



GUIDANCE NOTE 5: TRANSPORT OF BIOLOGICAL MATERIALS BY ROAD, RAIL OR AIR

University policy requires that:

Appropriate safety measures are taken to ensure containment during any transportation of biological agents/materials on- or off-site, and to deal with any emergency;

Current packaging and labelling requirements are complied with;

Legal framework

The GB regulations (*The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations*) covering the carriage of dangerous goods by road and rail are derived from European Directives (ADR (road) and RID (rail)), which in turn implement international modal agreements governing the transport of dangerous goods.

The international regulations for the transport of infectious substances by any mode of transport are based upon the Recommendations made by the Committee of Experts on the Transport of Dangerous Goods (UNCETDG), a committee of the United Nations Economic and Social Council. The Recommendations are presented in the form of Model Regulations. The United Nations Model Regulations are reflected in international law through international modal agreements:

Air

The Technical Instructions for the Safe Transport of Dangerous Goods by Air published by the International Civil Aviation Organization (ICAO) are the legally binding international regulations. The International Air Transport Association (IATA) publishes Dangerous Goods Regulations (DGR) that incorporate the ICAO provisions and may add further restrictions (where necessary such restrictions are included in these guidelines). The ICAO rules apply on all international flights. For national flights, i.e. flights within one country, national civil aviation authorities apply national legislation. This is normally based on the ICAO provisions, but may incorporate variations. State and operator variations are published in the ICAO Technical Instructions and in the IATA Dangerous Goods Regulations.

Rail

Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) apply to countries in Europe, the Middle East and North Africa. RID also applies to domestic transport in the European Union through Council Directive 2008/68/EC.

Road

The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) applies to 46 countries. In addition, modified versions of the convention are being used by countries in South America and South-East Asia. ADR also applies to domestic transport in the European Union through Council Directive 2008/68/EC.

Sea

The International Maritime Dangerous Goods Code published by the International Maritime Organization (IMO) is of mandatory application for all contracting parties to the International Convention for the Safety of Life at Sea (SOLAS).

Classification

The classification scheme used in the transport regulations reflects the risks associated with micro-organisms during transport rather than being based on the hazard group classification scheme. The definitions and classifications of biological materials for transport purposes are complicated, but it is important to get the classification correct as this determines how the goods should be packaged and labelled. It is important to remember that it is not acceptable to be cautious and classify more stringently than is necessary, since it is an offence to consign dangerous goods incorrectly classified.

It is the shipper's responsibility to ensure that the item is correctly packaged, labelled and documented for transport. Training is key to this, and anyone involved in shipping infectious substances must be trained and certified competent.

Biological agents, or materials that contain or may contain them, are allocated to UN Division 6.2 - Infectious Substances. Division 6.2 includes biological products, cultures, genetically modified micro-organisms (GMMs) and genetically modified organisms (GMOs) and medical/clinical waste.

Definitions

Infectious substances

Infectious substances are substances that are known or are reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsia, parasites, fungi) and other agents such as prions which can cause disease in humans or animals.

Patient specimens

Patient specimens human or animal materials, collected directly from humans or animals, including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluid swabs, and body parts being transported for purposes such as research, diagnosis, investigational activities, disease treatment and prevention.

Biological products

Biological products are those products derived from living organisms which are manufactured in accordance with the requirements of appropriate national authorities (in the UK: the Department of Health and the Medicines and Healthcare Regulatory Authority), which may have special licensing requirements, and are used either prevention, treatment or diagnosis of disease in humans or animals or for related development, experimental or investigational purposes. They include (but are not limited to) finished or unfinished products such as vaccines.

Biological products which do not fall under the previous paragraph and are known or reasonably believed to contain infectious substances and which meet the criteria for inclusion in Category A or Category B are assigned to UN 2814, UN 2900 or UN 3373, as appropriate.

Cultures

Cultures (laboratory stocks) are the result of processes by which pathogens are amplified or intentionally propagated in order to generate in high concentrations, thereby increasing the risk of infection should exposure occur. This definition refers to cultures prepared for the intentional generation of pathogens and does not include cultures intended for diagnostic and clinical purposes.

Genetically modified micro-organisms and organisms

Genetically modified micro-organisms and organisms are those micro-organisms and organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally. GMMs or GMOs that do not meet the definition of an infectious substance but are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction are assigned to Class 9 (UN 3245).

Medical or clinical wastes

Medical or clinical wastes are wastes that are derived from medical treatment of humans or animals or biological research. Medical or clinical waste containing category A infectious substances shall be assigned to UN 2814 or UN 2900 as appropriate. Details of University procedures for clinical waste treatment and collection can be found in Section F of this guidance document.

