

Bioterrorism and Australia – Where to from here?¹

by
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"Microbes are the foot soldiers of the 21st Century"

Jeremy Rifkin¹

BIOTERRORISM, the deliberate use of biological weapons by a terrorist group, has become a major concern for Australia n medical, government and military agencies over the past two to three years. The various forms of media, from reputable newspapers and journals to novels, documentaries and films regularly portray such attacks. In Australia, this depiction has varied from the fairly balanced recent *Weekend Australian* article on biological terrorism¹ to Tom Clancy's more outlandish *Rainbow*⁶³ portrayal of terrorism at the Sydney Olympic Games. Whilst response planning to a bioterrorist attack has been a major issue in the United States since 1996,¹ Australia is only now coming to terms with the issues involved and the possibility of Australians being a target.

The worldwide threat of bioterrorism is increasing and Australia cannot be excluded from this trend. The dimensions of this threat need further exploration to enable a realistic appreciation of the response required.¹ Such a review will enable an objective appraisal of Australia's current response capability and what future capability is needed, not just for major events such as the 2000 Olympics, but beyond.

BIOTERRORISM

Biological weapons have been utilised in one form or another for over 2000 years." Despite advances in detection and therapy, biological warfare remains a threat on the modern battlefield. The Russian and Iraq biological warfare programs have shown both the utility and the ease with which covert programs can be hidden.¹ Biological weapons may also prove to be a useful weapon in the armamentarium of the terrorist groups. The Aum sect has both researched and, unsuccessfully, tried to use anthrax and botulinum toxin." Other terrorist groups, like Usama bin Ladin's organisation, have indicated a strong interest in acquiring these agents as weapons."

So is 'Bioarmageddon' upon us?⁸ Is it just a matter of time before Australia faces 'Bioterror' or 'Agroterror'?^{10,11} Various press articles and novels would certainly have us believe that. To gain an appreciation, however, of whether these claims are realistic or merely sensational, a review of the current trends in terrorism and biological warfare is useful. The media hype and claims that biological weapons are so easy to produce and use that they have become the veritable terrorist 'poor man's atomic bomb',^{12,13} may even be detrimental. One unintended effect of the sensational media depiction of these weapons has been to make them more attractive to hoaxers, as evidenced by the recent spate of anthrax hoaxes in the United States.¹¹

THE TERRORIST THREAT

Terrorism may be defined as 'acts or threats of violence of national concern, calculated to evoke extreme fear for the purpose of achieving a political objective in Australia or in a foreign country'¹⁵

Australia, like the United States of the 1970's and 1980's, has been relatively immune to the spread of terrorism.¹⁶ Certainly, Australia has not seen anything on the scale of the World Trade Centre bombings and there were no major terrorist incidents in Australasia in 1998.¹⁷

Australia, however, has not been totally immune. Australia has seen bombings, assassinations, extortion attempts and hoaxes. The Sydney Hilton was bombed in 1978 and the Israeli Consulate-General's Offices were bombed by 15 May Organisation in December 1982.¹ The Turkish Consul-General was assassinated in Sydney by the Justice Commando's of the Armenian Genocide in December 1980. Extortion attempts have included the 'Mr Brown' QANTAS extortion in 1971, the Woolworths' bomb extortions in 1975,¹ and the more recent Coca-Cola extortion attempt in 1998. The most infamous hoax, and one with a bioterrorist flavour, was the 1984 threat by a prisoner to release a foot and mouth disease in Queensland.¹⁸

The terrorist threat is changing. Hoffman,¹⁹ in a seminal article, reviewed the terrorist threat from the 1970's until the present day. Hoffman noted that terrorist groups, whilst radical politically, have generally been conservative in the way they have carried out their attacks, being more 'imitative than innovative'.¹ Indeed, the groups were far more interested in getting their message across than killing lots of people. Consequently, whilst a few groups dabbled with the idea of weapons of mass destruction, the only actual incidents were not weapons of mass destruction related but instead involved food tampering as a form of economic sabotage. These include terrorist attempts at different times to poison Israeli oranges with mercury and to lace Chilean grapes with cyanide.¹⁰

