

Biosecurity Challenges for Australia & its Region

11-12 February 2008

The John Curtin School of Medical Research
The Australian National University

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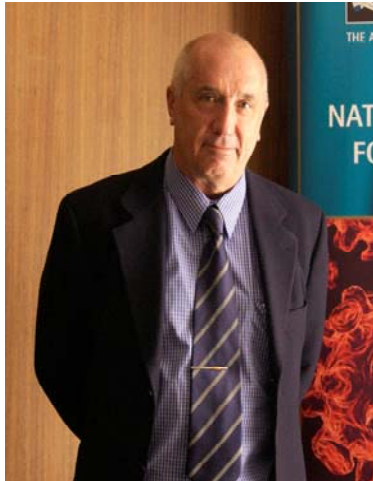


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Welcome from Director, Professor Ian Ramshaw



The symposium Biosecurity Challenges for Australia and its Region is the first to be organised by the National Centre for Biosecurity (NCB). We are excited to be hosting such an event and hope you find it inspiring, educational and enjoyable.

Biosecurity is an area of increasing interest in the academic and policy spheres, with bioterrorism, biosafety, and emerging and re-emerging infectious diseases issues of particular concern.

The NCB adopts a multi-disciplinary perspective on biosecurity by assessing and integrating the health, scientific, legal, ethical, political, social and other dimensions of infectious disease challenges to human health. We hope the multi-disciplinary nature of this symposium introduces you to perspectives on biosecurity which you may not have encountered previously.

I thank all those who have made this inaugural symposium possible, from our presenters to the organising committee to the administrative staff. As interest in biosecurity issues rises further, we plan to host more symposia in the years ahead.

About the National Centre for Biosecurity

The NCB was launched at the Australian National University (ANU) by Vice-Chancellor Ian Chubb on 31 January 2007. The Centre's aim is to engage in research, teaching and outreach on the security implications of infectious disease threats to human health. Biosecurity challenges we address include:

- fast-moving infectious disease outbreaks of natural origin
- biological weapons threats
- the risks associated with laboratory research on pathogenic micro-organisms
- the implications of emerging technologies
- the impact of disease on health governance, state functioning and the economy.

The NCB aims to set up a network of academics studying biosecurity around the Asia-Pacific region. We are currently working with the Australian Academy of Sciences to achieve this.

The multi-disciplinary make-up of the Centre includes: microbiologists, lawyers, ethicists, epidemiologists, political scientists, mathematical modellers and a variety of other academic specialists. Access to this broad range of fields provides members of the NCB a broader and deeper insight into biosecurity challenges facing Australia, the Asian region and the world.

Keynote Speakers

Professor Malcolm Dando

Malcolm Dando is Professor of International Security in the Department of Peace Studies at the University of Bradford in the UK. He trained originally as a biologist and after post-doctoral research in the USA he held UK Ministry of Defence Fellowships in Operational Research before moving to Bradford in 1979. He worked on nuclear arms control through the 1980s and after the first Gulf War he turned his attention to the questions of how the revolution in the life sciences might produce new possibilities for biological weapons and how the Biological and Toxin Weapons Convention might be strengthened. His recent publications include *Deadly Cultures: Biological Weapons Since 1945* (Harvard University Press, 2006) which he edited with Mark Wheelis and Lajos Rozsa

Professor John MacKenzie

John MacKenzie is Professor of Tropical Infectious Diseases at Curtin University, and inaugural holder of a Premier's Fellowship. He is also currently Deputy CEO of the Perth Node of the Australian Biosecurity Co-operative Research Council, and Honorary Professor of the University of Queensland. He was previously Professor of Microbiology at the University of Queensland, 1995-2004. Elected honours include Secretary-General of the International Union of Microbiological Societies (IUMS) from 1999-2005, Fellow of the American Academy of Microbiology, Past President of the Australian Society for Microbiology, and Past President of the Asian-Pacific Society for Medical Virology. He was a joint recipient of The Medical Journal of Australia/Wyeth Research Award, for the best original research paper published in The Medical Journal of Australia during 1996, and co-recipient of the James H. Nakano Citation from the US National Center for Infectious Diseases for an outstanding scientific paper published in 1999. He was the recipient of the D. I. Ivanovsky Medal from the Russian Academy of Sciences (1995), a Distinguished Service Award from the Australian Society for Microbiology (1999), and the Excellence in Virology Award from the Asian-Pacific Society for Medical Virology (2000).

Dr Suwit Wibulpolprasert

Suwit Wibulpolprasert served as a Deputy Permanent Secretary of the Thai Ministry of Public Health in 2000-2003. Currently, he serves at the highest rank of government official (PC11) as a Senior Advisor in Disease Control, after serving as a Senior Advisor in Health Economics during 2003-2006. He is the editor of a local journal for paramedical personnel and has produced radio and television programs on health and social issues for more than 15 years. He is currently the President of the Folk Doctor Foundation; Evaluation Board member of the Thailand Research Fund; and Board member of the Health Systems Research Institute, the Thai Health Promotion Foundation, the National Health Security Board, the Thai Medical Research Council, the National Nanotechnology Centre, the Mahidol University Council, and the National Science and Technology Board. Dr Suwit represented Thailand and the Southeast Asia Region as a member and Vice-Chair of the Governing Board of the Global Fund to Fight AIDS, TB, and Malaria in 2001-2004. He was the President of the Intergovernmental Forum on Chemical Safety in 2003-2006 and a member and Vice-Chair of the World Health Organisation (WHO) Executive Board during 2004-2007.

General Information

Venue

The Finkel Lecture Theatre in The John Curtin School of Medical Research will be the venue for all presentations. Morning/afternoon tea and lunches will be served in the foyer.

Name Badges

Your name badge will be your entry into the symposium lecture theatre, morning/afternoon tea and lunches. Please make sure that your name badge is visible at all times.

ATM

An ATM is located inside the Vanilla Bean Café. An alternative ATM is available at University House

Mobile Phones

Please ensure that your mobile phone is switched off during sessions.

Smoking

Smoking is banned inside The John Curtin School of Medical Research. If you wish to smoke, please do so outside.

