



# A population survey

## Would Australian general practice be the first point of contact during an anthrax bioterrorism event?

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### BACKGROUND

Anthrax bioterrorism is a new threat to Australians. How they would respond to an anthrax bioterrorism event is unknown.

### METHOD

A national telephone survey of Australian adults.

### RESULTS

We successfully interviewed 1001 Australian adults (response rate 63%). The threat of anthrax bioterrorism was of medium to high concern to 57% of survey participants. In the event of an anthrax bioterrorism event, the first point of care would be GPs for 60% of survey participants, and 71% were confident in their doctor's ability to recognise anthrax. Most would accept vaccination if anthrax bioterrorism cases were reported locally, or even elsewhere in Australia.

### DISCUSSION

Australian GPs should be included in any bioterrorism planning to respond to such threats.

**The Commonwealth Chief Medical Officer has emphasised the need to be prepared for a bioterrorism incident.<sup>1</sup> Anthrax has already been used effectively as a bioterrorism agent, and experts believe it would be the most likely agent to be used in Australia.<sup>2-4</sup> Australia's last two clinical anthrax cases, both cutaneous and occupation related, occurred in February 1997 (Victoria) and July 1998 (Brisbane).<sup>5</sup> However, multiple 'white powder' incidents occurred following cases in the USA during 2001.<sup>6</sup> In New South Wales, for example, 990 white powder incidents were reported and samples from 535 were submitted for laboratory testing in one month during 2001. This involved a massive diversion of personnel and resources, although no anthrax spores were found.<sup>7,8</sup>**

An anthrax fact sheet has been developed by the Department of Health and Ageing,<sup>9</sup> yet little attention has been given to understanding the Australian public's knowledge of anthrax or likely response to a bioterrorism event.<sup>10</sup> Accordingly, the research group set out to

explore these issues among adult Australians. The respondents' knowledge of smallpox, and prevention and response strategies was explored in the same survey, with those results published elsewhere.<sup>11</sup>

### Method

The research group employed eight experienced telephone interviewers. They rang private, randomly selected telephone numbers in each state and territory, proportional to their contribution to the adult population, over 18 days in mid 2004. Exclusion criteria were: children (persons aged less than 18 years); inability to participate due to limited English language ability or mental illness; and no response despite three attempts at different times on different days. The questionnaire was pretested for length and comprehensibility. Calls were conducted between 10.00 am and 7.00 pm, and the questionnaire administered with verbal consent after: introducing the survey's purpose; providing a guarantee of confidentiality; reassurance of freedom to choose to participate; and confirming that inclusion criteria were met. When individuals expressed interest but could not

complete the survey at that time, another call was made at an agreed time.

The research group undertook standard bivariate test analyses (t-tests, chi-square tests) and logistic regression modelling using dummy coding for all categorical variables. The survey population's demographic data was compared with those of the Australian population.<sup>12</sup> Approval was granted by the James Cook University Human Ethics Committee.

## Results

The research group contacted 1850 people, successfully recruiting 1001: 267 were exclusions (38 children; 91 adults with limited English ability; nine adults who were incoherent; 75 adults who were contacted at their workplace; and there was no answer at 54 numbers despite three attempts) and 582 refusals (response rate 63.2%).

The participants' mean age was 52.2 years (standard deviation 17 years); a majority (62.8%) were female; and most (58.6%) lived in a city (40.3% in a town/village or rural area and 1.1% unstated), compared to 66.3% of the Australian population. The highest educational level attained by participants was: primary school (7.7%); high school grade 10 or lower (23%); completed high school (34.3%); completed institutes for tertiary and further education or trade (13.9%); and university graduate (19.6%), while 1.6% refused to answer this question.

Concern about the risk of a bioterrorism attack in Australia was perceived as high by 18.2% of participants, medium by 39.2%, low by 33.9%, and as none by 1.4%; 7.2% did not know and 0.1% (two participants) refused to answer. Logistic regression modelling revealed that increasing age was the only demographic feature significantly associated with a perception of a bioterrorism attack as high (as opposed to low, medium or none) with an odds ratio of 1.016 per year ( $p < 0.001$ ).

