ARIZONA DEPARTMENT OF HEALTH SERVICES

PREPAREDNESS

Guide to Laboratory Services: Microbiology

Arizona Department of Health Services
Bureau of State Laboratory Services
250 North 17th Avenue
Phoenix, Arizona 85007
(602) 542-1188

May 2024

Victor Waddell, Ph.D.
Bureau Chief

Daniel M. Lavine, M.D.
Laboratory Director

Kathryn Fitzpatrick
Deputy Bureau Chief

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General Information

Bureau Chief, Laboratory Services	Victor Waddell, Ph.D.
Director, Laboratory Services	Daniel M. Lavine, M.D.
Deputy Bureau Chief	Kathryn Fitzpatrick

Hours of Operation:	8:00 AM to 5:00 PM Monday through Friday (Emergency services available outside business hours when required by public health needs.) Receiving section only is open from 9:30 AM to 5:00 PM on Saturday.
Annual Holiday Schedule:	Laboratory Services observes all state-recognized holidays.
Location:	250 North 17th Avenue, Phoenix, Arizona 85007
Telephone Number:	(602) 542-1188
WATTS Line:	(800) 525-8915
Fax Number:	(602) 542-0760
Emergency Phone (Weekends/After Hours):	(602) 887-9283

Arizona State Public Health Laboratory Contact Information

Section	Supervisor	Contact Information
Chief, Microbiology	Drew Francis	(602) 542-6146 Drew.Francis@azdhs.gov
Virology / Serology	Alice Price	(602) 542-6134 VirologySerologyLab@azdhs.gov
Bacteriology / (Limited) Parasitology	Katherine Nordell	(602) 542-6132 bacteriologylab@azdhs.gov
Environmental Microbiology	Teriani Johnson	(602) 542-6130 environmentallab@azdhs.gov
Mycobacteriology / Bioemergency Response and Detection for Select Agents	Rachel Wrobel	(602) 542-6135 tblab@azdhs.gov
Chief, Laboratory Support Services	Gail Weart	(480) 848-4395 gail.weart@azdhs.gov
Electronic Test Orders and Results (ETOR)/Lab Web Portal (LWP)	Gail Weart	(480) 848-4395 etor@azdhs.gov
Receiving / Shipping	Adrian Fichter	(602) 542-1190 labreceiving@azdhs.gov

Arizona Department of Health – Bureau of Epidemiology and Disease Control

Office of Infectious Disease Services	Main Number	(602) 364-3676
	After Hours	(480) 303-1191
State Epidemiologist	Ken Komatsu	(602) 364-3587

Core Functions and Capabilities of State Public Health Laboratories

State public health laboratories face the broad challenge of working toward the prevention and control of infectious diseases that cause significant morbidity and mortality. To function in this capacity, the public health labs provide diagnostic and surveillance testing for pathogens of public health importance. The labs serve as the first line of defense in the rapid recognition and prevention of the spread of communicable diseases, while also serving as centers of expertise for the detection and identification of biological agents of importance in human disease. The public health labs also perform testing to meet the specific program needs of public health agencies.

Routine diagnostic testing for hospitals and private laboratories is provided through independent reference laboratories. The Arizona State Public Health Laboratory (ASPHL) does provide targeted reference microbiological testing services and diagnostic testing services for unusual pathogens or confirmation of atypical results from cultures and clinical specimens. Diagnostic testing at the ASPHL refers to results obtained by ASPHL test methods that will be used by a healthcare provider to determine or evaluate necessary treatments for a patient. The ASPHL provides microbiological and immunological testing services to support public health initiatives for disease control and prevention at federal, state, county, and tribal agencies. The laboratory accepts cultures, clinical specimens, animal specimens, food, and water from a variety of agencies for outbreak investigations and surveillance.

Public health surveillance is the ongoing, systematic collection, analysis, and interpretation of health-related data that can be used for public health action or guide public health policy and programs. Surveillance of infectious diseases at the ASPHL allows public health officials to describe the burden of or potential burden of disease, monitor trends and patterns in disease, risk factors, and agents, detect sudden changes in disease occurrence and distribution, as well as evaluate prevention and control efforts. Surveillance samples include environmental, animal, as well as clinical samples previously tested and identified at a diagnostic laboratory. Results inform public health response but do not impact a healthcare provider's patient management for the disease. Some examples of public health surveillance activities include typing or serotyping of bacteria and viruses, mechanisms for antibiotic-resistant organisms, wastewater surveillance, etc.

The ASPHL will follow all state-required notifiable disease reporting requirements and results may be shared with the Arizona Department of Health Services Bureau of Infectious Diseases as well as County and Local Health Departments. State-mandated reporting requirements can be found at http://azdhs.gov/labreporting. This report will identify agents which must be reported to the state and which isolates must be submitted to the ASPHL.

Sample Submission for Testing

The ASPHL uses an Electronic Test Orders and Results (ETOR) portal for clinical microbiology sample test requests and select environmental samples. This platform will allow submitters to submit test orders and monitor the progress of the sample throughout the testing process. Notification of completion of testing and results reporting will be given to select users as specified in the portal.

To access this multifunctional portal, go to https://lwp-web.aimsplatform.com/az/#/auth/login. Click on the link labeled "New User Registration" to enter their account data and select a password.

The ETOR system sends an email to the submitter acknowledging receipt of the ETOR "New User Registration." Another email is sent when the registration has been completed and the account is active. Registration should be completed within 72 hours.

Additional food, water, animal, or environmental samples not currently on the ETOR portal may also be submitted for testing. The appropriate forms may be accessed at https://www.azdhs.gov/preparedness/state-laboratory/shipping-receiving/index.php#forms-home.

Collection Kits and Mailing Containers

ASPHL provides specimen collection materials and mailers free of charge for specimens submitted to the laboratory. Further information regarding specimen collection materials, mailing containers and *Request for Materials Form* is located in **Section 10: Requesting Collection Kits and Mailing Containers**. Submission forms and supplies for specimen submission are available through the Receiving department at https://www.azdhs.gov/preparedness/state-laboratory/shipping-receiving/index.php.

Supplies ordered from the Arizona State Public Health Laboratory (ASPHL) are to be used ONLY to submit specimens to the ASPHL. There are two Requests for Materials forms currently in use: a *Newborn Screening Supplies Request Form* and a *Request Form* for all other supplies available from the ASPHL. Supplies can be requested by faxing, emailing, or calling the Receiving section. All request forms are available as fillable or printable documents at:

https://www.azdhs.gov/preparedness/state-laboratory/shipping-receiving/index.php#forms-supply-order

Arizona Department of Health Services
Bureau of State Laboratory Services
ATTN: Receiving Section
250 North 17th Avenue
Phoenix, AZ 85007

Fax: (602) 364-0758
Phone: (602) 542-1190
Email: labreceiving@azdhs.gov

Please request materials before they are required as the expected turnaround time per order is **5 business days**. Most materials do have a limited shelf life; therefore, only order what will be used before the expiration date. Please do not use expired kits or any kits in which the medium has changed characteristics. Dispose of the media properly and order replacement supplies. The following table provides information regarding submission forms, kit contents, and the

expiration period of each kit. Submitters may use the Request for Materials form, found at https://www.azdhs.gov/preparedness/state-laboratory/shipping-receiving/index.php#forms-supply-order, to order entire kits, as well as individual components.

KIT	CONTENTS	SHELF LIFE
Enteric Kit	Instruction Sheet Baggie Media: Cary Blair Store +20 to +25 °C	1-2 years
Influenza Kit	Instruction Sheet N/P Swab Media: Universal Transport Medium Store +2 to +25 °C	1-2 years
Pertussis Kit	Instruction Sheet N/P Swab Media: Regan Lowe. Store +2 to +8 °C	4-6 months
Tuberculosis Kit	Sputum Vial 95 kPa Cardboard Mailer Store +20 to +25°C	n/a

Courier Services

ASPHL uses Specialized Delivery Services (SDS) for courier services. The schedule for routine pickup as well as will-call services for shipment and delivery can be found on the ADHS website at https://www.azdhs.gov/documents/preparedness/state-laboratory/lsip/courier-schedule.pdf. If your facility is not currently on the route for pickup, please contact Laboratory Support Services at (480) 848-4395.

Reporting

Results will only be communicated to the submitting agencies and providers listed on the submission/requisition form. Samples submitted for surveillance purposes may not be reported back to submitting agencies and providers. Laboratory results may be available to the local jurisdictional health departments. ASPHL has different mechanisms to report results. Reports can be accessed through the Electronic Test Orders and Results (ETOR) portal, emailed to a point of contact, faxed to a single number, or sent through mail. To have reports emailed or faxed to your facility, please contact Receiving at (602) 542-1190 or Laboratory Support Services at (480) 848-4395.

Specimen Rejection Policy

The ASPHL currently has the following policy for rejection of clinical laboratory specimens and/or requested examinations. Exceptions to this policy will be reviewed on a case-by-case basis by the Laboratory Director. This policy will not apply to samples submitted to the ASPHL specifically for surveillance activities. The ASPHL will NOT examine clinical/reference specimens if the following circumstances exist:

- The test is routinely available at a hospital or a private independent laboratory.
- The identifier on the specimen did not match the identifier on the submission form, or there was no identification on the specimen.
- The quantity of specimen was not sufficient for examination.
- The specimen was too long in transit between the time of collection and receipt in the laboratory.
- The specimen was broken or leaked in transit.
- The specimen was transported and/or received at the wrong temperature.
- Clinical/epidemiological information submitted with the specimen was either insufficient or incomplete.
- Specimen was submitted in an improper or expired container, transport media or preservative.
- Blood specimens were hemolyzed or contaminated.
- Only acute blood specimen was submitted, no convalescent specimen (if applicable).
- Material for rabies examination was too decomposed or desiccated to test.
- Reference cultures were mixed or contaminated; only pure cultures are acceptable.
- Specimens were not submitted in individual containers.
- Test request deemed unnecessary by the Bureau of Epidemiology and Disease Control.
- Use of outdated submission forms.

