

## Ten top tips: preventing pressure ulcers under face masks



Author:  
Joyce Black

Perhaps you have seen photographs of nurses with facial injury from masks used to care for COVID-9 patients. These alarming photos add to the collective anxiety of on-the-job injury during this pandemic.

### 1 You don't need to learn new science about pressure ulcer aetiology; it's the same physical forces at work:

The same physical forces that lead to pressure ulcers in patients lead to pressure injuries under a face mask. Pressure, shear, friction and microclimate are damaging forces to soft tissue. The intensity of pressure under a tight-fitting mask, such as an N-95 mask [Figure 1], leads to cellular deformation. The N-95 mask is meant to be worn tightly on the face, in order to create a seal to block inhalation of droplets of viruses from the air. The duration of pressure from wearing the mask for an entire shift of work is perhaps the biggest offender. The N-95 mask was designed to protect healthcare workers from exposure to tuberculosis, measles and meningitis. However, these cases were few and far between, and clinicians could take the mask off when outside of the room and caring for other patients. Now, wards of COVID-19 patients do not allow time to reduce the duration of exposure. Friction and shear can also be forces applied to the skin when the mask rubs on the face. Finally, the moisture that collects from exhaled air within the mask creates a hot environment. This moisture weakens the skin on the face, increasing risk of harm from the other physical forces. Surgical and procedure masks are intended to provide broad barrier protection. These types of masks do not need to be worn as tightly across the face and the edges of the mask are not designed to form a seal around the nose and mouth. They do clip tightly to the nose and anchor behind the ear and can lead to pressure injury in those places. Surgical and procedure masks cover the mouth and nose, and block potential contaminants in the immediate environment. They are not intended to protect from COVID-19 exposure (U.S. Food and Drug Administration, 2020).

### 2 N95 respirator masks and all personal protective equipment (PPE) must be worn correctly:

During times of shortages of equipment, it is tempting to take shortcuts to get work done. However, due to the pathogenicity of COVID, follow the existing regulations. COVID-19 is from a large

family of single-stranded RNA viruses, therefore, capable of mutation. The virus causes illnesses ranging from the common cold to respiratory failure. The pathogenic mechanism that produces pneumonia seems to be particularly complex. Recent data indicate that the viral infection can produce an excessive immune reaction in the host, labeled a 'cytokine storm'. The effect is extensive tissue damage and acute systemic inflammatory syndrome characterised by fever and multiple organ dysfunction (Cascella et al, 2020). Originally, N95 masks were classified as single-use items. Now that there is a shortage, they are being reused and re-sterilised. No data are available on what happens to the mask over time, so if your respirator is damaged or soiled, or if breathing becomes difficult, you should remove the respirator properly, discard it properly, and replace it with a new one. To safely discard your N95 respirator, place it in a plastic bag and put it in the trash. Wash your hands after handling the used respirator.

### 3 Be fitted for an N95 mask prior to patient care and confirm the seal during periods of long wear time:

Guidelines exist for how to fit an N95 mask to the shape and size of the face. N95 respirators are not designed for children or people with facial hair. As a proper fit cannot be achieved on children and people with facial hair, the N95 respirator may not provide full protection in these people. Confirming the seal of the mask by blowing out through the mouth and checking for air leaks will help you determine that the mask is still properly fitting.

### 4 Preventing spread of infection is the major function of the mask and cannot be compromised:

The recommendations that follow are designed to complement the proper use of PPE, especially the N95 mask. The tight fit on the N95 is intentional and the application of dressings at the interface can prevent the mask from fitting tightly.

### 5 Keep your facial skin clean and moisturised:

Continuous exposure to moisture under the mask increases the risk of injury from the mask. During down times, cleanse the skin with a pH-balanced product and moisturise the skin with a facial moisturiser. While it might seem counterintuitive to moisturise damp skin, moisturisers are more than water and help to restore the skin's architecture.

Joyce Black is Professor, College of Nursing, University of Nebraska Medical Center, Omaha, US

Figure 1. N95 face mask.