The following substances are not subject to the provisions of the regulations, unless they meet the criteria for inclusion in another class:

- Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals
- Substances containing micro-organisms which are non-pathogenic to humans or animals
- Substances in a form that any present pathogens have been neutralised or inactivated such that they no longer pose a risk to health
- Environmental samples (including foodstuff and water samples) which are not considered to pose a significant risk of infection
- Dried blood spots, collected by applying a drop of blood onto absorbent material, or faecal occult blood screening tests and blood and blood components collected for the purpose of transfusion or preparation of blood products and any tissues or organs for use in transplantation
- Human or animal (patient) specimens for which there is minimal likelihood that pathogens are present, providing the specimen is packed in a packaging which will prevent leakage (see below) and which is marked with the words “Exempt human specimen” or “Exempt animal specimen” as appropriate

Note: In determining whether any of the above has a minimal likelihood that pathogens are present, an element of professional judgement is required. That judgement should be based on the known medical history, symptoms and individual circumstances of the source, human or animal, and endemic local conditions. Examples of specimens which may be transported as a patient specimen for which there is a minimal likelihood that pathogens are present include blood or urine tests to monitor cholesterol levels, blood glucose levels, hormone levels, etc; tests required to monitor organ function for humans or animals with non-infectious disease, or therapeutic drug monitoring; tests conducted for insurance or employment purposes and intended to determine the presence of drugs or alcohol; pregnancy tests; biopsies to detect cancer; and antibody detection in humans and animals in the absence of any concern for infection. Details of packaging for exempt specimens is included later in this section.

Infectious substances are divided into the following categories:

Category A: an infectious substance which is transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life threatening or fatal disease to humans or animals. This includes all agents classified as HG4 in the Approved List of biological agents, many HG3 agents and two HG2 agents (*Clostridium botulinum* and poliovirus). Those that can cause disease in humans are assigned to UN 2814. Those that affect animals only are assigned to UN 2900 (additional requirements are in place for animal pathogens in the UK – see the DEFRA website for further details). The list is not exhaustive. Other infectious substances, including new or emerging pathogens, which do not appear in the table but which meet the same criteria must be assigned to Category A and if there is doubt as to whether or not a substance meets the criteria it is also to be included in Category A. Exposure occurs when an infectious substance is released outside of the protective packaging, resulting in physical contact with humans or animals.

UN 2814 INFECTIOUS SUBSTANCE, AFFECTING HUMANS (Proper shipping name)

UN 2900 INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only (Proper shipping name)

Category B: any infectious substance that does not meet the criteria for inclusion in Category A. These are assigned to UN 3373.

UN 3373 BIOLOGICAL SUBSTANCE, CATEGORY B (Proper shipping name)

GMMs or GMOs that do not meet the definition of an infectious substance but are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction are assigned to Class 9 (UN 3245).

Clinical or medical waste that contains Category B infectious substances (with the exception of cultures) or that only has a low probability of containing infectious substances is assigned to UN 3291.

Cultures

Cultures of micro-organisms that are infectious for humans and/or animals must be classified for transport as follows:

- Category A infectious substance if the particular micro-organism appears on the indicative list (or for new or emerging pathogens if they meet the Category A criteria) or
- Category B infectious substance if the particular micro-organism does not appear on the indicative list (and does not meet the criteria for Category A).

Cultures of micro-organisms that are not infectious for humans or animals are not subject to control under the various transport regulations. However, when transported they must always be packaged in such a way that they are unlikely to leak in transit.

Human and/or animal samples

Up until the end of 2005, samples of materials such as blood, tissue, excreta, secretions, body parts, etc collected from humans or animals were considered as a minimum, Category B infectious substances. However, the classification of some samples has been amended to exempt certain of these from the regulations (such samples are "Exempt human" or "Exempt animal" specimens, and the exemption includes materials transported for research purposes – see earlier section). Samples from healthy individuals, where there is no reason to suspect that the person is suffering from an infectious disease, and the sample is not being tested for the presence of pathogens, would be exempt. All samples from humans or animals that are known, or likely, to contain pathogens are considered, as a minimum, category B infectious substances. These may not be transported as exempt specimens.

Genetically modified micro-organisms (GMMs) or genetically modified organisms (GMOs)

These are micro-organisms and organisms in which genetic material has been purposely altered through genetic engineering in a way which does not occur naturally.

GMMs which meet the definition of infectious substances above must be assigned to either UN 2814 or UN 2900 or UN 3373 as appropriate. These would be genetically modified micro-organisms assessed as requiring containment level 2 or above (based on the risk assessment made under the GM regulations) because they are harmful, or potentially harmful, to humans and/or animals. EC Regulation requires notification of transboundary movements of Class 3 GMMs to the Biological Clearing House and European Commission (*transboundary movements are those entering or leaving the EC*). If your work involves Class 3 GMMs you should advise the Health and Safety Unit of any intention to transport these within or outside the UK.

GMMs that do not meet the definition of an infectious substance, but are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction are classified in Class 9 - Miscellaneous Dangerous Goods under UN 3245 GENETICALLY MODIFIED MICRO-

ORGANISMS. These would be GMMs which can be handled at containment level 1 but are vectors and can transfer genetic material to other organisms. Note this is in relation only to micro-organisms and does not cover, for example, naked nucleic acid, plasmids or liposome gene delivery systems, none of which are controlled under the transport regulations. Vectors which require containment level 2 or above for safe handling in the laboratory must be classified as infectious substances as described in the previous paragraph.

GMMs which do not meet the definition of an infectious substance, and which are not vectors as described above, are not subject to the provisions of the transport regulations. These would be GMMs which can be handled at containment level 1 and present no significant risks to human or animal health and safety or the environment.

