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Should emergency medical service staff use respirators with filtered valves during the COVID-19 pandemic?

To the Editor

Performing medical procedures with the use of personal protective equipment may reduce the efficiency of medical procedures performed. This can be exemplified currently with the use of respiratory protection devices such as N95 or surgical masks [1–3]. Healthcare workers (HCWs) using N95 respirators or medical masks may experience discomfort associated with wearing a mask when

performing medical procedures. This is particularly true for those procedures associated with increased physical activity causing increased respiratory effort. As shown by Macintyre *et al.* [4], the rates of infection in the medical mask group were double those in the N95 group. Other authors also point to the advantage of N95 respirators compared with medical masks in reducing the risk of viral infection (OR = 1.05; 95%CI: 0.88, 1.24; Figure 1) [4–7]. However, both N95 and med-

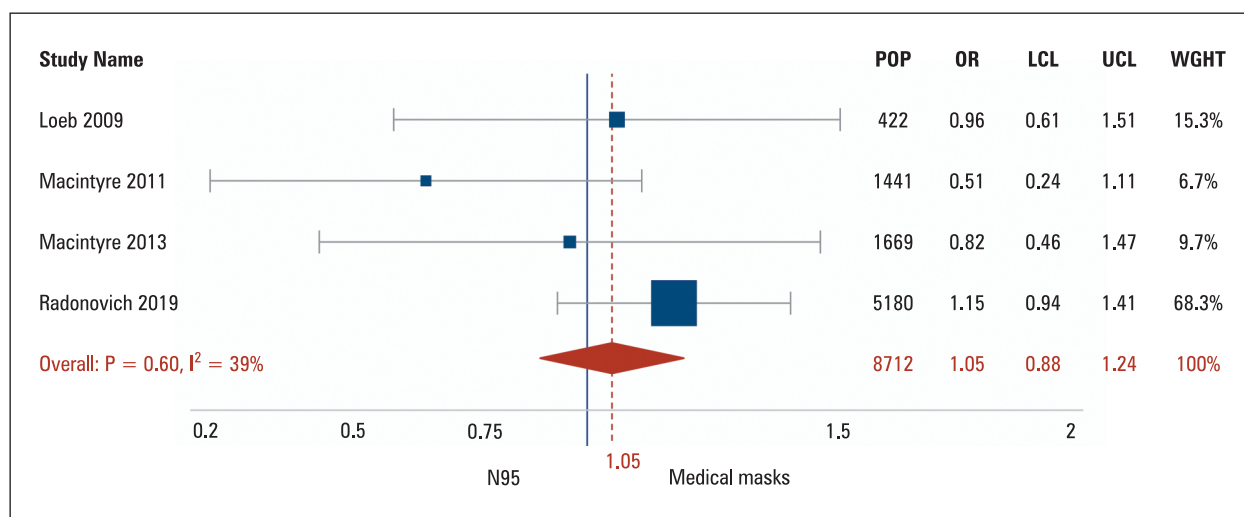


Figure 1. Forest plot of laboratory-confirmed respiratory viruses in N95 respirators vs medical masks. The center of each square represents the relative risk for individual trials and the corresponding horizontal line stands for a 95% confidence interval. The diamonds represent pooled results

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DOI: 10.5603/ARM.a2020.0167

Received: 21.10.2020

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ISSN 2451–4934

Table 1. Mask using complications (based on [4])

| Complication type | N95 respirators | Medical masks | OR (95%CI) |
|----------------------|-----------------|---------------|---------------------|
| Headaches | 1.3% | 3.9% | 3.80 (2.00, 7.21) |
| Skin rash | 5.0% | 4.6% | 1.08 (0.56, 2.08) |
| Difficulty breathing | 19.4% | 12.5% | 1.69 (1.13, 2.53) |
| Allergies | 7.1% | 9.3% | 0.75 (0.46, 1.24) |
| Pressure on nose | 52.2% | 11.0% | 8.81 (5.90, 13.16) |
| Other | 8.3% | 0.7% | 12.54 (3.04, 51.70) |

CI — confidence interval; OR — odds ratio

ical masks have disadvantages. Le *et al.* showed that N95 and surgical facemasks could induce different temperatures and humidity in the microclimates of facemasks which have profound influences on heart rate and thermal stress and can cause a subjective perception of discomfort [3]. MacIntyre *et al.* described complications reported by HCWs using masks (Table 1) [4].

As shown by Hayashi *et al.*, when comparing masks both with and without an exhaust valve (EV), masks with an EV are more effective in reducing the temperature and humidity inside the mask and speed up dry and wet heat loss through the nose [8]. However, it is important to remember that respirators with an EV do not offer others protection against infection with COVID-19. The goal of the valve on these masks is to allow the user to breathe out more comfortably. The concept is that, on an outward breath, the valve opens to allow the exhaled air to escape and prevent the buildup of heat and bacteria on the inside of the mask.

In conclusion, medical personnel should use respirators with an EV when performing procedures related to increased physical activity (i.e., cardiopulmonary resuscitation) in order to reduce the adverse effects of using protective masks or N95 respirators. However, it should be noted that we should not recommend this type of personal protective equipment for routine wear by the public because of the risk of spreading the infection by people asymptomatic with COVID-19 who are not aware that they are infected.

Conflict of interest:

None declared.

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