Module 6
Shipping Infectious Substances with Dry Ice
Overview

- Proper Packaging
- Markings and Labels
- Required Documentation
- Exercise: Packaging with dry ice
What happens when someone packs dry ice in a sealed container?
Not a good idea!

Exploding pig flu

Last week swine flu virus got through Australia’s famously tight customs and went off to school. But a month ago, in Geneva, the first days of swine flu literally sent the World Health Organisation (WHO) to their panic stations.

For a while everything felt precarious, as images of Mexicans in masks appeared in the media. It was as if the ‘fiction’ in science fiction had been annihilated. The possibilities were nightmarish.
Important issues when shipping with dry ice
Shipping with dry ice

- Samples which need to be kept frozen at -70 °C can be shipped using dry ice.
- Dry ice is a dangerous good.
- Shippers using dry ice (Carbon dioxide, solid) must be trained.
- When shipping with dry ice, the miscellaneous dangerous goods label is required.
- Shippers must properly mark and label the outside of packages containing dry ice.
- Appropriate documentation should discuss the presence of dry ice (for Category A this information will be included in the Dangerous Goods Declaration. For Category B and Exempt packages this information should be provided on the Air Waybill).
Shipping with dry ice (continued)

- The very low temperature (-79 °C) of dry ice can cause severe burns to skin upon direct contact.
- Packages containing dry ice must be designed and constructed so as to prevent the build up of pressure and allow the release of gas which could rupture the packaging.
- Substances shipped with dry ice are packaged in primary receptacles and secondary packagings capable of maintaining their integrity at such low temperatures.
- Samples being shipped with dry ice will need to be packaged in a manner which keeps the secondary packaging in its original position after the ice has dissipated.
What markings and labels are needed when shipping with dry ice?
Marking and labelling frozen shipments containing carbon dioxide, solid (dry ice)

Packages containing dry ice must be properly marked and labelled for all who may come in contact with the package during the shipping process.

**Dry ice (Carbon dioxide, solid) label**

This label should be placed on the outside of any package containing dry ice.

- **Label name:** Miscellaneous dangerous substances
- **Minimum dimensions:** 100 × 100 mm
- **(for small packages):** 50 × 50 mm
- **No. of labels per package:** 1
- **Colour:** Black and white

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**Dry ice (Carbon dioxide, solid) marking**

The PSN of dry ice must be followed by the words 'as coolant'. The net weight of the dry ice must be marked on the outside of any package containing dry ice.

**Dry ice as coolant**

UN1845

Net quantity ____kg
When dry ice is used to refrigerate Category A, Category B, or exempt human/animal specimens, these markings and labels must be applied.
What documentation is needed when shipping with dry ice?
Air waybill or DGD?

⚠️ For Category A shipments, the presence of dry ice is listed on the DGD. No additional information is needed on the air waybill.

⚠️ For Category B or exempt shipments, the presence of dry ice must be mentioned on the air waybill.
Air waybill (Category A with dry ice)

When shipping Category A infectious substances with dry ice, you will need to insert the first or both of the following statements in the "Handling Information" box:

1. Dangerous Goods – As per attached Shipper’s Declaration
2. "Cargo Aircraft Only" or "CAO"
Air waybill (Category A with dry ice)

Dangerous Goods – As per attached Shipper’s Declaration

Cargo Aircraft Only
Air waybill (Category B with dry ice)

When shipping Category B biological substances with dry ice, the Dangerous Goods Declaration is not required.

The contact details of the responsible person must appear in the "Handling Information" box.
# Air waybill (Category B with dry ice)

**Responsible Person:** Dr John Doe, Tel: +41 456 9786
Air waybill (Category B with dry ice)

When shipping Category B biological substances with dry ice, the Dangerous Goods Declaration is not required. Shippers must provide the following information in the "Nature and Quantity of Goods" box:

1. Proper shipping name
2. UN number
3. Number of boxes
4. Proper shipping name (dry ice)
5. Class
6. UN number
7. Weight
**Air waybill (Category B with dry ice)**

<table>
<thead>
<tr>
<th>Nature et quantité des marchandises (y compris dimensions ou volume)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Substance, Category B</td>
</tr>
<tr>
<td>UN 3373</td>
</tr>
<tr>
<td>1 box</td>
</tr>
<tr>
<td>Dry Ice</td>
</tr>
<tr>
<td>Class 9</td>
</tr>
<tr>
<td>UN 1845</td>
</tr>
<tr>
<td>3 kg</td>
</tr>
</tbody>
</table>
When shipping exempt specimens with dry ice, the Dangerous Goods Declaration is not required. Shippers must provide the following information in the "Nature and Quantity of Goods" box:

1. Exempt specimens
2. Proper shipping name (dry ice)
3. Class
4. UN number
5. Weight
Air waybill (Exempt with dry ice)

Exempt specimens

Dry Ice
Class 9
UN 1845
3 kg
Samples classified as Category B or Exempt do not require the Shipper’s Declaration for Dangerous Goods...

