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The Anti-Terrorism, Crime and Security Bill

Parts VI & VII: Pathogens, Toxins and Weapons of Mass Destruction

Bill 49 of 2001-2002

The events of 11 September 2001 and the discovery of letters containing anthrax spores have focused attention on the threat posed by the terrorist use of weapons of mass destruction.

This paper examines Parts VI and VII of the *Anti-Terrorism, Crime and Security Bill*, which would strengthen existing legislation controlling chemical, nuclear and biological weapons, and tighten controls on access to pathogens and toxins used in research laboratories in the United Kingdom. The paper also contains information on potential pathogen threats, with particular emphasis on anthrax and smallpox.

Other elements of the Bill are to be covered in separate Library Research Papers.

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Summary of main points

- The events of 11 September 2001 and the discovery of letters containing anthrax spores have focused attention on the threat posed by the terrorist use of nuclear, biological and chemical weapons. These weapons are often referred to collectively as ‘weapons of mass destruction’ or WMD.
- This paper examines **Parts VI and VII** of the *Anti-Terrorism, Crime and Security Bill*, which would strengthen existing legislation controlling weapons of mass destruction, and tighten controls on access to pathogens and toxins used in research laboratories in the United Kingdom.
- **Part VI** of the Bill would strengthen existing legislation controlling chemical, nuclear and biological weapons, by making it an offence to aid or abet the overseas use or development of chemical, nuclear, biological or radiological weapons (See Section II of this paper).
- Security measures in laboratories maintaining or researching pathogenic cultures have focused in the past on the containment of the pathogen and the safety of workers. **Part VII** of the Bill would supplement existing measures by restricting access to pathogens (See Section III of this paper).
- The Bill would also provide powers to vet personnel that work in such establishments and to mandate security provisions. In the event that research establishments do not meet personnel or security requirements, access to dangerous pathogens and toxins could be withdrawn. More detail on potential pathogen threats, and in particular anthrax and small pox, is given in Section IV of this paper.
- **Part XIII** of the Bill contains measures relating to the use or threatened use of noxious substances, (including biological agents or toxins, toxic chemicals or radioactive material) for terrorist and other similar purposes. It also introduces a new offence of hoaxing involving apparently noxious substances. These provisions are due to be covered in another Research Paper on the Bill.
- The other elements of the Bill relating to terrorist property, freezing orders, disclosure of information, immigration and asylum, race and religion, aviation and nuclear industry security, police powers, retention of communications data, and bribery and corruption are to be covered in separate Library Research Papers.

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I Introduction

The events of 11 September 2001 and the discovery of letters containing anthrax spores have focused attention on the threat posed by the terrorist use of nuclear, biological and chemical weapons. These weapons are often referred to collectively as ‘weapons of mass destruction’ or WMD.¹

The chief suspect for the 11 September attacks, Osama bin Laden, claimed in early November that his al-Qaeda network had procured nuclear and chemical weapons.² There are doubts as to the validity of these claims, although there have been persistent reports in recent years of al-Qaeda operatives seeking to obtain such weapons.³ President George W Bush warned earlier in November that:

We have seen the true nature of these terrorists, and the nature of their attacks. They’re seeking chemical, biological and nuclear weapons. Given the means, our enemies would be a threat to every nation and eventually, to civilisation itself.⁴

The British government has also indicated its concern over the threat. Prime Minister Tony Blair declared in late October 2001 that: “There is little doubt in my mind that if the bin Laden network could acquire devastating weapons of mass destruction, it would use them.”⁵

Parts VI and VII of the *Anti-Terrorism, Crime and Security Bill* would strengthen existing legislation controlling chemical, nuclear and biological weapons, and tighten controls on access to pathogens and toxins used in research laboratories in the United Kingdom.

¹ More detail on the various international arms control agreements relating to WMD can be found in Library Standard Note, *Arms Control and Weapons of Mass Destruction*, 28 August 2001.

² *Independent on Sunday*, 11 November 2001

³ See for example ‘Osama’s Endgame’, *Time*, 15 October 2001. For more detail on the al-Qaeda network and WMD, see Chapter III of Library Research Paper 01/72, *11 September 2001: the response*, 3 October 2001, and Chapter VII of Library Research Paper 01/81, *Operation Enduring Freedom and the Conflict in Afghanistan: An Update*, 31 October 2001.

⁴ *Independent*, 7 November 2001

⁵ Interview with the *Daily Telegraph*, 25 October 2001

II Part VI - Weapons of Mass Destruction

Part VI of the *Anti-Terrorism, Crime and Security Bill* would strengthen existing legislation controlling chemical, nuclear and biological weapons. According to the Home Office Press Notice issued on 13 November, the Bill will:

Make it an offence to aid or abet the overseas use or development of chemical, nuclear, biological or radiological weapons. It will also introduce offences for biological and nuclear weapons equivalent to those in the Chemical Weapons Act 1996.⁶

For the purposes of Part VI of the Bill, a United Kingdom person is defined as a United Kingdom national, a Scottish partnership or a body incorporated under the law of a part of the United Kingdom. UK nationals include individuals who are British citizens, British Dependent Territories citizens, British Nationals (Overseas), British overseas citizens, or who are British subjects under the *British Nationality Act 1981*, or who are British protected persons under that Act.

A. Amendments to the *Biological Weapons Act 1974*

1. Background: treaty

The *Biological Weapons Act 1974* implements in the UK the provisions of the 1972 *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction* (commonly known as the 'Biological and Toxin Weapons Convention').

