



**White Paper**

**Biological hazards in the workplace**

May 2021

# Biological hazards in the workplace

For those managing premises and estates, managing biohazards have been part of the day job for years, but the COVID-19 pandemic has shown us why we need to keep:

- Firm control of our existing biohazard risk management; and
- Our preparations for new and emerging risks under regular review.

Here we are taking a broad look at workplace biohazards and some of the issues you should be aware of. This information is given in relation to general building environments and not clinical, research or other settings where specific biohazards are being routinely used or tested for.

## What is a biohazard?

A **biological hazard**, often abbreviated to **biohazard**, "is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a microorganism, virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other animals." (Wikipedia)

In the main the term and the application of the biohazard symbol are used in situations where people are actively working with known biohazards. They can and do though exist in other situations and it is examples of these within the context of building and premises management we are considering.



Types of biological hazards/biohazards can vary, arise directly or indirectly from the work you do and include:

1. **Biological agents** – organisms including bacteria, viruses, fungi, protozoa.
2. **Biological toxins and venoms (Biotoxins)** – substances poisonous to humans and other organisms produced by different types of for example, bacteria, fungi, protozoa, reptiles, fish, molluscs, insects and plants.
3. **Blood and blood products** – which could include tissues, secretions and excretions, as well as blood itself.
4. **Environmental specimens** – these could be plants, soil, or water that are likely to contain biological agents or toxins.
5. **Recombinant or synthetic nucleic acid molecules and conjugated novel nanoparticles** – broadly molecules and particles that are produced outside living cells but have the capability of replicating within a living cell.

The Health and Safety Executive (HSE) have produced information have collated a number of resources on biosafety at [Biosafety Resources \(hse.gov.uk\)](https://www.hse.gov.uk/biosafety/)

## How are biohazards classified?

Different types of biohazard are classed in different ways. In the UK for example the Health and Safety Executive produce "The Approved List of biological agents", which provides the classification of biological agents as referred to in COSHH. The document further states:

"It is relevant to risk assessment for work with biological agents and the application of appropriate control measures. It is for use by people who deliberately work with biological agents, especially those in research, development, teaching or diagnostic laboratories and industrial processes, or those who work with humans or animals who are (or are suspected to be) infected with such an agent in health and animal care facilities."

Within the context of the document four hazard groups are defined for classifying a biological agent dependant on its level of risk of infection to humans. These are:

- **Group 1** - Unlikely to cause human disease.
- **Group 2** - 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.

Biological agents within this group include - Legionella pneumophila and Legionella spp, Salmonella spp, Escherichia coli (with the exception of non-pathogenic strains), Varicella-zoster virus (causes chickenpox/shingles), Influenzavirus (types A, B and C) (causes flu).

- **Group 3** - 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.

Biological agents within this group include – Bacillus anthracis (causes Anthrax), Escherichia coli (verocytotoxigenic strains (e.g. O157:H7)), Salmonella typhi (causes Typhoid fever), SARS-related coronavirus (causes COVID-19).

- **Group 4** - 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.

Biological agents within this group include – Ebolaviruses, Crimean/Congo haemorrhagic fever virus.



Alternatively, biotoxins can be differentiated from where they are made (e.g. zootoxins - produced by animals, phytotoxins – produced by plants and mycotoxins - produced by fungi). These can be further classified based on the effects they have, for example:

- **Neurotoxins** - substances that affect the nervous system;
- **Haemotoxins** - substances that destroy red blood cells, disrupt blood clotting, and/or cause organ degeneration;
- **Cytotoxins** – substances that affect/kill individual cells; and
- **Necrotoxins** - substances that cause tissue destruction.

