# Virginia Department of Health
# Glanders: Overview for Healthcare Providers

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| **Organism** | • Caused by bacterium *Burkholderia mallei* (formerly *Pseudomonas mallei*)<br>• Primarily infects equids (horses, donkeys and mules), but can also infect other mammals, including humans<br>• Gram-negative coccobacilli |
| **Reporting to Public Health** | • Suspected or confirmed cases require immediate notification to the local health department (LHD). See http://www.vdh.virginia.gov/local-health-districts/ |
| **Infectious Dose** | • Undetermined, but presumed to be very low if aerosolized |
| **Occurrence** | • Sporadic reports in Asia, Africa, the Middle East, Central America and South America<br>• In the United States, there have been no naturally-occurring cases in humans since 1945; in 2000, one case occurred in a research laboratory worker |
| **Natural Reservoir** | • Primarily horses, donkeys, and mules |
| **Route of Infection** | • Direct contact with tissues or body fluids of infected animals with entry into the body through skin cuts or abrasions and through mucosal surfaces<br>• Indirect contact with contaminated fomites, food, soil, or water<br>• Inhalation of contaminated aerosols |
| **Communicability** | • Person-to-person transmission is rare and has not been reported in the United States |
| **Risk Factors** | • Exposure to animals in endemic areas (veterinarians, caretakers, abattoir workers, farmers)<br>• Working in a laboratory where the organism is handled |
| **Case-fatality Rate** | • Without treatment, there is a high case fatality rate (>90%) for septicemic and pulmonary forms.<br>• With treatment, ~20% for localized infection, ~40%-50% for pulmonary and septicemic forms, and up to ~50% for chronic infection. |
| **Incubation Period** | • Varies depending on route of infection: in general, 1–14 days; if inhaled, 10–14 days; if direct skin contact, 1–5 days. |
| **Clinical Description** | • Localized infection: Might be limited to nodules, abscesses, or ulcers in the skin or mucous membrane at site of entry. Enlarged lymph nodes might be present. Infections involving the eyes, nose or respiratory tract can have mucus production from affected area. Infections can disseminate to other locations (e.g., lungs, spleen, or liver) 1–4 weeks after infection and a papular or pustular rash might be present.<br>• Septicemia: Might occur at any point in illness and signs and symptoms might include fever, chills, myalgia, headache, chest pain, and enlarged lymph nodes. Multiple abscesses involving spleen, liver and lungs or granulomatous or necrotizing lesions in any organ might occur; jaundice, diarrhea or a generalized papular rash that progresses to a pustular rash might occur.<br>• Pulmonary infection: Might include cough, fever, dyspnea, mucopurulent discharge, pneumonia, pulmonary abscesses, pleural effusion or symptoms described for septicemia.<br>• Chronic infection: Might include multiple abscesses in the muscles and skin, or in other organs (lungs, liver, spleen). Weight loss and lymph node enlargement are usually present. Characterized by remissions and exacerbations and can persist for years. |
| **Differential Diagnosis** | • Variable depending on form |
| **Radiography** | • Chest x-ray might show lobar pneumonia, bronchopneumonia, or nodular densities; consolidation might be present |

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| **Specimen Collection and Laboratory Testing** | • Alert lab if glanders is suspected so that appropriate precautions are taken during testing<br>• Available tests include culture of clinical specimens (e.g., blood, urine, abscess material, sputum, tissue specimens) and PCR<br>• If glanders is suspected, notify LHD immediately to discuss the case. If VDH approves public health testing, specimens may be sent to Division of Consolidated Laboratory Services (DCLS).<br>• For questions about collecting specimens, contact the DCLS Emergency ~~Duty~~ Officer available 24/7 at (804) 335-4617. |
| **Treatment during a Public Health Emergency (uncomplicated cases)*** | • Ceftazidime [50 mg/kg /(up to 2 g) IV every 8 hours or 6 g/d by continuous infusion after a 2-g bolus. Duration is generally 10-14 days but might be longer]<br>• Following IV antibiotic treatment, prolonged (at least 12 weeks) oral antibiotic treatment is recommended to ensure complete eradication of organism.<br>• TMP-SMX (agent of first choice)<br>Adult, >60 kg: 160 mg TMP /800 mg tablets: 2 tablets every 12 hours<br>Adult, 40–60 kg: 80 mg/400 mg tablets: 3 tablets every 12 hours<br>Adult, <40 kg: 160 mg/800 mg tablets: 1 tablet every 12 hours or 80 mg/400 mg tablets: 2 tablets every 12 hours<br>Child: 8 mg/40 mg/kg; maximum dose 320 mg/1,600 mg every 12 hours<br>**or**<br>• Amoxicillin/clavulanic acid (co-amoxiclav)<br>Adult, ≥60 kg: 500 mg/125 mg tablets: 3 tablets every 8 hours<br>Adult, <60 kg: 500 mg/125 mg tablets: 2 tablets every 8 hours<br>Child: 20 mg/5 mg/kg every 8 hours; maximum dose 1,000 mg/250 mg every 8 hours<br>• For additional information on dosing, please consult the reference for treatment recommendations* and the package insert |
| **Post-Exposure Prophylaxis during a Public Health Emergency*** | • Trimethoprim-sulfamethoxazole for 21 days (agent of first choice)<br>Adult, >60 kg: 160 mg/800 mg tablets: 2 tablets every 12 hours<br>Adult, 40–60 kg: 80 mg/400 mg tablets: 3 tablets every 12 hours<br>Adult, <40 kg: 160 mg/800 mg tablets: 1 tablet every 12 hours or 80 mg/400 mg tablets: 2 tablets every 12 hours<br>Child: 8 mg/40 mg/kg; maximum dose 320 mg/1,600 mg every 12 hours<br>**or**<br>• Amoxicillin/clavulanic acid (co-amoxiclav) for 21 days<br>Adult, ≥60 kg: 500 mg/125 mg tablets: 3 tablets every 8 hours;<br>Adult, <60 kg: 500 mg/125 mg tablets: 2 tablets every 8 hours<br>Child: 20 mg/5 mg/kg every 8 h; maximum dose 1,000 mg/250 mg every 8 hours<br>• For additional information on dosing, please consult the reference for PEP recommendations* and the package insert |
| **Vaccine** | • No vaccine available for humans or animals |
| **Infection Control** | • Use Standard and Airborne Precautions when caring for patients with glanders |

*Source of treatment and post-exposure prophylaxis recommendations: Lipsitz, R, Garges, S, Aurigemma, R, et al. (2010). Workshop on Treatment of and Postexposure Prophylaxis for *Burkholderia pseudomallei* and *B. mallei* Infection, 2010. Emerging Infectious Diseases. 18(12): e2. Available at https://wwwnc.cdc.gov/eid/article/18/12/12-0638_article (accessed November 9, 2018).