

Dangerous Goods Shipping Training

Environmental Health and Safety

ehs.pitt.edu

(412)624 – 9505

Instructions for Training Module

- There are four sections in this training module. Once the content of each section has been reviewed, complete the quiz at the end of each section.
- **Passing Score** – Once a **total minimum score of 12 correct answers** between the four quizzes is achieved, you will immediately receive a Certificate of Training via Pitt email (@pitt.edu) and be certified to ship the materials covered in this training.
- **If you score below 12 correct answers**, you will need to review the content again and re-take the quizzes.
- The training can be exited at any time and started at the exact point where leaving off **as long as you use the same computer and the same browser (without deleting cookies) on which the training was started.** The training must be completed within one week of starting it.

Introduction

Upon completion of this module, **shippers will only be certified to ship the materials listed below**. This training will focus on transportation regulations for shipping the following materials:

- Infectious Substances
- Biological Substances, Category B
- Exempt Patient Specimens
- Genetically Modified Micro-Organisms
- Dry Ice or Carbon Dioxide, solid

If shipping any other Dangerous Goods (such as: ethanol, formalin, methanol, corrosive materials, etc.) please contact EH&S at 412-624-9505. Additional training is required.

Training Requirement

Each person who offers Dangerous Goods for transportation must properly classify, package, mark, label, and document the shipment. All persons coming in contact with and directly affecting the safe transportation must be trained and certified.

The shipper (individual who signs the paperwork) is ultimately responsible for ensuring compliance.



Dangerous Goods (DG)

Dangerous Goods are defined as articles or substances capable of posing a risk to health, safety, property, or the environment and which are shown in the Dangerous Goods Table found in the IATA Dangerous Goods Regulations.



Regulatory Oversight of Dangerous Goods for Air Transportation

The Code of Federal Regulations and the International Civil Aviation Organization Technical Instructions prescribe requirements for the safe transport of dangerous goods in commerce.

Hazardous Materials Regulations (HMR)

- Published in Subchapter C of Title 49

Safe Transport of Dangerous Goods by Air

ICAO – International Civil Aviation Organization

- International Air Transport Association Dangerous Goods Regulations (**IATA**)
- IATA is an industry organization's guidance document that provides information for international transport of dangerous goods by air

Contact carriers (FedEx, UPS, DHL, etc.) for information related to carrier-specific variations. Carriers may have variations that are more restrictive than the established standards.

This training program focuses specifically on IATA standards.



Purpose of Training and Goals of Program

Purpose

- Ensure safe handling of Dangerous Goods
- Compliance. Training is required every two years!

When this training is completed, you will be able to:

- Use information to help make decisions regarding Dangerous Goods shipments
- Determine if a material is classified as a Dangerous Goods

Keep a copy of your certificate of training for your records to document the successful completion of the training.

The Training Requirement

49 CFR 172.704 – IATA 1.5

Everyone who directly affects hazardous material transportation safety in commerce must be trained.

Training is to take place every 2 years (IATA).

A test must be taken to demonstrate an understanding of the training content.

Training must provide information in the following areas:

1. **General Familiarization** – recognize Dangerous Goods and provide familiarity with shipping and general packing requirements
2. **Function Specific** – classification, packing instructions, labeling & marking, documentation
3. **Safety Training** – emergency response information and safe handling procedures.

Dangerous Goods Hazard Classes

Class 1: Explosives

substance or article designed to function by explosion



Class 2.1: Flammable Gas

forms a flammable mixture when mixed with air



Class 2.2: Non-Flammable

displaces oxygen (asphyxiant) /oxidizing gases



Class 2.3: Toxic Gas

toxic to humans, poses a health hazard during transport



Dangerous Goods Hazard Classes

Class 3: Flammable Liquids

liquids with a flashpoint $<140^{\circ}$ F



Class 4.1: Flammable Solids

solids which may cause fire through friction



Class 4.2: Spontaneously Combustible

liable to spontaneous heating under normal conditions



Class 4.3: Dangerous When Wet

contact with water material becomes spontaneously flammable, or gives off flammable or toxic gas



Dangerous Goods Hazard Classes

Class 5.1: Oxidizer

contribute to the combustion of other materials by yielding oxygen



Class 5.2: Organic Peroxide

hydrogen peroxide derivatives in which one or both of the hydrogen atoms have been replaced by organic radicals



Class 6.1: Poison/Toxic

toxic to humans as to pose a hazard to health during transportation



Dangerous Goods Hazard Classes

Class 6.2: Infectious Substance

known or reasonably expected to contain pathogens, which can cause disease in humans or animals



Class 7: Radioactive



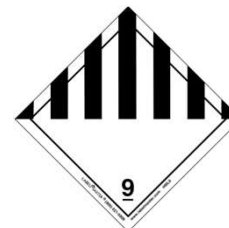
Class 8: Corrosive

causes severe damage when in contact with tissue/human skin



Class 9: Miscellaneous

substances that present a danger not covered by other hazard classes



Identifying Dangerous Goods

- **Dangerous Goods Table**

- Lists alphabetically approximately 3,000 regulated articles, which are likely to be offered for transportation by air
- To properly prepare, offer, or transport these materials, you must use this table

NOTE – This training only covers the Dangerous Goods listed in the Introduction Section (Slide 3). Upon the completion of this course, you will be certified to ship the materials listed in said section (Slide 3). If shipping any other Dangerous Goods, additional training is required. Contact EH&S at 412-624-9505 for details.

Dangerous Goods Table

[Abbreviated to include information reviewed in this training module]

UN/ID no. A	Proper Shipping Name/Description B	Class or Div C	Hazard Label(s) D	PG E	Passenger & Cargo Pkg Inst I	Passenger & Cargo MaxNet Qty/Pkg J	Cargo Only Pkg Inst K	Cargo Only MaxNet Qty/Pkg L
UN3373	Biological substance, Category B	6.2	-		See 650	See 650	See 650	See 650
UN1845	Dry Ice	9	Miscellaneous		954	200 kg	954	200 kg
UN3245	Genetically modified micro-organisms	9	-		959	No limit	959	No limit
UN2900	Infectious substance, affecting animals only (liquid)	6.2	Infectious Substance		620	50 mL	620	4 L
UN2900	Infectious substance, affecting animals only (solid)	6.2	Infectious Substance		620	50 g	620	4 kg
UN2814	Infectious substance, affecting humans (liquid)	6.2	Infectious Substance		620	50 mL	620	4 L
UN2814	Infectious substance, affecting humans (solid)	6.2	Infectious Substance		620	50 g	620	4 kg

Dangerous Goods Table

- **Column A** – UN number/ID number
- **Column B** – Proper Shipping Name
- **Column C** – Class or Division and Subsidiary Risk
- **Column D** – Hazard Labels (required on the outside of the package)
- **Column E** – Packing Group



Dangerous Goods Table (continued)

- **Column I** – Passenger and Cargo Aircraft Packing Instructions
- **Column J** – Passenger and Cargo Aircraft, Maximum Net Quantity
- **Column K** – Cargo Aircraft Only, Packing Instructions
- **Column L** – Cargo Aircraft Only, Maximum Net Quantity



Shipper's Responsibilities



The shipper is responsible for properly:

- Classifying substances for shipment
- Identifying the UN number and proper shipping name
- Assembling packages
- Marking and labeling packages
- Documenting shipments



Classification

- Shippers must determine as to whether shipped material is classified as a Dangerous Good
 - Refer to the IATA definitions for proper classifications
 - Refer to slides 35, 36, and 85
- Each decision is based on the shipper's understanding and interpretation of the definitions

Identification



- A **Proper Shipping Name** is assigned for all Dangerous Goods
- Examples of Proper Shipping Names:
 - Infectious substance, affecting humans
 - Infectious substance, affecting animals
 - Biological substance, Category B
 - Genetically modified micro-organisms
 - Dry Ice

Proper Packaging

All packaging used to transport Dangerous Goods must be designed, constructed, and maintained to prevent the release of Dangerous Goods.

Performance Packaging:

- ❑ inner receptacle
- ❑ cushioning/absorbent materials
- ❑ secondary receptacle
- ❑ outer packaging



Re-use of Packaging

Containers and packages may be used again **ONLY IF:**

- The package complies with the US DOT Hazardous Material Regulations and IATA specifications
- The packages are in like-new condition
- Previous markings and labels that do not apply are **removed/obliterated/completely covered**
- The package has been disinfected/sterilized to eliminate hazards

Outer Package is Not Acceptable to be Re-used (must completely remove labels)





Packing Instructions

Packing Instructions describe the acceptable types of packaging and outline packing, marking, and labeling procedures to ensure that packages containing Dangerous Goods arrive at their destination in good condition and present no hazards during transport.

