RESPIRATORY PROTECTION
Are All Masks Created Equally?

Image courtesy of the CDC

Handouts Are Located On the Right Side of Your Screen

Click on the link and the document will open.

You can save to your computer or print the document.
Disclaimer

- Karen Gregory RN is an employee of Total Medical Compliance.
- She is a Hu-Friedy Key Opinion Leader, a consultant for SciCan and serves on the OSAP Board of Directors.
- This does not serve as legal or medical advice.

Objectives

- Discuss the different level of masks based on ASTM categories
- Explain two differences between N95 respirators and surgical masks
15 DAYS TO SLOW THE SPREAD

Listen to and follow the directions of your state and local authorities.

If you feel sick, stay home. Do not go to work. Contact your medical provider.

If your child is sick, stay home.

If someone in your household is sick, stay home.

If you are an older person, stay home and away from other people.

If you are a person with a serious underlying health condition (that can put you at increased risk for example, a condition that impairs your lung or heart function or weakens your immune system), stay home and away from other people.

For more information, please visit CORONAVIRUS.GOV

30 Days Added

Flatten the Curve

Global, Inclusive, Realtime

Updated with emerging information, and open sourced in as many languages as possible.

Quantity of cases

Health care system capacity

Time since first case
Clinical Presentation

- Incubation period ~5 day (2 – 14 days)
- Symptoms at onset
  - Fever (83 – 98%)
  - Cough (46 – 82%)
  - Shortness of breath (31%)
- Adults median age 59
- One-third to one-half have underlying illness
  - Diabetes, hypertension, cardiovascular disease

Mode of Transmission

- Early reports suggest person-to-person transmission most commonly happens during close exposure to a person infected with COVID-19, primarily via respiratory droplets produced when an infected person coughs or sneezes.
- Droplets can land on people’s faces or be inhaled into the lungs of those nearby or possibly be inhaled into the lungs of those within close proximity.
- The contribution of small respirable particles, sometimes called aerosols or droplet nuclei, to close-proximity transmission is currently uncertain.

Close Contact

a) being within approximately 6 feet (2 meters) of a COVID-19 case for a prolonged period of time; close contact can occur while caring for, living with, visiting, or sharing a healthcare waiting area or room with a COVID-19 case

b) having direct contact with infectious secretions of a COVID-19 case (e.g., being coughed on)
Scientists found in *The New England Journal of Medicine* that severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was detectable in aerosols for up to three hours, up to four hours on copper, up to 24 hours on cardboard, and up to two to three days on plastic and stainless steel. The results provide key information about the stability of SARS-CoV-2, which causes COVID-19 disease, and suggests that people may acquire the virus through the air and after touching contaminated objects. The study

**COVID-19** is an emerging, rapidly evolving situation.

Get the latest public health information from CDC: [https://www.coronavirus.gov](https://www.coronavirus.gov)

Get the latest research information from NIH: [https://www.nih.gov/ncidod/coronavirus](https://www.nih.gov/ncidod/coronavirus)

**NEWS RELEASES**

**Tuesday, March 17, 2020**

**New coronavirus stable for hours on surfaces**

SARS-CoV-2 stability similar to original SARS virus.


**Coronavirus (COVID-19)**

**What You Need to Know**

**INFORMATION CENTRAL**
DENTAL SETTINGS

Coronavirus Disease 2019 (COVID-19)

Dental Settings
Interim Infection Prevention and Control Guidance for Dental Settings During the COVID-19 Response

Key Concepts
- Dental settings have unique characteristics that warrant additional infection control considerations.
- Postpone elective procedures, surgeries, and non-urgent dental visits, and contact patients prior to emergency procedures. Stay at home if sick and know steps to take if a patient with COVID-19 symptoms enters your facility.

ADA: COVID - 19 RESOURCES

ADA Coronavirus Center for Dentists
Last updated: March 30, 2020

- Upcoming Digital Events:
  - Tuesday, March 31

ADA: Q and A

Local and State Health Departments

- Local health department
- State health department
Hierarchy of Controls

- **Elimination**: Physically remove the hazard
- **Substitution**: Replace the hazard
- **Engineering Controls**: Isolate people from the hazard
- **Administrative Controls**: Change the way people work
- **PPE**: Protect the worker with Personal Protective Equipment

Centers for Medicare & Medicaid

**CMS Adult Elective Surgery and Procedures Recommendations:**

*Limit all non-essential planned surgeries and procedures, including dental, until further notice*

To aggressively address COVID-19, CMS recognizes that conservation of critical resources such as ventilators and Personal Protective Equipment (PPE) is essential, as well as limiting exposure of patients and staff to the SARS-CoV-2 virus. Attached is guidance to limit non-essential adult elective surgery and medical and surgical procedures, including all dental procedures. These considerations will assist in the management of vital healthcare resources during this public health emergency.

