



## Bioterrorism preparedness and the Public Health Laboratory Network (PHLN)

The anthrax events that occurred in the USA in 2001 demonstrated that bioterrorism remains a real possibility in the modern world. Although Australia was spared the genuine anthrax events, we did experience many hoax events and massive disruption. Biological agents can cause terror not only by the real risk when one is released, but also by the social and economic disruption resulting from credible threats. Laboratory capacity is fundamental to the bioterrorist response<sup>1</sup> and members of the Public Health Laboratory Network (PHLN) had a major role in the Australian white powder incidents.

The PHLN is a collaborative group of laboratories, nominated by State and Territory health departments, which have expertise and provide services in public health microbiology. National bodies involved in animal health and in the epidemiology of communicable diseases are also represented, as is the major public health laboratory in New Zealand.

When Australia began experiencing the 'white powder' incidents in 2001, PHLN members had to work quickly to develop protocols for safely handling these powders and to choose and evaluate methods for identifying anthrax, including the use of PCR-based methods. Rapid exclusion of biological agents allowed early reassurance of the public and those directly affected, and the reopening of buildings quickly allowed emergency services to get on with their many other jobs.

However, it was clear that laboratories were severely stretched, and had difficulty maintaining routine services while dealing with bioterrorist threats. That experience and further information acquired since then, has allowed PHLN to undertake a detailed evaluation of facilities, equipment and personnel needed to provide a comprehensive national laboratory response to bioterrorism events.

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Laboratories have to establish systems that will rapidly detect or exclude a range of bioterrorist agents as well as natural agents that may mimic them. Fulfilling these functions requires consideration of the range of clinical and environmental samples that may contain bioterrorist agents and developing procedures for each. For the foreseeable future, reliable testing will require the involvement of

conventional laboratories, as on-site tests have yet to prove themselves sufficiently reliable<sup>2</sup>.

Preparing laboratories for bioterrorist threats includes reviewing the physical facilities and the equipment needed for testing, having staff develop and evaluate protocols as well as doing the work, and developing communication mechanisms for sharing information in a secure manner.

As bioterrorist agents are not organisms routinely encountered in laboratories therefore posing special risks to staff, protocols are required for safe and reliable testing. Each State or Territory needs access to a Biosafety Level (BSL) 3 facility, but BSL 4 facilities for pathogens such as smallpox and viral haemorrhagic fevers will

### Members of the PHLN of Australia

#### **ACT**

Microbiology and Infectious  
Diseases Department  
The Canberra Hospital

#### **NSW**

Centre for Infectious Diseases and  
Microbiological Laboratory Services  
South East Area Laboratory Service

#### **NT**

Territory Health Services

#### **QLD**

Queensland Health Pathology Service  
Queensland Health Scientific Services

#### **SA**

Institute of Medical and Veterinary  
Science

#### **TAS**

Department of Microbiology and  
Infectious Diseases  
Royal Hobart Hospital

#### **VIC**

Microbiological Diagnostic Unit (MDU)  
Public Health Laboratory  
Victorian Infectious Disease Reference  
Laboratory (VIDRL)

#### **WA**

Western Australian Centre for  
Pathology and Medical Research

#### **National**

CSIRO Australian Animal Health  
Laboratories  
Communicable Diseases Network  
Australia & New Zealand  
National Centre for Disease Control  
National Centre for Epidemiology and  
Population Health

#### **New Zealand**

Communicable Disease Group  
Institute of Environmental Science &  
Research



be more restricted. Therefore safe specimen handling protocols at BSL 2 or BSL3 are important to reduce demand on BSL 3 and BSL 4 facilities respectively. For example, the early stages of treatment of samples for nucleic acid detection tests (NAT) may allow handling of samples containing BSL 3 or BSL 4 pathogens in routine laboratory areas<sup>3</sup>. NAT also provide robust, sensitive and specific methods for detection of potential bioterrorist agents<sup>4</sup>.

Safety for the public and staff is largely dependent on properly trained staff working in appropriate facilities with access to protective clothing, but PHLN has also been discussing the role of vaccines and post exposure antibiotic prophylaxis for laboratory staff.

In addition to concerns about biocontainment, laboratories now have to ensure that dangerous organisms cannot be accessed for illegal purposes. This necessitates a review of the physical security of the laboratory and may require some form of 'certification' of staff who have access to these organisms<sup>5</sup>.

The interaction of laboratories with other service providers is a critical component of the laboratory response, and PHLN members have collaborated closely with many other groups involved in bioterrorist responses. As a network we have worked with groups such as the Communicable Diseases Network of Australia, Emergency Management Australia and the Australasian Society for Infectious Diseases. Individual PHLN members have also interacted with many other services within their jurisdictions.

Proper triage of incidents by police or emergency services allows filtering out of incidents with negligible risk that would unnecessarily burden the system. It is essential to ensure that the correct samples from environmental sources are collected and transported properly and, if it is a possible criminal act, to maintain the chain of custody. Health care institutions must have systems in place to identify potential victims of bioterrorist events and protocols developed to collect and transport specimens.

As well as detecting bioterrorist agents, laboratories are important in identifying confounding natural infections, e.g. differentiating chickenpox from smallpox<sup>6</sup>. PHLN has also worked closely with colleagues in public health to identify events and individuals at risk and to ensure laboratory results are communicated promptly. It has also defined the laboratory role in surveillance for changes in patterns of disease that may indicate bioterrorist events. PHLN also looks to research groups such as the recently established Australian Biosecurity Cooperative Research Centre: Emerging Infectious Diseases for advances in detection systems that can be incorporated into laboratory diagnostics.

Whether or not Australia ever has to face the reality of bioterrorist events, preparedness is essential. It has involved a considerable investment of time and effort from a wide range of services, and PHLN has played an important role in this.

Continuing input will be needed to prepare for the current threats and to respond to new threats that emerge in the future.

### References

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