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Purpose

The purpose of this document is to provide guidance on personal protective equipment (PPE) when caring for patients who may have asymptomatic carriage with SARS-CoV-2 virus and those with suspected or confirmed COVID-19 disease.

This document outlines PPE related to the evolving COVID-19 pandemic and should be anticipated to evolve as knowledge about the SARS-CoV-2 pathogen emerges. Guidance on PPE **required** for other pathogens or care settings should be followed according to the Isolation and Standard Precautions policy [HS-IC0609](#).

A. Appropriate PPE When Caring for a Patient With COVID-19

SARS-CoV-2 Transmission Routes

The primary transmission route for the SARS-CoV-2 virus is through large droplets. Currently, PPE models also consider the potential risk of small droplet nuclei transmission (“airborne”, similar to tuberculosis or measles) although the risk of transmission through this pathway has not been proven.

Additionally, similar to some other respiratory viruses, contact with patient secretions or surfaces directly contaminated with patients secretions may play a role (although the ease of transmission by contact has not been demonstrated). Fecal-oral transmissions have not been documented as a major transmission mode for SARS-CoV-2 or other coronaviruses.

There is no significant evidence of transfusion-related infections at this time. Therefore, aerosolization of blood or other non-respiratory/non-fecal secretions or tissues is not considered a risk for transmission during routine clinical care. Other similar viruses including Influenza and other coronaviruses, have not been shown to be bloodborne pathogens.

Personal Protective Equipment Used to Interrupt Presumptive Transmission Pathways

All patients, including those with a diagnosis of COVID-19, should wear a cloth or surgical mask during encounters to minimize the spread of respiratory secretions. See [Universal Masking Guidance](#) for more details.

There are three components to health care worker personal protective equipment when caring for a patient suspected or confirmed to have COVID-19 disease:

1. **Contact precautions:** Gowns and gloves should be used for all encounters.
2. **Eye protection:** Three types of eye protection can be worn:
 - a. Goggles or glasses that cover the front and sides of the eyes
 - b. Mask with face shield
 - c. If used for respiratory protection, a PAPR also provides eye protection (see [Section E](#))
3. **Respiratory protection:** an N95 or PAPR respirator, or in some cases a surgical mask, should be used.
Note: an N95 and PAPR are considered equivalent for prevention against airborne transmission of pathogens.

The PPE model for your care setting may not require full eye protection or a respirator depending on the nature of the encounter. The following are specific considerations for non-acute care facility and other unique settings:

- **Outpatient:** In most outpatient care settings, aerosol-generating procedures including nasopharyngeal swab for diagnosis of COVID-19 are not performed. Additionally, care for the patient with COVID-19 should focus on home care including telemedicine with inpatient care when needed. The requirement for PPE, therefore, is for a brief encounter to triage a patient with suspected COVID-19. The risk of transmission with a masked patient (surgical or cloth mask) and a provider wearing surgical mask with gown and gloves is low. Therefore, if there is not a risk of direct cough or sneeze to the face, or a 6-foot distance can be kept, eye protection may be omitted. For these brief encounters an N95 or PAPR is not required. Select outpatient procedures may warrant a COVID-19 PPE model where the risk of transmission from an asymptomatic patient is elevated. (See [Appendix C](#))
- **Long-term Care Facility:** In the long-term care setting, the provision of medical care is more limited. The PPE required for low-acuity illness should include a surgical mask with face shield (or surgical mask with other eye protection) gown, and gloves. The PPE model may be adapted if there is more than one patient with suspected or confirmed COVID-19 in a facility.
 - Symptom screening, and in various permutations asymptomatic carriage screening, is happening at all long-term care facilities. Shift-use masks are provided upon entry at skilled nursing, personal care, and assisted living facilities. In these long-term care settings, UPMC-provided shift-use masks must be worn in all clinical areas at all times. [Refer to these shift-use mask guidelines in long-term care facilities for more information.](#)
- **Home Health Settings:** For encounters in the home health setting with patients with suspected respiratory infection standard precautions should be used, including a surgical mask (with eye protection if available), gown, and gloves. If patients do not have a cloth mask available a surgical mask should be provided to wear during the encounter. The patient can keep the mask clean and intact for reuse on return visits. For a patient diagnosed with COVID-19, the PPE model should include an N95 for respiratory protection, gown, and gloves. [COVID-19 related protocols for home health and family hospice can be found here.](#)
- **Imaging Services:** Radiology personnel may come into close contact with patients in the inpatient or outpatient setting. Guidance for PPE use in Imaging Services for COVID-19 suspected or confirmed patients, and those who are undergoing a high-risk aerosol-generating procedure can be found in [Appendix A](#).
- **Labor and Delivery:** [Find the recommended PPE for COVID-19 positive patients or PUI for labor and delivery here.](#)
- **Anesthesia-specific PPE Steps:** Guidance for PPE donning and doffing including transfer of patients to ICU can be found in Appendix B.

