Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work (seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC)

DIRECTIVE 2000/54/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 18 September 2000

on the protection of workers from risks related to exposure to biological agents at work

(seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC)

CHAPTER I U.K.

GENERAL PROVISIONS

Article 1 *U.K.*

Objective

1 This Directive has as its aim the protection of workers against risks to their health and safety, including the prevention of such risks, arising or likely to arise from exposure to biological agents at work.

It lays down particular minimum provisions in this area.

2 Directive 89/391/EEC shall apply fully to the whole area referred to in paragraph 1, without prejudice to more stringent and/or specific provisions contained in this Directive.

3 This Directive shall apply without prejudice to the provisions of Council Directive 90/219/EEC[(1)] and of Council Directive 90/220/EEC[(2)].

Article 2 *U.K.*

Definitions

For the purpose of this Directive:

(a) 'biological agents' shall mean micro-organisms, including those which have been genetically modified, cell cultures and human endoparasites, which may be able to provoke any infection, allergy or toxicity;

(b) 'micro-organism' shall mean a microbiological entity, cellular or non-cellular, capable of replication or of transferring genetic material;

(c) 'cell culture' shall mean the in-vitro growth of cells derived from multicellular organisms.

'Biological agents' shall be classified into four risk groups, according to their level of risk of infection:

1. group 1 biological agent means one that is unlikely to cause human disease:

2. group 2 biological agent means one that can cause human disease and might be a hazard to workers; it is unlikely to spread to the community; there is usually effective prophylaxis or treatment available;

3. group 3 biological agent means one that can cause severe human disease and present a serious hazard to workers; it may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available;

4. group 4 biological agent means one that causes severe human disease and is a serious hazard to workers; it may present a high risk of spreading to the community; there is usually no effective prophylaxis or treatment available.

Article 3 U.K.

Scope — Determination and assessment of risks

1 This Directive shall apply to activities in which workers are or are potentially exposed to biological agents as a result of their work.

2 In the case of any activity likely to involve a risk of exposure to biological agents, the nature, degree and duration of workers' exposure must be determined in order to make it possible to assess any risk to the workers' health or safety and to lay down the measures to be taken.

In the case of activities involving exposure to several groups of biological agents, the risk shall be assessed on the basis of the danger presented by all hazardous biological agents present.

The assessment must be renewed regularly and in any event when any change occurs in the conditions which may affect workers' exposure to biological agents.

The employer must supply the competent authorities, at their request, with the information used for making the assessment.

3 The assessment referred to in paragraph 2 shall be conducted on the basis of all available information including:

a classification of biological agents which are or may be a hazard to human health, as referred to in Article 18;

b recommendations from a competent authority which indicate that the biological agent should be controlled in order to protect workers' health when workers are or may be exposed to such a biological agent as a result of their work;

c information on diseases which may be contracted as a result of the work of the workers;

d potential allergenic or toxigenic effects as a result of the work of the workers;

e knowledge of a disease from which a worker is found to be suffering and which has a direct connection with his work.

Article 4 U.K.

Application of the various Articles in relation to assessment of risks

1 If the results of the assessment referred to in Article 3 show that the exposure and/or potential exposure is to a group 1 biological agent, with no identifiable health risk to workers, Articles 5 to 17 and Article 19 shall not apply.

However, point 1 of Annex VI should be observed.

2 If the results of the assessment referred to in Article 3 show that the activity does not involve a deliberate intention to work with or use a biological agent but may result in the workers' being exposed to a biological agent, as in the course of the activities for which an indicative list is given in Annex I, Articles 5, 7, 8, 10, 11, 12, 13 and 14 shall apply unless the results of the assessment referred to in Article 3 show them to be unnecessary.

CHAPTER II U.K.

EMPLOYERS' OBLIGATIONS

Article 5 U.K.

Replacement

The employer shall avoid the use of a harmful biological agent if the nature of the activity so permits, by replacing it with a biological agent which, under its conditions of use, is not dangerous or is less dangerous to workers' health, as the case may be, in the present state of knowledge.

Article 6 U.K.

Reduction of risks

1 Where the results of the assessment referred to in Article 3 reveal a risk to workers' health or safety, workers' exposure must be prevented.

2 Where this is not technically practicable, having regard to the activity and the risk assessment referred to in Article 3, the risk of exposure must be reduced to as low a level as necessary in order to protect adequately the health and safety of the workers concerned, in particular by the following measures which are to be applied in the light of the results of the assessment referred to in Article 3:

a keeping as low as possible the number of workers exposed or likely to be exposed;

b design of work processes and engineering control measures so as to avoid or minimise the release of biological agents into the place of work;

c collective protection measures and/or, where exposure cannot be avoided by other means, individual protection measures;

d hygiene measures compatible with the aim of the prevention or reduction of the accidental transfer or release of a biological agent from the workplace;

e use of the biohazard sign depicted in Annex II and other relevant warning signs;

f drawing up plans to deal with accidents involving biological agents;

g testing, where it is necessary and technically possible, for the presence, outside the primary physical confinement, of biological agents used at work;

h means for safe collection, storage and disposal of waste by workers including the use of secure and identifiable containers, after suitable treatment where appropriate;

i arrangements for the safe handling and transport of biological agents within the workplace.

Article 7 U.K.

Information for the competent authority

1 Where the results of the assessment referred to in Article 3 reveal risk to workers' health or safety, employers shall, when requested, make available to the competent authority appropriate information on:

a the results of the assessment;

b the activities in which workers have been exposed or may have been exposed to biological agents;

c the number of workers exposed;

d the name and capabilities of the person responsible for safety and health at work;

e the protective and preventive measures taken, including working procedures and methods;

f an emergency plan for the protection of workers from exposure to group 3 or a group 4 biological agent which might result from a loss of physical containment.

2 Employers shall inform forthwith the competent authority of any accident or incident which may have resulted in the release of a biological agent and which could cause severe human infection and/or illness.

3 The list referred to in Article 11 and the medical record referred to in Article 14 shall be made available to the competent authority in cases where the undertaking ceases activity, in accordance with national laws and/or practice.

Article 8 U.K.

Hygiene and individual protection

1 Employers shall be obliged, in the case of all activities for which there is a risk to the health or safety of workers due to work with biological agents, to take appropriate measures to ensure that:

a workers do not eat or drink in working areas where there is a risk of contamination by biological agents;

b workers are provided with appropriate protective clothing or other appropriate special clothing;

c workers are provided with appropriate and adequate washing and toilet facilities, which may include eye washes and/or skin antiseptics;

d any necessary protective equipment is:

— properly stored in a well-defined place,

— checked and cleaned if possible before, and in any case after, each use,

— is repaired, where defective, or is replaced before further use;

e procedures are specified for taking, handling and processing samples of human or animal origin.

2 Working clothes and protective equipment, including protective clothing referred to in paragraph 1, which may be contaminated by biological agents, must be removed on leaving the working area and, before taking the measures referred to in the second subparagraph, kept separately from other clothing.

The employer must ensure that such clothing and protective equipment is decontaminated and cleaned or, if necessary, destroyed.

3 Workers may not be charged for the cost of the measures referred to in paragraphs 1 and 2.

Article 9 U.K.

Information and training of workers

1 Appropriate measures shall be taken by the employer to ensure that workers and/or any workers' representatives in the undertaking or establishment receive sufficient and appropriate training, on the basis of all available information, in particular in the form of information and instructions, concerning:

a potential risks to health;
b precautions to be taken to prevent exposure;
c hygiene requirements;
d wearing and use of protective equipment and clothing;
e steps to be taken by workers in the case of incidents and to prevent incidents.

2 The training shall be:

a given at the beginning of work involving contact with biological agents,
b adapted to take account of new or changed risks, and
c repeated periodically if necessary.

Article 10 U.K.

Worker information in particular cases

1 Employers shall provide written instructions at the workplace and, if appropriate, display notices which shall, as a minimum, include the procedure to be followed in the case of:

a a serious accident or incident involving the handling of a biological agent;
b handling a group 4 biological agent.

