**Agent Classification:** Biological Type: Bacteria (Y. pestis)

**Description:** Y. pestis is a pathogenic Gram-negative bacteria found in humans, rodents (e.g., rats, prairie dogs, various squirrels, & marmots) & black-footed ferrets. Fleas act as the vector between infected animals & humans. Pets may also bring plague-infected fleas into the home. This zoonotic vector borne disease can present in three forms: 1) Pneumonic plague affects the respiratory system & is transmissible person to person & via a bio-terror aerosol. Pneumonic plague may occur secondarily to bubonic or septicemic plague. Pneumonic plague is naturally occurring but very rare; 2) Bubonic is an infection of the lymphatic system & is most common form; & 3) Septicemic is an infection of the bloodstream.

**Bio-Safety Level:** 3

**CDC Class:** A

**HHS/USDA Select Agent:** Yes

**Inoculation:** 1-8 days (bubonic); 1-3 days (pneumonic via person to person or bio-torrent)

**Duration of Illness:** Dependent on form of illness & treatment.

**Person-to-Person Transmission:** pneumatic: yes; bubonic: no

**Treatment:** Supportive with antibiotics such as streptomycin & doxycycline.

**Infectivity/Lethality:** High for pneumatic if untreated, > 90% will die within 24 hours of symptoms appearing. If prompt treatment received it drops < 5%. Lethality is approximately 14% for other forms.

**Persistence/ Stability:** The way in which Y. pestis persists in certain animal hosts & vector insects is not well understood. Y. pestis can be engineered to be stable in the environment. Y. pestis is rapidly inactivated by sunlight, desiccation, & heating & doesn’t survive long without a host. In a World Health Organization (WHO) analysis of a worst-case scenario, aerosolized Y. pestis was estimated to be viable & infectious for as long as 1 hour without a host.

**Release Scenarios**

**Air:** Aerosolized Y. pestis is considered to be a bio-threat as it is the primary cause of plague disease. Persons with pneumonic plague can infect others, within 6 feet of themselves, via droplets from coughing, sneezing, & breathing. If not "caught" by the BioWatch program, aerosolized releases of Y. pestis are likely to be confirmed only after patients present with pneumonic plague. During the incubation period, there would be minimal risk of further transmission of disease from the original aerosol release because Y. pestis is unstable in the environment.

**Soil:** Under controlled (temp & humidity) soil conditions, Y. pestis can remain viable & infectious for up to 40 weeks.

**Surfaces:** Under controlled conditions, Y. pestis can be viable for approx. 5 days after being suspended in solution, spread over a surface, & left to dry.

**Water:** May pose a water threat, Y. pestis has persisted 160 days in spring water under lab conditions.

**Food:** Infection can occur via contact with infected animals or contaminated animal products; this includes eating contaminated meat products.

**Other:** Vector & reservoir control will be required to mitigate potential of secondary plague outbreaks.

**Health Effects**

**Agents:** Biological Type: Bacteria (Y. pestis)

**Description:** Y. pestis is a pathogenic Gram-negative bacteria found in humans, rodents (e.g., rats, prairie dogs, various squirrels, & marmots) & black-footed ferrets. Fleas act as the vector between infected animals & humans. Pets may also bring plague-infected fleas into the home. This zoonotic vector borne disease can present in three forms: 1) Pneumonic plague affects the respiratory system & is transmissible person to person & via a bio-terror aerosol. Pneumonic plague may occur secondarily to bubonic or septicemic plague. Pneumonic plague is naturally occurring but very rare; 2) Bubonic is an infection of the lymphatic system & is most common form; & 3) Septicemic is an infection of the bloodstream.