Clinical encounters that entail non-procedural, face-to-face contact with a patient *without* COVID-19 disease or substantial risk of aerosolization do not require a COVID-19 PPE model while healthcare workers perform universal masking. Appropriate PPE for these encounters includes a surgical mask with the addition of eye protection only if otherwise standard for the clinical situation outside of COVID-19. See Appendices [C](#) and [D](#) for aerosol-generating and surgical procedures that do warrant COVID-19 appropriate PPE in asymptomatic patients.

Inpatient PPE Guidance

In the inpatient setting, engineering controls and PPE may be a limited resource. Alternatives should be considered and factor the risk of transmission based on patient symptoms and treatment being received. Guidance on [Engineering Controls for COVID-19](#) can be found on the [Infonet](#).

Clinical Situation-Based PPE Guidance

The table below outlines the appropriate PPE model based on the clinical or microbiologic diagnosis of COVID-19.

Patients With COVID-19 Disease or Carriage	
COVID-19 suspected, testing pending	<ul style="list-style-type: none"> ✓ Droplet precautions (surgical mask)* ✓ Eye protection (PAPR, face shield, or goggles) ✓ Gown ✓ Gloves <p><i>* Airborne precautions (N95 or PAPR) should be used for aerosol-generating procedures.</i></p>
COVID-19 confirmed	<ul style="list-style-type: none"> ✓ Airborne precautions (N95 or PAPR)* ✓ Eye protection (PAPR, face shield, or goggles) ✓ Gown ✓ Gloves <p><i>* At the direction of Infection Prevention, facilities may employ droplet precautions (surgical mask) for select patients at low risk of transmission.</i></p>
Asymptomatic patients with a positive screen (nasopharyngeal PCR) for SARS-CoV-2	<ul style="list-style-type: none"> ✓ Airborne precautions (N95 or PAPR)* ✓ Eye protection (PAPR, face shield, or goggles) ✓ Gown ✓ Gloves <p><i>* At the direction of Infection Prevention, facilities may employ droplet precautions (surgical mask) or discontinue isolation precautions on a case-by-case basis.</i></p>
COVID-19 Is Not Suspected or Diagnosed [#]	
General care	No COVID-19 related precautions required other than shift mask. <i>Use other transmission-based precautions if other pathogens are present.</i>
Aerosol-generating procedure (see Appendix C)	<ul style="list-style-type: none"> ✓ Airborne precautions (N95 or PAPR) ✓ Eye protection (PAPR, face shield, or goggles) ✓ Gown ✓ Gloves
Specified surgical procedures (see Appendix D)	<ul style="list-style-type: none"> ✓ Airborne precautions (N95 or PAPR) ✓ Eye protection (PAPR, face shield, or goggles) ✓ Gown ✓ Gloves
General inpatient care before/after an aerosol-generating procedure or surgery (Appendix C & D)	No COVID-19 related precautions required outside of the peri-operative/procedural setting other than shift mask. <i>Use other transmission-based precautions if other pathogens are present.</i>

Surgical procedures other than those specified in [Appendix D](#)

No COVID-19 related precautions required other than a shift mask.
Use other transmission-based precautions if other pathogens are present.

