Chapter 13
Packing and Shipping of Clinical Specimens and Etiologic Agents

A. Preparation for Transport of Infectious Specimens and Cultures

Transport of clinical specimens and etiologic agents should be done with care to minimize the hazard to humans or the environment and also to protect the viability of suspected pathogens. Transport of infectious items by public or commercial delivery systems may be subject to local or national regulations.

If possible, send specimens so that they will arrive during working hours to ensure proper handling and prompt plating of the specimens. Inform the receiving laboratory as soon as possible that the specimens are coming, preferably before sending the specimens.

Depending on local conditions, within-country transport may be by ground or by air. If specimens are sent by a messenger, the messenger must know the location of the laboratory and the appropriate person to contact. The sender should identify the fastest and most reliable way of transport in advance, whether it be by bicycle, motorcycle, car, ambulance or public transport, and should make sure that adequate funds are available to reimburse costs for fuel or public transport. For longer distances, the fastest transport service may be air freight or expedited delivery service. Since the ice packs or dry ice will last only 24 to 48 hours, arrangements should be made for immediate collection at the receiving airport. When the specimens are shipped by air, the following information should be communicated immediately to the receiving laboratory: the air bill number, the flight number, and the times and dates of departure and arrival of the flight.

B. Transport and Shipment of Cultures and Specimens

1. Regulatory organizations

The United Nations Committee of Experts on the Transport of Dangerous Goods is continually developing recommendations for the safe transport of dangerous goods. The International Civil Aviation Organization (ICAO) has used these recommendations as the basis for developing regulations for the safe transportation of dangerous goods by air. The regulations of the International Air Transport Association (IATA) contain all the requirements of the ICAO Technical Instructions for the Safe Transport of Dangerous Goods. However, IATA has included additional requirements that are more restrictive than those of ICAO. Member airlines of the IATA have adopted the use of the IATA regulations governing dangerous goods, and shippers must comply with these regulations in addition to any applicable regulations of the state of origin, transit, or destination.

The shipment of infectious agents or diagnostic specimens by air must comply with local, national and international regulations. International air transport regulations may be found in the IATA publication entitled, *Dangerous Goods Regulations*. This reference is published annually in January, and frequently the regulations change from year to year. A copy of the IATA regulations in English, Spanish, French, or German may be obtained from one of the regional offices listed below.

Orders from the Americas, Europe, Africa, and the Middle East:

Customer Service Representative
International Air Transport Association
800 Place Victoria
P.O. Box 113
Montreal, Quebec
CANADA H4Z 1M1
Telephone: 1-514-390-6726
FAX: 1-514-874-9659
Teletype: YMQTPXB

Orders from Asia, Australasia, and the Pacific:

Customer Service Representative
International Air Transport Association
77 Robinson Rd.
No. 05-00 SIA Bldg.
SINGAPORE 068896
Telephone: +65-438-4555
FAX: +65-438-4666
Telex: RS 24200 TMS Ref: TM 2883
Cable: IATAIATA
Teletype: SINPSXB

Internet Orders:

sales@iata.org

Internet Information:

www.iata.org

2. Shipping regulations for infectious substances and clinical/ diagnostic specimens

In general, all packages that are being shipped by air via commercial and cargo carriers such as Federal Express and passenger aircraft are affected by the IATA regulations. These regulations are outlined below as an example of acceptable packaging procedures for infectious materials. However, because they may not reflect current national or IATA requirements for packaging and labeling for

infectious substances, anyone packaging isolates or infectious specimens should consult the appropriate national regulations and the current edition of `Dangerous Goods Regulations` before packing and shipping infectious substances by any means of transport.

Definition of infectious substances

Infectious substances are defined as substances known to contain, or reasonably expected to contain, pathogens. Pathogens are microorganisms (including bacteria, viruses, rickettsia, parasites, fungi) or recombinant microorganisms (hybrid or mutant) that are known or reasonably expected to cause infectious disease in humans or animals.

Classification of clinical/diagnostic specimens

- Specimens (human, animal, food, environmental, etc.) known or reasonably expected to contain pathogens are now to be classified as infectious substances. When these specimens are transported/shipped for any purpose, including initial or confirmatory testing for the presence of pathogens, they are to be packaged and shipped as infectious substances (see below).
- Specimens that have a relatively low probability of containing pathogens are to be classified as clinical/diagnostic specimens. When these specimens are transported/shipped for the purpose of routine screening tests or initial diagnosis for other than the presence of pathogens, they are to be packaged and shipped as clinical/diagnostic specimens.
- Those specimens known not to contain pathogens are to be packaged and shipped as nonrestricted, i.e., packaging and shipping is not regulated. They are to be packaged in watertight primary containers and leakproof secondary containers.

Unless it has been specifically determined, i.e., by testing, that a clinical/diagnostic specimen does not contain a pathogen(s), it is considered to fall within the categories either of those specimens known or reasonably expected to contain pathogens or those specimens that have a relatively low probability of containing pathogens.

