

Respiratory Protection in Long Term Care

Why Do We Need Respirators

- When people breathe, talk, sing, cough, or sneeze moist warm droplets are emitted
- The droplets are of various sizes
- The droplets quickly lose water and become smaller
- Droplets of up to 100 microns may remain airborne long enough to be inhaled
- Influenza receptors are located throughout the respiratory tract
- Respirators, but not surgical masks, seal to the face and force air to pass through filtering media

When are LTC's required to use respirators

- During initial visit, when an Airborne Infectious Disease (AirID) suspected or confirmed case is not using source control
 - Unless respirator use is not feasible
- If the patient is not referred (e.g. COVID19 patient kept in SNF)
- If high hazard procedures are performed on AirID patients

Respirators and Surgical Masks



Respirators vs. Surgical Masks

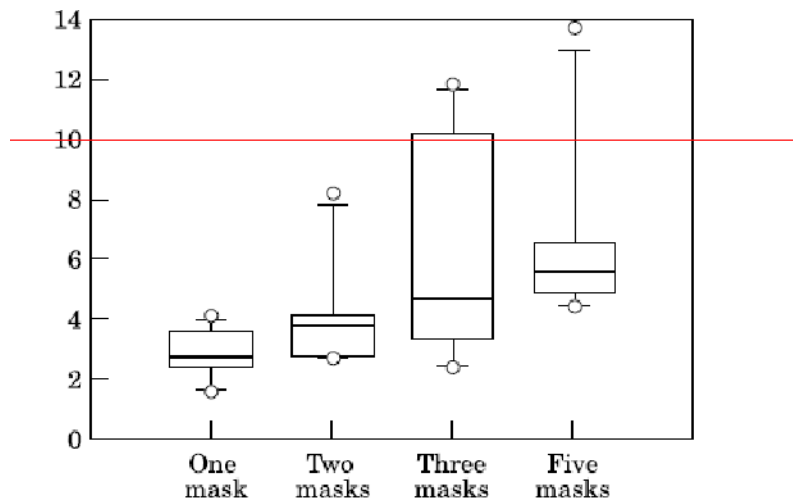
Protection provided by device without fit-testing

Type of Device	5 th percentile protection*
Elastomeric respirator	7.3
Filtering Facepiece N95	3.3
Surgical mask	1.2

*protection is outside concentration/inside concentration

Robert B. Lawrence, Matthew G. Duling, Catherine A. Calvert and Christopher C. Coffey , 'Comparison of Performance of Three Different Types of Respiratory Protection Devices', JOEH 3:9, 465 - 474

Multiple Surgical Masks



Derrick JL, Gomersall CD. Protecting healthcare staff from severe acute respiratory syndrome:filtration capacity of multiple surgical masks. In Journal of Hospital Infection (2005)59, 365-368.

Current Recommendations

- Health care workers caring for COVID-19 patients should use fit-tested N95 respirators or more effective respirators and must wear them when performing any atomizing procedures.
- CDC continues to recommend the use of respiratory protection that is at least as protective as a fit-tested disposable N95 respirator for healthcare personnel who are in close contact with patients with suspected or confirmed COVID-19.

Respirator Basics

- Respirator use in health care is regulated via Federal 29 CFR 1910.134
- Requirements
 - Reduction of hazard with engineering and administrative controls
 - Written program and designated administrator
 - Hazard assessment
 - Selection of appropriate, NIOSH approved respirators

Respirator Basics (cont)

- Medical Evaluation
- Fit-testing (initial and periodic)
- User procedures including seal check, cartridge change, and procedures for IDLH
- Procedures for storage, maintenance, cleaning and disinfection
- Training
- Record Keeping
- Program evaluation including employee involvement

Air Purifying Respirators

- Air purifying respirators remove contaminants from the air being inhaled by the user
 - Conventional APR has negative pressure in the facepiece, and is tight-fitting (generally)
 - Powered APR may have positive pressure, and may be a hood, helmet, or tight-fitting facepiece

N95 Respirators



Elastomeric Facepieces



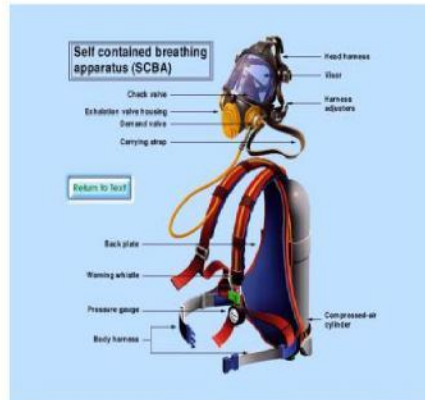
Powered Air-Purifying Respirators (PAPR)