Includes:

- Asymptomatic patients with no testing or a negative screening test
- Symptomatic patients with alternative diagnoses
- Symptomatic patients who test negative for COVID-19 (in the absence of high pre-test probability)
- After resolution of contagious COVID-19 disease (see [Discontinuation of Isolation Precautions.](#))

PPE Model When Alternative COVID-19 Engineering Controls Are Used

Negative Pressure Pod, Unit, or Wing PPE Requirements

- The entire pod/unit/wing is under negative pressure to areas adjacent to the pod.
- Ideally, negative pressure pods should have a room/area for donning and doffing outside of the unit/pod.
- Since the entire pod/unit/wing is a negative pressure space, **respiratory and eye protection** PPE should be worn **at all times**. Gloves and gowns should be changed between patient encounters.
 - Before entering the pod/unit/wing don your PPE.
 - When exiting the pod/unit/wing remove your PPE.
- PPE needed:
 - Gloves
 - Isolation gown
 - Goggles or face shield if wearing N95 respirator or PAPR

Additional Considerations

- Properly caring for a patient with COVID-19 does not require deviation to the Dress Code policy [HS-HR0714](#); or the Dress Code in the Operating Room policy [HS-OR0010](#).
- Boot covers and other PPE not described are not required for the care of a patient with COVID-19 disease.
- [Read more about non-UPMC issued PPE.](#)
- For information about how to safely transport patients through the hospital, [refer to this guide.](#)

B. PPE Conservation Through the Local Facility and PPE Champions

Local Command Centers and PPE Champions at each facility are responsible for the appropriate use and distribution of PPE including N95s.

Universal Masking

Shift-use masks are **mandatory** to be worn at all times in all clinical areas, high-traffic public areas (i.e. hallways, cafeterias, lobbies, elevators), non-clinical areas, and patient or resident rooms in these levels of care:

- Hospitals and hospital-based outpatient clinics including oncology and transplant
- Cancer Centers
- Skilled nursing, assisted living, personal care, and independent living long-term care residences

- Outpatient locations

Patient care or clinical care areas are defined as the physical or recognized borders of inpatient and outpatient areas where patients may be seen, evaluated, treated, or wait to be seen.

[Review our updated universal masking guidelines.](#)

Medical exemptions for shift-use mask wear may be granted based on certain medically based reasons. Employees seeking a medical exemption should contact your local HR department. Any staff member who does not comply may be subject to corrective action up to and including termination.

Distribution of N95s

In order to conserve the use of N95s, the Local Command Center will distribute N95s to providers at the beginning of the provider's shift. The Local Command Center is responsible for signing out N95s and tracking their use.

If just-in-time fit testing is indicated ([see Section C](#)), this can be performed at the Local Command Center or designated area, and providers will be offered these guidelines for education about appropriate N95 use.

Non-UPMC Issued PPE

Due to national shortages of PPE, the CDC has offered guidance to optimize, extend, and deploy alternatives to the standard PPE issued by UPMC for use in all clinical settings. Furthermore, the Joint Commission has also allowed exceptions to hospitals needing to deploy external resources when standard PPE is unavailable.

As a result of UPMC's strong supply chain and continuous review of daily PPE usage, the implementation of PPE conservation and extended use guidelines, and the limiting of non-essential use of PPE, **UPMC is not at a point where standard PPE is unavailable.**

Commercially Available PPE

If staff can provide commercially available PPE products, UPMC will not deny staff the ability to use these products.

These products **must** be reviewed by the business unit leads or the Local Command Center to ensure that they are reasonable, comparable, and are not disruptive to the clinical work. Staff using non-UPMC equipment for PPE are responsible for the care and outcomes of use.

Cloth Face Masks

Cloth face covering (cloth mask) should NEVER be worn in place of a surgical mask or respirator where these are required for patient care or in public or clinical areas defined above.