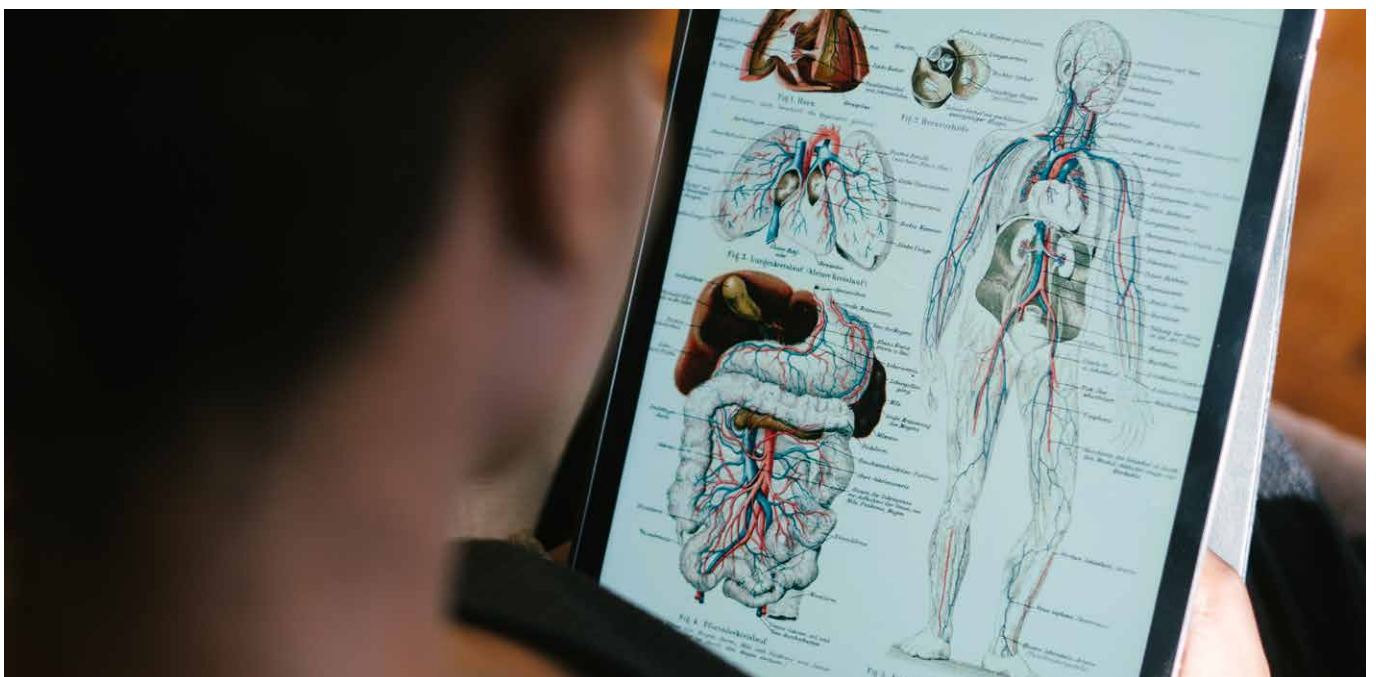
The effects a biohazard, particularly biological agents, can have on an individual vary, and while some affect everyone, other factors can increase the susceptibility of certain groups within the population, these include:

- Underlying disease / illness;
- Age (children and elderly are at higher risk);
- Treatment with antimicrobial, steroidal, or chemotherapeutic drugs;
- Vaccination status;
- Type of pathogen/agent exposure; and
- New and expectant mothers.

### Biohazard routes of transmission

Biohazard transmission can be through a number of routes, the primary of which are:

- **Injection** - By contaminated sharp objects (e.g. needle, scalpel) or through animal bites, scratches and broken/abraded skin;
- **Absorption** – Directly through the skin, by hand to face contact and/or splashes to the eyes, nose, mouth;
- **Ingestion** - By eating or drinking items with a biohazard in or on them and by hand to mouth contact where the hands have been contaminated; and
- **Inhalation** – Where particles, vapours and/or aerosols are breathed in/respired.





## What regulation affects biohazards?

Notwithstanding those who “deliberately work” with biohazards (i.e. research, development, teaching/diagnostic laboratories, industrial processes, etc.) and any specific additional regulations that may apply, the Control of Substances Hazardous to Health Regulations 2002 (COSHH) is the main piece of legislation applicable to biohazards.

Both chemicals and biological agents (micro-organisms are covered by this definition as we have seen) are contained within the regulations, with the general requirements for employers, for example being:

- **Assessing** the risk to health arising from the activity and the precautions required;
- **Introducing** suitable and sufficient measures to prevent or control the risk;
- **Implementing** effective controls and checking to make sure equipment is properly maintained, procedures followed;
- **Providing and monitoring** (as needed) any health surveillance and workplace exposure requirements; and
- **Informing, instructing, training and supervising** (IITS) employees about the risks and the precautions to be taken.

In addition, there are further requirements contained within Schedule 3 of the main regulations relating to work with biological agents.

Supporting the COSHH Regulations are a number of other HSE produced documents including:

- The Control of Substances Hazardous to Health Regulations 2002 Approved Code of Practice and guidance (L5);
- Working with substances hazardous to health: A brief guide to COSHH (INDG136); and
- EH 40/2005 – Workplace Exposure Limits (WELs).

Access to these documents and further information on COSHH can be found at:

[Control of Substances Hazardous to Health \(COSHH\) - COSHH \(hse.gov.uk\)](https://www.hse.gov.uk/coshh/)

[Harmful substances \(hse.gov.uk\)](https://www.hse.gov.uk/harmfulsubstances/)

<https://www.assurityconsulting.co.uk/knowledge/guides/coshh-what-does-it-mean-to-me>



## Where might biohazards affect general building operations?

While not exhaustive, below are several areas where biohazard management could affect duty holders and employers in the workplace and some of the areas that you may need to consider.

