

# The Approved List of biological agents

Advisory Committee on Dangerous Pathogens



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The Control of Substances Hazardous to Health Regulations 2002 refer to an 'approved classification of a biological agent', which means the classification of that agent approved by the Health and Safety Executive (HSE). This list is approved by HSE for that purpose.

This edition of the Approved List has effect from 12 July 2021. On that date the previous edition of the list approved by the Health and Safety Executive on the 1 July 2013 will cease to have effect. This list will be reviewed periodically, the next review is due in February 2022.

The Advisory Committee on Dangerous Pathogens (ACDP) prepares the Approved List included in this publication. ACDP advises HSE, and Ministers for the Department of Health and Social Care and the Department for the Environment, Food & Rural Affairs and their counterparts under devolution in Scotland, Wales & Northern Ireland, as required, on all aspects of hazards and risks to workers and others from exposure to pathogens.

The guidance in this document accompanies the Approved List.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

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# Notice of Approval

The Health and Safety Executive has on 2 July 2021 approved the publication of this document, *The Approved List of biological agents*, for the purposes of the Control of Substances Hazardous to Health Regulations 2002 (SI 2002/2677).

This edition of the Approved List shall have effect from 12 July 2021.

On that date, the previous edition of the list approved by the Health and Safety Executive on 1 July 2013 shall cease to have effect.

Signed

A handwritten signature in black ink, appearing to read 'Sarah Newton', written in a cursive style.

**Sarah Newton**  
*Chair of the Health and Safety Executive*

# Preface

This edition of the Approved List represents the sixth update of the official classification since it was first published in the *Categorisation of biological agents according to hazard and categories of containment* in 1995.

The sole change made to this edition has been to classify SARS-CoV-2 as Hazard Group 3, with associated guidance on certain types of work with SARS-CoV-2 that can be carried out at Containment Level 2 (CL2).

Enquiries relating to the Approved List may be addressed to HSE at Microbiology and Biotechnology Unit, HSE, Redgrave Court, Merton Road, Bootle, Merseyside L20 7HS or via email: [bioagents@hse.gov.uk](mailto:bioagents@hse.gov.uk).

# What is the Approved List?

- 1 The Control of Substances Hazardous to Health Regulations 2002 (COSHH), make reference to the 'approved classification' of a biological agent, which is defined as the classification of that agent approved by HSE. The Approved List is the list of classifications of biological agents approved by HSE for this purpose. Biological agents are bacteria, viruses, parasites and fungi which can cause harm to human health, usually due to infection (some are toxic or can cause an allergy).
- 2 COSHH implements, for Great Britain, the European Directive 2000/54/EC on the protection of workers from risks related to exposure to biological agents at work. That Directive requires Member States to classify biological agents that are or may be a hazard to human health. Annex III to the Directive contains a list of the Community Classifications of biological agents and the Approved List is based on that.
- 3 The Approved List is relevant to risk assessment for work with biological agents and the application of appropriate control measures. Your risk assessment under COSHH of work likely to expose any employees to biological agents should include consideration of the approved classification of any biological agent (regulation 6(2)(k)). The risk assessment must identify the steps you will take to adequately control exposure to biological agents (where it is not reasonably practicable to prevent exposure), taking into account the hazard(s) that they present (regulations 6 and 7).
- 4 The Approved List is intended to be used by people who work deliberately with biological agents, especially those in research, development, teaching or diagnostic laboratories and industrial processes, and people working with animals or humans who are, or who are suspected of being, infected with such an agent.
- 5 The classifications in the Approved List assign each biological agent listed to a hazard group according to its level of risk of infection to humans, where Hazard Group 1 agents are not considered to pose a risk to human health and Hazard Group 4 agents present the greatest risk. The full definition of each hazard group is in the Information Box on page 8. Only agents in Groups 2, 3 and 4 are listed.
- 6 ACDP has made the relevant classification of a biological agent having considered evidence as to:
  - the likelihood that it will cause disease by infection or toxicity in humans;

- how likely it is that the infection would spread to the community;
  - the availability of any prophylaxis<sup>1</sup> or treatment.
- 7 The Approved List indicates in the taxonomy/notes column which biological agents are toxigenic or an allergen, or for which a vaccine was readily available at the time of publication.
- 8 ACDP only considers the risks to human health when deciding appropriate classification. Some listed agents can also cause disease in animals (zoonoses) and have also been assigned a hazard classification under the Specified Animal Pathogens Order (SAPO) (there are separate Orders for England, Scotland and Wales). For ease of reference, the list now indicates if an agent is also classified under SAPO at the time of this list being published. You should refer to the relevant SAPO guidance for the current SAPO classification and appropriate control measures.
- 9 If more than one species in any particular genus is known to be pathogenic to humans, these are generally named. There may also be a wider reference ('spp') indicating other species of the same genus may be hazardous. However, if a whole genus is indicated in this way, it is implicit that species and strains which are non-pathogenic to humans are excluded.

### **How biological agents are added to the list**

- 10 Over time, new biological agents emerge which are found to cause disease in humans and new treatments are developed. ACDP, in consultation with other experts, periodically reviews the list. Its review considers any evidence for the addition of new agents and for any changes<sup>2</sup> to the classification of agents already listed. Also, taxonomic changes may be made to agents. Where new species names now exist, recently-used previous names are also included in the Taxonomy/notes column with the relevant cross-reference.
- 11 In the event of a significant new biological agent requiring an urgent classification, ACDP can make provision for a review and an initial classification to be made. However, this would only be appropriate where the indications are that the initial classification will be in Hazard Group 4 or Hazard Group 3, and for which significant, urgent research is required by multiple users. Where this is done HSE will publish this classification. Also see paragraphs 23-25 for guidance on classifying a new biological agent.

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1 Treatment which will prevent infection and/or may reduce the effect of an exposure or an infection. This will include vaccines.

2 The name and identity of the specific biological agent, according to recognised biological classification systems.

- 12 Genetically modified biological agents do not appear in the Approved List, although the wild-type species from which many of them are derived will be listed. Guidance on aspects of work with genetically modified micro-organisms is given in *The SACGM Compendium of Guidance* available on HSE’s biosafety web pages.

<b>Information box: Hazard group definitions</b> When classifying a biological agent it should be assigned to one of the following groups according to its level of risk of infection to humans	
<b>Group 1</b>	Unlikely to cause human disease.
<b>Group 2</b>	Can cause human disease and may be a hazard to employees; it is unlikely to spread to the community and there is usually effective prophylaxis or treatment available.
<b>Group 3</b>	Can cause severe human disease and may be a serious hazard to employees; it may spread to the community, but there is usually effective prophylaxis or treatment available.
<b>Group 4</b>	Causes severe human disease and is a serious hazard to employees; it is likely to spread to the community and there is usually no effective prophylaxis or treatment available.