Section 1: Sample Submission Guidelines

Submit all samples to the following location:

Arizona Department of Health Services
State Public Health Laboratory
250 N. 17th Ave
Phoenix, AZ 85007
(602) 542-1188

All infectious material must be classified as either Category A (UN2814) or B (UN3373) and must be transported to the Arizona State Public Health Laboratory according to appropriate IATA (International Air Transportation Association), USPS (United States Postal Service) and DOT (U.S. Department of Transportation) regulations. The list of Category A organisms, as outlined by IATA, is provided at the end of this section. All infectious material must be triple-packaged to protect against breakage and/or leakage during transportation. An ASPHL Submission Form must accompany every sample submitted for testing.

Category B shipments must follow Packaging Instruction (PI) 650. Category A shipments must follow PI 620 and shipments with dry ice must follow PI 954. All samples and their containers must be identified with the appropriate labels, client, and patient information.

Any samples which are leaking and/or not properly identified will be rejected. The following are brief guidelines for properly triple-packaging and shipping specimens for infectious testing at the Arizona State Public Health Laboratory:

- **Primary Container**
  - Must be securely sealed; leak-proof for liquids and sift-proof for solids
    - NOTE: Screw caps and parafilm are recommended.
    - NOTE: Primary **OR** secondary container must be pressure and temperature-capable (95 kPa) if air transportation is used.
  - Samples must be properly labeled with patient identifying information.
    - Specimen primary containers for Mycobacterial examination must be labeled with the patient's name, specimen type, date, AND time of the collection.
  - For Category A, the maximum quantity for a cargo plane is 4 L or 4 kg. For a passenger plane, the maximum quantity is 50 mL or 50 g.
  - For Category B, the maximum quantity is 500 mL or 500 g.
  - Wrap with absorbent material sufficient for entire contents, and cushioning material.
- **Secondary Container**
  - Securely sealed and watertight/leak-proof
    - NOTE: Primary **OR** secondary container must be pressure and temperature capable (95 kPa) if air transportation is used.
    - NOTE: If you have the appropriate materials you can place multiple primary containers inside a secondary container.

- A completed itemized list of contents must be placed outside of or surrounding the secondary container.
    - NOTE: An ASPHL Submission Form will satisfy the list of contents requirement.
- Place absorbent and cushioning material between the primary and secondary containers.
- Affix a biohazard symbol to the secondary container.

- **Tertiary/Outer Container for CATEGORY B shipments**
    - Outer package must be rigid and of good quality.
    - Affix UN3373 Biological Substance, Category B diamond shaped hazard label.
        - Do NOT affix biohazard symbol to outer package
    - Full name, complete address and phone number of shipper (responsible person).
    - Full name, complete address and phone number of recipient.

- **Tertiary/Outer Container for CATEGORY A shipments**
    - Outer package and inner containers must be UN certified, outer package must contain the UN symbol.
    - For Category A shipments containing infectious material affecting humans, affix **UN2814 Infectious Substances, Affecting Humans** diamond shaped hazard label.
    - For Category A shipments containing infectious material affecting animals, affix **UN2900 Infectious Substances, Affecting Animals** diamond shaped hazard label.
        - NOTE: A list of UN2814 and UN2900 organisms is contained at the end of this section.
        - NOTE: If the infectious material affects both humans and animals, then treat as UN2814.
    - Orientation marks (up arrows) must be present on two (2) sides of outer box.
    - Full name, complete address and 24-hour direct phone number of shipper (responsible person).
    - Full name, complete address and phone number of recipient.
    - NOTE: Make sure to write 6.2 above the UN2814 of the label. Leave the technical name off of the box.
    - NOTE: You must include the full technical name of the suspected unknown or Select Agent on the Dangerous Goods Form placed in with the Secondary Container.
    - For Infectious Substance and Dry Ice Label template examples, refer to the ASPHL Shipping/Receiving website.
        - https://www.azdhs.gov/preparedness/state-laboratory/index.php#shipping-receiving-shipping

- **Additional Documentation and Considerations**
    - **Temperature Considerations**
        - Consult appropriate sections within this *Guide to Laboratory Services* document for specific shipping temperatures based on the organism or laboratory section performing test.

- If wet ice or ice packs are to be used for maintaining refrigerated shipping temperatures or room temperatures (during warmer climate), ensure there is sufficient amount of absorbent material contained within to absorb all moisture if ice melts during transit so integrity of box is not compromised. Ensure that sufficient wet ice or ice packs are placed inside the container to ensure that appropriate temperatures are maintained during transit, especially during warmer climate.
    - NOTE: It is recommended to place wet ice and/or ice packs inside a zip-lock bag and surround this with absorbent material.
- If dry ice is to be used to maintain sub-frozen temperatures ensure that the package conforms to PI 954 and that dry ice is not placed inside any tightly sealed container that will prevent the release of carbon dioxide gas during sublimation.
    - NOTE: Dry ice will degrade rapidly therefore it must be purchased, obtained and used as close to actual shipping as possible.

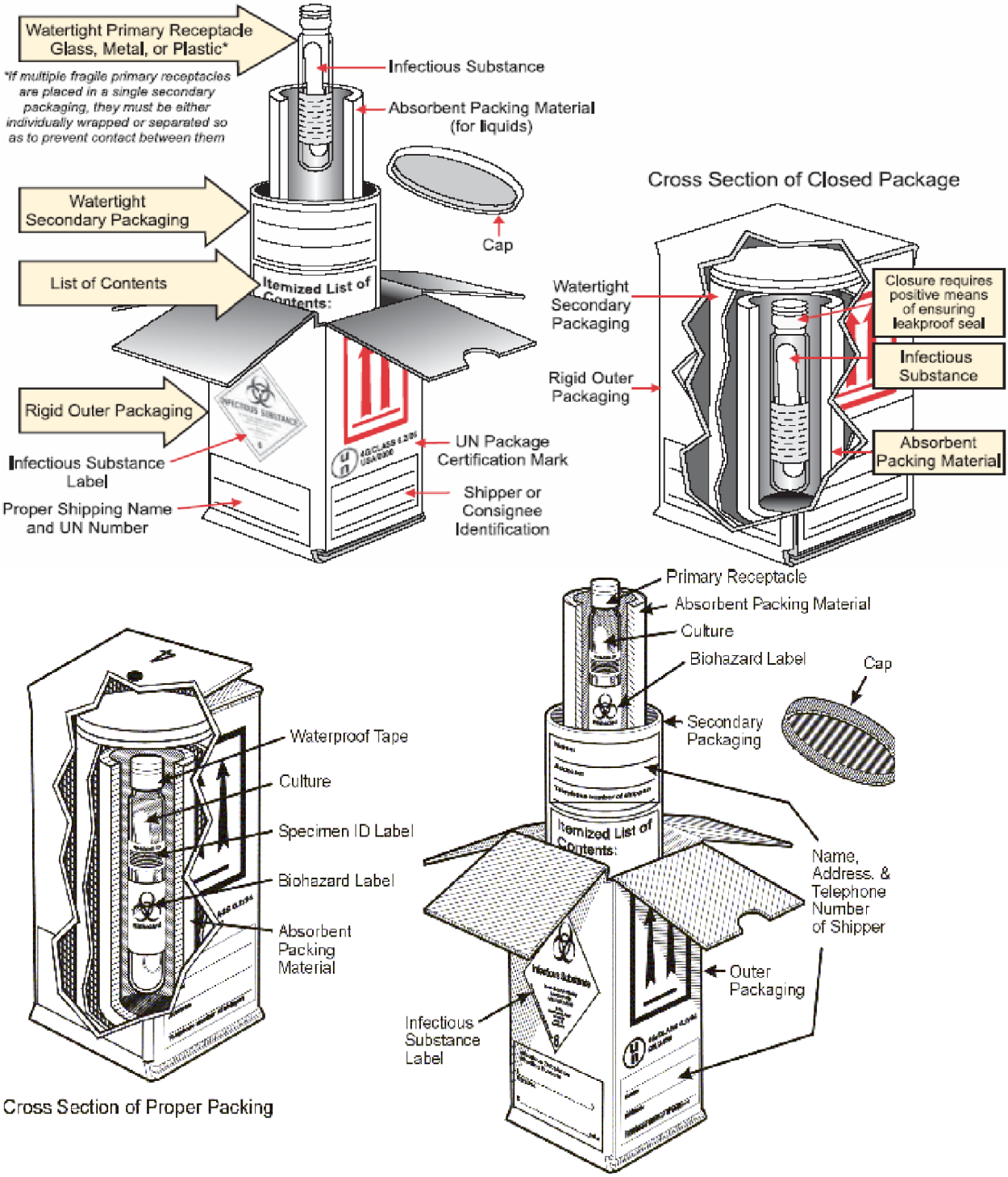
- **Dangerous Goods Shipper's Declaration**
    - A Shipper's Declaration must accompany all Category A shipments.
        - NOTE: A minimum of 3 color and signed copies is needed.
    - A Shipper's Declaration is not needed for Category B shipments.
    - A Shipper's Declaration is not needed if only shipping dry ice, or dry ice with a Category B shipment.

- **Select Agent and Toxin Transfers**
    - Shipping of any known Select Agent or Toxin must have prior approval and a completed CDC/APHIS Form 2.
    - Any "suspected" Select Agents must be shipped as either Category A or Category B as designated by its classification.
    - For additional information please visit the Select Agents website at: http://www.selectagents.gov/form2.html or contact the Arizona State Public Health Laboratory Bioemergency Response section at (602) 364-0999 for further assistance.