2 Workers shall immediately report any accident or incident involving the handling of a biological agent to the person in charge, or to the person responsible for safety and health at work.

3 Employers shall inform forthwith the workers and/or any workers' representatives of any accident or incident which may have resulted in the release of a biological agent and which could cause severe human infection and/or illness.

In addition, employers shall inform the workers and/or any workers' representatives in the undertaking or establishment as quickly as possible when a serious accident or

incident occurs, of the causes thereof and of the measures taken or to be taken to rectify the situation.

4 Each worker shall have access to the information on the list referred to in Article 11 which relates to him personally.

5 Workers and/or any workers' representatives in the undertaking or establishment shall have access to anonymous collective information.

6 Employers shall provide workers and/or their representatives, at their requst, with the information provided for in Article 7(1).

Article 11 U.K.

List of exposed workers

1 Employers shall keep a list of workers exposed to group 3 and/or group 4 biological agents, indicating the type of work done and, whenever possible, the biological agent to which they have been exposed, as well as records of exposures, accidents and incidents, as appropriate.

2 The list referred to in paragraph 1 shall be kept for at least 10 years following the end of exposure, in accordance with national laws and/or practice.

In the case of those exposures which may result in infections:

- a with biological agents known to be capable of establishing persistent or latent infections;
- b that, in the light of present knowledge, are undiagnosable until illness develops many years later;
- c that have particularly long incubation periods before illness develops;
- d that result in illnesses which recrudesce at times over a long period despite treatment, or
- e that may have serious long-term sequelae, the list shall be kept for an appropriately longer time up to 40 years following the last known exposure.

3 The doctor referred to in Article 14 and/or the competent authority for health and safety at work, and any other person responsible for health and safety at work, shall have access to the list referred to in paragraph 1.

Article 12 U.K.

Consultation and participation of workers

Consultation and participation of workers and/or their representatives in connection with matters covered by this Directive shall take place in accordance with Article 11 of Directive 89/391/EEC.

Article 13 U.K.

Notification to the competent authority

1 Prior notification shall be made to the competent authority of the use for the first time of:

- a group 2 biological agents;

b group 3 biological agents;
c group 4 biological agents.

The notification shall be made at least 30 days before the commencement of the work.

Subject to paragraph 2, prior notification shall also be made of the use for the first time of each subsequent group 4 biological agent and of any subsequent new group 3 biological agent where the employer himself provisionally classifies that biological agent.

2 Laboratories providing a diagnostic service in relation to group 4 biological agents shall be required only to make an initial notification of their intention.

3 Renotification must take place in any case where there are substantial changes of importance to safety or health at work to processes and/or procedures which render the notification out of date.

4 The notification referred to in paragraphs 1, 2 and 3 shall include:
a the name and address of the undertaking and/or establishment;
b the name and capabilities of the person responsible for safety and health at work;
c the results of the assessment referred to in Article 3;
d the species of the biological agent;
e the protection and preventive measures that are envisaged.

CHAPTER III U.K.

MISCELLANEOUS PROVISIONS

Article 14 *U.K.*

Health surveillance

1 The Member States shall establish, in accordance with national laws and practice, arrangements for carrying out relevant health surveillance of workers for whom the results of the assessment referred to in Article 3 reveal a risk to health or safety.

2 The arrangements referred to in paragraph 1 shall be such that each worker shall be able to undergo, if appropriate, relevant health surveillance:
a prior to exposure;
b at regular intervals thereafter.

Those arrangements shall be such that it is directly possible to implement individual and occupational hygiene measures.

3 The assessment referred to in Article 3 should identify those workers for whom special protective measures may be required.

When necessary, effective vaccines should be made available for those workers who are not already immune to the biological agent to which they are exposed or are likely to be exposed.

When employers make vaccines available, they should take account of the recommended code of practice set out in Annex VII.

If a worker is found to be suffering from an infection and/or illness which is suspected to be the result of exposure, the doctor or authority responsible for health surveillance of workers shall offer such surveillance to other workers who have been similarly exposed.

In that event, a reassessment of the risk of exposure shall be carried out in accordance with Article 3.

4 In cases where health surveillance is carried out, an individual medical record shall be kept for at least 10 years following the end of exposure, in accordance with national laws and practice.

In the special cases referred to in Article 11(2) second subparagraph, an individual medical record shall be kept for an appropriately longer time up to 40 years following the last known exposure.

5 The doctor or authority responsible for health surveillance shall propose any protective or preventive measures to be taken in respect of any individual worker.

6 Information and advice must be given to workers regarding any health surveillance which they may undergo following the end of exposure.

7 In accordance with national laws and/or practice:

a workers shall have access to the results of the health surveillance which concern them, and

b the workers concerned or the employer may request a review of the results of the health surveillance.

8 Practical recommendations for the health surveillance of workers are given in Annex IV.

9 All cases of diseases or death identified in accordance with national laws and/or practice as resulting from occupational exposure to biological agents shall be notified to the competent authority.

Article 15 *U.K.*

Health and veterinary care facilities other than diagnostic laboratories

1 For the purpose of the assessment referred to in Article 3, particular attention should be paid to:

a uncertainties about the presence of biological agents in human patients or animals and the materials and speciments taken from them;

b the hazard represented by biological agents known or suspected to be present in human patients or animals and materials and specimens taken from them;

c the risks posed by the nature of the work.

2 Appropriate measures shall be taken in health and veterinary care facilities in order to protect the health and safety of the workers concerned.

The measures to be taken shall include in particular:

a specifying appropriate decontamination and disinfection procedures, and

b implementing procedures enabling contaminated waste to be handled and disposed of without risk.

3 In isolation facilities where there are human patients or animals who are, or who are suspected of being, infected with group 3 or group 4 biological agents, containment measures shall be selected from those in Annex V column A, in order to minimise the risk of infection.

Article 16 U.K.

Special measures for industrial processes, laboratories and animal rooms

1 The following measures must be taken in laboratories, including diagnostic laboratories, and in rooms for laboratory animals which have been deliberately infected with group 2, 3 or 4 biological agents or which are or are suspected to be carriers of such agents.

a Laboratories carrying out work which involves the handling of group 2, 3 or 4 biological agents for research, development, teaching or diagnostic purposes shall determine the containment measures in accordance with Annex V, in order to minimise the risk of infection.

b Following the assessment referred to in Article 3, measures shall be determined in accordance with Annex V, after fixing the physical containment level required for the biological agents according to the degree of risk.

Activities involving the handling of a biological agent must be carried out:

— only in working areas corresponding to at least containment level 2, for a group 2 biological agent,

— only in working areas corresponding to at least containment level 3, for a group 3 biological agent,

— only in working areas corresponding to at least containment level 4, for a group 4 biological agent.

c Laboratories handling materials in respect of which there exist uncertainties about the presence of biological agents which may cause human disease but which do not have as their aim working with biological agents as such (i.e. cultivating or concentrating them) should adopt containment level 2 at least. Containment levels 3 or 4 must be used, when appropriate, where it is known or it is suspected that they are necessary, except where guidelines provided by the competent national authorities show that, in certain cases, a lower containment level is appropriate.

2 The following measures concerning industrial processes using group 2, 3 or 4 biological agents must be taken:

a The containment principles set out in the second subparagraph of paragraph 1(b) should also apply to industrial processes on the basis of the practical measures and appropriate procedures given in Annex VI.

b In accordance with the assessment of the risk linked to the use of group 2, 3 or 4 biological agents, the competent authorities may decide on appropriate measures which must be applied to the industrial use of such biological agents.

3 For all activities covered by paragraphs 1 and 2 where it has not been possible to carry out a conclusive assessment of a biological agent but concerning which it appears that the use envisaged might involve a serious health risk for workers, activities may only be carried out in workplaces where the containment level corresponds at least to level 3.

Article 17 U.K.

Use of data

The Commission shall have access to the use made by the competent national authorities of the information referred to in Article 14(9).

Article 18 U.K.