# Using the Approved List to carry out risk assessments and apply control measures

- 13 *The Approved List of biological agents* should be read in conjunction with COSHH and ACDP guidance, available on HSE's biosafety web pages.
- 14 COSHH requires employees and any other person working with biological agents in Hazard Groups 2, 3 and 4 to assess the risk of exposure to those biological agents. One of the matters to take into account in such a risk assessment is the approved classification of the relevant biological agents. COSHH specifies four containment levels for activities which involve working with biological agents. These correspond to the classification of biological agents into Hazard Groups 1 to 4, ie Hazard Group 2 biological agents should be handled at Containment Level 2 (see paragraph 3(4) in Part I of Schedule 3 of COSHH). The containment measures required at each containment level are set out in tables in COSHH, Schedule 3, Part II and Part III.
- 15 In addition to applying the containment measures appropriate to the containment level, the risk assessment and the control measures selected should consider the other matters set out in regulation 6(2) of COSHH.
- 16 In allocating human pathogens to a hazard group, no account is taken of particular effects on those whose susceptibility to infection may be affected, for example because of pre-existing disease, medication, compromised immunity, pregnancy or breastfeeding. Any additional risks, and whether it is possible to rely on the standard containment measures to provide adequate protection for such employees, should be considered as part of the general risk assessment required by COSHH. In the case of new or expectant mothers, the Management of Health and Safety at Work Regulations 1999 specifically sets out requirements for assessing the risks to the mother, or to her baby, from biological agents.

## **Biological agents which may be used at less than minimum containment conditions**

- 17 Certain Hazard Group 3 biological agents have been identified within the list of Community Classifications of biological agents as presenting a limited risk of infection for workers because they are

not normally infectious by the airborne route. Those intending to work with any of these agents may not necessarily need to use all the containment measures normally required at Containment Level 3 (CL3) because of the nature of the specific activity and the quantity of the agent involved. HSE and ACDP have produced accepted procedures for reducing the containment measures for these agents. In the Approved List, the agents for which this is relevant are indicated in the hazard group column with an asterisk (\*) and are listed in Annex 1.

- 18 Dispensing with control measures from CL3 does not imply that the work can be carried out at Containment Level 2 (CL2), it simply allows certain physical containment requirements (particularly those aimed at controlling airborne infection) normally expected at CL3 to be dispensed with. All other aspects of the work, in particular supervision and training, should reflect the high standards expected at CL3.
- 19 There may be other circumstances or types of work involving biological agents not specified in the list or Annex 1 where full containment measures may not be appropriate. A specific example is work where, although there is a strong indication or likelihood that certain Hazard Group 3 agents might be present, the work will not lead to an increase in the risk of exposure to the agent. For example, blood-borne viruses (BBVs) are unlikely to infect by an airborne route during diagnostic procedures not involving propagation or concentration of the virus, eg haematology, testing of blood donations or transfusion, serology and drug assays. Providing appropriate precautions are taken, not all the stated CL3 measures may be required.
- 20 Where your risk assessment indicates that it is appropriate to dispense with the standard containment requirements, you should follow the guidance on selecting the most appropriate containment measures set out in the publications/web pages listed under further information.

### **Reclassifying an agent**

- 21 Where a biological agent has an approved classification, but you have reason to believe the specific strain to be used presents a different risk of infection from the agent listed because it is attenuated or has lost known virulence genes, then that agent should be reclassified as if it were a new biological agent (see paragraph 23). Suitable control and containment can then be selected accordingly.
- 22 You should also take into account the type of work to be carried out, the quantity of material to be handled and the degree of

exposure when determining the most appropriate control and containment measures for such agents. **You will need to consult and agree with HSE that a suitable and sufficient risk assessment has been performed prior to locally reclassifying an agent, unless HSE guidance indicating what to do in specific circumstances has been published.**

### **Work with biological agents which have not been assigned a classification in the Approved List**

- 23 If a new biological agent does not have a hazard group classification, you should not assume it is Group 1 (unlikely to cause human disease). COSHH requires that a provisional hazard grouping must be determined by the person intending to work with the biological agent, by considering any available evidence and applying the most appropriate hazard group definition (see Information Box on page 8), taking into account the relevant factors used in carrying out the risk assessment. If you are in doubt as to which of two alternative groups is most appropriate, you should use the higher of the two. If the agent subsequently appears in a later edition of the Approved List, the classification given to it in that edition takes priority.
- 24 All viruses which have been isolated from humans, but which do not have an approved classification, should be classified in Hazard Group 2 as a minimum, unless and until there is evidence that they are unlikely to cause disease in humans.
- 25 When you have classified a new biological agent you will need to consider what you need to do to comply with your duties under COSHH in relation to work involving that agent, eg consider whether the notification requirements in Schedule 3 will apply.

# The Approved List of biological agents

Biological agent	Human pathogen hazard group	Taxonomy / notes
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**Bacteria**

<i>Arcobacter butzleri</i> (formerly <i>Campylobacter butzleri</i> )	2	
<i>Actinobacillus actinomycetemcomitans</i>	2	
<i>Actinomadura madurae</i>	2	
<i>Actinomadura pelletieri</i>	2	
<i>Actinomyces gerencseriae</i>	2	
<i>Actinomyces israelii</i>	2	
<i>Actinomyces pyogenes</i>	2	See <i>Arcanobacterium pyogenes</i>
<i>Actinomyces</i> spp	2	
<i>Alcaligenes</i> spp	2	
<i>Arcanobacterium haemolyticum</i> ( <i>Corynebacterium haemolyticum</i> )	2	
<i>Arcanobacterium pyogenes</i> (formerly <i>Actinomyces pyogenes</i> )	2	
<i>Bacillus anthracis</i>	3	Classified under SAPO Vaccine available
<i>Bacillus cereus</i>	2	
<i>Bacteroides fragilis</i>	2	
<i>Bacteroides</i> spp	2	
<i>Bartonella bacilliformis</i>	2	
<i>Bartonella quintana</i> ( <i>Rochalimaea quintana</i> )	2	
<i>Bartonella</i> spp ( <i>Rochalimaea</i> spp)	2	
<i>Bordetella bronchiseptica</i>	2	
<i>Bordetella parapertussis</i>	2	
<i>Bordetella pertussis</i>	2	Vaccine available
<i>Bordetella</i> spp	2	
<i>Borrelia burgdorferi</i>	2	
<i>Borrelia duttonii</i>	2	
<i>Borrelia recurrentis</i>	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Borrelia</i> spp	2	
<i>Brachispira</i> spp (formerly <i>Serpulina</i> spp)	2	
<i>Brucella abortus</i>	3	Classified under SAPO
<i>Brucella canis</i>	3	
<i>Brucella melitensis</i>	3	Classified under SAPO
<i>Brucella suis</i>	3	Classified under SAPO
<i>Burkholderia cepacia</i>	2	
<i>Burkholderia mallei</i> (formerly <i>Pseudomonas mallei</i> )	3	Classified under SAPO
<i>Burkholderia pseudomallei</i> (formerly <i>Pseudomonas pseudomallei</i> )	3	
<i>Campylobacter fetus</i>	2	
<i>Campylobacter jejuni</i>	2	
<i>Campylobacter</i> spp	2	
<i>Cardiobacterium hominis</i>	2	
<i>Chlamydophila pneumoniae</i>	2	
<i>Chlamydophila psittaci</i> (avian strains)	2	
<i>Chlamydophila psittaci</i> (non-avian strains)	2	
<i>Chlamydophila trachomatis</i>	2	
<i>Clostridium botulinum</i>	2	Toxigenic
<i>Clostridium perfringens</i>	2	
<i>Clostridium</i> spp	2	
<i>Clostridium tetani</i>	2	Toxigenic Vaccine available
<i>Corynebacterium diphtheriae</i>	2	Toxigenic Vaccine available
<i>Corynebacterium haemolyticum</i>	2	See <i>Arcanobacterium haemolyticum</i>
<i>Corynebacterium minutissimum</i>	2	
<i>Corynebacterium pseudotuberculosis</i>	2	
<i>Corynebacterium pyogenes</i>	2	See <i>Arcanobacterium pyogenes</i>
<i>Corynebacterium</i> spp	2	
<i>Corynebacterium ulcerans</i>	2	
<i>Coxiella burnetti</i>	3	

Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Edwardsiella tarda</i>	2	
<i>Ehrlichia sennetsu</i> ( <i>Rickettsiasennetsu</i> )	3	
<i>Ehrlichia</i> spp	2	
<i>Eikenella corrodens</i>	2	
<i>Elizabethkingia meningoseptica</i> (formerly <i>Flavobacterium meningosepticum</i> )	2	
<i>Enterobacter aerogenes/cloacae</i>	2	
<i>Enterobacter</i> spp	2	
<i>Enterococcus</i> spp	2	
<i>Erysipelothrix rhusiopathiae</i>	2	
<i>Escherichia coli</i> (with the exception of non-pathogenic strains)	2	
<i>Escherichia coli</i> , verocytotoxigenic strains (eg O157:H7 or O103)	3*	Toxigenic
<i>Flavobacterium meningosepticum</i>	2	See <i>Elizabethkingia meningoseptica</i>
<i>Fluoribacter bozemanae</i> (formerly <i>Legionella</i> )	2	
<i>Francisella tularensis</i> (Type A)	3	
<i>Francisella tularensis</i> (Type B)	2	
<i>Fusobacterium necrophorum</i>	2	
<i>Fusobacterium</i> spp	2	
<i>Gardnerella vaginalis</i>	2	
<i>Haemophilus ducreyi</i>	2	
<i>Haemophilus influenzae</i>	2	
<i>Haemophilus</i> spp	2	
<i>Helicobacter pylori</i>	2	
<i>Klebsiella oxytoca</i>	2	
<i>Klebsiella pneumoniae</i>	2	
<i>Klebsiella</i> spp	2	
<i>Legionella pneumophila</i>	2	
<i>Legionella</i> spp	2	See also <i>Fluoribacter bozemanae</i> (formerly <i>Legionella</i> )
<i>Leptospira interrogans</i> (all serovars)	2	
<i>Listeria ivanovii</i>	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Listeria monocytogenes</i>	2	
<i>Moraxella catarrhalis</i>	2	
<i>Morganella morganii</i>	2	
<i>Mycobacterium africanum</i>	3	Vaccine available
<i>Mycobacterium avium/ intracellulare</i>	2	
<i>Mycobacterium bovis</i>	3	Vaccine available
<i>Mycobacterium bovis</i> (BCG strain)	2	
<i>Mycobacterium chelonae</i>	2	
<i>Mycobacterium fortuitum</i>	2	
<i>Mycobacterium kansasii</i>	2	
<i>Mycobacterium leprae</i>	3	Vaccine available
<i>Mycobacterium malmoense</i>	3	
<i>Mycobacterium marinum</i>	2	
<i>Mycobacterium microti</i>	3*	
<i>Mycobacterium paratuberculosis</i>	2	
<i>Mycobacterium scrofulaceum</i>	2	
<i>Mycobacterium simiae</i>	2	
<i>Mycobacterium szulgai</i>	3	
<i>Mycobacterium tuberculosis</i>	3	Vaccine available
<i>Mycobacterium ulcerans</i>	3*	
<i>Mycobacterium xenopi</i>	2	
<i>Mycoplasma caviae</i>	2	
<i>Mycoplasma hominis</i>	2	
<i>Mycoplasma pneumoniae</i>	2	
<i>Neisseria gonorrhoeae</i>	2	
<i>Neisseria meningitidis</i>	2	Vaccine available
<i>Nocardia asteroides</i>	2	
<i>Nocardia braziliensis</i>	2	
<i>Nocardia farcinica</i>	2	
<i>Nocardia nova</i>	2	
<i>Nocardia otitidiscaviarum</i>	2	
<i>Pasteurella multocida</i>	2	
<i>Pasteurella</i> spp	2	
<i>Peptostreptococcus anaerobius</i>	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Peptostreptococcus</i> spp	2	
<i>Plesiomonas shigelloides</i>	2	
<i>Porphyromonas</i> spp	2	
<i>Prevotella</i> spp	2	
<i>Proteus mirabilis</i>	2	
<i>Proteus penneri</i>	2	
<i>Proteus vulgaris</i>	2	
<i>Providencia alcalifaciens</i>	2	
<i>Providencia rettgeri</i>	2	
<i>Providencia</i> spp	2	
<i>Pseudomonas aeruginosa</i>	2	
<i>Pseudomonas mallei</i>	3	See <i>Burkholderia mallei</i>
<i>Pseudomonas pseudomallei</i>	3	See <i>Burkholderia pseudomallei</i>
<i>Rhodococcus equi</i>	2	
<i>Rickettsia akari</i>	3*	
<i>Rickettsia canada</i>	3*	
<i>Rickettsia conorii</i>	3	
<i>Rickettsia montana</i>	3*	
<i>Rickettsia mooseri</i>	3	See <i>Rickettsia typhi</i>
<i>Rickettsia prowazekii</i>	3	
<i>Rickettsia rickettsii</i>	3	
<i>Rickettsia sennetsu</i>	3	See <i>Ehrlichia sennetsu</i>
<i>Rickettsia</i> spp	3	
<i>Rickettsia tsutsugamushi</i>	3	
<i>Rickettsia typhi</i> ( <i>Rickettsia mooseri</i> )	3	
<i>Rochalimaea quintana</i>	2	See <i>Bartonella quintana</i>
<i>Rochalimaea</i> spp	2	
<i>Salmonella arizonae</i>	2	
<i>Salmonella enterica</i> serovar <i>enteritidis</i>	2	
<i>Salmonella enterica</i> serovar <i>typhimurium 2</i>	2	
<i>Salmonella paratyphi A</i>	3*	
<i>Salmonella paratyphi B/java</i>	3*	



Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Salmonella paratyphi C/ Choleraesuis</i>	3*	
<i>Salmonella</i> spp	2	Serovars other than <i>arizonae</i> , <i>enterica</i> serovar <i>enteritidis</i> , <i>enterica</i> serovar <i>typhimurium</i> 2, <i>paratyphi</i> A, B, C, <i>typhi</i>
<i>Salmonella typhi</i>	3*	Vaccine available
<i>Serpulina</i> spp	2	See <i>Brachispira</i> spp
<i>Shigella boydii</i>	2	
<i>Shigella dysenteriae</i> (other than Type 1)	2	
<i>Shigella dysenteriae</i> (Type 1)	3*	Toxigenic
<i>Shigella flexneri</i>	2	
<i>Shigella sonnei</i>	2	
<i>Staphylococcus aureus</i>	2	Toxigenic
<i>Streptobacillus moniliformis</i>	2	
<i>Streptococcus agalactiae</i>	2	
<i>Streptococcus dysgalactiae</i> <i>aequisimilis</i>	2	
<i>Streptococcus pneumoniae</i>	2	
<i>Streptococcus pyogenes</i>	2	
<i>Streptococcus</i> spp	2	
<i>Streptococcus suis</i>	2	
<i>Treponema carateum</i>	2	
<i>Treponema pallidum</i>	2	
<i>Treponema pertenuae</i>	2	
<i>Treponema</i> spp	2	
<i>Ureaplasma parvum</i>	2	
<i>Ureaplasma urealyticum</i>	2	
<i>Vibrio cholerae</i> (including <i>El Tor</i> )	2	Toxigenic Vaccine available
<i>Vibrio parahaemolyticus</i>	2	
<i>Vibrio</i> spp	2	
<i>Yersinia enterocolitica</i>	2	
<i>Yersinia pestis</i>	3	
<i>Yersinia pseudotuberculosis</i>	2	
<i>Yersinia</i> spp	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
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**Fungi**

<i>Absidia corymbifera</i>	2	See <i>Lichtheimia corymbifera</i>
<i>Ajellomyces dermatitidis</i>	3	See <i>Blastomyces dermatitidis</i>
<i>Aspergillus fumigatus</i>	2	Allergen
<i>Aspergillus</i> spp	2	
<i>Blastomyces dermatitidis</i> ( <i>Ajellomyces dermatitidis</i> )	3	
<i>Candida albicans</i>	2	Allergen
<i>Candida</i> spp	2	
<i>Candida tropicalis</i>	2	
<i>Cladophialophora bantiana</i> (formerly <i>Xylohypha bantiana</i> , <i>Cladosporium bantianum</i> )	3	
<i>Cladosporium bantianum</i> (formerly <i>Xylohypha bantiana</i> )	3	See <i>Cladophialophora bantiana</i>
<i>Coccidioides immitis</i>	3	Allergen
<i>Coccidioides posadasii</i>	3	Allergen
<i>Cryptococcus neoformans</i> var <i>gattii</i> ( <i>Filobasidiella bacillispora</i> )	2	Allergen
<i>Cryptococcus neoformans</i> var <i>neoformans</i> ( <i>Filobasidiella</i> <i>neoformans</i> var <i>neoformans</i> )	2	Allergen
<i>Emmonsia crescens</i>	2	
<i>Emmonsia parva</i>	2	
<i>Epidermophyton floccosum</i>	2	Allergen
<i>Exophiala</i> spp	2	
<i>Filobasidiella bacillispora</i>	2	See <i>Cryptococcus neoformans</i> <i>var gattii</i>
<i>Filobasidiella neoformans</i> var <i>neoformans</i>	2	Sexual state of <i>Cryptococcus neoformans</i> var <i>neoformans</i>
<i>Fonsecaea compacta</i>	2	
<i>Fonsecaea pedrosoi</i>	2	
<i>Fusarium</i> spp	2	
<i>Geotrichum</i> spp	2	
<i>Histoplasma capsulatum</i> var <i>capsulatum</i> ( <i>Ajellomyces</i> <i>capsulatus</i> )	3	

Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Histoplasma capsulatum</i> var <i>duboisii</i>	3	
<i>Histoplasma capsulatum</i> var <i>farcinimosum</i>	3	Classified under SAPO
<i>Lichtheimia corymbifera</i>	2	
<i>Madurella grisea</i>	2	
<i>Madurella mycetomatis</i>	2	
<i>Malassezia</i> spp	2	
<i>Microsporium</i> spp	2	Allergen
<i>Neotestudina rosatii</i>	2	
<i>Paracoccidioides brasiliensis</i>	3	
<i>Penicillium marneffeii</i>	3	Allergen
<i>Pseudallescheria boydii</i>	2	See <i>Scedosporium apiospermum</i>
<i>Rhinocladiella mackenziei</i> (formerly <i>Ramichloridium</i> )	3	
<i>Rhizomucor pusillus</i>	2	
<i>Rhizopus microsporus</i>	2	
<i>Saksenaea vasiformis</i>	2	
<i>Scedosporium apiospermum</i> ( <i>Pseudallescheria boydii</i> )	2	
<i>Scedosporium proliferans</i> ( <i>inflatum</i> )	2	
<i>Scopulariopsis brevicaulis</i>	2	
<i>Sporothrix schenckii</i>	2	
<i>Trichophyton rubrum</i>	2	
<i>Trichophyton</i> spp	2	
<i>Trichosporon</i> spp	2	
<i>Xylohypha bantiana</i>	3	See <i>Cladophialophora bantiana</i>

**Helminths**

<i>Ancylostoma duodenale</i>	2	
<i>Angiostrongylus cantonensis</i>	2	
<i>Angiostrongylus costaricensis</i>	2	
<i>Anisakis simplex</i>	2	
<i>Ascaris lumbricoides</i>	2	Allergen
<i>Ascaris suum</i>	2	Allergen
<i>Brugia malayi</i>	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Brugia pahangi</i>	2	
<i>Brugia timori</i>	2	
<i>Capillaria philippinensis</i>	2	
<i>Capillaria</i> spp	2	
<i>Clonorchis</i>	2	See <i>Opisthorchis</i>
<i>Contracaecum osculatum</i>	2	
<i>Dicrocoelium dendriticum</i>	2	
<i>Dipetalonema</i>	2	See <i>Mansonella</i>
<i>Diphyllobothrium latum</i>	2	
<i>Dracunculus medinensis</i>	2	
<i>Echinococcus granulosus</i>	3*	Classified under SAPO
<i>Echinococcus multilocularis</i>	3*	Classified under SAPO
<i>Echinococcus vogeli</i>	3*	
<i>Enterobius vermicularis</i>	2	
<i>Fasciola gigantica</i>	2	
<i>Fasciola hepatica</i>	2	
<i>Fasciolopsis buski</i>	2	
<i>Heterophyes</i> spp	2	
<i>Hymenolepis diminuta</i>	2	
<i>Hymenolepis nana</i>	2	
<i>Loa loa</i>	2	
<i>Mansonella ozzardi</i>	2	
<i>Mansonella perstans</i>	2	
<i>Mansonella streptocerca</i>	2	
<i>Metagonimus</i> spp	2	
<i>Necator americanus</i>	2	
<i>Onchocerca volvulus</i>	2	
<i>Opisthorchis felineus</i>	2	
<i>Opisthorchis sinensis</i> ( <i>Clonorchis sinensis</i> )	2	
<i>Opisthorchis</i> spp	2	
<i>Opisthorchis viverrini</i> ( <i>Clonorchis viverrini</i> )	2	
<i>Paragonimus</i> spp	2	
<i>Paragonimus westermani</i>	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Pseudoterranova decipiens</i>	2	
<i>Schistosoma haematobium</i>	2	
<i>Schistosoma intercalatum</i>	2	
<i>Schistosoma japonicum</i>	2	
<i>Schistosoma mansoni</i>	2	
<i>Schistosoma mekongi</i>	2	
<i>Schistosoma</i> spp	2	
<i>Strongyloides</i> spp	2	
<i>Strongyloides stercoralis</i>	2	
<i>Taenia saginata</i>	2	
<i>Taenia solium</i>	3*	
<i>Toxocara canis</i>	2	
<i>Toxocara cati</i>	2	
<i>Trichinella nativa</i>	2	
<i>Trichinella nelsoni</i>	2	
<i>Trichinella pseudospiralis</i>	2	
<i>Trichinella spiralis</i>	2	Classified under SAPO
<i>Trichostrongylus orientalis</i>	2	
<i>Trichostrongylus</i> spp	2	
<i>Trichuris trichiura</i>	2	
<i>Wuchereria bancrofti</i>	2	

