# Report on the 4th International Conference on Infection Control – Dublin 1996

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#### INTRODUCTION

It was a great privilege to attend the 4th International Conference on Infection Control at Trinity College, Dublin. I would like to acknowledge and thank the New South Wales Nurses Registration Board for making it possible through their scholarship. Over three hundred and fifty delegates attended the conference from twenty-six countries. Common problems from all countries arose, such as, the lack of appropriate hand washing, lack of resources and the use and abuse of antibiotics that is pressuring the mutation of micro-organisms.

#### SIGNIFICANT FEATURES/PAPERS OF THE CONFERENCE A. Problems facing Developing countries

A major issue concerning the old Eastern Block countries was the lack of finances. Workers in Hungary, under the Communist regime, paid 41% of their salaries into schemes that were to provide for Health Care and old age pensions. They also had to pay another 30% for other taxes. The money set aside for Health Care and pensions has disappeared. To obtain any assistance from health care professionals, we were told people must be able to tip or bribe them, which very few people can afford to do. They are also required to purchase any necessary medications.

Third world countries experience significant problems regarding the allocation of resources. Pakistan, for example, spends 32% of its gross domestic product (GDP) on servicing foreign debt and 26% on defence. Amazingly only approximately 0.07% of the GDP is spent on Health (United States of America spends 14% of GDP on Health and Australia spends a little over 8%).

While having inadequate clean drinking water available is a major problem in developing countries, an even greater frustration exists. When antibiotics can be obtained, many have been tampered with, capsules may have a third to a quarter of the original amount of antibiotics in them. Stoppers in vials have been used previously and many are contaminated with *Pseudomonas* which can then be transmitted to other patients. These problems have resulted in a markedly two tiered Health Care System, one for those who have money and a token system for the rest.

#### **B. Infectious Diseases**

Infectious diseases kill 17,000,000 people each year and are the world's leading cause of death. In the 1970's we arrogantly believed that we would eradicate all infectious diseases. Except in the case of Smallpox we have been totally unsuccessful. We now have greater problems than ever with infectious diseases such as, human immuno deficiency virus (HIV), multi drug resistant tuberculosis (MDRTB) and multi resistant Malaria.

#### C. Antibiotic Usage

The area of greatest concern is the mutation of microorganisms especially related to the use and abuse of antibiotics. Five years ago one heard mutterings about "the era beyond antibiotics". Now at conferences many lectures are given on mutations of specific micro-organisms and their multi resistance to antibiotics. Examples of these are Multi Resistant *Staphylococcus aureus* (MRSA), Multi Resistant *Salmonella*, Multi Resistant *Pneumococci*, Vancomycin Resistant *Enterococci* and Multi Drug Resistant Tuberculosis (MDRTB).

Antibiotics are now seen as a victim of their own success! As they have been discovered they have been used and potentially abused. The heavy use of antibiotics has resulted in an evolutionary change which has resulted in selected resistance of the microorganism.

A review of antimicrobial usage over the last decade has shown that there has been no major change in the frequency of prescribing practice of antibiotics. However it appears a greater problem has developed with a change in type of antibiotic being prescribed. Marketing by pharmaceutical companies has emphasised broad spectrum antibiotics and many doctors have moved away from the tried and true narrower spectrum antibiotics. This trend has the effect of selecting out organisms which can resist broad spectrum and a broad range of antibiotics.

Antibiotic resistance occurs in two ways:

#### Intrinsic or inherent resistance

Some antibiotics cannot access the bacterium's cytoplasm and are therefore ineffective, eg. Vancomycin is effective at killing gram positive organisms, however it can not cross the cell envelope of gram negative bacteria. Gram negative bacteria are therefore intrinsically resistant to Vancomycin.

#### Acquired resistance

This is a more recent concern. It occurs when organisms that were inherently susceptible become resistant. In other words a bacterium that would once have been killed by a specific antibiotic will no longer be affected by it.

#### Contributing factors for antimicrobial resistance are:

- Bacterial load: the greater the bacterial load the greater chance of mutation.
- Immune system, the less effective the immune system in assisting the antibiotics the greater chance one has of a sub therapeutic effect, and this will enhance the development of resistance.
- Changing of disease patterns, eg. HIV is a tremendous

issue in the transfer of TB because of the higher inoculum level in HIV patients.

