**Appendix 3. Synthesis of Risk Mitigation Strategies**

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| **Category** | **Definitions & Examples** | **Risk Mitigation Strategies**  **(# denotes corresponding failure mode from Appendix 2)** |
| **Training/Education** |  |  |
| Fidelity | How closely the training environment matches the physical realism of doffing after caring for a patient with Ebola or other high consequence pathogen; How closely the training environment requires trainees to utilize the same behaviors and cognitions when doffing after caring for a patient with Ebola or other high consequence pathogen. | 1. Purposefully contaminate equipment and HCW to see what becomes contaminated and provide feedback (14, 26, 44)   * + Match physical features of practice environment to transfer environment (e.g., ED personnel practice doffing in ED, lab personnel practice in designated lab doffing space)   + Match the affective and cognitive responses of the practice environment to the transfer environment (e.g., simulate stress, task complexity) |
| Tools & Technology | Training and education related to how to use specific pieces of equipment | 2. Ensure TO is competent in the use of communication technology (e.g., poly com) utilized to exchange information with the HCW while they provide patient care (1, 3, 5)  3. Ensure team members understand logistics behind waste management  4. Ensure team members are competent in the handling of all patient care equipment consistent with manufacturer instructions for use (IFUs), including ear buds for electronic stethoscope |
| Teamwork skills | Training and education aimed at enhancing the interactions between the HCW, TO, and DA | 5. Team members should utilize assertiveness techniques and speak up if they are unsure or uncomfortable (13, 21, 25, 31, 53, 56, 68, 69, 95, 98, 100, 101, 102)  6. Ensure all team members know the roles and functions of all team members engaged in the doffing process (13)  7. Practice communication and information exchange between (e.g., closed-loop communication) the TO, DA, and HCW; beyond simple dictation of steps (13, 70, 75)  8. Training should include back-up behaviors and cross-checking between all team members, not just the HCW (14, 26, 29, 31, 33, 36, 37, 44, 98)  9. HCW should be turning around to help TO/DA with assessment (15, 16)  10. Need to avoid overreliance on the expectation that the HCW is able to identify contamination and DA/TO don’t need to pay as close of attention (15, 16)  11. All team members should be cross-trained to enhance the mutual understanding of all roles and responsibilities |
| Infection Prevention and Control | Training and education related to infection prevention and control best practices | 12. Ensure team members are competent in decontamination strategies (one wipe, one swipe motion) (5, 22)  13. HCW should be treated as contaminated as a baseline; if there is visual contamination, then even more attention is needed (15)  14. Understanding of germ theory (and viruses/bacteria) and competency in disinfection/identifying and assessing risks (20, 21, 27, 29, 42, 43, 65, 66, 91, 93, 102)  15. Provide training on appropriate application of ABHRa (23, 25)  16. Train team that every piece of equipment has the potential to be contaminated, even if it’s not visible (33, 36, 37)  17. Incorporate infection prevention and control education material into didactic components of training |
| Other | Miscellaneous training/education-focused risk mitigation strategies not currently defined by this coding schema | 18. Train and evaluate the competency of the TO in providing verbal instructions (13, 46)  19. Training should involve spatial orientation awareness between team members, environment, and equipment in relation to team member body movements (14, 26, 29, 33, 36, 37, 44, 45, 70, 102)  20. Incorporate learning opportunities for recovering from errors/ perturbations and exposure to task-relevant stressors into training (17, 45, 46, 69, 95)  21. Provide video-based feedback to enhance learning (39)  22. Provide additional practice in rolling up the shroud (If applicable) (75)  23. Ensure knowledge of equipment size and fit (including shoe size) (101, 103)  24. Ensure all team members are competent in all knowledge, skills, and attitudes underpinning effective performance through routine performance measurement |
| **Tools & Technology** |  |  |
| Design/features of PPE | Refers the specific elements of a particular type of PPE | 25. Only use aprons where the HCW is able to pull off the outer apron individually (30, 36)  26. Color code apron (and gown) to differentiate inside v. outside (34, 38, 39, 40)  27. Ensure inner gloves are not flesh colored (66)  28. Consider switching to a single, shorter PAPR shroud (75)  29. Ensure all equipment is fluid impermeable (45) |
