Proposed Update of Isolation Precautions Appendix A for Selected High-Consequence Pathogens

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Agenda

1. Rationale for Update
2. Review of VHF and patient placement recommendations (Appendix A)
3. Review of IPC considerations for select high-consequence pathogens
   - Marburg, CCHF, Lassa, South American Hemorrhagic Fevers, Andes, Nipah
   - Goal: Inform recommendation update for Appendix A
4. Discussion + vote on recommended precautions for each pathogen

1. Rationale for Update

Recent inquiries

- Marburg outbreaks in Equatorial Guinea, Tanzania (2023)
- 2 U.S. patients with Nipah in differential (2023)
- Lassa, CCHF are often in differential for ill returning travelers from endemic regions
- US had imported Andes virus case (person-to-person transmissible hantavirus) (2018)

→ Need for updated recommendations for healthcare infection control precautions

2. Review of current VHF PPE and patient placement recommendations

Appendix A – Viral Hemorrhagic Fevers

Viral hemorrhagic fevers due to Lassa, Ebola, Marburg, Crimean-Congo fever viruses	Droplet + Contact + Standard	Duration of illness	**Ebola Virus Disease for Healthcare Workers [2014]** ⚠ **Update:** Recommendations for healthcare workers can be found at Ebola For Clinicians. (accessed September 2018). Single-patient room preferred. Emphasize: 1. use of sharps safety devices and safe work practices, 2. hand hygiene; 3. barrier protection against blood and body fluids upon entry into room (single gloves and fluid-resistant or impermeable gown, face/eye protection with masks, goggles or face shields); and 4. appropriate waste handling. Use N95 or higher respirators when performing aerosol-generating procedures. Largest viral load in final stages of illness when hemorrhage may occur; additional PPE, including double gloves, leg and shoe coverings may be used, especially in resource-limited settings where options for cleaning and laundry are limited. Notify public health officials immediately if Ebola is suspected [212, 314, 740, 772]. Also see Table 3C for Ebola as a bioterrorism agent.

Recommended PPE and Patient Placement for Patients with suspected EVD (stable or “dry” patients)

While evaluating and managing PUIs who are clinically stable and do not have bleeding, vomiting, or diarrhea, healthcare providers should at a minimum wear:

- Fluid-resistant gown that extends to at least mid-calf or single-use (disposable) fluid-resistant coveralls without integrated hood
- Full face shield
- Facemask
- Gloves with extended cuffs. Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.

Patient Placement:

- Single patient room with closed door
- AIIR for AGPs

Recommended PPE for unstable/"wet" patients with suspected EVD or confirmed patients with EVD

While evaluating and managing PUIs who are clinically unstable and/or have bleeding, vomiting, or diarrhea, healthcare providers should at a minimum wear:

- Impermeable gown or coverall
- PAPR or N95 respirator
- Examination gloves with extended gloves
- Boot covers (or shoe covers in combination with coverall with integrated socks)
- Apron

Patient Placement:

- Single patient room with closed door
- AIIR for AGPs

Proposed Appendix A Update

- Propose update for the following pathogens
  - VHFs
    - Marburg
    - Lassa
    - Crimean Congo Hemorrhagic Fever (CCHF)
    - South American Arenaviruses (Junin, Machupo, Chapare, Guanarito, Sabia)
    - Andes Virus (a species of hantavirus)
  - Nipah Virus
- Review of virus-specific information to inform decision-making on recommended precautions

3. Review of IPC considerations for select high-consequence pathogens

Appendix A Update - Marburg

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Marburg	Fever, chills, headache, myalgia, sore throat, nausea, vomiting May progress to multi-organ failure, massive hemorrhage	23-90% No vaccine or approved treatments available Remdesivir used as treatment, efficacy unclear	Contact with body fluids – blood, most of all	Virus has been isolated from blood, urine, throat, liver biopsy (autopsy), eye (anterior chamber)	Yes Insufficient or no PPE (skin contact with body fluids), sharps injuries, mucous membrane exposures	Same as Ebola