**Protozoa**

<i>Acanthamoeba castellanii</i>	2	
<i>Acanthamoeba</i> spp	2	
<i>Babesia divergens</i>	2	
<i>Babesia microti</i>	2	
<i>Babesia</i> spp	2	
<i>Balantidium coli</i>	2	
<i>Blastocystis hominis</i>	2	
<i>Cryptosporidium hominis</i>	2	
<i>Cryptosporidium parvum</i>	2	
<i>Cryptosporidium</i> spp	2	
<i>Cyclospora cayetanensis</i>	2	
<i>Cyclospora</i> spp	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
<i>Dientamoeba fragilis</i>	2	
<i>Encephalitozoon cuniculi</i>	2	
<i>Encephalitozoon hellem</i>	2	
<i>Encephalitozoon intestinalis</i>	2	
<i>Entamoeba histolytica</i>	2	
<i>Enterocytozoon bieneusi</i>	2	
<i>Giardia lamblia</i> ( <i>Giardia intestinalis</i> )	2	
<i>Isopora belli</i>	2	
<i>Leishmania aethiopica</i>	2	
<i>Leishmania brasiliensis</i>	3*	
<i>Leishmania donovani</i>	3*	
<i>Leishmania major</i>	2	
<i>Leishmania mexicana</i>	2	
<i>Leishmania peruviana</i>	2	
<i>Leishmania spp</i>	2	
<i>Leishmania tropica</i>	2	
<i>Naegleria fowleri</i>	3	
<i>Plasmodium falciparum</i>	3*	
<i>Plasmodium spp</i> (human & simian)	2	
<i>Sarcocystis sui/hominis</i>	2	
<i>Toxoplasma gondii</i>	2	
<i>Trichomonas vaginalis</i>	2	
<i>Trypanosoma brucei brucei</i>	2	Classified under SAPO
<i>Trypanosoma brucei gambiense</i>	2	
<i>Trypanosoma brucei rhodesiense</i>	3*	
<i>Trypanosoma cruzi</i>	3	

**PRIONS – unconventional agents associated with transmissible spongiform encephalopathies (TSEs)**

**Human TSEs**

<b>Sporadic forms of human TSE:</b>		
Sporadic Creutzfeldt-Jakob disease agent	3*	
Sporadic fatal insomnia agent	3*	

Biological agent	Human pathogen hazard group	Taxonomy / notes
Variably protease-resistant prionopathy agent	3*	
<b>Genetic forms of human TSE:</b>		
Familial Creutzfeldt-Jakob disease agent	3*	
Fatal familial insomnia agent	3*	
Gerstmann-Sträussler-Scheinker syndrome agent	3*	
<b>Acquired forms of human TSE:</b>		
Variant Creutzfeldt-Jakob disease agent	3*	
Iatrogenic Creutzfeldt-Jakob disease agent	3*	
Kuru agent	3*	
<b>Animal TSEs</b>		
Bovine spongiform encephalopathy (BSE) agent and other related animal TSEs	3*	
All strains related to or derived from BSE (including feline spongiform encephalopathy agent and spongiform encephalopathy agent in exotic ungulates)	3*	
H-type BSE agent	3*	
L-type BSE agent	3*	
Scrapie and scrapie-related agents	2	
Atypical scrapie agent	2	
Chronic Wasting Disease agent	2	
<b>Laboratory strains of TSEs</b>		
Any strain propagated in primates, mice expressing PrP gene or mice encoding human familial mutations in PrP	3*	
Human strains propagated in any species	3*	

Biological agent	Human pathogen hazard group	Taxonomy / notes
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**Viruses**

**Order Herpesvirales**

Family **Herpesviridae**

Subfamily **Alpha-herpesvirinae**

<i>Genus Simplexvirus:</i>		
B virus	4	See Macacine herpesvirus 1
Herpesvirus simiae	4	See Macacine herpesvirus 1
Human herpes simplex viruses 1 and 2	2	
Macacine herpesvirus 1	4	Synonyms: Herpesvirus simiae; B virus
<i>Genus Varicellovirus:</i>		
Human herpesvirus 3	2	Synonym: Varicella-zoster virus
Varicella-zoster virus	2	See Human herpesvirus 3

Subfamily **Beta-herpesvirinae**

<i>Genus Cytomegalovirus:</i>		
Human herpesvirus 5	2	Synonym: Human cytomegalovirus
Human cytomegalovirus	2	See Human herpesvirus 5
<i>Genus Roseolavirus:</i>		
Human herpesvirus type 6 – HHV6	2	
Human herpesvirus type 7 – HHV7	2	

Subfamily **Gamma-herpesvirinae**

<i>Genus Lymphocryptovirus:</i>		
Human herpesvirus 4	2	Synonym: Epstein-Barr virus
Epstein-Barr virus	2	See Human herpesvirus 4
<i>Genus Rhadinovirus:</i>		
Human herpesvirus type 8 – HHV8 (Kaposi’s sarcoma-associated herpesvirus)	2	

**Order Mononegavirales**

Family **Bornaviridae**

<i>Genus Bornavirus:</i>		
Borna disease virus	3	



Biological agent	Human pathogen hazard group	Taxonomy / notes
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Family **Filoviridae**

<i>Genus <b>Ebolavirus:</b></i>		
Bundibugyo ebolavirus	4	
Reston ebolavirus	4	Includes strain Siena
Sudan ebolavirus	4	
Tai Forest ebolavirus	4	Previously known as Ebola Cote d'Ivoire virus
Zaire ebolavirus	4	
<i>Genus <b>Marburgvirus:</b></i>		
Marburg marburgvirus	4	