Fourteen percent of respondents incorrectly thought there had been inhalational anthrax disease in Australia in the past 5 years; 27% were unsure (Table 1). The likelihood of contracting 'anthrax of the lungs' if working in close contact with someone with

**Table 1. General knowledge about inhalational anthrax**

	n (%)			
	Yes	No	Don't know	No answer or refused
<b>In the past 5 years, do you think there:</b>				
Have been human cases of anthrax of the lungs in Australia?	140 (14)	583 (58)	271 (27)	7 (1)
Have been human cases of anthrax of the lungs somewhere in the world?	722 (72)	131 (13)	146 (15)	2 (0)
Is there an effective medical treatment for anthrax of the lungs?	217 (22)	249 (25)	534 (53)	1 (0)
<b>Of the 996 participants not vaccinated, those who would accept vaccination against anthrax:</b>				
As a precautionary measure	452 (45)	457 (46)	42 (4)	45 (5)
If cases were reported in the world	466 (47)	427 (43)	46 (5)	57 (6)
If cases were reported in Australia	581 (58)	314 (32)	44 (4)	57 (6)
If cases were reported in own community	735 (74)	170 (17)	34 (3)	57 (6)

the disease (eg. in the same office) was correctly considered to be low by 13.6%; medium by 10.1%; and high by 39.5% (don't know by 36.7%; 0.1% elected not to answer).<sup>13</sup>

The research group explored the acceptance of vaccination against anthrax under different hypothetical scenarios: 45.4% would accept vaccination as an immediate precautionary measure; 46.7%, 58.3% and 73.8% would accept vaccination if cases were reported somewhere in the world, Australia, or their own community, respectively. Older people were less likely to accept vaccination, odds ratios of 0.986 per year ( $p < 0.01$ ). Respondents with higher educational achievement were also less likely (odds ratio 0.845 per education category,  $p < 0.01$ ) to accept vaccination under any scenario. The proportion of respondents reporting prior vaccination against anthrax were: 0.5% yes, 92.4% no, 3.7% don't know, and 3.4% did not provide an answer. In those who reported no prior vaccination, readiness to accept vaccination increased as the hypothetical event occurred physically closer to them (Table 1).

A majority of respondents (59%) nominated their general practitioner when asked in an open question where they would first seek diagnosis or care if they thought they had contracted anthrax; 33% nominated hospital emergency departments; 4.3% a public health department; and 1.8% other sources (1.6% did not know; three participants refused to answer).

Confidence in their doctor's ability to recognise anthrax symptoms was high in 41.8%; medium in 29.1%; and low or none in 21.9% (6.8% did not know, and five participants refused to answer). Confidence in Australian health authorities' ability to cope with a bioterrorism attack was high in only 19.1%; medium in 37.1%; and low or none in 35.3% (8.3% didn't know, and three participants refused to answer). Preferred sources of reliable information during a hypothetical bioterrorism attack were (to an open question): the media (24.9%); their GP (21.6%); the internet (18.2%); a hospital (11.1%); and the government (10.8%); while 6.1% did not know and 7.4% refused to answer.

## Discussion

Although vignettes have been shown to predict behaviour,<sup>14–16</sup> this has not been validated for behaviour related to suspected bioterrorism events. Therefore, this survey must be interpreted within this limitation. In addition, there was an over representation of English speaking people, women (perhaps because of the timing of the calls), and university graduates when compared to the general adult population.

Nonetheless, these are unlikely to have distorted the survey findings, which suggest most Australians are concerned about the risk of a bioterrorism attack, and that they have only limited knowledge about anthrax. Redressing this will require engaging groups who appear more unwilling to accept public health measures such as vaccination if indicated, particularly the elderly and those with higher educational achievement. However, most realised they were not immune to anthrax, and there was a general willingness to accept vaccination when indicated. The anthrax vaccine for human use is not registered in Australia and can only be imported from the USA by special arrangement. The complicated schedule, involving six intramuscular doses over 18 months with necessary annual boosters, implies that anticipatory mass vaccination would be difficult, and hard to justify.<sup>17</sup>

The great level of confidence in GPs' abilities to diagnose anthrax and provide credible information during a bioterrorism event is important; GPs might play a central role in responding to a threat.<sup>18</sup> Perhaps the first steps should be taken toward educating GPs to play this pivotal role.

