Pathogens that cause myocarditis may be distributed focally and sparsely in the heart, despite extensive inflammatory infiltrates in the involved tissues. Because myocarditis can occur in the context of systemic diseases (e.g. Rocky Mountain spotted fever or meningococcemia), or as a manifestation of a primary infection involving another organ system (e.g., influenza), collecting multiple representative portions of cardiac tissue, as well as tissue samples from any other organ system with inflammatory cell infiltrates or other findings suggestive of infection, ensures the best chance of detecting the causative agent. Performance of specific immunohistochemical, molecular, or other assays will be determined using clinical and epidemiologic information provided by the submitter and the histopathologic features identified in the submitted tissue specimens.

### Collection of Tissue Specimens

The preferred specimens include a minimum of 2 paraffin blocks of involved heart tissue, or representative tissues in formalin (i.e., wet tissue). Fresh-frozen tissue may also be submitted for culture and molecular-based assays. Specific guidelines for these samples include:

1. Multiple fragments of cardiac tissue representing each anatomic portion of the heart involved by inflammatory infiltrates (e.g., ventricles, epicardium, pericardium)
2. If myocarditis is identified in the context of a systemic illness, representative tissues should be included from any other organ showing significant microscopic pathology

### Submission of Specimens

**Paraffin-embedded tissue blocks**

In general, this is the preferred specimen and is especially important to submit in cases where tissues have been in formalin for a significant time. Prolonged fixation (>2 weeks) may interfere with some immunohistochemical and molecular diagnostic assays.

**Wet tissue**

If available, we highly recommend that unprocessed tissues in 10% neutral buffered formalin be submitted in addition to paraffin blocks.

**Unstained slides**

Although not optimal, if paraffin blocks are unavailable it may be possible to utilize unstained sections cut at 3–5 microns (10 slides per block) for immunohistochemistry and special stains but not molecular diagnostic assays (e.g. PCR).

**Fresh-frozen tissue**

Send separately on dry ice

**Electron Microscopy (EM) specimens**

Samples fixed in glutaraldehyde and held in phosphate buffer. Sample containers are filled to the top with phosphate buffer and sent on wet ice. Do not freeze. Epoxy-embedded tissues are also accepted.

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Please refer to our General Guidelines for Shipping Pathology Specimens (next page).
## General Guidelines for Shipping Pathology Specimens

### Packaging Guidelines

<table>
<thead>
<tr>
<th>Room Temperature</th>
<th>Refrigerated (frozen gel packs)</th>
<th>Frozen (dry ice) §</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Formalin-fixed wet tissues&lt;br&gt;• Formalin-fixed paraffin-embedded blocks *&lt;br&gt;• Glass slides with sections from paraffin-embedded blocks&lt;br&gt;• Glass slides with smears&lt;br&gt;• EM blocks / EM grids</td>
<td>• Fresh tissue&lt;br&gt;• Blood&lt;br&gt;• Wet tissue in EM fixative&lt;br&gt;• Stool for EM</td>
<td>• Fresh frozen tissue&lt;br&gt;• Serum&lt;br&gt;• Body fluids (BAL, CSF, urine)</td>
</tr>
</tbody>
</table>

* During the warmer months (June – August), it is advisable to ship the block(s) with a frozen gel ice-pack in order to prevent the melting of paraffin-embedded tissue blocks during transit.

§ When shipping frozen specimens from long distances or from international locations, it is best to use a combination of dry ice and frozen gel ice-packs. The gel ice-packs will remain frozen for a day or two after the dry ice has dissipated.

### Shipping Guidelines

- All packages should be mailed for receipt by Friday.
- US Federal Holidays should be taken into consideration before mailing specimens.
- Exceptions can be made for urgent cases with prior approval.
- Please provide us the shipper’s package tracking number(s).
- Specific regulations for packaging, labeling, and shipping may be found at:
  - [http://www.cdc.gov/laboratory/specimenmanagement/shipping-packing.html](http://www.cdc.gov/laboratory/specimenmanagement/shipping-packing.html)
  - [http://www.cdc.gov/biosafety](http://www.cdc.gov/biosafety)
  - [http://www.iata.org/whatwedo/cargo/dangerous_goods/Pages/infectious_substances.aspx](http://www.iata.org/whatwedo/cargo/dangerous_goods/Pages/infectious_substances.aspx)

### Supporting Documentation

- Please include
  1. a cover letter outlining a brief clinical history, including relevant demographic / epidemiologic information
  2. a completed CDC Form 50.34
  3. a copy of (a) the autopsy report (preliminary or final) or (b) surgical pathology report
  4. copies of pertinent laboratory results (microbiology, hematology, serology, culture, and/or biochemical)
  5. images (clinical and/or gross autopsy photos)
- Include the full name, title, complete mailing address, e-mail address, and telephone and fax numbers of the submitter. This will be the person to whom the final pathology report is addressed.

>>> **Advance consultation is REQUIRED concerning the submission of all cases.** <<<

All specimens should be addressed to:

Infectious Diseases Pathology Branch (IDPB)<br>Centers for Disease Control and Prevention (CDC)<br>1600 Clifton Rd NE, MS G-32<br>Atlanta, GA 30329-4027

Phone: (404) 639-3133<br>Fax: (404) 639-3043<br>pathology@cdc.gov

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