



ECDC TECHNICAL DOCUMENT

Guidance for the management of suspected pneumonic plague cases identified on aircraft and ships

27/10/2017

Key messages

- Pneumonic plague is transmitted between humans most often by inhaling infected respiratory droplets. The transmission happens at close distance (usually defined as less than two metres) and only symptomatic patients are infectious.
- The infection can cause severe disease in humans but can be successfully treated with antibiotics, especially if antibiotic treatment is initiated early.
- A case of pneumonic plague can be suspected on aircraft or ships when a traveller (passenger or a crewmember) leaving an affected area has fever associated with persistent coughing and/or impaired breathing.
- The training of crewmembers and the increase in their awareness should reduce the risk of transmission on-board.
- A surgical mask and standard infection control precautions can be used to effectively reduce the spread of droplets from a suspected patient, if isolation measures are not possible.
- A surgical mask can be used to protect travellers (passengers and crewmembers) from infection by a suspected pneumonic plague case.
- Local authorities of the arrival airport/mooring port of call should be kept informed immediately after the identification of a suspected case of pneumonic plague on-board, in order to plan for mitigating the risks of further spread.
- All passengers should be advised about self-monitoring of plague compatible symptoms in case of an on-board event; collection of passenger contact details is crucial for further contact tracing.
- Early post-exposure prophylaxis should be considered for passengers and crewmembers who came into close contact with the ill passenger.
- After disembarkation, disinfection measures should be considered which comply with relevant national and international recommendations.

Pneumonic plague

What is pneumonic plague?

Plague is a bacterial zoonotic disease caused by the Gram-negative bacterium *Yersinia pestis*. Pneumonic plague is one of three clinical presentations of plague; other clinical presentations are bubonic and septicaemic plague. Pneumonic plague is transmitted between humans, most often by inhaling infected respiratory droplets; it may also develop from untreated bubonic or septicaemic plague after the bacteria spread to the lungs [1]. The infection can cause a severe disease in humans but can be successfully treated with antibiotics, especially if early treatment is instituted.

More information can be found in the ECDC and World Health Organization (WHO) factsheets about plague and in the previous risk assessment 'Rapid risk assessment: Outbreak of plague in Madagascar, 9 October 2017' [2-4].

When is a patient infectious?

There are no reported cases of transmission before the onset of symptoms. After the onset of symptoms, a patient remains infectious during the symptomatic period, which is mainly characterised by fever, headache, weakness, breathing difficulties and coughing [1]. The incubation period for plague ranges from one to seven days.

Identification of suspected pneumonic plague case on aircraft and ships

A case of pneumonic plague is suspected when a traveller (passenger or a crewmember) leaving an affected area has fever associated with persistent coughing and/or impaired breathing.

Options for management of suspected cases identified on an aircraft

The transmission of pneumonic plague between humans by infected respiratory droplets happens at a close distance, usually defined as less than two metres [5]. There is no evidence that recirculation of cabin air facilitates the transmission of infectious agents on an aircraft [6].

In the event of a suspected pneumonic plague case on an airplane en route, the application of the following measures can reduce the risk of transmission.

During the flight

- In accordance with International Air Transport Association (IATA) guidelines, after a traveller manifests the symptoms of pneumonic plague, the captain needs to be notified of the situation as soon as possible by the cabin crewmembers, as required by the International Health Regulations [7,8]. The captain will inform air traffic control and the destination airport about the suspected case so that cleaning and disinfection procedures that may be needed by local authorities [8] can be activated as well as an ambulance to transport the patient to the referral hospital [9]. Also, the pilot needs to be advised of where to park the aircraft [9].
- Advice for medical support from the ground (if available) should be considered immediately after the identification of a suspected pneumonic plague case [10].
- A surgical mask (included in the Universal Precaution Kit) [11] should be provided to the ill passenger in order to reduce the spread of droplets unless the traveller is unable to tolerate it. The passenger should be requested to wear the mask during the entire flight. The mask should be changed as soon as it becomes humid; used masks should be disposed of in a biohazard disposal waste bag only (see below). The passenger who is ill should be provided with tissues and a biohazard disposal waste bag (included in the Universal Precaution Kit) [11]. Tissues used by the unwell passenger should be disposed of in the biohazard bag only. If a biohazard disposal waste bag is not available, an airsickness bag marked as biohazard by crewmember can be used instead.
- If there is free space on the aircraft, it is suggested to relocate any adjacent passengers to other seats leaving a space of two metres between the ill passenger and any other passengers [8].
- If the relocation of adjacent passengers is not possible, any travellers sitting near (in a radius of less than two metres) the ill passenger should be provided with surgical masks [12].

- A cabin crewmember (preferably the one who has already been dealing with the ill traveller), should be designated to interact with him/her. The cabin crewmember should wear a surgical mask. Standard infection control precautions should be followed by the ill passenger and the crewmember assisting him/her. Hand hygiene should be practiced frequently by the ill passenger and the crewmember. Crewmembers should wear gloves if touching the ill passenger (or any object that may have been soiled by secretions from the passenger.) [8].
- A specific lavatory for the exclusive use of the ill traveller should be identified and appropriately signed on the door [8].
- All travellers accompanying the ill passenger should be asked if they have any similar symptoms [13].

