Laboratory testing in patients with suspected or confirmed mpox*

Part 1: Blood tests (for example urgent microbiology, haematology, and biochemical tests).

All clinical laboratories in acute healthcare settings must plan for safe provision of essential and urgent laboratory services to patients in whom mpox (Clade I or II) is suspected on a 24/7 basis. This requires advance assessment of associated risks in the facility and planning how those risks are managed in the laboratory.

- Clinical specimens from patients with suspected mpox can be packaged and transported as a CATEGORY B pathogen in accordance with local standard protocols and in line with HSE guidance for UN3373 category B samples (see figure, page 4)
- Essential urgent blood tests sent to the microbiology, haematology or biochemistry laboratory can be performed at Containment Level (CL)-2 level by trained staff following good laboratory practice including the use of appropriate PPE (gloves, laboratory coat +/- eye protection subject to risk assessment).
- Testing that is performed entirely on closed autoanalysers from patients with suspected or confirmed mpox virus can be performed according to standard laboratory procedures at CL-2 level[#]
- Where use of a centrifuge is needed, safety cups or sealed rotors should be used. Following centrifugation, the sealed bucket should be placed in a microbiological safety cabinet for 10 minutes and the user should open it carefully following good laboratory practice including use of appropriate PPE.
- As MPXV is an Hazard Group 3 pathogen, any diagnostic testing performed on specimens from patients with suspected mpox by methods where there is a risk of generating aerosols, droplets or splashes, must be performed within a microbiological safety cabinet at CL-3, using appropriate PPE. This includes nucleic acid extraction from cutaneous swabs or other sample types prior to virus inactivation (e.g. molecular testing for pathogens such as HSV, VZV, *Chlamydia trachomatis*, *Neisseria gonorrhoeae* or *T. pallidum*) unless the sample transport medium already includes lysis buffer validated for the inactivation of MPXV

- Microbiological samples requiring manual manipulation from probable or confirmed mpox cases, e.g. plating of swabs for culture, urine antigen testing, or manual manipulation of body fluids should be carried out in a microbiological safety cabinet at CL-3 level[2]. Microbiological samples from individuals not meeting the case definition for probable or confirmed mpox can be processed at CL-2 level subject to local risk assessment

[#] *If samples require aliquoting into a secondary tube prior to loading onto the analyser, this manipulation should be carried out in a safety cabinet at CL-3 level*

- Any manipulation of samples which would be regarded as aerosol-generating procedures should be performed in a CL-3 facility.
- Due to the potential risk for the generation of aerosols, splashes and/or droplets, the use of Point-of-Care/Near Patient Testing devices for the analysis of samples from patients with probable or confirmed mpox should be avoided unless a specific risk assessment can demonstrate that it can be undertaken safely, with appropriate PPE used, and the device/area can be adequately decontaminated[2]

** Formerly known as Monkeypox*

Part 2: Testing for mpox, specimen handling, packaging and transport

Mpox testing should be carried out if the HPSC case definition is met. There are currently two clades of monkeypox virus (MPXV) causing outbreaks globally. MPXV is categorised as an Hazard Group (HG) 3 organism. However, samples can be handled as Category B for transport and laboratory processing of both clades[1]. It is noteworthy that the case definitions and clinical management of the two clades differ, however, with Clade I still categorised as a High Consequence Infectious Disease (HCID).

The case definition for MPXV Clade I and Clade II can be found here: Case Definition - Health Protection Surveillance Centre (hpsc.ie)

Where Clade I MPXV is suspected, clinicians are encouraged to contact local infection services (Clinical Microbiology/Infectious Diseases), and, for adult patients, the case should be discussed with the on-call Infectious Diseases consultant at National High

Level Isolation Unit in the Mater Hospital, Dublin. For Paediatric patients, contact should be made with the Paediatrics Infectious Diseases team at Children's Health Ireland (CHI). The National Virus Reference Laboratory (NVRL) should be notified in advance if testing for Clade I MPXV is indicated.

