Revised forms for the submission of the Confidence-Building Measures

At the Third Review Conference it was agreed that all States Parties present the following declaration, later amended by the Seventh Review Conference:

Declaration form on Nothing to Declare or Nothing New to Declare for use in the information exchange

Measure	*Nothing to declare*	*Nothing new to declare*	*Year of last declaration if nothing new to declare*
A, part 1			
A, part 2 (i)			
A, part 2 (ii)			
A, part 2 (iii)			
B			
C			
E			
F		X	2011
G			

(Please mark the appropriate box(es) for each measure with a tick, and fill in the year of last declaration in the last column where applicable.)

Date: Wednesday, April 3, 2019

State Party to the Convention: United Kingdom of Great Britain and Northern Ireland

Date of ratification/accession to the Convention: Wednesday, March 26, 1975

National point of contact:

James McCormick (Counter Proliferation and Arms Control Centre) - James.Mccormick@fco.gov.uk
Head of Chemical and Biological Weapons Section

Address: Based in Ministry of Defence, Whitehall, London, SW1A 2HB

Telephone: +44 (0)20 7008 2489

Active promotion of contacts

The Third Review Conference agreed that States parties continue to implement the following:

"Active promotion of contacts between scientists, other experts and facilities engaged in biological research directly related to the Convention, including exchanges and visits for joint research on a mutually agreed basis."

In order to actively promote professional contacts between scientists, joint research projects and other activities aimed at preventing or reducing the occurrence of ambiguities, doubts and suspicions and at improving international cooperation in the field of peaceful bacteriological (biological) activities, the Seventh Review Conference encouraged States parties to share forward looking information, to the extent possible,

- on planned international conferences, seminars, symposia and similar events dealing with biological research directly related to the Convention, and

- on other opportunities for exchange of scientists, joint research or other measures to promote contacts between scientists engaged in biological research directly related to the Convention,

including through the Implementation Support Unit (ISU) within the United Nations Office for Disarmament Affairs.

Confidence-Building Measure "A"

Part 1 Exchange of data on research centres and laboratories

At the Third Review Conference it was agreed that States Parties continue to implement the following:

"Exchange of data, including name, location, scope and general description of activities, on research centres and laboratories that meet very high national or international safety standards established for handling, for permitted purposes, biological materials that pose a high individual and community risk or specialize in permitted biological activities directly related to the Convention."

Modalities

The Third Review Conference agreed on the following, later amended by the Seventh Review Conference:

Data should be provided by States Parties on each facility, within their territory or under their jurisdiction or control anywhere, which has any maximum containment laboratories meeting those criteria for such maximum containment laboratories as specified in the latest edition of the WHO[1] Laboratory Biosafety Manual and/or OIE [2] Terrestrial Manual or other equivalent guidelines adopted by relevant international organisations, such as those designated as biosafety level 4 (BL4, BSL4 or P4) or equivalent standards.

States Parties that do not possess a facility meeting criteria for such maximum containment should continue to Form A, part 1 (ii).

Form A, part 1 (i)

Exchange of data on research centres and laboratories [3]

1. Name(s) of facility [4]:
Defence Science and Technology Laboratory (Dstl), Porton Down

[Declared in accordance with Form A Part 2(iii)]

2. Responsible public or private organization or company:
Ministry of Defence (MOD)

3. Location and postal address:
Dstl, Porton Down, Salisbury, Wiltshire, SP4 0JQ

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence:

Largely financed by the MOD

5. Number of maximum containment units [5] within the research centre and/or laboratory, with an indication of their respective size (SqM):

BL 4: 335 SqM
2 Containment Level 4 (CL4) labs, 335m2 total

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate:

Research and development into protective measures as defence against the hostile use of micro-organisms and toxins

1. Name(s) of facility [4]:

Public Health England - Colindale

2. Responsible public or private organization or company:

Public Health England, an executive agency of the UK Department of Health & Social Care

3. Location and postal address:

Public Health England, 61 Colindale Avenue, London, NW9 5EQ

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence:

The UK Department of Health funds this activity as part of its finance of Public Health England's facility at Colindale, London NW9.

5. Number of maximum containment units [5] within the research centre and/or laboratory, with an indication of their respective size (SqM):

BL 4: 30 SqM
1 unit

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate:

This laboratory is used to provide diagnostic services for Herpes B; viral haemorrhagic fever infections: Lassa fever, Ebola, Marburg, Congo-Crimean haemorrhagic fever; avian influenza and SARS. To support diagnostic services a programme of applied diagnostic research and development is conducted.

1. Name(s) of facility [4]:

Public Health England – Porton

2. Responsible public or private organization or company:

Public Health England, an executive agency of the UK Department of Health & Social Care

3. Location and postal address:

Public Health England, Porton Down, Salisbury, Wiltshire, SP4 0JG

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence:

The UK Department of Health funds this activity as part of its finance of Public Health England's facility at Porton Down.

5. Number of maximum containment units [5] within the research centre and/or laboratory, with an indication of their respective size (SqM):

BL 4: 59 SqM
BL 4: 46 SqM

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate:

This laboratory is used to provide diagnostic services for Herpes B; diagnosis and research into various containment level 4 viruses including Lassa, Ebola, Marburg and other haemorrhagic fever viruses.

1. Name(s) of facility [4]:

National Institute for Biological Standards and Control

2. Responsible public or private organization or company:

The Medicines and Healthcare products Regulatory Agency, a Non-Departmental Public Body of the UK Department of Health & Social Care

3. Location and postal address:

Blanche Lane, South Mimms, Potters Bar, Hertfordshire, EN6 3QG

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence:

UK Government (Health and Home Office)

University of Wisconsin, US (Bill and Melinda Gates Foundation)

BARDA (Biomedical Advanced Research and Development Authority, US)

EU Seventh Framework Programme collaborative project, FP7 UNISEC 602012. (to identify, develop and clinically test the most promising leads for a universal influenza vaccine)

5. Number of maximum containment units [5] within the research centre and/or laboratory, with an indication of their respective size (SqM):

BL 4: 59 SqM
BL 4: 59 SqM

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate:

In general, the activities are related to development of assays and testing of reagents. During 2018 active projects involving the following organisms were undertaken:

Highly pathogenic influenza virus – novel vaccine protection studies; H7N9 reagent development and associated research.

Bacillus anthracis toxins – made available for vaccine testing, reagent development, development of in vitro assays to detect anthrax toxin neutralising antibodies.

Botulinum toxins (serotypes A, B, E) - laboratory testing of therapeutic anti-toxins; development of cell-based assays for clostridial toxins.

1. Name(s) of facility [4]:

The Francis Crick Institute Containment 4 facility

2. Responsible public or private organization or company:

Charity

3. Location and postal address:

The Francis Crick Institute, 1 Midland Road, London, NW1 1AT

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence:

Medical Research Council

5. Number of maximum containment units [5] within the research centre and/or laboratory, with an indication of their respective size (SqM):

BL 4: 298 SqM

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate:

Research and diagnostics on highly pathogenic avian influenza virus

1. Name(s) of facility [4]:

The Pirbright Institute

2. Responsible public or private organization or company:

The Pirbright Institute

3. Location and postal address:

The Pirbright Institute, Pirbright, Woking, Surrey, GU24 0NF

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence:

Biotechnology and Biological Sciences Research Council

Department for Environment, Food & Rural Affairs (Defra)

European Union

Food and Agriculture Organization of the United Nations (FAO)

World Organisation for Animal Health (OIE)

Bill and Melinda Gates Foundation

US Defense Advanced Research Projects Agency

US National Institutes of Health

The Pirbright Institute is not in receipt of Ministry of Defence funding.

5. Number of maximum containment units [5] within the research centre and/or laboratory, with an indication of their respective size (SqM):

BL 3: 413 SqM

No ACDP Containment Level (CL) 4 laboratories; 413m2 of ACDP CL3 laboratories excluding plant; 257m2 of SAPO† Level 4, ACDP CL3 laboratories excluding plant; 1391m2 of SAPO Level 4, ACDP CL2 laboratories excluding plant; 4327m2 of SAPO Level 4, ACDP CL2 animal accommodation including plant. *Advisory Committee on Dangerous Pathogens †Specified Animal Pathogens Order*

ABL 4: 257 SqM

257m2 of SAPO† Level 4, ACDP CL3 laboratories excluding plant

ABL 4: 1391 SqM

1391m2 of SAPO Level 4, ACDP CL2 laboratories excluding plant

ABL 4: 4327 SqM

4327m2 of SAPO Level 4, ACDP CL2 animal accommodation including plant

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate:

Diagnosis and surveillance of exotic animal diseases and research into control measures for those diseases. The Pirbright Institute maintains FAO and OIE Reference laboratories. Micro-organisms are categorised up to and including SAPO 4 and ACDP Hazard Group 3. These include but are not limited to: Foot and mouth disease, bluetongue, swine vesicular disease, African Horse Sickness, Capripox, African swine fever, Peste des Petits Ruminants, Rinderpest, Chickungunya and Rift Valley fever.

1. Name(s) of facility [4]:

Animal and Plant Health Agency (APHA)

2. Responsible public or private organization or company:

Department for Environment, Food & Rural Affairs (Defra)

3. Location and postal address:

Woodham Lane, Addlestone, Surrey , KT15 3NB

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed by the Ministry of Defence:

Most funding is through Defra.

5. Number of maximum containment units [5] within the research centre and/or laboratory, with an indication of their respective size (SqM):

ABL 4: 100 SqM
Avian Influenza laboratory
ABL 4: 100 SqM
Avian Influenza laboratory
ABL 4: 100 SqM
Newcastle Disease Virus laboratory
ABL 4: 100 SqM
Rabies virus laboratory
BL 2: 200 SqM
*Suite of Serology laboratories capable of increasing to SAPO level 4, but which usually runs at ACDP† level 2 * Specified Animal Pathogens Order † Advisory Committee on Dangerous Pathogens*
ABL 4: 800 SqM
Animal facility consisting of 14 individual rooms divided into 2 suites mainly used for Avian Influenza and Newcastle Disease statutory diagnosis testing and research

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate:

Diagnosis, statutory testing and applied research on the epidemiology and pathology of the disease of farmed, domesticated livestock (cattle, sheep, pigs and poultry) and wild animal reservoirs. Bacteria and viruses in ACDP hazard groups 1-3, GM class 1-4 and SAPO hazard groups 2-4.