Classification of biological agents

1 Community classification shall be on the basis of the definitions in the second paragraph of Article 2, points 2 to 4 (groups 2 to 4).

2 Pending Community classification Member States shall classify biologial agents that are or may be a hazard to human health on the basis of the definition in the second paragraph of Article 2, points 2 to 4 (groups 2 to 4).

3 If the biological agent tobe assessed cannot be classified clearly in one of the groups defined in the second paragraph of Article 2, it must be classified in the highest risk group among the alternatives.

Article 19 U.K.

Annexes

Purely technical adjustments to the Annexes in the light of technical progress, changes in international regulations or specifications and new findings in the field of biological agents shall be adopted in accordance with the procedure laid down in Article 17 of Directive 89/391/EEC.

Article 20 U.K.

Notifying the Commission

Member States shall communicate to the Commission the provisions of national law which they adopt in the field governed by this Directive.

Article 21 U.K.

Repeal

Directive 90/679/EEC, amended by the Directives referred to in Annex VIII, part A is repealed, without prejudice to the obligations of the Member States in respect of the deadlines for transposition laid down in Annex VIII, part B.

References to the repealed Directive shall be construed as references to this Directive and shall be correlated in accordance with the correlation table set out in Annex IX.

Article 22 U.K.

Entry into force

This Directive enters into force on the twentieth day following its publication in the Official Journal of the European Communities.

Article 23 U.K.

Addresses

This Directive is addressed to the Member States.

[F1 ANNEX I U.K.

INDICATIVE LIST OF ACTIVITIES
(Article 4(2))

Textual Amendments

F1 Substituted by Commission Directive (EU) 2019/1833 of 24 October 2019 amending Annexes I, III, V and VI to Directive 2000/54/EC of the European Parliament and of the Council as regards purely technical adjustments.

Preliminary note

Where the result of the risk assessment, carried out in accordance with Article 3 and Article 4(2) of this Directive, shows an unintentional exposure to biological agents, there may be other work activities, not included in this Annex, which should be considered.

1. Work in food production plants.
2. Work in agriculture.
3. Work activities where there is contact with animals and/or products of animal origin.
4. Work in healthcare, including isolation and post-mortem units.
5. Work in clinical, veterinary and diagnostic laboratories, excluding diagnostic microbiological laboratories.
6. Work in refuse disposal plants.
7. Work in sewage purification installations.]

ANNEX II U.K.

BIOHAZARD SIGN
(Article 6(2)(e))

[F1 ANNEX III U.K.

COMMUNITY CLASSIFICATIONArticle 2, second paragraph, and Article 18
INTRODUCTORY NOTES

1. In line with the scope of the Directive, only agents which are known to infect humans are to be included in the classified list. U.K.

Where appropriate, indicators are given of the toxic and allergic potential of these agents.

Animal and plant pathogens which are known not to affect man are excluded.

In drawing up this list of classified biological agents consideration has not been given to genetically modified micro-organisms.

2. The list of classified agents is based on the effect of those agents on healthy workers. U.K.

No specific account is taken of particular effects on those whose susceptibility may be affected for one or other reason such as pre-existing disease, medication, compromised immunity, pregnancy or breast feeding.

Additional risk to such workers should be considered as part of the risk assessment required by the Directive.

In certain industrial processes, certain laboratory work or certain work with animals involving actual or potential exposure to biological agents of groups 3 or 4, any technical precautions taken must comply with Article 16 of the Directive.

3. Biological agents which have not been classified for inclusion in groups 2 to 4 of the list are not implicitly classified in group 1. U.K.

For genera where more than one species is known to be pathogenic to man, the list will include those species which are known to be the most frequently responsible for diseases, together with a more general reference to the fact that other species of the same genus may affect health.

When a whole genus is mentioned in the classified list of biological agents, it is implicit that the species and strains known to be non-pathogenic are excluded.

4. Where a strain is attenuated or has lost known virulence genes, then the containment required by the classification of its parent strain need not necessarily apply, subject to assessment appropriate for risk in the workplace. U.K.

This is the case, for example, when such a strain is to be used as a product or part of a product for prophylactic or therapeutic purposes.

5. The nomenclature of classified agents used to establish this list reflects and is in conformity with the latest international agreements of the taxonomy and nomenclature of agents at the time the list was prepared.

6. The list of classified biological agents reflects the state of knowledge at the time that it was devised. U.K.

It will be updated as soon as it no longer reflects the latest state of knowledge.

7. Member States are to ensure that all viruses which have already been isolated in humans and which have not been assessed and allocated in this Annex are classified in group 2 as a minimum, except where Member States have proof that they are unlikely to cause disease in humans.

8. Certain biological agents classified in group 3 which are indicated in the appended list by two asterisks (**), may present a limited risk of infection for workers because they are not normally infectious by the airborne route. U.K.

Member States shall assess the containment measures to be applied to such agents, taking account of the nature of specific activities in question and of the quantity of the agent involved, with a view to determining whether, in particular circumstances, some of these measures may be dispensed with.

9. The requirements as to containment consequent on the classification of parasites apply only to stages in the life cycle of the parasite in which it is liable to be infectious to humans at the workplace.

10. This list also gives a separate indication in cases where the biological agents are likely to cause allergic or toxic reactions, where an effective vaccine is available, or where it is advisable to keep a list of exposed workers for more than 10 years. U.K.

These indications are shown by the following letters:

A: Possible allergic effects

D: List of workers exposed to this biological agent to be kept for more than 10 years after the end of last known exposure

T: Toxin production

V: Effective vaccine available and registered within the EU

The application of preventive vaccination should take account of the code of practice given in Annex VII.

BACTERIA and similar organisms U.K.

NB: For biological agents appearing on this list, the entry of the whole genus with the addition of 'spp.' refers to other species belonging to this genus that have not specifically been included in the list, but which are known pathogens in humans. See introductory note 3 for further details.

Biological agent	Classification	Notes
Actinomadura madurae	W	
Actinomadura pelletieri	2	
Actinomyces gerencseriae	2	
Actinomyces israelii	2	
Actinomyces spp.	2	
Aggregatibacter actinomycetemcomitans (Actinobacillus actinomycetemcomitans)	2	
Anaplasma spp.	2	
Arcanobacterium haemolyticum (Corynebacterium haenolyticum)	2	
Arcobacter butzleri	2	

a See paragraph 8 of the introductory notes.

Bacillus anthracis	3	T
Bacteroides fragilis	2	
Bacteroides spp.	2	
Bartonella bacilliformis	2	
Bartonella quintana (Rochalimaea quintana)	2	
Bartonella (Rochalimaea) spp.	2	
Bordetella bronchiseptica	2	
Bordetella parapertussis	2	
Bordetella pertussis	2	T, V
Bordetella spp.	2	
Borrelia burgdorferi	2	
Borrelia duttonii	2	
Borrelia recurrentis	2	
Borrelia spp.	2	
Brachyspira spp.	2	
Brucella abortus	3	
Brucella canis	3	
Brucella inopinata	3	
Brucella melitensis	3	
Brucella suis	3	
Burkholderia cepacia	2	
Burkholderia mallei (Pseudomonas mallei)	3	
Burkholderia pseudomallei (Pseudomonas pseudomallei)	3	D
Campylobacter fetus subsp. *fetus*	2	
Campylobacter fetus subsp. *venerealis*	2	
Campylobacter jejuni subsp. *doylei*	2	
Campylobacter jejuni subsp. *jejuni*	2	
Campylobacter spp.	2	

a See paragraph 8 of the introductory notes.

