

# Shipping Guidelines for Dried-Blood Spot Specimens

---

## Dried-blood spot specimen collection

Healthcare professionals collect dried-blood spot (DBS) specimens by carefully applying a few drops of freshly drawn blood from a finger stick or a heel stick onto specially manufactured absorbent specimen collection (filter) paper. The blood saturates the paper and should be air-dried for a minimum of 3 hours. The Clinical and Laboratory Standards Institute has published specimen collection techniques and specifications for FDA-approved absorbent filter paper as national standards.<sup>1</sup>

---

## Uses for dried-blood spot specimens

After collection, DBS specimens are shipped to public health laboratories by mail, courier service, or express delivery service. Technicians then subject the specimens to various analytical procedures. One of the most important DBS uses is screening the more than 4.2 million infants born annually in the United States for congenital and inherited metabolic disorders. Other important applications include DNA/RNA molecular methods; forensic studies; immunologic studies; and nutritional evaluations of infants, children, and adults.<sup>2</sup>

---

## Regulations for shipping dried-blood spot specimens

The U.S. Department of Transportation (DOT)<sup>3,4</sup> and the United States Postal Service consider DBS specimens nonregulated, exempt materials. DOT has harmonized its regulations<sup>5</sup> with the regulations issued by the

- International Air Transporter Association (IATA),<sup>6</sup>
  - World Health Organization's Guidance on Regulations for the Transport of Infectious Substances,<sup>7</sup> and
  - International Civil Aviation Organization's Technical Instructions for Safe Transport of Dangerous Goods by Air.<sup>8</sup>
- 

## Considerations when shipping dried-blood spot specimens

DBS specimens can be shipped by mail or other carrier with no reasonable expectations of occupational exposure to blood or other potentially infectious material. Use "standard precautions"<sup>9</sup> when collecting and preparing DBS specimens for shipment. Comply with local regulations and institutional policies.

---

---

**Proper packing essential**

Even though DBS are classified as nonregulated, exempt, you must properly package and label the specimens for shipping. Proper packaging and labeling notifies employees and transportation personnel of your package's contents and meets the Domestic Mail Manual (DMM) 601.10.17.8 guidelines.<sup>10</sup>

---

**Triple-packaging dried blood spots for shipment**

To mail DBS specimens, you must use the basic triple-packaging system.

1. The primary container is the filter paper matrix that contains the absorbed and dried blood.
  2. A secondary container must enclose the primary (filter paper) container. The secondary container should have a fold-over flap or an inner envelope to secure the contents.
  3. The third level of containment is an outer envelope of sturdy, high-quality paper. These levels of containment provide reasonable safety from occupational exposure and maintain optimal specimen integrity.<sup>7</sup>
- 

**Preparing the outer shipping container**

- The outer shipping container must have a complete return address and delivery address.
  - No content markings are required on the outer shipping container.<sup>10</sup>
  - You must affix or print the international biohazard symbol on the either the primary or secondary container to meet U.S. Occupational Safety and Health Administration requirements.<sup>11</sup>
- 

**Additional shipping considerations**

We do not recommend shipping packaged DBS specimens in plastic, foil bags, or other airtight, leak-proof sealed containers. The lack of air exchange in the inner environment of a sealed container causes heat buildup and moisture accumulation.<sup>1</sup>

Heat, direct sunlight, humidity, and moisture are also detrimental to the stability of DBS specimens and to analyte recovery. The inclusion of desiccant packs with the primary container will aid in preventing moisture accumulation. But remember that shipping conditions are uncontrolled, and desiccant has limited effectiveness.

---

---

**Local regulations might require plastic or foil shipping bags**

Always follow local postal, courier, and other transport regulations. If local regulations require enclosure in airtight, leak-proof sealed containers (plastic or foil bags) for transportation, then you must include a sufficient number of desiccant packages to ensure specimens are exposed only minimally to excessive moisture. You can also use indicator cards monitor humidity.<sup>1</sup>

---

**Shipping specimens that contain an infectious agent**

When shipping specimens known to contain an infectious agent, use special precautions and follow international, national, and local regulations (e.g., required packaging and an outside warning label).