Dental procedures use PPE and have one of the highest risks of transmission due to the close proximity of the healthcare provider to the patient. To reduce the risk of spread and to preserve PPE, we are recommending that all non-essential dental exams and procedures be postponed until further notice.
### ADA Guidance

- In order for dentistry to do its part to mitigate the spread of COVID-19, the ADA recommends dentists nationwide postpone elective procedures for the next three weeks. Concentrating on emergency dental care will allow us to care for our emergency patients and alleviate the burden that dental emergencies would place on hospital emergency departments.

#### DENTAL NON-EMERGENCY PROCEDURES

Routine or non-urgent dental procedures include but are not limited to:
- Initial or periodic oral examinations and recall visits, including routine radiographs
- Routine dental cleaning and preventive therapies
- Orthodontic procedures other than those to address acute issues (e.g., pain, infection, trauma)
- Extraction of asymptomatic teeth
- Restorative dentistry including treatment of asymptomatic carious lesions
- Aesthetic dental procedures

### Use of Teledentistry

A frequent question during these unprecedented times is some variation of: “May I use teledentistry to examine my patients?”

The answer from the board’s perspective is a resounding “Yes!” If, in your professional judgment, the images and information you receive are of sufficient quality for you to reach a conclusion or make a diagnosis, teledentistry is an excellent means to examine and remain in contact with your patients.

However, there are two caveats:
1. Be sure to check with any third parties about payment. The Board has no jurisdiction in this area but understands that some providers may not reimburse for teledentistry examinations.
2. Teledentistry may not be used to evade the regulations requiring direct supervision of dental hygienists and dental assistants.

The OCR is allowing the **short-term** use of certain applications for telehealth visits that do not meet HIPAA security standards. This is for a limited time in order to support response to COVID-19.

Used **for a limited time only** as they do not meet all HIPAA security requirements.
- FaceTime
- Facebook Messenger video chat
- Google Hangouts video
- Skype
- Zoom
Remote Consults

- Workers stay at home when showing signs of illness
- Reducing the number of patients going to the hospital or outpatient settings
- Excluding HCP not essential for patient care from entering their care area
- Reducing face-to-face HCP encounters with patients
- Excluding visitors to patients with confirmed or suspected COVID-19
- Maximizing use of telemedicine
Workplace Protections

- Encourage workers to stay at home with sick
- Do not require a healthcare provider’s note for return to work
- Discourage workers from sharing equipment such as desk, phones or computers
- Consider staggering shifts to increase physical distance of workers
- Remove magazines/toys from Lobby
- Check temperatures PRIOR to patient entry in to practice
- Have patients wait in the car if possible and not in the lobby area

Triage – Advance

**Emergent procedures only at this time**

- Contact patients in advance for screening
- Consider rescheduling of patients with positive responses to screening criteria
- Consider notice on website encouraging sick patients to reschedule appointments OR to contact the office prior to arrival
- Place notification on entry to practice or facility
From the GDA

- Fever
- Currently has a cough or shortness of breath
- History of significant chronic illness or compromised immune system
- You or a family member are considered high-risk
- You or a family member have traveled to a location with a level 3 travel health notice
- Airline travel in the past 2 weeks
- Previously asked to self-isolate or self-quarantine
- Close contact to an individual diagnosed with COVID-19 infection
Contact your local or state health department
Healthcare providers should immediately notify their local or state health department in the event of the identification of a PUI for COVID-19. When working with your local or state health department check their available hours.

The Basics

- Front door - Signage
- Lobby
  - Motion activated alcohol handrub
- Front desk
  - Provide a mask for patient with respiratory illness
  - Have patient complete the questionnaire
  - Hand hygiene product
  - Six feet away from the patient
- Appropriate use of PPE
  - Place patient in a room with door closed (6 air exchanges each hour)
  - Have patient wait in the car
  - Mask ASTM 2 for further triage of patients with respiratory illness
  - Remove mask when at least 6 feet away from patient
  - Hand hygiene
  - Contact local or state health department

Have patients wait in the car
Lack of Supplies?