- International travel allows for easy transfer of resistant organisms.
- Over the counter purchase of antibiotics (this occurs in some countries more than others), which allows increase usage which will then give increase pressure for mutation. In Australia the problem may be a person not completing a course of antibiotics and then, on another occasion, self-medicating when they believe they have a similar illness. Similarly, one person may offer another leftover antibiotics for what they believe is a similar illness.

#### Inappropriate use of antibiotics

- Used for non bacterial infections: Viruses, and several micro-organisms other than bacteria cannot be eradicated by antibiotics.
- Sub therapeutic doses: This may actually be worse than no medication at all and it markedly enhances the likelihood that some bacteria will develop resistance.
- Poor compliance: Inadequate dosing, incomplete courses etc., provide opportunities for the mutation of microorganisms which are resistant to the antibiotics.
- Duration too short: If the organism is not eradicated completely it may be the opportunity the organism is looking for to allow mutation.

Antibiotics pressure resistance in a number of ways. They kill sensitive organisms and this provides for less competition so the resistant ones can grow, or they cause alteration of the target sites or alter the antibiotic uptake.

#### At risk populations

Populations at greatest risk are people in hospital, the immuno suppressed or immunocompromised, or those in over-crowded situations such as day care centres, military institutions, prisons and the homeless.

#### Immediate concerns

The most concerning issue regarding mutations of microorganisms documented is demonstrated in the phenomena that, in a laboratory situation, *Staphylococcus aureus* has been able to develop Vancomycin resistance. Clinically this is something we have to anticipate, either as a result of the evolution of *Staphylococcus aureus* or by the acquisition of genetic material from the Enterococci which are already Vancomycin resistant.

Patients who have developed vancomycin resistant enterococci (VRE) have had these common factors:

- invasive procedures
- prolonged hospital stay, > 6 weeks
- neutropenia
- broad spectrum antibiotic usage
- patients who are recipients of organ transplants
- patients who are on haemodialysis
- being present in hospital during an outbreak These features could be characterised as immune depression, prolonged exposure and broad spectrum antibiotic usage.

The Irish nurses gave an excellent paper on controlling an outbreak of VRE in one of their hospitals. One of the concerning factors they discovered was that VRE can live up to three hours on environmental surfaces. This was implicated in further transmission throughout the hospital. This fact will have a major impact on current nursing practices.

For many years, infection control has placed emphasis on hand washing as the single most important infection control measure and there has been less emphasis placed on the environment. With VRE being a sign)ficant micro-organism it will mean a greater emphasis will have to be placed on the physical environment.

#### Antibiotics usage in non-clinical situations

While there was a focus on the use and abuse of antibiotics prescribed by medical staff, the abuse of antibiotics in the veterinary world and those used in the breeding of fish did not go unnoticed. Scotland were dealing with a multi resistant Salmonella in farmers which they had contracted from cattle. It is also possible to be infected with Salmonella from cats and dogs. The need of the poultry industry to liberally use antibiotics with the change in breeding patterns and overcrowding certainly brings its own problems. However, while there is some regulation in the veterinary industry, there are no regulations in the fishing industry. For instance, trout have a problem with bronchiolitis thus handfuls of antibiotics are thrown into the breeding ponds. Awareness of the use and abuse if antibiotics in the veterinary and fishing industries must be taken into consideration.

#### Appropriate antibiotic usage

If we are serious about delaying the 'era beyond antibiotics' then people's awareness of the use and abuse of antibiotics must be raised. Antibiotics must only be taken for bacterial infections. In hospitals, the taking of swabs for culture and sensitivities before commencing antibiotics should be mandatory. Once the sensitivities are known the narrowest spectrum antibiotic should be prescribed and the whole course must be taken. Otherwise one has a sub therapeutic course which encourages mutations.