Atmosphere Supplying Respirators

- Provide their own source of air (compressor, air tank, or portable air tank)
- Can be positive or (rarely) negative pressure
- Can be tight-fitting facepiece, or hood or helmet
- Generally do not filter air being exhaled

SCBA



Respirator Type	OSHA Assigned Protection Factors
Filtering facepiece	10 (5 being considered by ANSI)
Half-facepiece elastomeric	10
Full facepiece elastomeric	50
PAPR with hood	25 or up to 1000 (if maintain + pressure)
PAPR with tight-fitting facepiece	1000

Medical Issues with Respirator Use

- Increased resistance to air flow
- Increased dead space volume
- Increased CO₂
- Heat effects, particularly if used in conjunction with other PPE
- Physical work, ergonomics – particularly with SCBA
- Claustrophobia
- Limits to communications

Medical Evaluations

- Medical Evaluation must have the content of the questionnaire in 1910.134, Appendix C
- Questionnaire is available on many websites
- Must be evaluated by a PLHCP (physician or other licensed health care professional) who can order additional tests
- A “yes” answer to any specified question requires “further evaluation”
- An annual re-evaluation should be performed – the PLHCP and employer should specify

Fit-testing

- The purpose of fit-testing is to ensure that a selected respirator will provide the required protection factor.
- Qualitative fit-tests use a challenge agent: – bitrex, saccharine, irritant smoke, or isoamyl acetate.
- Quantitative fit-tests measure leakage:
 - Generated aerosol, ambient aerosol, controlled negative pressure.

Qualitative Fit Test



Quantitative Fit Test



Do N95's need to be fit-tested?

YES!!!

- Follow the Fit Test Kit's Manufacturer Procedure to conduct the fit test.
- Most Vendors also assist first time users

Effect of Fit-testing N95

Type	Geometric mean without fit-test	5 th %ile w/o /FT	5 th %ile pass bitrex	5 th %ile pass companion
Filtering facepiece	20.4	3.3	7.9	20.5

Source: Robert B. Lawrence, Matthew G. Duling, Catherine A. Calvert and Christopher C. Coffey , 'Comparison of Performance of Three Different Types of Respiratory Protection Devices', JOEH 3:9, 465 - 474

Additional Fit Tests

- To be provided if employee requests additional fit test
- If employee has weight gain or loss, facial changes (such as surgery or dental work) that may effect fit
- At least annually

N95 User Procedures

- User seal check difficult to perform on filtering facepiece respirators
- Can not be used in atmospheres “immediately dangerous to life or health”
- Will not protect against gases or vapors, only particles (including mists)
- Change respirator (filtering facepiece) or cartridge when breathing becomes more difficult or if dirty, wet, etc.

What’s Wrong with this Picture?

- Respirators do not work if they do not seal to the face.
- Facial hair must not interfere with the seal.
- Straps must be directly seated on the head, in this case above and below the ear



N95 Maintenance, Storage, Inspection

- Every respirator should be inspected prior to putting it on, to make sure the straps are okay, it is not torn, deformed, dirty, etc.
- Generally filtering facepiece respirators used against infectious particles should be disposed each time they are removed
- If shortage prevents disposal, employer should have storage and re-donning procedures, including procedures for handling respirator to prevent contamination
- No respirator should be put on if it is torn, wet, dirty, or unable to form a facepiece seal

Initial and Annual Training

Required training elements

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise respirator protective effect ;
- Limitations and capabilities of the respirator
- Emergency use and what to do it respirator malfunctions
- How to inspect, put on and remove, use, and check the seals of the respirator;
- maintenance and storage of the respirator;
- Medical signs and symptoms that may limit or prevent the effective use of respirators; and
- General requirements of regulation

Program Review

- At least annual
- Consult with affected employees

Record Keeping

- Medical evaluations
- Most recent fit-test
- Current respirator program made available

Respiratory Protection Guidance
from OSHA for LTC's During the
COVID-19 Pandemic

<https://www.osha.gov/sites/default/files/respiratory-protection-covid19-long-term-care.pdf>