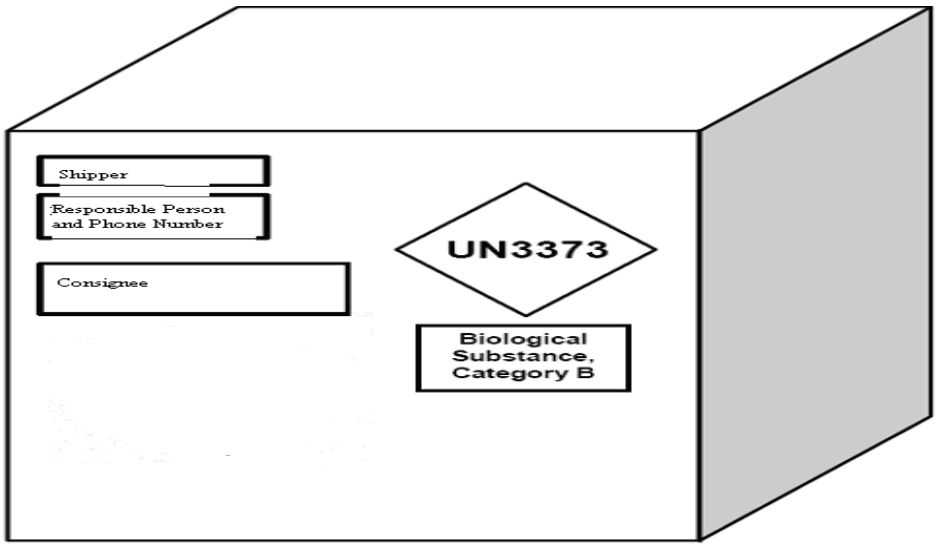
- **Training**
    - Anyone who packages or ships infectious material must receive appropriate training. There are several "hands-on" and online courses and trainings available. For further information or the next scheduled course please contact the ASPHL Technical Trainer at (602) 542-6175.

- **Supplies**
    - The Arizona State Public Health Laboratory offers several collection kits and materials for submitting samples. Please see Section 10 for further information.

Category A Shipping Examples



Category B Shipping Examples



A completely labeled outer package. The primary container inside the package contains a Biological Substance, Category B substance and is packed according to PI 650.

Section 2: Bacteriology

For testing assistance for organisms/diseases not offered by the ASPHL, please contact the Bacteriology section at (602) 542-6132. ASPHL partners with various public health laboratories for testing support, if necessary. Additional testing resources are available from the Centers for Disease Control and Prevention (CDC), Minnesota Public Health Laboratory (MPHL), Utah Public Health Laboratory (UPHL). Specimens should be forwarded to the CDC from the ASPHL and should not be sent directly from other facilities; please contact the Bacteriology section with any questions or for sample coordination with bacteriology or parasitology related samples.

Organism	Acceptable Specimen Source & Type	Transport Conditions	Test Method Performed by ASPHL	Comments	Turn Around Time (TAT) Business Days
Bordetella pertussis, Bordetella parapertussis, Bordetella holmesii	Regan-Lowe Semisolid Transport Medium	The acceptable temperature range is (2-25°C) Sample must be received by ASPHL within 7 days of collection	PCR	Swabs must be polyester, rayon, or nylon-flocked with a fine flexible wire or plastic shaft. Cotton-tipped or calcium alginate swabs, or swabs with a wooden shaft will be rejected.	7 days
Candida auris	Pure, viable isolate on non-selective agar plate or slant	The acceptable temperature range is (2-25°C)	Culture	Isolates are forwarded to the ARLN Regional Laboratory for AST	7 days
Candida auris Colonization Swabs	COPAN ESwab® (containing 1mL Amies)	The acceptable temperature range is (2-25°C) Sample must be received by ASPHL within 7 days of collection.	PCR	Colonization swabs that test positive for PCR will be cultured for isolate recovery. Isolates are forwarded to the ARLN Regional Laboratory for AST.	1-2 days for PCR
Carbapenem Resistant *Enterobacterales, Pseudomonas aeruginosa, Acinetobacter baumannii complex*	Pure, viable isolate on non-selective agar plate or slant	The acceptable temperature range is (2-25°C)	Culture, Carbapenemase Screen, AST, NG CARBA 5 and/or PCR	Attach complete susceptibility results that show carbapenem resistance. Carbapenem susceptible or intermediate only isolates will be rejected. *Pseudomonas aeruginosa* isolates susceptible to <u>both</u> ceftazidime and cefepime will be rejected. Fill out a	7-14 days

Organism	Acceptable Specimen Source & Type	Transport Conditions	Test Method Performed by ASPHL	Comments	Turn Around Time (TAT) Business Days
(CRE, CRPA, CRAB)				separate submission form for each isolate submitted for testing.	
Clostridium botulinum	Serum, Stool, Food - See Special Instructions for Botulism Testing	The acceptable temperature range is (2-8°C)	No testing performed - specimens are referred to the CDC	Approval for botulism testing must be obtained from the Bureau of Epidemiology and Disease Control prior to submission. Contact the Infectious Disease Section of the Bureau of Epidemiology and Disease Control at (602) 364-3676 (main number)/ (480) 303-1191 (after hours number).	12 weeks
Corynebacterium diphtheriae	Pure, viable isolate on non-selective agar plate or slant Nasopharyngeal swabs, throat swabs, and/or wound swabs (cotton or polyester tip) in semi-solid transport medium	**For isolates**, the acceptable temperature range is (2-25°C) _____ **For clinical samples**, the acceptable temperature range is (2-8°C) Sample must be received by ASPHL within **1** day of collection	Culture	Approval for testing must be obtained from the Bureau of Epidemiology and Disease Control prior to submission. Contact the Infectious Disease Section of the Bureau of Epidemiology and Disease Control at (602) 364-3676 (main number)/ (480) 303-1191 (after hours number). Isolates of *Corynebacterium diphtheriae*, *C. pseudotuberculosis*, and/or *C. ulcerans* will be referred to the CDC for toxin testing.	2-6 days
General Enteric Culture	Raw stool; preserved stool in ParaPak C&S, Modified Cary-Blair, or equivalent Aliquots of preserved stool are acceptable for testing.	The acceptable temperature range is (2-25°C) Sample must be received by ASPHL within 4 days of collection.	Culture, PCR, Serotyping	For optimal specimen recovery, preserved stool should be received by ASPHL within 4 days of collection. **Raw stool received more than 2 hours after collection will be rejected.** Stool samples submitted for General Enteric Culture will be screened for *Salmonella*, *Shigella*, *Campylobacter*, Shiga toxin-producing *E. coli*, *Aeromonas*, *Plesiomonas*, *Yersinia*, and *Vibrio*.	7-14 days

Organism	Acceptable Specimen Source & Type	Transport Conditions	Test Method Performed by ASPHL	Comments	Turn Around Time (TAT) Business Days
Haemophilus influenzae	Pure, viable isolate on a chocolate agar plate or slant	The acceptable temperature range is (2-25°C)	Culture	Patients 5 years and younger Isolates from patients older than 5 years must be approved by the Infectious Disease Section of the Bureau of Epidemiology and Disease Control. Contact at (602) 364-3676 (main number)/ (480) 303-1191 (after hours number).	7-14 days
Legionella spp.	Pure, viable isolate on BCYE or similar agar plate or slant	The acceptable temperature range is (2-25°C)	Culture, PCR		7-14 days
Listeria spp.	Pure, viable isolate on a non-selective agar plate or slant	The acceptable temperature range is (2-25°C)	Culture		7-14 days
Neisseria meningitidis	Pure, viable isolate on chocolate or similar agar plate or slant	The acceptable temperature range is (2-25°C)	Culture	Referred to MDH for Serotyping	7-14 days

Organism	Acceptable Specimen Source & Type	Transport Conditions	Test Method Performed by ASPHL	Comments	Turn Around Time (TAT) Business Days
Salmonella spp.	Pure, viable isolate on a non-selective agar plate or slant Preserved stool in ParaPak C&S, Modified Cary-Blair or equivalent Aliquots of the preserved stool are acceptable for testing.	**For isolates**, the acceptable temperature range is (2-25°C) _____ **For preserved stool**, the acceptable temperature range is (2-25°C) Sample must be received by ASPHL within **7** day of collection	Culture, Serotyping	For optimal specimen recovery, preserved stool should be received by ASPHL within 4 days of collection.	7-14 days
Shiga Toxin-Producing *Escherichia coli*	Pure, viable isolate on a non-selective agar plate or slant Preserved stool in ParaPak C&S, Modified Cary-Blair, or equivalent Aliquots of the preserved stool are acceptable for testing.	**For isolates**, the acceptable temperature range is (2-25°C) _____ **For preserved stool**, the acceptable temperature range is (2-25°C) Sample must be received by ASPHL within **7** day of collection	Culture, PCR, Serotyping	For optimal specimen recovery, preserved stool should be received by ASPHL within 4 days of collection.	7-14 days

Organism	Acceptable Specimen Source & Type	Transport Conditions	Test Method Performed by ASPHL	Comments	Turn Around Time (TAT) Business Days
Shigella spp.	Pure, viable isolate on a non-selective agar plate or slant Raw stool; preserved stool in ParaPak C&S, Modified Cary-Blair, or equivalent Aliquots of the preserved stool are acceptable for testing.	**For isolates**, the acceptable temperature range is (2-25°C) _____ **For preserved stool**, the acceptable temperature range is (2-25°C) Sample must be received by ASPHL within **7** days of collection.	Culture	For optimal specimen recovery, preserved stool should be received by ASPHL within 4 days of collection. Isolates of *Vibrio cholerae* will be referred to the CDC for toxin testing.	7-14 days
Vibrio spp.	Pure, viable isolate on a non-selective agar plate or slant Preserved stool in ParaPak C&S, Modified Cary-Blair or equivalent Aliquots of the preserved stool are acceptable for testing.	**For isolates**, the acceptable temperature range is (2-25°C) _____ **For preserved stool**, the acceptable temperature range is (2-25°C) Sample must be received by ASPHL within **7** days of collection.	Culture	For optimal specimen recovery, preserved stool should be received by ASPHL within 4 days of collection. Isolates of *Vibrio cholerae* will be referred to the CDC for toxin testing.	7-14 days

Organism	Acceptable Specimen Source & Type	Transport Conditions	Test Method Performed by ASPHL	Comments	Turn Around Time (TAT) Business Days
VISA/VRSA	Pure, viable isolate on a non-selective agar plate or slant	The acceptable temperature range is (2-25°C)	Culture, AST	Attach complete susceptibility results that show vancomycin intermediate or resistant results. Isolates of *S. aureus* that have a vancomycin MIC of 8ug/mL or greater (when tested by ASPHL) will be referred to the CDC for further testing.	5-7 days
Yersinia spp.	Pure, viable isolate on a non-selective agar plate or slant Preserved stool in ParaPak C&S, Modified Cary-Blair or equivalent Aliquots of preserved stool are acceptable for testing.	**For isolates**, the acceptable temperature range is (2-25°C) _____ **For preserved stool**, the acceptable temperature range is (2-25°C) Sample must be received by ASPHL within **7** day of collection.	Culture	For optimal specimen recovery, preserved stool should be received by ASPHL within 4 days of collection.	7-14 days

Shipping Conditions for Isolates:

Isolates should be sent to ASPHL, sealed with parafilm or an equivalent, and shipped at room temperature or refrigerated conditions (acceptable temperature range is 2-25°C). Isolates should be pure and viable.

