

## Disinfectants and Antibiotic Resistance

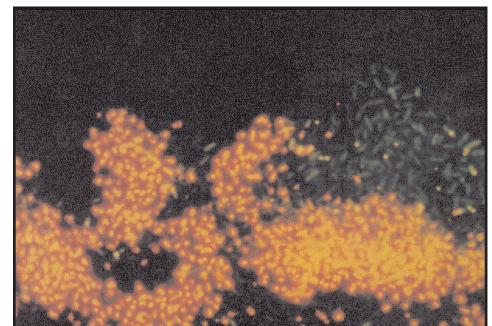
Dr. Peter Gilbert, School of Pharmacy, University of Manchester

Debate rages over the question: Can the overuse of surface antimicrobial agents engender bacterial resistance to antibiotics? To consider the question properly and to come to an informed conclusion, let us first look at bacteria in their natural state and at the mechanisms of bacterial resistance to disinfectants.

Nowadays we do not see bacteria growing planktonically as a natural state so much as attached to surfaces and growing in a biofilm. The last 20 years of research have shown us that biofilm bacteria attach to surfaces and become enveloped in extra-cellular polymeric slime. Within that slime individual bacterial cells are in close proximity to each other and able to cooperate. Biofilm bacteria are physiologically distinct than the same bacteria growing in a planktonic state and become as much as 1,000 times more resistant to disinfectants and antibiotics. These biofilms are not harmless. They are implicated in many hospital-acquired infections, particularly those related to catheters and implanted devices.

Imagine treating a very vibrant biofilm community with a non-oxidizing antimicrobial, killing 99.9% of the viable bacteria there. Pockets of surviving bacteria remain. These survivors could be random mutations that represent less susceptible clones, or they could be efflux mutants with multiple drug pumps, or they could be the result of conditioned responses to repeated, sub-effective biocidal treatment. The pockets of survivors with a less susceptible phenotype might now profligate into a new and less biocide-susceptible biofilm. The worry is that we are selecting for bacteria that are not only less susceptible to disinfectants, but that might also be cross-resistant to many forms of antibiotics. The truth of it is that even though we have been using disinfectants for well over a century, there is little or no evidence of increased resistance to these chemicals.

Disinfectants don't act like antibiotics. Disinfectants have a multiplicity of targets, and as concentration increases, so increases the number of targets. There has been noted in the liter-



ature a change in bacterial susceptibility to biocides, but susceptibility is different from resistance. Susceptibility refers to an increase in the minimum inhibitory concentration (MIC) – actual in-use concentrations are many times higher than the MIC. For actual resistance to emerge, ALL of the biocide's potential targets would have to change. While theoretically possible, this is something that we just haven't yet seen even after a hundred years of use. Is the age of environmental disinfection over? Are we entering a post-biocide era as the Harbingers of Doom would lead us to believe? The answer is an emphatic NO.

The Harbingers of Doom would argue that the uncontrolled use of biocides in the environment is a selection pressure towards antibiotic resistance. Although some evidence of this has been noted in the literature, in each case it was recorded in monoculture laboratory experiments. Survey evidence fails to demonstrate that use of antibacterials has affected antibiotic efficacy in the real world.

So what practical recommendations shall we take from all of this? Targeted hygiene. Limit the use of disinfectants to those applications in which have demonstrable benefit. Do not abandon good hygiene practices where there is a proven benefit to a product or a system in limiting disease transmission. Use disinfectants that lose effectiveness rapidly and leave no residual – oxidizing biocides are particularly preferable. Lastly, beware the Harbingers of Doom – look to the evidence.

### Inside This Issue:

Disinfectants and Antibiotic Resistance .....1

Virox Patron Member Scholarship Fund .....2

Conference and Education Schedule .....2

Teleclass 2004 .....3

CHICA.ORG .....3

Infection Control Guidelines .....4

What's New at Virox .....4

*"The secret of success is constancy of purpose"*

Benjamin Disraeli

## CHICA-Canada, Virox technologies and the Patron Partners Announce 2004 National Education Scholarship Opportunity

Through the financial support of the Virox Technologies Partnership, 15 CHICA-Canada members were awarded scholarships to attend the 2003 National Education Conference in Thunder Bay. A total of \$15,000 in scholarships for the 2003 conference was presented.