Parking

Pay and Display car parking is available at University House at the end of Garran Road. Cost is \$5.50 for all day parking.

Rest Rooms

The rest rooms are located in the foyer area.

Posters

The posters will be on display in the foyer over both days of the symposium.

Help

If you require any assistance during the symposium please seek out the staff wearing a blue name badge.

Disclaimer

The views expressed during the symposium are those of the individual presenters and do not necessarily represent the views of the symposium sponsors or the National Centre for Biosecurity.

Program

DAY ONE

Monday 11 February 2008

8.30am Registrations open

9am Welcome and introduction

Welcome to Country by Peter Pinnington

Introduction by Christian Enemark, Deputy Director, National Centre for Biosecurity, ANU College of Medicine & Health Sciences

9.30am

**Session 1.1 Biosecurity: Upgrading the Web of Prevention: A View from the UK.
Keynote address by Professor Malcolm Dando**

Chair: Bob Wells, Executive Director, College of Medicine and Health Sciences, ANU

10.30am Morning Tea

11am

Session 1.2 Laboratories

Chair: Edward Bertram, Head of Scientific Programs, Australian Phenomics Faculty

Establishing an Emerging Infections and Biohazard Response Unit

Names: Greg James, Lyn Gilbert

Organisations: Centre for Infectious Diseases and Microbiology, Institute of Clinical Pathology and Medical Research, Sydney West Area Health Service and University of Sydney

The Application of a Mobile Forensic Laboratory for Real Time Response to Chemical, Biological, Radiological Nuclear and Explosive (CBRNE) Incidents in Australia.

Names: Paul Roffey, Keith Norman and David Royds

Organisation: Australian Federal Police

Third Generation Surveillance Systems: Genomics Assisted Identification and Monitoring Of Biothreats

Names: Vitali Sintchenko,^{1,2} Jonathan Iredell,¹ Lyn Gilbert¹

Organisations: ¹Centre for Infectious Diseases and Microbiology, Institute of Clinical Pathology and Medical Research, Sydney West Area Health Service and Western Clinical School, Faculty of Medicine, University of Sydney, ²Centre for Health Informatics, University of New South Wales

Rapid Molecular Fingerprinting of Influenza Viruses

Name: Graeme Barnett

Organisation: Chief Executive Officer, BioChip Innovations Pty Ltd

DISCUSSION

12.30pm

Lunch

1.15pm

Session 1.3 Global Surveillance and Response to Outbreaks of Infectious Disease: the Role of the WHO Global Outbreak Alert and Response Network as the Response Arm of the New International Health Regulations.

Keynote address by Professor John MacKenzie

Chair: Alan Dupont, Director, Centre for International Security Studies, University of Sydney

2pm

Session 1.4 Science and Technology

Chair: Ian Ramshaw, Director, National Centre for Biosecurity, ANU College of Medicine & Health Sciences

Converging Technologies in Biosecurity

Names: Stephen Prowse¹ and Greg Tegart²

Organisations: CEO, Australian Biosecurity CRC for Emerging Infectious Disease, University of Queensland¹ and Centre for Strategic Economic Studies, Victoria University, Melbourne²

Nanotechnology and Australia's Biosecurity Policy

Name: Tom Faunce

Organisation: National Centre for Biosecurity, ANU College of Medicine & Health Sciences

Enhancing Cross-Disciplinary Problem-Based Biosecurity Research

Name: Gabriele Bammer

Organisations: National Centre for Epidemiology and Population Health and National Centre for Biosecurity, ANU College of Medicine and Health Sciences, and Hauser Centre for Non-profit Organizations, Harvard University

DISCUSSION

3.15

Afternoon Tea

3.45

Session 1.4 Law and Ethics

Chair: Michael Selgelid, Centre for Applied Philosophy and Public Ethics, ANU College of Arts & Social Sciences

Regulation of Security-Sensitive Biological Agents in Australia

Name: Letitia Toms and Gary Lum

Organisation: Office of Public Health, Department of Health and Ageing

Regulating the Biosecurity Risks Posed by Veterinary Laboratories

Name: Karinne Ludlow

Organisation: Centre for Regulatory Studies, Faculty of Law, Monash University, Victoria

Codes of Conduct in a Web of Prevention: Questions and Choices

Name: Brian Rappert

Organisation: Department of Sociology and Philosophy, University of Exeter, and Centre for International Security Studies, University of Sydney.

Ethics of the Dual-Use Dilemma

Name: Rob Floyd

Organisation: Department of Prime Minister and Cabinet

DISCUSSION

7pm

Dinner at Teatro Vivaldi, ANU Arts Centre

DAY TWO

Tuesday 12 February 2008

9am

Registrations open

9.30

Session 2.1 The Social And Spiritual Dimensions of Biosecurity: The Collective Survival of Mankind.

Keynote Address by Dr Suwit Wibulpolprasert

Chair: Perry Head, Assistant Secretary, Counter-Terrorism Branch, Department of Foreign Affairs and Trade

10.15

Morning tea

10.45

Session 2.2 International Health

Chair: Paul Kelly, National Centre for Epidemiology and Population Health, ANU College of Medicine & Health Sciences

A Model for Networked Laboratory Quality Assurance among Regional Countries: the Animal Health Laboratories

Name: Peter Daniels

Organisation: Australian Animal Health Laboratory, Geelong, Victoria

Emerging Infectious Diseases and Global Health Surveillance

Name: Lorna Weir and Dr. Eric Mykhalovskiy

Organisation: York University, UK

Global Public Health Security: the Pathway to National Biosecurity

Names: Mahomed Patel

Organisation: National Centre for Epidemiology and Population Health, ANU College of Medicine & Health Sciences

DISCUSSION

12.15

Lunch

1pm

Session 2.3 Pandemic Influenza

Chair: Mahomed Patel, National Centre for Epidemiology and Population Health, ANU
College of Medicine & Health Sciences

Assessing HPAI Health Risks to Humans along the Market Chain in the Philippines

Name: C.A. Benigno, J-A. L.M.L. Toribio, and R. Webb.