The nineties, however, saw a fundamental change in terrorist operations. Analysis of the Rand-St. Andrews University Chronology of International Terrorist Incidents, a database of over 8,000 incidents dating back to 1968, has shown some disturbing trends.¹ Whilst there has been an overall fall in the number of terrorist incidents, there has been a paradoxical rise in the percentage of incidents with fatalities. In 1995, 29 percent of all terrorist incidents involved fatalities as opposed to 17 percent of attacks in the 1970's and 19 percent of the attacks in 1980's.¹ This trend is associated with the growth throughout the 1990's of radical religious terrorist groups. These groups, arising from a wide spectrum of religious backgrounds, see violence as a 'divine' duty and an expedient way to achieve their eventual aims.²⁰ The religious terrorist group members appear not to be constrained by the political, or even 'moral', constraints of the more traditional terrorist groups. Interested only in themselves, and the small religious group they represent, these groups are not defending a perceived aggrieved constituency but instead aim to radically change the existing order.¹ Consequently, as outsiders, the religious terrorists are able to contemplate far more destructive and deadly attacks to fulfil this aim.²⁰ As such, these religious terrorist groups have come the closest to the effective use of weapons of mass destruction. The deliberate infection of the populace of The Dalles, Oregon with Salmonella typhimurium in 1984 by the followers of the Bhagwan Shree Rajneesh was to be a forerunner to the Aum Shinrikyo cult's more deadly 1995 nerve gas attack on the Tokyo subway,¹¹ a historical watershed in terrorist tactics. The more traditional terrorist groups, however, should not be ignored. Bioterrorist attacks against animals and plants may get their point across without accruing the same retaliation.¹¹ Whilst there has been no major terrorist attack with biological weapons, many believe that this situation will not last^{12,19-21}.

BIOLOGICAL EXPERTISE

Whilst opinions vary, most authors believe that an individual or individuals with a modicum of technical skill could acquire the necessary expertise to produce biological weapon¹². Whilst terrorist groups in the past may not have had the necessary technical expertise,¹⁹ the previously esoteric skills required are now generally available. American industry employs around 60,000 biologists and there are nearly 1,900

biotechnology companies in the United States and Europe²². Similar expertise exists within Australia. As we have seen from the Russian and Iraq biological warfare programs, interest and expertise exists within a number of proliferant countries.;

THE THREAT TO AUSTRALIA

Australia, on the surface, does not appear to be a probable target for a terrorist attack, let alone a bioterrorist attack. Our close association with the United States, an avowed Usama Bin Ladin target," the general openness of our society and the spectacle of the 2000 Sydney Olympics, with a host of possible targets, may make Australia more attractive for terrorists. Whether such terrorists will resort to biological weapons is a more vexing question. There are good reasons for terrorists not to use biological weapons. The inherent unpredictability of biological weapons, a personal fear of biological agents, anticipated governmental response to an attack, and a general satisfaction with current measures, may contribute to the terrorist's reticence.^{12,19} The fear of collateral damage to friends and a desire to limit the number killed may also concern more traditional terrorist groups.¹² Most authors agree, however, that with the growth of religious terrorism and availability of agents, there will be future attempts, on a limited scale, to use these weapons^{12,19}. Whether Australia would be a target of such terrorism is even more debatable.