GMOs that are not micro-organisms (i.e. plants or animals) and which are known or suspected to be dangerous to humans, animals or the environment must be transported in accordance with conditions specified by the competent authority, and are classified in Class 9 – Miscellaneous Dangerous Goods, under UN 3245 Genetically Modified Organisms. Further advice should be sought before any movement occurs.

Some GMMs and GMOs are authorised for use in certain countries by the competent authority for that country. Where they have been so authorised, e.g. have received a consent for deliberate release into the environment, they are not subject to controls under the transport regulations providing that for any journey, authorisations apply in the country of origin, transit and destination.

Refrigerated or frozen materials

There is often a requirement to transport biological materials at low temperatures, usually on dry or wet ice. Dry ice is listed in the Dangerous Goods List and is classified in Class 9 - Miscellaneous Dangerous Goods.

For air transport its proper shipping name is UN 1845 DRY ICE.
For transport by road, dry ice should be marked DRY ICE, AS COOLANT.

Liquid nitrogen is subject to controls under the transport regulations and wherever possible its use should be avoided for refrigerating infectious substances during transport. Very specialised UN type-approved packing is required to transport infectious substances in liquid nitrogen. Schools should consign infectious substances in liquid nitrogen only if there is no suitable alternative means.

Dry ice must only ever be placed in packaging designed to permit the release of CO₂ gas, and to prevent a build up in pressure. If dry ice is used to cool materials it should be placed around the secondary packaging, and the outer packaging must permit the release of CO₂ gas. Usually the dry ice is contained within a PI 904 compliant overpack. Dry ice must **never** be placed in either the primary or secondary receptacle as these will explode due to pressurisation.

When transporting refrigerants by road that can cause asphyxiation (dry ice or LN₂), an additional warning label may be required on the packaging, where a risk has been identified. The Department of Transport has assumed that, in most cases (with appropriate control measures) this will not apply to dry ice. Where there is any uncertainty further clarification should be sought.



Figure 1: Hazard label for dry ice. Substances packed in dry ice must display this label as well as the primary risk label (i.e. For Category A or Category B substances)

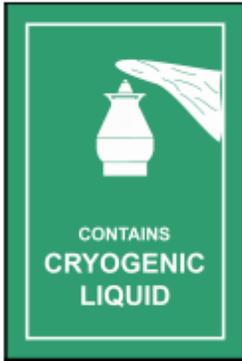


Figure 2: Handling label for cryogenic liquids, for use in air transport in addition to other risk labels (Category A and B)

Packaging and Labelling

Basic Triple Packaging System

This should be used for all infectious substances and consists of three layers as follows:

Primary receptacle: A primary watertight, leak-proof receptacle containing the specimen. The receptacle is packaged with enough absorbent material to absorb all fluid in case of breakage or leakage.

Secondary packaging: A second durable, watertight, leak-proof packaging to enclose and protect the primary receptacle(s). Several cushioned primary receptacles may be placed in one secondary packaging, but sufficient additional absorbent material shall be used to absorb all fluid in case of breakage or leakage.

Outer packaging: Secondary packaging is placed in an outer shipping packaging with suitable cushioning material. The outer packaging protects the contents from outside influences, such as physical damage, while in transit. The smallest overall external dimension shall be 100 x 100 mm.

Category A infectious substances

Category A infectious substances (either UN 2814 or 2900) should be packed for transport using Packaging Instruction 620 (PI620). This packaging must meet UN performance requirements as shown by design type testing. These are known as UN-type approved packaging for Class 6.2 substances and they are certified and marked accordingly.

For surface transport there is no maximum quantity per package. For passenger aircraft, there is a 50 ml/50 g limit; for cargo craft, there is a 4 litre/4 kg limit, with a limit of 500 ml/500 g per primary receptacle.

IATA Regulations **forbid** infectious substances being taken aboard aircraft as hand luggage, checked-in baggage or upon the person - they must always be consigned via a courier.

Figure 3:

Example of packaging and labelling for Category A shipment

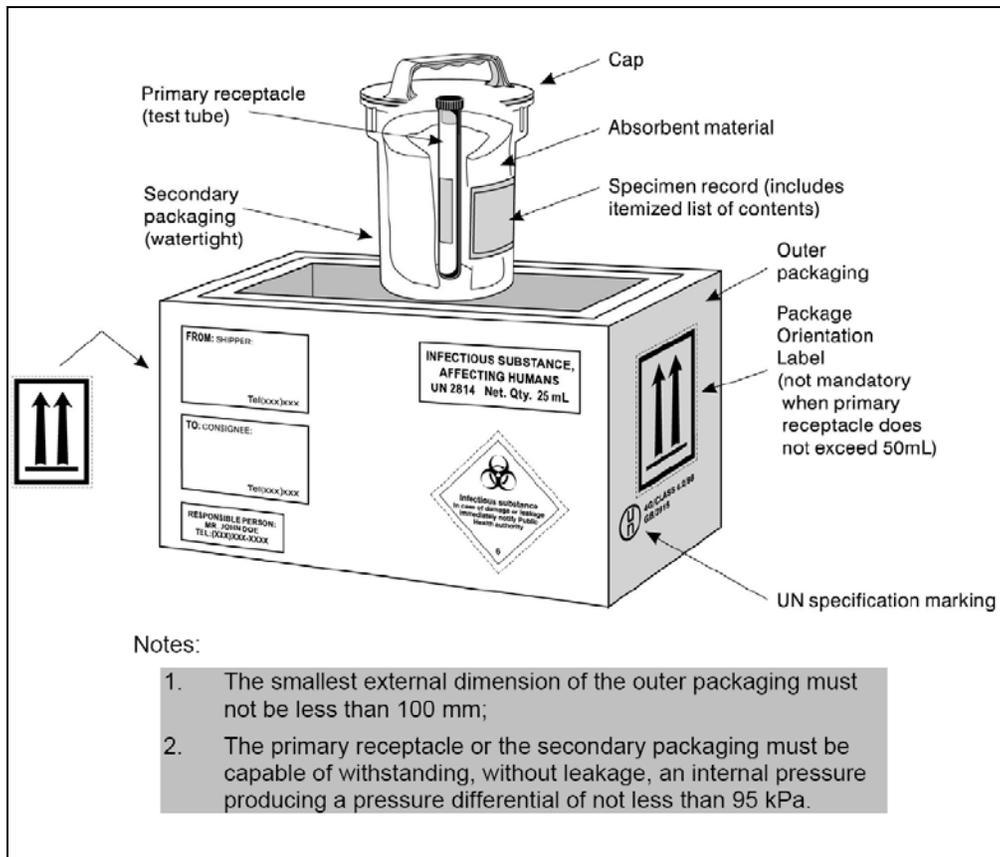


Diagram courtesy of IATA, Montreal, Canada

Labelling

Packages containing Category A infectious substances should be marked with:

- the proper shipping name, e.g. 'Infectious substance, affecting humans'. (It is no longer necessary to show the technical name, i.e. the name of the micro-organism, on the package but the proper shipping name should be supplemented with the technical name in the accompanying transport documentation);
- the appropriate UN number (e.g. for 'Infectious substances, affecting humans' this would be UN 2814); and
- the appropriate warning label. The danger sign for infectious substances is shown in Figure 4. This is 100mm x 100mm, or for small packages, 50mm x 50mm.

Figure 4



For frozen specimens being transported in an overpack, any certificated markings must be visible through the overpack or repeated on the overpack itself. The packaging should also be marked to indicate any subsidiary hazards.

Category B Biological Substances

Category B substances assigned to UN 3373 should be packaged in accordance with PI650. The same PI number is used for air transport, but again there are limits on quantities that can be sent per package.

Packaging for Category B infectious substances, packed using PI650, are not required to meet UN performance requirements provided they are capable of passing a 1.2 m drop test.

For transport by road, there are no limits on the quantity of materials contained within either the primary receptacle(s) or the total package. This is in contrast to transport by air where, other than for body parts, organs or whole bodies, on both passenger and cargo aircraft there is a 4L/4kg limit per package, with a 1L limit per primary receptacle for liquids, whereas for solids the primary receptacle must not exceed the outer packaging mass limit of 4kg.

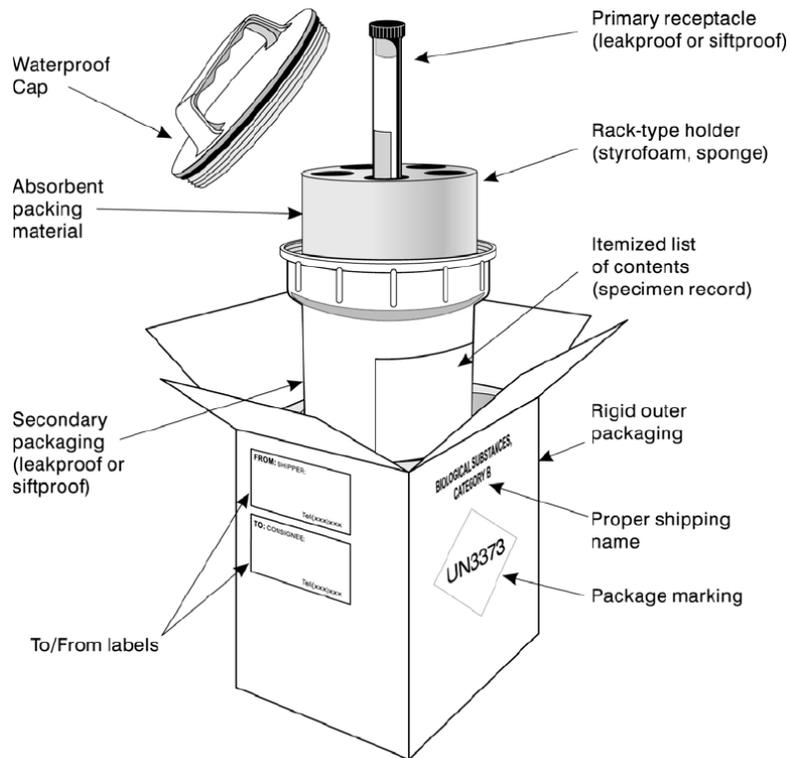
The appropriate label for Category B substances is shown in Figure 5:

Figure 5



Figure 6

Example of Packing and Marking for Category B Infectious Substances
(See Packing Instruction 650 for additional requirements, e.g. drop test)



Notes:

1. At least one surface of the outer packaging must have a minimum dimension of 100 mm x 100 mm;
2. The primary receptacle or the secondary packaging must be capable of withstanding, without leakage, an internal pressure producing a pressure differential of not less than 95 kPa.