**Bio-Safety Level:** 3

**CDC Class:** A

**HHS/USDA Select Agent:** Yes

**Inoculation:** 1-8 days (bubonic); 1-3 days (pneumonic via person to person or bio-torrent)

**Duration of Illness:** Dependent on form of illness & treatment.

**Person-to-Person Transmission:** pneumatic: yes; bubonic: no

**Treatment:** Supportive with antibiotics such as streptomycin & doxycycline.

**Infectivity/Lethality:** High for pneumatic if untreated, > 90% will die within 24 hours of symptoms appearing. If prompt treatment received it drops < 5%. Lethality is approximately 14% for other forms.

**Persistence/ Stability:** The way in which Y. pestis persists in certain animal hosts & vector insects is not well understood. Y. pestis can be engineered to be stable in the environment. Y. pestis is rapidly inactivated by sunlight, desiccation, & heating & doesn’t survive long without a host. In a World Health Organization (WHO) analysis of a worst-case scenario, aerosolized Y. pestis was estimated to be viable & infectious for as long as 1 hour without a host.

**Release Scenarios**

**Air:** Aerosolized Y. pestis is considered to be a bio-threat as it is the primary cause of plague disease. Persons with pneumonic plague can infect others, within 6 feet of themselves, via droplets from coughing, sneezing, & breathing. If not "caught" by the BioWatch program, aerosolized releases of Y. pestis are likely to be confirmed only after patients present with pneumonic plague. During the incubation period, there would be minimal risk of further transmission of disease from the original aerosol release because Y. pestis is unstable in the environment.

**Soil:** Under controlled (temp & humidity) soil conditions, Y. pestis can remain viable & infectious for up to 40 weeks.

**Surfaces:** Under controlled conditions, Y. pestis can be viable for approx. 5 days after being suspended in solution, spread over a surface, & left to dry.

**Water:** May pose a water threat, Y. pestis has persisted 160 days in spring water under lab conditions.

**Food:** Infection can occur via contact with infected animals or contaminated animal products; this includes eating contaminated meat products.

**Other:** Vector & reservoir control will be required to mitigate potential of secondary plague outbreaks.

**Health Effects**

**Agent Classification:** Biological Type: Bacteria (Y. pestis)

**Description:** Y. pestis is a pathogenic Gram-negative bacteria found in humans, rodents (e.g., rats, prairie dogs, various squirrels, & marmots) & black-footed ferrets. Fleas act as the vector between infected animals & humans. Pets may also bring plague-infected fleas into the home. This zoonotic vector borne disease can present in three forms: 1) Pneumonic plague affects the respiratory system & is transmissible person to person & via a bio-terror aerosol. Pneumonic plague may occur secondarily to bubonic or septicemic plague. Pneumonic plague is naturally occurring but very rare; 2) Bubonic is an infection of the lymphatic system & is most common form; & 3) Septicemic is an infection of the bloodstream.

**Bio-Safety Level:** 3

**CDC Class:** A

**HHS/USDA Select Agent:** Yes

**Inoculation:** 1-8 days (bubonic); 1-3 days (pneumonic via person to person or bio-torrent)

**Duration of Illness:** Dependent on form of illness & treatment.

**Person-to-Person Transmission:** pneumatic: yes; bubonic: no

**Treatment:** Supportive with antibiotics such as streptomycin & doxycycline.

**Infectivity/Lethality:** High for pneumatic if untreated, > 90% will die within 24 hours of symptoms appearing. If prompt treatment received it drops < 5%. Lethality is approximately 14% for other forms.

**Persistence/ Stability:** The way in which Y. pestis persists in certain animal hosts & vector insects is not well understood. Y. pestis can be engineered to be stable in the environment. Y. pestis is rapidly inactivated by sunlight, desiccation, & heating & doesn’t survive long without a host. In a World Health Organization (WHO) analysis of a worst-case scenario, aerosolized Y. pestis was estimated to be viable & infectious for as long as 1 hour without a host.

**Release Scenarios**

**Air:** Aerosolized Y. pestis is considered to be a bio-threat as it is the primary cause of plague disease. Persons with pneumonic plague can infect others, within 6 feet of themselves, via droplets from coughing, sneezing, & breathing. If not "caught" by the BioWatch program, aerosolized releases of Y. pestis are likely to be confirmed only after patients present with pneumonic plague. During the incubation period, there would be minimal risk of further transmission of disease from the original aerosol release because Y. pestis is unstable in the environment.