Cardiobacterium hominis	2	
Cardiobacterium valvarum	2	
Chlamydia abortus (Chlamydophila abortus)	2	
Chlamydia caviae (Chlamydophila caviae)	2	
Chlamydia felis (Chlamydophila felis)	2	
Chlamydia pneumoniae (Chlamydophila pneumoniae)	2	
Chlamydia psittaci (Chlamydophila psittaci) (avian strains)	3	
Chlamydia psittaci (Chlamydophila psittaci) (other strains)	2	
Chlamydia trachomatis (Chlamydophila trachomatis)	2	
Clostridium botulinum	2	T
Clostridium difficile	2	T
Clostridium perfringens	2	T
Clostridium tetani	2	T, V
Clostridium spp.	2	
Corynebacterium diphtheriae	2	T, V
Corynebacterium minutissimum	2	
Corynebacterium pseudotuberculosis	2	T
Corynebacterium ulcerans	2	T
Corynebacterium spp.	2	
Coxiella burnetii	3	
Edwardsiella tarda	2	
Ehrlichia spp.	2	
Eikenella corrodens	2	
Elizabethkingia meningoseptica (Flavobacterium meningosepticum)	2	

a See paragraph 8 of the introductory notes.

Enterobacter aerogenes (Klebsiella mobilis)	2	
Enterobacter cloacae subsp. *cloacae (Enterobacter cloacae)*	2	
Enterobacter spp.	2	
Enterococcus spp.	2	
Erysipelothrix rhusiopathiae	2	
Escherichia coli (with the exception of non-pathogenic strains)	2	
Escherichia coli, verocytotoxigenic strains (e.g. O157:H7 or O103)	3[a]	T
Fluoribacter bozemanae (Legionella)	2	
Francisella hispaniensis	2	
Francisella tularensis subsp. *holarctica*	2	
Francisella tularensis subsp. *mediasiatica*	2	
Francisella tularensis subsp. *novicida*	2	
Francisella tularensis subsp. *tularensis*	3	
Fusobacterium necrophorum subsp. *funduliforme*	2	
Fusobacterium necrophorum subsp. *necrophorum*	2	
Gardnerella vaginalis	2	
Haemophilus ducreyi	2	
Haemophilus influenzae	2	V
Haemophilus spp.	2	
Helicobacter pylori	2	
Helicobacter spp.	2	
Klebsiella oxytoca	2	
Klebsiella pneumoniae subsp. *ozaenae*	2	

a See paragraph 8 of the introductory notes.

Klebsiella pneumoniae subsp. *pneumoniae*	2	
Klebsiella pneumoniae subsp. *rhinoscleromatis*	2	
Klebsiella spp.	2	
Legionella pneumophila subsp. *fraseri*	2	
Legionella pneumophila subsp. *pascullei*	2	
Legionella pneumophila subsp. *pneumophila*	2	
Legionella spp.	2	
Leptospira interrogans (all serovars)	2	
Leptospira interrogans spp.	2	
Listeria monocytogenes	2	
Listeria ivanovii subsp. *ivanovii*	2	
Listeria invanovii subsp. *londoniensis*	2	
Morganella morganii subsp. *morganii (Proteus morganii)*	2	
Morganella morganii subsp. *sibonii*	2	
Mycobacterium abscessus subsp. *abscessus*	2	
Mycobacterium africanum	3	V
Mycobacterium avium subsp. *avium (Mycobacterium avium)*	2	
Mycobacterium avium subsp. *paratuberculosis (Mycobacterium paratuberculosis)*	2	
Mycobacterium avium subsp. *silvaticum*	2	
Mycobacterium bovis	3	V
Mycobacterium caprae (Mycobacterium tuberculosis subsp. *caprae)*	3	

a See paragraph 8 of the introductory notes.

Mycobacterium chelonae	2	
Mycobacterium chimaera	2	
Mycobacterium fortuitum	2	
Mycobacterium intracellulare	2	
Mycobacterium kansasii	2	
Mycobacterium leprae	3	
Mycobacterium malmoense	2	
Mycobacterium marinum	2	
Mycobacterium microti	3[a]	
Mycobacterium pinnipedii	3	
Mycobacterium scrofulaceum	2	
Mycobacterium simiae	2	
Mycobacterium szulgai	2	
Mycobacterium tuberculosis	3	V
Mycobacterium ulcerans	3[a]	
Mycobacterium xenopi	2	
Mycoplasma hominis	2	
Mycoplasma pneumoniae	2	
Mycoplasma spp.	2	
Neisseria gonorrhoeae	2	
Neisseria meningitidis	2	V
Neorickettsia sennetsu (Rickettsia sennetsu, Ehrlichia sennetsu)	2	
Nocardia asteroides	2	
Nocardia brasiliensis	2	
Nocardia farcinica	2	
Nocardia nova	2	
Nocardia otitidiscaviarum	2	
Nocardia spp.	2	
Orientia tsutsugamushi (Rickettsia tsutsugamushi)	3	
Pasteurella multocida subsp. *gallicida (Pasteurella gallicida)*	2	

a See paragraph 8 of the introductory notes.

Pasteurella multocida subsp. *multocida*	2	
Pasteurella multocida subsp. *septica*	2	
Pasteurella spp.	2	
Peptostreptococcus anaerobius	2	
Plesiomonas shigelloides	2	
Porphyromonas spp.	2	
Prevotella spp.	2	
Proteus mirabilis	2	
Proteus penneri	2	
Proteus vulgaris	2	
Providencia alcalifaciens (Proteus inconstans)	2	
Providencia rettgeri (Proteus rettgeri)	2	
Providencia spp.	2	
Pseudomonas aeruginosa	2	T
Rhodococcus hoagii (Corynebacterium equii)	2	
Rickettsia africae	3	
Rickettsia akari	3[a]	
Rickettsia australis	3	
Rickettsia canadensis	2	
Rickettsia conorii	3	
Rickettsia heilongjiangensis	3[a]	
Rickettsia japonica	3	
Rickettsia montanensis	2	
Rickettsia typhi	3	
Rickettsia prowazekii	3	
Rickettsia rickettsii	3	
Rickettsia sibirica	3	
Rickettsia spp.	2	

a See paragraph 8 of the introductory notes.

Salmonella enterica (choleraesuis) subsp. *arizonae*	2	
Salmonella Enteritidis	2	
Salmonella Paratyphi A, B, C	2	V
Salmonella Typhi	3[a]	V
Salmonella Typhimurium	2	
Salmonella (other serovars)	2	
Shigella boydii	2	
Shigella dysenteriae (Type 1)	3[a]	T
Shigella dysenteriae, other than Type 1	2	
Shigella flexneri	2	
Shigella sonnei	2	
Staphylococcus aureus	2	T
Streptobacillus moniliformis	2	
Streptococcus agalactiae	2	
Streptococcus dysgalactiae subsp. *equisimilis*	2	
Streptococcus pneumoniae	2	T, V
Streptococcus pyogenes	2	T
Streptococcus suis	2	
Streptococcus spp.	2	
Treponema carateum	2	
Treponema pallidum	2	
Treponema pertenue	2	
Treponema spp.	2	
Trueperella pyogenes	2	
Ureaplasma parvum	2	
Ureaplasma urealyticum	2	
Vibrio cholerae (including El Tor)	2	T, V
Vibrio parahaemolyticus (Benecka parahaemolytica)	2	
Vibrio spp.	2	

a See paragraph 8 of the introductory notes.

Yersinia enterocolitica subsp. *enterolitica*	2	
Yersinia enterocolitica subsp. *palearctica*	2	
Yersinia pestis	3	
Yersinia pseudotuberculosis	2	
Yersinia spp.	2	

a See paragraph 8 of the introductory notes.

VIRUSES (*)

(*) See paragraph 7 of the introductory notes.

NB: Viruses have been listed according to their order (O), family (F) and genus (G).

Biological agent(virus species or indicated taxonomy order)	**Classification**	**Notes**
Bunyavirales (O)		
Hantaviridae (F)		
Orthohantavirus (G)		
Andes orthohantavirus (Hantavirus species causing Hantavirus Pulmonary Syndrome [HPS])	3	
Bayou orthohantavirus	3	
Black Creek Canal orthohantavirus	3	

a See paragraph 7 of the introductory notes.

b Classification according to WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use.

c See paragraph 8 of the introductory notes.

d Tick-borne encephalitis.

e Hepatitis delta virus is pathogenic in workers only in the presence of simultaneous or secondary infection caused by hepatitis B virus. Vaccination against hepatitis B virus will therefore protect workers who are not affected by hepatitis B virus against hepatitis delta virus.

f Only for types A and B.

g Recommended for work involving direct contact with these agents.

h Two viruses are identified: one a buffalopox type and the other a variant of the Vaccinia virus.

i Variant of cowpox virus.

j Variant of Vaccinia.

k At present there is no evidence of disease in humans caused by the other retroviruses of simian origin. As a precaution containment level 3 is recommended for work with them.