Proper Packaging

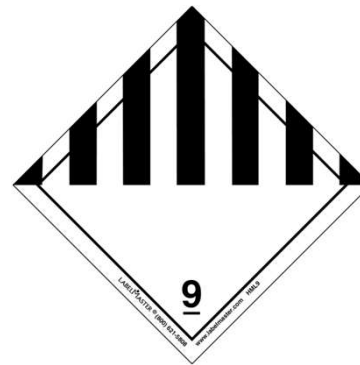
The shipper must:

- Comply with applicable Packing Instructions for each type of material shipped (See Dangerous Goods Table – Slide 14)
- Follow the packaging manufacturer's instructions for packing materials
- Restrict quantity to limits specified in Columns J or L of the Dangerous Goods Table (Slide 14)

Labeling



- **Labels** identify the primary and subsidiary/secondary hazards of the material being shipped
- Shipper must apply appropriate labels to each package
- **Hazard Labels must be:**
 - Placed in a “diamond on point” position (shown below)
 - 100mm x 100mm (4” x 4”)



Marking

Marking – required information on the outer package containing Dangerous Goods (DG)

Markings required on most packages of DG:

- Proper shipping name (with technical name if applicable);
- UN number or ID number;
- Name and address of shipper and consignee (receiver);
- Name and phone number of person responsible for shipment **(required if shipping Infectious Substance, Category A)**;
- Net Weight of Dry Ice (declared in kg), if used.



Marking/Labeling

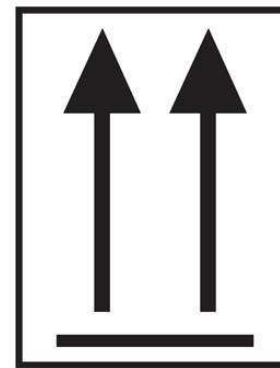
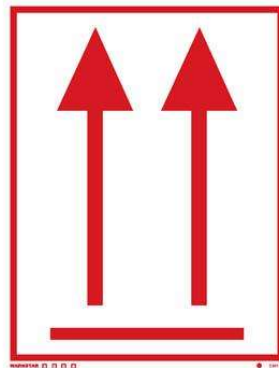
- Package must be large enough to accommodate all marks and labels;
- Labels/marks must be printed on or affixed to the same surface of the package near the proper shipping name;
- Labels/marks must be durable and the color must be in contrast to the color of the surface it is printed on or affixed to;
- Labels/marks must not be obscured/overlapped by other labels, marks, or attachments and may not wrap around corners of the package.



Marking – Package Orientation Markings

Package Orientation markings must be placed on opposing vertical sides of packages used to transport liquid Dangerous Goods

(marks must be **Red** or **Black**)
minimum dimensions: 74 x 105 mm





Two-Tiered Classification System for Infectious Substances

Category A

or

Category B

Category A Infectious Substances pose a higher
degree of risk than Category B.

Shipping of Infectious Substance, Category A

Infectious Substances – Definition

Substances that are known or reasonably expected to contain human or animal pathogens.

Pathogens are defined as micro-organisms, (bacteria, viruses, parasites, fungi) and other agents which can cause disease in humans or animals.

Note: Toxins from plant, animal, or bacterial sources that do not contain any infectious substances should be considered for classification in Division 6.1. Additional training is required to ship these toxins.

UN3172, Toxins, extracted from living sources, liquid, n.o.s., 6.1, PG II

Infectious Substance - Category A

Category A – An infectious substance that is transported in a form that, when **exposure** to it occurs, is **capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals**. (see lists on Slides 35 and 36 for indicative examples)

An exposure occurs when the substance is released outside of the protective packaging, resulting in physical contact with humans or animals.

Infectious Substance - Category A

Assignment to Category A must be based on known medical history, symptoms of the source patient/animal, endemic local conditions, or professional judgment concerning individual circumstances of the source.

Consider the risk of transmission and infection posed during transport



Infectious Substance - Category A



Proper Shipping Names:



Infectious Substance, affecting humans, UN2814



Infectious Substance, affecting animals, UN2900



****Select UN2814 if the substance affects both humans and animals**



If shipping Category A Infectious Substances, you must use specially designed packaging (UN-rated packaging).

Indicative Examples of Category A Infectious Substances

UN2814, Infectious Substance, Affecting Humans

- *Bacillus anthracis* (cultures only)
- *Brucella abortus, melitensis, suis* (cultures only)
- *Burkholderia mallei, psuedomallei* (cultures)
- *Chlamydia psittaci* – avian strains (cultures)
- *Clostridium botulinum* (cultures only)
- *Coccidioides immitis* (cultures only)
- *Coxiella burnetti* (cultures only)
- Crimean-Congo hemorrhagic fever virus
- Dengue virus (cultures only)
- Eastern equine encephalitis virus (cultures only)
- *Esherichia coli* verotoxigenic (cultures only)
- Ebola virus
- Flexal virus
- *Francisella tularensis* (cultures only)
- Guanarito virus
- Hantaan virus
- Hantavirus: hemorrhagic fever/renal syndrome
- Hendra virus
- Hepatitis B virus (cultures only)
- Herpes B virus (cultures only)
- HIV (cultures only)
- Avian influenza, highly pathogenic (cultures only)
- Japanese encephalitis virus (cultures only)
- Junin virus
- Kyasanur Forest disease virus
- Lassa virus
- Machupo virus
- Marburg virus
- Monkeypox virus
- *Mycobacterium tuberculosis* (cultures only)
- Nipah virus
- Omsk hemorrhagic fever virus
- Poliovirus (cultures only)
- Rabies virus (cultures only)
- *Rickettsia prowazekii, rickettsia* (cultures only)
- Rift Valley fever virus (cultures only)
- Russian spring/summer encephalitis virus (cultures)
- Sabia virus
- *Shigella dysenteriae* type 1 (cultures only)
- Tick-borne encephalitis virus (cultures only)
- Variola virus
- Venezuelan equine encephalitis virus (cultures only)
- West Nile virus (cultures only)
- Yellow fever virus (cultures only)
- *Yersinia pestis* (cultures only)

***The list is not exhaustive. Emerging pathogens, that do not appear on this list but meet the criteria, must be assigned to Category A.**

Indicative Examples of Category A Infectious Substances

UN2900, Infectious Substance, Affecting Animals

- African swine fever virus
- Avian paramyxovirus type 1 (Velogenic Newcastle virus)
- Classical swine fever virus
- Foot and mouth disease
- Lumpy skin disease virus
- Mycoplasma mycoides-contagious bovine pleuropneumonia
- Peste des petits ruminant virus
- Rinderpest virus
- Sheep-pox virus
- Goatpox virus
- Swine vesicular disease virus
- Vesicular stomatitis virus

*The list is not exhaustive. Emerging pathogens, that do not appear on this list but meet the criteria, must be assigned to Category A.

Infectious Substance - Category A

CULTURES

Cultures are the result of a process by which pathogens are intentionally propagated or grown. This definition does not include patient specimens.

Packaging – Triple Packaging

- Category A Infectious Substances must be triple-packed
- Three elements of triple packaging
 - Leak-proof/watertight primary receptacle
 - Leak-proof/watertight secondary receptacle
 - With absorbent material
 - Rigid outer UN-rated package



Packaging – IATA Packing Instruction (PI) 620 for Infectious Substances, Category A (previously listed as PI 602)

- Minimum Dimensions of the rigid outer package must be at least 100 mm (4 inches) in smallest dimension and UN rated/certified;
- Leakproof – Primary and secondary receptacles must be watertight;
- Absorbent – Sufficient absorbent to absorb the contents of primary receptacle (placed between primary and secondary);
- Multiple primary receptacles must be individually cushioned, and the shipper must enclose an itemized list of contents between the secondary and outer packaging.



Packaging – IATA PI 620 (continued)



Maximum Quantity
Per Outer Package

Passenger and Cargo Aircraft – 50ml or 50g
Cargo Aircraft Only – 4L or 4kg



Packages containing Infectious Substances **must** be marked on the outside of the package with the **NAME** and **TELEPHONE NUMBER OF PERSON RESPONSIBLE FOR THE SHIPMENT**