| Accessories | Tools/technology that supplement PPE but do not themselves provide protection to the HCW  *Example: Tape (for holding gloves in place)* | 30. Use duct tape to secure cuff in place or other means of securing the gloves to the gown (19)   * + If used, ensure there is a breach protocol in place in case of tear   + If not used, ensure there are alternative mechanisms to prevent the cuff from slipping   31. Ensure gown cuffs are fluid impermeable (19) |
| Other | Miscellaneous tools & technology risk factors not currently defined by this coding schema | 32. Ensure there is a communication channel/ pathway (e.g., poly com) between the TO (or DA) and the HCW in the patient room as well as from the TO (or DA to personnel outside of the doffing room/ leadership (1, 3)  33. Ensure adequate hair coverage (e.g., bouffant, skull cap), and straps and/or tape for securing corrective lenses to face (82) |
| **Environment** |  |  |
| Space | Aspects related to the physical space of the doffing room | 34. Ensure the physical size of the doffing room is adequate to doff safely (14, 40, 45, 46)  35. Provide visual indication of contamination vs. contamination free areas of doffing room (102) |
| Equipment placement | The optimization of equipment in relation to the doffing team members and/or other equipment | 36. Ensure patient room (1, 3) and doffing room (15, 16, 44) is equipped with full length mirrors to aid in self-inspection  37. Optimize the placement of equipment within the doffing room to decrease the frequency with which a team member bumps into a piece of equipment; standardize equipment placement across doffing rooms if possible (14, 26)  38. Ensure there is a sink and eye wash station in the doffing room (shower if possible) or close by (16)  39. Optimize the placement of equipment and supplies within the doffing room to promote safe behaviors and efficiency; standardize equipment and supply placement across doffing rooms if possible (22, 31, 45) |
| **Organization** |  |  |
| Doffing protocols and instructions | The extent to which protocols and guidance for doffing (including breach management) are in place | 40. Create specific guidance for managing visible contamination (one wipe, one swipe motion) (5, 22)  41. Integrate guidance in doffing protocol prompting closed-loop communication (13)  42. Doffing instructions should prompt HCW to move away from ABHRa dispenser/any other piece of equipment that can be touched and potentially contaminated (14, 26)  43. Ensure organizational protocol for managing breach is in place; Facility should be specific in their protocols on what should happen for each specific breach that can take place (i.e., a tiered breach protocol (16, 17, 95)  44. Universal guidance is needed for breach protocols that can be easily adaptable to local institutions (17)  45. Integrate guidance into the doffing protocol prompting both visual and verbal cues to aid in task completion (25)  46. Incorporate pause into protocol to encourage cross-checking (29)  47. Doffing protocol instructions should also include prompts for the DA to perform hand hygiene if they touch the HCWs PPE (31)  48. Ensure organizational protocol for remediation if contamination of next level of PPE occurs (33, 37, 60)  49. Ensure there is a protocol in place to ensure contamination of scrubs is managed effectively (e.g., disinfectant wipe on scrub area, shower immediately) (46)  50. Ensure standardized protocol for glove removal that emphasizes glove to glove contact (54, 58)  51. TO should inform HCW that if they feel a sting from applying ABHRa, that there could potentially be a small hole not visible to the eye (68)  52. Incorporate step in protocol for DA to check for and remediate any potential contamination prior to assisting with battery back removal (70)  53. Ensure organizational protocol and remediation steps are in place if HCW or Asst. touches underneath the inner shroud while rolling the hood up towards top of shoulders (75)  54. Provide instructional guidance for HCW to release Velcro during gown removal (83)  55. Ensure there is a systematic decontamination protocol/practice (e.g., sequential steps for cleaning different areas) if there is contamination following doffing (91, 93)  56. Ensure specific guidance is in place if HCWs skin/scrubs are contaminated following the removal of all PPE (95)  57. Ensure guidance for managing contamination, rips, tears are equally robust for all steps (95)  58. Ensure there is a prompt for the assistant to avoid touching the bottom of the HCWs boot covers (45)  59. Include instructions for assistant not to shake gown if they are providing assistance with gown removal (85) |