### Here are some of the comments made by scholarship recipients who attended in Thunderbay:

"Each year the CHICA conference provides a means and forum to share data, information, expertise and ideas in the practice of infection control. As a recipient of the Virox scholarship fund I want to say how helpful it was in helping me be a part of the 2003 CHIC Conference." – **Jim Curtin, RN**

"In light of deep budget cuts, ICPs find the Virox scholarship an additional and excellent opportunity to attend such conferences. I am really touched by the commitment of Virox in identifying and supporting the cause of furthering education for ICPs and promoting patient care." – **Vadula Jayaraman, MT**

"It was the first time I was able to attend a National Conference and I absolutely loved it. I learned so much, and in a comfortable atmosphere. Thanks to Virox for making it possible." – **Molly Blake, RN**

"This was my first time as an attendee at the CHICA conference. Without the help of the Virox scholarship, I would not have been able to go. I was delighted to be surrounded with people of such high caliber. It gave me the opportunity to share all the interesting things I have learned at CHICA." – **Nadia Desmarais, RN**

Applications are now being accepted for this year's National Education Conference in Calgary. Virox Technologies Inc., JohnsonDiversey, The Butchers Company, SciCan, Deb Canada and Webber Training are committed to furthering educational opportunities for the Infection Control Professional (ICP) in Canada. The Community and Hospital Infection Control Association-Canada (CHICA-Canada) National Education Conference is an excellent opportunity to bring ICPs together in a forum of learning.

The Virox Patron Member Scholarship Program is intended to provide financial assistance to eligible ICPs to attend the annual Conference.

Up to \$2000.00 is available for each successful recipient for the reimbursement of eligible costs related to participation at the CHICA-Canada National Conference.

**Applications are due by January 23, 2004**

For further information and application form, contact your local Chapter or visit [www.chica.org](http://www.chica.org) or [www.viroxtech.com](http://www.viroxtech.com)



## Conference & Education

### Winter/Spring Schedule

**Virox will be participating in the following functions:**

#### January 30th & 31st

The Lung Association's "Better Breathing Conference" in Toronto

#### March 1st

Beautex "Education Day for Health & Beauty" in Richmond Hill

#### March 5th

Chatham-Kent Infection Control Committee (C.K.I.C.C.) Long Term Care Meeting in Chatham

#### April 4th to 6th

Ontario Long Term Care Association "Together We Care" Trade Show in Toronto

#### April 23rd & 24th

Nurses Entrepreneurial Foot Care Association (NEFCA) Conference in Lindsay

#### April 27th & 28th

CSSA in Montreal

#### April 29th to May 2nd

CHICA Conjoint Conference in Calgary

Virox is very excited about participating in so many conferences & education days. We wish the best to all of the various organizers and would like to thank them for their dedication and effort in organizing these very important educational opportunities. We look forward to attending and talking to all of the participants.

## Teleclass Education 2004

**Our thanks** to tens of thousands of healthcare professionals on 7 continents for their faithful support of Teleclass Education in 2003. And thanks to our faithful sponsors (like Virox Technologies) for the funding that made Teleclass Education possible in the first place. Deepest thanks to the faculty who gave their time and their remarkable talent (without them it would just have been an hour on the phone with Paul!!).

pathogens, environmentalism in infection control, environmental cleaning, and some fantastic teleclasses on hand hygiene. We will have teleclasses on infection control in pediatric settings, and the impact of food safety on nosocomial infections. And we are particularly proud to be able to bring you a series of free teleclasses in July and August on infection control around the world. There's much to be said.



**Faculty 2004** Teleclass Education this year will bring repeat appearances (returning faculty, brand new lectures) from Elaine Larson, Dick Ward, Barry Farr, Michelle Alfa, Syed Sattar and others. We will be introducing you to new faculty from the CDC, Health Canada, WHO, and representing the US, Canada, Britain, Holland, Croatia, Germany, South Africa, Cameroon, Haiti, Brazil, Switzerland, Malta and Russia – literally the best ideas in the world.

**Topics 2004** In 2004 we will feature the control of MRSA including presentations from the US, Britain and Holland, and from the WHO in Geneva with a global comprehensive perspective. You will hear presentations on dialysis, endoscope reprocessing, control of airborne

### **No Barriers Initiative**

Through 2004 you will get periodic updates on our “No Barriers” initiative, and how your support of Teleclass Education allows us to expand infection control education into developing nations, and foreign languages. A profile of this program is available by request (contact Paul Webber).

Our deepest thanks to all of you who have expressed your support already through letters and offers of financial assistance.

**Coming Soon** Hundreds of you are using Teleclass Continuing Education Certificates and they'll soon be endorsed by several regulating organizations. Enhanced recordings on CD will be more widely distributed. Printable and customizable posters will be available to Members. A new Universal Registration option will give you access to dozens of teleclasses and teleclass recordings at a discounted price. Thanks in advance for your support in 2004.

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**Virox Technologies Inc. is proud to support infection control education initiatives**

## CHICA.ORG

Shirley MacDonald

The Community and Hospital Infection Control Association of Canada (CHICA-Canada) is a national association of professionals in the practice of infection prevention and control. Infection Control Professionals (ICPs) have a number of different backgrounds within the health care field, and may include nurses, physicians, medical technologists, microbiologists and epidemiologists. ICPs practice within hospitals and other health care facilities, such as nursing homes, home care and health units.