On arrival

- On arrival, the ill passenger and his/her accompanying travellers should be disembarked before any other passenger and guided to a designated healthcare facility [14] (within or outside the airport).
- The hand baggage should be removed together with the ill passenger on disembarking [13]. Furthermore, a procedure needs to be in place for obtaining checked luggage [9].
- Before or immediately after disembarking, all passengers should be advised about self-monitoring of plague compatible symptoms and about the need to seek medical care in the event of any symptoms, being sure to inform the healthcare providers about the travel history. When possible, they should also be provided with an information leaflet [14].
- Before or immediately after disembarkation, a passenger locator card [15] should be filled in by all passengers who came into close contact with the ill passenger; a list of passengers and a list of crewmembers should be made available to public health authorities.
- Early post-exposure prophylaxis should be considered for passengers and crew who came into close contact (e.g. crew assisting the ill passenger and passenger sitting less than two metres) with the ill passenger [16].
- Arrangements for post-event disinfection and disinfection procedures for the aircraft and the ill passenger's belongings should be considered after disembarkation [17].

Options for management of suspected cases identified on ships

Before departure

- Pre-travel information about health issues related to the risk of plague in the areas of departure/stops should be provided by travel companies and travel agencies to customers, and by shipping companies to crewmembers.
- Awareness of the health issues of plague should be increased among crewmembers. Education about how to recognise signs and symptoms, route of exposure, reporting suspected cases to designated crew, and understanding measures to prevent the spread should reduce the risk of transmission on-board [18].

Suspected cases of pneumonic plague among passengers on ships departing from an affected area or on ships stopping in a port of an affected area are possible. The following measures can be applied in the event that a suspected case is identified on board.

During the navigation

- The ship's master should notify the local health authority at the first port of call if a suspected case of plague is identified on board [19].
- If available on board, medical staff should be notified immediately after the identification of a suspected pneumonic plague case; if not available, medical advice from doctors stationed in ports should be requested [19].
- The ill passenger should be isolated in his/her cabin or in the sickbay [19]; isolation measures should be put in place in order to avoid close contact with other passengers.
- When assisted by crewmembers/medical staff in his/her cabin and lavatory or in the sickbay, the passenger should wear a surgical mask. Used masks should be disposed of in a biohazard disposal waste bag, as should all the tissues used by the passenger. Bed linen and clothes used by the ill passenger should be disposed of in the same manner, or boiled for 10 minutes [19]. If a biohazard disposal waste bag is not available, a resistant plastic bag marked as biohazard can be used instead.
- Crewmembers assisting the ill passenger should wear a surgical mask.
- Standard infection control precautions should be followed by the ill passenger and the crewmember assisting him/her. Hand hygiene should be practiced frequently by the ill passenger and the crewmember. Crewmembers should wear gloves if touching the ill passenger (or any object that may have been soiled by secretions from the passenger e.g. mask, bed linen, clothes, etc).

- Checking the health condition of the passenger's close contacts (cabin mate, etc.) should be performed immediately after the identification of a suspected case on-board and for the duration of the incubation period (checking temperature twice a day and checking for persistent coughing and/or impaired breathing); early post-exposure prophylaxis should be considered for passengers and crewmembers who came into close contact with the ill passenger [16].
- Antibiotic treatment should be established immediately for the suspected case by medical staff onboard (if available) or medical advice from doctors stationed in ports should be requested; a stock of doxycycline is recommended by the WHO list of recommended Medicines and Equipment by the International Medical Guide for Ships 3rd edition 2007 [19].
- A medical log for the ill passenger should be established; a designated crewmember should be responsible for reviewing and updating the medical data.

On arrival

- At the first mooring port, after consultation with the local health authorities, the passenger should be sent to an onshore medical facility [19].
- The ill passenger should disembark together with his/her luggage and personal items without coming into contact with other travellers ideally from a separate area of the ship or at a separate time [19].
- All the travellers (passengers and crewmembers) who came into close contact with the ill passenger should be advised about the need to continue self-monitoring of plague compatible symptoms and seek medical care in the event of any symptoms for seven days after the last close contact with the ill passenger;
- Information on how to conduct the early post-exposure prophylaxis [16], if it was not completed onboard, should be provided for passengers and crewmembers who came into close contact with the ill passenger.
- Contact details of travellers who came into close contact with the ill passenger should be collected for further information before disembarkation.
- Health authorities of the mooring port of call should be informed if any support is needed before the ship arrives at the port.
- After passengers' disembarkation, disinfection of the cabin occupied by the ill passenger and/or the sickbay, and the proper waste disposal of all the biohazard materials should be performed complying with relevant national and international recommendations.

Disclaimer

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