#### D. CDC Standard and Additional Precautions

Ms J Garner spoke on the Centre for Disease Control (CDC) renaming 'Universal Precautions' to 'Standard and Additional Precautions'. She explained that over time the term 'Universal Precautions' has had different definitions which has lead to some confusion in practice. CDC wanted new terminology that would contain adequate provision for all transmission of infections and this must include TB MDRTB, and the new emerging multi resistant micro-organisms.

'Standard Precautions' involve hand washing, the use of gloves, masks, goggles, face shields and environmental control, management of linen and patient placement. Additional Precautions are for highly transmissible diseases and for those microorganisms which are epidemiological significant. Highly transmissible diseases are airborne diseases that are < 5 microns, eg Measles, Varicella and TB. For paediatrics and immuno compromised patients, diseases > 5 microns carried by droplets which could infect at a distance to 3 feet eg. Influenza, Adenovirus, Mumps, Rubella and Parvo virus B, should also use 'additional precautions'. This would include a single room with negative air pressure, respiratory protections (N 95 respirator) for staff and restricted transport of the patient around the hospital.

#### E. Implications for Australia

Raising the awareness of all health care professionals about the need to avoid inappropriate antibiotic usage, the risks of microbial mutation and the implications of the 'post antibiotic' era help to avoid the evolution of mutant resistant strains.

The need to be aware of the modes of cross infection is a primary nursing responsibility. All nurses must be educated to the level where they can fully appreciate the implications of disease transmission. In an economic climate which focuses on resource management, careful application of good infection control principals will reduce the costs associated with nosocomial infection. Note that this does not excuse doctors from knowing.

There are implications for the undergraduate education of all nursing, medical and paramedical personnel. Good practice is not simply the responsibility of one group of health professionals. It is the responsibility of every person who works in the health care setting. Health professionals also have a responsibility to educate the public regarding the transmission of infectious diseases, lifestyles risks, antibiotic usage and basic hygiene and infection control.

Health policy needs to be developed in conjunction with an understanding of existing practice as well as the theoretical principals of good care. To meet challenge the Healthcare and Pharmaceutical industries will need to be vigilant, proactive and creative in their attempts to control the infections today without leaving themselves unable to meet the challenges of the futúre.

#### **Relevant Papers:**

- Brady Michael, Associate Professor of Paediatrics, USA, Antibiotic Resistance Past: Present: Future.
- Dr Damani, Northern Ireland, Problems of Infection Control in the Developing Countries.
- Garner Julia, Atlanta, Georgia, USA, The 1996 Guidelines for Isolation Precautions in Hospitals: A New Horizon for Isolation.
- Green Stephen, Consultant in Infectious Diseases, Sheffield, Infectious Diseases – RIP.
- Murphy H., ICN, Our Lady's Hospital for Sick Children, Dublin, Control of Spread of Vancomycin Resistant Enterococci: Back to Basics.
- Rielly Bill, Consultant Veterinarian, Glasgow, Salmonella and Antibiotic Resistance.

## AUSTRALIAN SOCIETY FOR MICROBIOLOGY SCIENTIFIC MEETING

### Adelaide, 28 September-3 October 1997

## Infection Control Day - Tuesday 30 September

For this year's meeting, the organisers have programmed in a day of special interest to all infection control practitioners. The day consists of:

- A symposium on Current Issues in Infection Control. Topics to be covered include control of MRSA in WA, infection control and health care reform, and the role of the microbiologist in infection control.
- A workshop on Surveillance Methods in Infection Control, with contributions from Brian Duerdon (PHLS), John Kaldor, David Looke and Celia Cooper. This session offers the opportunity to hear the experiences of the UK as well as what is currently happening in various parts of Australia.
- Two proferred paper sessions covering a range of contemporary issues in infection control and reports of outbreaks of nosocomial infection by various Australian speakers.

In summary, this is a meeting well worth attending, with an opportunity to learn more about microbiology in a friendly environment.

Day registration fee is \$230 and includes entry to the Trade Exhibition, the Rubbo Oration, and lunch, morning and afternoon tea.

For more information contact Irene Wilkinson on (08) 8222 3382 or your local ASM member.

For registration details contact Tour Hosts on (02) 9262 2277 or email asm97@tourhosts.com.au