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## **Risks associated with Transport of Human Blood, Body Fluids and Tissue**

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## Introduction

All Groups within OCDEM have a requirement to transport samples either within the Department or to third parties. There are different transport requirements for samples transported within the department than for samples that will be transported outside the Hospital grounds. Samples that are transported outside the hospital via public roads have to be packed in accordance with the relevant packing instruction required by the Department of Transport, the Civil Aviation Authority and the Maritime and Coastguard Agency.

## Persons at Risk

- Laboratory Staff, nursing and medical staff, students and visitors
- Domestic staff
- Maintenance engineers
- Members of the public
- Couriers

## Potential Hazards

- Health hazards
- Temperature (when using dry ice or liquid nitrogen)
- Manual Handling
- Dropping of transport containers within OCDEM when transporting between laboratories or the Clinical Research Unit.

## Risks to samples

- Delayed transit times resulting in thawing of samples
- Loss of package
- Theft of package
- Package delivered to incorrect destination

## Health Hazards

- All samples within OCDEM are from a healthy population with no known infectious diseases, therefore the risk of samples containing a pathogen is very low; all samples should still be treated as if they contain infectious agents.  
In the event of a sample spillage *OCDEM SOP S4: Disinfection in Containment Level 2 Areas* must be followed.
- For samples that need to be kept frozen dry ice will be required. Dry ice is a very cold (-76°C) solid that sublimates\* to become a toxic asphyxiant gas which will accumulate in poorly ventilated areas.
- Liquid nitrogen (used for snap frozen biopsies) produces approximately 700 times its volume of gas. The resulting displacement of oxygen from the atmosphere may be sufficient to cause asphyxiation. A specialist courier is required to transport specimens in liquid nitrogen.

## Temperature

Dry ice and liquid nitrogen are capable of inflicting serious burns due to skin contact and frost bite. Suitable cryo-gloves must be made available and worn; a scoop is available for transferring dry ice to the transport container. Long forceps are required for removing samples from liquid nitrogen.

\*Sublime: changes state from solid to gas with no liquid phase

## **Manual Handling**

Bags of dry ice can weigh up to 10 Kg; they are heavy, cold and awkward to carry. Transport boxes containing samples may also be heavy and awkward. Consideration must be given to the whether the person packing the samples is capable of handling the weight and size of the package.

Liquid Nitrogen has to be transported from the Clinical Research Unit to the laboratories in the correct dewars, which are awkward to carry. A lift cannot be used.

## **Dropping of Transport Containers**

There is a risk that transport containers suitable for use within the hospital may break open if dropped. All spills must be cleaned up in accordance with *OCDEM SOP S4: Disinfection in Containment Level 2 areas*.

If containers containing liquid nitrogen are dropped the area must be cleared and closed until the nitrogen has dissipated; the stairwells and corridors within OCDEM are well ventilated and this should be achieved within 30 minutes. In the laboratory liquid nitrogen will dissipate more quickly due to the high number of air changes.

## **Delayed transit times resulting in thawing of samples**

Occasionally sample delivery can be delayed due to unforeseen circumstances, for example: adverse, weather conditions; held in customs, held in a store room at the destination delivery point. Packages which need to be kept frozen should contain sufficient dry ice to last 72 hours to prevent the thawing of samples. The package should be tracked and the recipient asked to notify the sender when the package has been received. The courier can be asked for te package to be topped up with dry ice if necessary.

## **Loss of package**

Unfortunately there is a negligible risk that the package can be completely lost in transit; this is a very rare occurrence and if it does occur a thorough investigation must be made to discover what went wrong. An Adverse Event form will need to be completed and submitted to the DI.

## **Theft of package**

There is a very low risk that a package may be stolen, which may only show up as a missing package. Again this must be thoroughly investigated and an Adverse Event form will need to be completed and submitted to the DI.

## **Package delivered to incorrect destination**

Packages do occasionally get delivered to the incorrect destination; this usually becomes apparent when tracking the package or the recipient querying why they have not received it. The courier will know where the package was delivered; they will have to collect it and deliver it to the correct destination, adding more dry ice to the package if required.

## **Control Measures**

- Staff must be trained before they can transport samples; training must be recorded.
- Staff must be trained in the use and handling of dry ice and liquid nitrogen if applicable. This training must be recorded.
- OCDEM SOP S1: Laboratory Rules for the safe handling of Blood, Body Fluids and other Human Tissues: Containment Level 2 must be adhered to at all times.

- OCDEM SOP S7: Transporting Biological Substances, Category B within Europe must be adhered to when transporting samples outside the hospital grounds.
- OCDEM RA 2: Use and handling of Dry Ice must be adhered to if applicable.
- OCDEM RA 1: Risk assessment for the use and handling of liquid nitrogen in OCDEM and the Code of Practice for the handling of liquid nitrogen in OCDEM must be adhered to if applicable
- The correct transport containers must be used and the samples packed to the appropriate standard.
- Cryo-gloves must be available for use.
- A trolley must be available for use.
- Liquid nitrogen must not be carried in a lift.
- Domestic staff and maintenance engineers must attend an induction to the hazards associated with working in a Containment Level 2 laboratory.
- A Material Transfer Agreement is required for relevant material as defined by the Human Tissue Authority when the material is to be transported outside the University of Oxford.
- All packages sent by courier must be tracked and the recipient asked to confirm delivery; even if a package has been signed for it is no guarantee it has been delivered to the correct person.

## Update history

<b>Version</b>	<b>Date</b>	<b>Reason for update</b>	<b>Updated/reviewed by :</b>	<b>Date next review due</b>
1	Jan 2012	New Risk assessment	SMH	Jan 2014
1.1	Jan 2014	New header added – no other changes	SMH	Jan 2016
2.0	19/01/2016	Hod Added, ToC added, section added on risk to samples	SMH	Feb 2018