Reply to: "Skin damage among health care workers managing coronavirus disease 2019"

To the Editor: We were pleased to read the letter by Lan et al[1] on the characteristics of skin damage caused by personal protective equipment (PPE) during the coronavirus disease 2019 (COVID-19) pandemic. They reported that 97.0% of health care workers (n = 526/546) experienced cutaneous adverse events because of PPE, commonly on the nasal bridge (83.1%) and cheeks (78.7%). Although mild and self-limited, damage to the skin should not be overlooked because it can lead to an increased risk of contracting COVID-19. The associated symptoms of burning, itching, or stinging can predispose health care workers to face-touching behaviour, which has been implicated in viral transmission.[2] We believe that these PPE-associated cutaneous complications should not be ignored. In this article, we propose practical strategies that can be implemented by health care workers to mitigate cutaneous complications caused by various PPEs (Table I).

The additives (eg, formaldehyde textile resins) contained in fibers of scrubs ("greens") can lead to textile allergic contact dermatitis.[3] It is reported that 22.8% of the general population is sensitive to formaldehyde, and this complication can be exacerbated by friction, moisture from perspiration, warmth, and tight-fitting clothing.[3] To mitigate these effects, clinical environments should be maintained at adequate low temperatures, and health care workers should avoid wearing tight garments whenever possible.

Up to 99% of PPE-related cutaneous reactions are due to gloves because prolonged use can lead to allergic contact dermatitis, overhydration, and subsequent skin maceration and erosion.[4] To avoid overhydration, 1 layer of gloves is recommended. Other types of gloves to consider include nitrile or vinyl gloves, if available. Application of hand creams, a hydrophobic compress with normal saline, or topical zinc ointment after completing clinical duties can mitigate skin maceration.[4]

One study reported that 59.6% of health care workers who regularly used N95 masks during the Severe Acute Respiratory Syndrome (SARS) pandemic developed facial acne, whereas 35.8% of health care workers developed a facial rash from either irritant contact dermatitis or allergic contact dermatitis.[5] Similarly, prolonged goggle wear has led to urticaria, pressure injury, contact dermatitis, and acne vulgaris in health care workers.[4] Masks and goggles should be well fitted to reduce pressure injuries, and when possible, full-face shields can replace facial PPE. Facial moisturizers or gels should be applied before facial PPE is worn. Severe skin indentation can be managed with hydropathic

Table I. Recommendations for preventing personal protective equipment–associated cutaneous complications

Personal protective equipment	Recommendations
Additives (in scrubs clothing)	Maintain cool/moderate room temperature. Wear loose-fitting clothing underneath scrubs. Ensure scrubs are loose fitting.
Latex gloves	Wear 1 layer (unless health care worker has existing skin barrier damage, in which case he or she should wear an additional layer). Apply hand creams, hydrophobic compress with normal saline, or topical zinc ointment after shift. Moisturize hands regularly and ensure they are clean and dry before putting on gloves. Avoid wearing hand and wrist jewelry, as well as nail polish and artificial nails. Use nitrile or vinyl gloves. Keep nails short and filed.
N95 masks and goggles	Use full-face shields if cutaneous complications are present. Ensure they are well fitted and not tight. Apply facial moisturizers and gels before wearing facial PPE. Apply hydropathic compress to damaged skin.
Ear protection	Clean and dry external ear and canal after taking off PPE. Cover retroauricular areas with surgical cap before putting on ear PPE. Treat retroauricular skin with hydropathic compress after shift. Wear N95 mask with plastic handle.

compress and povidone iodine diluted by normal saline at a ratio of 1:9 on the face.[4]

Some facial masks are secured by anchoring to the ears, causing damage to the external ears and retroauricular skin areas because of pressure, prolonged exposure, or both.[4] To avoid damage, we recommended wearing ear-independent masks when possible, covering retroauricular areas with a surgical cap before wearing ear-dependent PPE, cleaning and drying the external ear and canal, and applying moisturizers to retroauricular skin.

An increase in the rigorous use of PPE by health care workers since the COVID-19 outbreak has presented unique dermatologic challenges related to PPE-associated pressure and abrasion injuries. Although strict adherence to PPE guidelines is paramount in reducing the spread of infection, measures should be implemented to protect the skin barrier, thereby preventing the paradoxic situation in which protection measures become a risk for COVID-19 infection.

Khalad Maliyar, BA,[a] Muskaan Sachdeva, BHSc,[a] Asfandyar Mufti, MD,[b] and Jensen Yeung, MD, FRCPC, Derm[b]

From the Faculty of Medicine, University of Toronto, Ontario, Canada[a]; and Department of Dermatology, University of Toronto, Ontario, Canada.[b]

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Correspondence to: Jensen Yeung, MD, FRCPC, Derm, Women's College Hospital, Division of Dermatology, 76 Greenville St, 5th Floor, Toronto, ON M5S 1B2, Canada

E-mail: jensen.yeung@utoronto.ca

REFERENCES

1. Lan J, Song Z, Miao X, et al. Skin damage among healthcare workers managing coronavirus disease-2019. *J Am Acad Dermatol*. 2020;82(5):1215-1216.
2. Kantor J. Behavioral considerations and impact on personal protective equipment use: early lessons from the coronavirus (COVID-19) pandemic. *J Am Acad Dermatol*. 2020;82(5):1087-1088.
3. Donovan J, Skotnicki-Grant S. Allergic contact dermatitis from formaldehyde textile resins in surgical uniforms and nonwoven textile masks. *Dermatitis*. 2007;18(1):40-44.
4. Yan Y, Chen H, Chen L, et al. Consensus of Chinese experts on protection of skin and mucous membrane barrier for health-care workers fighting against coronavirus disease 2019. *Dermatol Ther*. 2020:e13310. https://doi.org/10.1111/dth.13310.
5. Foo CCI, Goon ATJ, Leow Y-H, Goh C-L. Adverse skin reactions to personal protective equipment against severe acute respiratory syndrome--a descriptive study in Singapore. *Contact Dermatitis*. 2006;55(5):291-294.

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