The Biological and Toxin Weapons Convention (BWC) was opened for signature on 10 April 1972 and entered into force on 26 March 1975. It currently has around 144 States Parties. It complements the 1925 Geneva Protocol⁷ (which banned the use in war of chemical and biological weapons) by banning in addition the development, production or stockpiling of biological and toxin agents. The *SIPRI Yearbook 2000* summarises the provisions of the BWC as follows:

The convention prohibits the development, production, stockpiling or acquisition by other means or retention of microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification of prophylactic, protective or other peaceful purposes, as well as weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.⁸

⁶ Home Office Press Notice, 13 November 2001

⁷ Full title: *Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare*.

⁸ *SIPRI Yearbook 2000*, p.700, produced by the Stockholm International Peace Research Institute.

However, unlike the Chemical Weapons Convention, which was concluded over two decades later, the BWC contains no verification provisions to ensure compliance. During the early 1990s it emerged that the USSR had continued with an extensive biological weapons programme for over two decades in blatant violation of the BWC. These revelations, coupled with concern over Iraq's efforts to develop a biological weapons capability, created pressure for negotiations on some form of effective verification regime to ensure compliance with the BWC.

At a review conference on the BWC in 1996 the States Parties agreed to establish an ad hoc Group to negotiate a draft verification protocol. The talks showed signs of significant progress during early 2001, although developments were hampered by difficulties associated with the dual-use nature of biological agents and the equipment used to produce them. One key dilemma highlighted by representatives of the biotechnology industry has been how to introduce effective verification measures without jeopardising legitimate commercial interests and revealing trade secrets.

The process was dealt a serious blow in late July 2001 when the United States indicated it was unable to support the draft text under discussion. The chief US negotiator, Donald Mahley, declared that: "In our assessment, the draft protocol would put national security and confidential business information at risk."⁹ Other States, including the United Kingdom, have indicated their intention to continue with negotiations, although some commentators believe the withdrawal of the US has damaged the process irreparably.

2. Proposed amendments to the Act

Under Section 1 of the *Biological Weapons Act 1974*, it is an offence for any person to develop, produce, stockpile, acquire or retain:

- (a) any biological agent or toxin of a type and in a quantity that has no justification for prophylactic, protective or other peaceful purposes; or
- (b) any weapon, equipment or means of delivery designed to use biological agents or toxins for hostile purposes or in armed conflict.¹⁰

Under the Act, a person guilty of such an offence would be liable on conviction on indictment to imprisonment for life.

⁹ BBC News web site at <http://news.bbc.co.uk>, 25 July 2001

¹⁰ Section 1, *Biological Weapons Act 1974*

The proposed amendments to the *Biological Weapons Act 1974* contained in the *Anti-Terrorism, Crime and Security Bill* include the following provisions:

- To make it an offence to transfer biological agents or toxins outside the UK or to assist another person to do so (**Clause 43**);
- To extend UK jurisdiction to cover offences under the 1974 Act carried out overseas by a United Kingdom person (**Clause 44**);
- To make it an offence for a UK person to assist or induce a foreigner to carry out an act that would be contrary to Section 1 of the 1974 Act (**Clause 50**). Proceedings for any such offence could be taken in the UK, and the offence could for incidental purposes be treated as having been committed in the UK (**Clause 51**). Prosecutions under Clause 50 in England and Wales and in Northern Ireland would require the consent of the appropriate Attorney General (**Clause 55**);
- To give powers of entry under warrant to constables and officers of the Secretary of State to search for evidence for the commission of an offence (**Clause 52**);
- To permit Customs and Excise Commissioners to enforce offences under the 1974 Act in cases involving the movement of a biological weapon across a border (**Clause 45**).

B. Amendments to the *Chemical Weapons Act 1996*

1. Background: treaty

The *Chemical Weapons Act 1996* implements in the UK the provisions of the 1993 *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction* (commonly known as the ‘Chemical Weapons Convention’).

The Chemical Weapons Convention (CWC) was opened for signature on 13 January 1993. It entered into force on 29 April 1997 following ratification by the requisite number of States (65). It currently has around 129 States Parties. The UK’s instrument of ratification was deposited with the UN on 13 May 1996.¹¹

The CWC was the first treaty in history to ban the development, production, stockpiling, transfer and use of an entire category of weapons, and to lay down a strict verification regime to ensure compliance and monitor the production of chemicals that potentially could be diverted for use in weapons. Compliance is monitored by the Organisation for the Prohibition of Chemical Weapons (OPCW), which is based in The Hague. OPCW is responsible for verifying destruction programmes, inspecting all military facilities and civilian plants producing chemicals that could be used for armaments and carrying out routine monitoring and random checks on other civilian chemical installations.

¹¹ For more information on the treaty and the UK process of ratification, see Library Research Paper 95/116, *The Chemical Weapons Bill*, 21 November 1995.

2. Proposed amendments to the Act

Under Section 2 of the *Chemical Weapons Act 1996*, it is an offence for any person:

- (a) to use a chemical weapon;
- (b) to develop or produce a chemical weapon;
- (c) to have a chemical weapon in his possession;
- (d) to participate in the transfer of a chemical weapon;
- (e) to engage in military preparations, or in preparations of a military nature, intending to use a chemical weapon.¹²

A person found guilty of such an offence would be liable on conviction on indictment to imprisonment for life.

The *Chemical Weapons Act 1996* is more comprehensive than the *Biological Weapons Act 1974*, and already contains provisions that

- make it an offence to participate in the transfer of a chemical weapon (Section 2 Subsections (1)(d) and (4) and (5) of the 1996 Act);
- extend UK jurisdiction to cover offences under the Act carried out overseas by a United Kingdom person (Section 3 of the 1996 Act).