Given intent, the next consideration is capability. A terrorist group, even with limited technical capabilities, may be able to acquire or import a biological agent into Australia. Potential biological warfare agents could be acquired from natural reservoirs, appropriated or stolen from medical or research facilities, bought from legitimate or 'black market' suppliers, or procured from 'friendly' governments.^{1,19} Recently, concern has been raised about the potential use smallpox as a terrorist weapon, however, limited availability would make it difficult to acquire and use²⁴. Interest has already been shown by various overseas terrorist groups in acquiring anthrax, botulinum toxin and ricin^{18,25}

Whilst opinions vary, most authors believe that terrorists with a modicum of technical training could acquire the necessary technical expertise to produce biological weapons in small quantities.¹² The necessary technical skills and equipment needed, however, to produce agent in large quantities and to weaponise that agent are far more difficult to procure.^{5,14}

Delivery is the critical step. Most authors agree that effective delivery of biological warfare agents is even more problematic than its production.²² The most commonly proposed means of terrorist delivery is by the spread of a biological agent cloud over a city using a basic aerosoliser.^{8,18} This process, fortunately, is more difficult than it first appears.¹⁴ There are significant technical problems in keeping a biological agent in a cloud viable for long enough to infect or intoxicate the victim.¹³ Humidity, sunlight, smog, temperature and winds will all impact on the final dose received²⁷. Even with a good technical background, the Aum sect was unable to successfully deliver anthrax and botulinum toxin in Tokyo.^{16 18} Whilst a smaller scale attack in an confined area may be more feasible, the technical ability to produce and weaponise sufficient agent to cause harm would probably be beyond the capabilities of most terrorist groups.¹

The poisoning of a large water reservoir is also not as simple as postulated. An attack would require large quantities of agent and is unlikely to be successful due to problems with access to the site, dilution and environmental degradation^{12,29}.

THE RESULTS

A successful bioterrorist attack has the potential to be disastrous. Even a relatively small attack might quickly overwhelm the resources of even the richest and most capable of countries.³⁰ In a human attack, death and disease would be only part of the problem. The potential psychological effects and resultant panic would impact adversely on the infrastructure and operations of any country.¹⁰ Animal and plant attacks may have devastating effects on a country's economy and lead to hunger and further suffering. The financial impact would also be monumental. Kaufmann's model of the economic impact shows that, for every 100,000 persons exposed in an anthrax attack, the financial cost to a country could be over 26 billion American dollars.³¹

DEFENCE AGAINST BIOLOGICAL TERRORISM

Defending against biological terrorism is a daunting task. Unlike chemical or nuclear weapons, the current biodetection systems are limited in their scope and availability, so emphasis has to be placed on other measures. Sensitivity analysis has shown that preventive programs are cost-effective in defending against biological terrorism.³¹

OVERSEAS RESPONSE

With some notable exceptions, very few countries have grappled with the bioterrorism threat³². In the United States, Congress unanimously approved the setting up of a Department of Defense Domestic Preparedness Program in 1996 with an initial budget of \$150 million.^{33,34} Chemical and Biological Defense Command were tasked to help cities and State governments get ready for a chemical or biological terrorist attack. Simulations have already shown the different and potentially more devastating problems posed by bioterrorism³³. National Guard rapid response teams have been established and Defense's efforts, to train first-response teams in 121 of the largest U.S. cities, are continuing.³⁵ The US military already has considerable chemical/biological counter- terrorism technology expertise. The Technical Escort Unit (TEU) provides world-wide recovery and render safe expertise for chemical and biological weapons while the Chemical V Biological Anti-terrorism Team is responsible for developing the fieldable hardware for TEU and other units to carry out their render safe role.³⁶ Despite this investment, both the Congress and the Government Audit Office are concerned that the money allocated for terrorism defence is not being appropriately targeted towards biological and other terrorist threats.^{33,37} Many believe that a biological terrorist attack in the United States is inevitable and that the country remains unprepared.

THE AUSTRALIAN RESPONSE

Australia faces the challenge of many developed nations. The face of terrorism is changing and Australia, like most countries, is unlikely to be immune in future. The move to religious terrorism increases the probability that future terrorist attacks will involve biological or chemical weapons. Improved technical skills and equipment make a bioterrorist attack both more probable and more likely to be successful, particularly if done on a small scale.