Infectious Substance - Category A

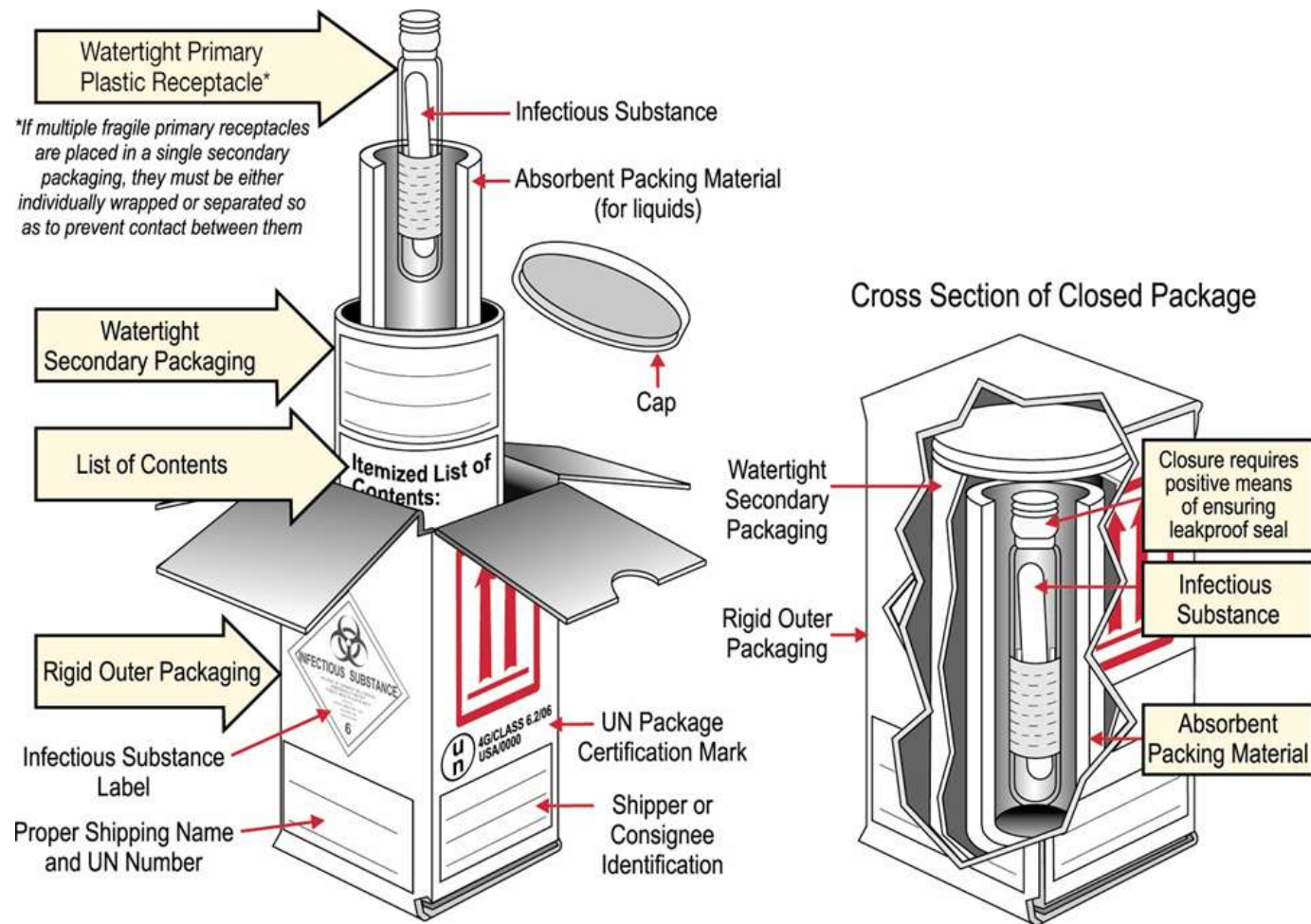
Technical Name

The name of the pathogen need not be marked on the outer package. However, it is **required** on the Shipper's Declaration.

Examples:

- Infectious Substance, Affecting Humans (Hepatitis B virus culture)
- Infectious Substance, Affecting Humans (HIV culture)

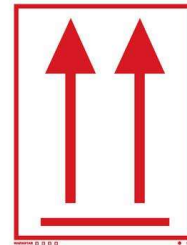
Triple Packaging for Infectious Substances, Category A



Marking/Labeling – Infectious Substance, Category A

The following is required on the outer package:


1. Class 6 Infectious Substance Hazard Class label on one side and Package Orientation markings on opposing sides



2. Shipper and consignee addresses and name and phone number of person responsible for the shipment
3. Proper Shipping Name “Infectious Substance, Affecting Humans, UN2814” or “Infectious Substance, Affecting Animals, UN2900”
 - Must be on the same side of the package as the Hazard Class label

Marking/Labeling – Infectious Substance, Category A (continued)

The following additional information is required on the outer package:

4. UN Certified Marking (stamped on the box)
Example (UN marking will vary) :  **4G/Class6.2/23/USA/STP**
5. “Cargo Aircraft Only” label (below) is required on the outer package only if shipping a total quantity over 50mL or 50g



Infectious Substance Labeling

- The hazard label above must be used when shipping Division 6.2 Infectious Substance.
- The text “In case of Damage or Leakage Immediately Notify Public Health Authority” must appear on the lower part of the label.



Shipper's Declaration



- A Shipper's Declaration must be used when shipping Category A Infectious Substances
- If shipping Category A Infectious Substances with dry ice, a Shipper's Declaration is required
- A Shipper's Declaration is not required when shipping Biological Substances, Category B or dry ice.

Shipper's Declaration

SHIPPER'S DECLARATION FOR DANGEROUS GOODS		IATA			
Shipper		Air Waybill No.			
Consignee		Page of Pages Shipper's Reference No. (optional)			
Two completed and signed copies of this Declaration must be handed to the operator.		WARNING Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.			
TRANSPORT DETAILS This shipment is within the limitations specified for:					
Airport of Departure (optional):		Shipments type: (delete non-applicable)			
<small>(delete non-applicable)</small>		<input type="checkbox"/> NON-RADIOACTIVE <input type="checkbox"/> RADIOACTIVE			
<table border="1"> <tr> <td><input type="checkbox"/> PASSENGER AND CARGO AIRCRAFT</td> <td><input type="checkbox"/> CARGO AIRCRAFT ONLY</td> </tr> </table>		<input type="checkbox"/> PASSENGER AND CARGO AIRCRAFT	<input type="checkbox"/> CARGO AIRCRAFT ONLY	Airport of Destination (optional):	
<input type="checkbox"/> PASSENGER AND CARGO AIRCRAFT	<input type="checkbox"/> CARGO AIRCRAFT ONLY				
NATURE AND QUANTITY OF DANGEROUS GOODS UN Number or Identification Number, Proper Shipping Name, Class or Division (subsidiary hazard), Packing Group (if required) and all other required information.					
Additional Handling Information					
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/packaged, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.		Name of Signatory Date			

- Shipper's Declaration is used to communicate the hazards of the material in the packages and on the vehicle of transport
- Shipper must retain a copy of the Declaration (or electronic image) for not less than two years after date of acceptance
- Declaration must be printed in black & contain red hatchings in the left & right margins
- Declaration must include:
 1. Proper shipping name
 2. Hazard class or division
 3. Identification number (UN or NA)
 4. Packing group

Complete 3 copies – One copy stays with the shipper and two copies go to the carrier

Errors or omissions in the Shipper's Declarations are the most common cause for package refusal.

Shipper's Declaration

- Shipper's Declaration is a legal document, and the shipper is responsible for completion of the document
 - Declaration must be accurate, legible, complete, in English, and all words must be spelled correctly
 - Declaration must be typewritten or computer-generated
 - Margins of declaration must have red hatchings in the margins
 - **The person who signs & dates the Shipper's Declaration must be trained and certified**
 - Accepts full responsibility for correct identification, proper packaging, and correctly describing the material
- Complete 3 copies – One copy stays with the shipper and two copies go to the carrier



24-Hour Emergency Number
Not required for Biological Substances, Category B or for Dry Ice.
Required when using a Shipper's Declaration

A 24-hour emergency phone number must be provided on the Shipper's Declaration.

- Emergency phone number must be monitored at all times (when a package is in transport/storage)
- Contact person must be aware of:
 - Hazards/risks
 - Emergency response information
 - Accident mitigation information
- Or have access to someone who has that knowledge
- Contract services are available. Contact EH&S at 412-624-9505 for additional details.

Shipping Scenario

Shipment containing: Dry Ice & Infectious Substances

- Substances to be shipped
 - Hepatitis B culture (5 mls)
 - Dry Ice (2 kg)
- *Step 1* – Classify the shipment
 - Classify as UN2814 Infectious Substance, affecting humans; &
 - UN1845 Dry Ice
- *Step 2* – Select packaging
 - Insulated fiberboard box. The outer package must be UN-rated.

