



Feidhmeannacht na Seirbhíse Sláinte  
Health Service Executive



# Biosafety guidance for diagnostic laboratories handling specimens from individuals with possible, probable or confirmed infection with Middle East respiratory syndrome coronavirus or avian influenza A (H7N9)

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## Background

Middle East respiratory syndrome coronavirus (MERS-CoV), which is genetically distinct from the SARS coronavirus, has caused a number of infections in humans. To date cases have been mainly associated with the Middle East\* but a small number of imported cases have occurred in European countries. Laboratory-acquired infection with MERS-CoV has not been reported to date. A small number of cases of laboratory-acquired infection with SARS coronavirus have been previously described, but only in the setting of laboratories involved in propagation of the virus.

A number of human cases of avian influenza A (H7N9) have been reported from China. To date, sustained human-to-human transmission of the virus has not been described, and no case of laboratory-acquired infection has been reported. Cases of laboratory-acquired infection with influenza have been only rarely reported.

The following guidance summarises current recommendations from the World Health Organization (WHO) and are based on the WHO Laboratory Biosafety Manual (3<sup>rd</sup> Edition), available at: [http://www.who.int/csr/resources/publications/biosafety/WHO\\_CDS\\_CSR\\_LYO\\_2004\\_11/en/](http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_CSR_LYO_2004_11/en/)

**Note: the following guidance relates to laboratory procedures in primary diagnostic laboratories and does not address biosafety requirements for viral isolation or work with animals infected with MERS-CoV or avian influenza A (H7N9)**

\* Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestinian territories, Oman, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen.

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## Recommendations for routine laboratory procedures

Diagnostic laboratory work and PCR analysis on clinical specimens from patients who are suspected or confirmed to be infected with MERS-CoV or avian influenza A(H7N9) virus causing human disease should be conducted adopting practices and procedures described for basic laboratory — Biosafety Level 2 (BSL-2) (as detailed in the WHO Laboratory Biosafety Manual (3<sup>rd</sup> Edition))

### **The following activities may be performed in BSL-2 facilities using standard BSL-2 work practices:**

- Diagnostic testing of serum, blood (including haematology and clinical chemistry), respiratory tract specimens, or other specimens
- Manipulations involving neutralized or inactivated (lysed, fixed, or otherwise treated) virus particles and/or incomplete, non-infectious portions of the viral genome
- Pathologic examination and processing of formalin-fixed or otherwise inactivated tissues
- Molecular analysis of extracted nucleic acid preparations
- Electron microscopic studies with glutaraldehyde-fixed grids
- Routine examination of bacterial and fungal cultures
- Routine staining and microscopic analysis of fixed smears
- Final packaging of specimens for transport to diagnostic laboratories for additional testing. Specimens should already be in a sealed, decontaminated primary container

### **The following activities involving manipulation of potentially infected specimens should be performed as above and in a Class II biological safety cabinet (BSC):**

- Aliquoting and/or diluting potentially infectious specimens
- Inoculating bacterial or fungal culture media
- Performing diagnostic tests that do not involve propagation of viral agents in vitro or in vivo
- Nucleic acid extraction procedures involving potentially infected specimens
- Preparation and chemical-or heat-fixing of smears for microscopic analysis

### **When handling and processing specimens, the following good laboratory techniques should be followed:**

- No eating, drinking, smoking, applying cosmetics, or handling contact lenses in any laboratory working areas
- Wear appropriate PPE
- Perform all technical procedures in a way that minimizes the formation of aerosols and droplets
- Perform all manipulations of potentially infectious materials, including those that may cause splashes, droplets, or aerosols of infectious materials (e.g. loading and unloading of sealed centrifuge cups, grinding, blending, vigorous shaking or mixing, sonic disruption, opening of containers of infectious materials whose internal pressure may be different from the ambient pressure) in appropriately maintained and validated Class II biological safety cabinet (BSC)
- Minimize the use of hypodermic needles and syringes. Always collect contaminated sharps in puncture-proof containers fitted with covers, and treat them as infectious waste

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- Never mouth pipette
- Use adequate biohazard containers for appropriate disposal of contaminated materials and locate these in the immediate working area
- Decontaminate work surfaces and equipment after any spill of potentially infectious material and at the end of the work being performed
  - Use disinfectants with proven activity against enveloped viruses (e.g. chlorine, alcohol, peroxygen, quaternary ammonium compounds and phenolic compounds) according to manufacturer's recommendations
- Collect contaminated sharps in puncture-proof containers fitted with covers and treat them as infectious waste
- Handle, transport and dispose of infectious laboratory waste according to Department of Health Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste (available from <http://www.lenus.ie/hse/handle/10147/120929>)
- Immediately report any symptoms of infection to the laboratory management and Occupational Health service
- Immediately report incidents or accidents involving potential or actual exposure to MERS-CoV or avian influenza A (H7N9) virus and appropriately decontaminate any affected area or equipment. Following an exposure, seek medical advice as soon as possible.
- Wash your hands often – especially after handling infectious materials and animals, before leaving the laboratory working areas, and before eating
- Remove PPE before leaving the laboratory

If procedures on potentially infectious material cannot be conducted within a BSC, use an appropriate combination of PPE (including respiratory and eye protection) and physical containment devices (e.g. centrifuge safety cups or sealed rotors).

## Shipping Requirements

Comply with applicable national regulations for the Transport of dangerous Goods by Road (available from [www.hsa.ie](http://www.hsa.ie))

- Specimens suspected or confirmed of containing avian influenza A(H7N9) virus or MERS-CoV can safely be shipped as biological substance, Category B
- Cultures of avian influenza A(H7N9) virus or MERS-CoV causing human disease are recommended to be shipped as Category A