The Australian community has, until recently, been generally under-prepared. In the early 1990's, there was no policy, training or planning in this area. In 1998, the Australian Medical Disaster Coordination Group identified major deficiencies in the preparations for a chemical or biological terrorist attack and set out, with Emergency Management Australia, to rectify these deficiencies. Australia is now preparing for biological terrorism, and its defensive measures can be broadly grouped into four main areas.¹²

The first area is information collection. Security and police agencies are and will continue to focus on monitoring terrorist groups of concern and their state-sponsors. The movement of biological agents and

microbiological equipment is regulated and controlled by Australian Customs and the Australian Quarantine Inspection Service. Australia is also fortunate enough to have a very well-developed Public Health laboratory network which both catalogues local endemic and epidemic disease and rapidly identifies and responds to epidemics through its surveillance network".³⁰ This system provides input into the ProMED internet epidemic surveillance system which has been very effective in establishing baseline data. There are well-developed links between different Government agencies and the medical community,³⁸ through Emergency Management Australia and committees like the Australian Medical Disaster Coordination Group, which ensure that information is shared to assist in creating a coherent picture of the problem.³⁹

The second area involves counter-acquisition strategies. Countries must make it very difficult for terrorist groups to acquire biological weapons. Australia has been at the forefront of such strategies over the last decade. Australia established the Australia Group, a group of like-minded nations, who meet in Paris on an annual basis. The individual countries in this Group monitor and control their national export of chemicals, biological agents, precursors and dual-use equipment to proliferant countries. Australia has also strongly supported the establishment of the Chemical Weapons Convention, the verification protocol for the Biological Weapons Convention, and the United Nations Special Commission (UNSCOM), who were responsible for disassembling Iraq's biological weapons program. While each of these strategies is not an end in itself, they contribute to the counter-acquisition web, which makes the acquisition and use of biological weapons more difficult. Counter-acquisition may require countries to both threaten, and be willing to carry out, retaliation against the terrorists and their state sponsors should biological weapons be developed or used.³⁹ Through military involvement with sanctions, Australia has been involved in bringing economic and moral pressure to bear on countries like Iraq to comply with international conventions, including the Biological Weapons Convention.⁷ The availability of dangerous micro-organisms is tightly controlled in Australia and trade in this area is heavily regulated. Police are receiving the necessary training to identify these agents, and the production equipment required, in the acquisition and transport stages. Australia also has a well-developed and nationally agreed National Anti-terrorist Plan. This plan is regularly exercised and revised. The 7th Edition, which will comprehensively cover chemical and biological terrorism procedures, will be published later this year.¹⁵

Passive protection is the third area. New, innovative and rapid biological detection systems are a cornerstone of early and appropriate response.²⁴ The Australian Defence Force (ADF) has made substantial progress in this area following the Gulf War. The Defence Science and Technology Organisation (DSTO) commenced research into medical defences against biological weapons in 1995 and have made some excellent advances in the development of bio-detection systems. One of the most promising is the AMBRI biosensor, which can rapidly detect up to four agents at a time.

Similarly, effective disease surveillance systems are critical. Adequate epidemiology and pathology resources are key facets of this surveillance.³⁰ The current Australian notifiable disease system is very effective and able to detect acute changes. Enhanced surveillance will also be in place during the Games period.

Protection should also cover the stockpiling of vaccines and therapeutic agents; improved water supply, air-conditioning and food production security; development of better individual protection equipment, and increased research into medical defences against biological weapons.¹⁻⁵ The ADF, through DSTO has also contributed to the development of other detection systems, therapies for the management of biological weapons and improved individual protection equipment. The new lightweight suits, whilst

giving the protection of older suits, will markedly reduce the heat stress encountered in the Australian environment. Policy on vaccination against biological weapons has been developed and various vaccines and therapeutic agents are stockpiled.

In November 1998, NSW Health identified a project manager to coordinate its CBR response. A review of equipment and standard operating procedures, and an audit of drug supplies have been initiated. Various other States are also looking at protective equipment and detection requirements.