If your job previously did not require the wearing of PPE or if you are not involved in direct patient care (non-clinical areas), you may consider wearing a cloth mask. [Read the Shift Use Mask Guidelines for more information about wearing cloth masks.](#)

Other Conservation Measures

The Local Command Center and PPE Champion should follow these best practices:

1. Ensure staff adhere to standard PPE conservation practices including limiting non-essential providers from patient care and combining patient care activities to reduce extraneous room entries during a shift.
2. Communicate with Infection Prevention regarding the requirement for transmission-based precautions for non-COVID-19 patients.
3. Do not discard PPE stored *outside* a patient's room. These PPE items should not be returned to supply but should be used for other patients. PPE stored *inside* a patient's room should be discarded after discharge.
4. Minimize airborne PPE usage by cohorting COVID-19 patients where feasible, using alternative engineering controls and PPE where needed, and following guidelines for Extended Use of N95 respirator ([see Section D](#)).
5. PAPRs are a limited resource and should be used in place of an N95 if the wearer has facial hair or has not successfully completed just-in-time fit testing. PAPRs may also be considered for continuous use in COVID-19 specific units.

Optional Special Teams Approach

If your facility has providers that perform a lot of procedures that entail use of an N95 or PAPR, consider a “special teams” approach to limit the number of providers who will use PPE. These designated providers must practice N95 reuse and extended use ([see Section D](#)).

Inappropriate Uses of an N95 Respirator

Inappropriate uses include:

- For patients not requiring airborne and/or contact precautions
- Underneath a PAPR
- To feel “better protected”
- To protect visitors and family members
- If you have facial hair that prevents a proper seal
- For routine fit testing (see Section D)
- During the transport of non-intubated patients (see [Transportation Guidelines](#))
- For staff not involved in direct patient care (non-clinical areas)

Do not wear a surgical mask over a N95 mask unless a surgical mask with face shield is the only accessible option for eye protection. Combining a surgical mask and N95 does not extend the use of the N95 mask, nor does it offer greater protection from respiratory viruses.

C. N95 Fit Testing

For general information about the UPMC Respiratory Protection Program, refer to [policy \(HS-FM0205-PRO\)](#).

Anticipating supply disruption and increased demand during the response to COVID-19, the UPMC N95 fit testing program has been modified.

Providers who will use an N95 and who have not been previously fit tested *at any time previously*, OR who have had a change in facial habitus will undergo just-in-time fit testing. **This will take place on the morning the need is anticipated under the direction of the Local Command Center or PPE Champion and Environmental Health and Safety.**

All fit test failures must wear a PAPR and coordinate with local Environmental Health and Safety group to evaluate other options for fit testing or masks.

The health care workers will complete the [UPMC Employee Health Medical Evaluation Form](#) in person prior to receiving the respirator fit test. The staff member should submit the completed Medical Evaluation to UPMC Employee Health and retain a copy of the form.

- Interoffice mail: UPMC Employee Health, RM1111 Kaufmann Bldg.
- Secure email: UPMCEmployeeHealth@upmc.edu

The Local Command Center or PPE Champion is responsible for notifying Employee Health via email. (UPMCEmployeeHealth@upmc.edu) that testing was completed. Include the following information:

- Date and time of N95 fit testing
- Name, title, and department of person who was fit tested
- Name of tester

D. N95 Conservation Measures

To conserve supply, all staff should practice N95 reuse and extended use. This section will describe how to safely use N95 respirators for more than a single encounter.

Definitions:

- **Reuse** — wearing one N95 respirator, with doffing and re-donning the same respirator.
- **Extended use** — wearing the same N95 respirator for repeated close contact encounters with several patients without removing the respirator between patient encounters.

N95 masks may be worn for up to 12 hours and then should be reprocessed for disinfection (if available at your facility) or discarded.

Appropriate N95 Respirator Reuse

In order to reuse your N95 respirator:

- Perform hand hygiene with soap and water or an alcohol-based hand sanitizer before and after adjusting or removing the respirator.
- Avoid touching the inside of the respirator.
- Store the mask in a clean container in a clean space.

