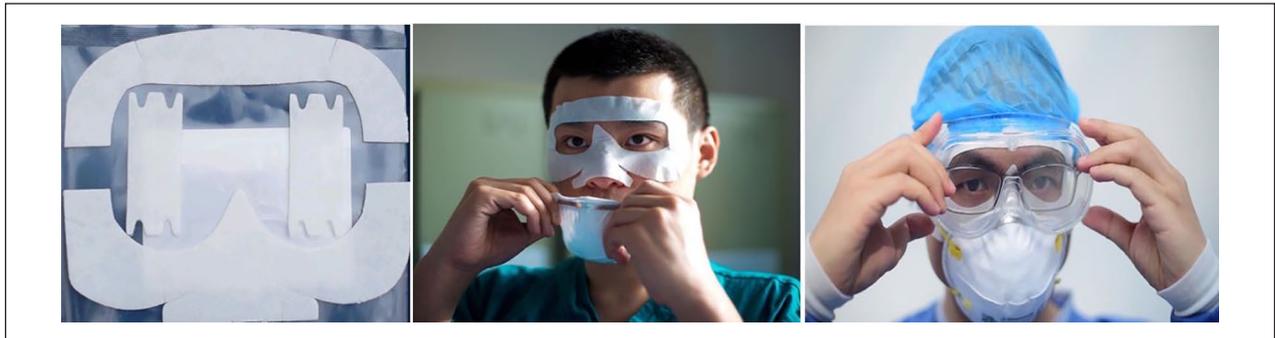


# Supporting Frontline Nurses During the Fight Against COVID-19

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**Figure 1.** A special equipment to improve comfort during long-term wearing of N95 respirator as well as eye and face shields.

To the Editor:

Coronavirus disease 2019 (COVID-19) poses an occupational health risk to health care workers. Compared with doctors, frontline nurses treating patients with COVID-19 are more likely exposed to higher risk of infection due to their frequent and close contact with patients. Besides, they are psychologically challenged when committing themselves to providing high-quality nursing care. On February 9, 2020, we 100 nurses together with 36 doctors came to the isolation ward in Guanggu Hospital, Wuhan, as the third batch of medical aid workers from Shanghai Ruijin Hospital to support the local health care workers in their fight against the COVID-19 infection. At the time of writing, the ward has treated over 90 cases of severe COVID, and the mortality was less than 1.1%. Notably, no health care workers have been infected. As one of these 100 frontline nurses, I consider that the following strategies could help achieve the goal of zero occupational infection.

First, a reasonable scheduling system created conducive work conditions for nurses. There are 50 beds in the ward and 100 nurses. The shift time is 4 hours, and 10 nurses work per shift. Besides, there are nurses working outside the isolation ward to deal with issues such as prescription administration, material management, hospital infection, and so on. Backup nurses will enter the ward when nurses inside the isolation ward felt uncomfortable during work, there are more patients and changes in patients' conditions, and so on.

Second, employment of strict safety protocols and proper use of personal protective equipment (PPE) are important to minimize the risk of occupational exposure.

When entering the isolation area (pollution area) to perform general nursing care, secondary protection is required, including wearing work clothes, pants, shoes, double-layer disposable hat, medical N95 protective mask, medical surgical mask, goggles, disposable isolation clothes, medical one-piece protective clothing, double-layer boots, and double-layer medical surgical gloves. If it is necessary to enter the room where the patient is not allowed to wear surgical mask (eg, the patient using the ventilator) or when performing nursing operation that may cause splashing, the enhanced version of secondary protection is necessary, that is, wearing a face guard on the basis of secondary protection. When carrying out the near-distance nursing operation that may produce aerosols (such as cardiopulmonary resuscitation, sputum suction, throat swab sampling, etc.), three-level protection is required, that is, wearing a full-covered face guard or an electric ventilation filter respirator on the basis of the second-level protection.

Third, we have made a special equipment to improve comfort when wearing an N95 respirator as well as using eye and face shields for extended periods of time (Figure 1). This equipment helps reduce the rates of pressure ulcers on their ears and forehead. Its excipient body is orderly made up with a base layer, a gauze net layer, a gel layer, and a covering layer. The base layer provides with an adhesive for attaching to the skin; the gauze layer has a grid structure made of medical non-woven fabrics, filled with Chinese herbal medicines Borneol and musk, and soaked in the medical magnesium sulfate solution before pressing; the gel layer has a

good cushioning effect; the covering layer has direct contact with protective equipment such as goggles, bandages, masks, and so on. The grid structure can better disperse the pressure, increase the area of stress, promote the circulation of the facial blood, and thus reduce the pressure injury; cooling effects of Borneol and musk, as well as high permeability of gauze mesh layer after immersion, can reduce local tissue inflammation, enhance blood circulation, and relieve the discomfort caused by long-term compression.

Nurses have made significant contributions during this epidemic. As the COVID-19 situation escalates, occupational exposure of nurses needs to be addressed comprehensively and decisively. Notably, although not directly caring for COVID-19 patients, psychiatric nurses, who provide care and psychosocial support to those who have recovered from the infection, are playing a pivotal role in managing the negative mental health consequences of the pandemic.

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#### **Author Roles**

Qiong Liu took care of clinical care, drafted the manuscript for intellectual content. Dingding Shen drafted the manuscript for intellectual content. Sheng Chen revised the manuscript for intellectual content. Jun Liu revised the manuscript for intellectual content.

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