The proposed amendments to the *Chemical Weapons Act 1996* contained in the *Anti-Terrorism, Crime and Security Bill* include the following provisions:

- To make it an offence for a UK person to assist or induce a foreigner to carry out an act that would be contrary to Section 2 of the 1996 Act (**Clause 50**). Proceedings for any such offence could be taken in the UK, and the offence could for incidental purposes be treated as having been committed in the UK (**Clause 51**). Prosecutions under Clause 50 in England and Wales and in Northern Ireland would require the consent of the appropriate Attorney General (**Clause 55**);
- To give powers of entry under warrant to constables and officers of the Secretary of State to search for evidence for the commission of an offence (**Clause 52**);
- To permit Customs and Excise Commissioners to enforce offences under the 1996 Act in cases involving the movement of a chemical weapon across a border (**Clause 46**);

¹² Section 2 of the *Chemical Weapons Act 1996*

C. Nuclear Weapons

Unlike the provisions that exist with regard to chemical and biological weapons, there is currently no legislation prohibiting the development, production, transfer or possession of nuclear weapons. The *Anti-Terrorism, Crime and Security Bill* seeks to change that state of affairs.

Clause 47 of the Bill would make it an offence to:

- (a) knowingly cause a nuclear weapon explosion;
- (b) develop or produce, or participate in the development or production of, a nuclear weapon;
- (c) possess a nuclear weapon;
- (d) participate in the transfer of a nuclear weapon;
- (e) engage in military preparations, or in preparations of a military nature, intending to use, or threaten to use, a nuclear weapon.

A person guilty of such an offence would be liable on conviction on indictment to imprisonment for life (**Clause 47 (5)**). Under the terms of the Bill, a 'nuclear weapon' is taken to include a nuclear explosive device that is not intended for use as a weapon (**Clause 47 (6)**). The provisions of the Bill with regard to nuclear weapons would also apply to acts carried out by a United Kingdom person outside the UK (**Clause 47 (7)**).

The provision that would make it an offence knowingly to cause a nuclear weapon explosion would cease to have effect once the *Nuclear Explosions (Prohibition and Inspections) Act 1998* comes into force (**Clause 47 (8)**). The 1998 Act implements in the UK the provisions of the *Comprehensive Nuclear Test Ban Treaty* (CTBT), which has yet to enter into force. It is currently awaiting ratification by the United States.¹³ Once in force, Section 1 of the 1998 Act will make it an offence, punishable by life imprisonment, to cause a nuclear weapon test explosion or any other nuclear explosion, other than one carried out in the course of an armed conflict.¹⁴

Clause 48 introduces exceptions to the provisions contained in Clause 47 to allow the use of nuclear weapons by the United Kingdom in the course of an armed conflict or under authorisation of the Secretary of State. The Bill would allow the Secretary of State to authorise any act that would otherwise contravene the provisions of Clause 47 in such manner and on terms as he thinks fit. The Secretary of State would also be authorised to determine whether an offence was committed in the course of an armed conflict.

¹³ For more information on the on the treaty and the UK process of ratification, see Library Research Paper 97/111, *The Nuclear Explosions (Prohibition and Inspections) Bill [HL]*, 31 October 1997. Details on the reasons for the delay in ratification by the United States can be found in Library Standard Note *Arms Control and Weapons of Mass Destruction*, 28 August 2001

¹⁴ See p.15 of Library Research Paper 97/111.

Clause 54 (1) would make it an offence to make recklessly a false or misleading statement in order to secure an authorisation from the Secretary of State for the use of a nuclear weapon. Such an offence would carry a sentence of up to two years imprisonment and a fine (**Clause 54 (2)**). In addition to provisions relating to corporate responsibility, **Clause 54 (3)** lays out the individual liability of the relevant senior office holder in a body corporate, when that body commits such an offence.

Under **Clause 49 (1)** a person accused of possessing, or participating in the transfer of, a nuclear weapon may claim as a defence that he did not know, or had no reason to believe, that the object in question was a nuclear weapon. The accused could also claim as a defence that he took steps, as soon as reasonably practicable, to inform the authorities once he had become aware that the object in question was a nuclear weapon (**Clause 49 (3)**).

In addition to the above measures, the Bill would introduce the following provisions:

- To make it an offence for a UK person to assist or induce a foreigner to carry out an act that would constitute an offence under Clause 47 of the Bill (**Clause 50**). Proceedings for any such offence could be taken in the UK, and the offence could for incidental purposes be treated as having been committed in the UK (**Clause 51**). Prosecutions under Clause 50 in England and Wales and in Northern Ireland would require the consent of the appropriate Attorney General (**Clause 55**);
- To give powers of entry under warrant to constables and officers of the Secretary of State to search for evidence for the commission of an offence (**Clause 52**);
- To permit Customs and Excise Commissioners to enforce offences under Clauses 47 and 50 that involve the movement of a nuclear weapon across a border (**Clause 53**);

III Part VII - Laboratory Security

The Advisory Committee on Dangerous Pathogens (ACDP) is a non-statutory advisory quango, or non-departmental public body.¹⁵ The ACDP has produced information on pathogens and established a ranking system.

