Re-Use of Personal Protective Equipment in the COVID-19 Pandemic

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Why...
COVID-19 Personal Protective Equipment (PPE) for Healthcare Personnel

**Preferred PPE – Use N95 or Higher Respirator**
- Face shield or goggles
- N95 or higher respirator
  When respirators are not available, use the best available alternative, like a facemask.
- One pair of clean, non-sterile gloves
- Isolation gown

**Acceptable Alternative PPE – Use Facemask**
- Face shield or goggles
- Facemask
  N95 or higher respirators are preferred but facemasks are an acceptable alternative.
- One pair of clean, non-sterile gloves
- Isolation gown

[cdc.gov/COVID19](https://www.cdc.gov/COVID19)
Warnings

• Last Resort—first apply Strategies for Optimizing the Supply of N95 Respirators: Crisis/Alternate Strategies
• Voids the NIOSH approval
• Decontamination technologies should be used cautiously
  • UVGI, vaporized hydrogen peroxide, warm moist heat, etc.
• Should only be done by the organization and trained professionals
• This was the result of multiple tests, a review of the scientific literature, and incorporation of current institutional practice
Why we chose UVGI--Possible

Effects of Ultraviolet Germicidal Irradiation (UVGI) on N95 Respirator Filtration Performance and Structural Integrity


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Inactivation of Viruses on Surfaces by Ultraviolet Germicidal Irradiation

Chun-Chieh Tseng and Chih-Shan Li

Graduate Institute of Environmental Health, National Taiwan University, Taipei, Taiwan
Trust

- Discussion with HCW
  - Initial
  - Process Design
  - Process Evaluation
  - Operationalization
  - Feed Back
- Communication
  - Strategy
- Safety
  - Those Processing
  - Those Using
Process Map

Principles

• Clear
• Step by Step
• Flow from each use through reprocessing through reuse
• Everyone knows their role
• Refresher training on donning and doffing
Optimizing Process

- Trial and error
  - Placement
  - Exposure times
- Surface decontamination process not entire FFR
- UVGI is measure by room UV meter
Process confirmation

Organism Kill

- Used BSL2 bacterial and viral surrogates seeded on FFR surface to refine dosage in room
- *Staphylococcus aureus*
- Chikungunya virus
- 10 FFR at each UVGI exposure route
- $10^6$ organism kill at each round

FFR Fit

- Ran 5 FFR through qualitative fit tests to assure maintained filtration efficiency and fit
- Didn’t use quantitative as it would destroy FFR
- Don’t know how many UVGI cycles the mask can take.
- Others indicate in unpublished data—filter loading from spittle