Cano Delgadito orthohantavirus	3	
Choclo orthohantavirus	3	
Dobrava-Belgrade orthohantavirus (Hantavirus species causing Haemorrhagic Fever with Renal Syndrome [HFRS])	3	
El Moro Canyon orthohantavirus	3	
Hantaan orthohantavirus (Hantavirus species causing Haemorrhagic Fever with Renal Syndrome [HFRS])	3	
Laguna Negra orthohantavirus	3	
Prospect Hill orthohantavirus	2	
Puumala orthohantavirus (Hantavirus species causing Nephropathia Epidemica [NE])	2	
Seoul orthohantavirus (Hantavirus species causing Haemorrhagic Fever with Renal Syndrome [HFRS])	3	
Sin Nombre orthohantavirus (Hantavirus species causing Hantavirus Pulmonary Syndrome [HPS])	3	

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i	Variant of cowpox virus.
j	Variant of Vaccinia.
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Other hantaviruses known to be pathogenic	2	
Nairoviridae (F)		
Orthonairovirus (G)		
Crimean-Congo haemorrhagic fever orthonairovirus	4	
Dugbe orthonairovirus	2	
Hazara orthonairovirus	2	
Nairobi sheep disease orthonairovirus	2	
Other nairoviruses known to be pathogenic	2	
Peribunyaviridae (F)		
Orthobunyavirus (G)		
Bunyamwera orthobunyavirus (Germiston virus)	2	
California encephalitis orthobunyavirus	2	
Oropouche orthobunyavirus	3	
Other orthobunyaviruses known to be pathogenic	2	
Phenuiviridae (F)		
Phlebovirus (G)		
Bhanja phlebovirus	2	

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b Classification according to WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use.

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Punta Toro phlebovirus	2	
Rift Valley fever phlebovirus	3	
Sandfly fever Naples phlebovirus (Toscana Virus)	2	
SFTS phlebovirus (Severe Fever with Thrombocytopenia Syndrome-Virus)	3	
Other phleboviruses known to be pathogenic	2	
Herpesvirales (O)		
Herpesviridae (F)		
Cytomegalovirus (G)		
Human betaherpesvirus 5 (Cytomegalovirus)	2	
Lymphocryptovirus (G)		
Human gammaherpesvirus 4 (Epstein-Barr virus)	2	
Rhadinoovirus (G)		
Human gammaherpesvirus 8	2	D
Roseolovirus (G)		
Human betaherpesvirus 6A (Human B-lymphotropic virus)	2	
Human betaherpesvirus 6B	2	
Human betaherpesvirus 7	2	

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j	Variant of Vaccinia.
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Simplexvirus (G)		
Macacine alphaherpesvirus 1 (Herpesvirus simiae, Herpes B virus)	3	
Human alphaherpesvirus 1 (Human herpesvirus 1, Herpes simplex virus type 1)	2	
Human alphaherpesvirus 2 (Human herpesvirus 2, Herpes simplex virus type 2)	2	
Varicellovirus (G)		
Human alphaherpesvirus 3 (Herpesvirus varicella-zoster)	2	V
Mononegavirales (O)		
Filoviridae (F)		
Ebolavirus (G)	4	
Marburgvirus (G)		
Marburg marburgvirus	4	
Paramyxoviridae (F)		
Avulavirus (G)		
Newcastle disease virus	2	
Henipavirus (G)		
Hendra henipavirus	4	
Nipah henipavirus	4	
Morbillivirus (G)		

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b Classification according to WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use.

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j Variant of Vaccinia.

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Measles morbillivirus	2	V
Respirovirus (G)		
Human respirovirus 1 (Parainfluenza virus 1)	2	
Human respirovirus 3 (Parainfluenza virus 3)	2	
Rubulavirus (G)		
Mumps rubulavirus	2	V
Human rubulavirus 2 (Parainfluenza virus 2)	2	
Human rubulavirus 4 (Parainfluenza virus 4)	2	
Pneumoviridae (F)		
Metapneumovirus (G)		
Orthopneumovirus (G)		
Human orthopneumovirus (Respiratory syncytial virus)	2	
Rhabdoviridae (F)		
Lyssavirus (G)		
Australian bat lyssavirus	3[c]	V
Duvenhage lyssavirus	3[c]	V
European bat lyssavirus 1	3[c]	V
European bat lyssavirus 2	3[c]	V
Lagos bat lyssavirus	3[c]	

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b Classification according to WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use.

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j Variant of Vaccinia.

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Mokola lyssavirus	3	
Rabies lyssavirus	3[c]	V
Vesiculovirus (G)		
Vesicular stomatitis virus, Alagoas vesiculovirus	2	
Vesicular stomatitis virus, Indiana vesiculovirus	2	
Vesicular stomatitis virus, New Jersey vesiculovirus	2	
Piry vesiculovirus (Piry virus)	2	
Nidovirales (O)		
Coronaviridae (F)		
Betacoronavirus (G)		
Severe acute respiratory syndrome-related coronavirus (SARS-virus)	3	
Middle East respiratory syndrome coronavirus (MERS-virus)	3	
Other *Coronaviridae* known to be pathogenic	2	
Picornavirales (O)		
Picornaviridae (F)		
Cardiovirus (G)		
Saffold virus	2	

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b Classification according to WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use.

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j Variant of Vaccinia.

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Cosavirus (G)		
Cosavirus A	2	
Enterovirus (G)		
Enterovirus A	2	
Enterovirus B	2	
Enterovirus C	2	
Enterovirus D, Human Enterovirus type 70 (Acute haemorrhagic conjunctivitis virus)	2	
Rhinoviruses	2	
Poliovirus, type 1 and 3	2	V
Poliovirus, type 2[b]	3	V
Hepatovirus (G)		
Hepatovirus A (Hepatitis A virus, Human Enterovirus type 72)	2	V
Kobuvirus (G)		
Aichivirus A (Aichi virus 1)	2	
Parechovirus (G)		
Parechoviruses A	2	
Parechoviruses B (Ljungan virus)	2	
Other *Picornaviridae* known to be pathogenic	2	

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i	Variant of cowpox virus.
j	Variant of Vaccinia.
k	At present there is no evidence of disease in humans caused by the other retroviruses of simian origin. As a precaution containment level 3 is recommended for work with them.

Unassigned (O)		
Adenoviridae (F)	2	
Astroviridae (F)	2	
Arenaviridae (F)		
Mammarenavirus (G)		
Brazilian mammarenavirus	4	
Chapare mammarenavirus	4	
Flexal mammarenavirus	3	
Guanarito mammarenavirus	4	
Junín mammarenavirus	4	
Lassa mammarenavirus	4	
Lujo mammarenavirus	4	
Lymphocytic choriomeningitis mammarenavirus, neurotropic strains	2	
Lymphocytic choriomeningitis mammarenavirus (other strains)	2	
Machupo mammarenavirus	4	
Mobala mammarenavirus	2	
Mopeia mammarenavirus	2	
Tacaribe mammarenavirus	2	

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i Variant of cowpox virus.

j Variant of Vaccinia.

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Whitewater Arroyo mammarenavirus	3	
Caliciviridae (F)		
Norovirus (G)		
Norovirus (Norwalk virus)	2	
Other *Caliciviridae* known to be pathogenic	2	
Hepadnaviridae (F)		
Orthohepadnavirus (G)		
Hepatitis B virus	3[c]	V, D
Hepeviridae (F)		
Orthohepevirus (G)		
Orthohepevirus A (Hepatitis E virus)	2	
Flaviviridae (F)		
Flavivirus (G)		
Dengue virus	3	
Japanese encephalitis virus	3	V
Kyasanur Forest disease virus	3	V
Louping ill virus	3[c]	
Murray Valley encephalitis virus (Australia encephalitis virus)	3	
Omsk haemorrhagic fever virus	3	

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k	At present there is no evidence of disease in humans caused by the other retroviruses of simian origin. As a precaution containment level 3 is recommended for work with them.

