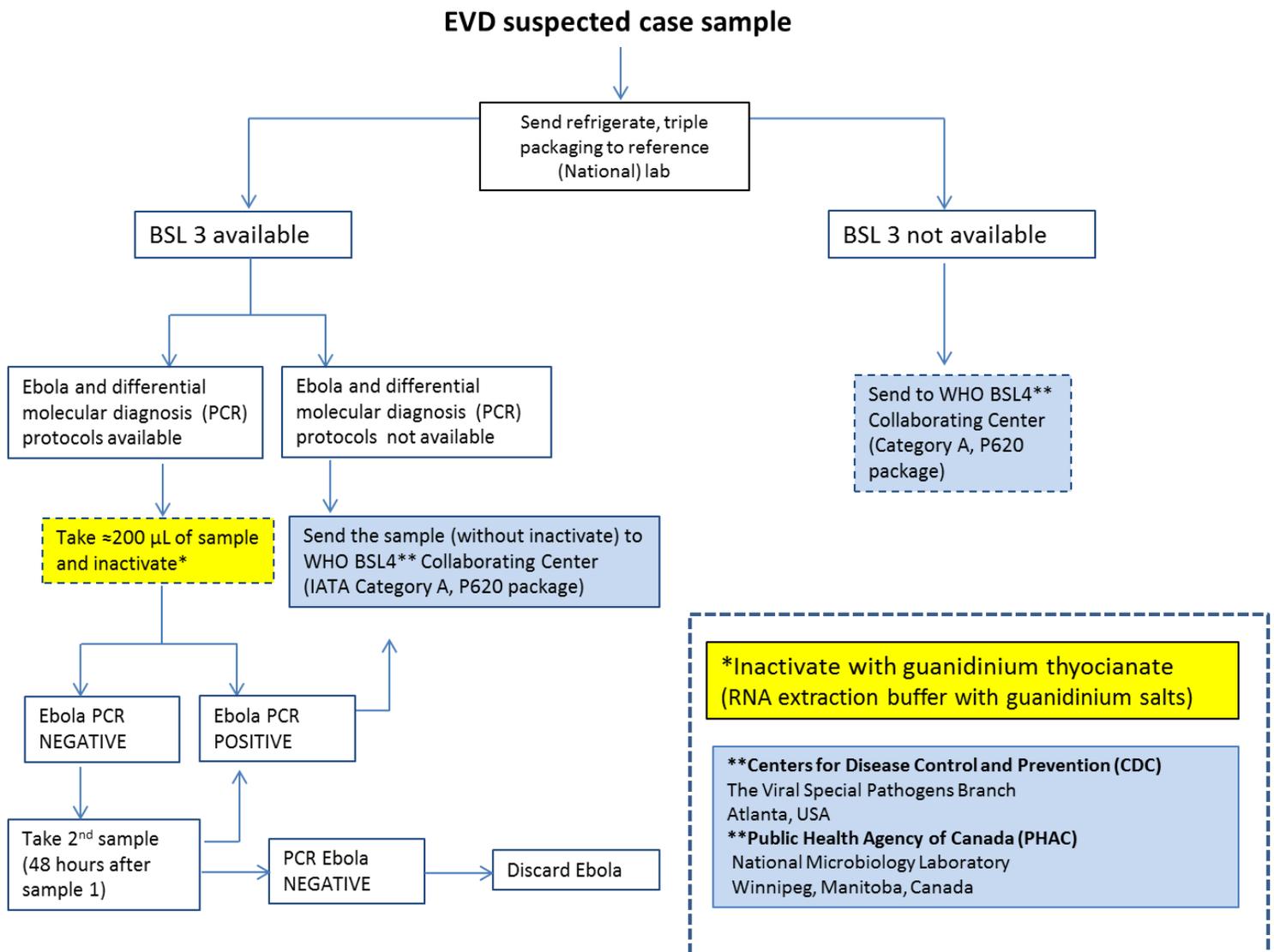


Algorithm for handling of samples from suspected Ebola Virus Disease (EVD)¹

Given that the initial manifestations of EVD can be very unspecific, the only way to establish the etiology of a suspected case will be through a laboratory test. However, it should be noted that Ebola viruses are classified as Risk Group 4 Pathogens, requiring Laboratory Biosafety Level 4-equivalent containment for viral isolation. Although on-site molecular tests may be performed **only if the virus has been inactivated in a BSL-3 facility**, final confirmation of the first cases should be performed in a WHO Collaborator Center (WHO CC). Therefore, countries where BSL-4 or BSL-3 facilities are not available should guarantee the shipping of the sample (IATA Category A) to a WHO CC.