The latest edition [of “Categorisation of biological agents according to hazard and categories of containment”] contains practical standards for the safe conduct of work with infectious biological agents, in particular in laboratories to align with the changes in the COSHH¹⁶ Regulations 1999 brought about by implementation of European Community Directives 90/679/EEC (on the protection of workers from risks related to biological agents at work) and 93/88/EEC (which contains a Community classification of biological agents).¹⁷

A Health and Safety Executive publication available on the internet provides a guide to the class and hazard level of known pathogens.¹⁸ The supply of pathogens to laboratories requires those laboratories to have suitable facilities for the containment of those pathogens and such laboratories have to be registered with the HSE in order to be supplied with pathogens. Thus the supply of pathogens to research laboratories has some restriction at the beginning of the process. The focus however is still on ensuring that the pathogens are contained and that workers do not become unnecessarily exposed. Obviously unauthorised laboratories are unlikely to receive starter cultures of pathogens from authorised suppliers but there is nothing in place to prevent unauthorised persons from accessing such laboratories in order to obtain cultures.

ACDP defines four Containment Levels for laboratory work, each Containment Level being appropriate to work involving pathogen(s) from the equivalent Hazard Group. Thus organisms categorised as Hazard Group 1 (lowest hazard rating) should normally be handled in Laboratory Containment Level One facilities, and likewise up to Hazard Group 4 (highest hazard rating) in Containment Level Four facilities. Hazard Groups 1 to 4 are defined as follows; for the purposes of these definitions, “disease” refers to disease caused by infection:

- **Hazard Group 1:** A biological agent unlikely to cause human disease.
- **Hazard Group 2:** A biological agent that can cause human disease and may be a hazard to employees; it is unlikely to spread to the community and there is usually effective prophylaxis or effective treatment available.

¹⁵ <http://www.doh.gov.uk/acdp.htm>

¹⁶ *Control of Substances Hazardous to Health Regulations 1999*,
<http://www.hmso.gov.uk/si/si1999/19990437.htm>

¹⁷ HSE Books *Categorisation of biological agents according to hazard and categories of containment*. Fourth edition 1995

¹⁸ <http://www.hse.gov.uk/hthdir/noframes/agent1.pdf>

- **Hazard Group 3:** A biological agent that can cause severe human disease and presents a serious hazard to employees; it may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available.
- **Hazard Group 4:** A biological agent that causes severe human disease and is a serious hazard to employees; it is likely to spread to the community and there is usually no effective prophylaxis or treatment available.

Anthrax (*Bacillus anthracis*) is a good example of a hazard class 3 pathogen as it presents a serious hazard from exposure but is unlikely to spread quickly. In contrast smallpox (*Variola virus*) and Ebola viruses are hazard class 4 as they present a serious hazard and are likely to spread quickly among the community. Most of the pathogens subject to control under Part VII of the Bill have been assigned hazard classes as described (see table in Subsection 2 below).

1. Current controls

Controls on the use of hazardous pathogens in the UK have essentially been focussed on the safety of those working with the organisms and the containment of the pathogens within the research environment.

Work in microbiology laboratories and other laboratories where there may be exposure to biological agents (e.g. clinical laboratories) is covered by COSHH. There are around 230,000 people who work in biomedical sciences - with an estimated 12,500 scientists working in NHS laboratories. Infection rates are estimated as 162 per million per year in 1994/5, with the majority of these being associated with Hazard Group 2 pathogens in diagnostic laboratories.

The choice of laboratory control measures is largely based on the categorisation of biological agents into one of four hazard groups from 1 (lowest) to 4 (highest, e.g. Ebola and Lassa Fever). The UK categorisation is set out in guidance from the Advisory Committee on Dangerous Pathogens (ACDP) - this includes a formal HSC Approved List of Biological Agents.

There is also specific ACDP guidance on work in laboratories as well as guidance from the Health Services Advisory Committee (HSAC) on safe working in clinical laboratories.¹⁹

2. Proposed changes

The changes proposed in the *Anti-Terrorism, Crime and Security Bill* are focussed very much on a greater scrutiny of distribution of dangerous substances and making it more difficult to access areas where such agents are stored and used. The pathogens and toxins affected are specified in Schedule 5 of the Bill, and are shown in the table below,

¹⁹ <http://www.hse.gov.uk/hthdir/noframes/biolhaz.htm>

classified with their ACDP hazard group. Further substances may be added to the list by order of the Secretary of State. The list of substances has been broken down into viruses,²⁰ rickettsiae,²¹ bacteria²² and toxins.²³

Nature of substance	Hazard Group	
VIRUSES	Chikungunya virus	3
	Congo-crimean haemorrhagic fever virus	4
	Dengue fever virus	3
	Ebola virus	4
	Hantaan virus	3
	Japanese encephalitis virus	3
	Junin virus	4
	Lassa fever virus	4
	Lymphocytic choriomeningitis virus	3
	Machupo virus	4
	Marburg virus	4
	Monkey pox virus	3
	Rift Valley fever virus	3
	Tick-borne encephalitis virus (Russian Spring-Summer encephalitis virus)	4
	Variola virus	4
White pox	4	
Yellow fever virus	3	
RICKETTSIAE	<i>Coxiella burnetii</i>	3
	<i>Bartonella quintana</i> (<i>Rochalimea quintana</i> , <i>Rickettsia quintana</i>)	2
	<i>Rickettsia prowazeki</i>	3
	<i>Rickettsia rickettsii</i>	3
BACTERIA	<i>Bacillus anthracis</i> (anthrax)	3
	<i>Brucella abortus</i>	3
	<i>Brucella melitensis</i>	3
	<i>Brucella suis</i>	3
	<i>Chlamydia psittaci</i>	3
	<i>Clostridium botulinum</i>	2
	<i>Francisella tularensis</i> Type A	3
	<i>Francisella tularensis</i> Type B	2
	<i>Burkholderia mallei</i> (<i>Pseudomonas mallei</i>)	3
	<i>Burkholderia pseudomallei</i> (<i>Pseudomonas pseudomallei</i>)	3
	<i>Salmonella typhi</i>	3
	<i>Shigella dysenteriae</i> Type 1	3
	<i>Shigella dysenteriae</i> Other Types	2
<i>Vibrio cholerae</i>	2	
<i>Yersinia pestis</i>	3	

²⁰ An organism that can only reproduce in a parasitic fashion within other organisms cells.