Organisation: Faculty of Veterinary Science, University of Sydney

Governance: Managed Access Provisions for Sharing Influenza Viruses and Related Benefit Sharing and Capacity Building Arrangements

Name: Anna George

Organisation: School of Social Sciences and Humanities, Murdoch University, Western Australia

The Waiting Time for Importation of Pandemic Strain Influenza

Name: Peter Caley*, Niels G. Becker and David J. Philp

Organisation: *National Centre for Epidemiology and Population Health, ANU College of Medicine & Health Sciences

Population Health Intelligence: the Role of Syndromic Surveillance

Names: David Muscatello, Wei Zheng, Tim Churches

Organisation: Centre for Epidemiology and Research, NSW Department of Health

DISCUSSION

2.30

Afternoon tea

3pm

Session 2.4 Disease Outbreaks and Society

Chair: Christian Enemark, Centre for International Security Studies, University of Sydney

Epidemics and Pandemics in Australia – Signposts, Lessons and Challenges

Name: Peter Curson

Organisation: Centre for International Security Studies, University of Sydney

Risk Communication for a Possible Pandemic: Lessons from SARS and Other Outbreaks

Name: Claire Hooker

Organisation: Centre for Values, Ethics and Law in Medicine, University of Sydney

'Y2K' or 'Watch This Space': Journalists on Pandemic and Avian Influenza

Names: Julie Leask and Catherine King

Organisation: National Centre for Immunisation Research and Surveillance, University of Sydney

DISCUSSION

4.15pm

Close

Abstracts

Presentations

1.1 Keynote address

Monday 9.30am

Biosecurity: Upgrading the Web of Prevention: A View from the UK. Professor Malcolm Dando

The presentation begins by reviewing the wider context of the international control of the biotechnology revolution. It then concentrates on the threat of deliberate disease: from biowarfare, bioterrorism and the possible misuse of benignly-intended civil research. The recent history of the Biological and Toxin Weapons Convention is reviewed and the emphasis on in-depth implementation of the Convention including codes of conduct and education for life scientists is noted. However, it is pointed out that there is much evidence that life scientists know very little about these issues. The wider question of how this prohibition regime might be strengthened is discussed and in conclusion it is suggested that the education of life scientists might be improved through the development of appropriate education modules.

1.2 Laboratories.

Monday 11am

Establishing an Emerging Infections and Biohazard Response Unit

Greg James and Lyn Gilbert

Centre for Infectious Diseases and Microbiology, Institute of Clinical Pathology and Medical Research, Sydney West Area Health Service and University of Sydney

After the anthrax attacks in the USA in October 2001, many countries around the world, including Australia, were subjected to related hoaxes and false alarms. Suspicious substances and powders were sent to laboratories to exclude the presence of anthrax spores. In Australia, Public Health Laboratory Network (PHLN) laboratories received >1500 items for testing within a six week period, including >600 sent to the Centre for Infectious Diseases and Microbiology, ICPMR, Westmead. Although none contained dangerous bacteria, these incidents illustrated that public health laboratories in Australia were ill-prepared for potential infectious disease or bioterrorism emergencies and prompted reviews of facilities, staffing and procedures.

In November 2001, the establishment of a Biohazard Response Unit at CIDM was proposed and, in 2003, funds were allocated by the NSW government for a new PC3/4 laboratory, which was commissioned in August 2007. It provides state-of-the art facilities for the safe handling of the most dangerous pathogens.

The other essential component of such a unit is adequately trained staff. With a small staff enhancement CIDM is training a pool of scientists, on rotation from routine service laboratories, to provide surge capacity for potential infectious diseases emergencies. They are trained to manage the sophisticated engineering systems of the unit, safely handle, culture and identify potentially dangerous micro-organisms, using a wide range of screening or confirmatory antigen detection, culture and molecular methods, Management of such unit within a large diagnostic and public health microbiology laboratory service, is an on-going challenge.

The Application of a Mobile Forensic Laboratory for Real Time Response to Chemical, Biological, Radiological, Nuclear and Explosive Incidents in Australia.

Paul Roffey, Keith Norman and David Royds
Australian Federal Police

The concept of a mobile laboratory may not meet the requirements of some jurisdiction due to the availability of high speed sample transfer of samples to a regional laboratory, such as within the US or the UK. In Australia where it is common to have considerable distance between the site of the incident and an effective forensic laboratory, the deployment of a mobile laboratory may provide the support required to rapidly progress a criminal investigation.

The deployability of such laboratories enables rapid support to other agencies and governments both domestically and internationally as either a reactive or proactive response. By providing a stand alone laboratory to an incident it provides the highly trained scientific staff a well equipped well supported clean area that can provide the rapid results that are required in modern police operations.

Third Generation Surveillance Systems: Genomics Assisted Identification and Monitoring of Biothreats

Vitali Sintchenko,^{1,2} Jonathan Iredell,¹ Lyn Gilbert¹,

¹Centre for Infectious Diseases and Microbiology, Institute of Clinical Pathology and Medical Research, Sydney West Area Health Service and Western Clinical School, Faculty of Medicine, The University of Sydney, ²Centre for Health Informatics, University of New South Wales, Sydney, Australia

The development of efficient communicable disease surveillance systems is an active area of biosecurity research. In contrast to existing methods, 'new generation' biosurveillance, based on microbial genomics, has the potential to improve the specificity and timeliness of signals.

Our research is focused on designing and testing innovative molecular profiling methods of communicable disease pathogens to assist outbreak detection and infection control. In particular, we aim to improve the detection and monitoring of the new biothreats and multidrug resistant organisms (MROs) which have transformed previously treatable conditions into life-threatening sentinel health events.

The spread of multidrug resistant *Mycobacterium tuberculosis*, *Salmonella* Typhimurium, *Staphylococcus aureus* (MRSA) and gram-negative opportunistic pathogens is now a critical problem in Australia and worldwide. We show evidence that the rapid profiling of MROs can alert public health practitioners and clinicians to routes of spread of microbial clones and transmissible resistance genes, especially among vulnerable populations.

The integration of microbial profiles with epidemiological and geographical information, producing global real-time surveillance of pathogens with epidemic potential, has emerged as an innovative approach to improving national early warning capacity. The challenge of laboratory response networks, standardisation of methods and creation of effective systems for probability-outcome analysis will be discussed.