1. Name(s) of facility [4]:

Boehringer Ingelheim Animal Health UK Limited (formerly Merial Animal Health, Biological Laboratory)

2. Responsible public or private organization or company:

Private company: Boehringer Ingelheim Animal Health UK Limited

3. Location and postal address:

Ash Road, Pirbright, Surrey , GU24 0NQ

4. Source(s) of financing of the reported activity, including indication if the activity is wholly or partly financed

by the Ministry of Defence:

Private finance

5. Number of maximum containment units [5] within the research centre and/or laboratory, with an indication of their respective size (SqM):

ABL 4: N/A SqM
5 SAPO Level 4 containment units (manufacturing laboratories and QC testing laboratories for the production of foot and mouth disease and bluetongue disease vaccines) * Specified Animal Pathogens Order*

6. Scope and general description of activities, including type(s) of micro-organisms and/or toxins as appropriate:

Production of inactivated foot and mouth disease antigen and vaccines, and bluetongue disease antigen.

Form A, part 1 (ii)

If no BSL4 facility is declared in Form A, part 1 (i), indicate the highest biosafety level implemented in facilities handling biological agents[6] on a State Party's territory:

Biosafety level 3[7]	N/A
Biosafety level 2[8] (if applicable)	N/A

Any additional relevant information as appropriate:

N/A

Part 2 Exchange of information on national biological defence research and development programmes

At the Third Review Conference it was agreed that States Parties are to implement the following:

In the interest of increasing the transparency of national research and development programmes on biological defence, the States Parties will declare whether or not they conduct such programmes. States Parties agreed to provide, annually, detailed information on their biological defence research and development programmes including summaries of the objectives and costs of effort performed by contractors and in other facilities. If no biological defence research and development programme is being conducted, a null report will be provided.

States Parties will make declarations in accordance with the attached forms, which require the following information:

(1) The objective and summary of the research and development activities under way indicating whether work is conducted in the following areas: prophylaxis, studies on pathogenicity and virulence, diagnostic techniques, aerobiology, detection, treatment, toxinology, physical protection, decontamination and other related research;

(2) Whether contractor or other non-defence facilities are utilized and the total funding provided to that portion of the programme;

(3) The organizational structure of the programme and its reporting relationships; and

(4) The following information concerning the defence and other governmental facilities in which the biological defence research and development programme is concentrated;

(a) location;

(b) the floor areas (sqM) of the facilities including that dedicated to each of BL2, BL3 and BL4 level laboratories;

(c) the total number of staff employed, including those contracted full time for more than six months;

(d) numbers of staff reported in (c) by the following categories: civilian, military, scientists, technicians, engineers, support and administrative staff;

(e) a list of the scientific disciplines of the scientific/engineering staff;

(f) the source and funding levels in the following three areas: research, development, and test and evaluation; and

(g) the policy regarding publication and a list of publicly-available papers and reports.

Form A, part 2 (i)

National biological defence research and development programmes Declaration

Are there any national programmes to conduct biological defence research and development within the territory of the State Party, under its jurisdiction or control anywhere? Activities of such programmes would include prophylaxis, studies on pathogenicity and virulence, diagnostic techniques, aerobiology, detection, treatment, toxinology, physical protection, decontamination and other related research.

yes

If the answer is Yes, complete Form A, part 2 (ii) which will provide a description of each programme.

Form A, part 2 (ii)

National biological defence research and development programmes

Description

UK MOD biological defence research and development programme

1. State the objectives and funding of each programme and summarize the principal research and development activities conducted in the programme. Areas to be addressed shall include: prophylaxis, studies on pathogenicity and virulence, diagnostic techniques, aerobiology, detection, treatment, toxinology, physical protection, decontamination and other related research.

The UK MOD biological defence research and development programme provides effective measures for the UK and its Armed Forces against the threat posed by biological weapons. The objectives of the programme reflect the UK National Security Strategy and Strategic Defence and Security Review, which recognises and seeks to mitigate the risk of biological attacks against the UK or its forces, and the UK Biological Security Strategy, which aims to address the threat of infectious disease outbreaks whether naturally occurring, caused by an accidental release or as the result of a deliberate attack. To achieve these objectives, the programme creates bespoke capabilities based on innovative solutions to minimise the impact of CBRN threats to military and civilian operations.

Hazard Assessment

CBR Hazard Assessment maintains the ability to provide an effective assessment of the current and developing CBR hazard and is thus the bedrock on which sound CBR defence is built. It requires the evaluation of the range of potential biological and toxin agents that might be utilised by a potential aggressor. The information generated helps define defence strategy, concepts and doctrine, as well as identifying the required performance of protective equipment. Therefore Hazard Assessment is an essential enabler to the CBR capability.

The studies undertaken necessarily involve activities such as consideration of the agents' potency and dissemination characteristics, their aerobiology and the way in which they might be utilised by an aggressor in military and terrorist scenarios. This includes the potential impacts of genomics and proteomics. This work is essential to determine the challenge levels against which detectors, protective equipment and countermeasures must be effective. Current work includes studying the inhalation toxicity of a range of materials and the aerosol survival of pathogenic bacteria and viruses.

Detection and diagnostics

The ability to detect the presence or release of biological and toxin warfare (BTW) agents across the battlespace is crucial in providing timely warning to military personnel to allow them to adopt the appropriate protective posture and avoid casualties. Work programmes have focussed on technologies for improved sample collection, non-specific detection (to detect particulate material), generic detection (to distinguish between biological and non-biological materials) and specific identification (to identify the material). The objective is to develop point detection systems that are man portable and impose less logistic burden than current systems.

Technologies for the specific identification of BTW currently rely on the use of Biological Recognition Elements, such as antibodies and gene probes. The research programme has continued to develop specific antibodies - recombinant, monoclonal and polyclonal – to extend the range of potential BTW agents that can be identified. Testing is conducted in the laboratory by assessing the binding of the BTW agent to the generally immobilised antibody, monitored either through a linked colour change (e.g. Dipsticks) or electronically (biosensors).

Gene probe-based technology offers highly sensitive and specific assays for the identification of BTW agents like bacteria and viruses. Work is continuing in order to accelerate and simplify the methodology thus rendering it suitable for military use. Rapid PCR systems have been developed so that this technology can be used in field situations. In addition, similar technologies are also being investigated for use in medical diagnostic systems.

The research programme has continued to assess whether biological mass spectrometry technology could offer unambiguous detection and identification of BTW agents with a significant reduction in whole life costs.

Protection

The dissemination of BTW agents by an aggressor is likely to result in the production of particulate aerosols. Effective individual and collective protection (COLPRO) requires the prevention of the inhalation of this particulate challenge or its contact with the skin of personnel. Individual Protective Equipment (IPE) consists of a respirator and suit while collective protection systems provide isolation from a BW agent challenge in the form of whole buildings, rooms, ships or vehicles.

Current research focuses on providing IPE with effective levels of protection but with significantly reduced physiological loading compared with in-service equipment. This involves the development of new materials, integrating the materials into protective suit ensembles, and assessing the performance of the ensembles using non-pathogenic micro-organisms.

COLPRO research aims to design systems that provide the required levels of protection but pose a lower logistical burden on the user. This includes assessing the potential of Commercial off the Shelf (COTS) systems to meet the requirements of UK Armed Forces, including rapid strike, lightweight and low power requirements as well as incorporating protection into general purpose tentage.

Medical Countermeasures

The Medical Countermeasures (MedCM) programme seeks to determine the efficacy of vaccines, antibiotics, antivirals and antitoxins for the prevention of disease caused by BW agents.

The current suite of in-service MedCM offers a capability which does not protect against all BW agents. In some cases, no licensed MedCM are available and in others the in-service provision provides protection against lethality but not incapacitation. Opportunities for using COTS MedCM are extremely limited. Where no COTS solutions exist, and there is a realistic prospect of identifying feasible candidate MedCM, additional research has been performed to establish ‘proof-of-principle’ for potential interventions. Before COTS products or other medical interventions can be recommended, evidence base for their use in the treatment of personnel exposed to CBR agents has been assessed.

Programmes have continued to devise vaccines against tularemia (caused by *Francisella tularensis*) and melioidosis/glanders (caused by *Burkholderia pseudomallei/mallei*). A sub-unit vaccine approach is being employed for the development of vaccine candidates for Q-fever (caused by *Coxiella burnetii*). These vaccines will be tested using inhalation challenge models of disease.

Assessment of candidate anti-toxins against ricin, botulinum and SEB has continued, assessing efficacy, safety and acceptability.

The programme to explore the development of broad-spectrum BW countermeasures has continued, including therapies against *Brucella,* VEEV and Filoviruses. It has three broad elements: to investigate the up-regulation of the innate immune system, for example through immunomodulator stimulation; to determine whether there are cross-protective antigens or common mechanisms of virulence shared by different BW agents; and, to identify broad spectrum antimicrobials. Antibiotics and anti-virals which are newly emerging from industry are being tested to investigate whether they are effective against a wide range of candidate BW agents.

Projects to identify how animal models of disease can be replaced with *in vitro* assays, cell or organ culture systems are continuing.

Hazard Management

The ability to decontaminate personnel, materiel and infrastructure once an aggressor has dispersed BTW agents is a key element to hazard management and restoring operational tempo. Research aims to develop low logistic burden approaches for decontamination of BTW agents based on liquid formulations, strippable coatings, and reactive gases. Validated test methodologies for determining the efficacy of these decontamination processes are also being developed in parallel.

Arms Control

Dstl staff at Porton Down provide technical advice on CBW non-proliferation to the Ministry of Defence and the Foreign and Commonwealth Office as well as to other Government Departments involved in formulating and implementing UK policy on non-proliferation matters. Since its formation in July 2016, such advice has been provided to the Counter Proliferation and Arms Control Centre (CPACC), which consolidates in a single location expertise and policy-making on international counter proliferation and arms control issues, drawing from the Foreign and Commonwealth Office (FCO), Ministry of Defence (MOD), Department for International Trade (DIT) and the Department for Business, Energy and Industrial Strategy (BEIS). Over the years, Dstl support has included working towards and participating in: the Review Conferences of the BTWC; the Ad Hoc Group of Governmental experts tasked with identifying and examining potential verification measures; the Special Conference of States Parties held in September 1994; the BTWC Ad Hoc Group; and the annual Meetings of Experts and of States Parties during the intersessional programmes of work following Review Conferences since 2002.