²¹ These are bacteria that cannot survive outside the cells of animals. The bacteria are passed on by, for example, the bites of ticks and mosquitoes.

²² Small single celled organisms that multiply by cell division and do not possess a nucleus.

²³ Any poisonous agent, especially a poisonous substance produced by one living organism that is poisonous to other organisms.

The equine encephalitis viruses are not mentioned in the published list. As might be expected of a list of hazardous pathogens none of the toxins in the Schedule are given a hazard class. No toxin could be classified as class 4 as unlike pathogens, toxins do not spread through a population, reproducing over time. The toxins included are produced by micro-organisms that may also be included on the list though some, such as *Staphylococcus aureus* are not. *Staphylococcus aureus* is a micro-organism that can be isolated from the skin surface and so unsuitable for containment legislation. The restricted toxins are:

Botulinum toxins
 Shiga toxin
 Conotoxin
 Ricin
 Saxitoxin
 Clostridium perfringens toxins
 Staphylococcus aureus toxins
 Tetrodotoxin
 Verotoxin
 Microcystin (Cyanginosin)
 Aflatoxins

Clause 59 will require owners of premises to inform the Secretary of State of intent to keep or use dangerous substances within those premises. Similar information will be required to be made available to a chief of police under **clause 60** including measures taken to ensure the security of the dangerous substance. **Clause 62** will provide the police with the power to demand measures to ensure the security of premises keeping or using dangerous substances.

Premises that hold dangerous substances will need to keep detailed records of those people that have access to the premises as **clause 61** will require them to provide that information, under request, to the police. New people will not normally be allowed access until 30 days after their details are submitted, enabling the police to vet them.²⁴ The Secretary of State, through **clause 64**, will be given the power to deny to particular individuals access to dangerous substances if he believes that to be in the national interest.

If the Secretary of State has reason to believe that security measures on a premises keeping or using a dangerous substance are not sufficient, **clause 63** will provide the power to direct the owner of the premises dispose of the substance. The direction from the Secretary of State may instead require the owner to allow a specified person to dispose of the dangerous substance. A person denied access, under the provisions of

²⁴ This period may be varied by order of the Secretary of State.

clause 70, would be able to appeal to the Pathogens Access Appeal Commission set up under the same clause.

All directions and notices made under the provisions of Part VII may be delivered by post (**clause 72**). **Clause 71** would provide the ability to appeal requirements or notices made under clauses 60, 62 and 63.

Clauses 65 and 66 would provide powers of entry and search. **Clause 65** would provide constables with the power to arrange times to enter and inspect premises that hold or use dangerous substances. **Clause 66** would provide a justice of the peace with the power to issue search warrants for premises:

- that are believed to hold dangerous substances but have not been so notified or
- that are failing to comply with security measures required of them.

Clause 67 would make it an offence not to comply with duties imposed by Part VII of the Bill punishable by imprisonment, a fine or both. **Clauses 68** and **69** would make provision for offences to be committed under the legislation by ‘bodies corporate’ and ‘partnerships and unincorporated associations’ respectively.

Finally, **clause 75** would enable the Secretary of State to extend the scope of Part VII beyond the (human) pathogens and toxins in Schedule 5 to animal and plant pathogens, pests or toxic chemicals. Such an extension would be carried out by statutory instrument under the affirmative procedure.

IV Potential Pathogen Threats

The United States Centers for Disease Control and Prevention (CDC)²⁵ names a number of pathogens considered to pose a risk because they:

- can be easily disseminated or transmitted person-to-person;
- cause high mortality, with a potential for major public health impact;
- might cause public panic and social disruption and
- require special action or public health preparedness²⁶

Those placed in the highest risk group are:

Bacillus anthracis (anthrax)

Clostridium botulinum toxin (botulism)

Yersinia pestis (plague)

Variola major (smallpox)

Francisella tularensis (tularemia)

Viral haemorrhagic fever

As anthrax and smallpox have been the most widely discussed potential threats in recent press coverage these have been expanded upon in the following sections.

1. Anthrax

Anthrax is considered a high risk pathogen in the context of bio-terrorism because of the relative ease with which it can be grown using commercially obtainable equipment, and the hardiness of the spores. Spores spread by aerosol have the potential to infect large numbers of people, but it is considered that bacterium would be hard to distribute in sufficient quantities to cause widespread infection within a population.

Importantly, anthrax is not spread from person to person. To be effective multiple victims would have to inhale the spores directly. Professor Harry Smith, emeritus professor of microbiology at Birmingham University and Chairman of the Royal Society's working group on biological weapons, considers that man is fairly resistant to anthrax and that

unlike nuclear warfare, high explosives and chemical warfare, the biological weapon has never been shown to be effective in the field.²⁷

²⁵ US Centers for Disease Control <http://www.bt.cdc.gov/Agent/Agentlist.asp>

²⁶ *ibid.*

²⁷ "Germ warfare expert plays down the threat of spores, *Daily Telegraph*, 10 October 2001

He has also cited an accident in 1979 when an unknown amount of spores escaped from a Russian military facility. The number of deaths, 77, was small in relation to the size of the exposed population of about a quarter of a million.²⁸

The organism

Anthrax is an acute infectious disease caused by the bacterium *Bacillus anthracis* and spread through its spores. It is primarily a disease of herbivorous animals but all mammals are susceptible to infection.