### 1. Food and drink

Catering facilities, especially cooking kitchens can be the source of a number of biohazards, either in the raw foodstuffs being brought into the facility or through poor preparation, cooking and storage.

Adopting good food safety and food hygiene practices and procedures from sourcing and delivery, through preparation and cooking, to consumption and disposal, all can help reduce the likelihood of particularly microbial contamination and any resultant ill health in staff and visitors. Check what your in-house or contract caterers are doing and the procedures, processes and records they are keeping. The Food Standards Agency provide a range of information at [Food safety and hygiene | Food Standards Agency](#).

Allergens (substances that can cause allergic reactions in people) are another consideration. Although there is an argument as to whether they should be classed as biohazards, they can also cause serious harm to susceptible individuals.

<https://www.assurityconsulting.co.uk/knowledge/guides/what-are-food-allergies-and-intolerances>

Foodstuffs including nuts, fruit, shellfish, eggs and cows' milk are just some of 14 groups of food allergens that should be listed (on menus or product labels) where when they are used as ingredients. The Food Standards Agency provide information on food allergies and intolerances at [Food allergy and intolerance | Food Standards Agency](#). Again, check what information is being provided by your caterers.

Drinking water provision, certainly through direct mains supplies, is on the whole of excellent microbiological quality in the UK. Depending on usage, maintenance and the implemented cleaning regime, experience shows bottled water dispensers and vending machines can pick up contaminants, so need to be carefully managed and form part of any water quality audits you have in place.

### 2. First Aid/Injuries/Illness

In relation to biohazards, the main concerns in delivering first aid, is blood and potentially other body fluids (vomit and faeces). The HSE do provide information on for example blood-borne viruses (BBV) in the workplace as well as more general information, advice and guidance on first aid at work ([First aid - First aid at work \(hse.gov.uk\)](#)).

You should also consider your cleaning procedures and whether you will employ any specific procedures where blood or other body fluids have contaminated the workplace. Check and discuss with your cleaners/cleaning company.

### 3. The Building Environment

Legionella is an obvious biohazard that can contaminate a range of building water systems and services. As expected, it is an area covered in detail by the HSE through the requirements of Approved Code of Practice Legionnaires' disease. The control of Legionella bacteria in water systems (L8) and its associated technical guidance HSG274 parts 1-3 as well as HSG 282 (for spa pools).

The need for a suitable and sufficient risk assessment, written scheme of management, relevant training and comprehensive records, are requirements. For further information see:

[Legionnaires' disease: The control of Legionella bacteria in water systems \(hse.gov.uk\)](https://www.hse.gov.uk/legionnaires-disease/)

<https://www.assurityconsulting.co.uk/knowledge/guides/what-do-i-need-to-know-about-legionella>

At both construction sites, operational buildings and their surrounding areas, situations can arise that increase the possible risk of the presence of biohazards. Examples of these include:

- Poisonous plants, especially in school environments and building sites, can pose a problem through contact or ingestion. Common plants including Wolfsbane, Cuckoo Pint, Foxglove and Hemlock are all potentially dangerous. Where young children have access to outside environments with a range of plants, a survey to check if anything potentially hazardous is growing there would be advisable.
- Weil's disease (Leptospirosis) can occur where rat urine or water contaminated with it enters the body through cuts or contact with the nose, eyes and mouth. Be aware of areas infested with rats and any associated water sources regularly used/contacted.
- Similarly, areas where sewage or animal faeces/droppings have contaminated a location, either indoors or outside, it needs to be carefully managed. The potential for disease causing organisms to be present cannot be discounted and these could include:
  - Bacteria and fungi in bird droppings can cause illnesses such as Psittacosis, Histoplasmosis and cryptococcosis.
  - Animal droppings (and the animals themselves) can harbour a number of infectious microorganisms such as Salmonella and Hantaviruses.
  - Sewage, as well as being offensive can contain all sorts of biological agents and blood. Hepatitis, as well as other blood-borne viruses (BBV) and E.coli.
  - Items such as discarded needles or other sharps can cause injection injuries and where contaminated lead to exposure to BBVs including Hepatitis and HIV.

If any of these are identified at your site or location you need to produce a suitable and sufficient risk assessment to determine the precautions and controls to be followed whether that is working in the area or remediating the contamination, as relevant.



#### 4. Malicious attack

Malicious attacks involving biohazards are extremely rare but should form part of your wider risk management planning. It is likely you will not know what the biohazard will be, or how it will be “delivered”, so often your plans and procedures need to reflect a variety of possible circumstances.