Rapid Molecular Fingerprinting of Influenza Viruses

Graeme Barnett

BioChip Innovations Pty Ltd

In the context of recent outbreaks of human, avian and equine influenza in Australia, the need for more efficient molecular tools to perform detailed epidemiological studies has become critically important.

Brisbane-based company Biochip Innovations has developed a unique set of single-step reverse-transcriptase PCR reagents that permit rapid sequence analysis of multiple strains of influenza type A virus, either directly on clinical samples or on cultured virus.

These reagents facilitate studies on the origins of influenza outbreaks by comparative sequence analysis of the haemagglutinin (H), neuraminidase (N) and PB2 gene segments of viruses to generate specific molecular fingerprints. The information-rich sequence data provides for rapid and accurate identification of the Hx-Ny subtype, drug resistance, emergence of highly pathogenic variants and host range potential. Conventional analysis of influenza viruses requires costly, complex and labour intensive methods such as haemagglutination inhibition, neuraminidase inhibition, pathogenicity testing and host-range analysis.

The Company is commercialising these reagents as Influenza PrimRset™, a range of affordable, room-temperature stable and ready-to-use products that will determine the identity and genetic fingerprint of known and emerging new strains of influenza virus with unprecedented speed and accuracy.

1.3 Keynote Address

Monday 1.15pm

Global Surveillance and Response to Outbreaks of Infectious Disease: the Role of the WHO Global Outbreak Alert and Response Network as the Response Arm of the New International Health Regulations

Professor John MacKenzie

1.4 Science and Technology

Monday 2pm

Converging Technologies in Biosecurity

Professor Stephen Prowse¹, and Professor Greg Tegart²

CEO, Australian Biosecurity CRC for Emerging Infectious Disease, University of Queensland¹ and Centre for Strategic Economic Studies, Victoria University, Melbourne²

The rise of the global knowledge economy has transformed the way in which knowledge is created and used. This has a profound impact on biosecurity. In research it is now recognised that the most productive research is increasingly interdisciplinary, team-based and crosses organisations. Knowledge flows across boundaries, human resources are more mobile and organisation of research is more open and flexible with national and international teams working together to solve problems.

As a consequence new technologies and new approaches are being created from the convergence of traditional disciplines. Thus information technology, biotechnology and nanotechnology have emerged from different combinations of physics, chemistry, biology and engineering. These can be described as converging technologies. In Europe the term is

used broadly to describe 'enabling technologies and knowledge systems that enable each other in pursuit of a common goal'.

With this definition in mind, we brought together a diversified group of specialists in different disciplines from across the Asia-Pacific region to discuss biosecurity in the context of emerging infectious diseases at a workshop in Melbourne in June 2007. It is clear that there is a need to respond rapidly to outbreaks of diseases in Australia and the region in order to reduce the risk to public and animal health and the damage to environment and trade. We believe that the effective use of information is a key to improved responsiveness.

We considered biosecurity in terms of information generation and collection, information management, information analysis, and use of analysis. Each of these covers a number of disciplines and requires the application of different technologies to deal with them. By bringing people of different backgrounds and cultures together focused on a common topic we were able to identify a number of areas for urgent attention. Improved generation, collection and management of data was highlighted as a key need with major advances identified. New diagnostic technologies need to be better integrated with information management. Sharing information across boundaries while maintaining data integrity and security is now possible. Enhanced access to, and analysis of the large amounts of data has the potential to improve forecasting and decision making. A changed model of information management has the potential to enhance biosecurity capability in Australia and the region.

Nanotechnology and Australia's Biosecurity Policy

Tom Faunce

National Centre for Biosecurity, ANU College of Medicine & Health Sciences

Nanotechnology involves the engineering and manufacture of products at the nanoscale (1–100 nm, a nanometre being a billionth of a metre). This paper explores the extent to which Australian biosecurity policy should, and has, taken into account nanotechnology, particularly in areas of hazard surveillance through quantum dot biosensing. It explores the potential of nanotechnology applications in this area and efforts being undertaken in comparative jurisdictions, particularly the US. It proposes policy priorities for this emerging and significant area of biosecurity.

Enhancing Cross-Disciplinary Problem-Based Biosecurity Research

Gabriele Bammer

National Centre for Epidemiology and Population Health, National Centre for Biosecurity, ANU College of Medicine & Health Sciences and Hauser Centre for Non-profit Organizations.

There is growing appreciation of the importance of problem-based research, in other words research that draws together insights from various disciplines, from people affected by the problem and from those in a position to influence it. Such a problem-based approach is key to many aspects of improving the biosecurity of Australia and the region. Although problem-based research is becoming increasingly common, there are three challenges in conducting such research that are not yet resolved. They are:

1. no effective institutional structures within which to undertake such research;

2. the lack of a core methodological underpinning, which is an inherent weaknesses in the way problem-based research is currently conducted;
3. recurrent issues in tackling complex problems, particularly few mechanisms to stimulate fresh thinking, poor management of ignorance and uncertainty, lack of uptake of knowledge by decision makers, and under-development of systems-based approaches.

I discuss each of these challenges and then propose a potential solution, namely a new discipline – Integration and Implementation Sciences.

1.5 Law and Ethics

Monday 3.45pm

Regulation of Security-Sensitive Biological Agents in Australia

Letitia Toms and Gary Lum

Office of Public Health, Department of Health and Ageing

On 13 April 2007, the Council of Australian Governments (COAG) considered the recommendations of the COAG Report on the Regulation and Control of Biological Agents and agreed to the establishment of a national regulatory scheme for biological agents of security concern, legislated through the National Health Security Act. The security-sensitive biological agents (SSBA) regulatory scheme is anticipated to be operational in January 2009.

COAG's recommendations encompass:

- the establishment of a 'national authority' within the Department of Health and Ageing (DoHA) to regulate and monitor facilities working with SSBA;
- the development of a registration scheme addressing physical, personnel and transport security concerns;
- the establishment of a National Register (informed by mandatory reporting) identifying facilities handling SSBA and allowing for the provision of this information to intelligence agencies;
- the delivery of an education and awareness-raising campaign covering the proposed security requirements, use of the National Register, and coordination with other existing schemes.