Dstl staff collate the data for the UK Confidence Building Measures returns and provide technical advice towards the formulation and execution of policy on export control legislation, covering items related to biological weapons proliferation in foreign countries.

Dstl staff also assist BEIS in its role as the UK National Authority for the Chemical Weapons Convention, providing technical support over declarations, licensing, and inspections. Dstl operates the UK's Single Small Scale Facility at Porton Down, which has been declared under the CWC.

Dstl staff are also involved in supporting the UK International Biological Security Programme, part of the UK contribution to the Global Partnership, which seeks to promote safe, secure and responsible application of dual use biological science internationally.

2. State the total funding for each programme and its source.

The total UK expenditure on research and development on biological defence for the protection of the UK and its armed forces against microorganisms and toxins in the fiscal year, April 1st 2018 - March 31st 2019 is forecast to be £39.4 M. This includes £18.5 M for work as project support to the procurement of armed forces biological defence equipment.

Total Funding: 39.4

Funding Currency: GBP

3. Are aspects of these programmes conducted under contract with industry, academic institutions, or in other non-defence facilities?

yes

4. If yes, what proportion of the total funds for each programme is expended in these contracted or other facilities?

During the fiscal year April 1st 2018 to March 31st 2019, a total of 44 extramural contracts were placed. Of these, 17 extramural contracts on research and development aspects relating to biological defence were in place with universities and other academic institutions, and 27 extramural contracts with other bodies, which are either government funded or industrial companies. Funding for these extramural contracts during the fiscal year totalled approximately £7.66 M. This represents ~19.4 % of the total UK expenditure in the fiscal year on research and development on biological defence. The duration of individual contracts varies from a few months to three or four years, and in a few cases they include periods of work at Dstl. The precise institutions and companies are constantly varying as they are selected according to the needs of the defence programme and the availability of the necessary specialist skills.

5. Summarize the objectives and research areas of each programme performed by contractors and in other facilities with the funds identified under paragraph 4.

Contracts are let on specific research topics in support of the main research programme carried out at Dstl.

6. Provide a diagram of the organizaional structure of each programme and the reporting relationships (include individual facilities participating in the programme).

See diagram:

Note:

- The National Counter Proliferation Strategy to 2020 describes how the UK aims to prevent the spread or further development of chemical, biological, radiological and nuclear capability or advanced military technology which could threaten UK interests or regional stability.
- The Defence Counter-CBRN Policy defines Defence's contribution to the cross-Government effort to counter CBRN threats to the UK, UK vital interests and the Armed Forces.

7. Provide a declaration in accordance with Form A, part 2 (iii) for each facility, both governmental and non-governmental, which has a substantial proportion of its resources devoted to each national biological defence research and development programme, within the territory of the reporting State, or under its jurisdiction or control anywhere.

The only UK facility which has a substantial proportion of its resources devoted to the national biological defence research and development programme is Dstl, Porton Down, for which a declaration is made on Form A` Part 2 (iii).

Attachments:
N/A

Home Office CONTEST programme

1. State the objectives and funding of each programme and summarize the principal research and development activities conducted in the programme. Areas to be addressed shall include: prophylaxis, studies on pathogenicity and virulence, diagnostic techniques, aerobiology, detection, treatment, toxinology, physical protection, decontamination and other related research.

The Home Office (HO) co-ordinates the CONTEST programme. The research undertaken under this programme is aimed at enhancing the UK's capability to minimise the risk of a CBRN terrorist incident. Areas addressed include:

- Detection and analysis of biological materials
- Hazard assessment and decontamination of biological agents
- Developing an understanding of the impact and spread of biological materials
- Hazard prevention of biological materials

2. State the total funding for each programme and its source.

Home Office

Total Funding: 170,000

Funding Currency: GBP

3. Are aspects of these programmes conducted under contract with industry, academic institutions, or in other non-defence facilities?

no

4. If yes, what proportion of the total funds for each programme is expended in these contracted or other facilities?

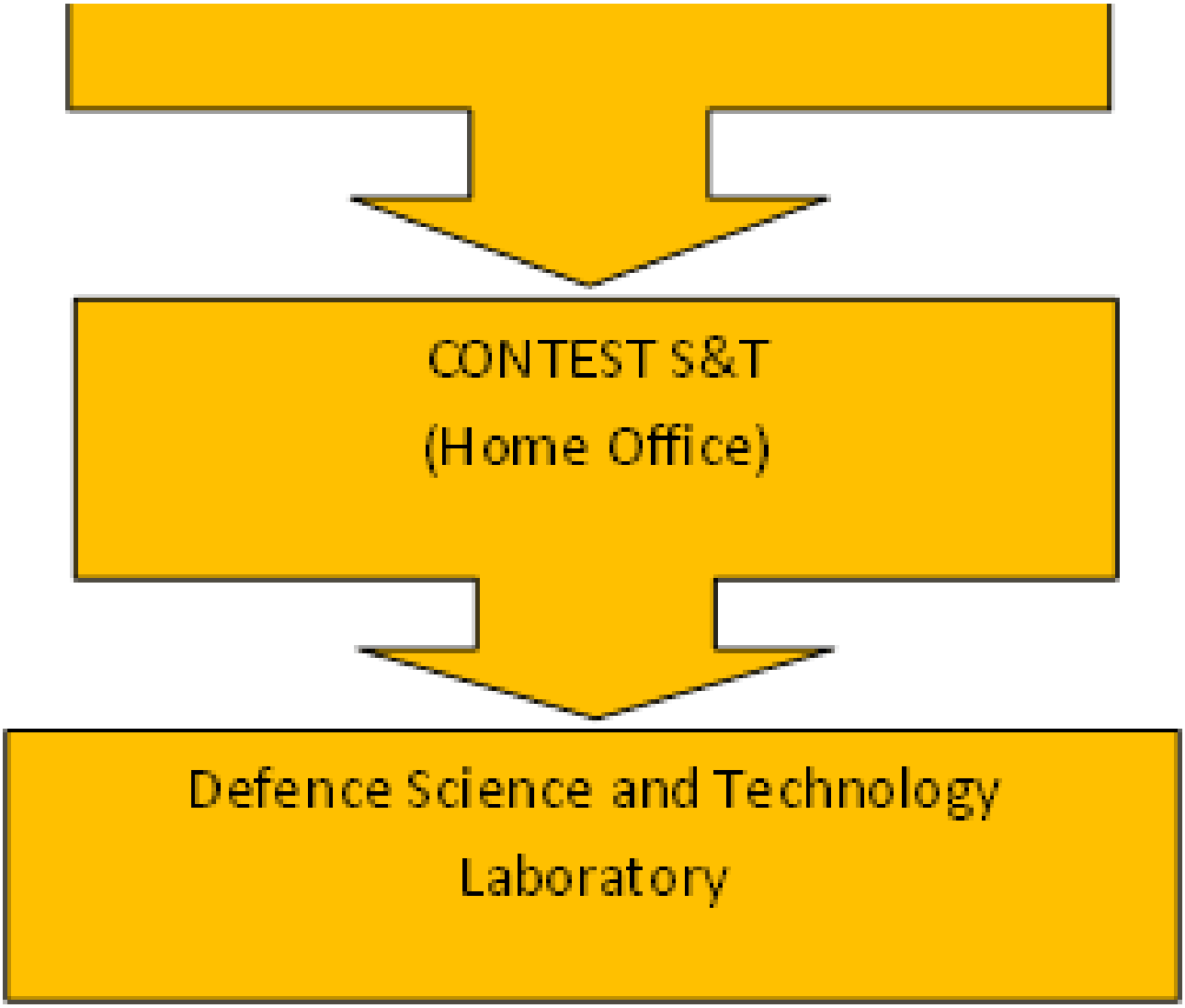
Not applicable

5. Summarize the objectives and research areas of each programme performed by contractors and in other facilities with the funds identified under paragraph 4.

Not applicable

6. Provide a diagram of the organizaional structure of each programme and the reporting relationships (include individual facilities participating in the programme).

See diagram



7. Provide a declaration in accordance with Form A, part 2 (iii) for each facility, both governmental and non-governmental, which has a substantial proportion of its resources devoted to each national biological defence research and development programme, within the territory of the reporting State, or under its jurisdiction or control anywhere.

The only facility that falls into this category is Dstl, Porton Down, for which a declaration is made on Form A Part 2 (iii).

Attachments:
N/A

Form A, part 2 (iii)

National biological defence research and development programmes

Facilities

Complete a form for each facility declared in accordance with paragraph 7 in Form A, part 2 (ii).

In shared facilities, provide the following information for the biological defence research and development portion only.

1. What is the name of the facility?

Defence Science and Technology Laboratory, Porton Down

2. Where is it located (include both address and geographical location)?

Dstl, Porton Down, Salisbury, Wiltshire, SP4 0JQ

The geographical location is shown in the file attached as Figure 2. (G13 Access Road, centre of south boundary, Latitude 50° 07-N, Longitude 01° 40-W.)

3. Floor area of laboratory areas by containment level:

BL 2: 1600 SqM
BL 3: 1050 SqM
BL 4: 335 SqM

Total laboratory floor area (SqM):

N/A

4. The organizational structure of each facility.

(i) Total number of personnel: 232

(ii) Division of personnel:
Military: 0
Civilian: 232

(iii) Division of personnel by category:
Scientists: 184
Engineers: 1
Technicians: 10
Administrative and support staff: Administration 2; Managerial 21; Professional 14

(iv) List the scientific disciplines represented in the scientific/engineering staff.

Aerobiology, aerosol physics, mathematics, chemistry, chemical engineering, physics, bacteriology, biology, biophysics, bioinformatics, virology, genetics, immunology, medicine, veterinary science, microbiology, biochemistry, molecular biology, physiology, pharmacology, neuropharmacology, psychology, toxicology, engineering, electronics, ergonomics, hydrodynamics, information science, materials science, operational analysis, operational research, information technology, CB defence science.

(v) Are contractor staff working in the facility? If so, provide an approximate number.

A small number of contractors work on the programme from time to time. Other contractor staff carry out building and maintenance work and some administrative functions.

(vi) What is (are) the source(s) of funding for the work conducted in the facility, including indication if activity is wholly or partly financed by the Ministry of Defence?

Porton Down is one of the sites of the Defence Science and Technology Laboratory (Dstl), which is part of the Ministry of Defence. Some work, approximately 8%, is carried out for other governmental and commercial customers.