Sampling for mpox: hospital-based setting

1. If testing for mpox is indicated, ensure that the specimen is collected with adherence to good infection prevention and control (IPC) practice including appropriate hand hygiene and use of PPE
2. The recommended sample of choice is one standard viral swab in viral transport medium (VTM) taken from a mucosal or cutaneous lesion: either ulcer or vesicular fluid if present.
3. If there are concerns that patient is presenting during the prodromal stage and there are no cutaneous lesions, or if pharyngeal lesions are present, a viral throat swab may be collected under the advice of an infection specialist
4. Follow-up samples from confirmed mpox cases are not required. If there are exceptional circumstances where follow up testing is considered discuss in advance with the NVRL
5. Clearly label the anatomical site of sample collection
6. Provide locally agreed patient identifiers on the request form: full name (or initials, in line with local clinical practice); date of birth; medical record number; and the name of the requesting clinician
7. Double bag the sample at the point of collection in the clinic setting
8. The referring clinician should inform the local microbiology laboratory if samples from probable mpox cases are being submitted for investigation
9. The double bagged sample should be taken to the microbiology laboratory in person and not via the pod/chute/pneumatic system. The bag should be clearly labelled as samples collected from a suspected mpox case.

*Sampling for mpox: other clinical settings**

1. Perform a clinical assessment and sampling as outlined in steps 1 to 6 above, including a **test for mpox** using one standard viral swab in *viral transport*

medium (VTM).

2. Package sample in line with **UN3373 Category B** sampling, the full HSE guidance on Preparation for transport of specimens and other biological materials is available here.
3. The summary requirements within the guidance are shown below.

** If testing is undertaken in non-hospital settings, mechanisms for transportation can be discussed with the local public health team*