Shipping Scenario

Shipment containing: Dry Ice and Infectious Substances

- *Step 3* – Pack the substances per Packing Instructions 620 and 954
 - Use triple packaging
 - Dry Ice should be placed outside of the secondary package
 - Include an itemized list of contents outside of the secondary package



Shipping Scenario

Shipment containing: Dry Ice and Infectious Substances

□ *Step 4* – Ensure the package is properly labeled and marked
(Slide 55)

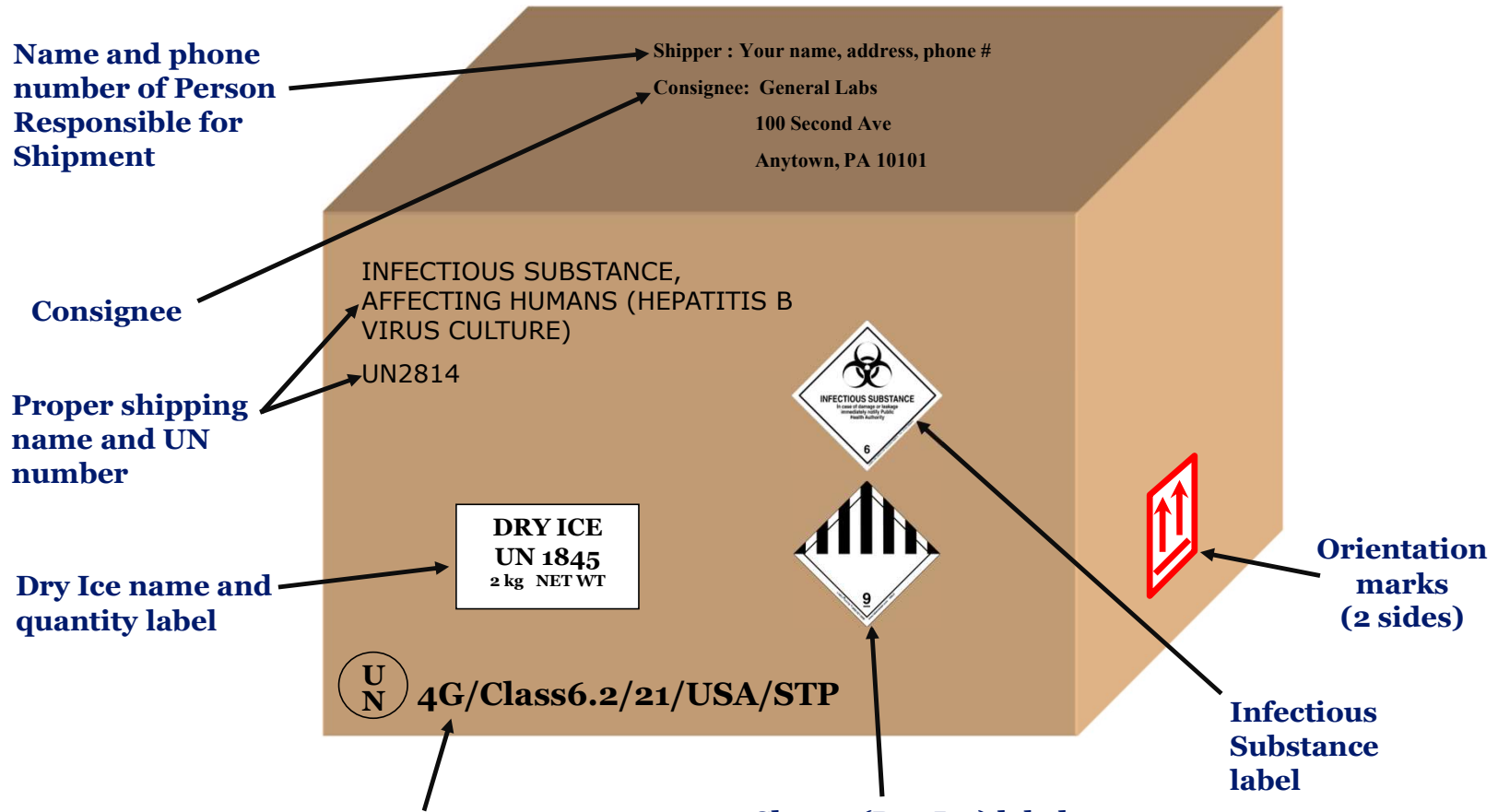
- Division 6.2 (Infectious Substance) Label
- Class 9 (Miscellaneous) Label
- Proper Shipping Names and appropriate UN numbers
 - Infectious Substance, affecting humans, UN2814
 - Dry Ice, UN1845
- Net weight of Dry Ice (listed in kg)
- Package Orientation Arrows on two opposing sides
- Shipper and Consignee Information
- Name and phone number of person responsible for shipment

Shipping Scenario

Shipment containing: Dry Ice and Infectious Substances

- *Step 5* – Prepare proper shipment documentation
 - Shipper's Declaration is required since shipping Category A Infectious Substance (Slide 56)
 - Declaration must be signed by a trained/certified individual
 - Must provide 24-hour Emergency Number (monitored 24 hours by person knowledgeable of the shipment)
 - Shipper's Declaration – must be prepared using an approved software program, such as FedEx Ship Manager Software (free) or other approved shipping software

Properly Labeling Infectious Substance, Category A with Dry Ice Package - Sample Scenario



Infectious Substance, Category A with Dry Ice – Example Shipper's Declaration



SHIPPER'S DECLARATION FOR DANGEROUS GOODS				(Provide at least three copies to the airline.)		
Shipper Your name, address, and phone number		Air Waybill No.		Page 1 of 1 Pages		
Consignee Recipient's address		Shipper's Reference Number <i>(optional)</i>		This shipper's declaration was prepared using a FedEx Express template. It must be used ONLY for: * Class 7 radioactive shipments * Shipments using an 023 air waybill (IP1, IXF or ATA service) * Shipments originating from a non-US location		
Two completed and signed copies of this Declaration must be handed to the operator				WARNING		
TRANSPORT DETAILS This shipment is within the limitations prescribed for: <i>(delete non applicable)</i> PASSENGER AND CARGO AIRCRAFT <input checked="" type="checkbox"/> CARGO ONLY <input checked="" type="checkbox"/>		Airport of Departure Carrier will complete		Failure to comply with all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.		
Airport of Destination: Carrier will complete		Shipment type: <i>(delete non-applicable)</i>		NON-RADIOACTIVE <input checked="" type="checkbox"/> <input type="checkbox"/>		
NATURE AND QUANTITY OF DANGEROUS GOODS						
Dangerous Goods Identification				Quantity and type of packaging	Packing Inst.	Authorization
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Pack-ing Group			
UN 2814	Infectious Substance, Affecting Humans (Hepatitis B Virus Culture)	6.2		2 x 15 ml	620	
UN 1845	Dry Ice	9	III	2 kg	954	
				All packed in one fiberboard box		
Additional Handling Information						
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable International and National Governmental Regulations. I declare that all of the applicable air transport requirements have been met.				Name/Title of Signatory		
				Place and Date		
				Signature <i>(see warning above)</i>		
Enter 24-hour number				Emergency Telephone Number		
FOR RADIOACTIVE MATERIAL SHIPMENT ACCEPTABLE FOR PASSENGER AIRCRAFT, THE SHIPMENT CONTAINS RADIOACTIVE MATERIAL INTENDED FOR USE IN OR INCIDENT TO RESEARCH, MEDICAL DIAGNOSIS, OR TREATMENT. ADR EUROPEAN TRANSPORT STATEMENT - CARRIAGE IN ACCORDANCE WITH 1.1.4.2.1						


Biological Substance, Category B Shipping

Category B Infectious Substance: Biological Substance Category B (UN3373)

Infectious Substances which do not meet the criteria for inclusion in Category A, must be assigned to Category B – Biological Substance Category B (UN3373)

If the substance does not “fall into” Category A, it most likely should be classified as Category B.





Category B Infectious Substance: Biological Substance Category B (UN3373)

- The proper shipping name for UN3373 is **Biological Substance Category B**
- The terms “Diagnostic Specimen” and “Clinical Specimen” **are not recognized and no longer permitted!**

Category B Infectious Substance: Biological Substance Category B (UN3373)

Advantages to Category B classification and shipments:

- Shipper's Declaration for Category B shipments is not required (use carrier-issued air waybill when shipping Biological Substance, Category B);
- 24-hour emergency contact number is not required;
- Specially designed packaging is required, but packaging is not required to be UN-rated

Shipping Exceptions

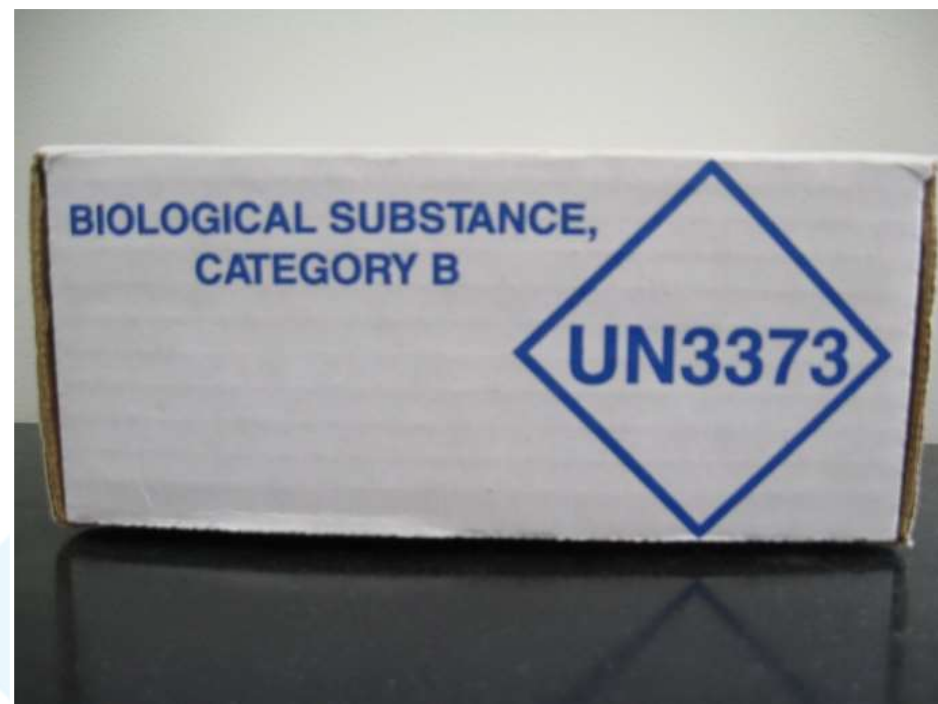
- Substances that are not likely to cause disease in humans or animals are not regulated unless they meet the criteria for inclusion in another class.
- Micro-organisms that are non-pathogenic to humans or animals are not regulated unless they meet the criteria for inclusion in another class.
- Pathogens that have been neutralized or inactivated such that they no longer pose a health risk are not regulated unless they meet the criteria for inclusion in another class (i.e. – sterilization, chemical disinfection).
- Dried blood spots, fecal occult blood screening tests, and blood/organs that have been collected for transfusion or transplantation are not regulated.