**Soil:** Under controlled (temp & humidity) soil conditions, Y. pestis can remain viable & infectious for up to 40 weeks.

**Surfaces:** Under controlled conditions, Y. pestis can be viable for approx. 5 days after being suspended in solution, spread over a surface, & left to dry.

**Water:** May pose a water threat, Y. pestis has persisted 160 days in spring water under lab conditions.

**Food:** Infection can occur via contact with infected animals or contaminated animal products; this includes eating contaminated meat products.

**Other:** Vector & reservoir control will be required to mitigate potential of secondary plague outbreaks.

**Health Effects**

**Agent Classification:** Biological Type: Bacteria (Y. pestis)

**Description:** Y. pestis is a pathogenic Gram-negative bacteria found in humans, rodents (e.g., rats, prairie dogs, various squirrels, & marmots) & black-footed ferrets. Fleas act as the vector between infected animals & humans. Pets may also bring plague-infected fleas into the home. This zoonotic vector borne disease can present in three forms: 1) Pneumonic plague affects the respiratory system & is transmissible person to person & via a bio-terror aerosol. Pneumonic plague may occur secondarily to bubonic or septicemic plague. Pneumonic plague is naturally occurring but very rare; 2) Bubonic is an infection of the lymphatic system & is most common form; & 3) Septicemic is an infection of the bloodstream.

**Bio-Safety Level:** 3

**CDC Class:** A

**HHS/USDA Select Agent:** Yes

**Inoculation:** 1-8 days (bubonic); 1-3 days (pneumonic via person to person or bio-torrent)

**Duration of Illness:** Dependent on form of illness & treatment.

**Person-to-Person Transmission:** pneumatic: yes; bubonic: no

**Treatment:** Supportive with antibiotics such as streptomycin & doxycycline.

**Infectivity/Lethality:** High for pneumatic if untreated, > 90% will die within 24 hours of symptoms appearing. If prompt treatment received it drops < 5%. Lethality is approximately 14% for other forms.

**Persistence/ Stability:** The way in which Y. pestis persists in certain animal hosts & vector insects is not well understood. Y. pestis can be engineered to be stable in the environment. Y. pestis is rapidly inactivated by sunlight, desiccation, & heating & doesn’t survive long without a host. In a World Health Organization (WHO) analysis of a worst-case scenario, aerosolized Y. pestis was estimated to be viable & infectious for as long as 1 hour without a host.
LNG RECORDS. These records may be useful in decontaminating items that are intended to be returned to owners.

Methods used on surfaces: 1) Source reduction step, including HEPA vacuuming; 2) Liquid antimicrobial products such as pH-amended bleach (mixture of 1 part household bleach (5.25% to 6.5%) to 1 part white vinegar to 6 parts water, is recommended). This product affects surfaces differently in terms of corrosiveness, staining, & residue. The product will be most efficient a) at higher temperatures (i.e., >70°F or 21°C) b) when plain bleach (i.e., no added fragrance) is used to make the pH-amended bleach solution, c) when pH is < 7. d) when presence of other surface contaminants is minimal, & e) when surfaces remain wet with amended bleach solution for 60 minutes. Note: Store-bought bleach does degrade with time – check the expiration date. Alternate antimicrobial products include: chlorine dioxide, hydrogen peroxide, & peracetic acid. Fumigation: Uses gas or vapor to decontaminate facilities in which there is evidence of high levels of contamination, re-aerosolization, or if decontamination of limited access areas is required (e.g. HVAC systems). Fumigants: chlorine dioxide, & vaporized hydrogen peroxide. Prior to use, the fumigant’s compatibility with materials, penetration capacity, method of removal at the end of fumigation, as well as it’s physical, chemical, & toxicological properties should be taken into account. Each chemical has a specified range for process variables (e.g., temperature, relative humidity, concentration & contact time) that must be followed. Other Decon: 1) Ethylene oxide sterilization is used to decontaminate items in an off-site sterilization chamber. 2) Irradiation uses cobalt-60 & electron beam technologies to destroy agents at off-site locations. This procedure may destroy magnetic media. Irradiation & chemical sterilization may be useful in decontaminating items that are intended to be returned to owners.