Family **Paramyxoviridae**

Subfamily **Paramyxovirinae**

<i>Genus <b>Avulavirus:</b></i>		
Newcastle disease virus	2	Classified under SAPO
<i>Genus <b>Henipavirus:</b></i>		
Hendra virus (formerly equine morbillivirus)	4	Classified under SAPO
Nipah virus	4	Classified under SAPO
<i>Genus <b>Morbillivirus:</b></i>		
Measles virus	2	Vaccine available
<i>Genus <b>Respirovirus:</b></i>		
Human parainfluenza virus (Types 1 and 3)	2	
<i>Genus <b>Rubulavirus:</b></i>		
Mumps virus	2	Vaccine available
Human parainfluenza virus (Types 2 and 4)	2	

Subfamily **Pneumovirinae**

<i>Genus <b>Metapneumovirus:</b></i>		
Human metapneumovirus	2	
<i>Genus <b>Pneumovirus:</b></i>		
Human respiratory syncytial virus	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
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Family **Rhabdoviridae**

<i>Genus <b>Lyssavirus</b>:</i>		
Australian bat lyssavirus	3	Classified under SAPO Rabies vaccine provides protection
Duvenhage virus	3	Classified under SAPO Rabies vaccine provides protection
European bat lyssaviruses 1 and 2	3	Classified under SAPO Rabies vaccine provides protection
Lagos bat virus	3	Classified under SAPO
Mokola virus	3	Classified under SAPO
Rabies virus	3*	Classified under SAPO Vaccine available
Other Lyssavirus species not listed above	3	Classified under SAPO
<i>Genus <b>Vesiculovirus</b>:</i>		
Piry virus	3	
Vesicular stomatitis virus	2	Classified under SAPO

Order **Nidovirales**

Family **Coronaviridae**

Subfamily **Coronavirinae**

<i>Genus <b>Alphacoronavirus</b>:</i>		
Human coronavirus 229E	2	
<i>Genus <b>Betacoronavirus</b>:</i>		
MERS-related coronavirus	3	
SARS-related coronavirus	3	
Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)	3	Certain work can be undertaken at Containment Level 2 – See Annex 2
OC43 virus	2	

Subfamily **Torovirinae**

<i>Genus <b>Torovirus</b>:</i>		
Bovine torovirus subspecies Breda virus	2	
Equine torovirus subspecies Berne virus	2	
Human torovirus	2	
Porcine torovirus	2	
Other Coronaviridae	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
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**Order Picornvirales**

Family **Picornaviridae**

<i>Genus <b>Enterovirus:</b></i>		
Acute haemorrhagic conjunctivitis virus (AHC)	2	Synonyms: Coxsackievirus CA24 (A24); Enterovirus 70
Coxsackieviruses (A and B)	2	See Human enteroviruses A and B
Echoviruses	2	Subspecies of Human enterovirus B
Human enteroviruses A and B	2	Synonym: Coxsackieviruses A and B
Human enterovirus C	2	Synonym: Poliovirus Vaccine available
Human rhinoviruses	2	
Polioviruses	2	See Human enterovirus C
Poliovirus type 2	3	This will include attenuated strains of type 2 polio virus once this component is no longer used as part of the trivalent polio vaccine
<i>Genus <b>Hepatovirus:</b></i>		
Hepatitis A virus (human enterovirus type 72)	2	Vaccine available
<i>Genus <b>Parechovirus:</b></i>		
Parechoviruses	2	

**Virus Families not assigned to an Order**

Family **Adenoviridae**

Adenoviridae	2	
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Family **Anelloviridae**

<i>Genus <b>Alphatorquevirus:</b></i>		
Torque teno virus (TTV)	2	Previously listed as Transfusion Transmitted virus
Transfusion transmitted virus	2	See Torque teno virus (TTV)

Family **Arenaviridae**

<i>Genus <b>Arenavirus:</b></i>		
Amapari virus	2	
Chapare virus	4	
Flexal virus	3	
Guanarito virus	4	

Biological agent	Human pathogen hazard group	Taxonomy / notes
Ippy virus	2	
Junin virus	4	
Lassa fever virus	4	
Latino virus	2	
Lujo virus	4	
Lymphocytic choriomeningitis virus LCMV (all strains other than Armstrong)	3	
Lymphocytic choriomeningitis virus LCMV (Armstrong strain)	2	
Machupo virus	4	
Mobala virus	3	
Mopeia virus	2	
Parana virus	2	
Pichinde virus	2	
Sabia virus	4	
Tamiami virus	2	
Whitewater Arroyo virus	2	
Other LCM-Lassa complex viruses	2	Includes Kodoko, Morogoro, Merino Walk viruses
Other New World arenaviruses	2	Includes Allpahuayo, Bear Canyon, Cupixi, Oliveros, Pirital, Tacaribe
Family <b>Astroviridae</b>	2	

Family **Bunyaviridae**

<i>Genus <b>Hantavirus:</b></i>		
Andes virus	3	
Belgrade (Dobrava) virus	3	
Hantaan virus (Korean haemorrhagic fever)	3	
Prospect Hill virus	2	
Puumala virus	2	
Seoul virus	3	
Sin Nombre virus (formerly Muerto Canyon)	3	
<i>Genus <b>Nairovirus:</b></i>		
Crimean/Congo haemorrhagic fever virus	4	

Biological agent	Human pathogen hazard group	Taxonomy / notes
Dugbe virus	2	
Ganjam virus	2	Variant of Nairobi Sheep Disease virus
Hazara virus	2	Subspecies of Crimean Congo haemorrhagic fever virus
Nairobi Sheep Disease virus	2	Subspecies of Dugbe virus
<b>Genus <i>Orthobunyavirus</i>:</b>		
Akabane virus	2	
Bunyamwera virus	2	
Bunyavirus germiston	3	Synonym: Germiston virus Subspecies of Bunyamwera virus
California encephalitis virus	2	
Germiston virus	3	See Bunyavirus germiston
La Crosse virus	3	Subspecies of California encephalitis virus
Ngari virus	3	Subspecies of Bunyamwera virus
Oropouche virus	3	
Snowshoe hare virus	3	Subspecies of California encephalitis virus
<b>Genus <i>Phlebovirus</i>:</b>		
Punta Toro virus	2	
Rift Valley fever virus	3	Classified under SAPO
Sandfly fever Naples virus	2	
Toscana virus	2	Subspecies of Sandfly fever Naples virus
<b>Unclassified <i>Phlebovirus</i>:</b>		
Bhanja virus	3	
Severe fever with thrombocytopenia syndrome virus (SFTS)	3	
Other Bunyaviridae not listed above	2	

Family **Caliciviridae**

<b>Genus <i>Norovirus</i>:</b>		
Noroviruses	2	Synonyms: Norwalk calicivirus, human calicivirus, human calicivirus NLV
<b>Genus <i>Sapovirus</i>:</b>		
Sapporo viruses	2	Synonym: Human calicivirus NLV
Other Caliciviridae	2	