(vii) What are the funding levels for the following programme areas:

Research: £20.9 M
Development: £18.5 M
Test and evaluation: This is carried out as required to support research and development. Not separately funded in UK.

(viii) Briefly describe the publication policy of the facility:

Staff at Dstl are encouraged to publish their work in the scientific literature.

(ix) Provide a list of publicly-available papers and reports resulting from the work published during the previous 12 months. (To include authors, titles and full references)

Listed in Annex file attached. In addition, all recent Dstl publications are listed at https://www.gov.uk/guidance/access-defence-science-and-technology-research.

Notes:

Personnel numbers given represent the numbers of staff involved in the biological defence research and development programmes. Further information on the total number of staff on site is as follows:

The organisational structure of Dstl is shown in the file attached as Figure 1. The facility provides research for all aspects of defence, including CBR. The total number of Dstl staff at Porton Down on 15 January 2019 was 2100 civilians (2001 permanent and 99 temporary) and 6 military. The civilian staff fall into the following categories:

Administration: 155

Engineers: 158

Managerial: 220

Professional: 241

Scientific: 1079

Technical: 247

TOTAL: 2100

Military personnel: 6

Attachments:
uk_cbm_2019_form_a_part_2_iii_publication_annex.pdf, uk_cbm_2019_form_a_part_2_iii_figure_1.pdf, uk_cbm_2019_form_a_part_2_iii_figure_2.pdf

5. Briefly describe the biological defence work carried out at the facility, including type(s) of micro-organisms [9] and/or toxins studied, as well as outdoor studies of biological aerosols.

The work of Dstl, Porton Down has been reported under Question 1 of Forms A Part 2 (ii). Projects currently underway include:

- The assessment of the hazard posed by micro-organisms and toxins when used by an aggressor as BW.
- Research into systems to facilitate collection, detection, warning, and identification of BW agents. This work includes the evaluation of collection and detection systems in outdoor studies using microbiological simulants and research into the composition of naturally occurring biological aerosols.
- Research to establish the protection afforded by materials and CBRN defence equipment against BW agents. This work includes the evaluation of military equipment both in the laboratory and in outdoor studies using microbiological simulants.
- Research into formulations and techniques for decontaminating microbiologically contaminated equipment using suitable simulants.
- Rapid identification of micro-organisms and toxins by the use of monoclonal antibodies and gene probes.
- Studies on the mechanism of action and treatment of toxins.

- Therapies for bacterial and viral infections.
- Studies on the mechanisms of pathogenicity of viruses and bacteria and the development of improved vaccines.

Confidence-Building Measure "B"

Exchange of information on outbreaks of infectious diseases and similar occurrences caused by toxins

At the Third Review Conference it was agreed that States Parties continue to implement the following:

> Exchange of information on outbreaks of infectious diseases and similar occurrences caused by toxins, and on all such events that seem to deviate from the normal pattern as regards type, development, place, or time of occurrence. The information provided on events that deviate from the norm will include, as soon as it is available, data on the type of disease, approximate area affected, and number of cases.

The Seventh Review Conference agreed the following:

> No universal standards exist for what might constitute a deviation from the normal pattern.

Modalities

The Third Review Conference agreed on the following, later amended by the Seventh Review Conference:

1. Exchange of data on outbreaks that seem to deviate from the normal pattern is considered particularly important in the following cases:

> - When the cause of the outbreak cannot be readily determined or the causative agent [10] is difficult to diagnose,
>
> - When the disease may be caused by organisms which meet the criteria for risk groups III or IV, according to the classification in the latest edition of the WHO Laboratory Biosafety Manual,
>
> - When the causative agent is exotic to a given geographical region,
>
> - When the disease follows an unusual pattern of development,
>
> - When the disease occurs in the vicinity of research centres and laboratories subject to exchange of data under item A,
>
> - When suspicions arise of the possible occurrence of a new disease.

2. In order to enhance confidence, an initial report of an outbreak of an infectious disease or a similar occurrence that seems to deviate from the normal pattern should be given promptly after cognizance of the outbreak and should be followed up by annual reports. To enable States Parties to follow a standardized procedure, the Conference has agreed that Form B should be used, to the extent information is known and/or applicable, for the exchange of annual information.

3. The declaration of electronic links to national websites or to websites of international, regional or other organizations which provide information on disease outbreaks (notably outbreaks of infectious diseases and similar occurrences caused by toxins that seem to deviate from the normal pattern) may also satisfy the declaration requirement under Form B.

4. In order to improve international cooperation in the field of peaceful bacteriological (biological) activities and in order to prevent or reduce the occurrence of ambiguities, doubts and suspicions, States Parties are encouraged to invite experts from other States Parties to assist in the handling of an outbreak, and to respond favourably to such invitations, respecting applicable national legislation and relevant international instruments.

Form B

Information on outbreaks of infectious diseases and similar occurrences, that seem to deviate from the normal pattern[11]

Highly Pathogenic Avian Influenza H5N6 in wild birds

1. Time of cognizance of the outbreak:

9 January - 15 June 2018

2. Location and approximate area affected:

Wild birds and wild water birds* found dead in Armargh, Antrim, Devon, Dorset, Greater London, Glamorgan, Hertfordshire, Herefordshire, Surrey, Suffolk, Oxfordshire, Lincolnshire, Warwickshire. (*Mute swans (Cygnus olor), Canada goose (Branta canadensis), Pochard (Aythya ferina), Great black-backed gulls (Larus marinus); Herring gull (Larus argentus); Great crested grebe (Podiceps cristatus), Greylag geese (Anser anser), Mallards (Anas platyrhynchos), Tufted ducks (Aythya fuligula), Common gull (Larus canus), Moorhen (Gallinula chloropus), Wild pheasant (Phasianus colchicus), Common Buzzard (Buteo buteo), Northern goshawk (Accipiter gentilis).

N/A

3. Type of disease/intoxication:

Highly Pathogenic Avian Influenza (HPAI) H5N6 in wild birds

4. Suspected source of disease/intoxication:

Wild birds

5. Possible causative agent(s):

H5N6 HPAI virus

6. Main characteristics of systems:

High mortality

7. Detailed symptoms, when applicable
N/A

- Respiratory:

Present

- Circulatory:
N/A

- Neurological/behavioural:

Present

- Intestinal:

Present

- Dermatological:

N/A

- Nephrological:
N/A

- Other:
N/A

8. Deviation(s) from the normal pattern as regards

- Type:

H5N6 HPAI was reported in the Netherlands in December 2017 in wild birds and commercial poultry, and in 2018 there were subsequent reports in wild birds in northwest Europe (Denmark, Finland, Germany, Ireland, the Netherlands, Slovakia and Sweden). It is very likely that wild bird migration played a role in the transmission of H5N6 HPAI to these wild birds and wild water birds in 2018. There were no detections in UK poultry in 2018.

- Development:
N/A

- Place of occurrence:
N/A

- Time of occurrence:

- Symptoms:
N/A

- Virulence pattern:

Sequence of the virus predicted high pathogenicity

- Drug resistance pattern:

N/A

- Agent(s) difficult to diagnose:
N/A

- Presence of unusual vectors:
N/A

- Other:
N/A

9. Approximate number of primary cases:
21

10. Approximate number of total cases:
21

11. Number of deaths:

12. Development of the outbreak:

97 wild birds and wild waterfowl across 21 different locations tested positive for H5N6 HPAI, however, there were large numbers (100s) of wild bird die off at these locations and birds that were not submitted for laboratory testing.

13. Measures taken:
N/A

Notes:

Attachments:
N/A

Importation of monkeypox

1. Time of cognizance of the outbreak:
N/A

2. Location and approximate area affected:

N/A

N/A

3. Type of disease/intoxication:
N/A

4. Suspected source of disease/intoxication:
N/A

5. Possible causative agent(s):
N/A

6. Main characteristics of systems:
N/A

7. Detailed symptoms, when applicable
N/A

- Respiratory:
N/A

- Circulatory:
N/A

- Neurological/behavioural:
N/A

- Intestinal:
N/A

- Dermatological:
N/A

- Nephrological:
N/A

- Other:
N/A

8. Deviation(s) from the normal pattern as regards

- Type:
N/A

- Development:
N/A

- Place of occurrence:
N/A

- Time of occurrence:

- Symptoms:
N/A

- Virulence pattern:
N/A

- Drug resistance pattern:
N/A

- Agent(s) difficult to diagnose:
N/A

- Presence of unusual vectors:
N/A

- Other:
N/A

9. Approximate number of primary cases:
N/A

10. Approximate number of total cases:
N/A

11. Number of deaths:

12. Development of the outbreak:

13. Measures taken:
N/A

Notes:

In 2018, there were no outbreaks of human related disease in the UK that were considered to meet the criteria for reporting under CBM B. However, for the purpose of transparency, it should be noted that there were three cases of monkeypox, which were known to relate to importation of disease to the UK through international travel. This is the first time that monkeypox has been diagnosed in the UK.

On 8 September 2018, an imported case of monkeypox was reported in the UK. A second imported case was reported on 11 September 2018. Further information about these cases and the public health response is available in the Health Protection Report:

https://www.gov.uk/government/publications/health-protection-report-volume-12-2018/hpr-volume-12-issue-33-news-14-september

A third case was reported on 26 September in a person who was involved in the care of one of the imported cases before monkeypox had been diagnosed; further details are available here:

https://www.gov.uk/government/news/monkeypox-case-in-england.

There has been no further transmission of monkeypox in the UK linked to these individual cases.