Packaging– IATA Packing Instruction (PI) 650 (Biological Substance Category B)

- Use Triple packaging (see Slide 38)
- Leak-Proof – Primary and secondary receptacles must be watertight
- Primary or secondary receptacles must be capable of withstanding an internal pressure of 95 kPa
- Use absorbent material between primary and secondary packaging. Not required for solids.
- Minimum dimension of outer container: 4 x 4 inches
- Place an itemized list of contents between the secondary packaging and outer packaging.

Packaging – IATA PI 650 (Biological Substance Category B)

- Each package containing Biological Substance, Category B must be marked with the **UN3373 marking and Proper Shipping Name** (adjacent to the marking)
 - “**Biological Substance Category B**” must be marked in letters at least 6 mm high



Packaging – IATA PI 650 (Biological Substance Category B)

Required marking:

- Name and address of both the shipper and consignee must be on the outer package
- Name and phone # of the person responsible for shipment must be either on the air waybill or on the outer package

The “Nature and Quantity of Goods” box on the air waybill must show “**UN3373**” and “**Biological Substance, Category B**” and the number of packages being shipped.

Packaging – IATA PI 650 (Biological Substance Category B)

Quantity Limits

Liquids:

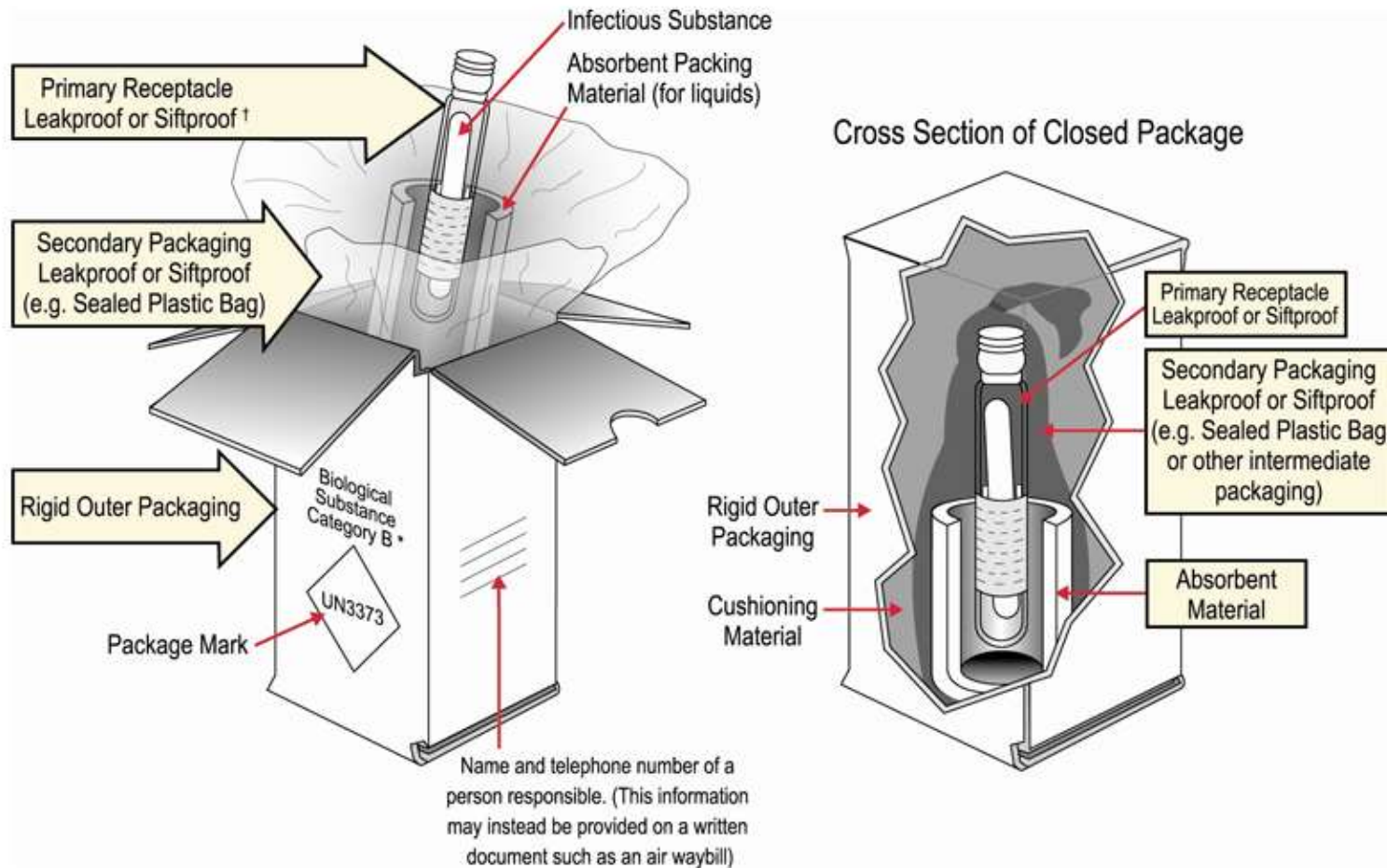
- Primary container must not contain more than 1L
- Net quantity of the entire package must not contain more than 4L

Solids:

- Outer packaging must not contain more than 4kg

Contact EH&S if your shipment exceeds the quantity limits.

Triple Packaging for Biological Substances, Category B



Proper Marking: Biological Substance Category B



- 50 mm x 50mm (minimum) mark with UN3373 must be displayed on the outer package
- Width of line on the UN3373 marking must be at least 2mm thick and letters/numbers must be at least 6mm high
- “Biological Substance Category B” must be marked on the outer package – 6 mm high

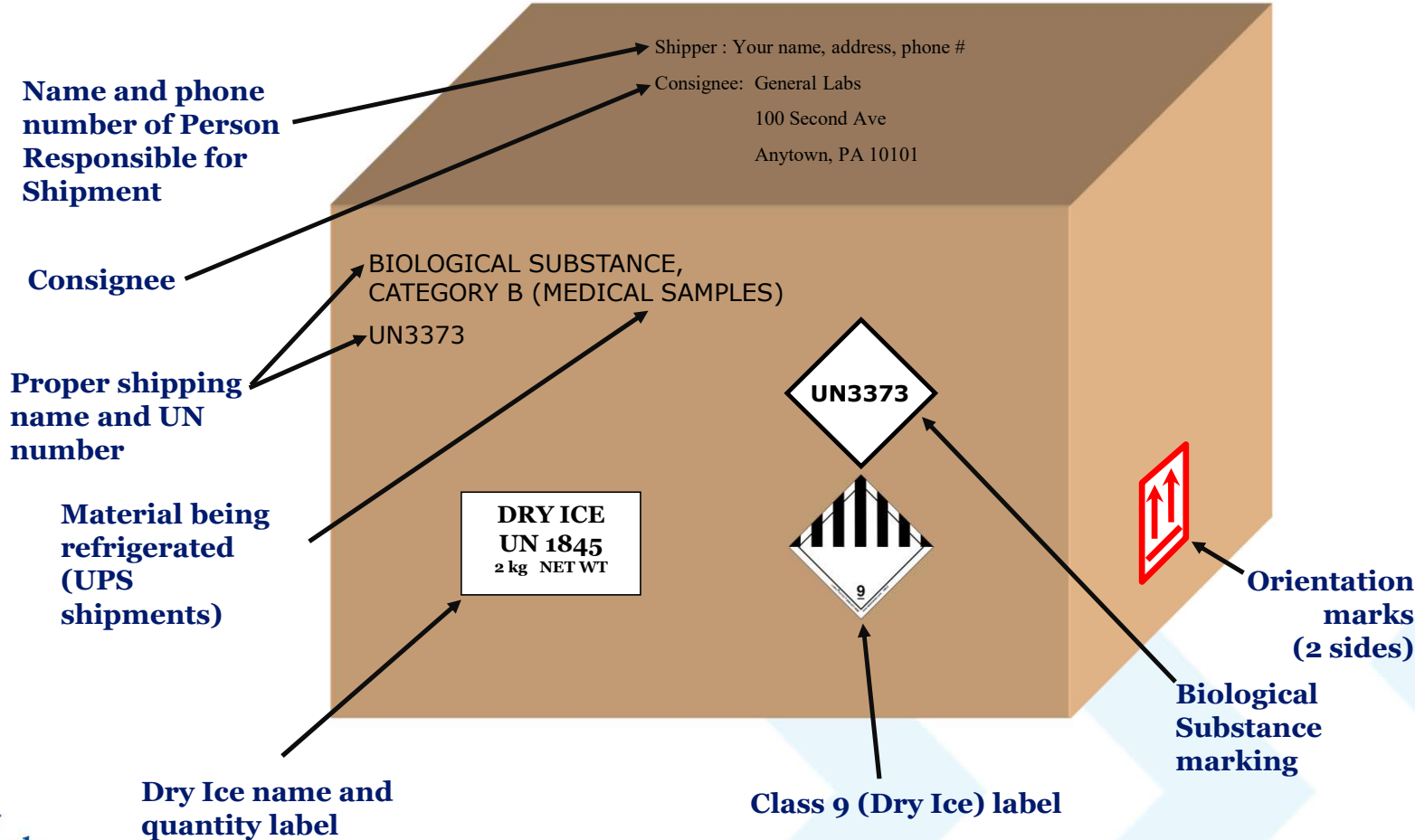
Marking/Labeling – Biological Substance, Category B