The Centre for the Protection of National Infrastructure (CPNI) document “Recognising the Terrorist Threat” provides general information (including Chemical, Biological or Radiological (CBR) materials) and the HSE “Biological/chemical threats by post ([Biological/chemical threats by post \(hse.gov.uk\)](https://www.hse.gov.uk/biotech/biotech.htm)) further more specific advice.

In addition to your post room (and its staff), security should also form part of your risk management team and preparations as they could spot suspicious items/individuals around the premises or on the grounds.

Your procedures should include the actions you need to take, location and means of any containment you are going to employ and all the relevant contacts for notifying/reporting an incident.



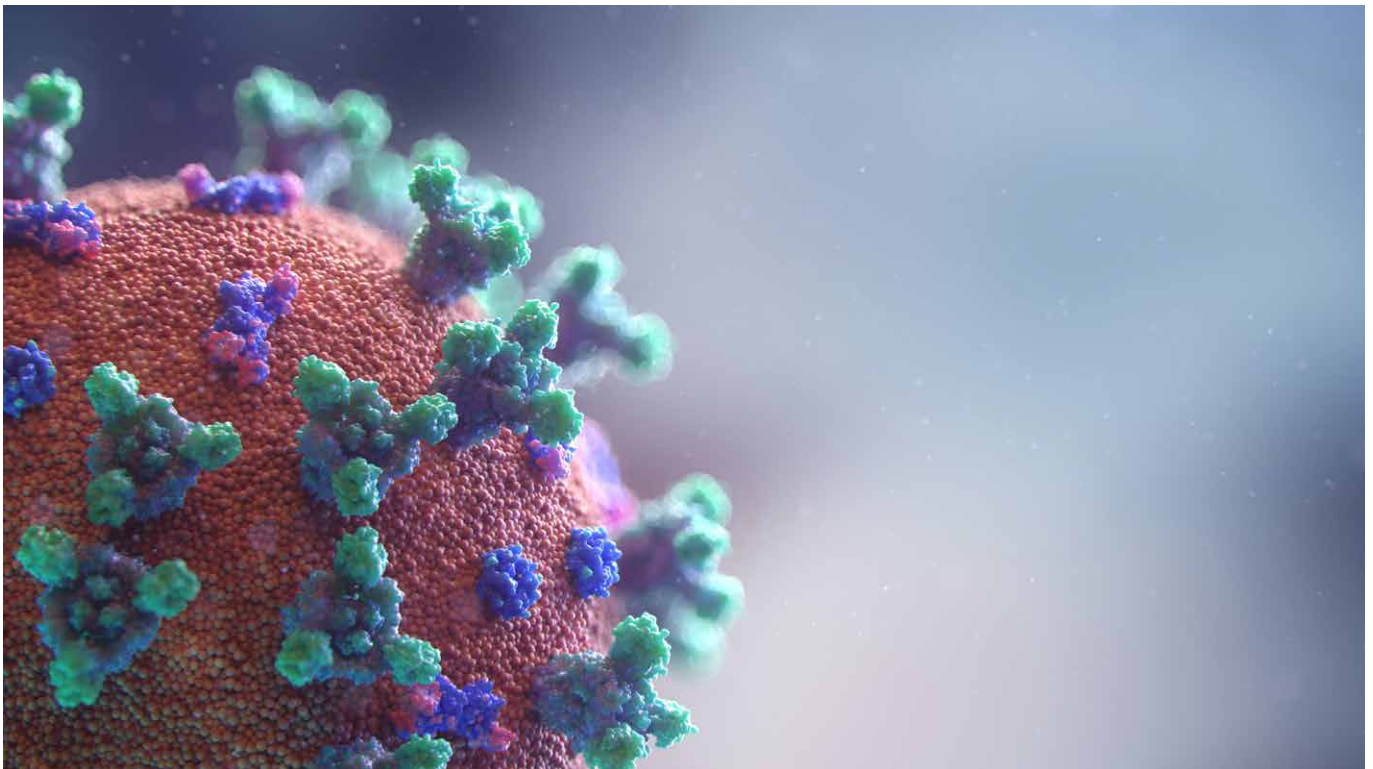


## 5. Epidemics/Pandemics

The current SARS-CoV-2/COVID-19 pandemic has been an unwelcome and very real example of the effects epidemic/pandemic disease can cause. As we have seen historically with SARS, Swine flu, Bird flu and Ebola, they are difficult to predict and can have a variable reach and consequence.

While these events can quickly become public health issues and managed as such through central government departments and other agencies, from an organisational perspective they should also form part of your business continuity plan(s).

Use the experience of COVID-19 to review and update your plans accordingly as well as the means your organisation will use to assess the situation in the future as well reflect changes in other jurisdictions where business travel occurs.



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