---

**References**

1. Clinical Laboratory and Standards Institute. Blood collection on filter paper for newborn screening programs; Approved standard—Fifth edition. CLSI document LA4-A6. Wayne, PA: Clinical and Laboratory Standards Institute; 2012.
2. De Jesús VR, Mei JV, Bell CJ, Hannon WH. Improving and assuring newborn screening laboratory quality worldwide: 30-year experience at the Centers for Disease Control and Prevention. *Seminars in Perinatology* 2010;34:125–33.
3. Federal Register. 39 CFR part 111 New Mailing Standards for Division 6.2 Infectious Substances. 2006; Section 10.17.9(b). Available at: [www.gpo.gov/fdsys/pkg/FR-2006-11-01/pdf/E6-18062.pdf](http://www.gpo.gov/fdsys/pkg/FR-2006-11-01/pdf/E6-18062.pdf) [Accessed 2012 April 17].
4. Federal Register. 49 CFR part 173 Shippers General Requirements for Shipments and packaging. 2010; Section 173.134(b). Available at: <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=8662f082afd4c81e20b32e6f54361a73&rgn=div8&view=text&node=49:2.1.1.3.9.4.25.13&idno=49> [Accessed 2012 April 17].
5. US Postal Service. 346 Toxic Substances and Infectious Substances (Hazard Class 6). 346.234 Nonregulated Materials. Available at: [http://pe.usps.com/text/pub52/pub52c3\\_021.htm](http://pe.usps.com/text/pub52/pub52c3_021.htm) [Accessed 2012 April 19].
6. International Air Transporter Association (IATA). Division 6.2- Infectious Substances. Available at: [http://www.iata.org/whatwedo/cargo/dangerous\\_goods/Documents/DGR52\\_InfectiousSubstances\(DGR362\).pdf](http://www.iata.org/whatwedo/cargo/dangerous_goods/Documents/DGR52_InfectiousSubstances(DGR362).pdf) [Accessed 2012 April 17].
7. World Health Organization. Guidance on regulations for the transport of infectious substances 2011–2012. Geneva: WHO/HSE/IHR/2010.8. Available at: [http://www.biosafety.moh.gov.sg/home/uploadedFiles/Common/WHO\\_Guidance\\_on\\_regulations\\_for\\_transport\\_of\\_Infectious\\_Substances](http://www.biosafety.moh.gov.sg/home/uploadedFiles/Common/WHO_Guidance_on_regulations_for_transport_of_Infectious_Substances).

- [pdf](#) [Accessed 2012 April 19].
8. International Civil Aviation Organization (ICAO). International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air, 2005–2006. Available at: [http://www.icao.int/publications/Documents/guidance\\_doc\\_infectious\\_substances.pdf](http://www.icao.int/publications/Documents/guidance_doc_infectious_substances.pdf) [Accessed 2012 April 19].
  9. Centers for Disease Control and Prevention. Guide to infection prevention for outpatient settings: minimum expectations for safe care. Available at: <http://www.cdc.gov/HAI/settings/outpatient/outpatient-care-gl-standared-precautions.html> [Accessed 2012 April 18].
  10. United States Postal Service (USPS). Domestic Mail Manual (DMM). 601 Mailability 10.17.8: Packaging Nonregulated Materials. Available at: [http://pe.usps.com/text/pub52/pub52apxc\\_028.htm](http://pe.usps.com/text/pub52/pub52apxc_028.htm) [Accessed 2012 April 18].
  11. Occupational Health and Safety Administration. 29 CFR 1910.1030(g)(1)(i) Occupational Safety and Health Standards, Bloodborne pathogens. Available at: [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=standards&p\\_id=10051](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=10051) [Accessed 2012 May 4].
-