Appropriate N95 Respirator Extended Use

Extended use will only be utilized where serial contact with multiple suspected or confirmed COVID-19 patients might fit naturally into the workflow such as triaging multiple patients in admissions, operating or procedural rooms, for care in units for isolation of cohorted COVID-19 patients. Employees and supervisory personnel will be trained in appropriate

and safe extended use per protocol by the Infection Prevention and Control or Environmental Health and Safety departments. During extended use, the N95 may be removed during breaks or meals. Extended use should also be considered in the “Optional Special Teams Approach” ([Section C](#)).

Safely Performing Reuse and Extended Use for N95 Respirators

Storage

1. Use a food service closable container or similar simple clean container to store your mask. (Containers should be made available in the local command center.)
2. Label the container with your name.

Donning

1. Open the outside of the container, leave the container open.
2. Perform hand hygiene.
3. Place mask on.
4. Perform hand hygiene.

Doffing

1. [Follow proper doffing procedure.](#)
2. Perform hand hygiene.
3. Grab mask from rubber bands to remove and place in the open container.
4. Perform hand hygiene.
5. Close the container.
6. Don a new shift-use surgical mask. [Refer to the shift- use mask guide for more details.](#)

When to Discard an N95 Mask

N95 mask should be discarded if any of the following conditions occur:

- When the respirator becomes contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients
- If the respirator becomes visibly soiled, damaged in any other way, or is difficult to breathe through
- At the end of your shift (discard the storage container as well)

N95 masks do not need to be discarded after an aerosol-generating procedure, as long as the above conditions do not occur.

Decontamination of N95 Masks

UPMC is partnering with Battelle for the reprocessing of N95 respirators. The Battelle Decontamination System has been authorized for emergency use to decontaminate compatible N95 or N95-equivalent respirators. [Visit Battelle’s website to find more information on how the process works](#) and to access printable resources to share with your staff.

[Staff using respirators will need to label masks according to these instructions.](#) Be sure to include:

- Hospital three-digit code
- Name (on inside of mask)
- Two-digit unit code _____

Central Supply will coordinate overall packing and pick up with information provided by Battelle.

UPMC staff should not use UV light or other methods to disinfect and reuse N95 masks.

E. PAPR Use and Cleaning Protocol

When to use a PAPR

N95s are the preferred respirator due to limited availability of PAPRs at most facilities. However, an N95 and PAPR are considered equivalent for prevention against airborne transmission of pathogens. When a respirator is recommended, a PAPR may be used in place of an N95 if the wearer has facial hair or has not successfully completed just-in-time fit testing. If a PAPR is used in the operating room setting, an elongated PAPR hood should be used if available.

Guidelines on PAPR use can be found on [Infonet by searching "PAPR guidelines."](#)

PAPR Hood Disinfection Protocol

Use this standard method to clean and reuse 3M PAPR hoods:

1. Perform hand hygiene.
2. Don protective gloves.
3. Place headcover on hard, cleanable surface, such as a table or countertop.
4. Inspect hood for damage. If it has damage (tears, punctures, split seams) discard.
5. Using hospital-approved disinfectant wipes:
 - a. Wipe exterior surfaces, then discard wipe.
 - b. Obtain a second wipe. Wipe the interior of hood. Do not soak head band.
6. Use disinfectant wipe to clean the surface where hood disinfection occurred.
7. Place hood on clean surface and allow dwell time associated with the wipe used.
8. Doff gloves.
9. Perform hand hygiene.
10. Allow the headcover to dry before reuse.
11. Following dwell time, survey the outside/inside of face shield of the hood for streaking from the disinfection process. If streaked the shield may be wiped with a paper towel dampened with clean water.
12. Hood may be returned to storage for reuse by health care workers.

F. Eye Protection Cleaning and Reuse

PPE used for eye protection, including goggles, glasses, face shield, and PAPR ([see Section F](#)) should be used for multiple patient encounters to conserve supply. Providers may practice both reuse and extended use ([see Section E for definitions](#)) for goggles, glasses, and face shields.

These PPE should undergo low-level disinfection with a hospital-approved disinfectant wipe between patient use or in-between providers.

- Goggles and glasses should be put back into circulation for use by other staff after disinfecting.
- Face shields
 - Only clean the clear plastic part of the face shield.
 - These should only be used by one person and should not use for more than one shift before discarding.