The bacillus is easy to grow in the laboratory, but is fragile and easily killed in the open. However, the bacillus produces a spore that is hardy. Spores can be found in animal products such as wool, hair, hides, skins, bonemeal and the carcasses of infected animals. Spores can contaminate soil and survive for many years. New areas of infection can arise through infected animal feed.²⁹ Although spores are extremely resistant to conditions such as heat and drying, they are relatively easily killed with dilute bleach.³⁰

Anthrax can be found globally. It is more common in developing countries or countries without veterinary public health programs. Certain regions of the world (South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East) report more anthrax in animals than others.

In the UK, anthrax is very rare and is almost entirely an occupational disease affecting workers handling infected animals or exposed to infected animal products. It is a notifiable disease; there were 14 notifications between 1981 and 2000. The last deaths in the UK were in 1974, and were associated with bone meal fertiliser.

Routine control measures include:

- Elimination of anthrax in farm animals
- Certification of imported high risk materials and appropriate disinfection
- Precautionary measures as outlined in the HSE Guidance Note EH23 *Anthrax Health Hazards*
- Information, instruction and training on risks
- High standards of personal hygiene by workers who may be at risk, and covering of cuts with waterproof dressings
- Immunisation for those in regular contact with potentially infective material³¹

²⁸ “Germ warfare expert plays down the threat of spores, *Daily Telegraph*, 10 October 2001

²⁹ Department of Health *Immunisation against infectious disease*, 1996, 13.3

³⁰ For environmental decontamination see “Provisional PHLS guidelines for action in the event of a deliberate release of anthrax” http://www.phls.co.uk/facts/deliberate_releases.htm

³¹ “Ministers seek to soothe fears of biological attack”, *The Independent*, 11 October 2001

Management of an outbreak under normal circumstances was set out by the Department of Health in 1996:

All cases of anthrax should be notified. An attempt should be made to confirm the diagnosis bacteriologically and the source of infection should be investigated. Penicillin is the treatment of choice. Skin lesions should be covered; any discharge or soiled dressings should be disinfected. Anthrax vaccine has no role in the management of a case or an outbreak.³²

The illness

Anthrax infection can occur in three forms depending on the route of entry into the body: cutaneous (skin), inhalation, and gastrointestinal. Symptoms usually occur within 7 days, but may take up to 2 months to develop in some cases. In the later stages of the illness the bacteria produce toxins which enter the blood and can cause haemorrhaging and tissue decay.

Cutaneous: Most (about 95%) anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the centre. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy.

Inhalation: Initial symptoms may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

Intestinal: The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterised by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, fever are followed by abdominal pain, vomiting of blood, and severe diarrhoea. Intestinal anthrax results in death in 25% to 60% of cases.³³

Diagnosis and Treatment

In the event of a suspected anthrax exposure, nasal swabs would be taken from those thought to be exposed, and they would be treated with antibiotics. Infection is confirmed by isolating *B. anthracis* from the blood, skin lesions, or respiratory secretions or by measuring specific antibodies in the blood.

³² Department of Health *Immunisation against infectious disease*, 1996, 13.3

³³ US Centers for Disease Control, http://www.cdc.gov/ncidod/dbmd/diseaseinfo/anthrax_g.htm, updated June 20 2001

In the early stages, symptoms can be difficult to distinguish from other less serious infections. Initial symptoms of inhalation anthrax are mild and non-specific and may include fever, malaise and mild cough or chest pain.

Anthrax is susceptible to a number of antibiotics. Ciprofloxacin is the treatment of choice. Inhalation anthrax progresses rapidly once symptoms develop, and early antibiotic use following exposure is essential to maximise the chances of survival.

Direct person-to-person spread of anthrax is extremely unlikely to occur. The US Centers for Disease Control advises that:

Direct person-to-person spread of anthrax is extremely unlikely, if it occurs at all. Therefore, there is no need to immunize or treat contacts of persons ill with anthrax, such as household contacts, friends, or coworkers, unless they also were also exposed to the same source of infection.

In persons exposed to anthrax, infection can be prevented with antibiotic treatment.

Early antibiotic treatment of anthrax is essential—delay lessens chances for survival. Anthrax usually is susceptible to penicillin, doxycycline, and fluoroquinolones.³⁴

Immunisation

An anthrax vaccine has been licensed in the UK since 1979, and is manufactured at the Centre for Applied Microbiology at Porton Down. A new vaccine is under development that is expected to enter clinical trials in the near future.³⁵

In the UK routine immunisation against anthrax is only recommended for those workers at risk of exposure to the disease (workers handling infected animals or exposed to infected animal products) and laboratory staff who work with the organism.³⁶ Military personnel considered at risk from biological weapons are also offered immunisation on the basis of voluntary informed consent.³⁷

Precautionary measures

The World Health Organisation has advised that public health authorities should have contingency plans prepared in case of a deliberate release of biological or chemical agents

³⁴ US Centers for Disease Control, Anthrax and bioterrorism, July 2000

³⁵ HC Deb 22 October 2001 c 1W

³⁶ Department of Health *Immunisation against infectious disease*, 1996, para 13.3

³⁷ HC Deb 8 March 2001 c 285-6W

against civilian populations, and has issued a working draft of WHO's technical guide "Health aspects of Biological and Chemical Weapons".³⁸

The UK has been working on contingency plans for some years. BBC Online reports that a Home Office and Department of Health exercise, Misty Scene, has been carried out to look at preparedness for an anthrax attack in the UK. This looked at diagnosis and identification of people affected, response of public health laboratories and NHS response.³⁹ However, information is considered sensitive and is not in the public domain.