Finally, there must be measures that mitigate the effect of an attack. These measures, including better and more specific biological disaster planning, public health coordination, and evacuation planning, are all being developed in Australia.¹¹ Emergency and medical responders are learning what they are dealing with and how to manage it. Education and training in bioterrorism, at all levels, has become a priority.^{25,40}

The ADF is able to decontaminate and render safe chemical and biological munitions whilst protecting its forces through detection systems, protective equipment, medical countermeasures and research. Doctrine for the management of biological munitions and casualties has been developed, and instructors, specialist advisers and medical officers trained. Such preparations, however, are focused on troops in the field and not on terrorist threats. The Commonwealth Government committed \$23 million in the last budget to enhance this capability, with increased spending on response capability and protection and detection systems.

The Commonwealth Government is regularly exercising chemical and biological terrorism disaster plans through desktop and other exercises. Commonwealth Health has commenced work on an Australian Emergency Manual to provide doctrine for the management of chemical and biological casualties. This Manual, coordinated by Emergency Management Australia (EMA), should be released in August or September 1999.⁴¹ EMA has also provided awareness training material to all the States and Territories.⁴¹ In November 1998, NSW Health trained 7 specialist medical personnel through the ADF Medical Officers Nuclear, Biological and Chemical Defence course. Between February and June 1999, over 150 personnel, including 50 health and ambulance staff, were trained on chemical and biological response 'train the trainer' courses. Further health service training will commence in late September 1999 and continue in a variety of forms throughout 2000. This course was developed utilising the Manual and assistance from Commonwealth Health. Various other States are also looking at the contingency planning, health co-ordination and training requirements of such preparedness.

Sharp, in his review of medical preparedness for the 1996 Atlanta Olympics, outlined the resources available to counter a biological weapons attack. They included a specialist site assessment team, a science and technology centre to provide technical support, stockpiles of antimicrobials, specialised training for first-responders, enhanced public health surveillance, and a Chemical Biological Incident Response Force to decontaminate and stabilise casualties.⁴² The Australian bioterrorism emergency response infrastructure is being progressively developed and should be equal to the world's best practice by the 2000 Olympic Games.

CONCLUSION

Bioterrorism will not disappear as a potential problem and will remain an area of political and media interest. Fortunately, the successful completion of even a small-scale bioterrorism attack is far more difficult than portrayed by much of the media. Even a very limited attack, however, may have a major psychological effect with the resultant panic severely hampering any emergency response. The

Australian medical and emergency response communities have started to face this threat and will be better prepared to face both the bioterrorist and emerging exotic infectious disease challenges of the new century.