If there is any visible damage to the PPE it should be discarded.

G. Conservation of Other PPE

Find information about conserving surgical gowns by [searching “surgical gown conservation” on Infonet](#).

H. Instructions for Don and Doff

General guidance on PPE donning and doffing is available:

- [Review this donning and doffing flier.](#)
- [Watch this donning and doffing video.](#)
- Read this [PAPR Use document](#)

Appendix A: Imaging Services PPE Guidance

In outpatient and inpatient imaging services, the PPE model should follow guidance described in [Section A](#).

Additionally, engineering controls are described in the [Engineering Controls for COVID-19 document](#).

Additional precautions to minimize transmission risk:

- Dedicated scanners/rooms when possible.
- Minimize technologist, physician, and staff interactions (special teams).
- Specifically, for MRI and other procedural patients, encourage radiologist/ordering physician discussion before patient arrives to determine risk/benefit of test to ensure best plan of care for patient while minimizing staff exposure and use of PPE.

N95 PPE and MRI Safety

Ensure each MRI site has staff available to go into scanner who can wear N95 mask if indicated.

Halyard Yellow Procedure Mask Reference 47117:

- The yellow procedure mask contains a ferromagnetic strip across the nose portion of the mask. This strip will need to be removed for any patient undergoing an MRI.
 - Remove strip by cutting a small slit over the end of the metal and pull out of mask.
 - You can use a small piece of medical tape over the nose to hold the mask in place, if needed.
 - When scan complete, replace patient mask with new one if metal bridge was removed.
- For MR staff, the yellow mask poses no safety issue.
 - This mask will pull slightly on your face when you stand very close to the mouth of the bore.
 - Due to the metal strip, you may want to avoid leaning into the bore while wearing it.
 - If pull becomes an issue, you can easily remove the strip from the mask.

N-95 Halyard Reference 46767 (orange in color)

- This orange N95 mask contains a non-ferrous strip across the nose portion of the mask.
- Poses no danger to MR staff wearing the mask.

Appendix B: PPE Model Including Donning and Doffing for Anesthesia Services

Given airway management is a highly aerosolizing procedure, anesthesia services will follow the PPE model recommended in [Section A](#) for **aerosol-generating procedures**.

This model will be followed during airway management and during other high-risk aerosolizing-procedures for **all patients** including:

- COVID-19 positive patients – via testing
- Patients under investigation (PUIs) – test is planned or pending
- Patients who have screened positive – via history
- Patients who have screened negative – via history

- COVID-19 negative patients- via testing

All donning and doffing of this PPE will be in accordance with this [link](#).

PPE Model

- ✓ Airborne precautions (N95 or PAPR)
- ✓ Eye protection (PAPR, face shield, or goggles)
- ✓ Gown
 - Impervious surgical gown only for team member performing airway procedures
 - Yellow gown for other team members
- ✓ Gloves

Intraoperative Care

- Anesthesia staff entering and exiting the procedural location will be minimized for positive patients and PUIs.
- However, utilizing proper donning and doffing procedures in the link above, staff may enter and exit the room as needed to care for the patient or care for other patients.

Transport of Positive Patients and PUIs to the ICU or PACU

- Anesthesia transport of a patient varies from usual transport practices because of the requirement that anesthesia team members be ready to care for the patient, including airway management, during any transport.
- Therefore, unlike other transport practices, anesthesia team members transporting a patient do so using the same PPE model as used during the procedural care of the patient.
- However, doffing and re-donning of a new gown and new gloves is required prior to leaving the procedural room.
 - Team members doff gown and gloves used during case in procedural location before leaving OR with patient by relieving each other from patient care.
 - Each dons new gown and gloves prior to transport.
 - After transport, team members doff in patient's PACU or ICU room.

Appendix C: Potentially Aerosol-generating Procedures in the Non-operative Setting

The following diagnostic or therapeutic interventions in the non-operative setting are considered potentially aerosol-generating procedures. For these interventions, the risk of aerosolization may be proven, commonly accepted, or merely theoretical. Until research or public health guidelines suggest less precautionary PPE models, UPMC will provide PPE appropriate for COVID-19 in patients *without* COVID-19 disease to attenuate the risk of transmission from an asymptomatic carrier. Actions that may mitigate the risk of aerosol generation for all procedures are denoted and when available should be considered for all patients to reduce the risk of exposure to any pathogen.

