Duke University Health System
Hazard-Specific Respiratory Protection Policy

For *Mycobacterium tuberculosis*, SARS-CoV-2 (the causative agent of COVID-19), SARS-CoV-1, and Other Airborne Pathogens and Particulates in Clinical Settings

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Departments: All Duke University Health System entities

This document is intended to supplement the "Duke Respiratory Protection Policy" (Section II, Chapter 2 of the Duke University Safety Manual), which states that departments with employees who are required to use respiratory protection shall develop and implement a written site-specific policy defining the use of respirators for each application. This document supports the Duke Tuberculosis Exposure Control Plan (Section VI, chapter 2 of the Duke University Safety Manual). The Duke Safety Manual can be found online at www.safety.duke.edu.

This document provides a standard format for documenting tasks that require the use of respiratory protection by employees. Respiratory protection is used to reduce the probability of exposure to airborne particulates and pathogens. If exposed to airborne pathogens, employees could contract the disease caused by that pathogen (e.g., Tuberculosis (TB) from the *Mycobacterium tuberculosis* bacterium or COVID-19 from the SARS-CoV-2 virus). Certain aerosolized hazardous drugs, such as ribavirin particulates, can cause adverse reproductive effects. Records for Duke University Health System document which employees are authorized to use respiratory protection, the model and size of respirator they are authorized to use, and their status with regard to medical clearance, training, and fit testing (for tight-fitting respirators). These records are stored in the Safety Management System (SMS) maintained by the Occupational and Environmental Safety Office (OESO).

Respirator Selection:

Respirator use is required while performing the following tasks:

Task	Potential hazards	Acceptable respiratory protection	When to throw away/disinfect
Entering a room housing a patient on Airborne Isolation	• Infections through the airborne route • Examples: pulmonary TB, measles	N95* or Powered Air-Purifying Respirator (PAPR)	• Discard N95 if it does not pass the seal check • Discard N95 or PAPR headgear when dirty, damaged, shows compromised integrity, or

			at end of patient's stay • *A single N95 is used for individual patients on Airborne Isolation* • Disinfect PAPR motor unit, belt, headgear, and tubing using hospital-approved disinfectant after each use, following the PAPR user instructions
Entering an enclosed area housing a patient who is on Airborne Isolation ***AND*** Contact Isolation	• Infections through the airborne or contact route • Examples: Chickenpox (*Varicella zoster*), Herpes zoster, Anthrax	N95* or PAPR	• Discard N95 after use - **do NOT reuse** • Throw away PAPR headgear after use (or if reuse by same employee for same patient is necessary, completely and thoroughly disinfect with hospital-grade disinfectant) • Disinfect **all** exterior surfaces of the PAPR unit with hospital-grade disinfectant after use
Entering an enclosed area housing a patient on ***Special*** Airborne Isolation	• Infections through the airborne route • Examples: COVID-19, Flu caused by Avian Influenza Virus, Mpox (Monkey pox), Smallpox	N95* or PAPR	• Discard N95 or PAPR head gear when dirty, damaged, does not pass the seal check, shows compromised integrity, or at end of patient's stay • *A single N95 is used for individual patients on Special Airborne Isolation* • Disinfect PAPR motor unit, belt, head gear, and tubing using hospital-approved disinfectant after each use, following the PAPR user instructions
• Mixing or administering BCG outside of a biological safety cabinet • Pouring bleach into toilet or flushing toilet after BCG-treated	• Inhaling BCG does not cause TB, however, if inhaled subsequent PPD skin tests will show a false positive • *M. bovis*	N95* or PAPR	• Discard N95 or PAPR headgear when dirty, damaged, shows compromised integrity, or (N95 only) does not pass the seal check • Disinfect PAPR motor unit, belt, headgear, and tubing using hospital-