Guidelines for packaging and labeling infectious substances

Persons who ship infectious agents or diagnostic specimens must comply with all local and international regulations pertaining to the packaging and handling of these items. They must ensure that specimens arrive at their destination in good condition and that they present no hazard to persons or animals during shipment.

The inner packaging must include the following:

- An inner watertight primary container that is glass, metal, or plastic and has a leakproof seal. **Petri plates should not be shipped.**
- A watertight, impact-resistant secondary container
- Absorbent material between the primary container and the secondary

container. If multiple primary containers are placed in a single secondary packaging, they must be wrapped individually to ensure that contact between them is prevented. The absorbing material, such as cotton wool, must be sufficient to absorb the entire contents of all primary containers.
- An itemized list of contents between the secondary packaging and the outer packaging

Multiple primary receptacles placed in a single secondary packaging must be wrapped individually, or for infectious substances transported in liquid nitrogen, separated and supported to ensure that contact between them is prevented. The absorbing material must be sufficient to absorb the entire contents of all primary receptacles.

The outer packaging must meet the following requirements:

- Be of sufficient strength to adequately protect and contain the contents
- Be at least 100 mm (4 inches) in its smallest overall external dimension
- Be durably and legibly marked on the outside with the address and telephone number of the consignee. A biohazard warning label must be affixed to the outside of the outer container, and must bear the inscription, "Infectious substance. In case of damage or leakage immediately notify public health authority." Packaging for infectious substances must be marked with United Nations specification markings denoting that the packaging has been tested and certified for shipping infectious substances.

Figure 13-1 illustrates these packaging recommendations.

Guidelines for packaging and labeling clinical/diagnostic specimens not for microbiologic examination

Clinical specimens with a low probability of containing an infectious agent that are not being transported for examination for the presence of pathogens must be packaged as follows:

- Be "triple packaged" as described above for infectious agents
- Be in packaging that will not leak after a 4-foot drop test
- Have a "Clinical Specimens" label affixed to the outside of the outer container
- If being shipped by air, bear the following statement, "Contents not restricted, packed in compliance with IATA packing instruction 650."

Figure 13-2 illustrates these packaging recommendations.

Reference

International Air Transport Association. 1999. Annual publication. Dangerous goods regulations. Montreal, Quebec, Canada: IATA Publications Office.