Attachments:
N/A

Background information on UK outbreaks of infectious diseases in humans, animals and plants

1. Time of cognizance of the outbreak:
N/A

2. Location and approximate area affected:

N/A

N/A

3. Type of disease/intoxication:
N/A

4. Suspected source of disease/intoxication:
N/A

5. Possible causative agent(s):
N/A

6. Main characteristics of systems:
N/A

7. Detailed symptoms, when applicable
N/A

- Respiratory:
N/A

- Circulatory:
N/A

- Neurological/behavioural:
N/A

- Intestinal:
N/A

- Dermatological:
N/A

- Nephrological:
N/A

- Other:
N/A

8. Deviation(s) from the normal pattern as regards

- Type:
N/A

- Development:
N/A

- Place of occurrence:
N/A

- Time of occurrence:

- Symptoms:
N/A

- Virulence pattern:
N/A

- Drug resistance pattern:
N/A

- Agent(s) difficult to diagnose:
N/A

- Presence of unusual vectors:
N/A

- Other:
N/A

9. Approximate number of primary cases:
N/A

10. Approximate number of total cases:
N/A

11. Number of deaths:

12. Development of the outbreak:

13. Measures taken:
N/A

Notes:

Background information on UK outbreaks of infectious diseases in humans, animals and plants can be obtained via:

https://www.gov.uk/government/collections/notifications-of-infectious-diseases-noids

https://www.gov.uk/government/publications/notifiable-diseases-weekly-reports-for-2018

https://www.gov.uk/government/publications/notifiable-diseases-last-52-weeks

https://www.gov.uk/government/publications/notifiable-diseases-causative-agents-report-for-2018

http://www.hps.scot.nhs.uk/

http://www.hps.scot.nhs.uk/surveillance/ReportsSummary.aspx

http://www.publichealth.hscni.net/directorate-public-health/health-protection/notifications-infectious-diseases

http://www.publichealth.hscni.net/directorate-public-health/health-protection/noids-archive

https://www.gov.uk/government/collections/notifiable-diseases-in-animals

https://www.gov.uk/government/collections/animal-disease-surveillance-reports

http://www.oie.int/wahis_2/public/wahid.php/Countryinformation/Countryreports

https://planthealthportal.defra.gov.uk/

https://secure.fera.defra.gov.uk/phiw/riskRegister/plant-health

https://www.ippc.int/en/countries/united-kingdom/pestreports/

Attachments:
N/A

Confidence-Building Measure "C"

Encouragement of publication of results and promotion of use of knowledge

At the Third Review Conference it was agreed that States parties continue to implement the following:

> Encouragement of publication of results of biological research directly related to the Convention, in scientific journals generally available to States parties, as well as promotion of use for permitted purposes of knowledge gained in this research.

Modalities

The Third Review Conference agreed on the following:

1. It is recommended that basic research in biosciences, and particularly that directly related to the Convention should generally be unclassified and that applied research to the extent possible, without infringing on national and commercial interests, should also be unclassified.

2. States parties are encouraged to provide information on their policy as regards publication of results of biological research, indicating, inter alia, their policies as regards publication of results of research carried out in research centres and laboratories subject to exchange of information under item A and publication of research on outbreaks of diseases covered by item B, and to provide information on relevant scientific journals and other relevant scientific publications generally available to States parties.

3. The Third Review Conference discussed the question of cooperation and assistance as regards the safe handling of biological material covered by the Convention. It concluded that other international forums were engaged in this field and expressed its support for efforts aimed at enhancing such cooperation.

Comments:

UK policy is that basic research in biosciences, and particularly that related to the Convention, should generally be unclassified and applied research is also unclassified to the extent possible without infringing on national and commercial interests.

It is UK policy to encourage research scientists funded by the Government to publish the results of their work in scientific journals readily available to the scientific community. This applies to the publication of the results of research carried out in the research centres and laboratories subject to exchange of information under Confidence Building Measure A.

Insofar as publication of research on outbreaks of diseases covered by Confidence Building Measure B is concerned again it is UK policy to encourage research scientists funded by the Government to publish the results of their studies.

Examples of relevant scientific journals and other scientific publications include the following:

Accounts of Chemical Research

ACS Synthetic Biology

American Journal of Tropical Medicine and Hygiene

Analyst

Analytical and Bioanalytical Chemistry

Analytical Methods

Annals of Infectious Disease and Epidemiology

Antimicrobial Agents and Chemotherapy

Antiviral Research

Applied and Environmental Microbiology

Applied Biosafety

Archives of Virology

Atmospheric Measurement Techniques

Avian Pathology

Bioconjugate Chemistry

Bioinformatics

Bioorganic and Medicinal Chemistry

Biophysical Journal

Bioscience Reports

Biosensors and Bioelectronics

BMC Genomics

BMC Infectious Diseases

BMC Microbiology

BMC Proceedings

Bulletin of Mathematical Biology

Cell

Cell & Bioscience

Chemistry & Biology

Chemical Society Reviews

Clinical Microbiology and Infectious Diseases

Clinical and Vaccine Immunology

Critical Reviews in Biotechnology

Current Opinion in Microbiology

Cytokine

Cytometry

Developmental and Comparative Immunology

Emerging Infectious Diseases

Epidemiology and Infection

Ergonomics

European Journal of Clinical Microbiology and Infectious Diseases

Eurosurveillance

Expert Review of Anti-infective Therapy

Expert Review of Vaccines

FEMS Microbiology Ecology

FEMS Microbiology Letters

FEMS Microbiology Reviews

Foodborne Pathogens and Disease

Free Radical Biology and Medicine

Frontiers in Cellular and Infection Microbiology

Frontiers in Immunology

Frontiers in Microbiology

Future Virology

Genome Research

Indian Journal of Experimental Biology

Infection and Immunity

Influenza and Other Respiratory Viruses

International Journal of Antimicrobial Agents

International Journal of Experimental Pathology

International Journal of Infectious Diseases

International Journal of Medical Microbiology

International Journal for Parasitology

Journal of Aerosol Science

Journal of Bacteriology

Journal of Clinical Microbiology

Journal of Comparative Pathology

Journal of Food Protection

Journal of General Virology

Journal of Immunological Methods

Journal of Immunology Research

Journal of Infectious Diseases

Journal of Medical Microbiology

Journal of Molecular and Genetic Medicine

Journal of the Royal Society Interface

Journal of Veterinary Diagnostic Investigation

Journal of Virological Methods

Journal of Virology

Lancet

Letters in Applied Microbiology

Methods

Methods in Molecular Biology

Microbial Pathogenesis

Microbiology

Molecular Immunology

Molecular Microbiology

Nature

Nature Biotechnology

Outlooks on Pest Management

Parasite Immunology

Parasitology Research

Pathogens

Philosophical Transactions of The Royal Society B-Biological Sciences

PLoS Neglected Tropical Diseases

PLoS One

Proceedings of the National Academy of Sciences

Proteomics

Resistance Microbiology

Scientific Reports

Structure

The EMBO Journal

The Veterinary Journal

Transactions of the Royal Society of Tropical Medicine and Hygiene

Transboundary and Emerging Diseases

Trends in Analytical Chemistry

Trends in Biochemical Sciences

Trends in Immunology

Trends in Microbiology

Trends in Parasitology

Vaccine

Veterinary Immunology and Immunopathology

Veterinary Microbiology

Veterinary Research

Viral Immunology

Virology

Virology Journal

Virus Research

Viruses

Confidence-Building Measure "D"

(Deleted)

Confidence-Building Measure "E"

Declaration of legislation, regulations and other measures

At the Third Review Conference the States parties agreed to implement the following, later amended by the Seventh Review Conference:

As an indication of the measures which they have taken to implement the Convention, States parties shall declare whether they have legislation, regulations or other measures:

(a) To prohibit and prevent the development, production, stockpiling, acquisition or retention of the agents, toxins, weapons, equipment and means of delivery specified in Article I of the Convention, within their territory or anywhere under their jurisdiction or under their control anywhere;

(b) In relation to the export or import of micro-organisms pathogenic to man, animals and plants or of toxins in accordance with the Convention;

(c) In relation to biosafety and biosecurity.

States parties shall complete the attached form (Form E) and shall be prepared to submit copies of the legislation or regulations, or written details of other measures on request to the Implementation Support Unit (ISU) within the United Nations Office for Disarmament Affairs or to an individual State party. On an annual basis States parties shall indicate, also on the attached form, whether or not there has been any amendment to their legislation, regulations or other measures.

Form E

Declaration of legislation, regulations and other measures

Relating to	*Legislation*	*Regulations*	*Other measures*[12]	*Amended since last year*
(a) Development, production stockpiling, acquisition or retention of microbial or other biological agents, or toxins, weapons, equipment and means of delivery specified in Article I	yes	yes	yes	no
(b) Exports of micro-organisms[13] and toxins	yes	yes	yes	yes
(c) Imports of micro-organisms[13] and toxins	yes	yes	yes	yes
(d) Biosafety[14] and biosecurity[15]	yes	yes	yes	no

Additional information to Form E:

See Annex file attached.

Confidence-Building Measure "F"

Declaration of past activities in offensive and/or defensive biological research and development programmes

In the interest of increasing transparency and openness, States parties shall declare whether or not they conducted any offensive and/or defensive biological research and development programmes since 1 January 1946.

If so, States parties shall provide information on such programmes, in accordance with Form F.

Form F

Declaration of past activities in offensive and/or defensive biological research and development programmes

1. Date of entry into force of the Convention for the State Party.

Wednesday, March 26, 1975

2. Past offensive biological research and development programmes:

- yes

- Period(s) of activities

The UK had a modest programme to provide a capability to retaliate in kind should UK force be attacked by BW which started in 1940 and ceased in the late 1950s.

- Summary of the research and development activities indicating whether work was performed concerning production, test and evaluation, weaponization, stockpiling of biological agents, the destruction programme of such agents and weapons, and other related research.

Previous submission (2011, covering data for 2010):

Updated Information:

The UK provided information on its past offensive programme in 1992. Since that point the CBM F has not been updated. In the past year information has become available, as part of regular reviews of retained files held at The National Archives, which reveals some experimental work on anti-livestock biological warfare, which has not been previously acknowledged in the UK's CBM submissions. The UK is therefore taking this opportunity to update the information provided in its CBM Form F. Our original Form F is being reproduced in this year's return.

The Porton Experiments Sub-Committee was established in September 1940 as a sub-committee of the War Cabinet to investigate the feasibility of the means of biological warfare. Until then there had been no systematic scientific investigation in the UK into offensive and defensive biological warfare. Those engaged in UK efforts worked from the assumption that only by a full examination of the methods of attack would it be possible to develop effective means of defence. Work started at Porton Down within the Chemical Defence Experimental Station (CDES) in November 1940 to assess the feasibility of BW, to define the necessary defensive measures and to acquire the means to retaliate in kind in the event of use of BW against the UK or its allies.

As part of this work in January 1941, the UK noted the possibilities for attacks on livestock using saboteurs and aircraft as the means of delivery of the causative agents. At the then current state of knowledge of human and animal diseases, it was believed that the spreading of the latter appeared to be the more formidable weapon. It was subsequently proposed that preparatory measures for retaliation with animal diseases should be initiated or continued by the Ministry of Agriculture and Fisheries at its Weybridge and Pirbright stations or elsewhere.[1] The diseases under investigation were Foot and Mouth Disease (FMD), Rinderpest, Glanders and Swine Fever.