See [Appendix D](#) for Surgical Procedures for which COVID-19 precautions should be considered in patients not considered to have COVID-19 disease.

Aerosol Generating Procedure	Mitigation Actions
Nasopharyngeal swab for respiratory virus testing	
Respiratory Failure and Airway Management	
Intubations	
Extubations	
Manual ventilation	AMBU Bag with proximal exhalation filter before PEEP valve – UPMC Item # 0180607
Prolonged face mask ventilation	
High flow nasal cannula	MAX 6 liters consider transition to Simple Mask or NIV Cpap
Non-Invasive ventilation	Filtered Exhalation on circuit V 60 Cpap – UPMC Item # 10340
Breaking closed ventilation system	
Endotracheal tube repositioning	
ETT fixation device change	
Tracheostomy management	
Respiratory Diagnosis, Toileting, and Therapy	
Bronchoscopy procedure	
Bronchial alveolar lavage	
Sputum induction	
Endotracheal and endonasal suctioning	Closed Suction during mechanical ventilation – UPMC Item ID # ETT-0213883 / Tracheostomy-0213885
Administration of aerosolizing or nebulizing medications	Nebulizers with exhalation filter 0.14 microns – Salter Labs Nebutech UPMC ID ref # 8982-7
Chest physiotherapy (manual)	
Chest vest (automated)	
Cough in/exsufflation therapy	
Hyperinflation therapy (IS/Flutter/EZPAP)	Filter Exhalation-UPMC Item # 0241717
Pulmonary function testing/spirometry	

Sleep studies (including with non-invasive ventilation)	
Non-Respiratory Care	
Cardiopulmonary resuscitation	
Exercise cardiac stress testing	
Nasogastric tube placement	
Esophageal manometry	
Fiberoptic endoscopic evaluation of swallowing	

Appendix D: COVID-19 PPE for Select Surgical and Interventional Procedures

The following surgical and interventional procedures are those for which the potential for encountering SARS-CoV-2 virus in **asymptomatic** patients may present a risk of aerosolization and therefore exposure risk to health care workers **in the operating room**, or for which the risk of aerosolization of virus may not be significant, but for which airborne protection has been suggested pending further study.

Note: this procedure list is not intended to be used as a list of procedures warranting pre-operative asymptomatic screening. Please see [COVID-19 Asymptomatic Testing Processes](#) for a description of procedures included in the asymptomatic screening program.

Cardiac Surgery
<ul style="list-style-type: none"> • Bronchoscopy • Tracheostomy (open or percutaneous) • Redo sternotomy cases in which the lung tissue is entered during mediastinal dissection • Thoracotomy procedures (especially redo thoracotomy) for which lung tissue is abraded during adhesiolysis • Sternotomy with high speed drill • Primary chest cardiac surgical procedures (e.g., CABG, valve repair/replacement, LVAD implantation, heart transplantation)
Heart and Vascular Institute
<ul style="list-style-type: none"> • TEE with sedation (unintubated) • TEE with intubation • Cardiac catheterization
Interventional Radiology
<ul style="list-style-type: none"> • Lung biopsy • Lung ablation • Thoracentesis • Pleural drains • Chest tube for pneumothorax • Bronchial artery embolization • Nasogastric Tube (NG tube) placement • Gastrostomy • Gastro-jejunostomy tube placement • Jejunostomy
Gastroenterology Lab
<ul style="list-style-type: none"> • EGD • ERCP • EUS • Transnasal endoscopy • PEG • Colonoscopy • Flex sig • Anoscopy
Gastrointestinal Surgery
<ul style="list-style-type: none"> • Laparoscopic and robotic cases • Endoscopy and proctoscopy