The passing of the *National Health Security Act 2007* by Parliament on 20 September 2007 has enabled the SSBA regulatory scheme to be established. This paper will provide an update on progress of the SSBA regulatory scheme's implementation.

Regulating the Biosecurity Risks Posed by Veterinary Laboratories

Karinne Ludlow

Centre for Regulatory Studies, Faculty of Law, Monash University

Whilst all pathology laboratories, whether medical, veterinary or plant, pose potential biosecurity risks, veterinary laboratories are a unique class. Unlike medical pathology laboratories, veterinary laboratories (diagnostic or research) do not require accreditation to access Commonwealth Medicare-funded procedures. Accreditation is voluntary. Although the majority are accredited, some veterinary laboratories are unlikely to seek accreditation. Others may not renew accreditation if funding is withdrawn. Further, whilst the number and identity of accredited veterinary laboratories is known, this is not true for unaccredited laboratories. Nevertheless, such laboratories are likely to possess

human pathogens given 61 percent of the 1, 415 recognised human pathogens are zoonotic. Laboratories storing such organisms obtained from wildlife or domestic animals pose biosecurity risks through intentional acts and laboratory accidents.

So what regulatory measures are there in regards to biosecurity issues relating to Australian veterinary laboratories? Currently although veterinary pathology laboratories are regulated, that regulation is not directed at ensuring the security of pathogenic micro-organisms, with the potential to cause human health and economic damage.

Council of Australian Governments has recently made recommendations on the better regulation of this issue. WA has also moved towards modernising its' biosecurity arrangements. This paper considers the possible implications for veterinary laboratories arising from these proposed regulatory measures.

Codes of Conduct in a Web of Prevention: Questions and Choices

Brian Rappert

University of Exeter, UK

Codes of conduct have received a significant amount of attention in recent years as a policy option to address biosecurity concerns. While the term 'code of conduct' has functioned as a generic umbrella phrase for an array of different types of codes, in general, such codes seek to set expectations regarding thinking and behavior for those associated with the life sciences. This presentation surveys and assesses the recent attention to codes to prevent the destructive application of the life sciences (with particular emphasis on developments in North America and Europe). It will do so with a view to promoting discussion on their future place and purpose in Australia and its Region.

Ethical Aspects of the Dual-Use Dilemma

Rob Floyd

Department of Prime Minister and Cabinet, National Centre for Biosecurity, ANU College of Medicine & Health Sciences

The 'dual-use dilemma' arises in the context of research in the biological and other sciences when knowledge or technology arising from scientific research can have the potential to be used to cause harm as well as for the good of a society.

The ethics of the dual-use dilemma will be explored from the perspectives of the researcher, and the government (which may have authority to assist or impede the researcher's work). The ethical dilemma results from weighing the benefits or good of the research against the potential for its use to cause harm, for example, the promotion of the benefits of health research against it also potentially providing the means for harming innocent people. For the researcher, the dilemma arises because of the potential actions of others. Others, with terrorist or criminal intent might appropriate dangerous biological agents produced or used by the researcher; alternatively, other researchers might use the results of the original researcher's work for malicious purposes, for example, bio-terrorism, bio-warfare and blackmail for financial gain. For governments the dilemma arises in allowing or impeding the researcher's work, based on an assessment of the potential benefits for the community weighed against the potential harm it may cause the same community.

2.1 Keynote Address

Tuesday 9.30am

The Social and Spiritual Dimensions of Biosecurity: The Collective Survival of Mankind.
Dr Suwit Wibulpolprasert

2.2 International Health

Tuesday 10.45am

A Model for Networked Laboratory Quality Assurance among Regional Countries: the Animal Health Laboratories

Peter Daniels

Australian Animal Health Laboratory

An effective response to infectious disease outbreaks, although multifaceted, is absolutely dependant on an effective laboratory diagnostic capability. National governments and international agencies must have confidence in the results of laboratory testing, particularly being confident that tests are appropriate for the intended purpose and that test results are reproducible among laboratories.

In response to the H5N1 avian influenza epidemic in poultry, with the consequent human health implications, national and international AI reference laboratories throughout Australasia are collaborating in strengthening quality assured diagnostic testing in the region. Elements in the program include gap analyses using a laboratory assessment tool, donor coordination to address facility and equipment shortfalls, technology transfer based on training and numerous rounds of on-site support visits by visiting experts, use of standardized test methods with reference materials supplied by the international reference laboratory, application of the principles of internal quality control of testing, and the provision of rounds of proficiency testing.

A pilot program in Indonesia has resulted in a demonstrated capability to use real time PCR (qPCR) for rapid diagnosis of AI infections among eight national laboratories. Providing leadership into such activities is an important role for designated reference laboratories and collaborating centres, that in turn enhances the role and recognition of all the participating laboratories.

Emerging Infectious Diseases and Global Health Surveillance

Lorna Weir and Eric Mykhalovskiy

York University

Emerging infectious diseases (EID) has become a central concept of biosecurity. This paper traces the history of the EID concept from its invention in the US where it was linked with national security interests to its reception and reformulation at the WHO as a matter of global health. The effects of the EID framework on global infectious disease surveillance will be described and analysed by comparing the WHO surveillance system in place from 1950-1996 to the EID system from 1997 to the present. Both periods were characterised by a division between formal, politically authorised knowledge of outbreak and informal, non-authorised knowledge.

Throughout the history of the WHO the relation between formal and informal knowledge of outbreak has been characterised by tensions between sovereign state control of information and public health officials' informal knowledge from a variety of sources, including news reports. In the period 1996 to the present, the relation between formal

and informal knowledge was transformed through the invention of online early warning outbreak detection systems, particularly the Global Public Health Intelligence Network (GPHIN), which is sourced in online news media. The detection of EID by GPHIN shifted the relation between formal and informal knowledge as informal knowledge became systematic, in real time and sourced in data largely beyond national control. The 2005 International Health Regulations specified conditions under which the WHO could publicize informal knowledge in the absence of country consent, an historic change in the authorisation of informal knowledge.