Experiments were conducted in 1941 and 1942 to test the survival of Swine Fever virus on certain foodstuffs, particularly cakelets, and when sprayed on grass. Similar programmes were undertaken for FMDV and Rinderpest virus. Research was also done to investigate defensive measures against these agents. Work on glanders involved some initial studies on virulence, growth and survival of the causative agent, as well as defensive measures.

It seems that no further progress was made on developing these agents into practical weapons in the 1940 to 1942 period. Although experimental work with FMDV and Rinderpest virus in cattle cakes was undertaken, no evidence has been found to indicate that there were any stockpiles produced to match the anthrax charged cattle cakes, which were the sole means of providing a BW retaliatory capability during the Second World War.

Original Form F: BIOLOGICAL AND TOXIN WEAPONS CONVENTION: UK CBM FORM F 1993

United Kingdom concern about the possible future menace of the use of biological weapons (BW) began in the 1920s and continued through the 1930s with the establishment in 1936 of a sub-committee of the Committee for Imperial Defence, with a mandate “to report on the practicality of the introduction of bacteriological warfare and to make recommendations on the countermeasures which should be taken to deal with such an eventuality.” This led to the establishment in 1940 of the Biology Department, Porton (BDP).

From 1940 to 1946 the UK focus for BW studies was the Biology Department, Porton (BDP) which though located within the then Chemical Defence Experimental Station was a small autonomous organisation (up to about 45 people at its largest) set up to assess the feasibility of BW, to define the necessary defensive measures and to acquire the means to retaliate in kind in the event of use of BW against the UK or its allies. The latter part of this mandate involved carrying out trials using anthrax spores disseminated from bombs on Gruinard Island in 1942 and 1943. The success in demonstrating this method of release of spores was followed by the start of a conjoint United Kingdom, United States and Canadian development of a retaliatory capability based on cluster bombs with anthrax charged munitions, the so called N-bomb project. This project had not come to fruition by the end of the war, and the War Cabinet’s requirement for a retaliatory capability in World War II was fulfilled by the development of a modest anti-livestock aircraft-delivered BW capability based on anthrax spores in cattle cakes. A stockpile of 5,000,000 cattle cakes was produced by BDP in 1942-3 and was stored at Porton. This weapon was never employed.

In the immediate post-war period the cattle cake stockpile was destroyed by autoclaving and burning; a few cardboard boxes each holding 400 cakes were retained as curiosities in the culture collection of the then Microbiological Research Establishment (MRE) at Porton until they were destroyed in 1972 at the time of the signature of the Biological Weapons Convention.

Whilst some research on offensive aspects continued for a few years after World War II, by 1957 the UK had abandoned work on an offensive capability. Subsequent work was on biological defence and included assessment of hazards should BW be used against the UK.

[1] Pirbright in Surrey was the Ministry of Agriculture and Fisheries’ Foot and Mouth Disease Research Station. Weybridge, also in Surrey, was the Ministry’s Veterinary Laboratory.

3. Past defensive biological research and development programmes:

- yes

- Period(s) of activities

1940 - Present

- Summary of the research and development activities indicating whether or not work was conducted in the following areas: prophylaxis, studies on pathogenicity and virulence, diagnostic techniques, aerobiology, detection, treatment, toxinology, physical protection, decontamination, and other related research, with location if possible.

BW defence was pursued from 1940 by BDP, notably in evaluation of respiratory protection, immunisation, anti-biotic therapy, and decontamination. By 1946 the BDP had become the Microbiological Research Department (MRD). In 1951 the MRD moved to a separate building in from within what had now become the Chemical Defence Experimental Establishment (CDEE). It was still known as MRD until 1957 when it became the Microbiological Research Establishment (MRE), under which title it continued until 1979.

Defensive studies were carried on from 1946 at MRD and then at MRE. The programme involved work on pathogenicity and virulence, aerobiology and experimental inhalation infection, detection and warning of BW aerosols, rapid identification of BW agents and rapid diagnosis of infectious diseases, prophylaxis, toxins, physical protection for individual and collective use, and decontamination. Most of this work was done at Porton but in the period 1948-1955 field trials with pathogens were performed on the high seas off the Bahamas and off the Scottish coast, initially to determine the feasibility of conducting trials at sea and latterly to acquire data on the behaviour of microbial aerosols under realistic conditions. Although such work was begun during the period when offensively motivated R&D was also being pursued, the data acquired was relevant to defence.

In the late 1960s and 1970s the proportion of MRE effort devoted to BW defence was gradually reduced as a result of reductions in defence funding offset by increases in civil research and microbiology. In the late 1970s it was decided that BW defence should be carried out at the then Chemical Defence Establishment (CDE) on a much reduced scale, resulting in defence sector economies and benefits from the wholesale commitment of MRE to public health microbiology. MRE was transferred to the Public Health Laboratory Service of the Department of Health in 1979. It is now the Centre for Applied Microbiology and Research in the Public Health Service. Accordingly, on 1 April 1979, a new Defence Microbiology Division (DMD) was set up within CDE as the focus of UK research on BW defence. The impact of genetic engineering, molecular biology, and biotechnology began to be felt in the early 1980s and has been highlighted in the UK papers submitted to all three Review Conferences of the Convention. These scientific and technological developments brought about a reassessment of the potential hazard posed by living biological and toxin weapons to the UK Armed Forces, and of continuing progress towards better detection and protection. In the latter areas it was recognised that the emerging biological technologies would make a significant contribution within the integrated research programme of CDE to counter the CBW threat. In April 1991, CDE was renamed the Chemical and Biological Defence Establishment (CBDE) to reflect more accurately the scope of the Establishment’s work.

Confidence-Building Measure "G"

Declaration of vaccine production facilities

To further increase the transparency of biological research and development related to the Convention and to broaden scientific and technical knowledge as agreed in Article X, each State party will declare all facilities, both governmental and non-governmental, within its territory or under its jurisdiction or control anywhere, producing vaccines licensed by the State party for the protection of humans. Information shall be provided on Form G attached.

Form G

Declaration of vaccine production facilities

1. Name of facility:

Seqirus Vaccines Limited

2. Location (mailing address):

Gaskill Road, Speke, Liverpool, L24 9GR

3. General description of the types of diseases covered:

During 2018, only Influenza vaccines were manufactured at this facility: two distinct products for the market, Agrippal® and Fluad®, (seasonal influenza strain presentations). The Fluvirin ® product is no longer manufactured.

Northern & Southern Hemisphere Influenza vaccine: Cultivation of egg adapted influenza virus. Three strains incorporated within the vaccine (Trivalent), trade name Agrippal® or Fluad®.

Cultivation in eggs of attenuated influenza strains produced by 'Reverse Genetics' and classical reassortant techniques. For seasonal strains, the work was undertaken at containment biosafety level 2.

Attenuated influenza virus strains in reverse genetic form are designated as GMOs and an appropriate manufacturing licence (GM consent) has been granted from the UK Competent Authority. IAPO (Importation of Animal Pathogens Order 1980) does not apply to these strains due to attenuation at the genetic level.

Note: The manufacturing facility in Liverpool manufactures the bulk influenza vaccine in site 4 with eggs supplied from site 6. The formulation of the final bulk vaccine is also now carried out in site 4. The fill finish operations to manufacture individual influenza vaccine doses occur at two contractor facilities, one based in Belgium and the other based in Spain.

1. Name of facility:

AstraZeneca Liverpool (registered in Companies House as MedImmune UK Limited)

2. Location (mailing address):

Plot 7 Renaissance Way, Boulevard Industry Park, Speke, Liverpool, L24 9JW

3. General description of the types of diseases covered:

Influenza: Manufacture of influenza vaccine based on WHO recommendations

1. Name of facility:

Porton Biopharma Limited

2. Location (mailing address):
Porton Biopharma Limited, Porton Down, Salisbury, Wiltshire, SP4 0JG

3. General description of the types of diseases covered:

Anthrax vaccine manufacture

1. Name of facility:
Merck BioReliance® Services

2. Location (mailing address):
Todd Campus, West of Scotland Science Park, Glasgow, G20 0XA

3. General description of the types of diseases covered:

The BioReliance® Services business of Merck KGaA is primarily a Contract Testing Organisation, providing biosafety testing services for a wide range of global, biopharmaceutical companies.

The Glasgow facility also has a biomanufacturing facility. No products are manufactured for direct sale - only contract manufacturing for others. Typical products produced are (i) Cell Banks, (ii) Virus Seed Stocks and (iii) Viral Vectors.

Of relevance to this declaration, the facility produces the active viral ingredient for a vaccine program on behalf of a US-based pharmaceutical company, for use in the US. This is an Adenovirus vaccine (Type 4 and Type 7) and is used to vaccinate against Adenovirus Disease and Febrile Respiratory Illness. The site is licensed and operates under a Manufacturing Authorisation granted by the UK Medicines and Healthcare products Regulatory Agency (MHRA).

The product is sent to the client as a frozen liquid formulation, for further processing and tabletting. The US-based pharmaceutical company holds marketing authorisation from the FDA for use of the vaccine in the United States.

1. Name of facility:
Valneva Scotland Ltd

2. Location (mailing address):
Oakbank Park Road, Livingston, EH53 0TG

3. General description of the types of diseases covered:

Valneva manufactures Japanese Encephalitis Viral vaccine (IXIARO®/JESPECT®) at its cGMP facilities in Livingston, Scotland. The site is licensed and operates under a Manufacturing Authorisation granted by the UK Medicines and Healthcare products Regulatory Agency (MHRA). The vaccine is designed to protect travellers and military against Japanese encephalitis (JE), the leading cause of viral neurological disease & disability in Asia.

IXIARO® is a purified, inactivated aluminum-adjuvanted JE vaccine, based on the SA14–14–2 virus strain, and is available in North America, Europe, Canada, Switzerland, Singapore, Hong Kong and Israel as well as in Australia & New Zealand (as JESPECT®).

Marketing approval from the European Medicines Agency is held by Valneva Austria GmbH.

Valneva supplies Japanese Encephalitis Vaccine in other territories including Taiwan, through commercial partner Adimmune (JEVAL) and in India through commercial partner Biological E (JEEV).