Biological agent	Human pathogen hazard group	Taxonomy / notes
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Family **Flaviviridae**

<i>Genus <b>Flavivirus:</b></i>		
Absettarov virus	3	Strain of Central European tick-borne encephalitis virus (Far Eastern subgroup)
Alkhurma haemorrhagic fever virus	3	Subspecies of Kyasanur Forest disease virus
Central European tick-borne encephalitis virus	3	Vaccine available European subtype of tick-borne encephalitis virus also including Siberian tick-borne encephalitis virus
Dengue viruses types 1–4	3	
Far Eastern tick-borne encephalitis virus	4	Vaccine available See Russian spring–summer encephalitis virus
Hanzalova virus	3	Vaccine available Strain of Central European tick-borne encephalitis virus
Hypr virus	3	Vaccine available Synonym: Tick-borne encephalitis virus strain Hypr
Israel turkey meningitis meningoencephalomyelitis virus	3	
Japanese encephalitis virus	3	Classified under SAPO Vaccine available
Kumlinge virus	3	Species in Tick-borne encephalitis virus group
Kyasanur Forest disease virus	4	
Louping ill virus	3*	
Murray Valley encephalitis virus	3	
Negishi virus	3	Species in Tick-borne encephalitis virus group
Omsk haemorrhagic fever virus	4	
Powassan virus	3	
Rocio virus	3	Subspecies of Ilheus strain of mosquito-borne virus
Russian spring–summer encephalitis virus	4	Synonym: Far Eastern tick-borne encephalitis virus; subtype of Tickborne encephalitis virus
Sal Vieja virus	3	
San Perlita virus	3	
Siberian tick-borne encephalitis virus	3	Vaccine available See Central European tick-borne encephalitis virus

Biological agent	Human pathogen hazard group	Taxonomy / notes
Spondweni virus	3	Subspecies of Zika virus
St Louis encephalitis virus	3	Classified under SAPO
Tick-borne encephalitis virus	3	
Wesselsbron virus	3*	
West Nile fever virus	3	Classified under SAPO
Yellow fever virus	3	Vaccine available
Zika virus	2	See Spondweni virus
<b>Genus <i>Hepacivirus</i>:</b>		
Hepatitis C virus	3*	

Unclassified **Flaviviridae**

<b>Genus <i>Pegivirus</i>:</b>		
Human pegivirus	3*	Formerly known as GB virus C; or Hepatitis G virus
Other Flaviviridae known to be pathogenic	2	

Family **Hepadnaviridae**

<b>Genus <i>Orthohepadnavirus</i>:</b>		
Hepatitis B virus	3*	Vaccine available
Hepatitis D virus (delta)	3*	Vaccine available Synonym: Deltavirus Hepatitis delta virus

Family **Hepeviridae**

<b>Genus <i>Hepevirus</i>:</b>		
Hepatitis E virus	3*	

Family **Orthomyxoviridae**

<b>Genus <i>Influenzavirus A</i></b>		
<b>Genus <i>Influenzavirus B</i></b>		
<b>Genus <i>Influenzavirus C</i></b>		
Influenza types A, B and C	2	Vaccine available Potentially pandemic strains Classified under SAPO For work with emerging potentially pandemic strains refer to ACDP guidance <i>Advice on Experimental working with Influenza Viruses of Pandemic Potential</i> <a href="http://www.hse.gov.uk/biosafety/diseases/acdpflu.pdf">www.hse.gov.uk/biosafety/diseases/acdpflu.pdf</a>

Biological agent	Human pathogen hazard group	Taxonomy / notes
<b>Genus <i>Thogotovirus</i>:</b>		
Dhori virus	2	
Thogoto virus	2	

Family **Papillomaviridae**

Human papillomaviruses	2	
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Family **Parvoviridae**

Subfamily **Parvovirinae**

<b>Genus <i>Bocavirus</i>:</b>		
Human bocavirus	2	
<b>Genus <i>Erythrovirus</i>:</b>		
Human parvovirus B19	2	
<b>Genus <i>Parvovirus</i></b>		
<b>Unclassified <i>Parvovirus</i>:</b>		
Human parvoviruses 4 and 5	2	Synonyms: Human partetravirus (Parv4/Parv5)

Family **Polyomaviridae**

<b>Genus <i>Polyomavirus</i>:</b>		
BK polyomavirus	2	
JC polyomavirus	2	
Simian virus 40 (SV40)	2	

**Unclassified *Polyomavirus*:**

KI polyomavirus	2	
WU polyomavirus	2	

Family **Poxviridae**

Subfamily **Chordopoxvirinae**

<b>Genus <i>Molluscipox</i>:</b>		
Molluscum contagiosum virus	2	
<b>Genus <i>Orthopox</i>:</b>		
'Buffalopox' Vaccinia virus	2	
Cowpox virus	2	
Monkeypox virus	3	Vaccine available Vaccinia virus
Variola virus (major and minor)	4	Vaccine available All strains including Whitepox virus



Biological agent	Human pathogen hazard group	Taxonomy / notes
<b>Genus <i>Parapox</i>:</b>		
Orf virus	2	
Pseudocowpox virus (Milker's nodes virus)	2	
<b>Genus <i>Yatapox</i>:</b>		
Tanapox virus	2	
Yaba monkey tumour virus	2	

Family **Reoviridae**

Subfamily **Sedoreovirinae**

<b>Genus <i>Orbivirus</i>:</b>		
Orbiviruses	2	
<b>Genus <i>Rotavirus</i>:</b>		
Human rotaviruses A, B and C	2	Vaccine available for group A
<b>Genus <i>Seadornavirus</i>:</b>		
Banna virus	3	

Subfamily **Spinareovirinae**

<b>Genus <i>Coltivirus</i>:</b>		
Colorado tick fever virus	2	
<b>Genus <i>Orthoreovirus</i>:</b>		
Mammalian orthoreoviruses 1 to 3	2	Synonyms: Mammalian orthoreovirus; subspecies Mammalian orthoreovirus 1 to 3; Reovirus types 1 to 3
Reoviruses types 1 to 3	2	See Mammalian orthoreoviruses 1 to 3

Family **Retroviridae**

Subfamily **Orthoretrovirinae**

<b>Genus <i>Deltaretrovirus</i>:</b>		
Primate T-cell lymphotropic viruses types 1 and 2	3*	Synonyms: Human T-cell lymphotropic viruses (HTLV) types 1 and 2
<b>Genus <i>Gammaretrovirus</i>:</b>		
Xenotropic murine leukaemia virus-related virus	2	
<b>Genus <i>Lentivirus</i>:</b>		
Human immunodeficiency viruses	3*	
Simian immunodeficiency virus	3*	

Biological agent	Human pathogen hazard group	Taxonomy / notes
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Family **Togaviridae**

<i>Genus <b>Alphavirus:</b></i>		
Bebaru virus	2	
Chikungunya virus	3*	
Eastern equine encephalomyelitis encephalitis virus	3	Classified under SAPO
Everglades virus	3*	
Getah virus	3	
Mayaro virus	3	
Middelburg virus	3	
Mucambo virus	3*	
Ndumu virus	3	
O'nyong-nyong virus	2	
Ross River virus	2	
Sagiyama virus	3	Subspecies of Ross River virus
Semliki Forest virus	2	
Sindbis virus	2	
Tonate virus	3*	
Venezuelan equine encephalitis virus	3	Classified under SAPO
Western equine encephalitis virus	3	Classified under SAPO
Other known alphaviruses	2	
<i>Genus <b>Rubivirus:</b></i>		
Rubella virus	2	Vaccine available

# Annex 1: Biological agents which may be used at less than the minimum containment conditions

This annex provides a list of biological agents that are human pathogens which may be used at less than the minimum containment conditions required by the Control of Substances Hazardous to Health Regulations 2002 (COSHH).