EID surveillance transformed the spatio-temporal relations of outbreak. In the first period, infectious disease outbreaks were events that occurred in local historical time and place with weak links to national and international public health systems. Under EID surveillance, outbreaks were articulated to synchronised global time and global space, a process consolidating EID as a matter of global health rather than, as in the previous period, a problem of the 'developing world.'

Global Public Health Security: the Pathway to National Biosecurity

Mahomed Patel

National Centre for Epidemiology and Population Health, National Centre for Biosecurity, ANU College of Medicine & Health Sciences

Emerging infectious diseases are more likely to spread and evade early detection in poor countries. In these settings, alert and response functions are constrained by overburdened health systems caused by chronic under-funding and the uncoordinated proliferation of donor activities that fragment health structures and systems of recipient nations. Furthermore, while responsibility for health is national, health determinants are becoming increasingly trans-national, and globalisation has amplified the risk of emergence and international transfer of biological threats. Consequently, prevention, preparedness and the timely recognition and containment of such threats call for a shift away from the mindset of 'donors and recipients' to one of partnerships that acknowledge interdependencies between nations, and a shift in balance from vertical disease-focused programs (the path of least resistance) to overarching public health initiatives. It is development of the latter that provides the platform and pathways for enhancing the porous patchwork of surveillance and response systems.

This paper explores the model being used by Australia and other developed countries to strengthen workforce capacity and systems for controlling communicable diseases, and identifies the centrality of stable broad-based public health infrastructures. Investing in trans-boundary public health is good politics, good economics and good for national biosecurity.

2.3 Pandemic Influenza

Tuesday 1pm

Assessing HPAI Health Risks to Humans along the Market Chain in the Philippines

C..A. Benigno, J-A. L. M. L. Toribio, and R. Webb

Faculty of Veterinary Science, University of Sydney

Live bird markets (LMB) are recognized as a potentially important point for the transmission of highly pathogenic avian influenza (HPAI) from birds to humans in south-east Asia. However few formal investigations of practices at LBMs are reported in the

literature and knowledge of handling and trade practices along the poultry market chain is also limited.

A survey was conducted during 2006 in 55 LBM in four provinces and one metropolitan area in the Philippines. Based on the findings of this survey we will describe the informal market chain for poultry in the Philippines and the trade and handling practices of market players involved in this market chain to highlight critical points that pose a substantial risk for HPAI bird to human transmission.

Identification of these critical points should be used to guide policy and regulations related to LBM in the Philippines that will mitigate risk of HPAI transmission should HPAI enter this country. Due to similarities between LBMs across south-east Asia knowledge from this study may also assist other countries seeking to reduce HPAI risk posed by LBMs.

Governance: Managed Access Provisions for Sharing Influenza Viruses and Related Benefit Sharing and Capacity Building Arrangements

Anna George

School of Social Sciences and Humanities, Murdoch University

Strategies developed to respond to H5N1 avian influenza have generated increased levels of global collaboration among governments and key international and national institutions. Increased awareness of the consequences of a pandemic has also resulted in political pressure from key developing countries (including Indonesia and China) to impose specific restrictions on the access and use of the H5N1 virus by the WHO Collaborating Centres. The issues raised by countries directly affected by this virus are targeted to include the linking of Third Party access to virus samples to ensure rights and access to other important resources such as: influenza vaccines; to increased technical capacity building; recognition of States' intellectual property rights (genetic resources) and establishing a new economic benefit sharing arrangement.

International mechanisms to address developing country concerns are evolving and will have an impact on the key themes of this Symposium. For example, policy development related to health governance, codes of conduct, international law and domestic regulation may need to be adapted to take account of changes in access to vital research material. The placing of further restrictions on access to research material may have implications for the effective management and prevention of pandemics. If developing country concerns are not sufficiently recognised the effectiveness of existing global collaborative mechanisms could be diluted.

The Waiting Time for Importation of Pandemic Strain Influenza

Peter Caley, Niels G. Becker and David J. Philp

National Centre for Epidemiology and Population Health, ANU College of Medicine & Health Sciences

We quantitatively model the delay between the start of an influenza pandemic and its subsequent initiation in Australia, and assess how it may be extended by non-pharmaceutical interventions. Our model accounts for: (i) epidemic growth in the source region; (ii) the delay until an infected individual from overseas seeks to travel to Australia; (iii) the chance that infected travelers are detected by border screening; (iv) the possibility of in-flight transmission; (v) the chance that an infected arrival might not initiate an epidemic (vi) the delay until infection in Australia gathers momentum.

Efforts that reduce the disease reproduction number in the source region below two and severe travel restrictions are most effective for delaying a local epidemic, and under favourable circumstances, could add several months to the delay. On the other hand, border screening for symptomatic infection, wearing a mask during travel, promoting early presentation of imported cases and moderate reduction in travel volumes increase the delay only by a matter of days or weeks. Elevated in-flight transmission reduces the delay only minimally. It appears that short of preventing international travel altogether, eradicating a nascent pandemic in the source region appears to be the only reliable method of preventing country-to-country spread of a pandemic strain of influenza.

Population Health Intelligence: the Role of Syndromic Surveillance

David Muscatello, Wei Zheng and Tim Churches

Centre for Epidemiology and Research, NSW Department of Health

In response to public health threats such as bioterrorism, SARS and pandemic influenza, epidemiologists have been focusing on more rapid health and disease surveillance methods. Increasing prevalence of computerised clinical information systems has made available several non-traditional surveillance data sources offering more timely but less specific 'syndromic' information, rather than more specific but less timely disease information.

Using research on syndromic surveillance of routinely collected data from hospital Emergency Departments, we evaluate the utility of syndromic surveillance in the near real-time monitoring the health of human populations.

Time series analyses of clinical diagnoses of influenza or gastrointestinal illness from Emergency Departments offer a minimum of 3-4 days early warning of increases in the incidence of disease compared with surveillance of laboratory results or of institutional outbreaks. When reporting delays inherent in traditional surveillance systems are considered, the time advantage increases to a week or more.

Furthermore, syndromic surveillance has provided rapid information on public health problems that were invisible to traditional surveillance systems, such as gastroenteritis in the community, poisonings and drug and alcohol problems, among others.