- CDC recommends alerting your state/local health department and local healthcare coalition, with helping troubleshoot through temporary shortages.
- FDA encourages manufacturers and healthcare facilities to report supply disruptions to the device shortages mailbox: deviceshortages@fda.hhs.gov.
- Mailbox is closely monitored and is an important surveillance resource to augment FDA efforts to detect and mitigate potential supply chain disruption.

- Gown
- Mask
  - Level II ASTM
  - N95 Respirator – aerosol generating procedures
- Eye protection
  - Goggles
  - Glasses with side shields
  - Face shield
- Gloves
Respiratory Protection

- Facemasks are an acceptable alternative when the supply chain of respirators cannot meet the demand.
- Available respirators should be prioritized for procedures that are likely to generate respiratory aerosols, which would pose the highest exposure risk to HCP.
- Facemasks protect the wearer from splashes and sprays.

Add face shield

Surgical Masks

- FDA reviews and clears; class II medical device.
- Different thicknesses and ability to protect from contact with liquids.
- Block large-particle droplets, splashes, sprays, or splatter.
  - Protect the environment from the wearer
- Reduce exposure of the worker’s secretions.
- Does NOT filter or block very small particles
- Do not provide complete protection because of the loose fit.

FDA: https://www.fda.gov/medical-devices/personal-protective-equipment-infection-control/n95-respirators-and-surgical-masks-face-masks#s2
ASTM - Standards Setting

Understanding ASTM Face Mask Performance Levels

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid Resistance</td>
<td>Mask resistance to penetration by synthetic blood under pressure (mmHg). Higher fluid resistance = Higher protection.</td>
</tr>
<tr>
<td>BFE - Bacterial Filtration Efficiency</td>
<td>Percentage of aerosol particles filtered at a size of 3 microns.</td>
</tr>
<tr>
<td>PFE - Submicron Particle Filtration Efficiency</td>
<td>Percentage of submicron particles filtered at 0.1 microns.</td>
</tr>
<tr>
<td>Delta P - Differential Pressure</td>
<td>Pressure drop across mask, or resistance to air flow in mmHg O2/cm². Greater resistance = better filtration but less breathability.</td>
</tr>
<tr>
<td>Flame Spread</td>
<td>Measures the flame spread of the mask material.</td>
</tr>
</tbody>
</table>

Crosstex

ASTM Mask Levels

MAXIMUM FILTRATION
- NIOSH Approved Respirator
- High Fluid Resistance 160 mmHg
- Filtration Efficiency 95%
- Respiratory Protection Efficiency (RPE) 99.9% @ 0.3 micron
- Breathing Resistance ≤ 0.6 newtons/m²
- Flame Spread Class 1

ASTM LEVEL 3
- High Fluid Resistance 100 mmHg
- Filtration Efficiency ≥ 98%
- RPE ≥ 98% @ 0.3 micron
- Breathing Resistance ≤ 0.6 newtons/m²
- Flame Spread Class 1

ASTM LEVEL 2
- Moderate Fluid Resistance 120 mmHg
- Filtration Efficiency ≥ 96%
- RPE ≥ 96% @ 0.3 micron
- Breathing Resistance ≤ 0.6 newtons/m²
- Flame Spread Class 1

ASTM LEVEL 1
- Low Fluid Resistance 80 mmHg
- Filtration Efficiency ≥ 95%
- RPE ≥ 95% @ 0.3 micron
- Breathing Resistance ≤ 0.6 newtons/m²
- Flame Spread Class 1

LOW PERFORMANCE
- Surgical Molded Utility Mask
- Physical Barrier Only
- No LEVEL Performance Level
- Filtration Efficiency N/A

*Unless mask manufacturer certifies mask meets ASTM performance Level 1
Limited Supply?

ASTM Level 2

ASTM Level 3

N95 Respirator Healthcare

- Class II medical device
- Tight seal over the mouth and nose
- Fit-testing
- Fluid resistant
- NIOSH certified

FDA.gov
N95 Respirator - Industrial

- Tight seal over the mouth and nose
- Fit-testing
- Not necessarily fluid resistant
- NIOSH certified

Mask, N95, Surgical N95

- Standard Earloop Mask
  Photo courtesy of Newton Safety/Sanax
- Molded Cup Style N95 Respirator
  Photo courtesy of Sperian
- Molded Cup Style Surgical N95 Respirator
  Photo courtesy of Sperian
- Standard Tie on Surgical Mask
  Photo courtesy of Newton Safety/Sanax
- Pleated Style N95 Respirator
  Photo courtesy of Alpha TechPro
- Duck Bill Style Surgical N95
  Photo courtesy of Kimberly Clark
Intended Use