Powassan virus	3	
Rocio virus	3	
St. Louis encephalitis virus	3	
Tick-borne encephalitis virus		
Absettarov virus	3	
Hanzalova virus	3	
Hypr virus	3	
Kumlinge virus	3	
Negishi virus	3	
Russian spring-summer encephalitis[d]	3	V
Tick-borne encephalitis virus Central European subtype	3[c]	V
Tick-borne encephalitis virus Far Eastern Subtype	3	
Tick-borne encephalitis virus Siberian subtype	3	V
Wesselsbron virus	3[c]	
West Nile fever virus	3	
Yellow fever virus	3	V
Zika virus	2	
Other flaviviruses known to be pathogenic	2	
Hepacivirus (G)		

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h	Two viruses are identified: one a buffalopox type and the other a variant of the Vaccinia virus.
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Hepacivirus C (Hepatitis C virus)	3[c]	D
Orthomyxoviridae (F)		
Gammainfluenzavirus (G)		
Influenza C virus	2	V[f]
Influenzavirus A (G)		
Highly Pathogenic Avian Influenza Viruses HPAIV (H5), e.g. H5N1	3	
Highly Pathogenic Avian Influenza Viruses HPAIV (H7), e.g. H7N7, H7N9	3	
Influenza A virus	2	V[f]
Influenza A virus A/New York/1/18 (H1N1) (Spanish flu 1918)	3	
Influenza A virus A/ Singapore/1/57 (H2N2)	3	
Low Pathogenic Avian Influenza Virus (LPAI) H7N9	3	
Influenzavirus B (G)		
Influenza B virus	2	V[f]
Thogoto virus (G)		
Dhori virus (Tick-borne *orthomyxoviridae*: Dhori)	2	
Thogoto virus (Tick-borne *orthomyxoviridae*: Thogoto)	2	

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Papillomaviridae (F)	2	D[g]
Parvoviridae (F)		
Erythroparvovirus (G)		
Primate erythroparvovirus 1 (Human parvovirus, B 19 virus)	2	
Polyomaviridae (F)		
Betapolyomavirus (G)		
Human polyomavirus 1 (BK virus)	2	D[g]
Human polyomavirus 2 (JC virus)	2	D[g]
Poxviridae (F)		
Molluscipoxvirus (G)		
Molluscum contagiosum virus	2	
Orthopoxvirus (G)		
Cowpox virus	2	
Monkeypox virus	3	V
Vaccinia virus (incl. Buffalopox virus[h], Elephantpox virus[i], Rabbitpox virus[j])	2	
Variola (major and minor) virus	4	V
Parapoxvirus (G)		

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Orf virus	2	
Pseudocowpox virus (Milkers' node virus, parapoxvirus bovis)	2	
Yatapoxvirus (G)		
Tanapox virus	2	
Yaba monkey tumor virus	2	
Reoviridae (F)		
Seadornavirus (G)		
Banna virus	2	
Coltivirus (G)	2	
Rotaviruses (G)	2	
Orbivirus (G)	2	
Retroviridae (F)		
Deltaretrovirus (G)		
Primate T-lymphotropic virus 1 (Human T-cell lymphotropic virus, type 1)	3[c]	D
Primate T-lymphotropic virus 2 (Human T-cell lymphotropic virus, type 2)	3[c]	D
Lentivirus (G)		
Human immunodeficiency virus 1	3[c]	D
Human immunodeficiency virus 2	3[c]	D

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Simian Immunodeficiency Virus (SIV)[k]	2	
Togaviridae (F)		
Alphavirus (G)		
Cabassouvirus	3	
Eastern equine encephalomyelitis virus	3	V
Bebaru virus	2	
Chikungunya virus	3[c]	
Everglades virus	3[c]	
Mayaro virus	3	
Mucambo virus	3[c]	
Ndumu virus	3[c]	
O'nyong-nyong virus	2	
Ross River virus	2	
Semliki Forest virus	2	
Sindbis virus	2	
Tonate virus	3[c]	
Venezuelan equine encephalomyelitis virus	3	V
Western equine encephalomyelitis virus	3	V
Other alphaviruses known to be pathogenic	2	

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Rubivirus (G)		
Rubella virus	2	V
Unassigned (F)		
Deltavirus (G)		
Hepatitis delta virus[e]	2	V, D

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PRION DISEASE AGENTS

Biological agent	Classification	Notes
Agent of Creutzfeldt-Jakob disease	3[a]	D[b]
Variant Agent of Creutzfeldt-Jakob disease	3[a]	D[b]
Agent of Bovine Spongiform Encephalopathy (BSE) and other related animal TSEs	3[a]	D[b]
Agent of Gerstmann-Sträussler-Scheinker syndrome	3[a]	D[b]
Agent of Kuru	3[a]	D[b]
Agent of Scrapie	2	

a See paragraph 8 of the introductory notes.

b Recommended for work involving direct contact with these agents.

PARASITES

NB: For biological agents appearing on this list, the entry of the whole genus with the addition of ‘spp.’ refers to other species belonging to this genus that have not specifically been included in the list, but which are known pathogens in humans. See introductory note 3 for further details.

Biological agent	Classification	Notes
Acanthamoeba castellani	2	
Ancylostoma duodenale	2	
Angiostrongylus cantonensis	2	
Angiostrongylus costaricensis	2	
Anisakis simplex	2	A
Ascaris lumbricoides	2	A
Ascaris suum	2	A
Babesia divergens	2	
Babesia microti	2	
Balamuthia mandrillaris	3	
Balantidium coli	2	
Brugia malayi	2	
Brugia pahangi	2	
Brugia timori	2	
Capillaria philippinensis	2	
Capillaria spp.	2	
Clonorchis sinensis (Opisthorchis sinensis)	2	
Clonorchis viverrini (Opisthirchis viverrini)	2	
Cryptosporidium hominis	2	
Cryptosporidium parvum	2	
Cyclospora cayetanensis	2	
Dicrocoelium dentriticum	2	
Dipetalonema streptocerca	2	
Diphyllobothrium latum	2	
Dracunculus medinensis	2	
Echinococcus granulosus	3[a]	
Echinococcus multilocularis	3[a]	
Echinococcus oligarthrus	3[a]	
Echinococcus vogeli	3[a]	
Entamoeba histolytica	2	
Enterobius vermicularis	2	

a See paragraph 8 of the introductory notes.

Enterocytozoon bieneusi	2	
Fasciola gigantica	2	
Fasciola hepatica	2	
Fasciolopsis buski	2	
Giardia lamblia (Giardia duodenalis, Giardia intestinalis)	2	
Heterophyes spp.	2	
Hymenolepis diminuta	2	
Hymenolepis nana	2	
Leishmania aethiopica	2	
Leishmania braziliensis	3[a]	
Leishmania donovani	3[a]	
Leishmania guyanensis (Viannia guyanensis)	3[a]	
Leishmania infantum (Leishmania chagasi)	3[a]	
Leishmania major	2	
Leishmania mexicana	2	
Leishmania panamensis (Viannia panamensis)	3[a]	
Leishmania peruviana	2	
Leishmania tropica	2	
Leishmania spp.	2	
Loa loa	2	
Mansonella ozzardi	2	
Mansonella perstans	2	
Mansonella streptocerca	2	
Metagonimus spp.	2	
Naegleria fowleri	3	
Necator americanus	2	
Onchocerca volvulus	2	
Opisthorchis felineus	2	
Opisthorchis spp.	2	
Paragonimus westermani	2	

a See paragraph 8 of the introductory notes.