REFERENCES

1. Thatcher G. Poison on the wind: the new threat of chemical and biological weapons. *Christian Science Monitor* 1988; B1-12.
2. Safe M. Bio terrorism. *The Australian Magazine* 1999 July 31:32.
3. Clancy T. *Rainbow 6*. Harmondsworth: Penguin Books; 1998.
4. Starr B. Chemical and biological terrorism. *Jane's Defence Weekly* 1996;26(7):16-21.
5. Russo E. Bioterrorism concerns heightened. *Scientist* 1999;13(6):1.
6. Robertson AG, Robertson LJ. From asps to allegations: biological warfare in history. *Mil Med* 1995;160(8):369-373.
7. Seelos C. Lessons from Iraq on bioweapons. *Nature* 1999; 398:187-188.
8. MacKenzie D. Bioarmageddon. *New Scientist* 1998 Sep 19;159(2151).
9. Tenet G.J. Dangers and threats to the U.S.: delivered to Senate Armed Services Committee, Washington, D.C. *Vital Speeches of the Day* 1999 Feb 2:293-299.
10. Crowley M. Bioterror. *The Boston Phoenix* 1999 Mar 18-25.
11. Goldstein S.U.S. could face new terror tactic: Agricultural warfare. *Philadelphia Inquirer* 1999 June 22, I.
12. Purver R. *Chemical and biological terrorism: The threat according to the open literature*. Ottawa: Canadian Security Intelligence Service; 1995.
13. Ventner AJ. Biological warfare: the poor man's atomic bomb. *Jane's Intelligence Review* 1999:42-47.
14. Tucker JB, Sands A. An unlikely threat. *Bull Atomic Scientists* 1999 JuVAug:46-52.
15. *National Anti-Terrorist Plan* (6th Ed.); Nov 1995.
16. Cronin J. *Australia: the terrorist connection*. South Melbourne: Sun Books; 1986.
17. Gestern O. Terrorism in the region during 1998. *Asia-Pacific Defence Review (Annual Reference Edition)* 1999: 28-30.
18. Douglas JD, Livingstone NC. *America the vulnerable: the threat of chemical and biological warfare*. lexington: lexington; 1987.
19. Hoffman B. Terrorism and WMD: some preliminary hypotheses. *The Nonproliferation Review* 1997 Spring-Summer:45-53.
20. Hoffman B. Intelligence and terrorism: emerging threats and new security challenges in the post-cold war era. *Intelligence and National Security* 1996;11(2):207-223.
21. Cole LA. The specter of biological weapons. *Sci Am* 1996; 275:60-5.
22. Taylor R. All Fall Down. *New Scientist* 1996;150(2029):32.
23. Timmerman K. This man bankrolls terror. *Readers Digest* 1998 Jul 16-23.
24. Henderson DA. The looming threat of bioterrorism. *Science* 1999;283(5406):1279-82.
25. Stephenson J. Confronting a biological Armageddon: experts tackle problem of bioterrorism. *JAMA* 1996;276(5):349-51.
26. Abel D. U.S. knowledge of bioweapons largely obsolete. *Defense Week* 1999 Mar 8;20(10):7.
27. Hall R, Cameron S, Givney R. Biological weapons. *Recent Advances in Microbiology* 1998; 6:1-30.
28. Stern J. *The ultimate terrorists*. Cambridge: Harvard University Press; 1999.
29. Roberts B. *Biological weapons: weapons of the future*. Washington: Centre for Strategic and International Studies; 1993.
30. Goldsmith ME Preparing for medical consequences of terrorism. *JAMA* 1996;275:1713-1714.

31. Kaufman AF, Meltzer MI, Schmid GP. The economic impact of a bioterrorist attack: are prevention and post-attack intervention programs justifiable. *Emerg Infect Dis* 1997;3(2):12-25.
32. Stern]. Taking the terror out of bio-terrorism. *New York Times* 1998 Apr 8.
33. Boyce N. Nowhere to hide. *New Scientist* 1998;158(2127):4.
34. U.S. terrorism crackdown. *Jane's Defence Wcldy* 1996;26(4).
35. Experts: *U.S. unprepared for bio-terrorists*. CNN 1998 Apr 14.
36. Counter-terrorism technology. *Jane's Defence Weekly* 1996;26(7):18.
37. McCutcheon C. lawmakers say Clinton's plans for combating terrorism lack urgency and coherence. *CQ Weekly* 1999 Mar 13:627.
38. Wise R. Bioterrorism: thinking the unthinkable. *Lancet* 1998;351(9113):1378.
39. Mann P. Terrorism needs massive response. *Aviation Wee/1 and Space Technology* 1999 Mar 1:54-55.
40. McDade JE, Franz D. Bioterrorism as a public health threat. *Emerg Infect Dis* 1998;4(3):493-494.
41. Patterson D. A new course at AEMI. *Aust J Emerg Management* 1999;14(1):1.
42. Sharp TW, Brennan RJ, Keirn M, Williams RJ, Eitzen E, Lillibridge S. Medical preparedness for a terrorist incident involving chemical or biological agents during the 1996 Atlanta Olympic Games. *Ann Emerg Med* 1998; 32:214-223.