Appendix A Update – Crimean Congo Hemorrhagic Fever

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Crimean Congo Hemorrhagic Fever (CCHF)	Fever, headache, back/joint pain, stomach pain, nausea, vomiting, jaundice Severe bruising, nosebleeds, uncontrolled bleeding at injection sites	3-30% No vaccine or approved treatments available	Contact with body fluids Improper sterilization of medical equipment Percutaneous inoculation from needles Possible droplet/aerosol transmission	PCR detected in blood, nasal swab, saliva, urine, stool, vaginal fluid Viral isolation has been reported from patients/corpses	Yes Percutaneous and cutaneous transmission Possible droplet/aerosol transmission	Same as Ebola

Appendix A Update – Lassa Fever

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Lassa	Mild symptoms: flu-like illness Severe illness: hemorrhage, respiratory distress, vomiting, hearing loss, tremors, encephalitis, multi-organ failure	Hospitalized patients' mortality rate: 15-20% Overall mortality rate: 1% Ribavirin used as treatment, efficacy unclear No vaccine available	Prolonged contact in setting of unknown exposure Respiratory droplet or aerosol spread in earlier outbreaks were implicated when source was unknown	Viral culture positive in blood, urine, saliva, and semen	Yes Insufficient or no PPE (skin contact with body fluids)	Same as Ebola

Appendix A Update – South American Hemorrhagic Fevers

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
South American Hemorrhagic Fevers (Arenaviruses) Junin (Argentine HF) Machupo (Bolivian HF) Chapare (Chapare HF) Guanarito (Venezuelan HF) Sabia (Brazilian HF)	All: flu-like illness Junin: absence of respiratory symptoms Machupo: may develop neurologic/hemorrhagic manifestations Chapare: may develop ARDS/multiorgan dysfunction Guanarito: respiratory symptoms, may develop neurological/hemorrhagic manifestations Sabia: may develop multiorgan dysfunction	Junin: 15-30%, 1% w/ Rx Machupo: 25% Chapare: 60% Guanarito: 33% Sabia: 50% Only Junin has vaccine (not available in US) No proven treatments for any	Junin: P2P transmission surmised in large-scale outbreaks Machupo: P2P transmission demonstrated in 1971, large-scale outbreaks Guanarito: Unclear; only one case of secondary transmission has been identified Chapare: Yes, via contact with body fluids (all) Sabia: not established	Junin: reported from oral swabs, urine, breastmilk, ?sexual transmission Machupo: blood/throat swab/post-mortem liver/spleen (viral cx) Chapare: 2019 outbreak w/ blood/urine/conjunctival/semen NP/OP +PCR and culture/NGS Guanarito: not established Sabia: not established	Junin: none Machupo: yes Chapare: yes Guanarito: none Sabia: two lab accidents	Same as Ebola

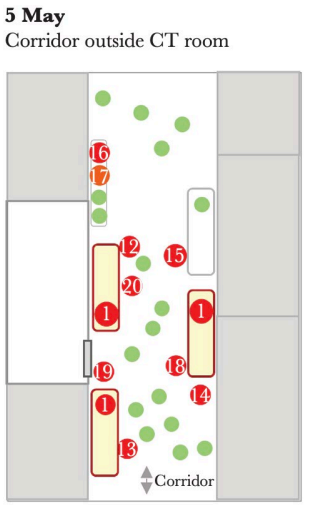
Appendix A Update – Andes

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Andes	Fever, chills, headaches Cough, shortness of breath Respiratory failure Coagulopathy Multiorgan dysfunction	30% No vaccine/treatment	P2P transmission is well-documented among those with close and prolonged contact to case-patients	Breastmilk (PCR) Blood/serum/PBMC (PCR; viral isolate) Urine (PCR) Respiratory sample (PCR)	Yes No/incomplete PPE	Gown, single pair of gloves, respirator, eye protection Patient placement in AIIR

Appendix A Update – Nipah

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Nipah	Non-specific prodromal phase (fever, HA, myalgia, dizziness), respiratory symptoms, vomiting Neurological symptoms within 1 week - coma, hyporeflexia, areflexia, segmental myoclonus, seizures Survivors may experience relapse or late-onset encephalitis	40-75% No vaccine or treatment	Contact with body fluids, especially respiratory secretions Prolonged exposure to NiV patient(s), those with respiratory symptoms, and older patients Unclear if NiV_B may be more P2P-transmissible than NiV_M	Respiratory samples with positive NiV RNA on PCR Viral culture positive from throat, nasal, and urine (NiV_M)	Yes Absence of any or minimal PPE	If clinically stable without vomiting (suspect Nipah): gown, single pair of gloves, respirator, eye protection If clinically unstable (suspect Nipah) or confirmed Nipah: same as Ebola “wet” precautions Patient placement in AIIR