Investigational Medicinal Product (IMP) licence for clinical trial manufacture granted by MHRA in a fully segregated, multi-purpose clinical trial material manufacturing facility ("CTM Unit") allows the bulk production of viral products intended to undergo clinical investigations including:

Zika vaccine VLA1601

VLA1601 is a highly purified inactivated vaccine candidate against the Zika virus, developed using the same manufacturing platform as Valneva's IXIARO® (JESPECT®) JE vaccine. In pre-clinical development, VLA1601 demonstrated excellent purity and had an overall biological, chemical and physical profile comparable to the commercially produced JE vaccine. Valneva has an established manufacturing process in its dedicated clinical JE vaccine facility.

Chikungunya vaccine VLA1553

A potential single-shot vaccine against a severe, growing threat, VLA1553 is a monovalent, single dose, live-attenuated vaccine candidate for protection against chikungunya. The vaccine candidate is designed for prophylactic, active, single-dose immunization against chikungunya in humans over one year old. The vaccine aims for long-lasting protection and an anticipated safety profile similar to licensed vaccines for active immunization in adults and children.

Notes

1. World Health Organization

2. World Organization for Animal Health.

3. The containment units which are fixed patient treatment modules, integrated with laboratories, should be identified separately.

4. For facilities with maximum containment units participating in the national biological defence research and development programme, please fill in name of facility and mark "Declared in accordance with Form A, part 2 (iii)".

5. In accordance with the latest edition of the WHO Laboratory Biosafety Manual, or equivalent.

6. Microorganisms pathogenic to humans and/or animals

7. In accordance with the latest edition of the WHO Laboratory Biosafety Manual and/or the OIE Terrestrial Manual or other equivalent internationally accepted guidelines.

8. In accordance with the latest edition of the WHO Laboratory Biosafety Manual and/or the OIE Terrestrial Manual or other equivalent internationally accepted guidelines.

9. Including viruses and prions.

10. It is understood that this may include organisms made pathogenic by molecular biology techniques, such as genetic engineering.

11. See paragraph 2 of the chapeau to Confidence-Building Measure B.

12. Including guidelines.

13. Micro-organisms pathogenic to man, animals and plants in accordance with the Convention.

14. In accordance with the latest version of the WHO Laboratory Biosafety Manual or equivalent national or international guidance.

15. In accordance with the latest version of the WHO Laboratory Biosecurity Guidance or equivalent national or international guidance.

Attachments

Form A2 part iii (biological defence research and development programmes):

- uk_cbm_2019_form_a_part_2_iii_publication_annex.pdf
- uk_cbm_2019_form_a_part_2_iii_figure_1.pdf
- uk_cbm_2019_form_a_part_2_iii_figure_2.pdf

Form E:

- uk_cbm_2019_form_e_annex.pdf

ANNEX TO
Form A Part 2 (iii)

BIOLOGICAL DEFENCE RESEARCH PUBLICATIONS FOR Dstl PORTON DOWN 2018

Aller S *et al*. Integrated human-virus metabolic stoichiometric modelling predicts host-based antiviral targets against Chikungunya, Dengue and Zika viruses. *J R Soc Interface*, 2018. 15(146)

Amarasinghe GK *et al*. Taxonomy of the order Mononegavirales: update 2018. *Arch Virol*, 2018. 163(8): 2283-2294

Carruthers J *et al*. A Novel Stochastic Multi-Scale Model of *Francisella tularensis* Infection to Predict Risk of Infection in a Laboratory. *Front Microbiol*, 2018. 9: 1165

Clay KA *et al*. Use of axenic media to determine antibiotic efficacy against *Coxiella burnetii*. *Int J Antimicrob Agents*, 2018. 51(5): 806-808

Djouiai B *et al*. Role of DNA Repair and Protective Components in *Bacillus subtilis* Spore Resistance to Inactivation by 400 nm Blue Light. *Appl Environ Microbiol*, 2018. 84(19)

Garcia-Jimenez WL, FJ Salguero and RV D'Elia. Histopathological and immunohistochemical characterization of *Burkholderia pseudomallei* lesions in an acute model of infection with BALB/c mice. *Int J Exp Pathol*, 2017. 98(6): 347-355

Godsmark C *et al*. Moisture vapour permeable gloves extend thermal endurance and safe work time more than other similarly permeable chemical-biological ancillary protective items. *Ergonomics*, 2018. 61:12: 1635-1645

Jenner D *et al.* An imaging flow cytometry method to assess ricin trafficking in A549 human lung epithelial cells. *Methods*, 2018. 134–135: 41–49

Khalid S, TJ Piggot and F Samsudin. Atomistic and Coarse Grain Simulations of the Cell Envelope of Gram-Negative Bacteria: What Have We Learned? *Acc Chem Res*, 2018 (on-line)

Knight AR *et al*. A high-sensitivity electrochemiluminescence-based ELISA for the measurement of the oxidative stress biomarker, 3-nitrotyrosine, in human blood serum and cells. *Free Radic Biol Med*, 2018. 120: 246-254

Marshall LE *et al*. An O-Antigen Glycoconjugate Vaccine Produced Using Protein Glycan Coupling Technology is Protective in an Inhalational Rat Model of Tularemia. *J Immunol Res*, 2018. 2018: 8087916

McMahon RM *et al*. Virulence of the Melioidosis Pathogen *Burkholderia pseudomallei* Requires the Oxidoreductase Membrane Protein DsbB. *Infect Immun*, 2018. 86(5).

Moore BD *et al*. Dual route vaccination for plague with emergency use applications. *Vaccine*, 2018. 36(34): 5210-5217

Reeman S *et al*. Protection of Mice from Lethal Vaccinia Virus Infection by Vaccinia Virus Protein Subunits with a CpG Adjuvant. *Viruses*, 2017. 9(12): 378

Ruske S *et al*. Machine learning for improved data analysis of biological aerosol using the WIBS. *Atmos. Meas. Tech*, 2018. 11: 6203-6230

Smither SJ *et al*. Two-Center Evaluation of Disinfectant Efficacy against Ebola Virus in Clinical and Laboratory Matrices. *Emerg Infect Dis*, 2018. 24(1): 135-139

Tsaousis AD *et al*. The Human Gut Colonizer Blastocystis Respires Using Complex II and Alternative Oxidase to Buffer Transient Oxygen Fluctuations in the Gut. *Front Cell Infect Microbiol*, 2018. 8: 371

Whelan AO *et al*. Protection induced by a *Francisella tularensis* subunit vaccine delivered by glucan particles. *PLoS One*, 2018. 13(10): e0200213

Willcocks SJ *et al*. High-throughput analysis of *Yersinia pseudotuberculosis* gene essentiality in optimised *in vitro* conditions, and implications for the speciation of *Yersinia pestis*. *BMC Microbiol*, 2018. 18: 46

Figure 1: Organisational Structure of Dstl (Division contributing to the Biological Defence Programme is CBR Division)

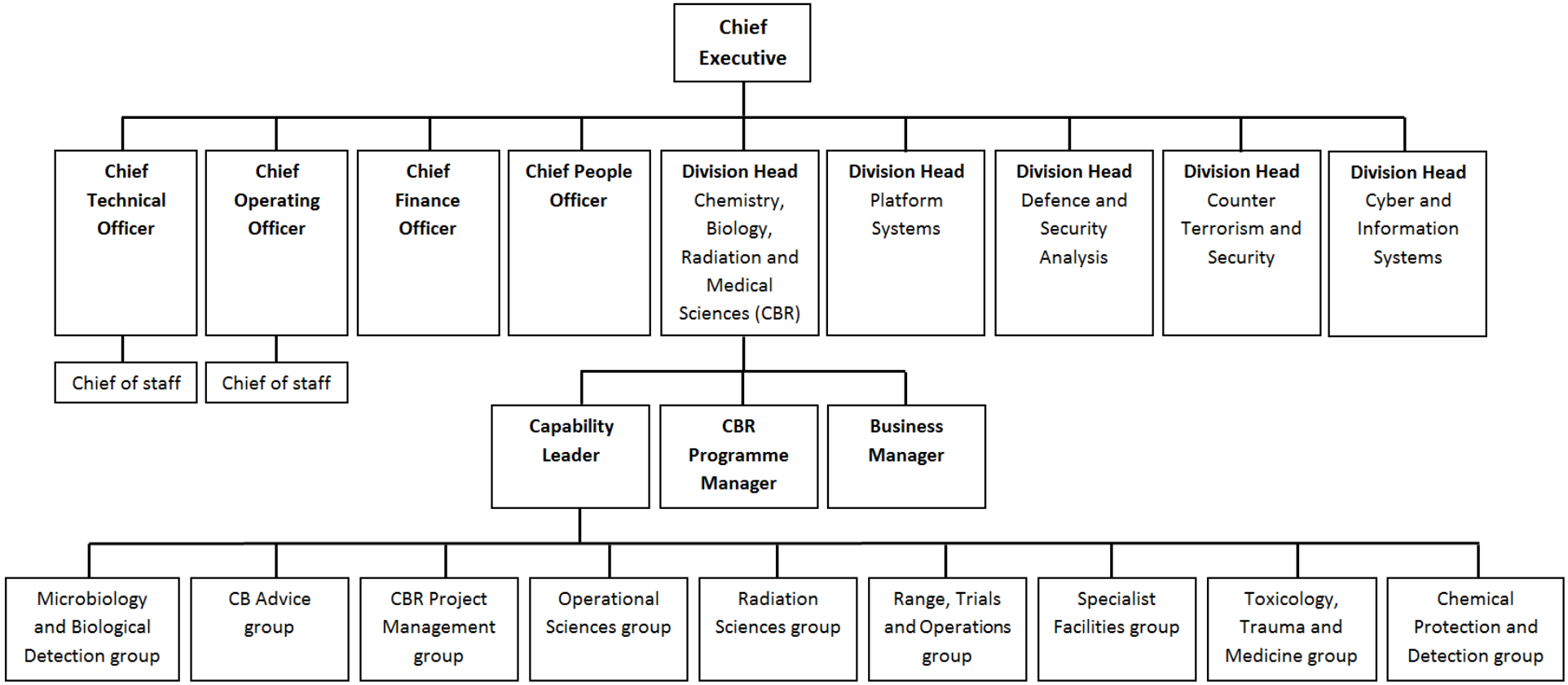


Figure 2: Routes to Dstl Porton Down

Dstl Porton Down

[dstl]

