

# The very real threat of Bioterrorism – Are we prepared?

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## Abstract

The terrorist attack of 11<sup>th</sup> September, 2001 and its aftermath have necessitated politicians and the medical community alike to address the hitherto poorly-addressed issue of biological terrorism. With recent advances in science and technology, unconventional and revolutionary ways of waging war are sprouting around the world with 'white powder' incidents still continuing to cause concern<sup>1</sup>. Such incidents although disturbing, reinforce the fact that a major bioterrorist attack is a 'cloud on the horizon' event. Further, such events are perceived as 'low risk' but their potential is 'high impact'. Hence, the need to educate and enhance capacity in clinical and public health management of such highly-infectious diseases has never been greater. In the last decade alone, successive outbreaks caused by fresh, newly-recognised and resurgent pathogens such as H5N1 and SARS and their destructive potential, have galvanised public health physicians and agencies such the Health Protection Agency (HPA) to act as torchbearers in the event of such a major incident. Are we really ready to deal with a biological terrorist attack?

## INTRODUCTION

The terrorist attack of 11<sup>th</sup> September, 2001 and its aftermath have necessitated politicians and the medical community alike to address the hitherto poorly-addressed issue of biological terrorism. With recent advances in science and technology, unconventional and revolutionary ways of waging war are sprouting around the world with 'white powder' incidents still continuing to cause concern<sup>1</sup>. Such incidents although disturbing, reinforce the fact that a major bioterrorist attack is a 'cloud on the horizon' event. Further, such events are perceived as 'low risk' but their potential is 'high impact'. Hence, the need to educate and enhance capacity in clinical and public health management of such highly-infectious diseases has never been greater. In the last decade alone, successive outbreaks caused by fresh, newly-recognised and resurgent pathogens such as H5N1 and SARS and their destructive potential, have galvanised public health physicians and agencies such the Health Protection Agency (HPA) to act as torchbearers in the event of such a major incident. Are we really ready to deal with a biological terrorist attack?

## WHAT IS THE DEFINITION OF BIOTERRORISM?

Bioterrorism is defined as 'the intentional or threatened use of microorganisms or toxins derived from living organisms to cause death or diseases in humans, animals or plants upon

which we depend'<sup>2</sup>. This can be perpetrated overtly, the envelopes containing anthrax spores distributed through US Postal Service in 2001 being a case in point, or covertly, such as the 1984 Salmonella typhimurium contamination of salad bars in restaurants in Dalles, Oregon, by followers of Baghwan Shree Rajneesh, when 751 people developed gastroenteritis<sup>3</sup>. Another crucial point in the ideology of bioterrorism is to generate as much fear in the population as possible. More than 180 pathogens have been reported to be potential agents for bioterrorism, including West Nile Virus, Anthrax, Botulism and Ricin<sup>4</sup>. Biological weapons have their own niche amongst chemical, biological, radioactive and nuclear (CBRN) weapons in that they are relatively easily disguised and transported<sup>5</sup>. Similarly, they are potentially more lethal due to the latency they possess. Further, these weapons can be used to cause economic damage through the introduction of pestilence into crops and livestock<sup>6</sup>. Outbreaks of such agents pose a serious threat not only to public health, but to national security, morale and socioeconomic productivity and stability. Such attacks therefore, are multi-focal in their destructive capacity and so their appreciation and recognition are imperative.

**Figure 1**

Figure 1: Known biological agents/diseases



[Source: <http://www.bt.cdc.gov/agent/agentlist-category.asp>]

**Figure 2**

Figure 2: Microbiological, Cutaneous and Radiological manifestations of Anthrax, (left). Eschar formation is characteristic of Anthrax infection, with oedema and erythema (centre). A widened mediastinum characteristic of Anthrax inhalation (right).



[Sources:

[http://www.hpa.org.uk/infections/topics\\_az/anthrax](http://www.hpa.org.uk/infections/topics_az/anthrax),  
<http://www.bt.cdc.gov/agent/anthrax/anthrax-images>]

## HOW DO BIOLOGICAL WEAPONS WORK?

Biological agents may be introduced into a building's heating, ventilation or air-conditioning system or via food or water contamination.<sup>7</sup> However, regardless of the type of dispersal method used, victims generally are exposed in 3 ways, namely through cutaneous, gastrointestinal, and pulmonary routes. Although biological agents are limited by environmental constraints including wind, sunlight, temperature, desiccation etc., the potential impact of widespread illness and death may be devastating.<sup>8</sup>

## WHAT IS THE CURRENT STATE OF PREPAREDNESS?

Authorities the world over acknowledge the catastrophic

potential of such attacks and therefore have been preparing for such events. Simulated major incidents such as that practiced in London a few years ago at Bank underground station have exposed inadequacies in current resources and logistics in place to deal with such an incident and it is through these dress rehearsals we can reflect, evaluate and improve our response to dealing with a biological attack.<sup>9</sup> Similar studies and exercises have been performed around the world.<sup>10</sup> In the UK, training courses such as the 'Silent Weapons' course had previously provided attendees with specialist knowledge of dealing with CBRN attacks, but over the last few years funding has been withdrawn. Similarly, in medical schools public health is not given enough credence in the core curriculum, nor is it taught in an engaging manner. With MMC changes afoot, there is a great opportunity to raise the profile of the specialty, and highlight these particular areas of concern. Simulations and training exercises are useful because they identify problems in response and allow responders the opportunity to practice.<sup>6789</sup> Limitations however exist in that the vast array of biological agents are variable in their deployment and action and therefore, there is a need for a mechanism which is versatile enough to cope with the idiosyncrasies of each event. The HPA have published 'CBRN incidents: clinical management and health protection', which is a comprehensive one-stop guide to dealing with any CBRN incident.<sup>11</sup> It forms a decent platform from which to work from in the event of a biological weapons attack. With such frameworks in place, hospital triage and assessment tools could be tailored to classify and manage major incidents, so that adequate resources and specialist input is accessible.<sup>810</sup>

## HOW CAN WE IMPROVE OUR PREPAREDNESS?

The government has spent a considerable amount of money on vaccines and antibiotics such as ciprofloxacin.<sup>11</sup> Increased spending on drugs and vaccines, training and education in preparation of such pandemics is needed.<sup>10</sup> Complacency is causing the good work of some to be rendered ineffectual by others.<sup>11</sup> Recent initiatives illustrate that the authorities in the UK are showing signs of adopting a more dogmatic approach to public health, none more so than the HPA, who have recently been involved with some good work on UK preparedness for future influenza pandemics.<sup>11</sup> Over the last twelve months they have raised awareness by publishing information and guidelines along with providing emergency planning training and laboratory exercises in an effort to deal with such an event.

## CONCLUSION

The threat of biological terrorism demands due respect, adequate preparation and response planning<sup>12</sup>. Moreover, these processes must be flexible and dynamic so that appropriate measures can be implemented as an outbreak progresses. In addition, they also need to be generic in view of the large number of potential organisms (Figure 1) and even if known pathogens such as smallpox and SARS do not re-emerge, the experience gained from the planning and risk management involved is invaluable in preparing for threats of any type of CBRN<sub>11</sub> event terrorism orientated or not.

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