Even in the absence of bioterrorism or an influenza pandemic, syndromic surveillance has demonstrated that it can provide early warning of outbreaks and previously unmonitored public health problems, and will be of considerable value in future human biosecurity challenges.

2.4 Disease Outbreaks and Society

Tuesday 3pm

The 'Right to Know' and it's Implications for Biosecurity and State/Society Relations in China

Michael Barr

University of Newcastle upon Tyne

During the SARS outbreak in 2003, Chinese intellectuals and mass media advocated the concept of the 'right to know' (zhiqingquan). It was argued that free access to

information regarding the details of SARS would help promote public health and ameliorate the impact of the disease.

In this paper I argue that the 'right to know' is a critical factor in biosecurity, as it relates to at least four crucial issues: (a) the promotion of effective communication between provincial and central authorities, as well as between military and civilian personnel (b) the challenge of balancing public confidence and professional interests with the need to meet international demands for transparency (c) the effectiveness of public education campaigns designed to reduce the spread of rumour and stigma, (d) the development of governance mechanisms for trans-national data sharing.

My paper addresses these issues in the context of China's sensitive political discourse and highlights the importance for biosecurity of understanding state/society relations. The paper marks the start of a three month stay in China, funded by the UK government, where I will interview a wide range of academics and officials on issues pertaining to infectious disease.

Risk Communication for a possible Pandemic: Lessons from SARS and Other Outbreaks

Claire Hooker

Centre for Values, Ethics and Law in Medicine, University of Sydney

At the outset of any possible epidemic event, when the magnitude of the event is still uncertain, good risk communication is of primary importance. Risk communication has multiple goals: not only to encourage public responses necessary for containing the actual outbreak (such as hand washing, compliance with quarantines) but also to minimise negative social and economic impacts such as losses to tourism and hospitality industries or the stigmatisation of particular social groups. This paper closely examines responses to the outbreaks of SARS in Toronto in 2003 and other outbreak events to present lessons learned about effective risk communication in these scenarios.

'Y2K' or 'Watch this Space': Journalists on Pandemic and Avian Influenza

Julie Leask and Catherine King

National Centre for Immunisation Research and Surveillance, University of Sydney

In the event of an influenza pandemic, managing public response will be crucial. The media is one of the strongest influences on public perceptions and responses to new health threats. For those involved in liaising with the media, it is particularly important that the processes and factors that shape reporting are well understood. This study investigated how the media construct stories on avian and pandemic influenza. It included in-depth interviews with 16 Australian journalists, editors and producers in print, radio and television news and current affairs. Qualitative analysis provided an overview of how journalists perceive a pandemic threat; what remains newsworthy after the initial media interest; how they choose experts and deal with technical information; and their personal intentions about working during a pandemic. The presentation will also summarise what journalists believe are the best ways for those in government, health and disaster management to communicate with the media during a pandemic.

Posters

The Big Picture in Biosecurity – what happens when the pixels drop out?

Raymond Chan

Department of Microbiology and Infectious Diseases

Royal Prince Alfred Hospital

While efforts to ensure that national, State and local plans and systems are in place, are trialled and are constantly updated are to be commended, these 'big pictures' ultimately rely in reality on individuals for their efficient execution. Here, the analogy with large TV screens is apt. How much drop-out of individual pixels can a screen tolerate before the picture becomes depauperate? Systems and plans must address these personal ethical and moral questions faced by individual health (and indeed, other essential service) workers when confronted with a biosecurity risk scenario. These questions must be considered and resolved by the 'big picture' planners because failure to do so, may well result in pixel-drop-out when the threat becomes reality. Such drop-out, if numerous, will interfere with the integrity of any plan or system.

I shall present some personal reflections on questions relevant to individual workers raised by the plans to deal with the current threat of biosecurity, and some suggestions as to how these might be resolved.

Communicating with the Public in the Event of a Disease Outbreak.

Patricia Gray

National Centre for Biosecurity

History has shown us that when an outbreak occurs in Australia that fear follows. People may act irrationally and even violently. In such an emotional event it is important to ensure the best protection methods are taking place and that requires the public's co-operation. What are the best methods of communicating with the public in order to not only keep them informed but also gain their co-operation? Working within a specific area people become used to the language and they acquire specific views on a topic. It is easy to forget that the public does not use this language nor hold the views found within the science. This talk will highlight the important issues to be aware of when communicating with the public, focusing on the highly emotional event of a disease outbreak.

Hosting a Safe and Secure APEC 2007 Forum – Implications for Public Health

Jan Fizzell,

Centre for Health Protection, NSW Department of Health

Aim: To describe the public health emergency response arrangements and challenges presented by hosting the Asia-Pacific Economic Cooperation Forum, held in Sydney NSW in September 2007, for the NSW Department of Health and Area Health Services.

Background: APEC 2007 presented multiple public health challenges. The focus on the health and safety of the delegates gave scope for the development and refinement of public health emergency response systems.

Outcomes: A key role of NSW Health's public health services was to balance the competing concerns of security personnel regarding potential biosecurity hazards and more routine concerns regarding the more general public health risks to the delegates.

The presence of the Forum in Sydney gave impetus to public health emergency response planning, including a new web-based public health emergency response information sharing system, the development of multi-agency emergency response standard operating procedures and new communications systems to provide a more timely response to public health threats. Barriers to response were also identified, including the challenge of sharing and interpreting information in a high-security environment with multiple agency involvement.

In support of the zoophyte: strategic directions for cross-sector biosecurity research

Professor John Lovett

Chairman, CRC for National Plant Biosecurity

Biosecurity challenges that are being researched and technologies which are being developed for humans, animals and plants are remarkably similar. However, the critical importance of human and animal health means that these sectors are better resourced and further advanced in biosecurity technologies than are the plant industries.

The number of plant pest incursions in Australia (10 recorded in 2007) contrasts the demand in areas of incursion management with the level of investment supplied. With so much in common, with limited resources and with so much to knowledge to share, are there real barriers preventing collaboration in biosecurity research for humans, animals and plants?

This talk illustrates the plant biosecurity challenge via some recent examples of incursions and outlines strategic directions for plant biosecurity research in Australia through the Cooperative Research Centre for National Plant Biosecurity (CRCNPB). Opportunities for greater cross-sector collaboration in biosecurity research will be outlined.