Dstl Porton Down
Salisbury, Wilts
SP4 0JQ

Central Enquiries
T +44 (0)1980 950000

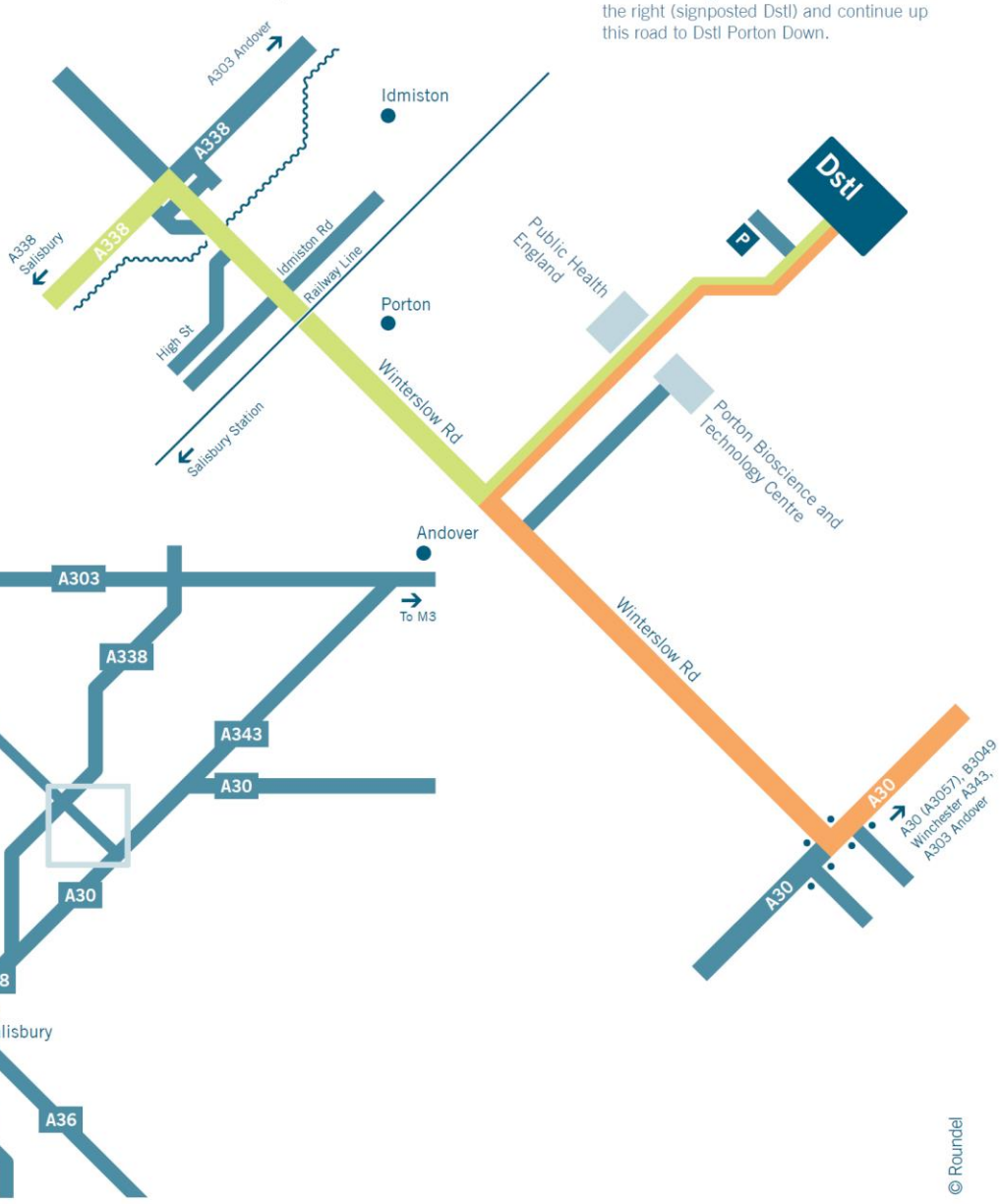
By Rail and Bus
Salisbury Station, suitable for disabled users, approx 20-30 mins by taxi. Alternatively from Andover Station, suitable for disabled users. Approx 30 mins by taxi.
Dstl operates an hourly shuttle bus service during the day from directly outside Salisbury train station entrance to Porton Down - speak to your host for the current timetable.

Dstl operates commuter bus services from Durrington, Amesbury and Salisbury (London Road) in addition to the services to and from Salisbury train station.

By Road
Green route from Salisbury. Take the A338 northbound signed to Cholderton and Marlborough. Turn right at Porton into Winterslow Road, crossing over the river and under the railway, and take the next road on the left (signposted Dstl). Continue up this road to Dstl Porton Down.

Orange route from Andover. Take the A343 southwest towards Salisbury. At the junction with the A30, continue towards Salisbury, then take the road northwest towards Porton at the traffic lights. Take the second road on the right (signposted Dstl) and continue up this road to Dstl Porton Down.

Detail map



Locator map

UK CBM 2019 FORM E ANNEX
LEGISLATION, REGULATIONS AND OTHER MEASURES: ADDITIONAL INFORMATION

For further details of relevant legislation, regulations and other measures see the following **(those amended since last year are shown in** red):

(a) The Biological Weapons Act 1974:

- http://www.legislation.gov.uk/ukpga/1974/6/contents

The Anti-Terrorism, Crime and Security Act 2001 (ATCSA):

- http://www.legislation.gov.uk/ukpga/2001/24/contents
- http://www.legislation.gov.uk/uksi/2007/926/contents/made
- http://www.legislation.gov.uk/uksi/2007/929/contents/made
- http://www.legislation.gov.uk/uksi/2012/1466/contents/made

The Academic Technology Approval Scheme (ATAS):

- https://www.gov.uk/academic-technology-approval-scheme

(b) UK Export Control legislation:

- https://www.gov.uk/guidance/export-military-or-dual-use-goods-services-or-technology-special-rules

UK Strategic Export Control Lists

- https://www.gov.uk/government/publications/uk-strategic-export-control-lists-the-consolidated-list-of-strategic-military-and-dual-use-items-that-require-export-authorisation

Latest version reflects the amendment of Council Regulation (EC) 428/2009 by Commission Delegated Regulation (EU) No 2018/1922 of 10 October 2018 (OJ L319/1 of 14/12/2018)

- https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018R1922

A summary of changes made to Council Regulation (EC) 428/2009 can be found here:

- http://trade.ec.europa.eu/doclib/docs/2018/october/tradoc_157452.pdf

(c) Relevant amendments in 2018 to Plant Health Orders and Regulations:

England:

- http://www.legislation.gov.uk/uksi/2018/71/contents/made?text=plant%20health#match-1
- http://www.legislation.gov.uk/uksi/2018/320/contents/made?text=plant%20health#match-1

- http://www.legislation.gov.uk/uksi/2018/910/contents/made?text=plant%20health#match-1
- http://www.legislation.gov.uk/uksi/2018/1051/contents/made?text=plant%20health#match-1
- http://www.legislation.gov.uk/uksi/2018/1136/contents/made?text=plant%20health#match-1

Scotland:

- http://www.legislation.gov.uk/ssi/2018/112/contents/made?text=plant%20health#match-1
- http://www.legislation.gov.uk/ssi/2018/283/contents/made?text=plant%20health#match-1

Wales:

- http://www.legislation.gov.uk/wsi/2018/1064/contents/made?text=plant%20health#match-1

Northern Ireland:

- http://www.legislation.gov.uk/nisr/2018/184/contents/made?text=plant%20health#match-1

England and Scotland (Forestry):

- http://www.legislation.gov.uk/uksi/2018/1048/contents/made?text=plant%20health#match-1

(d) Health and Safety at Work etc. Act 1974:

- http://www.legislation.gov.uk/ukpga/1974/37/contents

Health and Safety at Work (Northern Ireland) Order 1978:

- http://www.legislation.gov.uk/nisi/1978/1039

The Control of Substances Hazardous to Health Regulations 2002:

- http://www.legislation.gov.uk/uksi/2002/2677/contents/made

  The associated Approved List of Biological Agents - last revised list published in April 2016:

  - http://www.hse.gov.uk/pubns/misc208.pdf

  The associated Control of Substances Hazardous to Health Approved Code of Practice and Guidance (L5: Sixth Edition):

  - http://www.hse.gov.uk/pubns/books/l5.htm

The Control of Substances Hazardous to Health Regulations (Northern Ireland) 2003:

- http://www.legislation.gov.uk/nisr/2003/34/contents/made

The Genetically Modified Organisms (Contained Use) Regulations 2014:

- http://www.legislation.gov.uk/uksi/2014/1663/contents/made

The Genetically Modified Organisms (Contained Use) Regulations (Northern Ireland) 2015:

- http://www.legislation.gov.uk/nisr/2015/339/contents/made

The Specified Animal Pathogens Order 2008:

- http://www.legislation.gov.uk/uksi/2008/944/contents/made
- http://www.legislation.gov.uk/uksi/2009/3083/contents/made

The Specified Animal Pathogens (Wales) Order 2008:

- http://www.legislation.gov.uk/wsi/2008/1270/contents/made
- http://www.legislation.gov.uk/wsi/2009/3234/contents/made

The Specified Animal Pathogens (Scotland) Order 2009:

- http://www.legislation.gov.uk/ssi/2009/45/contents/made
- http://www.legislation.gov.uk/ssi/2009/394/contents/made

The Specified Animal Pathogens (Northern Ireland) Order 2008:

- http://www.legislation.gov.uk/nisr/2008/336/contents/made
- http://www.legislation.gov.uk/nisr/2010/24/contents/made

Guidance for licence holders on the containment and control of specified animal pathogens:

- http://www.hse.gov.uk/pubns/books/hsg280.htm

The Anti-Terrorism, Crime and Security Act 2001 (ATCSA):

- http://www.legislation.gov.uk/ukpga/2001/24/contents
- http://www.legislation.gov.uk/uksi/2007/926/contents/made
- http://www.legislation.gov.uk/uksi/2007/929/contents/made
- http://www.legislation.gov.uk/uksi/2012/1466/contents/made

Further information and guidance on biosafety and biosecurity measures in the UK:

- http://www.hse.gov.uk/biosafety/information.htm

Further information on UK domestic controls to prevent the proliferation of nuclear, chemical and biological weapons, and their means of delivery has been submitted under UN Security Council Resolution 1540 requirements and can be found via:

- http://www.un.org/en/sc/1540/national-implementation/national-reports.shtml
- http://www.un.org/en/sc/1540/national-implementation/1540-matrices/committee-approved-matrices.shtml
- http://www.un.org/en/sc/1540/national-implementation/legislative-database/list-of-legislative-documents.shtml