Diagram courtesy of IATA, Montreal, Canada

Exempt Specimens (human or animal)

These must be packed in accordance with the packing requirements specified in the main text of the ADR and IATA Regulations. They should be marked with the words: EXEMPT HUMAN SPECIMEN or EXEMPT ANIMAL SPECIMEN

Figure 7

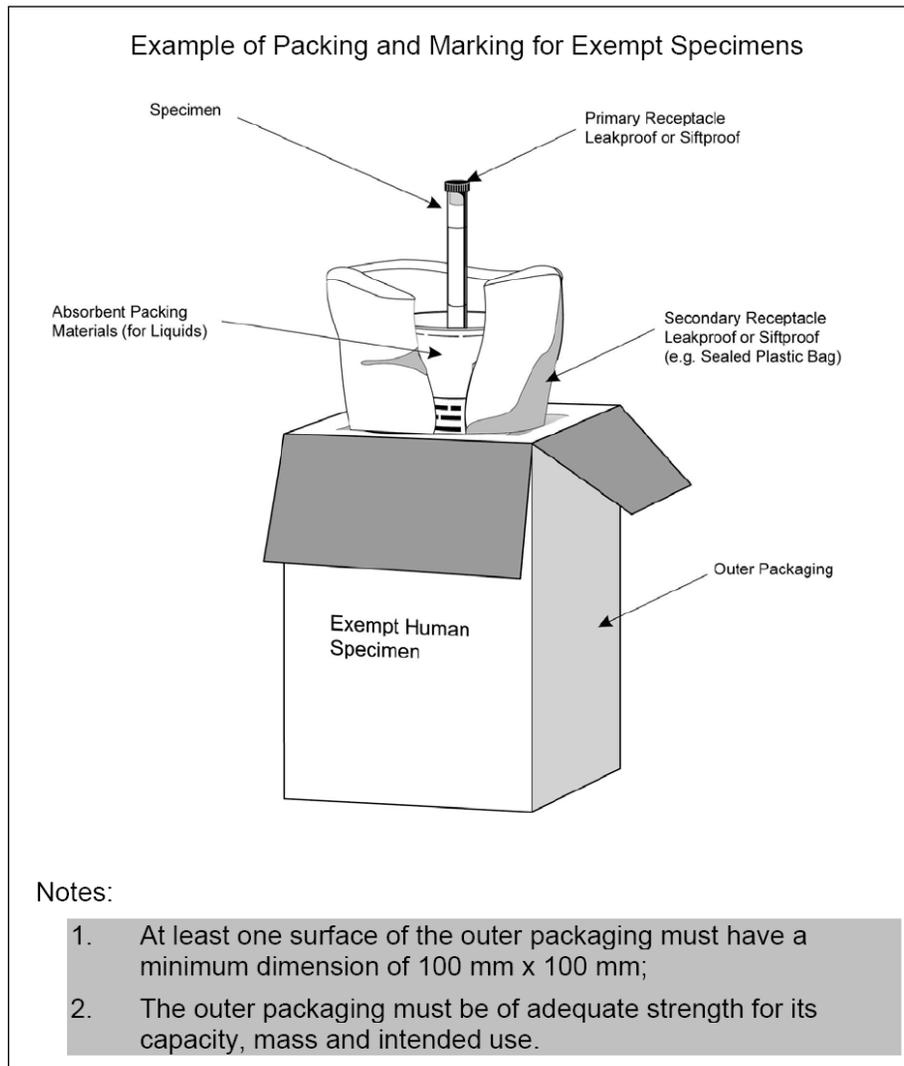


Diagram courtesy of IATA, Montreal, Canada

Genetically Modified Micro-organisms assigned to UN 3245

These are packaged in accordance with ADR PI 904 (Road) or IATA PI 959.

Genetically modified micro-organisms assigned to UN 3245 must be packed according to the procedures (i.e. triple layer packaging system) for UN 2814, INFECTIOUS SUBSTANCE AFFECTING HUMANS, except that UN approved packaging need not be used. There are no limits on the quantity transported by road, but by air the following limits apply:

on both passenger or cargo aircraft, no limit per package, but the maximum quantity in the primary receptacle must not exceed 100ml or 100g.

The hazard warning label is the UN 3245 label, shown in Figure 8:

Figure 8



Packaging can be obtained from a number of companies (“home made” packaging must never be used):

DGP UK Group [www.dgpgroup.com];

Air-Sea containers Ltd [www.air-sea.co.uk];

Dangerous Goods International [www.dgiglobal.com].

Reference to these companies does not imply endorsement by the University. They are provided for information.