Appendix A Update – Nipah (2)

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Nipah	Non-specific prodromal phase (fever, HA, myalgia, dizziness), respiratory symptoms, vomiting Neurological symptoms within 1 week - coma, hyporeflexia, areflexia, segmental myoclonus, seizures Survivors may experience relapse or late-onset encephalitis	40-75% No vaccine or treatment	Contact with body fluids, especially respiratory secretions Prolonged exposure to NiV patient(s), those with respiratory symptoms, and older patients Unclear if NiV_B may be more P2P-transmissible than NiV_M	Respiratory samples with positive NiV RNA on PCR Viral culture positive from throat, nasal, and urine (NiV_M)		If clinically stable without vomiting (suspect Nipah): gown, single pair of gloves, respirator, eye protection If clinically unstable (suspect Nipah) or confirmed Nipah: same as Ebola "wet" precautions Patient placement in AIIR

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Discussion + Vote

Appendix A Update – Marburg (2)

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Marburg	Fever, chills, headache, myalgia, sore throat, nausea, vomiting May progress to multi-organ failure, massive hemorrhage	23-90% No vaccine or approved treatments available Remdesivir used as treatment, efficacy unclear	Contact with body fluids – blood, most of all	Virus has been isolated from blood, urine, throat, liver biopsy (autopsy), eye (anterior chamber)	Yes Insufficient or no PPE (skin contact with body fluids), sharps injuries, mucous membrane exposures	Same as Ebola

Discussion + Vote on Proposed Update for Marburg

- **Proposal:** Change recommended PPE and placement for Marburg to be same as recommended for Ebola
- **If change is accepted**:
  - Appendix A will be updated to refer to Ebola guidance
  - Ebola guidance will also be updated to include other pathogens to which it applies in addition to Ebola

Appendix A Update – Crimean Congo Hemorrhagic Fever (2)

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Crimean Congo Hemorrhagic Fever (CCHF)	Fever, headache, back/joint pain, stomach pain, nausea, vomiting, jaundice Severe bruising, nosebleeds, uncontrolled bleeding at injection sites	3-30% No vaccine or approved treatments available	Contact with body fluids Improper sterilization of medical equipment Percutaneous inoculation from needles Possible droplet/aerosol transmission	PCR detected in blood, nasal swab, saliva, urine, stool, vaginal fluid Viral isolation has been reported from patients/corpses	Yes Percutaneous and cutaneous transmission Possible droplet/aerosol transmission	Same as Ebola

Discussion + Vote on Proposed Update for CCHF

- **Proposal:** Change recommended PPE and placement for CCHF to be same as recommended for Ebola
- **If change is accepted**:
  - Appendix A will be updated to refer to Ebola guidance
  - Ebola guidance will also be updated to include other pathogens to which it applies in addition to Ebola

Appendix A Update – Lassa Fever (2)

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Lassa	Mild symptoms: flu-like illness Severe illness: hemorrhage, respiratory distress, vomiting, hearing loss, tremors, encephalitis, multi-organ failure	Hospitalized patients' mortality rate: 15-20% Overall mortality rate: 1% Ribavirin used as treatment, efficacy unclear No vaccine available	Prolonged contact in setting of unknown exposure Respiratory droplet or aerosol spread in earlier outbreaks were implicated when source was unknown	Viral culture positive in blood, urine, saliva, and semen	Yes Insufficient or no PPE (skin contact with body fluids)	Same as Ebola

Discussion + Vote on Proposed Update for Lassa

- **Proposal:** Change recommended PPE and placement for Lassa to be same as recommended for Ebola
- **If change is accepted**:
  - Appendix A will be updated to refer to Ebola guidance
  - Ebola guidance will also be updated to include other pathogens to which it applies in addition to Ebola

Appendix A Update – South American Hemorrhagic Fevers (2)