Paragonimus spp.	2	
Plasmodium falciparum	3[a]	
Plasmodium knowlesi	3[a]	
Plasmodium spp. (human and simian)	2	
Sarcocystis suihominis	2	
Schistosoma haematobium	2	
Schistosoma intercalatum	2	
Schistosoma japonicum	2	
Schistosoma mansoni	2	
Schistosoma mekongi	2	
Strongyloides stercoralis	2	
Strongyloides spp.	2	
Taenia saginata	2	
Taenia solium	3[a]	
Toxocara canis	2	
Toxocara cati	2	
Toxoplasma gondii	2	
Trichinella nativa	2	
Trichinella nelsoni	2	
Trichinella pseudospiralis	2	
Trichinella spiralis	2	
Trichomonas vaginalis	2	
Trichostrongylus orientalis	2	
Trichostrongylus spp.	2	
Trichuris trichiura	2	
Trypanosoma brucei brucei	2	
Trypanosoma brucei gambiense	2	
Trypanosoma brucei rhodesiense	3[a]	
Trypanosoma cruzi	3[a]	
Wuchereria bancrofti	2	

a See paragraph 8 of the introductory notes.

FUNGI

NB: For biological agents appearing on this list, the entry of the whole genus with the addition of 'spp.' refers to other species belonging to this genus that have not specifically been included in the list, but which are known pathogens in humans. See introductory note 3 for further details.

Biological agent	**Classification**	**Notes**
Aspergillus flavus	2	A
Aspergillus fumigatus	2	A
Aspergillus spp.	2	
Blastomyces dermatitidis (Ajellomyces dermatitidis)	3	
Blastomyces gilchristii	3	
Candida albicans	2	A
Candida dubliniensis	2	
Candida glabrata	2	
Candida parapsilosis	2	
Candida tropicalis	2	
Cladophialophora bantiana (Xylohypha bantiana, Cladosporium bantianum, trichoides)	3	
Cladophialophora modesta	3	
Cladophialophora spp.	2	
Coccidioides immitis	3	A
Coccidioides posadasii	3	A
Cryptococcus gattii (Filobasidiella neoformans var. bacillispora)	2	A
Cryptococcus neoformans (Filobasidiella neoformans var. neoformans)	2	A
Emmonsia parva var. *parva*	2	
Emmonsia parva var. *crescens*	2	
Epidermophyton floccosum	2	A
Epidermophyton spp.	2	
Fonsecaea pedrosoi	2	
Histoplasma capsulatum	3	
Histoplasma capsulatum var. farciminosum	3	

Histoplasma duboisii	3	
Madurella grisea	2	
Madurella mycetomatis	2	
Microsporum spp.	2	A
Nannizzia spp.	2	
Neotestudina rosatii	2	
Paracoccidioides brasiliensis	3	A
Paracoccidioides lutzii	3	
Paraphyton spp.	2	
Rhinocladiella mackenziei	3	
Scedosporium apiospermum	2	
Scedosporium prolificans (inflatum)	2	
Sporothrix schenckii	2	
Talaromyces marneffei (Penicillium marneffei)	2	A
Trichophyton rubrum	2	A
Trichophyton tonsurans	2	A
Trichophyton spp.	2	]

ANNEX IV U.K.

PRACTICAL RECOMMENDATIONS FOR THE HEALTH SURVEILLANCE OF WORKERS
(Article 14(8))

1. The doctor and/or the authority responsible for the health surveillance of workers exposed to biological agents must be familiar with the exposure conditions or circumstances of each worker.

2. Health surveillance of workers must be carried out in accordance with the principles and practices of occupational medicine: it must include at least the following measures:

— keeping records of a worker's medical and occupational history,

— a personalised assessment of the worker's state of health.

— where appropriate, biological monitoring, as well as detection of early and reversible effects.

Further tests may be decided on for each worker when he is the subject of health surveillance, in the light of the most recent knowledge available to occupational medicine.

[F1 ANNEX V U.K.

INDICATIONS CONCERNING CONTAINMENT MEASURES AND CONTAINMENT LEVELS (Articles 15(3) and 16(1)(a) and (b))

Preliminary note

The measures contained in this Annex shall be applied according to the nature of the activities, the assessment of risk to workers, and the nature of the biological agent concerned.

In the table, 'Recommended' means that the measures should in principle be applied, unless the results of the assessment referred to in Article 3(2) indicate otherwise.

A. Containment measures	**B. Containment levels**		
	2	**3**	**4**
Workplace			
1. The workplace is to be separated from any other activities in the same building	No	Recommended	Yes
2. The workplace is to be sealable to permit fumigation	No	Recommended	Yes
Facilities			
3. Infected material including any animal is to be handled in a safety cabinet or isolation or other suitable containment	Where appropriate	Yes, where infection is by airborne route	Yes
Equipment			
4. Input air and extract air to the workplace are to be filtered using (HEPA[a]) or likewise	No	Yes, on extract air	Yes, on input and extract air
5. The workplace is to be maintained at an air pressure negative to atmosphere	No	Recommended	Yes
6. Surfaces impervious to water and easy to clean	Yes, for bench and floor	Yes, for bench, floor and other surfaces determined by risk assessment	Yes, for bench, walls, floor and ceiling

a HEPA: High efficiency particulate air

b Airlock: Entry must be through an airlock which is a chamber isolated from the laboratory. The clean side of the airlock must be separated from the restricted side by changing or showering facilities and preferably by interlocking doors.**]**

7. Surfaces resistant to acids, alkalis, solvents, disinfectants	Recommended	Yes	Yes
System of work			
8. Access is to be restricted to nominated workers only	Recommended	Yes	Yes, via airlock[b]
9. Efficient vector control, for example rodents and insects	Recommended	Yes	Yes
10. Specified disinfection procedures	Yes	Yes	Yes
11. Safe storage of a biological agent	Yes	Yes	Yes, secure storage
12. Personnel should shower before leaving the contained area	No	Recommended	Recommended
Waste			
13. Validated inactivation process for the safe disposal of animal carcases	Recommended	Yes, on or off site	Yes, on site
Other measures			
14. A laboratory is to contain its own equipment	No	Recommended	Yes
15. An observation window, or, alternative, is to be present, so that occupants can be seen	Recommended	Recommended	Yes

a HEPA: High efficiency particulate air

b Airlock: Entry must be through an airlock which is a chamber isolated from the laboratory. The clean side of the airlock must be separated from the restricted side by changing or showering facilities and preferably by interlocking doors.**]**

[F1ANNEX VI U.K.

CONTAINMENT FOR INDUSTRIAL PROCESSES
(Article 4(1) and Article 16(2)(a))

Preliminary note

In the table, 'Recommended' means that the measures should in principle be applied, unless the results of the assessment referred to in Article 3(2) indicate otherwise.

Group 1 biological agents

For work with group 1 biological agents including live attenuated vaccines, the principles of good occupational safety and hygiene should be observed.

Groups 2, 3 and 4 biological agents

It may be appropriate to select and combine containment requirements from different categories below on the basis of a risk assessment related to any particular process or part of a process.

