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Why are frontline healthcare workers being infected with COVID-19 at a higher rate than the general public?



# Why are frontline healthcare workers being infected with COVID-19 at a higher rate than the general public?

**Every day, millions of healthcare workers around the world protect the lives of the general public, providing advice, medical treatment, care and life saving procedures to those in need.**

In looking after others, those on the frontline are placed under immense stress, exposed to volatile situations and can suffer psychological trauma as part of working in these positions.

Now these workers have a further health risk to navigate and that's being in direct contact with COVID-19. Because the worst cases of COVID-19 reach hospitals when medical intervention is needed, these individuals coming into contact with healthcare workers are both contagious and need a lot of assistance from the staff, making contact with each other inevitable.

With the global number of daily cases steadily increasing and showing no sign of dropping off, it is clear that this disease is here to stay for some considerable time to come and this risk is only going to become worse for those on the frontline.



# Issues with Current PPE

Throughout this pandemic, there has been a number of measures taken to reduce the infection risk, such as social distancing, limiting patient contact and wearing personal protective equipment (PPE).

However close interactions are such an integral part of many healthcare worker's roles that it is simply not feasible to implement reduced contact, therefore PPE becomes the primary line of defense. When an infected person sneezes or coughs, respiratory droplets are spread up to 10 meters and can be suspended in the air for up to 10 minutes.

With the mouth, nose and eyes all being areas where the disease can be contracted, it is essential these areas are covered when coming into contact with any suspected infected person.

Typically in these settings we are seeing surgical masks or N95s, safety glasses and face shields being worn in addition to gowns and gloves, etc. Although healthcare workers are required to wear PPE in areas where there is an increased risk of contamination, we are still seeing incredibly high infection rates among this demographic.

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**14%** OF COVID-19 CASES ARE HEALTHCARE WORKERS\* | **IN SOME COUNTRIES THIS IS AS HIGH AS 35%**

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**IN A MAJORITY OF COUNTRIES POPULATIONS, HEALTHCARE WORKERS ARE ESTIMATED TO REPRESENT LESS THAN 3%**

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\*Reported to the World Health Organization (WHO)

Around 14% of COVID-19 cases reported to the World Health Organization (WHO) are healthcare workers and in some countries this as high as 35%. With healthcare workers estimated to represent less than 3% of the population in the majority of countries, these infection rates show a massive disproportion, indicating that there are some considerable issues that need to be addressed as to why they are being infected at such high rates.



Current healthcare PPE (N95) & Standard Surgical mask

# The issues that are being experienced with this type of PPE set up is largely with usage and the level of protection being gained.

**With such increased demand, this has caused global strains on supplies, significantly reducing the availability of both surgical masks and N95s.**

As these are absolutely vital, this is seeing healthcare workers having to wear disposable masks for hours on end when these would normally be disposed of when they become damp, torn or soiled as well as after leaving a patient's room.

N95s are also designed to be disposable and these are now being reused for entire shifts, forcing healthcare workers to wear them again even after their breaks, and in a lot of cases reuse them for days on end. Some healthcare facilities are so desperate for supply that they have been forced to disinfect the respirator even though this is known to weaken the product which puts the wearer at greater risk of contracting COVID-19.

Further to the supply issues, surgical masks also provide no filtration capabilities, rather these act as a loose barrier that is designed to contain some of the spread of germs from the user to others, and vice versa.

Because they are not tight-fitting, this leaves a large area particularly along the cheek bone that provides an easier route for transmission. As with N95s, these do provide filtration, however these are only effective with pathogens down to 0.3 microns.

Covid-19 is only 0.12 microns in size, meaning these pathogens are able to be respired regardless of the condition or fit of the N95 the user is wearing. In the US, these carry NIOSH certification which requires the masks to be fit tested under the respiratory protection standard.

The fit test ensures that the user has a tight seal along their skin, which prevents leakages from occurring. During this pandemic fit testing has ceased to happen in many cases and a large proportion of wearers have not completed fit testing at all as their use of N95s has been an emergency response. Although this is occurring with the best intentions of wanting greater protection, this unfortunately is putting health workers at risk and demonstrates the issues that are leading to higher infection rates.



# When we examine the difference in protection gained from respirators between males and females there are some very alarming statistics.

In studies it has been found that males pass fit testing at around 95% compared to 85% with females, however other research indicates that this can be as low as 63% with men and 29% with females.

Further to this gender difference, females of Asian heritage are at a serious disadvantage, passing fit testing at 60% compared to 90% for Caucasians.

The WHO reports that the healthcare sector is made up of 70% females which means that there is a huge number of people that are working in these high-risk environments that are not being adequately protected.

This highlights the issues of tight-fitting respirators such as N95s as these do not accommodate for varying facial features and suggests that this is a large reason why there's higher contraction of COVID-19 among healthcare workers.

AROUND **95%** OF MALES PASS FIT TESTING

COMPARED TO JUST

**85%** OF FEMALES PASSING



# The Future of Healthcare PPE

**As we continue to learn about pandemic responses and the best ways forward, it is very clear that reviewing what types of PPE is being worn is vital in protecting those on the healthcare frontlines.**

What we have seen from supply shortages and the need for a greater level of respiratory protection is people switching to alternative forms of PPE. One that previously has been predominantly used in industrial settings is the loose-fitting respirator paired with a powered air purifying respirator (PAPR) and this is making a huge resurgence in healthcare settings.

PAPRs can provide filtration of pathogens and particulates down to 0.12 microns, which is known to be effective against COVID-19. The chances of droplet transmission are further reduced with these systems as the filter is behind the user, rather than on the face as it is with N95s. Perhaps most importantly, these are loose-fitting and positive pressure which means there is no need for fit testing.

The incoming air is supplied to the headtop at a greater rate than any ambient air can enter so therefore there does not need to be a complete seal at all times.

This also means that any user who wears one of these is ensured to be protected at all times, which is a huge positive in making workplaces safer for staff but also for reducing the disproportionate gender and ethnicity differences that we are seeing.

Healthcare workers are putting their lives at risk every day to protect us and thousands of lives have been lost because of outdated forms of respiratory protection. We have the technology available, so we are obligated to use it when and where it really matters.

**Now is the time to challenge the norm and push for change that will make a real difference, protecting those that are protecting us so they can get home safely every day.**





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