The following is required on the outer package :

1. UN3373 marking
2. “Orientation Arrows” on opposing sides
3. Shipper and consignee addresses on the outer package
4. Name & phone number of the person responsible for the shipment on outer package or air waybill
5. “Biological Substance, Category B”



Properly Marked/Labeled Biological Substance, Category B with Dry Ice Package - Sample Scenario



Air Waybill



The air waybill must include the following documentation information:

- Shipper's Name and Address
- Consignee's Name and Address
- Nature and Quantity of Goods section of the air waybill must indicate:
 - Biological Substance, Category B
 - Total number of packages
 - DRY ICE (if applicable) – net weight expressed in kg

Complete all other carrier-specific information (account number, total weight, special handling instructions, authorized signatures, etc.)

Exempt Patient Specimen Shipping

Patient Specimens

Defined:

Specimens 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.



Patient Specimens

Exempt Patient Specimen Rules

Examples of specimens which may be shipped as exempt patient specimens:

- Blood or urine tests to monitor cholesterol, glucose, and hormone levels;
- Tests required to monitor organ function for humans/animals with non-infectious diseases;
- Tests conducted for insurance or employment purposes intended to determine drugs/alcohol;
- Pregnancy tests, biopsies to detect cancer, antibody detection in humans/animals.

Patient Specimens

Exempt Patient Specimen Rules

Patient specimens for which there is minimal likelihood that pathogens are present are not regulated if the specimen is packed in packaging which will prevent any leakage.

Must use:

1. Leak-proof/watertight primary receptacle;
2. Leak-proof/watertight secondary receptacle;
3. Outer package of adequate strength for its capacity and have one surface of 100 mm x 100 mm; and
4. Absorbent materials between the primary and secondary receptacles for liquids

For multiple primary receptacles, ensure each is individually wrapped or cushioned to prevent contact between them.

Patient Specimens

Exempt Patient Specimen Rules

Packages containing patient specimens must be appropriately marked using one of the following two markings:

“Exempt Human Specimen”

or

“Exempt Animal Specimen”



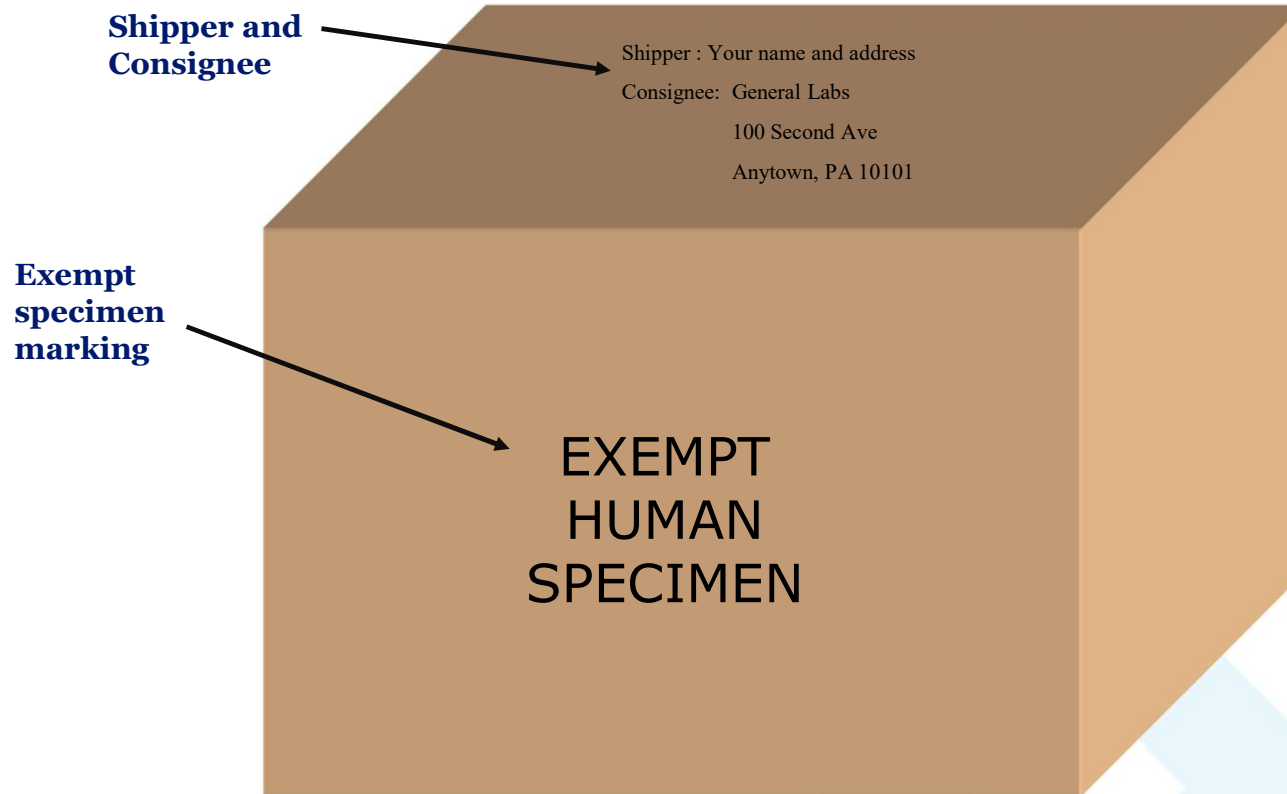
Patient Specimens

Exempt Patient Specimen Rules

Documentation

- If shipping exempt patient specimens, do not mark UN3373 on the air waybill or on the outer package.
- Mark both the outside of the package and air waybill with:
“Exempt Human Specimen” or “Exempt Animal Specimen.”

Properly Marked Exempt Human Specimen Package - Sample Scenario



Patient Specimens

Exempt Patient Specimen Rules

Note:

*In determining whether a patient specimen has a minimal likelihood that pathogens are present, an **element of professional judgment is required** to determine if a substance is exempt. The judgment should be based on the known medical history, symptoms, and individual circumstances of the source patient or animal and prevalent local conditions.

If there is **any** reason to suspect that the specimen contains a pathogen, it **cannot** be shipped as an exempt specimen.

***Must be able to provide documented “professional judgment” if called upon.**

Genetically Modified Micro-Organisms Shipping (Non-infectious/Non-toxic)

Genetically Modified Micro-Organisms (NON-INFECTIOUS/NON-TOXIC)

- Defined as organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally
- Capable of altering animals, plants, or microbiological substances in a way that is not normally the result of natural reproduction must be classified in Class 9 and assigned UN3245
- Replication defective vectors are often shipped under this classification
- If a Genetically Modified Micro-Organism (GMO) meets the definition of an Infectious Substance, must ship as such
- COVID-19 vaccines containing GMOs, including those in clinical trials, are not subject to the Regulations

Genetically Modified Micro-Organisms (NON-INFECTIOUS/NON-TOXIC)

- Pack in accordance to Packing Instruction 959;
- Triple packaging – Leak-proof primary and secondary receptacles with absorbent materials;
- Rigid outer packaging of adequate strength/capacity; smallest surface dimension of 100mm
- If packed in compliance with PI 959, GMO is not subject to the Regulations.
- Display UN3245 mark, on outer package
- Minimum dimension of mark must be 2 inches in length and text must be at least 6 mm high.



Packaging – IATA PI 959

(for Genetically Modified Micro-organisms)



PI 959 requires shippers to prepare packages similar to PI 650, but packaging need not be tested.