| Resource availability | The availability of tools and technologies for safety doffing after caring for a patient with Ebola or other high consequence pathogen | 60. Ensure the integrity and availability of supplies prospectively (5, 22, 23)  61. Ensure organization tracks supply levels and ensure appropriate supply levels based on personnel size needs (101, 103) |
| Other | Miscellaneous organization-focused risk mitigation strategies | 62. Form a transdisciplinary team (e.g., infection preventionists, clinicians, patient safety scientists) to create protocols, develop training, configure room, and establish policy for managing the safety of healthcare workers caring for patients exposed to high consequence pathogens  63. Test and evaluate the efficacy of doffing protocol during simulated exercises to identify breakdowns or areas for improvement  64. Ensure there are both electronic and hard copies of IFUs and protocols  65. Consider the physical attributes of healthcare workers volunteering care for patients exposed to high consequence pathogens  66. Ensure the usability of the checklist used by the TO |
| **Task** |  |  |
| Team composition | The optimal number of individuals/specific roles to safely complete the doffing task | 67. Ensure TO and DA are rotated with new team members at appropriate intervals (95)  68. Ensure there is both a TO and assistant to facilitate the doffing process for the HCW; it is less safe for only one person to assume both the TO and assistant roles (102) |
| Sequencing of doffing procedure | Optimization strategies designed to eliminate unnecessary steps, improve the clarity/ease of existing steps, and/or add new steps to improve safety/efficiency | 69. TO should pull HCW from room immediately if they are trying to manipulate PPE by themselves in patient room (e.g., fix shroud, retie gown) (1)  70. HCW should engage the TO (or DA) immediately upon completion of providing patient care (3)  71. Team members should stretch out their arms completely while disinfecting glove surfaces (25)  72. Every time TO instructs HCW to disinfect, they need to say ‘wait for your hands to dray’ and ‘don’t shake your hands’ (27)  73. HCW should be removing apron by themselves before entering the doffing area (if a facility can’t due to space, they need to add a disinfectant step) (30, 36) If aprons are used that don’t allow the HCW to pull it off individually, then the apron should be cut rather than pulling it over the HCW head (30)  74. Boot covers should not be removed first, they should be removed during the last step (consistent with current CDC guidelines) (46)  75. Throw glove away rather than balling it up because it is not necessary to keep in hand (59)   * + Need verbal and visual confirmation that entire glove is balled in hand before proceeding if HCW holds balled glove in hand (59)   76. Recommend that Assistant untie gown and start fold (6 inches) on either side of the gown in the back to avoid outside of the gown from touching HCW’s scrubs (83, 85)  77. HCW should be instructed to only touch outside of gown during removal. They should start with one hand touching the opposite shoulder on the outside of the gown; repeat instructions for opposite shoulder (85)  78. HCW should shower immediately after patient care if there is contamination following doffing (not just after shift) (91, 93)  79. Consider the utility of donning a clean pair of shoes rather than shuffling feet on disinfectant pad (98)  80. Always allow the HCW to apply additional ABHR if requested |
| Other | Misc. optimization strategies improve the safety and efficiency surrounding doffing actions | 81. If multiple HCWs are providing care, they should assist each other in identifying contamination prior to engaging TO (3)  82. TO (or DA) should utilize a communication channel/ pathway (e.g., poly com) to always be able to communicate with and see (if possible) the HCW(s) (3, 5)  83. Team member(s) should perform hand hygiene immediately if they touch a contaminated portion of PPE or equipment (34, 38, 39, 44, 70)  84. There should be clear demonstration of folding the apron from inside to outside (39, 40)  85. TO needs to verbalize/remind HCW not to touch face/hair after removing hood in waste receptacle (82)  86. Confirm size of PPE elements are appropriate during donning (101, 103) |

a alcohol based hand rub