Specimen Collection Guidelines for Clinical Bacteriology Testing:

- ***Swabs: Nasopharyngeal, Throat, Wound***
    - Collection Conditions:
        - Nasopharynx - Keep the swab in the nasopharynx for 10 - 30 seconds during the collection process. Collect from the inflamed areas of the nasopharynx, if possible.
        - Throat - If throat membranes are present and can be removed, swab from beneath the membrane.

        - Wound - Gently roll swab over the surface of the wound approximately five times, focusing on areas of pus and/or inflammation.

    - Transport Conditions, COPAN Eswab: Place the swab in the Amies transport media, cutting the excess length of the swab shaft so that the tube can be closed securely. Do not coil, bend, or otherwise smash the swab into the collection tube - samples submitted in this manner will be rejected. Keep at room temperature (15-25°C) until shipment. : Ship in room temperature or refrigerated conditions (acceptable temperature range is (2-25°C)

    - Transport Conditions, Other swabs: Refrigerate samples immediately after collection (2-8°C) and keep refrigerated until shipment. Ship at refrigerated conditions (acceptable temperature range is (2-8°C)

- ***Stool***

    - Collection Conditions:
        - Collect during the acute stage of infection (usually within 5-7 days of symptom onset), before the administration of antibiotics.
        - The stool should be passed into a clean, dry pan or toilet-mounted container. Do not collect using toilet paper, as toilet paper may be impregnated with barium salts which are inhibitory to some fecal pathogens.
        - Minimum quantity collected should be 1g of formed stool (approximately the size of a walnut) or 5 mL of diarrheal stool. If sending an aliquot of preserved stool, please send a minimum of 5mL.
        - Please do not overfill the specimen container, as this may cause the container to leak. Leaking specimens or specimens with visible stool contamination on the outside of the container will be rejected.
        - Keep at room temperature (18-25°C) until shipment.

    - Transport Conditions: Ship in room temperature or refrigerated conditions (acceptable temperature range is (2-25°C). If sending an aliquot of preserved stool, please indicate this clearly on the specimen container.

Special Instructions for Botulism Testing

IMPORTANT: Collection and transport conditions are determined by the CDC and are subject to change. Always consult the most recent version of the CDC testing directory (https://www.cdc.gov/laboratory/specimen-submission/list.html) before collecting and/or sending samples for botulism testing.

- Specimen Source and Type:
    - Adult patients: Serum, Stool
    - Infant Patients: Stool

- Collection Conditions - Serum:
    - Minimum volume for serum is 1mL; at least 5mL serum is preferred

    - Serum samples must be collected before antitoxin treatment
    - Refrigerate samples immediately after collection (2-8°C) and keep refrigerated until shipment.

- Collection Conditions - Stool:
    - Minimum quantity for stool is 0.5 - 1g; at least 10g stool is preferred
    - Stool can be collected via enema, using sterile non-bacteriostatic water
    - Refrigerate samples immediately after collection (2-8°C) and keep refrigerated until shipment.

- Collection Conditions - Food:
    - Foods should be left in their original containers or placed in sterile unbreakable containers. Empty containers with remnants of foods are also acceptable for testing.
    - Refrigerate samples immediately after collection (2-8°C) and keep refrigerated until shipment.

- Transport Conditions:
    - For clinical samples, provide patient name, date of birth, history of present illness, and treatment history, including date of BabyBIG or BAT administration.
    - Neither ASPHL nor the CDC accept shipments on weekends or holidays. **Make sure specimens are received by ASPHL Monday - Thursday** so that they can be forwarded to the CDC immediately.
    - Ship stool specimens in refrigerated (2-8°C) conditions. **IMPORTANT: Stool specimens must be received by the CDC within 2 days of collection.** To prevent specimen rejection due to shipping delays, send stool specimens to ASPHL using a STAT courier (if available) as soon as possible after collection.
    - Ship serum specimens in refrigerated (2-8°C) conditions. Serum samples can be received by the CDC within 20 days of collection date.
    - Package must have proper labeling for biological hazards: UN3373 biological substance, Category B.

Section 3: Mycobacteriology

For more information about specimen collection and shipping refer to the Specimen Collection & Shipment Guide found at https://www.azdhs.gov/preparedness/state-laboratory/public-health-microbiology/index.php#tuberculosis.

Mycobacteria Sample Type	Specimens	Transport Conditions	Test Method Performed by ASPHL	Comments	Turn Around Time (TAT) Business Days
Mycobacterium spp. – Clinical Samples	Acceptable clinical samples include: respiratory specimens, bodily fluids, tissues, urine, stool	The acceptable temperature range is (2-8°C) Sample must be received by ASPHL within 7 days of collection.	AFB smear, Culture	Stool specimens will be subjected for microscopic analysis only.	6-8 Weeks
Mycobacterium tuberculosis complex – Direct Detection in Clinical Samples	NALC-NaOH digested/decontaminated respiratory specimens Requires approval from the Arizona Department of Health Services, TB control section main telephone line at (602) 364-4750	The acceptable temperature range is (2-8°C) Sample must be received by ASPHL within 7 days of collection.	NAAT PCR	May be sent to CDC for MDDR testing if Rifampin resistance is detected.	2-3 Days
Mycobacterium tuberculosis complex – Reference Drug Susceptibility Testing	Pure, viable isolate/culture in suitable medium or Growth in MGIT tube	The acceptable temperature range is (2-25°C)	MGIT 960 DST and Agar Proportion DST methods	May be sent to CDC for additional testing.	3-4 weeks
Mycobacterium tuberculosis complex – Reference Identification & Confirmation of Isolate	Pure, viable isolate/culture in suitable medium or Growth in MGIT tube	The acceptable temperature range is (2-25°C)	PCR, Culture	None	3-4 weeks
Mycobacterium spp. – Reference Identification & Confirmation of Isolate	Pure, viable isolate/culture in suitable medium or Growth in MGIT tube	The acceptable temperature range is (2-25°C)	MALDI-TOF, Culture	None	3-4 weeks

TB Specimen Collection Guidelines:

AFB Clinical: Mycobacterium tuberculosis complex, Mycobacterium spp.

Acceptable Clinical Sample Types: respiratory specimens (i.e. sputum, induced sputum, bronchial washings, NP swab), bodily fluids (i.e. gastric, pleural, ascitic, CSF), tissues (i.e. biopsy, autopsy, bone), skin lesions (i.e. abscess, wound swab), urine, stool

- The following sample types are acceptable but not optimal for testing, which may negatively impact the recovery of AFB: swabs, stool
- Specimens that have leaked in transit are subject to rejection

Unacceptable Clinical Sample Types: blood, serum, bone marrow

Collection Conditions: Collect from symptomatic individuals only, ideally within two weeks of symptom onset. Refrigerate samples immediately after collection (2-8°C) and keep refrigerated until shipment.

- Respiratory specimens
  - Minimum quantity collected should be of 5mL. Less than 5mL and greater than 1mL may be acceptable but is considered poor volume and may impact recovery of AFB.
  - Sputum samples should be collected in the morning before eating or drinking.
  - Use sterile 50mL conical tubes for sample collection.
- Bodily fluids
  - Minimum quantity collected should be of 5mL. Greater than 1mL and less than 5mL may be acceptable but is considered poor volume and may impact recovery of AFB.
  - Use sterile 50mL conical tubes for sample collection.
  - Indicate if the fluid collected is sterile or non-sterile
- Tissues & Skin lesions
  - Use sterile 50mL conical tubes for sample collection.
  - Indicate if the specimen collected is sterile or non-sterile.
- Stool
  - Minimum quantity for stool is 0.5 - 1g; at least 10g stool is preferred
  - Stool can be collected via enema, using sterile non-bacteriostatic water

Transport Conditions: Ship in refrigerated (2-8°C) conditions. Clinical samples must be received by ASPHL within 7 days of collection; samples received >7 days after collection will be rejected.

AFB Reference: Mycobacterium tuberculosis complex, Mycobacterium spp.

Acceptable Reference Sample Types: Pure, viable isolate/culture in suitable medium (i.e. MGIT broth tube, LJ slant, Middlebrook 7H11, Mitchison 7H11 Selective, Middlebrook 7H10, Middlebrook 7H9 broth, Chocolate agar, Versatrek)

Unacceptable Reference Sample Types: clinical samples

- Stool cultures will be rejected
- Specimens that have leaked in transit are subject to rejection

Transport Conditions: Ship in room temperature or refrigerated conditions (acceptable temperature range is 2-25°C) Reference cultures and isolates may be greater than 7 days after the original specimen collection date.

Section 4: Limited Parasitology

The ASPHL no longer accepts routine diagnostic samples for testing of parasites. The laboratory offers screening for *Giardia* and *Cryptosporidium* to assist in outbreak investigations with approval from the Bureau of Epidemiology and Disease Control. All other submissions are forwarded to CDC with the approval of the Bureau of Epidemiology and Disease Control.