A. Containment measures	**B. Containment levels**		
	2	**3**	**4**
General			
1. Viable organisms should be handled in a system which physically separates the process from the environment	Yes	Yes	Yes
2. Exhaust gases from the closed system should be treated so as to:	Minimise release	Prevent release	Prevent release
3. Sample collection, addition of materials to a closed system and transfer of viable organisms to another closed system, should be performed so as to:	Minimise release	Prevent release	Prevent release
4. Bulk culture fluids should not be removed from the closed system unless the viable organisms have been:	Inactivated by validated chemical or physical means	Inactivated by validated chemical or physical means	Inactivated by validated chemical or physical means
5. Seals should be designed so as to:	Minimise release	Prevent release	Prevent release
6. The controlled area should be designed to contain spillage of the	No	Recommended	Yes

a HEPA: High efficiency particulate air

b Closed system: A system that physically separates the process from the environment (e.g. incubator vats, tanks, etc.).

c Airlock: Entry must be through an airlock which is a chamber isolated from the laboratory. The clean side of the airlock must be separated from the restricted side by changing or showering facilities and preferably by interlocking doors.**]**

entire contents of the closed system			
7. The controlled area should be sealable to permit fumigation	No	Recommended	Yes
Facilities			
8. Decontamination and washing facilities should be provided for personnel	Yes	Yes	Yes
Equipment			
9. Input air and extract air to the controlled area should be HEPA[a] filtered	No	Recommended	Yes
10. The controlled area should be maintained at an air pressure negative to atmosphere	No	Recommended	Yes
11. The controlled area should be adequately ventilated to minimise air contamination	Recommended	Recommended	Yes
System of work			
12. Closed systems[b] should be located within a controlled area	Recommended	Recommended	Yes, and purpose-built
13. Biohazard signs should be posted	Recommended	Yes	Yes
14. Access should be restricted to nominated personnel only	Recommended	Yes	Yes, via an airlock[c]
15. Personnel should shower before leaving the controlled area	No	Recommended	Yes

a HEPA: High efficiency particulate air

b Closed system: A system that physically separates the process from the environment (e.g. incubator vats, tanks, etc.).

c Airlock: Entry must be through an airlock which is a chamber isolated from the laboratory. The clean side of the airlock must be separated from the restricted side by changing or showering facilities and preferably by interlocking doors.**]**

16. Personnel should wear protective clothing	Yes, work clothing	Yes	Yes, complete change
Waste			
17. Effluent from sinks and showers should be collected and inactivated before release	No	Recommended	Yes
18. Effluent treatment before final discharge	Inactivated by validated chemical or physical means	Inactivated by validated chemical or physical means	Inactivated by validated chemical or physical means

a HEPA: High efficiency particulate air

b Closed system: A system that physically separates the process from the environment (e.g. incubator vats, tanks, etc.).

c Airlock: Entry must be through an airlock which is a chamber isolated from the laboratory. The clean side of the airlock must be separated from the restricted side by changing or showering facilities and preferably by interlocking doors.]

ANNEX VII U.K.

RECOMMENDED CODE OF PRACTICE ON VACCINATION
(Article 14(3))

1. If the assessment referred to in Article 3(2) reveals that there is a risk to the health and safety of workers due to their exposure to biological agents for which effective vaccines exist, their employers should offer them vaccination.

2. Vaccination should be carried out in accordance with national law and/or practice.

Workers should be informed of the benefits and drawbacks of both vaccination and non-vaccination.

3. Vaccination must be offered free of charge to workers.

4. A vaccination certificate may be drawn up which should be made available to the worker concerned and, on request, to the competent authorities.

ANNEX VIII U.K.

PART A U.K.

Repealed Directive with its successive amendments

(referred to in Article 21)

Council Directive 90/679/EEC (OJ L 374, 31.12.1990, p. 1)

Council Directive 93/88/EEC (OJ L 268, 29.10.1993, p. 71)

Commission Directive 95/30/EC (OJ L 155, 6.7.1995, p. 41)

Commission Directive 97/59/EC (OJ L 282, 15.10.1997, p. 33)

Commission Directive 97/65/EC (OJ L 335, 6.12.1997, p. 17)

PART B U.K.

DEADLINES FOR TRANSPOSITION INTO NATIONAL LAW

(referred to in Article 21)

Directive	**Deadline for transposition**
90/679/EEC	28 November 1993
93/88/EEC	30 April 1994
95/30/EC	30 November 1996
97/59/EC	31 March 1998
97/65/EC	30 June 1998

ANNEX IX U.K.

CORRELATION TABLE

Directive 90/679/EEC	**This Directive**
Article 1	Article 1
Article 2, point (a)	Article 2, first paragraph, point (a)
Article 2, point (b)	Article 2, first paragraph, point (b)
Article 2, point (c)	Article 2, first paragraph, point (c)
Article 2, point (d)	Article 2, second paragraph
Article 3(1)	Article 3(1)
Article 3(2)(a)	Article 3(2), first subparagraph
Article 3(2)(b)	Article 3(2), second subparagraph
Article 3(2)(c)	Article 3(2), third subparagraph
Article 3(2)(d)	Article 3(2), fourth subparagraph
Article 3(3), first indent	Article 3(3)(a)
Article 3(3), second indent	Article 3(3)(b)
Article 3(3), third indent	Article 3(3)(c)
Article 3(3), fourth indent	Article 3(3)(d)
Article 3(3), fifth indent	Article 3(3)(e)
Article 4	Article 4

Article 5	Article 5
Article 6	Article 6
Article 7(1), first indent	Article 7(1)(a)
Article 7(1), second indent	Article 7(1)(b)
Article 7(1), third indent	Article 7(1)(c)
Article 7(1), fourth indent	Article 7(1)(d)
Article 7(1), fifth indent	Article 7(1)(e)
Article 7(1), sixth indent	Article 7(1)(f)
Article 7(2)	Article 7(2)
Article 7(3)	Article 7(3)
Article 8(1)(a) to (e)	Article 8(1)(a) to (e)
Article 8(2)(a)	Article 8(2), first subparagraph
Article 8(2)(b)	Article 8(2), second subparagraph
Article 8(3)	Article 8(3)
Article 9(1)(a) to (e)	Article 9(1)(a) to (e)
Article 9(2), first indent	Article 9(2)(a)
Article 9(2), second indent	Article 9(2)(b)
Article 9(2), third indent	Article 9(2)(c)
Article 10(1), first indent	Article 10(1)(a)
Article 10(1), second indent	Article 10(1)(b)
Article 10(2) to (6)	Article 10(2) to (6)
Article 11(1)	Article 11(1)
Article 11(2), second subparagraph, first indent	Article 11(2), second subparagraph, (a)
Article 11(2), second subparagraph, second indent	Article 11(2), second subparagraph, (b)
Article 11(2), second subparagraph, third indent	Article 11(2), second subparagraph, (c)
Article 11(2), second subparagraph, fourth indent	Article 11(2), second subparagraph, (d)
Article 11(2), second subparagraph, fifth indent	Article 11(2), second subparagraph, (e)
Article 11(3)	Article 11(3)
Article 12	Article 12
Article 13(1), first indent	Article 13(1)(a)
Article 13(1), second indent	Article 13(1)(b)

Article 13(1), third indent	Article 13(1)(c)
Article 13(2) to (4)	Article 13(2) to (4)
Article 14(1)	Article 14(1)
Article 14(2), first indent	Article 14(2)(a)
Article 14(2), second indent	Article 14(2)(b)
Article 14(3) to (6)	Article 14(3) to (6)
Article 14(7), first indent	Article 14(7)(a)
Article 14(7), second indent	Article 14(7)(b)
Article 14(8)	Article 14(8)
Article 14(9)	Article 14(9)
Article 15	Article 15
Article 16(1)	Article 16(1)
Article 16(2)(a)	Article 16(2)(a)
Article 16(2)(b)	Article 16(2)(b)
Article 16(2)(c)	Article 16(3)
Article 17	Article 17
Article 18(1)	—
Article 18(2)	Article 18(1)
Article 18(3)	Article 18(2)
Article 18(4)	Article 18(3)
Article 19	Article 19
Article 20(1)	—
Article 20(2)	Article 20
—	Article 21
—	Article 22
—	Article 23
Annex I	Annex I
Annex II	Annex II
Annex III	Annex III
Annex IV	Annex IV
Annex V	Annex V
Annex VI	Annex VI
Annex VII	Annex VII
—	Annex VIII

—	Annex IX

(**1**) Council Directive 90/219/EEC of 23 April 1990 on the contained use of genetically modified micro-organisms (OJ L 117, 8.5.1990, p. 1). Directive as last amended by Directive 98/81/EC (OJ L 330, 5.12.1998, p. 13).

(**2**) Council Directive 90/220/EEC of 23 April 1990 on the deliberate release into the environment of genetically modified organisms (OJ L 117, 8.5.1990, p. 15). Directive as last amended by Directive 97/ 35/EC (OJ L 169, 27.6.1997, p. 72).