The CHICA-Canada website provides a venue for ICPs to keep abreast of association news and information as well as opportunities for continuing education and keeping up to date with important current events in infection prevention and control (e.g. specialized webpages on SARS and West Nile Virus). The website also acts as an information medium for the public, to educate in the prevention of infection. A Members section contains chat groups (WebBoard) for dialoguing with other ICPs, association policy manuals and minutes of meetings, as well as tools for ICPs to use in their daily activities. Links to infection control-related websites are included to help ICPs quickly navigate around the internet. Industry is represented on the CHICA-Canada website by our patron members, with links to their business home pages.

**“The future belongs to those who believe in the beauty of their dreams”.**

Eleanor Roosevelt

## Health Canada Infection Control Guidelines

Linda Kingsbury RN, BScN, CIC

Health Canada Centre for Infectious Disease Prevention & Control

Representing scientific evidence collection and expert consensus, Health Canada publishes a series of Infection Control Guidelines as supplements to the Canada Communicable Disease Report. These guidelines are an invaluable resource.

### Published guidelines include:

- Internet Links to Health Canada's Infection Control Guidelines
- Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care
- Infection Prevention and Control Practices for Personal Services: Tattooing, Ear/Body Piercing, and Electrolysis
- Hand Washing, Cleaning, Disinfection and Sterilization in Health Care
- Proceedings of the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens
- Preventing the Spread of Vancomycin-Resistant Enterococci (VRE) in Canada
- Foot Care by Health Care Providers
- Preventing Infections Associated with Indwelling Intravascular Access Devices
- Controlling Antimicrobial Resistance: An Integrated Action Plan for Canadians
- Preventing the Transmission of Bloodborne Pathogens in Health Care and Public Service Settings
- An Integrated Protocol to Manage Health Care Workers Exposed to Bloodborne Pathogens
- Canadian Contingency Plan for Viral

Hemorrhagic Fevers and Other Related Diseases

- Guidelines for Preventing the Transmission of Tuberculosis in Canadian Health Care Facilities and Other Institutional Settings
- Construction-related Nosocomial Infections in Patients in Health Care Facilities
- Prevention and Control of Occupational Infections in Health Care

As well as the published guidelines, infection control guidelines under development include:

- Prevention of Healthcare-Associated Pneumonia
- Prevention of Human to Human Transmission of Gastrointestinal Infections
- Health care Facility Preparedness/contingency Plans for Bioterrorist Events
- Guidelines for Decontamination of People and Health Care Facilities Following a Bioterrorist Event
- Infection Control and Occupational Health Guideline During Pandemic Influenza in Traditional and Non-Traditional Health Care Settings
- Prevention of Infection from Endoscope Procedures
- Preventing Infection in Dialysis

Electronic copies of the Infection Control Guidelines are available free of charge on the Health Canada website (URL links follow). Printed copies may be purchased from the Canadian Medical Association Member Service Centre by phoning toll free 888- 855-2555 (Can./ US) or 613- 731- 8610 ext. 2307. <http://www.hc-sc.gc.ca/hpb/lcdc/publicat/ccdr>

## What's new at Virox?

### More Patents Received!

On December 5th, 2003 Virox received an official notice of allowance from the USA Patent office that further broadens and strengthens the intellectual property protection that Accelerated Hydrogen Peroxide already enjoys in over 26 countries around the globe. Additionally, there are 4 more global patents pending that will see AHP expand aggressively with unique applications in medical device disinfection, hand care and other infection control applications.

### Formulations Finalized for a New Generation of Chemosterilant & High Level Disinfectants

The Research & Development Team at Virox focuses exclusively on oxidizing infection control technologies, specifically "Accelerated Hydrogen Peroxide". Infection Control Practitioners have long been keen to find a replacement for toxic sterilants that have many negative side effects. In the past there have been several oxidizing products that held promise, but in practice were found to be incompatible with many medical devices, particularly endoscopes. With this in mind Virox has worked tirelessly for over four years with leading medical device manufacturers to develop a rapid sterilant that is remarkably effective and will not harm these delicate instruments. In early 2004 Virox will apply for DIN registration for two new formulations to Health Canada and anticipate registration later in the year.

### Virox's New Home

The much anticipated move has been postponed until the end of February. Provided everything runs smoothly we expect to be fully functional in the new facility by February 23rd. Our new 22,000 sq. ft. building is double the size of our current facility and will include a clean room for processing our line of Chemosterilants & High Level Disinfectants.

**Virox Expands  
in 2004**

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