For testing assistance for organisms/diseases not offered by the ASPHL please refer to the Centers for Disease Control and Prevention (CDC) Test Directory website (http://www.cdc.gov/laboratory/specimen-submission/list.html).

Organism	Acceptable Specimen Source & Type	Transport Conditions	Test Method Performed by ASPHL	Comments	Turn Around Time (TAT) Business Days
Giardia & Cryptosporidium	Preserved stool in liquid Cary-Blair	The acceptable temperature range is (2-25°C)	PCR	**Sample must be received by ASPHL within 4 days of collection.**	2-3 Days

Collection Guidelines for Clinical Parasitology Testing

- Collection Conditions:
  - Collect during the acute stage of infection (usually within 5-7 days of symptom onset), before the administration of antibiotics.
  - Stool should be passed into a clean, dry pan or toilet-mounted container. Do not collect using toilet paper, as toilet paper may be impregnated with barium salts which are inhibitory to some fecal pathogens.
  - Minimum quantity collected should be 1g of formed stool (approximately the size of a walnut) or 5mL of diarrheal stool.
  - Please do not overfill the specimen container, as this may cause the container to leak. Leaking specimens or specimens with visible stool contamination on the outside of the container will be rejected.

- Transport Conditions: Ship in room temperature or refrigerated conditions (acceptable temperature range is (2-25°C)

Section 5: Environmental Microbiology

For testing assistance for organisms/diseases not offered by the ASPHL, please contact the Environmental Microbiology section at (602) 542-6130. ASPHL additional testing resources are available from the Centers for Disease Control and Prevention (CDC). Specimens should be forwarded to the CDC from the ASPHL and should not be sent directly from other facilities; please contact the Environmental Microbiology section with any questions or for sample coordination with related samples.

Sample Type	Test Method Performed by ASPHL or Sendout	Possible Analytes*	Acceptable Amount	Comments	Turn Around Time (TAT) Business Days
Food/Product	ELISA VIDAS, BAX-PCR, Culture, Sendout	• E. coli O157:H7 • STEC Big 6 (O26, O45, O103, O111, O121, and O145) • Salmonella species • Listeria species • Staphylococcal enterotoxins	30 grams	If possible for food, submit entire containers. Food must be suspected of being intentionally contaminated with one of the agents listed below.	1-2 weeks
Environmental (swabs, sponges)	PCR, Culture, Sendout	• E. coli O157:H7 • STEC Big 6 (O26, O45, O103, O111, O121, and O145) • Salmonella species • Listeria species		Collect aseptically.	1-2 weeks
Wastewater	dPCR	SARS-CoV-2	50ml conical tubes with 40-45ml of wastewater (in **triplicate** for each sample)	Acceptable samples are raw, untreated wastewater collected either influent of the WWTP or upstream in the wastewater collection network.	2-3 days
Water samples	Enzyme Substrate Coliform Test	Coliform and E.coli	• 100ml for drinking water, • 125ml for other water samples	Samples are accepted from the county health departments with prior approval from management.	1-2 days
	Sendout to Legionella Reference Center for culture	Legionella species	• 1L for bulk water • 120ml for hot water tank sediment or cooling tower water • 300-500ml for filter media		2-3 weeks

*For food/product and environmental samples, please contact the Environmental Microbiology section at (602) 542-6130 to confirm the requested analyte can be tested for the sample type being submitted

Submission Forms:

All samples submitted must be sent with a completed submission form and Chain of Custody. Food/product and water samples are submitted on individual submission forms, whereas environmental samples can have up to 5 samples on the forms. The chain of custody can work for one or multiple samples. If using the chain of custody for multiple samples, list all sample descriptions that apply to the chain of custody in the description box.

- ***Food/Product***
  - https://www.azdhs.gov/documents/preparedness/state-laboratory/public-health-microbiology/food-analysis-form.pdf?v=20230808
- ***Environmental***
  - https://www.azdhs.gov/documents/preparedness/state-laboratory/public-health-microbiology/environmental-microbiology-misc-analysis-form.pdf?v=20230808
- ***Wastewater and other water samples***
  - https://www.azdhs.gov/documents/preparedness/state-laboratory/public-health-microbiology/water-microbiological-sample-submission-form.pdf?v=20230927
- ***Chain of Custody***
  - https://www.azdhs.gov/documents/preparedness/state-laboratory/public-health-microbiology/chain-of-custody-form.pdf

Specimen Collection and Transporting Guidelines for Environmental Microbiology Testing:

Neither ASPHL nor the CDC accept shipments on weekends or holidays. **Make sure specimens are received by ASPHL Monday - Thursday** so that they can be tested or forwarded immediately to the CDC. IMPORTANT: Collection and transport conditions are determined by the CDC and are subject to change. Always consult the most recent version of the CDC testing directory (https://www.cdc.gov/laboratory/specimen-submission/list.html) before collecting and/or sending samples for testing.

- ***Food***
  - Foods should be left in their original containers or placed in sterile unbreakable containers. Sterile whirl-pak plastic bags, sterile urine collection cups, or sterile conical tubes are available upon request. If you are unsure about how to collect please contact ASPHL.
  - Refrigerate samples immediately after collection (2-8°C) and keep refrigerated until shipment.

- ***Environmental Samples***
  - Collection should be in a sterile whirl-pak plastic bag, sterile urine collection cup, or a sterile conical tube. Items are available upon request. Environmental samples such as “kissing bugs” should be placed in non-crushable containers before being sent to ASPHL. If you are unsure about how to collect please contact ASPHL.
  - Sponges and swabs should be refrigerated immediately after collection (2-8°C) and kept refrigerated during transport.
  - Other environmental products/samples should be sent and kept at room temperature 15-25°C during transport.

- ***Wastewater Samples***
  - Acceptable samples are raw, untreated wastewater collected either influent of the WWTP or upstream in the wastewater collection network.
  - Do not fill 50ml conical tubes to the top. No more than 45ml should be filled for each 50ml conical. Allow sufficient headspace in all tubes to compensate for pressure and temperature changes.
  - Wipe the outside of all tubes with a 10% bleach solution before submitting.
  - Refrigerate samples immediately after collection (2-8°C) and keep refrigerated until shipment with frozen ice packs.

- ***Other water samples***
  - Drinking water samples should be collected in sterile four-ounce whirl-pak bags or sterile collection bottles with sodium thiosulfate added to neutralize any chlorine in the water. Aseptically collect water from the sample tap. If using sterile collection bottles fill to the 100 mL line and leave adequate air space. If using the whirl-pak bags, collect 125 mL of water. Be sure to whirl them closed tightly and tie the tabs together securely.
  - Surface water, source waters, runoff waters, etc., can be aseptically collected in any appropriate size sterile whirl-pak bag or bottle (sodium thiosulfate is not needed); however, at least 125 mL is needed to test.
    - These waters need to be received in the laboratory within six hours of collection, and must be iced during transit. Before submitting these water samples, please call the Environmental Microbiology section at (602) 542-6130 to arrange for testing.
  - For samples being sent out to the Legionella Reference Center please see the LRC Reference Guide for more information than was provided in the previous table.
    - https://www.aphl.org/aboutAPHL/publications/Documents/LRC-Reference-Guide.pdf

Section 6: Serology

The Serology section is responsible for performing immunologic testing for communicable diseases in support of outbreak investigations, and reference testing for private and public laboratories. The time required to process a serology specimen varies considerably, as indicated by the following table. Detailed information on the collection and submission of laboratory samples for any of the following tests can be obtained in the narrative guidelines that follow.

Organism/ Disease	Specimen Type	Minimum Sample Volume	Test Method	Comments	Turn Around Time (TAT) Business Days
Dengue virus*[1, 4]	Serum	1.0 mL	IgM EIA PCR PRNT	Date of onset needed, test method determined by case history. PRNT testing performed on presumptive positive or equivocal samples. Specimens may also be tested for West Nile virus and St. Louis Encephalitis virus.	2-7 days 2-7 days 14-28 days
Chikungunya virus*[4]	Serum	1.0 mL	IgM EIA PCR PRNT	Date of onset needed, test method determined by case history. PRNT testing performed on presumptive positive or equivocal samples.	2-7 days 2-7 days 14-28 days
Hantavirus*[2]	Serum	1.0 mL	IgM EIA IgG EIA		1-7 days

Organism/ Disease	Specimen Type	Minimum Sample Volume	Test Method	Comments	Turn Around Time (TAT) Business Days
HIV	Serum	0.5 mL	Ag/Ab EIA HIV-1, HIV-2 Ab Differentiation HIV-1/HIV-2 NAAT	ADHS HIV Prevention Program only. Referred to Florida Department of Public Health	3-5 days
Measles	Serum	0.5 mL	IgM EIA IgG EIA	IgM and IgG are tested together. Sample will also be tested for Rubella IgM and IgG	3-5 days
Mumps	Serum	0.5 mL	IgM EIA IgG EIA		Referred to CDC
Q Fever (*Coxiella*), phase I & phase II	Serum	0.5 mL	IgG IFA		Referred to CDC
Rickettsia spp. Rocky Mountain Spotted Fever (RMSF) Group Typhus Fever Group Other spp.	Serum Whole Blood	0.5 mL 2.0 mL	IgG IFA PCR	Acute and convalescent serum preferred for testing. Typhus Fever Group and other spp. referred to CDC.	IgG IFA 2-14 days PCR 2-7 days
Rubella	Serum	0.5 mL	IgM EIA IgG EIA	IgM and IgG are tested together. Sample will also be tested for Measles IgM and IgG.	3-5 days
SARS CoV-2	Serum	0.5 mL	Total Ab EIA		3-5 days

Organism/ Disease	Specimen Type	Minimum Sample Volume	Test Method	Comments	Turn Around Time (TAT) Business Days
St. Louis Encephalitis (SLE) virus [1]	Serum CSF	0.5 mL 0.5 mL	IgM EIA PRNT	Sample will also be tested for WNV PRNT testing is performed on samples where the P/N ratio between WNV & SLE is <3x.	3-7 days 14-28 days
West Nile Virus (WNV)[1]	Serum CSF	0.5 mL 0.5 mL	IgM EIA PRNT	Sample will also be tested for SLE PRNT testing is performed on samples where the P/N ratio between WNV & SLE is <3x.	3-7 days 14-28 days
Zika virus*[1, 3]	*Serum*[3] CSF Whole Blood	2.0 mL 1.0 mL 1.0 mL	PCR		2-7 days

* Prior notification and approval required

Test abbreviations:

EIA – Enzyme Immunoassay
IFA – Indirect Fluorescent Antibody
PCR – Polymerase Chain Reaction
Ab – Antibody
Ag – Antigen
PRNT – Plaque Reduction Neutralization Test

1. Significant cross-reactivity has been observed within the viruses in the Flavivirus group including Dengue, SLE, WNV, and Zika. Confirmatory testing with Plaque Reduction Neutralization Testing (PRNT) will be performed on samples where cross-reactivity is suspected.
2. Specimens submitted for Hantavirus testing are tested for both IgG and IgM antibodies. Demonstration of the presence of IgM antibody is suggestive of recent exposure to Hantavirus (Sin Nombre virus). With prior notice and approval from the Arizona Department of Health Services Office of Infectious Disease Services, the turnaround time for test results can be shortened.

