



ECDC TECHNICAL DOCUMENT

Guidance for healthcare workers on the use of personal protective equipment in the management of bubonic and pneumonic plague patients

27 October 2017

Bubonic plague

Bubonic plague is typically caused by the bite of an infected flea, by contact with infected human/animal body fluids, or by touching or skinning infected animals [1]. Transmission by these routes can result in primary bubonic plague or in septicaemic plague [1].

Healthcare workers (HCW) can become infected during the management of an infected patient or during sample collection (e.g. collection of pus samples from swollen lymph nodes or buboes) [2].

Pneumonic plague

Pneumonic plague can be transmitted via infected respiratory droplets from infected humans or animals [3] [4], or through contact with infected human/animal body fluids [5]. It can also be transmitted by contact with bed linen/clothing contaminated with body fluids of an infected patient [5]. Human-to-human transmission by infected respiratory droplets can occur over a close distance, usually defined as less than two metres.

Healthcare workers can become infected during the management of an infected patient or during sample collection (e.g. collection of sputum samples) [6].

Personal protective equipment for the management of possible, probable and confirmed cases of plague

Healthcare workers should be informed and trained on procedures and approaches to prevent and control infection. They should dispose of, disinfect or decontaminate all personal protective equipment (PPE) (disposable or not) used for the management of a plague patient according to the procedures for waste management [7]. They should also wash their hands frequently, particularly before putting on and after removing the PPE.

Bubonic plague

In line with the national and international infection prevention and control recommendations, HCW should wear the following PPE when managing or caring for a patient with possible, probable or confirmed bubonic plague:

- gloves
- long-sleeved gown with tight cuffs (single use/disposable preferable)
- eye protection (face shield or goggles)
- respiratory protection (surgical mask).

The interim guidance on 'How to safely collect pus samples from buboes of patients suspected to be infected with bubonic plague' [2] should be followed for the specimens' collection in case of suspected cases of bubonic plague.

Pneumonic plague

Healthcare workers should apply standard hygiene procedures for the management of the patient. They should isolate the patient [8] [9] and follow Body Substance Isolation (BSI) precautions [10] [11]. If isolation is not possible, they should ensure a separation of at least two metres between patients, and a dedicated bathroom for the infected patient.

Health authorities should consider chemoprophylaxis for HCW in direct contact with pneumonic plague patients [9]. Due to the transmission route by droplets, these procedures should be continued for 48 hours after initiation of effective treatment [12].

In line with the national and international infection prevention and control recommendations, HCW should wear the following PPE when managing or caring for a patient with possible, probable or confirmed pneumonic plague:

- gloves
- long-sleeved gown with tight cuffs (single use/disposable preferable)
- eye protection (face shield or goggles)
- respiratory protection (FFP3 filter mask or N-95 particulate).

The patient should wear a surgical mask if it is necessary to move him/her around the hospital; HCW should inform the patient about cough etiquette and respiratory hygiene. They should also follow the interim guidance on 'How to safely collect sputum samples from patients suspected to be infected with pneumonic plague' [6] for the specimens' collection in case of suspected cases of pneumonic plague.

Biosafety for the management of specimens

All the samples collected for routine testing and cultures should be handled in Biosafety Level 2 (BSL-2) laboratories. Large-scale cultures and activities with high potential for droplet or aerosol production (centrifuging, grinding, etc.) require Biosafety Level 3 (BSL-3) conditions [13] [8].

Disclaimer

ECDC issued this guidance document in accordance with Regulation (EC) No 853/2004 establishing a European centre for disease prevention and control. In the framework of ECDC's mandate, the specific purpose of an ECDC guidance is to present different options on a certain matter. The responsibility on the choice of which option to pursue and which actions to take, including the adoption of mandatory rules or guidelines, lies exclusively with the EU/EEA Member States. In its activities, ECDC strives to ensure its independence, high scientific quality, transparency and efficiency.

References

1. Centers for Disease Prevention and Control. Plague Home: Ecology and Transmission [updated 2015 Sept 14; cited 2017 Oct 19]. Available from: <https://www.cdc.gov/plague/transmission/index.html>.
2. World Health Organization. How to safely collect pus samples from buboes of patients suspected to be infected with bubonic plague 2016 [cited 2017 Oct 19]. Available from: <http://www.who.int/csr/disease/plague/collecting-pus-samples.PDF?ua=1>.
3. Inglesby TV, Dennis DT, Henderson DA, Bartlett JG, Ascher MS, Eitzen E, et al. Plague as a biological weapon: medical and public health management. Working Group on Civilian Biodefense. JAMA. 2000 May 03;283(17):2281-90.
4. Centers for Disease Prevention and Control - National Center for Emerging and Zoonotic Infectious Diseases - Division of Vector-Borne Diseases - Bacterial Diseases Branch. Protect yourself from plague [cited 2017 Oct 19]. Available from: https://www.cdc.gov/plague/resources/235098_plaquefactsheet_508.pdf.
5. Public Health Agency of Canada. The Plague [updated 2017 Oct 16; cited 2017 Oct 19]. Available from: <https://www.canada.ca/en/public-health/services/chronic-diseases/plague.html>.
6. World Health Organization. How to safely collect sputum samples from patients suspected to be infected with pneumonic plague 2016 [cited 2017 Oct 19]. Available from: <http://www.who.int/csr/disease/plague/collecting-sputum-samples.PDF?ua=1>.
7. European Centre for Disease Prevention and Control. Safe use of personal protective equipment in the treatment of infectious diseases of high consequence - A tutorial for trainers in healthcare settings 2014 [cited 2017 Oct 20]. 2:[Available from: <https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/safe-use-of-ppe.pdf>.
8. Stewart CE. Weapons of mass casualties and terrorism response handbook: Jones & Bartlett Learning; 2006.
9. World Health Organisation. Plague. Fact sheet (updated October 2017) 2017 [updated 2017 Oct; cited 2017 Oct 19]. Available from: <http://www.who.int/mediacentre/factsheets/fs267/en/>.
10. Delaware health and social services - Division of Public Health - Emergency Medical Services. Plague [updated 2007 May; cited 2017 Oct 19]. Available from: <http://dhss.delaware.gov/dph/files/plaqueems.pdf>.
11. Jane D. Siegel MD, Emily Rhinehart RN MPH CIC, Marguerite Jackson PhD, Linda Chiarello RN MS, the Healthcare Infection Control Practices Advisory Committee. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007 [cited 2017 Oct 19]. Available from: <https://www.cdc.gov/infectioncontrol/pdf/guidelines/isolation-guidelines.pdf>.
12. Ontario Public Health Standards. Infectious Diseases Protocol, Appendix A: Disease-Specific Chapters [updated 2014 Dec; cited 2017 Oct 19]. Available from: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/plague_chapter.pdf.
13. US Department of Health and Human Services. Biosafety in Microbiological and Biomedical Laboratories 2009 [cited 2017 Oct 25]. Available from: <https://www.cdc.gov/biosafety/publications/bmbL5/BMBL.pdf>.