Detailed guidance on the packaging requirements for PI 620 and PI 650 can be found in the World Health Organisation’s guidance on regulations for the Transport of Infectious Substances, which is regularly updated.

Paperwork

Before sending any biological materials abroad, the person sending the goods (the consignor/shipper) should contact the person to whom they are being sent (the consignee) to let them know shipping details and to check that the substance may be legally imported. The person receiving the materials is generally regarded as the importer and the one responsible for obtaining, where necessary, all appropriate permits or licences. Importation of materials into the United States is particularly tightly regulated and there are restrictions even on some items that may be transported as non-dangerous goods. In contrast, very few items require any sort of import permit, licence or notification to be made when importing into the UK.

Any carriage of goods subject to controls under the transport regulations must be accompanied by documentation as specified in those regulations. The information required must be clearly legible and for air transport must exactly meet the specified format. The following includes requirements for paperwork included within the package and for paperwork accompanying the package for the carrier etc.

When transporting any biological materials, paperwork must be included within the package between the secondary container and the outer container (attached to the secondary), giving:

- the names and addresses of both the consignor (sender) and consignee (receiver), including emergency contact details (name and telephone number) at both ends and
- for dangerous goods, a description of the goods in the following format/order UN NUMBER and PROPER SHIPPING NAME

In addition, for Category A infectious substances assigned to UN 2814 or UN 2900:

- the proper shipping name must be supplemented with the technical name (the recognised biological/scientific/technical name of the micro-organism). When the infectious substances to be transported are unknown, but suspected of meeting the criteria for inclusion in Category A and assignment to UN 2814 or UN 2900, the words "suspected Category A infectious substance" in parentheses should be used as the technical name.
- an itemised list of contents must be given, to include for each named item the number of tubes and their volume.

or

- for exempt human or animal specimens, a simple statement saying what the materials are, that there is minimal likelihood that pathogens are present and that they are exempted under the transport regulations. or
- for non-hazardous biological materials, a simple statement saying what the materials are, that they are non-hazardous and that they are not classified as dangerous goods under the transport regulations.

Written emergency response procedures must also be provided with any package containing biological materials classified under UN 2814, UN 2900, UN 3373 or UN 3245.

When using a courier, senders must always give a full description of the goods to the company when initially arranging the shipment, including the relevant UN number(s) and proper shipping name(s), in order the courier is fully aware they will be transporting dangerous goods and ensures the necessary paperwork is completed.

For transport by road of packages containing dangerous goods other than those assigned to UN 3373 as category B infectious substances, the carrier (company transporting the goods) should request that a dangerous goods declaration form be completed. Typically the carrier will provide a copy of the form for completion.

For transport by air of packages containing dangerous goods it is necessary to complete an Air Waybill and, in most cases, a Shipper's Declaration for Dangerous Goods.

| | |
|--|--|
| INSURANCE - If carrier offers insurance, and such insurance is requested in accordance with the conditions thereof, indicate amount of insurance in figures in box marked "Amount of Insurance". | |
| SCI | |
| Nature and Quantity of Goods (incl. Dimensions of Volume) | |
| Biological Substance, Category B UN3373 2 x 100ml Packing Instruction 650 Dry ice Class 9 UN1845 1 x 5kg | |

Figure 9: An example of a completed Air Waybill



Movement of Class 3 Genetically Modified Micro-organisms:

The Health and Safety Unit must be informed of any intention by University personnel to transport (within the UK or abroad) Class 3 GMMs since advance notification must be made to the Health and Safety Executive.

Transport

Although the regulatory requirements only apply to transport of infectious material off site, on-site transport still needs to be carried out in a safe manner. Secondary containment (such as a carry box or high sided trolley) must always be used.

Transport between one part of private premises and another part of those premises situated in the immediate vicinity of that first part, where both parts are occupied by the same person even if those parts may be separated by a road, does not fall within the scope of the regulations.

You should always discuss your transport requirements with your chosen carrier, in particular, you may need to provide some of the information that will be used on the accompanying documentation. You will need to establish whether any of the intended transport will be by air, even within the UK, to ensure that the correct packaging is used and that quantity limits are not exceeded. Precise detail of the documentation that may be required is not given here. You should consult your carrier about this information, as it may vary depending on the carrier and/or the final destination.

Examples of carriers include:

DHL (www.dhl.co.uk),
FedEx (www.fedex.com/gb) or
Dangerous Goods International (<http://www.dgiglobal.com/index.asp>).

Reference to these companies does not imply endorsement by the University. They are simply provided for information.

If the infectious materials are being consigned by air, it is essential that a courier is employed and that they are consigned as freight – samples are not permitted on aircraft in hand luggage, checked-in baggage or carried on the person. Biological samples not meeting the criteria for infectious substances should still be shipped by courier. There is little to distinguish the appearance of non-hazardous laboratory samples from hazardous ones and the general concerns over bioterrorism may mean that the samples do not get past the authorities.

If you wish to transport any Category B or non-infectious substances on the public highway in the UK you should ensure it is packaged and labeled as described above. You should also:

- Carry relevant documentation e.g. Headed paper with description of specimens, intended use, place of origin and destination and contact details of sender and recipient;
- Carry University ID at all times;
- Ensure you have the appropriate insurance if you use your own vehicle (Contact the University Insurance Office for details: 46111);
- Never leave the package unattended;
- Report a lost or missing package immediately to the Health and Safety Unit.