Whether any of the applicable containment measures can be dispensed with in relation to work with the biological agents listed will depend on the particular activity undertaken. Please refer to guidance paragraphs 17 and 18 for further information.

## **Bacteria**

- 1 Escherichia coli, vero-cytotoxigenic strains (eg 0157:H7 or 0103)
- 2 Mycobacterium microti
- 3 Mycobacterium ulcerans
- 4 Rickettsia akari
- 5 Rickettsia canada
- 6 Rickettsia montana
- 7 Salmonella typhi
- 8 Salmonella paratyphi A, B, C
- 9 Shigella dysenteriae (Type 1)

## **Unconventional agents associated with TSEs**

- 10 The agent of bovine spongiform encephalopathy (BSE) and other related animal TSEs
- 11 The agents of Creutzfeldt-Jakob disease
- 12 The agents of variant Creutzfeldt-Jakob disease

## **Viruses**

- 13 Chikungunya virus
- 14 Everglades virus
- 15 Hepatitis B virus
- 16 Hepatitis C virus
- 17 Hepatitis D virus
- 18 Hepatitis E virus
- 19 Human pegivirus (Hepatitis G)
- 20 Human immunodeficiency viruses
- 21 Primate T-cell lymphotropic viruses
- 22 Louping ill virus

- 23 Mucambo virus
- 24 Rabies virus
- 25 Simian immunodeficiency virus
- 26 Tonate virus
- 27 Wesselsbron virus

### **Parasites**

- 28 Echinococcus granulosus
- 29 Echinococcus multilocularis
- 30 Echinococcus vogeli
- 31 Leishmania braziliensis
- 32 Leishmania donovani
- 33 Plasmodium falciparum
- 34 Taenia solium
- 35 Trypanosoma brucei rhodesiense

## Annex 2: SARS-CoV-2 Work at Containment Level 2

### **Work that may be conducted at CL2**

Routine laboratory blood tests can be carried out in auto-analysers using standard practices and procedures at CL2, but only after a suitable and sufficient risk assessment has been conducted which considers the potential for the generation of infectious aerosols. Auto-analysers should be disinfected following local procedures after sample processing and before scheduled maintenance in accordance with manufacturers' recommendations.

Some auto-analyser protocols for routine laboratory tests may require specimen tubes to be opened first, or initial processing of the sample to be performed. Evidence suggests that capping and uncapping of samples is not a high-risk aerosol generating procedure which is dependent on the cap and tube design. These factors must be considered in a suitable and sufficient risk assessment which also considers if the sample needs to be centrifuged, vortexed or pipetted manually. The risk assessment must include consideration of whether a microbiological safety cabinet (MSC) needs to be used.

The following work may also be conducted at CL2 following standard laboratory precautions, where this is consistent with the terms of the local risk assessment for those activities:

- diagnostic assays using whole blood, serum and plasma, including routine biochemistry and haematology, unless there is a risk of generating aerosols;
- assays using virus-inactivated specimens, including molecular testing of inactivated specimens;
- examination of bacterial or fungal cultures;
- staining and microscopy of heat-fixed or chemically-fixed smears;
- centrifugation of routine blood samples. However, where there is infectious potential, samples must be centrifuged using sealed centrifuge rotors or sample cups which are loaded and unloaded in an MSC.

## Work that may be conducted within an MSC at CL2

Following completion of a suitable and sufficient risk assessment, the following work with samples potentially containing SARS-CoV-2 may be conducted in an MSC at CL2:

- preparation of specimens for molecular testing (for example respiratory virus PCR) prior to sample inactivation;
- division, aliquoting, or diluting of respiratory tract specimens, faecal specimens, urine specimens, and tissue specimens in which virus has not been inactivated;
- inoculation of bacterial or fungal culture media from high-risk patients;
- urine antigen testing (such as for detection of *Legionella pneumophila* or *Streptococcus pneumoniae*).

**Note:** if the above is not possible (for example, testing instrument does not fit inside the CL2 cabinet), carry out a local risk assessment:

- rapid antigen tests of respiratory tract specimens;
- processing of any non-inactivated specimen that might result in the generation of aerosols;
- preparation and fixing (chemical or heat) of smears for microscopy;
- haematological or immunological work;
- rapid diagnostic tests for malaria parasites.

Where risk assessment has identified that work should be conducted within an MSC at CL2 the following still applies to work activities:

- only fully trained and competent staff must carry out the work; in addition to this the level of training provided should be appropriate to the level of risk and the complexity of the procedures being undertaken;
- inactivation methods must be in place before removal of the sample from an MSC; these methods must be validated to ensure effectiveness of the method (for example through use of a surrogate marker);
- effective emergency procedures, including methods for dealing with spillage, are in place;
- waste routes for samples are appropriate for HG3 samples.

## Work to be conducted at CL3

The following work must be conducted at CL3:

- any propagation, culturing or deliberate work on SARS-CoV-2 for diagnostic or research purposes.

## Further information

HSE and ACDP publications give advice on various aspects of work with biological agents. General and sector-specific guidance for work with biological agents published by HSE, ACDP and with links to guidance from other government departments is available on HSE website at: [www.hse.gov.uk/biosafety/information.htm](http://www.hse.gov.uk/biosafety/information.htm)

Guidance that should be consulted, as appropriate, when deciding on containment measures:

*TSE: Safe working and the prevention of infection* [webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/ab/ACDP/TSEguidance/index.htm](http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/ab/ACDP/TSEguidance/index.htm)

Blood-borne virus web pages [www.hse.gov.uk/biosafety/blood-borne-viruses/index.htm](http://www.hse.gov.uk/biosafety/blood-borne-viruses/index.htm)

Advisory Committee on Dangerous Pathogens: *Management and operation of microbiological containment laboratories* HSE 2019 [www.hse.gov.uk/biosafety/management-containment-labs.pdf](http://www.hse.gov.uk/biosafety/management-containment-labs.pdf). See 'Section 5 Selection and application of containment and control measures' and 'Appendix 8: Work with hazard group 3 parasites'.

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