## Implications for general practice

- Most Australians are concerned about the risk of bioterrorism.
- GPs are likely to be the first point of care if a bioterrorism attack is suspected.
- GPs are generally regarded as a credible source of such information.
- GPs might need special education for this role.

Conflict of interest: none declared.

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## References

1. Smallwood R, Merianos A, Mathews J. Bioterrorism in Australia. *Med J Aust* 2002;176:251–3.
2. Henderson D. Bioterrorism as a public health threat. *Emerg Infect Dis* 1998;4:488–92.
3. Inglesby T, O'Toole T, Henderson D, Bartlett J. For the working group on civilian biodefense. Anthrax as a biological weapon: medical and public health management. *JAMA* 1999;281:1735–45.
4. Smallwood R. Editorial: the risk of anthrax and smallpox in Australia. *Commun Dis Intell* 2001;25:188–9.
5. Australian Government Department of Health and Ageing. Anthrax fact sheet for health professionals. Available at [www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-communic-factsheets-anthrax\\_gp.htm](http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-communic-factsheets-anthrax_gp.htm) [Accessed October 2005].
6. Smallwood R, Merianos A, Mathews J. Bioterrorism in Australia. *Med J Aust* 2002;176:251–3.
7. Leask A, Delpech V, McAnulty J. Anthrax and other suspect powders: initial responses to an outbreak of hoaxes and scares. *NSW Public Health Bull* 2003;14:218–21.
8. James G, Yuen M, Gilbert L. Laboratory investigation of suspected bioterrorism incidents, NSW, October 2001 to February 2002. *NSW Public Health Bull* 2003;14:221–3.
9. Australian Government Department of Health and Ageing. Anthrax fact sheet. Available at [www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-communic-factsheets-anthrax\\_fact.htm](http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-communic-factsheets-anthrax_fact.htm) [Accessed October 2005].
10. Whitby M, Street A, Ruff T, Fenner F. Biological agents as weapons 1: smallpox and botulism. *Med J Aust* 2002;176:431–3.
11. Durrheim D, Muller R, Sanders V, Speare R, Lowe J. Australian public and smallpox. *Emerg Inf Dis* 2005;11:1748–50.
12. Australian Bureau of Statistics. Yearbook Australia 2002. Available at [www.abs.gov.au](http://www.abs.gov.au) [Accessed October 2005].
13. Inglesby T, O'Toole T, Henderson D, et al. Anthrax as a biological weapon. Updated recommendations for management. In: Henderson DA, Inglesby TV, O'Toole T editors. *Bioterrorism: guidelines for medical and public health management*. Chicago: AMA Press, 2002.
14. Finch J. The Vignette technique in survey research. *Sociology* 1987;21:105–14.
15. Durrheim D, Duse A, Kloeck P. Managing dog bite in Mpumalanga Province, South Africa: the vignette approach, a useful tool for assessing knowledge and practice. *South African Journal of Epidemiology and Infection* 1998;13:86–9.
16. Peabody J, Luck J, Glassman P, et al. Measuring the quality of physician practice by using clinical vignettes: a prospective validation study. *Ann Intern Med* 2004;141:771–80.
17. Centers for Disease Control and Prevention. Anthrax vaccination questions and answers. Available at [www.bt.cdc.gov/agent/anthrax/faq/vaccination.asp](http://www.bt.cdc.gov/agent/anthrax/faq/vaccination.asp) [Accessed October 2005].
18. Cherry C, Kainer M, Ruff T. Biological weapons preparedness: the role of physicians. *Intern Med J* 2003;33:242–53.