Verification of Decon: Site & situation specific. Please contact ERT (732-321-6880) & NDT (800-329-1841) for further assistance.

CAUTION: Decon Solutions should not be deployed as a spray whenever possible. Decon Methods: Decon decisions will be site & situation specific but due to re-aerosolization concerns, under NO circumstances should a non-HEPA vacuum cleaner or a broom be used. EPA’s National Decon Team (800-329-1841) can provide specific decontamination parameters & requirements for using readily available commercial items such as household bleach.

Decontamination/Cleanup

Note: Vector & reservoir control may be required once a plague outbreak is confirmed. 

CAUTION: Only manufacturer certified HEPA vacuum equipment should be used.

Decon Planning: Site-specific decon/cleanup plan should be developed & approved by all necessary organizations/SMEs via ICS channels. Responders should develop a plan that takes into account: 1) Nature of contamination including purity, physical properties, how it entered the facility, etc. 2) Extent of contamination, including the amount & possible pathways that have spread the agent. It is advisable to isolate the contaminated area; & 3) Objectives of decon, including decon of critical items for re-use & the treatment, removal, or packaging of other items for disposal. Note: Crisis exemptions from EPA’s Office of Pesticide Programs might be necessary depending on decontaminating agents used.

CAUTION: DECON SOLUTIONS SHOULD NOT BE DEPLOYED AS A SPRAY WHENEVER POSSIBLE.

Decon Methods: Decon decisions will be site & situation specific but due to re-aerosolization concerns, under NO circumstances should a non-HEPA vacuum cleaner or a broom be used. EPA’s National Decon Team (800-329-1841) can provide specific decontamination parameters & requirements for using readily available commercial items such as household bleach.

Methods used on surfaces: 1) Source reduction step, including HEPA vacuuming; 2) Liquid antimicrobial products such as pH-amended bleach (mixture of 1 part household bleach (5.25% to 6.5%) to 1 part white vinegar to 6 parts water, is recommended). This product affects surfaces differently in terms of corrosiveness, staining, & residue. The product will be most efficient a) at higher temperatures (i.e., >70°F or 21°C) b) when plain bleach (i.e., no added fragrance) is used to make the pH-amended bleach solution, c) when pH is < 7. d) when presence of other surface contaminants is minimal, & e) when surfaces remain wet with amended bleach solution for 60 minutes. Note: Store-bought bleach does degrade with time – check the expiration date. Alternate antimicrobial products include: chlorine dioxide, hydrogen peroxide, & peracetic acid. Fumigation: Uses gas or vapor to decontaminate facilities in which there is evidence of high levels of contamination, re-aerosolization, or if decontamination of limited access areas is required (e.g. HVAC systems). Fumigants: chlorine dioxide, & vaporized hydrogen peroxide. Prior to use, the fumigant’s compatibility with materials, penetration capacity, method of removal at the end of fumigation, as well as it’s physical, chemical, & toxicological properties should be taken into account. Each chemical has a specified range for process variables (e.g., temperature, relative humidity, concentration & contact time) that must be followed. Other Decon: 1) Ethylene oxide sterilization is used to decontaminate items in an off-site sterilization chamber. 2) Irradiation uses cobalt-60 & electron beam technologies to destroy agents at off-site locations. This procedure may destroy magnetic media. Irradiation & chemical sterilization may be useful in decontaminating items that are intended to be returned to owners.

Verification of Decon: Site & situation specific. Please contact ERT (732-321-6880) & NDT (800-329-1841) for further assistance.