## References

- Cascella M, Rajnik M, Cuomo A et al (2020) *Features, Evaluation and Treatment Coronavirus (COVID-19)*. StatPearls [Internet]
- National Pressure Injury Advisory Panel (2020) *NPIAP Position Statement on Preventing Injury with N95 Masks*. Available at: <https://bit.ly/2xsWbhO> (accessed 17.04.2020)
- U.S. Food and Drug Administration (2020) *N95 Respirators and Surgical Masks (Face Masks) U.S. Food and Drug Administration*. Available at: <https://www.fda.gov/medical-devices/personal-protective-equipment-infection-control/n95-respirators-and-surgical-masks-face-masks#s2>. Published 2020 (accessed 20.04.2020)

Figure 2. NPIAP infographic on protecting facial skin.



## PROTECTING FACIAL SKIN Under PPE N95 Face Masks

- 1

### PREP YOUR SKIN

  - Cleanse your face gently with pH balanced cleansers
  - Apply liquid skin sealants/protectants on areas of direct mask contact and allow to dry
  - Do not use petrolatum jelly or mineral oil as a skin sealant
- 2

### GET THE PRESSURE OFF!

  - Remove the mask by lifting at the sides for at least 5 minutes every 2 hours, and ideally 15 minutes every 2 hours
  - If this time frame isn't practical, any pressure relief is helpful
- 3

### DO IT ALL SAFELY!

  - Do not use dressings that alter the seal of the N-95 mask
  - If you use thin prophylactic dressings on your nose or cheeks, recheck the seal of the N-95 mask
  - Preliminary reports indicate thin dressings can be used under other PPE devices if they don't impair the function of the PPE device
  - When removing the thin prophylactic dressing, close eyes and avoid inhaling any aerosolized virus or particles
- 4

### HELP WOUNDS HEAL

  - Treat abrasions from masks with moisturizer, skin sealant, cyanoacrylate or a thin dressing
  - Do not apply cyanoacrylates near the eyes or mouth

Please refer to the NPIAP position statement on preventing injury with N95 masks for more detail ©2020 NPIAP | [www.npiap.com](http://www.npiap.com)

the case of dressings with a porous outer surface (NPIAP, 2020). If a clinician determines that a thin prophylactic dressing is needed on the bridge of the nose or cheek bones, he/she must use only thin dressings, not stack the dressings and not use porous foam dressings. If possible, have the mask refitted with the dressings in place. Refitting may not be practical, so always confirm that the mask still seals on the face, by blowing out of it to check for air leaks. Prophylactic dressings can be used under surgical and procedure masks to reduce pressure, as these masks need not maintain a tight seal.

## 8 Release pressure from the face by lifting the mask off the face for 15 minutes every 2 hours:

This process should be done outside of patient care areas in order to avoid risk for exposure. If that timeframe is not practical, lift the mask by its sides from the face for 5 minutes every 2 hours. If that timeframe is not feasible, lift the mask whenever you can. The injuries are from pressure and the best means to relieve pressure from the face is to lift the mask.

## 9 Assume facial prophylactic dressings are contaminated and exercise caution with removal:

Close your eyes and hold your breath in exhalation during dressing removal to avoid transmission of aerosolised Covid-19. Follow infection control practices at the hospital on how to properly dispose of the mask, disinfect the mask and re-wear the mask.

## 10 If facial injury occurs, treat it topically with a topical moisturiser, a skin sealant, a thin dressing or cyanoacrylate:

Occupational health practitioners should advise the provider if she/he can return to work, possibly in a different area of the facility or using a different mask that will not be applying pressure to the open wound. Persons with deep tissue injury or full-thickness pressure injury occurring on the face should be referred for professional wound care. These wounds should be considered serious due to the risk of infection and scarring as they heal. The proper use of N95 respirator masks and other PPE is crucial for the safety of all persons. The NPIAP recently released an infographic [Figure 2] to help portray the message to all providers wearing masks.

## Conclusion

Injury to the bridge of the nose and cheek bones from N95 masks may not be fully avoidable due to the need for a tight seal. However, the severity of the injury can be minimised by implementing good skin care protocols and removing pressure from the mask during working hours.