3. For Zika virus testing to proceed, serum submission is a requirement. Other specimen types such as urine, whole blood, CSF, and amniotic fluid can also be submitted and recommended but they must be accompanied by a serum specimen.

4. For Dengue virus and Chikungunya virus testing, patient history including travel, symptoms, and symptom onset is required. The test method utilized for detection of these viruses is dependent on clinical information.

Specimen Collection:

Blood

Blood specimens should be collected aseptically in an appropriate collection tube and labeled with a patient identifier (e.g., patient name). Follow the manufacturer's instructions for volume to collect for each tube submitted. For pediatric patients, smaller volumes of blood may be collected utilizing pediatric tubes.

- **Serum:** red top, tiger top, gold top vacutainer tubes
- **Whole Blood/plasma:** lavender top vacutainer tube w/ EDTA anticoagulant

Acute blood samples should be drawn as soon as possible after appearance of symptoms. A convalescent sample should be drawn 10 – 14 days after the acute sample.

After collection, the tube may be transported directly to the Arizona State Public Health Laboratory (ASPHL) or the tube may be centrifuged and the serum/plasma poured off into a separate vial. Whole blood specimens for PCR testing should not be centrifuged prior to submission to the ASPHL.

Other

Other specimens may be sent to the ASPHL for serological testing. These include cerebrospinal fluid (CSF) and amniotic fluid which should be collected in a sterile container.

Transportation & Storage:

Store samples refrigerated and shipped in refrigerated (2-8°C) conditions. *Do not freeze whole blood specimens.* The specimen should be transported to the ASPHL as soon as possible. Serum samples, separated from the clot can be frozen at <-20°C if shipment to the ASPHL will be delayed.

Samples must be transported with the appropriate paperwork, verifying that the information appearing on the specimen matches that on the submission form. Since the integrity of the sample must be maintained from the time of collection of the sample until testing is completed, **labeling errors will result in the rejection of the specimen**.

Laboratory submission forms should be filled out completely with all pertinent demographic information. Successful tracking of positive cases is reliant on complete and accurate information being supplied on these forms, including patient name or identifier, date collected, date of onset of illness, submitter's name and address, and agency code.

For HIV serological testing, specimens are to be submitted with an *HIV Submission Form* only. All other serological specimens should be accompanied with a *Microbiology Submission Form.*

Specimens may be mailed or delivered by courier to the ASPHL. See Section 1: Sample Submission Guidelines.

If sent by courier

- Blood and blood products sent in vacutainer tubes should first be placed in a primary screw-cap leakproof container (such as a 50 mL plastic conical tube available from the ASPHL) to reduce the risk of shattering while in transit.
- The specimen should then be placed in a secondary container such as a plastic specimen bag with separate compartments for the submission form and specimen.
- All infectious material must be triple packaged and conform to U.S. Department of Transportation (DOT) requirements.
- Pack the specimen and its form in absorbent material to help prevent breakage.

  Note: It is acceptable to send more than one specimen together, as long as they are properly secured and identified.

If sent by mail

- Blood sent in vacutainer tubes should first be placed in a leak proof primary container (such as a 50 mL conical tube available from the ASPHL) to reduce the risk of shattering while in transit.
- All infectious material must be triple-packaged and conform to current shipping regulations. Consult the Domestic Mail Manual published by the US Post Office (USPS) for current USPS requirements, and the Hazardous Material Regulations (HMR) for current DOT requirements.
- Wrap the submission form around the secondary container, and place inside the tertiary container or cardboard mailer. Package the specimen with enough absorbent material for entire contents and to help prevent breakage.

  Note: Do not put the submittal form around the primary container; it must be around the secondary container.

- Place appropriate biohazard label on the outside of the secondary container before transportation to the ASPHL.

50 mL conical tubes and cardboard mailers are available from the ASPHL Receiving Section via request for materials form available at http://www.azdhs.gov/preparedness/state-laboratory/shipping-receiving/index.php#forms-supply-order or by emailing labreceiving@azdhs.gov. Please submit your orders in advance to ensure prompt service and delivery. See Section 10: Requesting Collection Kits and Mailing Containers.

Section 7: Virology

The Virology section is responsible for performing diagnostic, reference, and surveillance testing for viruses. The following table provides the viruses the ASPHL Virology department can identify and the turnaround times to report results. Detailed information on the collection and submission of laboratory samples for any of the following tests can be obtained in the narrative guidelines that follow.

Note: Bacteriological collection swabs and transport medium are not acceptable for virus detection. Swabs should be placed into a liquid media such as viral transport media or universal transport media.

Organism	Specimen	Transport Medium & Volume	Comments	Turn Around Time (TAT) Business Days
Arbovirus Surveillance	Mosquito Pools *Culex spp.* *Aedes spp.*	None	Ship frozen	7-14 days
Enterovirus[2]	Respiratory Swabs[1], Rectal Swab, Viral Isolate Stool, CSF	Hanks, Viral Transport Media (VTM), Universal Transport Media (UTM), Sterile Saline. Sterile collection container Min. volume: 2 mL	Enterovirus D68 is referred to CDC. Must have prior approval.	Referred to CDC
Influenza virus ● Seasonal ● Avian ● Novel ● Variant ● A only	Respiratory Swabs[1], Viral Isolates Respiratory washes/aspirates, Sputum, tissue	Hanks, Viral Transport Media (VTM), Universal Transport Media (UTM), Sterile Saline. Sterile collection container Min. volume: 2 mL	Surveillance only specimens– aliquot of sample can be submitted, minimum volume 0.5 mL	PCR: 1-5 days

Organism	Specimen	Transport Medium & Volume	Comments	Turn Around Time (TAT) Business Days
Measles virus	Respiratory Swabs[1], viral isolates Respiratory aspirates, urine	Hanks, Viral Transport Media (VTM), Universal Transport Media (UTM), Sterile Saline. Sterile collection container Min. volume: 2 mL 10 mL – Urine	Submission of both a throat swab and urine is preferred for testing.	PCR: 1-5 days
Mumps virus	Respiratory Swabs[1], viral isolates Respiratory aspirates, urine	Hanks, Viral Transport Media (VTM), Universal Transport Media (UTM), Sterile Saline. Sterile collection container Min. volume: 2 mL 10 mL – Urine	Submission of both a buccal swab and urine is preferred for testing.	PCR: 1-5 days
Norovirus PCR	Stool (raw)	Sterile collection container	Do not freeze.	2-10 days
Rabies	Small animal (bat), animal head, brain tissue	None	Refer to Section 8	1-2 days
Respiratory Virus Panel (PCR)	NP Swab	Viral Transport Media (VTM), Universal Transport Media (UTM) Min. volume: 2 mL	Prior Approval Required	1-5 days

Organism	Specimen	Transport Medium & Volume	Comments	Turn Around Time (TAT) Business Days
SARS-CoV-2	Respiratory Swabs[1] Respiratory washes/aspirates, Sputum	Hanks, Viral Transport Media (VTM), Universal Transport Media (UTM), Sterile Saline. Sterile collection container		1-5 days
Zika virus[3]	Amniotic Fluid Urine	Sterile collection container Min. volume: 2 mL	Testing determined by case history and/or travel history and follows the current guidelines from the CDC	2-7 days

1. Respiratory Swabs: Nasopharyngeal, nasal, throat, buccal
2. Enterovirus D68 requests need prior approval, specimens referred to the CDC.
3. For Zika virus testing, serum must be submitted in addition to other specimen types.

Collection

In order to optimize the ability of the Virology section to identify viral agents from clinical specimens, it is very important that the specimens be collected, handled, and transported in a manner that minimizes deleterious effects on any viral agents present. In addition, sufficient information should be provided with a submitted specimen to guide the laboratory in the selection of proper inoculation techniques for the suspected viral agents.

Transport Media

Transport media for viral detection should be a liquid medium free from serum. The following liquid media is approved for use for viral sample collections

- Hank's Balanced Salt Solution
- Viral Transport Media (VTM)
- Universal Transport Media (UTM)
- Sterile Saline (only when other media is not available)

Collection Swabs

Recovery of virus is also dependent upon the swab the specimen was collected. Acceptable swabs include:

- Polyester
- Synthetic
- Flocked swabs (FLOQ)
- Dacron
- Nylon

Unacceptable swab types include:

- Calcium alginate swabs
- Cotton tip swabs with wooden shafts

Nasopharyngeal/Throat

Virus identification is most successful if respiratory specimens are collected within 3 to 5 days of onset of illness. Swabs from both the throat and nasal passage should be collected. The pharynx is swabbed vigorously with a swab moistened with a collection medium and then placed in a transport container containing a transport medium. Break off the ends of the applicator sticks leaving the swab tips in the collection medium.