The mark below must be displayed on an external surface (2 inches minimum length; letters and numbers 6 mm high)



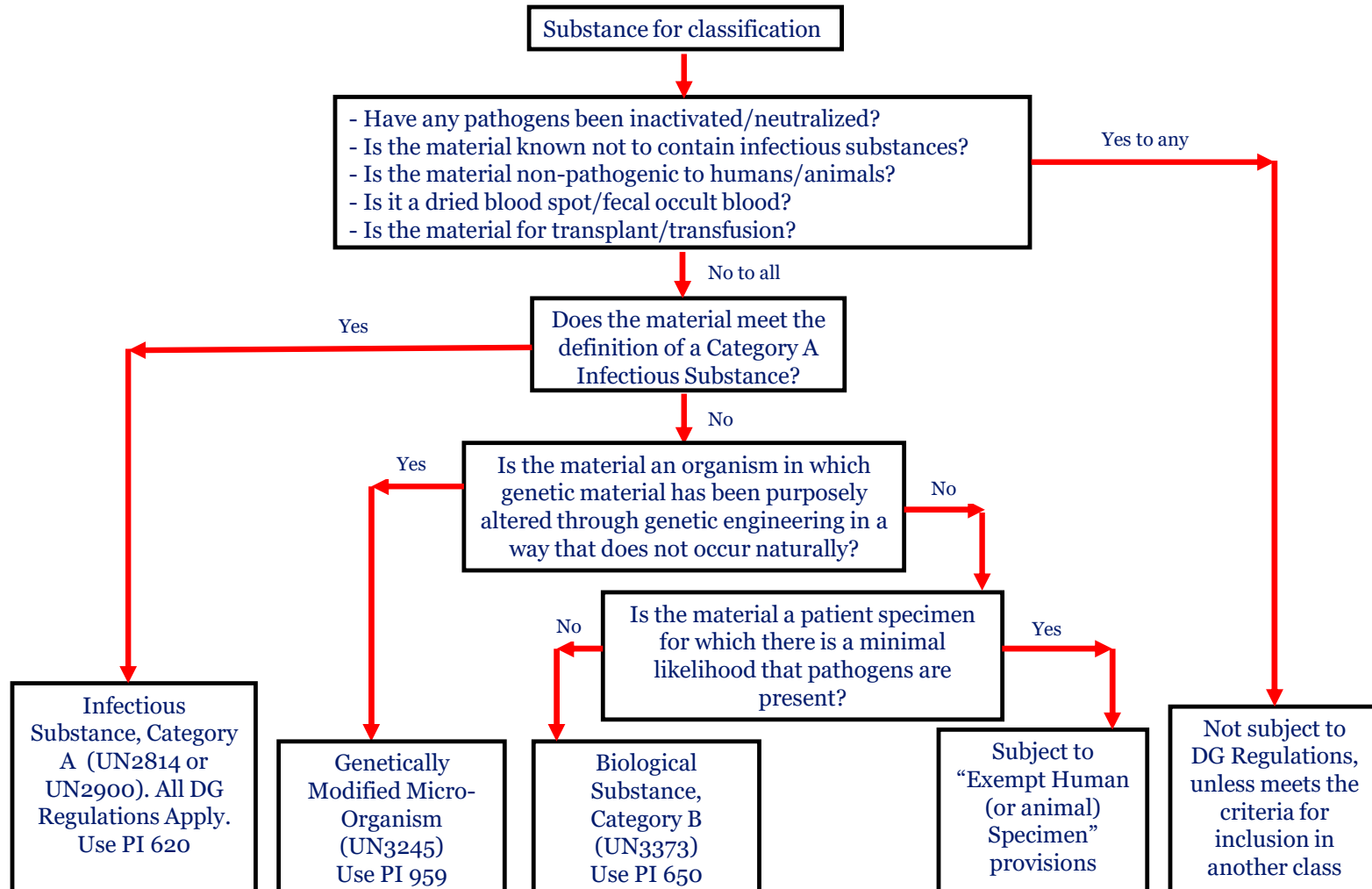
Proper Marking: Genetically Modified Micro-organisms



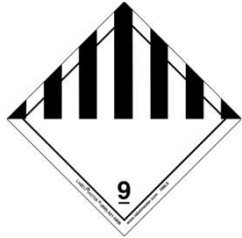
- 2" x 2" (minimum) diamond with UN3245 must be displayed on the outer package.
- The width of the line must be at least 2 mm and letters and numbers must be at least 6 mm high.

Classification Flowchart

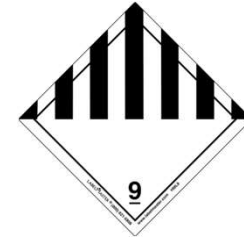
Category A, Category B, Genetically Modified, & Exempt Specimens



Dry Ice Shipping



Shipping with Dry Ice

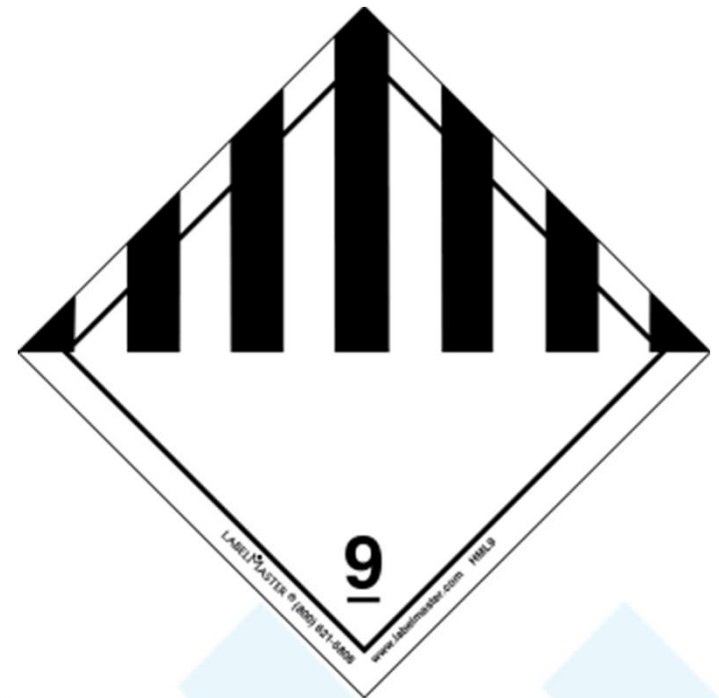


- Carbon Dioxide, solid (dry ice) is a regulated Dangerous Good and must always be declared by marking, labeling, and documentation.
Use Packing Instruction 954.
- If there are no other dangerous goods in a shipment with dry ice, a shipper's declaration is not required.
- Must use Class 9 Miscellaneous hazard label
- Timing is critical & delivery time must be considered
- Ventilation must be provided – **Never ship dry ice in a sealed container**
- **Net weight of dry ice and identity of contents that are being refrigerated must be marked on the outside of the package**

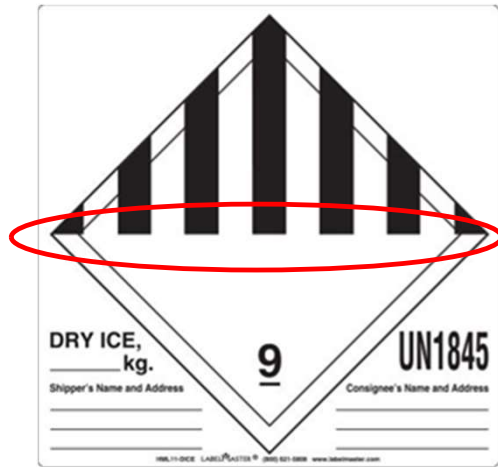
Marking/Labeling – Dry Ice

The following is required on the outer package:

1. Class 9 Miscellaneous hazard label
2. “Carbon dioxide, solid or Dry Ice” & UN1845
3. Shipper and consignee addresses
4. “Orientation Arrows” on opposing sides
5. Net weight of Dry Ice used (expressed in kg)



Dry Ice Labeling



The Class 9 Miscellaneous hazard label does not contain a horizontal line connecting the vertical black bars. Be sure to use the correct label.