Mask | N95 Respirator | Surgical N95 Respirator
---|---|---
A surgical mask is intended to prevent the release of potential contaminants from the user into their immediate environment. It is also used to protect the wearer from large droplets, sprays and splashes of bodily fluids. | Occupational (including medical) use. Reduces wearer’s exposure to particles including small particle aerosols and large droplets (all non-oil aerosols). | Can be used in any occupational setting where an N95 respirator is appropriate. Medical use where a sterile field needs to be maintained. Reduces wearer’s exposure to certain airborne particles (all non-oil aerosols) and provides a barrier to splashes and sprays.

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Surgical Mask | N95 Respirator
---|---
Testing and Approval | Cleared, tested, and approved by NIOSHes per the requirements in 42 CFR Part 84 | Cleared by the U.S. Food and Drug Administration (FDA)
Intended Use and Purpose | Fluid resistant and provides the wearer protection against large droplets, splashes, or sprays of bodily or other hazardous fluids. Protects the patient from the wearer’s respiratory emissions. | Reduces wearer’s exposure to particles including small particle aerosols and large droplets (only non-oil aerosols).
Face Seal Fit | Loose-fitting | Tight-fitting
Fit Testing Requirement | No | Yes
User Seal Check Requirement | No | Yes, required each time the respirator is donned (put on)
Filtration | Does not provide the wearer with a reliable level of protection from inhaling smaller airborne particles and is not considered respiratory protection. | Filters out all levels of airborne particles, including large and small particles
Leakage | Leakage occurs around the edge of the mask when use inhales. | When properly fitted and donned, minimal leakage occurs around edges of the respirator when use inhales
Use Limitations | Disposable. Discard after each patient encounter. | Ideally should be discarded after each patient encounter and after aerosol-generating procedures. It should also be discarded when it becomes damaged or contaminated; no longer serve an effective seal to the face.
Respirators

- Personal protective device that is worn on the face, covers at least the nose and mouth, and is used to reduce the wearer’s risk of inhaling hazardous airborne particles
- Particulate respirators, which filter out airborne particles
  - Disposable or filtering facepiece
  - Reusable or elastomeric respirators
  - Powered air purifying respirators (PAPRs)

Description

- **Particulate filtering facepiece respirators**
  - Disposable
  - Commonly referred to as “N95s”
  - Filter out at least 95% of airborne particles during “worse case” testing using a “most-penetrating” sized particle

- **Elastomeric respirators**
  - Reusable respirators because the facepiece is cleaned and reused
  - Filter cartridges are discarded and replaced when they become unsuitable for further use

- **Powered air-purifying respirators (PAPRs)**
  - Battery-powered blower moves the airflow through the filters.

https://www.cdc.gov/niosh/npptl/topics/respirators/factsheets/respsars.html
Counterfeit Respirators

Example of typical markings on filtering facepiece respirators.

N95 Respirator Shortage

- Minimize the number of individuals who need to use respiratory protection through the preferential use of engineering and administrative controls;
- Use alternatives to N95 respirators (e.g., other classes of filtering facepiece respirators, elastomeric half-mask and full facepiece air purifying respirators, powered air purifying respirators) where feasible;
- Implement practices allowing extended use and/or limited reuse of N95 respirators, when acceptable; and
- Prioritize the use of N95 respirators for those personnel at the highest risk of contracting or experiencing complications of infection.

https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html
FDA Responds to CDC Request

- **Emergency Use Authorization**
- All disposable filtering facepiece respirators (FFRs) approved by the National Institute for Occupational Safety and Health (NIOSH)
- **Passed the manufacturers' recommended shelf-life, for use in healthcare settings by healthcare personnel**
- **Information on Respirator Use**

Aerosol – Generating Procedures

- Some procedures performed on patient with known or suspected COVID-19 could generate infectious aerosols. In particular, procedures that are likely to induce coughing (e.g., sputum induction, open suctioning of airways) should be performed cautiously and avoided if possible.
- If performed, the following should occur:
  - HCP in the room should wear an N95 or higher-level respirator, eye protection, gloves, and a gown.
  - The number of HCP present during the procedure should be limited to only those essential for patient care and procedure support. Visitors should not be present for the procedure.
  - AGPs should ideally take place in an airborne infection isolation room (AIIR)
  - Clean and disinfect procedure room surfaces promptly as described in the section on environmental infection control below.