NP swabs are used to collect specimens from the nasal passage. Allow the swabs to remain in the nasal passages for a few seconds to absorb the nasal secretions laden with the virus. Place the swabs in the Hanks or VTM and label the vial.

Specimens should be stored in refrigerated conditions at 2-8 °C for up to 72 hours and shipped in the same conditions. If the delay to the laboratory is greater than 72 hours, specimens should be stored frozen at -70°C and transported to the ASPHL on dry ice.

Urine

Urine specimens can be submitted for further aid in diagnosis of a viral infection. Generally, Measles, Mumps, and Zika virus can be found in the urine. For measles virus and mumps virus testing, it is recommended that a respiratory specimen and a urine specimen be submitted for a suspect patient.

Collect the specimen as soon as possible after the onset of illness. Clean voided specimens (10-20 mL) are collected in sterile containers and stored in refrigerated conditions at (2-8 °C) and shipped in the same conditions.

Throat Washings

Throat washings should be collected by gargling with Hanks Balanced Salt Solution (HBSS). Collect the specimen in a sterile container. Collect the specimen as soon as possible after the onset of illness. Stored in refrigerated conditions at (2-8 °C) and shipped in the same conditions.

Cerebrospinal Fluid (CSF)

For virus isolation, 3-4 mL of CSF should be collected no later than 7-10 days after onset of illness. Place in a sterile screw-capped tube without a collection medium. Stored in refrigerated conditions at (2-8 °C) and shipped in the same conditions.

If delays in transport, store frozen at -70 °C. and transported to the ASPHL on dry ice.

Stools

Place three to four grams of stool into a sterile container and transport to the laboratory on wet ice or a cold pack.

Stool specimens collected to test for the presence of Norovirus must be refrigerated (not frozen) as soon as possible after collection.

Autopsy or Biopsy Specimens

Autopsy specimens should be collected within 24 hours after death. Samples from probable sites of pathology are collected using separate, sterile instruments and separate sterile containers for each specimen. Tissues are transported to the laboratory on wet ice or cold pack. If they cannot be tested within 48 hours, they should be stored frozen at -70 °C.

Shipment of Specimens

All infectious material must be triple-packaged. Place specimens in screw-cap leak proof primary container. Place the primary container in a leak proof secondary container and wrap submission form around the secondary container. Place the secondary container and submission form in an appropriate tertiary container. Ensure adequate ice or cool packs are used if required. Each specimen must be accompanied with a *Microbiology Submission Form*. Mail, ship or courier specimens to the ASPHL.

See Section 1: Sample Submission Guidelines.

Reporting and Interpretation of Results

Influenza and COVID-19 diagnostic samples must be shipped at -70 °C if testing cannot be performed within 72 hours. A disclaimer will be added to all samples submitting for influenza testing that states: “Specimens should be shipped at -70 °C if testing cannot be performed within 72 hours of collection. If shipping conditions are not met, a negative test result does not rule out the presence of Influenza/COVID-19 virus.”

Section 8: Special Virology – Rabies

Collection

Updated collection information can be found at
http://www.azdhs.gov/preparedness/epidemiology-disease-control/rabies/index.php

Prior approval from the local health department and Bureau of Epidemiology and Disease Control Vector-Borne and Zoonotic Disease Section is needed on all submissions. Refer to the link above for information on approval.

To identify animals that are rabid, testing requires samplings of brain tissue. For animals that are extremely small such as bats, mice, rats, and other rodents, the animal should be sent intact. Larger animals but no larger than the size of a dog should have the head of the animal submitted. The head should be severed close to the shoulders allowing sufficient tissue of the throat to remain, to ensure inclusion of salivary glands. For larger animals, such as cows, horses, and horned animals, the brain should be removed by a veterinarian and sent to the laboratory. Arrangements can be made with ADHS for removal of brain tissue at the Arizona Veterinary Diagnostic Laboratory in Tucson.

- **Entire Animal:** Bats, mice, rats, rodents
- **Head only:** animals the size of skunks, foxes, wild cats, domestic cats, domestic dogs, javelina, etc.
- **Brain only:** horses, cows, horned animals

Please Note: Rodents will be tested only by prior approval from the Vector-Borne and Zoonotic Disease Section of the Bureau of Epidemiology and Disease Control. Rodents may carry other serious and deadly diseases, such as plague, tularemia, or Hantavirus, and should be handled with extreme caution.

Birds and reptiles *will not* be accepted for examination.

Specimens for rabies examination should be collected immediately after the death of the animal. Decomposed specimens or specimens infested with maggots may not be testable but will be determined by the Virology section.

Shipment of Specimens

All infectious material including specimens submitted for rabies testing should be triple-packaged. Place the head in a leak-proof primary container, and place the primary container in another leak-proof secondary container. The secondary container should be placed in a tertiary container that is filled with wet ice or cold packs as necessary. An animal ID should be written on the primary, secondary, or tertiary container to ID each sample submitted. An approved *Rabies Submission Form* should be placed in a separate sealed plastic bag outside of the secondary container, or in a separate plastic bag or envelope taped to the outside of the box. Ship the specimens to the Arizona State Public Health Laboratory. Testing delays may be experienced on specimens that are received frozen.

See Section 1: Sample Submission Guidelines.

Reporting and Interpretation of Results

In all cases when exposure of a human is reported by a physician or veterinarian, laboratory examination will be made consisting of microscopic examination of smears prepared from brain material. The results of the microscopic examinations will be available 24 to 48 hours after receipt of the specimen. Positive results will be reported by telephone to the Vector-Borne and Zoonotic Disease Section of the Bureau of Epidemiology and Disease Control. Section 9: Bioemergency Detection and Response (Select Agents)

Please contact the State Bureau of Epidemiology and Disease Control at (602) 364-3676 (main number) or (480) 303-1191 (after hours number) and the Bioemergency Detection and Response Laboratory at (602) 364-0999 before submitting samples for potential outbreak. In the event that an intentional release of any biological agent is suspected, contact your local county health department, local law enforcement agencies, and the FBI Phoenix field office at (602) 279-5511 to inform them of the incident.

Section 9: Bioemergency Detection and Response (Select Agents)

Specimen Collection and Shipping

Refer to the American Society for Microbiology (ASM) Sentinel Laboratory procedures for acceptable specimen type and handling. Sample collection should be consistent with current medical practices for the disease/organism biology.

Environmental specimens should be of sufficient quantity and may consist of food, soil, smooth non-porous surfaces swab/wipe, powders, or packages (Table 1). Prior to submitting environmental samples, contact the Bioemergency Detection and Response testing laboratory section at (602) 364-0999 for submission guidance. For details regarding the collection and submission of powder samples/suspicious unknowns including those associated with a threat, please contact your local law enforcement and refer to the Arizona Department of Health Services Suspicious Substances guidelines:

http://azdhs.gov/documents/preparedness/emergency-preparedness/response-plans/suspicious-substance-protocol.pdf

All organisms (in culture form) listed in this section are considered Category A infectious substances and must be shipped accordingly. For information regarding the packaging and shipping of Category A infectious agents please refer to Section 1: Sample Submission Guidelines of this manual and/or the ASM Packaging and Shipping Guidelines for Sentinel Laboratories.

https://www.asm.org/ASM/media/Policy-and-Advocacy/Biosafety_Sentinel_Guideline_October_2018_FINAL.pdf

Table 1 – Environmental specimens

Specimen Type	Amount	Notes
Smooth non-porous surface (counter, instrument, etc.)	26 cm^2 (4 in^2) – Macrofoam swabs 645 cm^2 (100 in^2) – Cellulose sponge-wipe 929 cm^2 (144 in^2) – Gauze	Use a sterile swab, Cellulose sponge-wipe, or gauze. Synthetic fibers and synthetic or metal shafts strongly preferred.
Powder	Up to 5 g	Collect aseptically.
Food	25 – 100 g	If food is not available, submit empty containers. Food must be suspected of being intentionally contaminated with one of the agents listed below.
Isolate	Isolate plate or slant	Send in both plates or tubes.

Table 2 – Clinical specimens

Approval is required for clinical samples. *Approval must be obtained from the Bureau of Epidemiology and Disease Control prior to submission. Contact the Infectious Disease Section of the Bureau of Epidemiology and Disease Control at (602) 364-3676 (main number)/ (480) 303-1191 (after hours number).*

Organism	Specimen	Transport Conditions	Test Method	Comments	Turn Around Time (TAT) Business Days
Bacillus anthracis	Recovered isolates from clinical specimens For cutaneous anthrax, sterile swabs for collection of vesicular fluid and eschar material. For intestinal or pulmonary anthrax, whole blood in EDTA, serum, sputum.	The acceptable temperature range for **isolates** is (2-25°C) The acceptable temperature range for clinical **samples** is (2-8°C) Clinical samples must be received by ASPHL within 7 days of collection.	PCR, Culture	For optimal specimen recovery, use Dacron swabs for swab site collection	7 days

Organism	Specimen	Transport Conditions	Test Method	Comments	Turn Around Time (TAT) Business Days
Brucella spp.	Recovered isolates from clinical specimens **Acceptable clinical sample**: whole blood in EDTA and serum.	The acceptable temperature range for **isolates** is (2-25°C) The acceptable temperature range for clinical **samples** is (2-8°C) Clinical sample must be received by ASPHL within 7 days of collection.	PCR, Culture	When brucellosis is suspected, multiple blood cultures should be obtained.	14 days
Burkholderia mallei/ pseudomallei	Recovered isolates from clinical specimens **Acceptable clinical samples**: whole blood in EDTA and serum	The acceptable temperature range for **isolates** is (2-25°C) The acceptable temperature range for clinical **samples** is (2-8°C) Clinical samples must be received by ASPHL within 7 days of collection.	PCR, Culture	None	14 days
Coxiella burnetii	◦ **Acceptable samples include**: whole blood in EDTA	The acceptable temperature range for clinical **samples** is (2-8°C) Clinical samples must be received by ASPHL within 7 days of collection.	PCR	None	3 days