Since 11 September hospitals have been asked to review their emergency planning responses and stocks of medical supplies and drugs.⁴⁰ No official information is available about vaccine stocks.⁴¹ Forty-nine laboratories of the Public Health Laboratory Service maintain surveillance and provide diagnostic experts.

General practitioners and other health care workers receive up to date advice from the chief Medical Officer via the Public Health link cascade.⁴² Clinical and public health guidance is available on the Public Health Laboratory Service website.⁴³ This includes disease facts and "PHLS Interim Guidelines for Action in the Event of a Deliberate Release" for Anthrax, Botulism, Plague and Smallpox.⁴⁴

Information for the general public is available through NHS Direct.⁴⁵

NHS guidance on planning for major incidents is issued by the Department of Health.⁴⁶ The Department has also issued guidance to the NHS to help plan health service response in the event of deliberate release of biological and chemical agents.⁴⁷ Procedures in the event of release of a biological agent are included in the *Guide to a co-ordinated response to a hazardous material (HAZMAT) incident*.⁴⁸

³⁸ *Health aspects of biological and chemical weapons*, unedited, unofficial draft, World Health Organisation, issued 15 September 2001, to be finalised in December 2001
http://www.who.int/emc/pdfs/BIOWEAPONS_FULL_TEXT2.pdf

³⁹ "Doctors plan bioterror response" BBC News online 18 September 2001

⁴⁰ "Hospitals get ready for germ warfare", *The Scotsman*, 27 September 2001

⁴¹ Department of Health official, personal communication, 9 October 2001

⁴² Public Health Link, "Anthrax case in Florida, USA, 11 October 2001, CEM/CMO/2001/13

⁴³ <http://www.phls.co.uk>

⁴⁴ http://www.phls.co.uk/facts/deliberate_releases.htm

⁴⁵ Telephone 0845 4647

⁴⁶ <http://www.doh.gov.uk/epcu/epcu/>

⁴⁷ *Deliberate Release of Biological and Chemical Agents*, Department of Health, March 2000. This document has a restricted security classification.

⁴⁸ <http://www.doh.gov.uk/epcu/pdf/hazmat.pdf>

The Civil Contingencies Secretariat has issued (19 October 2001) guidance for local authorities which has been in development since before the current circumstances arose, entitled “*Response to the Deliberate Release of Chemicals and Biological Agents: Guidance for Local Authorities.*”⁴⁹

The Secretary of State for Health, Alan Milburn, has stressed that there is no specific credible threat to the UK, but it is the Government’s responsibility to prepare for all outcomes.⁵⁰ On 11 October 2001, Mr Milburn signed an agreement of “Collaboration in Improving Public Health Responses to Emergencies” with the US Centers for Disease Control and Prevention, to improve early detection and control of infectious diseases.⁵¹

Mr Milburn commented:

It might be useful and for the benefit of the House if I set out what we have done more generally since the appalling events of 11 September. First, since the atrocities took place, the chief medical officer has reviewed all our plans for protecting the public from any possible biological or chemical attack. Secondly, extensive contingency planning is already in place based on guidance that we issued to the NHS last year, well before the appalling events in New York, Washington and elsewhere in America. New guidance has been issued and we are planning to issue still further guidance.

Thirdly, we have taken the appropriate steps to secure additional supplies of drugs and equipment for use in an emergency. Fourthly, we have cascaded details to doctors about how they can access information from the Public Health Laboratory Service website on signs and symptoms of anthrax. Finally, as the hon. Gentleman is aware, I signed in Washington last week a joint United Kingdom-United States agreement on protecting our people from bio-terrorism by pooling our intelligence, our expertise and our planning.

...The best intelligence that we have is that it would be extremely difficult for anyone to deliver a quantity of anthrax sufficient to harm a large number of people.

...I know that many people on both sides of the Atlantic fear both the prospect of further terrorist attacks and the form that they might take. We all understand those concerns, but as the hon. Gentleman rightly says, it is important that fear does not win. Fear is the terrorists’ victory. I repeat: there is no need for public panic. Our response--all our responses--in the House, among the public and in the media is and must be proportionate. Our duty is to go on planning for all eventualities.⁵²

⁴⁹ “Response to the Deliberate Release of Chemicals and Biological Agents: Guidance for Local Authorities”, <http://www.lga.gov.uk/lga/publicprotection/biological.htm>

⁵⁰ “Ministers seek to soothe fears of biological attack”, *The Independent*, 11 October 2001

⁵¹ *ibid.*

⁵² HC Deb 16 October 2001 c 1049

2. Smallpox

Smallpox virus (*variola major*) is considered a bioterrorism threat because of its potential to cause severe illness with a high death rate in a non-immune population and because it can be transmitted by the airborne route. The infectious dose is small. Importantly, person to person transmission of the virus occurs. A single case is considered a public health emergency.

Depending on the conditions, viruses can survive for long periods of time in dry scabs (13 years has been documented), and in refrigerated cultures. However, in normal environmental conditions, the virus is highly unlikely to survive for more than 48 hours.

The illness and treatment

The incubation period is about 12 days (range: 7 to 17 days) following exposure. Initial symptoms resemble those of other acute viral illnesses, and include high fever, fatigue, and head and back aches. A characteristic rash, most prominent on the face, arms, and legs, follows in 2-3 days. The rash starts with flat red lesions that evolve at the same rate. Lesions become pus-filled and begin to crust early in the second week. Scabs develop and then separate and fall off after about 3-4 weeks.