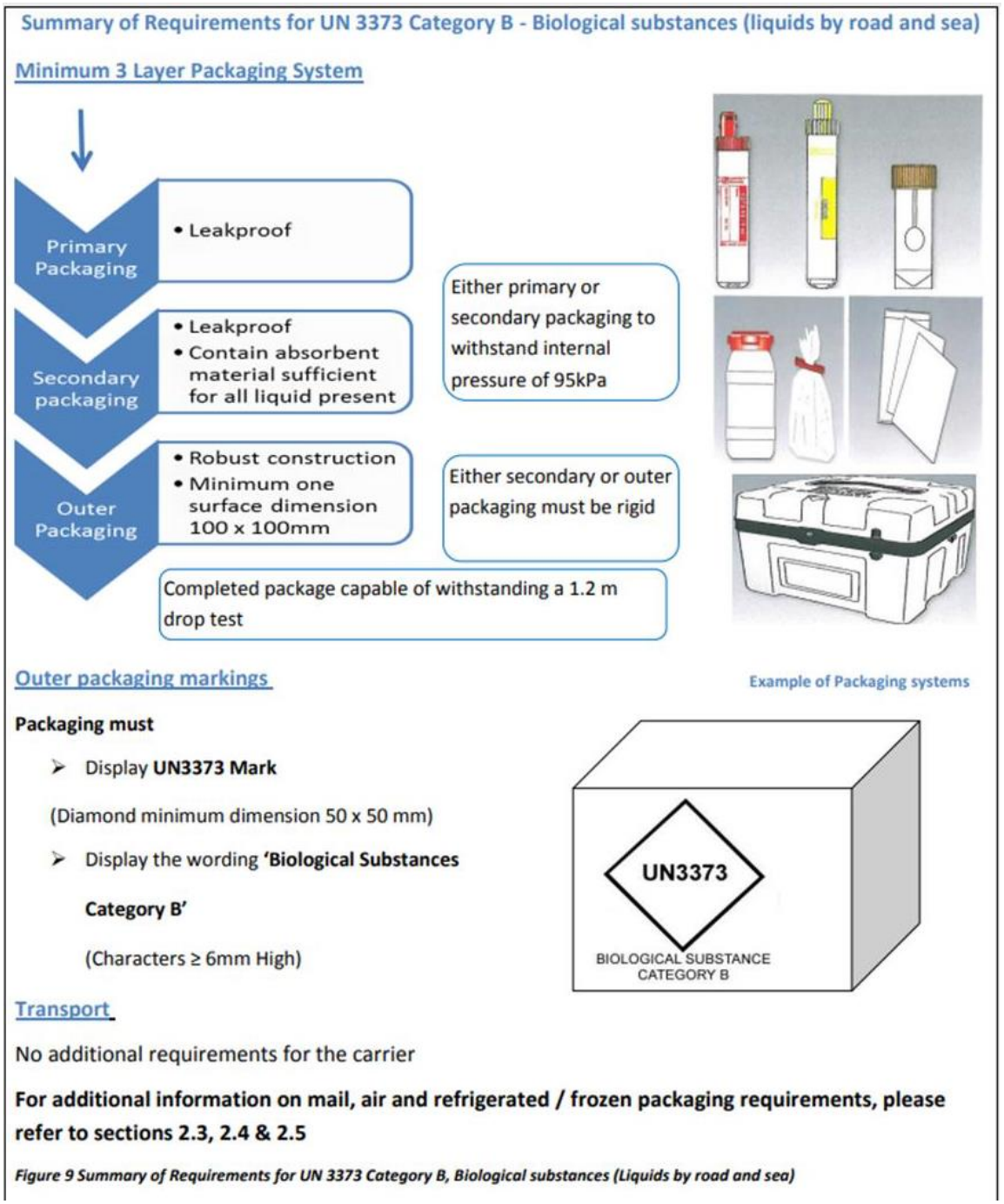

Figure 9 Summary of Requirements for UN 3373 Category B, Biological substances (Liquids by road and sea)

Local Microbiology Laboratory

- Samples from patients with suspected mpox can be packaged and transported as a CATEGORY B pathogen in accordance with local standard protocols.
- Samples should be clearly marked as probable mpox.
- Any sample taken for mpox investigations should be packaged separately to samples being sent to NVRL for other investigations.
- The courier should be informed as to which package contains sample(s) for mpox investigations in order to alert reception on arrival to the NVRL.
- All other sample types collected from suspected mpox cases that are deemed clinically necessary, should also be clearly marked as “probable mpox” and managed through the local laboratory (as section 1 above).

Mpox testing at the NVRL

- The sample will be inactivated in CL-3 conditions, prior to testing by real-time polymerase chain reaction (PCR) for the presence of Orthopoxvirus DNA, and, concurrently, for MPXV Clade differentiation[#]
- Samples will be tested concurrently for the presence of VZV, HSV-1 and HSV-2 DNA.
- In addition to routine reporting arrangements and notification requirements under public health legislation, positive mpox results will be communicated by telephone to the referring microbiology laboratory
- When NVRL diagnoses a Clade I MPXV case, they will notify the local MOH (in and out of hours) by phone (immediate preliminary notification) and the referring clinician/laboratory. This is followed by confirmation in writing via email. The Local MOH will notify National Health Protection (in hours and out of hours) by phone as soon as notified by NVRL. This is followed by confirmation in writing via email. In this early phase of the response, NVRL will also notify the local MOH (in and out of hours) by phone of the results of tests undertaken in highly suspected/probable Clade I MPXV cases, when MPXV is *Not Detected*.

[#] Unless prior discussion indicates a probable MPXV Clade I case, samples returning an "Orthopoxvirus DNA DETECTED" result will undergo clade differentiation concurrently with a MPXV Clade II-specific PCR. Samples returning a negative MPXV Clade II-specific PCR result will be tested for the presence of MPXV Clade I DNA.

References

1. https://www.hsa.ie/eng/your_industry/adr_-_carriage_of_dangerous_goods_by_road/information_guidance/class_6_2_infectious_substances/9789240089525-eng.pdf
2. UKHSA Mpox (monkeypox): diagnostic testing. https://www.gov.uk/guidance/monkeypox-diagnostic-testing#:~:text=Mpox%20is%20diagnosed%20by%20PCR,or%20more%20vesicles%20or%20ulcers. Accessed 29/08/24