Organism	Specimen	Transport Conditions	Test Method	Comments	Turn Around Time (TAT) Business Days
Ebola virus	**Acceptable clinical samples**: whole blood in EDTA, serum, plasma, and urine[2]	The acceptable temperature range for clinical **samples** is (2-8°C) Clinical samples must be received by ASPHL within 7 days of collection.	PCR	[2]Urine should not be the sole specimen tested. If a urine specimen from a patient is tested, it should be tested alongside a blood specimen.	3 days
Francisella tularensis	Recovered isolates from clinical specimens **Acceptable clinical samples:** whole blood in EDTA, and sputum **Acceptable Autopsy specimens**: abscess material, biopsy of lymph node, lung, liver, spleen. **Acceptable animal samples include:** aspirates, necropsy specimens: abscess material, biopsy of lymph node, lung, liver, spleen, bone marrow scrapings	The acceptable temperature range for **isolates** is (2-25°C) The acceptable temperature range for clinical **samples** is (2-8°C) Clinical samples must be received by ASPHL within 7 days of collection.	PCR, Culture	None	7 days
Marburg virus	Acceptable clinical samples: whole blood in EDTA	The acceptable temperature range for clinical samples is (2-8°C) Clinical sample must be received by ASPHL within 7 days of collection.	PCR	None	3 days

Organism	Specimen	Transport Conditions	Test Method	Comments	Turn Around Time (TAT) Business Days
Orthopoxvirus	**Acceptable clinical samples**: Synthetic swabs of lesion, vesicular material, crust, or scab from the roof of a vesicle, or fresh tissue biopsy.	The acceptable temperature range for clinical samples is (2-8°C)	PCR	Submit dry swabs, biopsy tissue, and scabs. A dry, synthetic swab is preferred. Do not use cotton swabs.	3 days
Yersinia pestis	Recovered isolates from clinical specimens **Acceptable samples**: whole blood in EDTA and sputum. **Acceptable Autopsy specimens**: abscess material, a biopsy of lymph node, lung, liver, spleen, and bone marrow scrapings. ◦Autopsy specimens: abscess material or sections of lymph node, lung, liver, spleen. **Acceptable animal samples**: aspirates, necropsy specimens: abscess material, biopsy of lymph node, lung, liver, spleen, bone marrow scrapings.	The acceptable temperature range for isolates is (2-25°C) The acceptable temperature range for clinical samples is (2-8°C) Clinical samples must be received by ASPHL within 7 days of collection.	PCR, Culture	None	7 days

For questions regarding sample submission, turnaround times, or reporting mechanisms please contact the Bioemergency Detection and Response laboratory section at (602) 364-0999.

When a select agent is identified by ASPHL, the submitting laboratory will be contacted by ASPHL with the information regarding the need to fill out and submit the sections C and D of the APHIS/CDC Form 4A to CDC. A complete list of Select Agents can be found on the following website: http://www.selectagents.gov/SelectAgentsandToxinsList.html

Respiratory (e.g. nasopharyngeal swabs) and gastrointestinal (e.g. stool) specimens may be submitted to the Laboratory Response Network Biological (LRN-B) department at ASPHL and routed for additional BioFire PCR panel testing after select agents have been ruled out.

LRN Specimen Collection and Transport Guidelines

***Bacillus anthracis* Specimens**

- Whole blood
  - Collect blood in EDTA (lavender) tube.
  - Maintain at 2-8℃ for storage
  - Ship in refrigerated conditions (acceptable temperature range is (2-8°C)
  - Collect specimens prior to antimicrobial therapy, if possible.
- Cutaneous - Vesicular (early) stage
  - Unroof vesicle and aspirate fluid or collect with two sterile swabs (dacron).
- Cutaneous - Eschar (late) stage
  - Insert swab (dacron) beneath the edge of the eschar, rotate the swab or obtain an aspirate.
  - Ship in refrigerated conditions (acceptable temperature range is (2-8°C).
- Inhalational
  - Collect expectorated sputum into a sterile transport cup or collect during a bronchoscopy procedure.
  - Collect blood in EDTA (lavender) tube
  - Ship in refrigerated conditions (acceptable temperature range is (2-8°C)

***Brucella spp.* Specimens**

- Whole blood
  - Collect blood in EDTA (lavender) tube.
  - Maintain at 2-8℃ for storage and shipping.
  - Collect specimens prior to antimicrobial therapy, if possible.
- Serum
  - Collect at least 1 ml without anticoagulants.
  - Maintain at 2-8℃ for storage and shipping Ship in refrigerated conditions (acceptable temperature range is (2-8°C)
  - Acute specimens are collected as soon as possible after onset of disease.
  - Convalescent-phase should be collected >14 days after the acute specimen.

***Burkholderia mallei* and *Burkholderia pseudomallei* Specimens**

- Whole blood
  - Collect blood in EDTA (lavender) tube.
  - Ship in refrigerated conditions (acceptable temperature range is (2-8°C)
  - Collect specimens prior to antimicrobial therapy, if possible.
- Sputum
  - Collect the expectorated specimen into a sterile transport cup or collect during a bronchoscopy procedure.
  - Transport at room temperature up to 2 h.

- If it is known that material will be transported from 2-24 h after collection, then store and transport at 2-8°C.
- Saliva is not acceptable.

***Coxiella burnetti* Specimens**

- Whole blood
  - Collect blood in EDTA (lavender) tube.
  - Maintain at 2-8℃ for storage and shipping.
  - Ship in refrigerated conditions (acceptable temperature range is 2-8°C)
  - Collect specimens prior to antimicrobial therapy, if possible.

Ebola virus Specimens

- Whole blood
  - Collect blood in EDTA (lavender) tube.
  - Maintain at 2-8℃ for storage and shipping.
  - Ship in refrigerated conditions (acceptable temperature range is 2-8°C)
  - Collect specimens prior to antimicrobial therapy, if possible.

***Franciscella tularensis* Specimens**

- Whole blood
  - Collect blood in EDTA (lavender) tube.
  - Maintain at 2-8℃ for storage and shipping.
  - Ship in refrigerated conditions (acceptable temperature range is 2-8°C)
  - Collect specimens prior to antimicrobial therapy, if possible.
- Respiratory specimens (e.g. sputum, bronchial wash)
  - Collect in a sterile container.
  - Ship in refrigerated conditions (acceptable temperature range is 2-8°C)

Marburg virus Specimens

- Whole blood
  - Collect blood in EDTA (lavender) tube.
  - Maintain at 2-8℃ for storage and shipping.
  - Ship in refrigerated conditions (acceptable temperature range is 2-8°C)
  - Collect specimens prior to antimicrobial therapy, if possible.

***Orthopoxvirus* Specimens**

- Swab of lesion material
  - Collect 2 swabs from each lesion, preferably from different locations on the body or from lesions that differ in appearance.
    - Do not clean the lesion prior to swabbing.
  - Use sterile, dry synthetic swabs (i.e. polyester, nylon, Dacron)

        - Do not use cotton swabs.
    - Vigorously swab the surface of the lesion. It is not necessary to de-roof the lesion. If the lesion ruptures while swabbing, ensure that the swab collects lesion fluid.
    - Put each swab into a separate container by either step:
        - Break or cut off the end of the swab applicator into a 1.5- or 2-ml screw-capped tubes with an o-ring or other sterile leak-proof container.
        - Put the entire swab into a sterile container with a gasket seal.
    - Store refrigerated (2-8°C) or frozen (-20°C or lower) within 1 hour of collection.
    - Ship in refrigerated conditions (acceptable temperature range is 2-8°C)
- Vesicular material
    - Sanitize the patient's skin with an alcohol wipe and allow skin to dry.
    - Open the top of a vesicle or pustule with a scalpel.
    - Collect the skin of the vesicle top in a dry, sterile 1.5- to 2-mL screw-capped tube. Label the tube.
    - Scrape the base of the vesicle or pustule with the wooden end of an applicator stick or swab and smear the scrapings onto a sterile container.
    - Swab the base of the lesion with a synthetic swab, place in a screw-capped plastic vial, break off the applicator handle, and seal.
    - Repeat this procedure for 2 or more lesions.
- Lesion crust (scab) specimens
    - Sanitize the patient's skin with an alcohol wipe and allow skin to dry.
    - Use forceps to remove all or a piece of the crust at least 4mm x 4mm
    - Place each crust into dry, separate sterile screw-capped plastic tubes.
    - Wrap parafilm around the juncture of the cap and vial.
    - Label the tube.
- Biopsy lesions (At least 2 specimens obtained by using a 3.5- or 4-mm punch biopsy kit.)
    - Use sterile technique and appropriate anesthetic.
    - Place 1 sample in formalin for immunohistochemical or histopathologic evaluation and store at room temperature.
    - The second specimen should be placed dry (do not add transport medium) in a sterile 1.5- to 2-mL screw-capped container (do not add transport medium).
    - Refrigerate if shipment occurs within 24 hours; otherwise, the specimen should be frozen.
- Transport Media
    - Viral Transport Media (VTM): Acceptable for both presumptive testing at ASPHL and confirmatory testing by CDC

***Yersinia pestis* Specimens**

- Whole blood
  - Collect blood in EDTA (lavender) tube.
  - Maintain at 2-8℃ for storage and shipping.
  - Ship in refrigerated conditions (acceptable temperature range is 2-8°C)
  - Collect specimens prior to antimicrobial therapy, if possible.
- Lower respiratory tract
  - Ship in refrigerated conditions (acceptable temperature range is 2-8°C).
  - If it is known that material will be transported from 2-24 h after collection, then store and transport at 2-8°C.
- Sputum
  - Collect in a sterile container.
  - Transport at room temperature for immediate processing.
  - If processing of specimen is delayed beyond 2 hours, keep specimen chilled (2-8°C).