Dental Guidance

- Caring for patients requiring Transmission-Based Precautions is not possible in most dental settings as they are not designed for or equipped to provide this standard of care.
- For example, most dental settings do not have airborne infection isolation rooms or single-patient rooms, do not have a respiratory protection program, and do not routinely stock N95 respirators.


Patient On-site - Dental

- Defer non-urgent procedures
  - Give the patient a mask to cover his or her mouth
  - Send the patient home if not acutely sick
  - Refer the patient to a medical facility if acutely sick (e.g., trouble breathing)
  - If treatment is urgently needed, refer to an appropriate facility

- Clean and disinfect the room and equipment according to the Guidelines for Infection Control in Dental Health-Care Settings—2003

  - Clean, disinfect, or discard the surface, supplies, or equipment located within 6 feet of symptomatic patients
  - Use products with EPA-approved emerging viral pathogens claims—

Schedule Emergency Care

- People with COVID-19 who have completed home isolation clearance can receive emergency dental care. This is defined as:
  - At least 3 days (72 hours) have passed since recovery (resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms, e.g., cough, shortness of breath), and at least 7 days have passed since symptoms first occurred.
- OR
- For individuals with laboratory-confirmed COVID-19 who have not had any symptoms, at least 7 days have passed since the date of the first positive COVID-19 diagnostic test and have had no subsequent illness.

Elements of Standard Precautions

- Hand hygiene
- Use of personal protective equipment
- Respiratory hygiene/cough etiquette
- Safe injection practices
- Instrument management
- Environmental surfaces cleaning and disinfection
TRANSMISSION-BASED PRECAUTIONS

OPTIMIZING SUPPLIES
Surge Capacity

- **Conventional capacity**: No change in the delivery of patient care.
- **Contingency capacity**: May change daily practices but may not have any significant impact on the care delivered to the patient or the safety of healthcare personnel.
- **Crisis capacity**: Are not commensurate with U.S. standards of care. These measures, or a combination of these measures, may need to be considered during periods of known facemask shortages.


Assumptions

- Aware of facemask inventory and supply chain.
- Aware of facemask utilization rate.
- Facilities are in communication with local healthcare coalitions, federal, state, and local public health partners (e.g., public health emergency preparedness and response staff) regarding identification of additional supplies.
- Facilities have already implemented other engineering and administrative control measures including:
  - Reduction in number of patients seen
  - Reducing face-to-face HCP encounters with patients
  - Maximizing use of telemedicine
- Training for any changes to normal processes.

Contingency Capacity

- Selectively cancel elective and non-urgent procedures and appointments for which a facemask is typically used by HCP.
- Remove facemasks for visitors in public areas.
  - Available to provide to symptomatic patients upon check in at entry points. All facemasks should be placed in a secure and monitored site.
- Implement extended use of facemasks.
  - Wearing the same facemask for repeated close contact encounters with several different patients, without removing the facemask between patient encounters.
- Restrict facemasks to use by HCP, rather than patients for source control
  - *Patients cover nose/mouth with tissues.*
Crisis Capacity

- Cancel all elective and non-urgent procedures and appointments
- Use facemasks beyond the manufacturer-designated shelf life
- Implement limited re-use of facemasks - using the same facemask by one HCP for multiple encounters with different patients but removing it after each encounter.
  - Carefully remove, not touching front of mask
  - Discard if soiled, damaged, hard to breath through
  - Masks with elastic loops better choice

Prioritize Use

- For provision of essential surgeries and procedures
- During care activities where splashes and sprays are anticipated
- During activities where prolonged face-to-face or close contact with a potentially infectious patient is unavoidable
- For performing aerosol generating procedures, if respirators are no longer available
No Facemasks

- Exclude HCP at higher risk for severe illness from COVID-19 from contact with known or suspected COVID-19 patients.
- Designate convalescent HCP for provision of care to known or suspected COVID-19 patients.
- Use a face shield that covers the entire front (that extends to the chin or below) and sides of the face with no facemask.

Infectious disease physicians, nurses and key leaders throughout our system, created a template for a sewn mask that meets CDC guidelines and can be used after all existing face mask options are used. While we currently have a supply of regular face mask options, the Tree Top Needlecrafters are hard at work sewing hundreds of masks that will initially be used for patients with flu-like symptoms, to help reduce exposure. In the event of a supply shortage, the masks could be used or healthcare providers.