even when dry ice is used for refrigeration!
What additional information needs to be provided on the Shipper’s Declaration for Dangerous Goods when shipping Category A samples with dry ice?
**Dangerous Goods Declaration (Category A)**

**Transport Details**
- **Shipper:** Dr KY Orange, tel 6725 612 120
- **Consignee:** Dr AH Nelson, tel 6721 650 120
- **Air Waybill No.:** 143 7619 9370
- **Page 1 of 1 Pages**
- **Shipper's Reference Number:** 01234

**WARNING**
Failure to comply with all aspects of this Dangerous Goods Declaration may lead to serious penalties.

**NATURE AND QUANTITY OF DANGEROUS GOODS**

<table>
<thead>
<tr>
<th>UN No.</th>
<th>Description</th>
<th>Class or Division</th>
<th>Packaging Group</th>
<th>Quantity and Type of Packing</th>
<th>Packing Test</th>
<th>Authorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>2614</td>
<td>Infectious substance, affecting humans (Ebola virus)</td>
<td>6.2</td>
<td>6</td>
<td>50ml, 654</td>
<td>020</td>
<td></td>
</tr>
<tr>
<td>1845</td>
<td>Dry ice</td>
<td>9</td>
<td></td>
<td>200kg</td>
<td>954</td>
<td>All packed in one fibreboard box</td>
</tr>
</tbody>
</table>
# Summary of requirements for shipping samples with dry ice

<table>
<thead>
<tr>
<th><strong>Category A</strong> (P620)</th>
<th><strong>Category B</strong> (P650)</th>
<th><strong>Exempt</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>UN 2814 - Infectious Substance affecting Humans</td>
<td>UN 3373 - Biological Substance, Category B</td>
<td>Exempt Human Specimen</td>
</tr>
<tr>
<td>UN 2900 - Infectious Substance affecting Animals Only</td>
<td></td>
<td>Exempt Animal Specimen</td>
</tr>
<tr>
<td>P620 + P954</td>
<td>P650 + P954</td>
<td>Minimal triple packaging + P954</td>
</tr>
<tr>
<td>Shipper must be trained (dry ice is a dangerous good)</td>
<td>Shipper must be trained (dry ice is a dangerous good)</td>
<td>Shipper must be trained (dry ice is a dangerous good)</td>
</tr>
<tr>
<td>Markings and labels</td>
<td>Markings and labels</td>
<td>Markings and labels</td>
</tr>
<tr>
<td>Shipper's Declaration for Dangerous Goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air waybill for air transport</td>
<td>Air waybill for air transport (Name and Tel of a responsible person to be placed on box or on air waybill)</td>
<td>Air waybill for air transport</td>
</tr>
<tr>
<td>Import/export permit (if required)</td>
<td>Import/export permit (if required)</td>
<td>Import/export permit (if required)</td>
</tr>
<tr>
<td>Weight and volume limitations for infectious substances, Category A and for dry ice</td>
<td>Weight and volume limitations for biological substances, Category B and for dry ice</td>
<td>Weight and volume limitations for dry ice</td>
</tr>
</tbody>
</table>
Exercise

Packaging infectious substances with dry ice
Provided supplies

- Gloves
- 2 Category A samples in primary containers
- Secondary container
- Rubber bands
- Dry ice
- Absorbent material
- Inner lining
- Cushioning material
- Outer container
- Disinfectant
- Laboratory test instructions and itemized list of contents
SOP for packaging with dry ice

<table>
<thead>
<tr>
<th>Step</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open outer container</td>
</tr>
<tr>
<td>2</td>
<td>Remove secondary container</td>
</tr>
<tr>
<td>3</td>
<td>Open secondary container</td>
</tr>
<tr>
<td>4</td>
<td>Insert absorbent material</td>
</tr>
<tr>
<td>5</td>
<td>Put on gloves</td>
</tr>
<tr>
<td>6</td>
<td>Wrap cushioning material around primary container</td>
</tr>
<tr>
<td>7</td>
<td>Place sample into secondary container</td>
</tr>
<tr>
<td>8</td>
<td>Remove gloves</td>
</tr>
<tr>
<td>9</td>
<td>Close secondary container</td>
</tr>
<tr>
<td>10</td>
<td>Wrap itemized list of contents and laboratory test instructions around secondary container</td>
</tr>
<tr>
<td>11</td>
<td>Place secondary container into designated space in outer container</td>
</tr>
<tr>
<td>12</td>
<td>Fill outer container with dry ice (ensure dry ice is placed OUTSIDE of the secondary receptacle because of the risk of explosions)</td>
</tr>
<tr>
<td>13</td>
<td>Close outer container</td>
</tr>
<tr>
<td>14</td>
<td>Ensure proper labelling and marking, especially with dry ice</td>
</tr>
</tbody>
</table>
Questions and comments