¹ Both the algorithm and the recommendations made in this document can be subject to later modifications in accordance to the advances in the knowledge of the disease and the etiologic agent.

Sample selection, collection, and shipment

Type of sample:

- Viral detection is only possible in symptomatic patients. **Sample should not be taken from healthy contacts.**
- Once the symptoms have begun, viremia reaches its highest peak around day 6, and can be detected until (approximately) day 15. However, samples collected during days 1-2 after the onset of symptoms can be negative even in infected individuals. For this reason, a second sample should be taken with at least 48 hours of difference in order to increase the timeliness of the detection, according to the infection dynamic.
- The recommended sample for virological diagnostic is whole blood (5 ml, in plastic tube with EDTA is preferred); however serum or plasma can also be used for the diagnosis.
- The oral swab is recommended only for post-mortem cases or in situations where the blood sample is impossible to obtain. It should be collected in viral transportation universal media, and should be take only by trained personnel. The sensitivity of laboratory tests in this type of sample is low.
- The collection of the sample should be carried out only by trained personnel, guaranteeing the adequate use of all personal protective equipment. (See document: *Recommendations for safely collection and properly management of potentially infected samples with highly pathogenic agents*. PAHO/WHO 2014)

Conservation of the sample:

- The sample can be kept under refrigeration (2–8°C) for up to a week. However, shipping the sample to the reference lab during the first 48 hours after collection is recommended.
- DO NOT STORE BIOLOGICAL SAMPLES UNDER BSL2 CONDITIONS ANY LONGER THAN NECESSARY BEFORE SHIPMENT.

Shipment of the sample to the National Reference Laboratory and to the WHO CC:

- According to the algorithm, the samples should be sent to the National Reference Laboratory, ensuring triple packaging and all pertinent biosafety measures (see document: *Recommendations for proper packaging and shipping by land, of samples potentially infectious with highly pathogenic agents*. PAHO/WHO, 2014).
- For air transportation and shipment to the WHO CC, IATA recommendations for biological substances category A should be strictly fulfilled (see document: *Guidance on regulations for the transport of Infectious Substances 2013–2014*, WHO)
 - Triple packaging (certified box P620)
 - Certified shipper
 - Shipper's Dangerous Goods Declaration (DGD)

- Air waybill
- In addition, the refrigerated condition of the sample should be guaranteed. In cases where dry ice is used, proper cooler P954 box (Styrofoam box) should be used as well as the corresponding label (see document: *Guidance on regulations for the transport of Infectious Substances 2013–2014*, WHO)
- Before taking and sending the sample, the WHO CC should be contacted through the PAHO regional office. The WHO CC will not receive samples without previous authorization.
- For the shipment of samples to the WHO CC, an available transport company (Courier or civil airline. See document: *Electronic bulletin EB 2014/57 of the International Civil Aeronautic Organization*, ICAO 2014) should be guaranteed.
- Samples sent to the CC WHO should be sent without being inactivated. Only under special conditions where the transportation of Category A infectious substances is impossible to carry out (once all possibilities have been explored), can the shipment of an inactivated sample (category B or exempt) be considered, after consulting with the WHO CC and the PAHO regional office.
- WHO has an agreement with World Courier (WC) Switzerland to provide shipping services. Under this agreement, the costs incurred by the courier company will be covered by WHO and not by the sending country/laboratory.

Reference documents

- Recommendations for safely collection and properly management of potentially infected samples with highly pathogenic agents; 2014
http://www.paho.org/hq/index.php?option=com_docman&task=doc_download&Itemid=&gid=27683&lang=en
- Recommendations for proper packaging and shipping by land, of samples potentially infectious with highly pathogenic agents; 2014
http://www.paho.org/hq/index.php?option=com_docman&task=doc_download&Itemid=270&gid=27681&lang=en
- Interim guidance for specimen collection, transport, testing and submission for patients with suspected infection with Ebola Virus Disease. Centers for Disease Control and Prevention. USA, 2014
<http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html>
- Guidance on regulations for the Transport of Infectious Substances 2013–2014; 2012
http://www.paho.org/hq/index.php?option=com_docman&task=doc_download&Itemid=270&gid=26979&lang=en
- Electronic bulletin EB 2014/57 of the International Civil Aeronautic Organization, ICAO 2014
http://www.phls.gov.bt/recent_reports/ebola/SLEB_2014_057_FULL_EN-EDENPROD-%23526093-v1.pdf