**Hospital Masks – Instructions (1/5)**

**Materials:**
- One piece of 100% cotton, tightly woven fabric. Cut to the size of 15” x 7.5” (38cm x 19cm). NO quilted or perforated fabric
- One piece of Cut Away Embroidery Stabilizer or Interfacing (14” x 6.5”) *if available*
- 2 heavier plastic-coated wire. (such as a twist tie) 4 - 6 inches in length (no paper twist ties – as these will not stand up to washing)

**Video:**
HCP Return to Work

- **Test-based strategy.** Exclude from work until
  - Resolution of fever without the use of fever-reducing medications **and**
  - Improvement in respiratory symptoms (e.g., cough, shortness of breath), **and**
  - Negative results of an FDA Emergency Use Authorized molecular assay for COVID-19 from at least two consecutive nasopharyngeal swab specimens collected ≥24 hours apart (total of two negative specimens) [1]. See Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens for 2019 Novel Coronavirus (2019-nCoV).

- **Non-test-based strategy.** Exclude from work until
  - At least 3 days (72 hours) have passed since recovery defined as resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms (e.g., cough, shortness of breath); **and**
  - At least 7 days have passed since symptoms first appeared

- If HCP were never tested for COVID-19 but have an alternate diagnosis (e.g., tested positive for influenza), criteria for return to work should be based on that diagnosis.


HCP Return to Work

- Wear a facemask at all times while in the healthcare facility until all symptoms are completely resolved or until 14 days after illness onset, whichever is longer

- Be restricted from contact with severely immunocompromised patients (e.g., transplant, hematology-oncology) until 14 days after illness onset

- Adhere to hand hygiene, respiratory hygiene, and cough etiquette in CDC’s interim infection control guidance (e.g., cover nose and mouth when coughing or sneezing, dispose of tissues in waste receptacles)

- Self-monitor for symptoms, and seek re-evaluation from occupational health if respiratory symptoms recur or worsen
HCP Exposure

<table>
<thead>
<tr>
<th>Epidemiologic risk factors</th>
<th>Exposure category</th>
<th>Recommended Monitoring for COVID-19 (until 14 days after last potential exposure)</th>
<th>Work Restrictions for Asymptomatic HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCP PPE: None</td>
<td>Medium</td>
<td>Active</td>
<td>Exclude from work for 14 days after last exposure</td>
</tr>
<tr>
<td>HCP PPE: Not wearing a facemask or respirator</td>
<td>Medium</td>
<td>Active</td>
<td>Exclude from work for 14 days after last exposure</td>
</tr>
</tbody>
</table>


After Patient Discharge

- Disinfect surfaces with EPA registered hospital level disinfectant
- [EPA list of products](https://www.epa.gov/clean-water/list-products)
- [American Chemistry](https://www.asm.org/certified/american-chemistry-spot-checker.html)
**AFTER PATIENT DISCHARGE**

SOURCE: [www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html#b1](http://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html#b1)

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### Table B.1. Air changes/hour (ACH) and time required for airborne-contaminant removal by efficiency *

<table>
<thead>
<tr>
<th>ACH  $\frac{\text{air changes}}{\text{hour}}$</th>
<th>Time (mins.) required for removal 99% efficiency</th>
<th>Time (mins.) required for removal 99.9% efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>138</td>
<td>207</td>
</tr>
<tr>
<td>4</td>
<td>69</td>
<td>104</td>
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<tr>
<td>6*</td>
<td>46</td>
<td>69</td>
</tr>
<tr>
<td>8</td>
<td>35</td>
<td>52</td>
</tr>
<tr>
<td>10*</td>
<td>28</td>
<td>41</td>
</tr>
</tbody>
</table>

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**Respiratory Protection 1910. 134**

Establish and implement a written respiratory protection program with worksite-specific procedures.

Medical evaluation
Respiratory Protection Program

- [https://www.osha.gov/SLTC/eetools/respiratory/respirator_basics.html#fit_testing](https://www.osha.gov/SLTC/eetools/respiratory/respirator_basics.html#fit_testing)

Trusted Resources

- CDC Coronavirus website
- Local health department
- State health department
- OSAP.org
- ADA Coronavirus Info
- EPA list of products
- American Chemistry
- N95 – Filtering Facepiece Respirator Information
  - Information on Respirator Use
  - Use of stockpiled equipment
- Cybersecurity and Infrastructure Security Agency
References

- COVID-19
- Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings
- Johns Hopkins
- WHO
- OSAP
- ADA
- NIOSH

Thank you!

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