CRCNPB is the coordinating body for plant biosecurity research across all Australian states and territories. Operations commenced in November 2005. CRC Plant Biosecurity's mission is to foster scientific collaboration and engage stakeholders to deliver plant biosecurity technologies that will reduce risk to, and ensure sustainability of, Australia's plant industries.

Intelligence led responses to the Challenges of Biosecurity

Richard Jones, Chief Scientist

The Distillery Pty Ltd

Intelligence can be defined in two interlinked ways: as actionable information, and as the retention of enterprise knowledge across operations. Both of these ways of looking at intelligence seem very relevant when looking at biosecurity problems. An intelligence repository can be used after the event to assist in the analysis and investigation of a biosecurity incident and to retain for later use knowledge acquired in that process. It can also be used to assess streams of events to help determine a small proportion which may be high risk. Such streams might include airline passenger lists and container arrivals.

This paper will discuss the possible approaches in this space with some focus on the technologies developed by The Distillery Pty. Ltd., a Canberra based software product company. The company has delivered intelligence based solutions to a wide range of government and commercial organisations, in areas as diverse as national security and

mortgage fraud and has a significant R&D program supported by the Federal Government..

Surveillance of The Genomic Pool: Moving Beyond The Species

Jonathan Iredell, Sally Partridge, Vitali Sintchenko

Centre for Infectious Diseases and Microbiology, Sydney West Area Health Service and Western Clinical School, Faculty of Medicine, The University of Sydney, Sydney, Australia; Centre for Health Informatics, University of New South Wales.

One of the great failures of prokaryotic surveillance systems, especially with regard to the Gram-negative bacteria, relates to the historical concept of species. Gram-negative bacteria are particularly adapted to sharing of genetic information. This means that survival traits such as resistance to antibiotics are part of a pool of genetic material which moves between bacteria. This pool is a mosaic of known resistance genes and transmission-enabling DNA, and characterisation of this pool allows us to predict the potential for antibiotic resistance in all organisms participating in it.

In Australia, new arrivals in this gene pool often come from countries in which the use of antibiotics is less tightly regulated, and these threaten health systems in developing and developed countries in our region, involving both organisms of public health significance (eg salmonella) and those which cause the high mortality and enormous costs associated with antibiotic-resistant infection in hospitals. We have recently started to map the gene pool of our own hospital and identified the silent arrival of highly threatening antibiotic resistance genes. We have previously developed novel highly multiplexed methods for surveillance of infections such as influenza (including H5N1) and applied these to this problem. We believe that a systematic surveillance strategy is highly cost-effective and will allow us to contain future similar threats by providing early warning and by generating accurately targeted screening and diagnostic tools which are specific for each region.

Using Bayesian Nets in Biosecurity Decision-Making

Kerrie Mengersen and Peter Whittle

Queensland University of Technology, School of Mathematical Sciences

Biosecurity risk events are typically highly unlikely, but of high or extreme consequence. Rarely is sufficient data available on which to base risk estimates and plans. Rather, biosecurity planning typically involves filling information gaps using expert estimates characterised by high uncertainty. Bayesian statistical approaches can capture uncertainty in a decision model, so that instead of a single estimate, a distribution is derived, that predicts the best and worst cases as well as the most likely outcome.

Bayesian models permit sensitivity analysis, to identify the most influential decision factors, supporting tactical risk mitigation. Bayesian approaches further manage uncertainty because the 'prior' probability estimates can be dynamically updated as new information emerges. Bayesian Nets are effective tools for biosecurity applications because they manage uncertainty as described, and also they can capture and integrate diverse information types in complex systems. Queensland University of Technology, School of Mathematical Sciences is experienced in applying Bayesian nets in a range of complex systems, including algal blooms, invasive species surveillance and rare species conservation. We have developed an open source expert elicitation tool that can be used

in conjunction with GIS for risk mapping. We are interested to collaborate in applying Bayesian nets to biosecurity decision-making.

Vaccines, Communicable Disease and Bioterrorism - Is Australia Prepared?

Nathan Rogers

Department of Biotechnology, University of Queensland

The Australian Government faces a dangerous mix of biosecurity issues that require high-level assessment, strategy, and reform. More specifically, this paper offers a 'point-in-time' synopsis of the Commonwealth's vaccine, communicable disease, and bioterrorism policy standings. For the most part, the research determined that vaccine usage is stifled by ethical issues, safety concerns, and con-current biological evolution. Secondly, it was found that communicable disease control is a coefficient of global hygiene levels, human nature, and the efficiency of surveillance networks. Finally, the paper concludes that the threat of bioterrorism is mismanaged by Australia's law enforcement and intelligence community. For this reason, the author calls for tighter import/export controls, and more robust legal frameworks to police dual-use scientific research.

List of Participants

Listing as of 1 February 2008

Name	Organization
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Mr John Bates	Public Health Microbiology/Forensic and Scientific Services
Dr Edward Bertram	Australian Phenomics Faculty, National Centre for Biosecurity, ANU
Wendy Bowden	Laboratory Capacity and Regulations, Department of Health and Ageing
Ms Meredith Caelli	Hunter New England Health
Dr Peter Caley	National Centre for Epidemiology and Populations Health, ANU
Dr Nguyen Van Cam	National Centre for Veterinary Diagnosis - Department of Animal Health of Vietnam
Dr Raymond Chan	Microbiology and Infectious Diseases, Royal Prince Albert Hospital
Colonel Nouv Chamnan	Institute for Research and Chemical Lab, Ministry of Defence
Mrs Chanpen Chamnanpood	Veterinary Research and Development Centre
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Dr Robyn Cleland	Office of the Gene Technology Regulator, Department of Health and Ageing
Professor Tony Cunningham	Westmead Millennium Institute
Professor Peter Curson	Centre for International Security Studies, University of Sydney
Professor Malcolm Dando	Department of Peace Studies, University of Bradford
Peter Daniels	Commonwealth Scientific and Industrial Research Organisation
Mr George J. De Lara	Philippine National Bureau of Investigation
Professor Alan Dupont	Centre for International Security Studies University of Sydney
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