Postal Services - Royal Mail

Infectious substances (including diagnostic or clinical specimens) are not permitted in international mail. However, many biological substances can be sent via domestic mail (**NOT** materials containing category A substances), providing they are classified, packaged and labelled in accordance with the preceding guidelines. The Royal Mail should be contacted beforehand to ensure it will transport the materials. The maximum amount of biological substances (including any items assigned to UN 3373, UN 3245 or Exempt human or animal specimens) that can be sent by post is 50g or 50ml per package. Dry ice is **NOT** permitted.

The Royal Mail supplies "Safebox™", a purpose designed packaging for sending Category B infectious substances in the postal system. It is supplied as a ready to use kit, and can be posted in a pillar box. It must **NOT** be used for sending Category A infectious substances. Details can be obtained from the Royal Mail website (www.royalmail.com) or by telephoning their order Line.

Importation of biological agents

There is no requirement under health and safety law to obtain a licence to import human pathogens into the UK, other than the requirement under COSHH to notify the movement of HG4 agents (this would cover movement from, for example, the airport to the receiving laboratory). There is a requirement to notify first use of HG2-HG4 agents at a particular premises, but this relates to use of the agents in the laboratory, not the consignment of those agents. **The importation of animal pathogens (some of which may be zoonotic agents), animal by-products, soil, plants and plant pathogens is covered in separate legislation and licences may be needed to import and store/use this material. Please contact the Health and Safety Unit for details.**

You will also need to notify the Home Office in advance if the agent you are importing is covered under the Anti-terrorism, Crime and Security Act 2001. This will be done by the Health and Safety Unit.

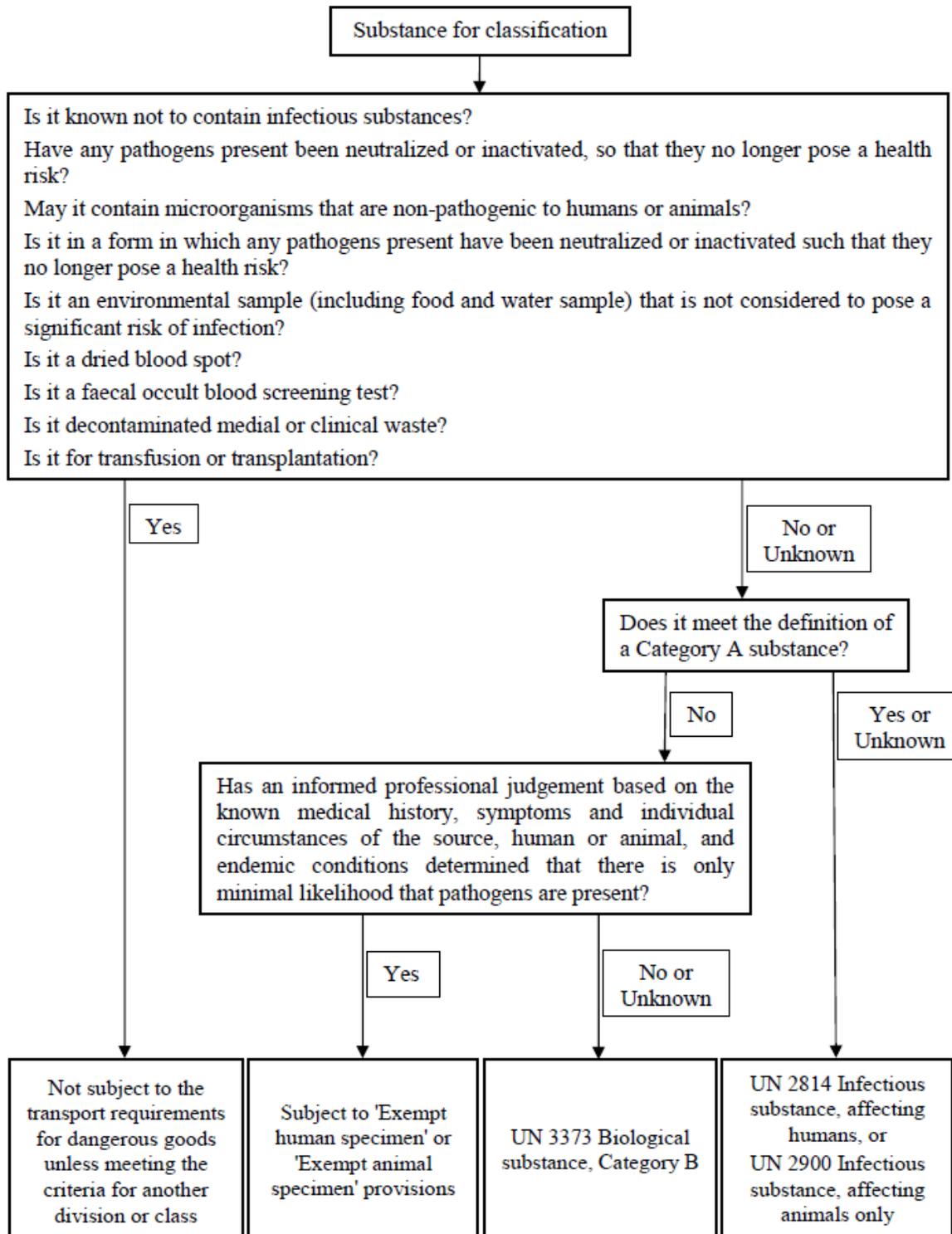
Security of Materials

Both ADR and IATA require precautions to be taken to minimise the likelihood of theft/misuse of dangerous goods at points along the transport chain. It is therefore recommended that the following action is taken:

All packages containing infectious materials should only be given to **identified** representatives of courier companies for transportation. While awaiting collection packages must be stored safely and securely. Where infectious substances are classified as Category A materials, and are assigned to UN 2814 or 2900 they are considered to be "High Consequence Dangerous Goods". These could potentially be used in terrorist incidents and may result in high numbers of casualties or high levels of damage. Additional security measures should therefore be put in place. Advice can be obtained from local Counter-terrorism Security Advisers, via the Health and Safety Unit. A lost package must be reported **immediately** to the Health and Safety Unit as this may constitute a dangerous occurrence.

Summary of transport requirements

Flowchart for the classification of infectious substances and patient specimens



Indicative list of infectious substances included in Category A in any form, unless otherwise indicated (taken from United Nations Model Regulations, 17th Edition:

| INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED | |
|--|--|
| UN Number and Proper Shipping Name | Microorganism |
| UN 2814 Infectious substance, affecting humans | <i>Bacillus anthracis</i> (cultures only) |
| | <i>Brucella abortus</i> (cultures only) |
| | <i>Brucella melitensis</i> (cultures only) |
| | <i>Brucella suis</i> (cultures only) |
| | <i>Burkholderia mallei</i> – <i>Pseudomonas mallei</i> – glanders (cultures only) |
| | <i>Burkholderia pseudomallei</i> – <i>Pseudomonas pseudomallei</i> (cultures only) |
| | <i>Chlamydia psittaci</i> – avian strains (cultures only) |
| | <i>Clostridium botulinum</i> (cultures only) |
| | <i>Coccidioides immitis</i> (cultures only) |
| | <i>Coxiella burnetii</i> (cultures only) |
| | Crimean-Congo haemorrhagic fever virus |
| | Dengue virus (cultures only) |
| | Eastern equine encephalitis virus (cultures only) |
| | <i>Escherichia coli</i> , verotoxigenic (cultures only) ¹ |
| | Ebola virus |
| | Flexal virus |
| | <i>Francisella tularensis</i> (cultures only) |
| | Guanarito virus |
| | Hantaan virus |
| | Hantaviruses causing haemorrhagic fever with renal syndrome |
| | Hendra virus |
| | Hepatitis B virus (cultures only) |
| | Herpes B virus (cultures only) |
| | Human immunodeficiency virus (cultures only) |
| | Highly pathogenic avian influenza virus (cultures only) |
| | Japanese Encephalitis virus (cultures only) |
| | Junin virus |
| | Kyasanur Forest disease virus |
| | Lassa virus |
| | Machupo virus |
| | Marburg virus |
| | Monkeypox virus |
| | <i>Mycobacterium tuberculosis</i> (cultures only) ¹ |
| Nipah virus | |

| INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED | |
|--|--|
| | Omsk haemorrhagic fever virus |
| | Poliovirus (cultures only) |
| | Rabies virus (cultures only) |
| | <i>Rickettsia prowazekii</i> (cultures only) |
| | <i>Rickettsia rickettsii</i> (cultures only) |
| | Rift Valley fever virus (cultures only) |
| | Russian spring-summer encephalitis virus (cultures only) |
| | Sabia virus |
| | <i>Shigella dysenteriae</i> type 1 (cultures only) ¹ |
| | Tick-borne encephalitis virus (cultures only) |
| | Variola virus |
| | Venezuelan equine encephalitis virus (cultures only) |
| | West Nile virus (cultures only) |
| | Yellow fever virus (cultures only) |
| | <i>Yersinia pestis</i> (cultures only) |
| UN 2900 Infectious substance, affecting animals only | African swine fever virus (cultures only) |
| | Avian paramyxovirus Type 1 – Velogenic Newcastle disease virus (cultures only) |
| | Classical swine fever virus (cultures only) |
| | Foot and mouth disease virus (cultures only) |
| | Lumpy skin disease virus (cultures only) |
| | <i>Mycoplasma mycoides</i> – contagious bovine pleuropneumonia (cultures only) |
| | Peste des petits ruminants virus (cultures only) |
| | Rinderpest virus (cultures only) |
| | Sheep-pox virus (cultures only) |
| | Goatpox virus (cultures only) |
| | Swine vesicular disease virus (cultures only) |
| | Vesicular stomatitis virus (cultures only) |

References and Further information

World Health Organisation guidance on regulations for the Transport of Infectious Substances:
<http://www.who.int/en/>

International Air Transport Association: <http://www.iata.org>