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
South American Hemorrhagic Fevers (Arenaviruses) Junin (Argentine HF) Machupo (Bolivian HF) Chapare (Chapare HF) Guanarito (Venezuelan HF) Sabia (Brazilian HF)	All: flu-like illness Junin: absence of respiratory symptoms Machupo: may develop neurologic/hemorrhagic manifestations Chapare: may develop ARDS/multiorgan dysfunction Guanarito: respiratory symptoms, may develop neurological/hemorrhagic manifestations Sabia: may develop multiorgan dysfunction	Junin: 15-30%, 1% w/ Rx Machupo: 25% Chapare: 60% Guanarito: 33% Sabia: 50% Only Junin has vaccine (not available in US) No proven treatments for any	Junin: P2P transmission surmised in large-scale outbreaks Machupo: P2P transmission demonstrated in 1971, large-scale outbreaks Guanarito: Unclear; only one case of secondary transmission has been identified Chapare: Yes, via contact with body fluids (all) Sabia: not established	Junin: reported from oral swabs, urine, breastmilk, ?sexual transmission Machupo: blood/throat swab/post-mortem liver/spleen (viral cx) Chapare: 2019 outbreak w/ blood/urine/conjunctival/semen NP/OP +PCR and culture/NGS Guanarito: not established Sabia: not established	Junin: none Machupo: yes Chapare: yes Guanarito: none Sabia: two lab accidents	Same as Ebola

Discussion + Vote on Proposed Update for South American Hemorrhagic Fevers

- **Proposal:** Change recommended PPE and placement for South American Hemorrhagic Fevers to be same as recommended for Ebola
- **If change is accepted**:
  - Appendix A will be updated to refer to Ebola guidance
  - Ebola guidance will also be updated to include other pathogens to which it applies in addition to Ebola

Appendix A Update – Andes (2)

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Andes	Fever, chills, headaches Cough, shortness of breath Respiratory failure Coagulopathy Multiorgan dysfunction	30% No vaccine/treatment	P2P transmission is well-documented among those with close and prolonged contact to case-patients	Breastmilk (PCR) Blood/serum/PBMC (PCR; viral isolate) Urine (PCR) Respiratory sample (PCR)	Yes No/minimal PPE	Same as Ebola “dry” precautions with the exception of: respirator, single pair of gloves and patient placement in AIIR Patient placement in AIIR

Discussion + Vote on Proposed Update for Andes

- **Proposal:**
  - Same as Ebola “dry” precautions with the exception of: respirator, single pair of gloves and patient placement in AIIR
- **If change is accepted**:
  - Andes would be added to Appendix A as above

Appendix A Update – Nipah (3)

Virus	Clinical Illness	Mortality	Modes of P2P transmission	Body fluids	Episodes of occupationally-acquired transmission in healthcare	Proposed PPE and Patient Placement
Nipah	Non-specific prodromal phase (fever, HA, myalgia, dizziness), respiratory symptoms, vomiting Neurological symptoms within 1 week - coma, hyporeflexia, areflexia, segmental myoclonus, seizures Survivors may experience relapse or late-onset encephalitis	40-75% No vaccine or treatment	Contact with body fluids, especially respiratory secretions Prolonged exposure to NiV patient(s), those with respiratory symptoms, and older patients Unclear if NiV_B may be more P2P-transmissible than NiV_M	Respiratory samples with positive NiV RNA on PCR Viral culture positive from throat, nasal, and urine (NiV_M)	Yes Absence of any or minimal PPE	If clinically stable without vomiting (suspect Nipah): same as Ebola “dry” precautions with exception of single pair of gloves, respirator, and patient placement in AIIR If clinically unstable or confirmed Nipah: same as Ebola “wet” precautions and patient placement in AIIR

Discussion + Vote on Proposed Update for Nipah

- **Proposal**
  - If clinically stable without vomiting (suspect Nipah): same as Ebola "dry" precautions with exception of single pair of gloves, respirator, and patient placement in AIIR
  - If clinically unstable or confirmed Nipah: same as Ebola "wet" precautions and patient placement in AIIR
- **If change is accepted**:
  - Nipah would be added to Appendix A as above

Thank you!

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Extra slide

Key references

Marburg

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Key references Andes

Andes

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