reversible allergic reactions and high success rates have been reported.”

Bacteriophages are the most abundantly available biomass on earth outnumbering prokaryotes by approximately tenfold in number. They are viruses that recognize and target bacterial cells in order to replicate. The first reported discovery of bacteriophages was by Ernest Hankin who reported antibacterial activity against *Vibrio cholerae* in the Ganges and Jumna rivers, India, in 1896, which he described as a phenomenon caused by an unknown substance. It was Félix Hubert d'Hérelle, a Canadian working in Paris, who observed the lysis of *Shigella* cells in a broth culture in 1917. This led to d'Hérelle naming the virus “bacteriophage,” which is a combination of “bacteria” and “pagein,” which means, “to eat” in Greek. d'Hérelle later used the bacteriophages to treat dysentery in World War I soldiers, which was the first reported

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Virox Technologies Inc. Announces the Syed A Sattar African Scholarship

We are proud to announce that Virox Technologies Inc. in partnership with ICAN (Infection Control Africa Network) has established a scholarship fund in honour of Dr. Syed A. Sattar.

In recognition of Dr. Sattar's highly notable scientific career spanning nearly five decades, we at Virox, along with his friends and colleagues in the Canadian infection prevention and control community, were honoured to announce the creation of the scholarship on May 25th at the IPAC 2014 National Conference.

Dr. Syed A. Sattar's research into the influence of environmental factors on the fate of human pathogens has evolved into hundreds of published papers, several books and book chapters, and scores of addresses to scientific meetings on four continents. He was singularly instrumental in the creation and evolution of the Teleclass Education Lecture Series that now reaches into tens of thousands of hospitals in almost every country on the globe. He is a preeminent authority and trusted advisor to many governments and standard-setting agencies, and

his work forms the basis of national and international standards. In the course of Sattar's remarkable career he has received numerous fellowships, awards, and honours.

The Syed A. Sattar African Scholarship award will enable a deserving recipient from an African country, to attend the annual conference of the Infection Control Africa Network.

For more information on Dr. Sattar's Scholarship Fund please visit:
<http://www.icanetwork.co.za/conferences/bursaries-and-scholarships/>

For further information:

Nicole Kenny, B.Sc, Assoc Chem
Senior Director, Professional and Technical Services
1-800-387-7578 x118
nkenny@virox.com

SYED A. SATTAR AFRICAN SCHOLARSHIP

In recognition of your highly notable scientific career of nearly five decades, we at Virox Technologies Inc., along with your friends and colleagues in the Canadian infection prevention and control community are honoured today, May 25, 2014, at this conference of Infection Prevention and Control Canada, to publicly recognize your commitment to excellence.

Your research into the influence of environmental factors on the fate of human pathogens has evolved into hundreds of published papers, several books and book chapters, and scores of addresses to scientific meetings on four continents. You were singularly instrumental in the creation and evolution of the Teleclass Education Lecture Series that now reaches into tens of thousands of hospitals in almost every country on the globe. You are a preeminent authority and trusted advisor to many governments and standard-setting agencies, and your work forms the basis of national and international standards.

In the course of your remarkable career you have received numerous fellowships, awards, and honours. However, being a modest and humble man, you derive more satisfaction from recounted stories of lives saved and improved as a direct result of your life's work.

We are pleased to announce the creation of the Syed A. Sattar African Scholarship. This award will enable a deserving recipient from an African country, who wouldn't ordinarily be able to afford travel for educational purposes, to attend the annual conference of the Infection Control Africa Network. In addition, we are delighted to sponsor your attendance at the 2014 ICAN conference in Zimbabwe where you will be honoured again by those for whom your work has had immeasurable impact.

Thank you for your lifetime of dedication, and please accept our very best wishes for a happy retirement.

RANDY PILON
PRESIDENT, VIROX TECHNOLOGIES INC.

VIROX

May 25, 2014
DATE

Improving hospital staff compliance with environmental cleaning behavior

NICOLE KENNY, VIROX TECHNOLOGIES INC.

Reducing the incidence of healthcare-associated infections requires proper environmental cleanliness of frequently touched objects within the hospital environment. An interesting study out of the University of North Texas School of Public Health (*Proc (Bayl Univ Med Cent)*. 2014 Apr;27(2):88-91) builds on the work of Phillip Carling and others to evaluate whether training interventions, including luminescent markers, would be effective in changing the behaviour of nurses and environmental services (EVS) staff in cleaning patient rooms.