Labeling – Dry Ice

shippers declaration not required

part B is required

dry ice amount must be in kilograms

note 2 lbs = 1 kg

airwaybills/airbills must have the following:

1. "Dangerous Goods - shippers declaration not required"
2. Dry Ice; 9; UN1845
3. $\frac{\text{number of packages}}{\text{weight}}$ x kg

shippers name and address

consignee name and address

9

DRY ICE, _____ kg

UN1845

AIR SEA CONTAINERS 1-305-599-9123

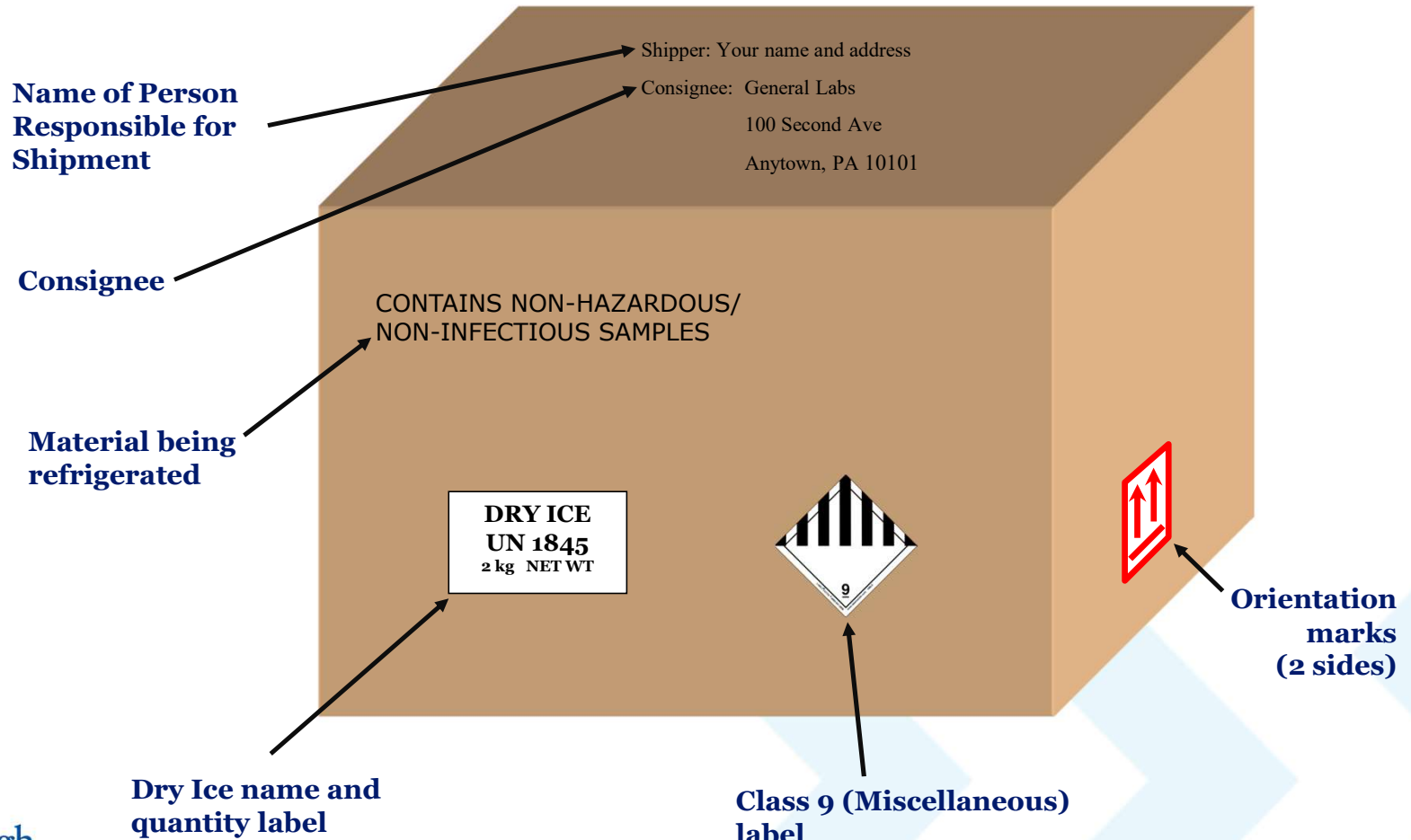
Air Waybill – Dry Ice

When a Shipper's Declaration is not required, the following must be contained in the "Nature and Quantity of Goods" section on the air waybill:

- UN1845
- Dry Ice or Carbon Dioxide, solid
- Total number of packages
- Net weight of dry ice in each package (in kilograms)

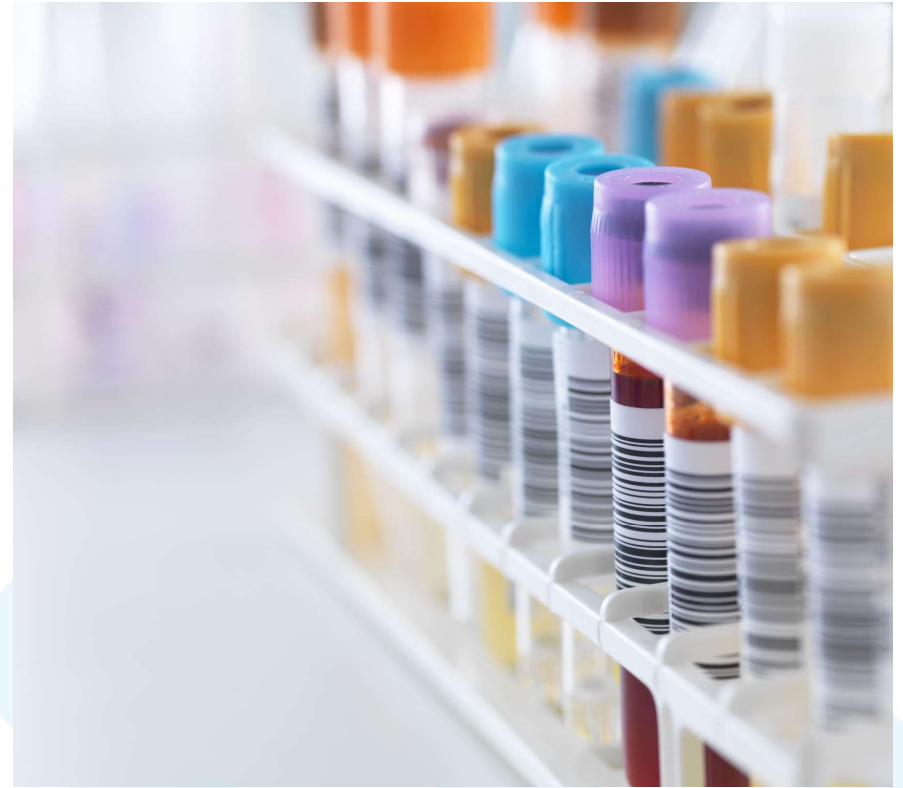


Properly Marking/Labeling a Dry Ice Package (no other Dangerous Goods in the shipment)



General Safety Training

- Dangerous Goods emergencies/incidents may include:
 - Package failure, spills, leaks
 - Contamination of the work area
 - Personal injury or exposure



General Safety Training- Emergency Procedures for Spills

- Isolate area. Keep unauthorized personnel away.
- Identify the substance involved.
- Do not touch or walk through material.
- Do not touch damaged containers unless wearing appropriate Personal Protective Equipment (PPE).
- Damaged packages containing dry ice may produce water. Do not touch the liquid, it could be contaminated by the contents of the package.
- Disinfect Category A and B materials with liquid bleach diluted with water 1:10; allow 15-20 minutes contact time
- Absorb material and dispose properly. Avoid direct contact.
- Notify the shipper and/or the consignee.

General Safety Training- Response to Emergencies



- **Isolate** – keep people away
- **Evaluate** – obtain information about the package and its contents
- **Report** –
 - **Environmental Health and Safety – 412-624-9505**
 - **24 Hour, Campus Emergency Number/Pitt Police – 412-624-2121**

Avoid handling the package. If you must touch the package, wear appropriate protective equipment (safety glasses, gloves, lab coat etc).

Keep handling to a minimum!

General Safety Training- Exposure or Injury



- Call **412-624-2121 (Campus Emergency Number)** for emergency medical care if necessary
- In the event of contact, immediately flush skin or eyes with running water for at least 15 minutes

DOT Security Plan: Hazardous Materials



Goal: Identify and reduce security risks related to the transportation of Dangerous Goods/Hazmat

Personnel Security

- Background and reference checks for newly-hired employees who handle hazardous materials

Unauthorized Access

- Keep doors locked, store hazardous materials/Dangerous Goods in secure areas
- Maintain control of packages, report suspicious activity

En Route Security

- Use reputable carriers
- Confirm a plan is in place to ensure the safe, secure transport of hazmat



Thank you

**Department of Environmental
Health & Safety
Public Safety Bldg – 4th Floor
3412 Forbes Avenue
safety@pitt.edu
412-624-9505**

Important Contact Information

- 1-800-554-9964, UPS Hazmat Hotline
- 1-800-782-7892, UPS Customer Service, questions related Customs, import/export, etc.
- 1-800-463-3339 (say “Dangerous Goods”), FedEx Dangerous Goods Hotline

Please contact Mailing Services/Shipping Services at expressmailinfo@cfo.pitt.edu for any questions related to ProShip, the web-based shipping system.

Useful Links

IATA – International Air Transport Association

<http://www.iata.org/index.htm>

DOT – Hazmat Safety

<http://www.phmsa.dot.gov>

DOT – Department of Transportation

<http://www.transportation.gov>

CDC – Center for Disease Control

cdc.gov

ABSA – American Biological Safety Association

<http://absa.org>



More Useful Websites



Pathogen Safety Data Sheets
(PSDS)

<http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php>



FedEx Dangerous Goods

<https://www.fedex.com/en-us/service-guide/dangerous-goods.html>



FedEx – Shipping Biological
Substances

<https://www.fedex.com/en-us/shipping/how-to-ship-clinical-samples.html>



University of Pittsburgh EH&S

<http://www.ehs.pitt.edu/>

Websites for Publications and Supplies

www.fishersci.com

www.airseacontainers.com

www.iata.org/en/publications/store

www.jjkeller.com

www.labelmaster.com

www.inmarkinc.com