patient uses toilet (BCG is used in bladder cancer treatment)	infections		approved disinfectant after each use, following the PAPR user instructions
Entering a clinical laboratory or autopsy suite when potentially-infectious aerosol-generating procedures are being conducted**	• Infections through the airborne route • Examples: TB, measles, histoplasmosis (*Histoplasma capsulatum)*	N95* or PAPR	• Discard N95 or PAPR headgear when dirty, damaged, shows compromised integrity, or (N95 only) does not pass the seal check • Disinfect PAPR motor unit, belt, headgear, and tubing using hospital-approved disinfectant after each use, following the PAPR user instructions
Opening exhaust ductwork in the air-handling system coming from a workspace where aerosols from an airborne disease may be present	• Infections through the airborne route • Examples: TB, measles, histoplasmosis (*Histoplasma capsulatum)*	N95* or PAPR	• Discard N95 or PAPR headgear when dirty, damaged, does not pass the seal check, or shows compromised integrity • Disinfect PAPR motor unit, belt, headgear, and tubing using hospital-approved disinfectant after each use, following the PAPR user instructions

*Requires fit testing, see below for more information.
The clinical laboratory and/or autopsy suite employees may encounter situations where respiratory protection is required for airborne pathogens ***and* formaldehyde or other organic gases/vapors (e.g., spills, diminished exhaust performance, etc.). The N95 and particulate-only (magenta) PAPR filters are **not** effective for protecting employees from formaldehyde or other organic gases/vapors. These situations would warrant the use of a 3M Versaflo 600-series PAPR with a combination particulate/formaldehyde/organic vapor cartridge. Please contact the Occupational Hygiene and Safety Division of OESO at 919-684-5996 or ohs.oeso@dm.duke.edu with any questions.

During use of respirators, if the employees encounters an emergency involving respirator function or a toxic/life-threatening atmosphere for which the respirator is not designed, the following recommended methods for handling these emergencies must be followed:

Type of Emergency	Respirator affected	Suggested Action
Difficulty breathing	N95 or PAPR	Leave contaminated area. Perform hand hygiene. Remove the respirator and discard it appropriately. Perform hand hygiene again and don a new respirator. If breathing difficulty continues, it may not be related to the

		respirator. Seek medical assistance if needed.
Flow to PAPR headgear decreases noticeably or other malfunction is noticed (PAPR alarm).	PAPR	Leave contaminated area. Order a replacement PAPR using your area's ordering process. Tag the malfunctioning PAPR and the battery charger for Clinical Engineering pickup or responsible maintenance/service provider.
Other medical emergencies (e.g., feelings of claustrophobia, light headedness, allergic reaction, etc.)	any	Leave contaminated area. Perform hand hygiene, if able, prior to removing respirator. Perform hand hygiene again, if able. Seek medical assistance if needed.

Health Evaluation:

Staff are required to obtain medical clearance from the Employee Occupational Health and Wellness office. Medical clearance expiration dates are indicated on compliance reports from OESO. Only employees who have a current medical clearance will be allowed to wear respirators. Documentation of medical clearance is kept at Employee Occupational Health & Wellness (EOHW) and online in Duke's Safety Management System.

Fit Testing:

- Employees who wear tight-fitting respirators (e.g., N95s) must be fit tested at least annually.
- Fit testing records are kept by OESO. Only employees who are in compliance with fit testing shall wear tight-fitting respirators (e.g., N95 respirators). Employees can only wear respirators of the specific models and sizes for which they have passed a fit test.
- Fit testing is not required for loose-fitting PAPRs.
- New employee fit tests, when required, will be performed at EOHW during their placement medical evaluations.
- Fit test sessions are offered by both EOHW and OESO's Occupational Hygiene and Safety (OHS) Division. More information including addresses and hours can be found at the following link: https://www.safety.duke.edu/occupational-hygiene-safety/Upcoming-Fit-Test-Sessions
- Managers are responsible for tracking medical clearance and fit test needs for their employees and for ensuring that employees are clocked in to attend fit test sessions at least once per year (except for those employees who wear PAPRs). Multiple sessions might be needed to pass a fit test.