After patients were discharged from their rooms, a public health student entered random rooms on the medical and surgical floors and lightly swabbed high touch objects (HTOs) with a fluorescent marking gel (invisible to the naked eye) before EVS staff or nurses performed routine cleaning duties in each room. The staff was blinded with respect to which rooms were going to be sampled for inclusion in the study. After the cleaning, the HTOs were evaluated with blue light. If the gel mark was completely wiped off, then the cleaning was recorded as pass. If any surface gel was still present, then the cleaning was recorded as fail.



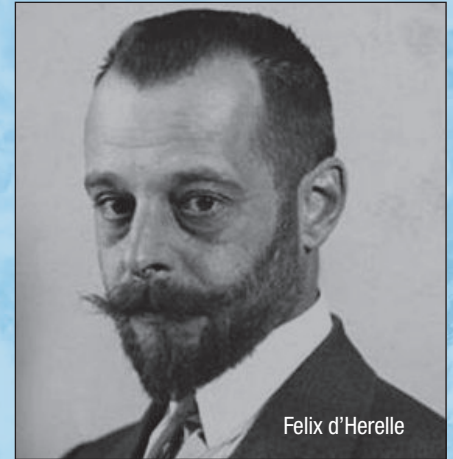
The 3-part study took place between June 2012 and August 2013. Initially 747 sites were sampled. Then the nurses and EVS staff were trained on infection control principles, identifying HTOs, and methods for environmental cleaning and disinfection. For the second part of the study another 1,322 sites were sampled and for the third part of the study 2,188 sites were sampled, and further training took place between each study.

The overall percentage of cleaned surfaces was compared among the three evaluation periods, and the overall percentage of cleaned surfaces was compared by buildings and floor levels. The goal was to evaluate the relationship between interventions and cleaning behavior from trial to trial. The percentage of cleaned surfaces improved incrementally between the three trials—with values of 20%, 49%, and 82%—showing that repeat training favorably changed behavior in the staff. There was a decline from 0.27 to 0.21 per 1000 patient days for *Clostridium difficile* infection, 0.43 to 0.21 per 1000 patient days for ventilator-associated infections, 1.8% to 1.2% for surgical site infections, and 1.2 to 0.7 per 1000 central venous line days for central line-associated bloodstream infections. Other infection control interventions were also initiated during the study period.

The authors of this study didn't attempt to estimate what portion of the decrease in HAIs was due to environmental cleaning; however, decreasing the contribution of pathogens from the environment surely had an impact. This has been established by the CDC and other studies. Current accomplishments in HAI eradication have been encouraging, but much more needs to be done to promote the elimination of HAIs due to environmental contamination.

An important component to reducing the incidence of HAIs is getting buy-in from the staff to address the importance of labor-intensive cleaning of HTOs. This study shows that ongoing training followed by blinded monitoring with transparent reporting of the results in a positive, engaging manner will motivate staff to improve cleaning behavior.

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Felix d'Herelle

therapeutic use of bacteriophages. With the discovery and development of antibiotics, research on bacteriophage therapy declined, although in 1970, the Society of Friends of Felix d'Herelle was founded to continue bacteriophage research.

Bacteriophages are highly host specific and will only attack specific strains depending on the bacteriophage used and the target proteins, which facilitate adhesion to the bacterial host. In phage therapy, normal microbiota are able to compete successfully with other potential pathogens. This is not the case of antibiotic treatment, during which normal microbiota and nonresistant pathogens are destroyed simultaneously.

Another advantage of bacteriophage therapy is that it has been demonstrated that when administered intravenously, bacteriophages can be found in nearly all organs, which is ideal when treating localized infections in different parts of the body. This is an advantage when compared to some antibiotics, which only reach certain and specific organs during treatment. Injection of bacteriophages is not a suitable option in the poultry industry, due to the large number of birds involved, but it demonstrates that if the bacteriophages are capable of reaching the blood stream, they should reach all the organs.

The use of bacteriophages for the treatment of bacterial diseases in a post-antibiotic era holds as much promise as it did in the d'Hèrelle years. However, in order to fully evaluate the potential use of bacteriophages as a treatment option, it is essential that all aspects of the biology of the phages be fully understood.