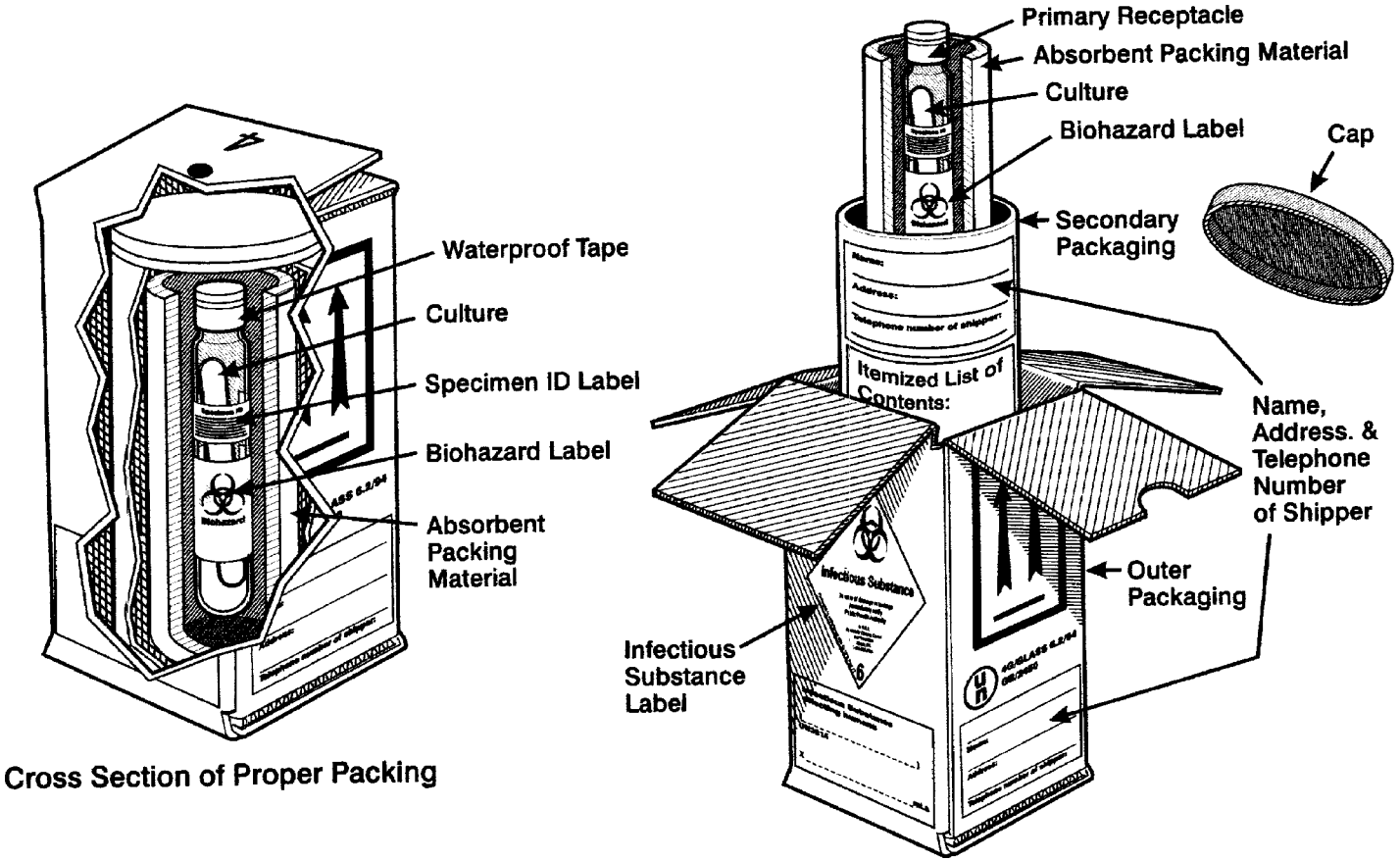

Figure 13-1. Packing and labeling of infectious substances

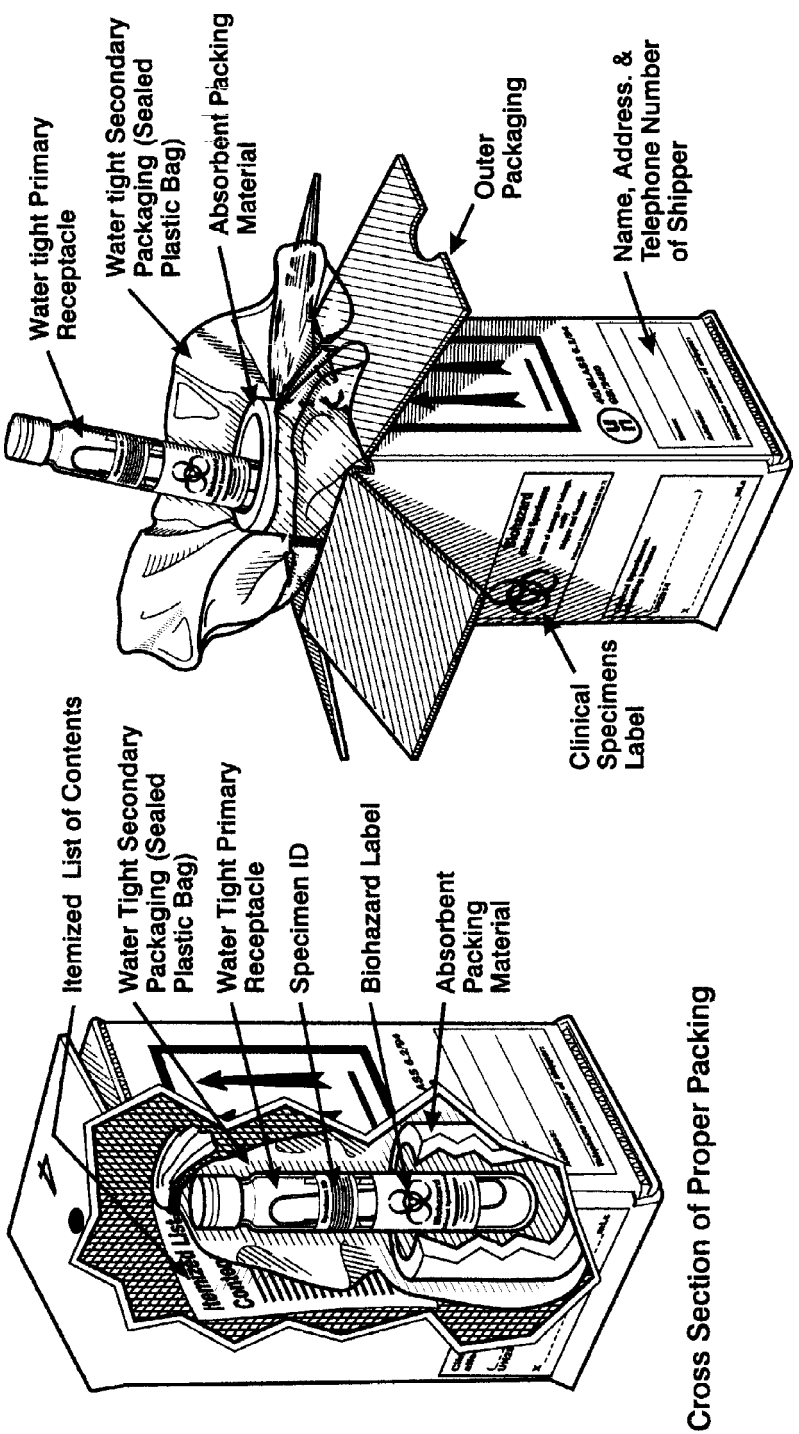

Figure 13-2. Packing and labeling of clinical specimens