There is no proven treatment for smallpox but research to evaluate new antiviral agents is ongoing. Patients with smallpox can benefit from supportive therapy (intravenous fluids, medicine to control fever or pain, etc.) and antibiotics for any secondary bacterial infections that occur. Vaccination in the first four days of the incubation period can modify the course of the disease and reduces mortality.

Estimates of mortality are complicated by the fact that documented epidemics were always modified either by the presence of some immune individuals in a population or by interventional immunisation. Also, some strains of variola were highly virulent (*variola major*) and others much less so (*variola minor*). Mortality in natural epidemics was reported as 15-50% for *variola major* and nearer to 1% for *variola minor*. Importation into naïve populations (e.g., Shetland Islands or among native Americans), was reported to cause 50-90% mortality. The highest mortality was seen in children aged less than 1 year and in the elderly.⁵³

⁵³ 'Interim guidelines in the event of a deliberate release – smallpox', Public Health Laboratory Service, issued 17 October 2001, http://www.phls.co.uk/advice/smallpox_guidelines.pdf

Transmission

Smallpox is spread from one person to another by respiratory droplets. Skin lesions and secretions are also infectious. Patients with smallpox become infectious at the onset of feverish illness and remain so until their scabs separate (about three weeks). They are most infectious during the first week of illness, because that is when the largest amount of airborne virus is produced.

Immunisation

Routine public vaccination ended in the 1970s. In normal circumstances, vaccination is now only indicated for workers in laboratories where pox viruses are handled, and others whose work involves an identifiable risk of exposure to pox virus.⁵⁴

Most people born in the UK over the age 25-30 will have been vaccinated. However, although some degree of protection may remain, smallpox vaccination does not confer a life-long immunity, and vaccinated individuals are still susceptible to the disease.

The most effective countermeasure against smallpox is vaccination before exposure. Vaccination takes eight to ten days to become effective. Previously vaccinated individuals may have an 'accelerated' response. In people exposed to smallpox, the vaccine can lessen the severity of or even prevent illness if given within 4 days after exposure. Vaccine against smallpox contains another live virus called vaccinia. The vaccine does not contain smallpox virus.

Side effects of vaccination can be severe, but are considered acceptable in the face of exposure or an epidemic. These include dissemination of the vaccinia virus in eczematous skin, development of skin ulcers, post vaccination encephalopathy and fetal damage in pregnant women.

WHO review of vaccination

The World Health Organisation (WHO) has looked again at whether to call on countries to resume inoculations against smallpox because of its possible use as a weapon. Guidance was issued on 26 October 2001.

In summary, the guidance is that vaccination of entire populations is not recommended. The reason for not recommending such mass vaccination is that there is a risk of severe reactions to the vaccine, including death, and the fact that vaccination can prevent smallpox even after exposure to the virus. Up to now the guidance has also stated that only those with suspected exposure to smallpox or a related virus should be vaccinated. That has not changed. However, the review recommends increasing attention being given

⁵⁴ Department of Health, *Immunisation against infectious disease*, 1996, para 29.1

to the extent and quality of existing vaccine stocks, and to the possible need both to stimulate vaccine production and increase stocks of vaccine for use in the event of an outbreak. The conclusion of the review states that:

Existing vaccines have proven efficacy but also have a high incidence of adverse side-effects. The risk of adverse events is sufficiently high that mass vaccination is not warranted if there is no or little real risk of exposure. Individual countries that have reason to believe that their people face an increased risk of smallpox because of deliberate use of the virus are considering options for increasing their access to vaccines. The vaccines would be given to people who are at risk of exposure to smallpox, including health and civil workers, and would be used in a search and containment exercise should an outbreak occur.⁵⁵

UK guidelines

The UK Public Health Laboratory Service guidelines with respect to vaccination in the event of exposure to smallpox is as follows:

Successful immunisation in the past two to three years reduces the attack rate for smallpox to below 10%, and the mortality to less than 1% in most studies. Vaccination after exposure is also effective in reducing the attack rate, and the severity of those cases that occur despite early immunisation.

The principle is that only those who have been, or are likely to be exposed in the course of their work, and those who have shared the same house or the same room at the time of exposure to the virus, including exposure to a symptomatic case, should be vaccinated. **Detailed advice on who should receive vaccine will be provided via PHLS-CDSC and the Department of Health in the event of any suspicion of smallpox.**

2.4.2 Efficacy of vaccine

The effectiveness of vaccine in the **first four days after exposure** is difficult to assess, but it probably reduces the attack rate by 24% to 50%. It certainly reduces the severity of attacks which occur, changing the percentage of mild or abortive cases from 5 or 6% in the unvaccinated to over 60% in those successfully vaccinated after exposure.

⁵⁵ “World Health Organisation announces updated guidance on smallpox vaccination”, Statement to the press by the Director General of the World Health Organisation Dr Gro Harlem Brundtland, WHO/16, 26 October 2001

Vaccination should be given to the groups of frontline workers who:

- Enter the exposed zone.
- Are involved in decontamination of exposed persons or handling of exposed clothing and fomites.⁵⁶
- Attend smallpox patients in hospital, or handle contaminated clothing, bed linen and fomites.

Vaccination should also be given to laboratory staff who handle specimens from smallpox patients, and mortuary workers involved in disposal of the deceased.⁵⁷

⁵⁶ Any object exposed by patient contact e.g. towels etc.

⁵⁷ 'Interim guidelines in the event of a deliberate release – smallpox', Public Health Laboratory Service, issued 17 October 2001, http://www.phls.co.uk/advice/smallpox_guidelines.pdf