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for EVS were more likely to report they had sufficient staff to clean their hospitals when they had fewer beds per cleaner. There are no recommended staffing levels for cleaners in hospitals in environmental cleaning guidelines and there is a need for further research to determine optimal EVS staffing levels. CAEM has invested in another research project with Queen's University to determine time standards based on best practice cleaning and disinfection. Preliminary results were presented at the CAEM "Reaching for the Top" conference and trade show September this year. Final results may be published in the third edition of the PIDAC best practice document 2015 (www.publichealthontario.ca).

Introductory training programs for new cleaning personnel average 44.7 hours, ranging from as brief as 4 hours to as long as 186. Most frequently covered topics include infection control, basic cleaning techniques, use of personal protective equipment, and hand hygiene, but the introductory training rarely covers topics such as customer service, personal hygiene, and dealing with spillages.

Respondents indicate that Accelerated Hydrogen Peroxide® based products (72%) and quaternary ammonium compounds (63%) are the most frequently used disinfectants. Microfiber cloths are used for cleaning in two thirds of the hospitals, but the practice of using colour coded cloths or rags for different applications is employed by just 37%. Almost all respondents reported that their hospital have written procedures for cleaning patient rooms for patients positive for MRSA, VRE, and CDI. High-touch objects in patient rooms for patients positive for CDI are cleaned twice a day in 70% of hospitals, and for patients without ARO infection, only 8% of hospitals will clean to that level.

Interestingly, only a third of the hospitals report that the environmental cleaning of an average medical surgical patient room is audited weekly, and a third of the hospitals will audit monthly. The rest of hospitals in the study don't review cleaning tasks on a regular basis to determine the ability of cleaning staff to meet cleaning demands. In this study the auditing of the cleaning of patient rooms primarily refers to a visual inspection and doesn't commonly include environmental marking methods, or the measurement of residual bioburden. Environmental marking and residual bioburden are recommended components of cleaning audits.

We did find some cleaning practices of concern. Several of the hospitals report using toilet bowl brushes for more than one washroom in medical surgical patient rooms, a practice that is not recommended. Also, the cleaning of blood glucose meters and wheelchairs are not EVS responsibilities in most of the hospitals surveyed. One would probably find there are gray areas for EVS, nursing, and other healthcare staff about whose responsibility it was to clean the various pieces of medical equipment in patient care areas.

We concluded our report with 2 major recommendations. Firstly, there is a need for increased and improved auditing of environmental cleaning in hospitals. Without comprehensive auditing programs in place, hospital administrators cannot be certain that their hospital is sufficiently clean for patient safety purposes. Secondly, there appears to be a need for more cleaning staff in the

majority of Canadian hospitals. EVS staffing deficits translate into less frequent cleaning and corners being cut such that the level of cleaning necessary to prevent and control nosocomial infections will not be accomplished with the requisite frequency and thoroughness.

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(a face shield or a medical mask and goggles), a clean, non-sterile long-sleeved gown, and gloves (sterile gloves for some procedures). Laboratory workers are also at risk. Samples taken from humans and animals for investigation of Ebola infection should be handled by trained staff and processed in suitably equipped laboratories.

In the only study to assess contamination of the patient care environment during an outbreak, conducted in an African hospital under "real world conditions", Ebola virus was not detected in any of sampled sites that were not visibly bloody. The expectation is that, with consistent daily cleaning and disinfection practices, the persistence of Ebola virus in the patient care environment would be short – with 24 hours considered a cautious upper limit.

Although there are no products with specific label claims against the Ebola virus, Ebola is an enveloped virus and therefore highly susceptible to disinfection. However, the CDC recommends that surfaces having been potentially contaminated with Ebola virus should be disinfected with a hospital disinfectant with a label claim for a non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus).

Further advice from the World Health Organization and the CDC include:

- Avoid contamination of reusable porous surfaces that cannot be made single use.
- Use only a mattress and pillow with plastic or other covering that fluids cannot penetrate.
- Do not place patients with suspected or confirmed Ebola virus infection in carpeted rooms and remove all upholstered furniture and decorative curtains from patient rooms before use.
- Disposable materials such as cleaning cloths and single-use personal protective equipment (PPE) should be placed in leak-proof bags and discarded appropriately.
- Incineration or autoclaving as a waste treatment process is effective in eliminating viral infectivity and minimizes waste.

Ebola Virus Disease is not a truly global risk (at this point anyway), and the case count is comparatively insignificant when you compare it to other killers like HIV. But the death rate of more than 50% of those infected and the lack of treatment options and vaccination make it concerning nonetheless. We in the developed world have a social contract to engage with our infection prevention and control colleagues in western Africa to battle this disease that is ravaging their economies and their societies.