CAUTION: Decon Solutions should not be deployed as a spray whenever possible.

Decon Methods: Decon decisions will be site & situation specific but due to re-aerosolization concerns, under NO circumstances should a non-HEPA vacuum cleaner or a broom be used. EPA’s National Decon Team (800-329-1841) can provide specific decontamination parameters & requirements for using readily available commercial items such as household bleach.

Methods used on surfaces: 1) Source reduction step, including HEPA vacuuming; 2) Liquid antimicrobial products such as pH-amended bleach (mixture of 1 part household bleach (5.25% to 6.5%) to 1 part white vinegar to 6 parts water, is recommended). This product affects surfaces differently in terms of corrosiveness, staining, & residue. The product will be most efficient a) at higher temperatures (i.e., >70°F or 21°C) b) when plain bleach (i.e., no added fragrance) is used to make the pH-amended bleach solution, c) when pH is < 7. d) when presence of other surface contaminants is minimal, & e) when surfaces remain wet with amended bleach solution for 60 minutes. Note: Store-bought bleach does degrade with time – check the expiration date. Alternate antimicrobial products include: chlorine dioxide, hydrogen peroxide, & peracetic acid. Fumigation: Uses gas or vapor to decontaminate facilities in which there is evidence of high levels of contamination, re-aerosolization, or if decontamination of limited access areas is required (e.g. HVAC systems). Fumigants: chlorine dioxide, & vaporized hydrogen peroxide. Prior to use, the fumigant’s compatibility with materials, penetration capacity, method of removal at the end of fumigation, as well as it’s physical, chemical, & toxicological properties should be taken into account. Each chemical has a specified range for process variables (e.g., temperature, relative humidity, concentration & contact time) that must be followed. Other Decon: 1) Ethylene oxide sterilization is used to decontaminate items in an off-site sterilization chamber. 2) Irradiation uses cobalt-60 & electron beam technologies to destroy agents at off-site locations. This procedure may destroy magnetic media. Irradiation & chemical sterilization may be useful in decontaminating items that are intended to be returned to owners.

Verification of Decon: Site & situation specific. Please contact ERT (732-321-6880) & NDT (800-329-1841) for further assistance.

CAUTION: Hazardous waste transportation & disposal are regulated federally; however, more stringent regulations may exist under state authority. These regulations differ from state-to-state. Detailed state regulations can be found at http://www.envcap.org.

Waste Disposal

CAUTION: Hazardous waste transportation & disposal are regulated federally; however, more stringent regulations may exist under state authority. These regulations differ from state-to-state. Detailed state regulations can be found at http://www.envcap.org.

Waste Disposal Planning: Waste generated from assessment & cleanup activities should be autoclaved, chemically disinfected, or fumigated & then tested to be sure the agent(s) were inactivated. Waste disposal for agent-contaminated wastes generated from decontamination & disposal activities will be problematic. Landfills willing to take these wastes may be limited & incineration may be prohibitively expensive or impractical. All waste disposal options should be investigated as early into the response process as possible. Transportation of the agent contaminated wastes from the site to the landfill or incinerator may be problematic as well. Agreements must be reached between the waste generator & acceptor BEFORE transport. Information regarding the agreements may be required to be available to the public. Transportation of hazardous waste may cross several states & locales, which may exceed federal regulations. Requirements for transporting hazardous materials, & procedures for exemption, are specified at: http://www.fmcsa.dot.gov/safety-security/hazmat/complyinreg.htm. The EPA has developed a web-based Incident Waste Management Planning & Response Tool which contains guidance related to waste transportation & handling, carcass disposal, contact information for potential treatment, disposal facilities, & state regulatory offices, packaging guidance to minimize risk to workers, & guidance to minimize the potential for contaminating the treatment or disposal facility. Access to the EPA’s web based disposal tool requires preregistration: http://www2.ergweb.com/bdttool/login.asp.