Training:

- Training records are kept by OESO.

- Annual training is required for employees, regardless of the type of respirator worn.
- Respiratory protection training is available online through OESO's training website at https://sms.duhs.duke.edu/onlinetraining/. The module is named "Respirator Training for Airborne Pathogens". If the course does not appear in the employee's course list, please reach out to OESO Biological Safety at biosafety@duke.edu.
- Managers are responsible for tracking training needs for their employees and ensuring that their employees complete the required training.

Preventive Conditions:

Some employees may be unable to wear an N95 respirator because of facial hair or other preventive condition, or the inability to pass an N95 fit test. Other conditions may include medical considerations, including diminished lung capacity or claustrophobia.

Employees that cannot wear an N95 respirator must wear a PAPR (if medically cleared to do so) and must be designated in OESO's SMS as PAPR users. The Occupational Hygiene and Safety Division manages these designations. Designation changes or questions can be submitted to ohs.oeso@dm.duke.edu.

Maintenance, Inspection, Cleaning and Repair:

N95

1) N95s should be stored in a clean, dry area free of any hazardous material.
2) N95 users should inspect the respirator before each use to make sure that the respirator is not misshapen, the straps are attached, and the elastic is not showing signs of dry rotting. The user must perform a "user seal check" upon donning the respirator, which will ensure that the essential parts of the N95 are present and that the fit is adequate.
3) After wearing an N95 into the room of a patient on airborne and contact isolation, it is discarded upon removal.
4) N95s are not to be shared by employees and are only to be used while providing care for one patient (i.e., one respirator, one employee, one patient).

PAPR

1) Within the hospitals, PAPR performance monitoring, maintenance, and inspection will be completed by Clinical Engineering.
    a. Outside of Duke-owned buildings, this will be completed by maintenance contractors.
2) Before each use, the user is responsible for inspecting the PAPR to ensure that filters are in place, the headgear is attached properly, the battery charge is sufficient, and airflow is adequate. See PAPR user instructions for detailed instructions.
3) The brand of PAPR disposable headgear **must** be the same brand as the PAPR unit; headgear brands **are not** interchangeable.

4) After wearing a PAPR into the room of a patient on contact isolation, the employee who used the PAPR is responsible for disinfecting the outside of the non-disposable parts of the PAPR (and the disposable headgear if it is going to be reused for the same patient).
5) The PAPR headgear are not to be shared by employees. PAPR headgear should be thrown away when they become worn or dirty.

Contact Numbers and Ordering Information:

- To order PAPRs from Equipment Distribution:
  - For standard orders: Through the Equipment Request Portal
  - For immediate needs or emergent situations call the Equipment Distribution hotline at 919-681-2072, 24/7
- To order PAPR disposable head covers and N95 respirators through SAP:
  - 3M Versaflo PAPR disposable head covers
  - 3M Aura Health Care Particulate Respirator and Surgical Mask 1870+
  - Halyard duckbill
  - See Respiratory Protection for more information.
- For PAPR repair and/or replacement:
  - Order a replacement PAPR motor/blower unit and parts from Equipment Distribution.
  - Tag the malfunctioning PAPR and battery charger for Clinical Engineering pickup or responsible maintenance/service provider.
- External clinics should visit this page for ordering information.
- For questions about medical clearance: Call Employee Occupational Health and Wellness (EOHW), 919-684-3136.
- For general questions on respirator usage: Call Occupational Hygiene and Safety, 919-684-5996 or Biological Safety, 919-684-8822.

Storage:

Respirators will be stored in the following approved locations:

- In the hospitals:
  - N95 respirators are stored on the carts
  - PAPR units and the chargers are stored in various places on the unit. Ask your supervisor or charge nurse where the PAPRs are kept.
  - Anterooms of isolation rooms when in use, otherwise in the Equipment Distribution Division of the Clinical Engineering Department.
- External clinics will have storage locations contingent on the layout of the clinic. Ask your supervisor where the respiratory protection is kept prior to needing it.