Gynecologic Surgery

- Laparoscopic and robotic cases

Neurologic/Spine Surgery

- Endoscopic endonasal surgery – pituitary/skull base
- Craniotomy with involvement of frontal sinus
- Transmastoid approach
- CSF rhinorrhea/otorrhea
- Craniotomy with high speed drill
- Internal stabilization of lumbar, thoracic, or cervical fractures
- Decompressive laminectomy lumbar, thoracic or cervical spine (IF using high speed drill)
- I&D Spinal abscess lumbar, thoracic, or cervical spine (IF using pulse lavage)
- I&D infected instrumentation lumbar, thoracic or cervical spine (IF using pulse lavage)

Ophthalmology

1. Medial or inferior orbital tumor resection (transconjunctival / trans lid biopsy not high risk)
2. Orbital fracture repairs
3. Medial or floor orbital decompression
4. Orbital and periorbital abscess drainage
5. DCR for uncontrolled infection
6. Enucleation
7. Osteotomies with high speed drill

Otolaryngology Surgery

- Tracheostomy
- Surgical resection of upper aerodigestive tract malignancies
 1. All SCCA regardless of stage. (non-cutaneous)
 2. Sinonasal/skull base malignant tumors
 3. Ear malignancy/temporal bone resection
 4. Complications of head and neck procedures
 1. Post-operative hematoma
 2. Flap failure
- Airway procedures
 1. Direct laryngoscopy and/or bronchoscopy
 1. Highly suspicious lesions require biopsy
 2. Treatment of glottal incompetence in critically ill patients
 2. Removal of airway or esophageal foreign bodies or obstructive benign lesions (Respiratory Papillomatosis)
- Nasal endoscopy
- Endoscopic endonasal surgery
 1. Urgent endoscopic endonasal approach for neurologic or visual compromise
 2. Recalcitrant epistaxis
 3. Infectious complications of sinusitis
 1. Abscess
 2. Intracranial extension
 3. Orbital extension
 4. Complications associated with benign sinonasal tumors
 5. Skull base osteomyelitis that is symptomatic
 6. CSF rhinorrhea

- Transoral procedure (non-malignancy)
 1. I&D of head/neck abscess with intraoral communication
 2. Repair of facial fractures or related head/neck trauma intraoral
 1. Mandible/mid-face
 3. Recalcitrant sialoadenitis
 4. Intraoral bleeding
- Otologic surgery requiring mastoidectomy
 1. Infectious complications of otitis media/mastoiditis
 2. Facial nerve paralysis
 3. Translabrynthine/transcochlear approaches
 4. CSF otorrhea (Select cases)
- Thyroidectomy
 1. Advanced stage thyroid malignancies
 2. Non-papillary thyroid cancer
- Cutaneous malignancies
 1. Melanoma
 2. Advanced stage squamous cell carcinoma without intraoral or intranasal communication
- Salivary Malignancy
- I&D of neck abscess without intraoral communication
- Repair of facial fractures (non-oral)
 1. Orbit (except medial wall, high-risk)
 2. Zygomatic maxillary complex

Orthopedic Surgery

- Orthopedic procedures requiring powered instruments to drill, cut, or ream bone and/or need for pulsatile lavage

Thoracic Surgery

Category – Endoscopy of the upper aerodigestive tract

- Rigid bronchoscopy
- Rigid esophagoscopy
- Airway stenting/stent removals
- Airway laser procedures (trachea/endobronchial, including PDT and Nd:Yag laser)
- Endobronchial or endo-tracheal tumor debridement (mechanical or laser assisted)
- Esophageal stenting/stent removals
- Flexible bronchoscopy
- Flexible esophagogastroduodenoscopy/EGD
- Flexible bronchoscopy in intubated patient for pulmonary toilet/mucus clearance
- Chest tube placement
- Flexible esophago-gastroduodenoscopy in intubated and paralyzed patient

Category: Operative procedures

- Tracheostomy and tracheal surgery
- Bronchial sleeve resection/open bronchoplasty
- Lung resection (open thoracotomy)
- Lung resection (“closed” procedure such as VATS or robotic)
- Esophageal surgery (open/VATS/robotic)
- Sternotomy with high speed drill