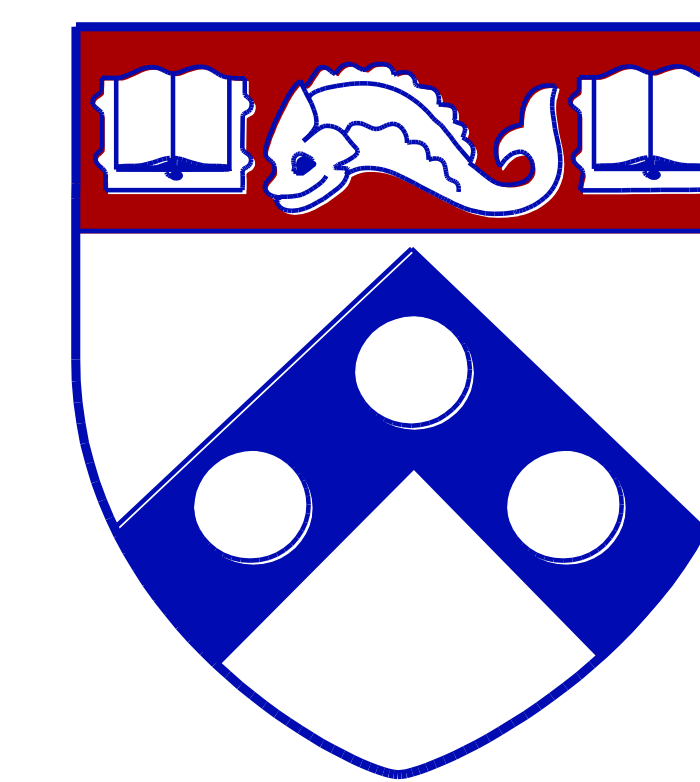


Toll of COVID-19 Critical Care on ICU Nursing Staff



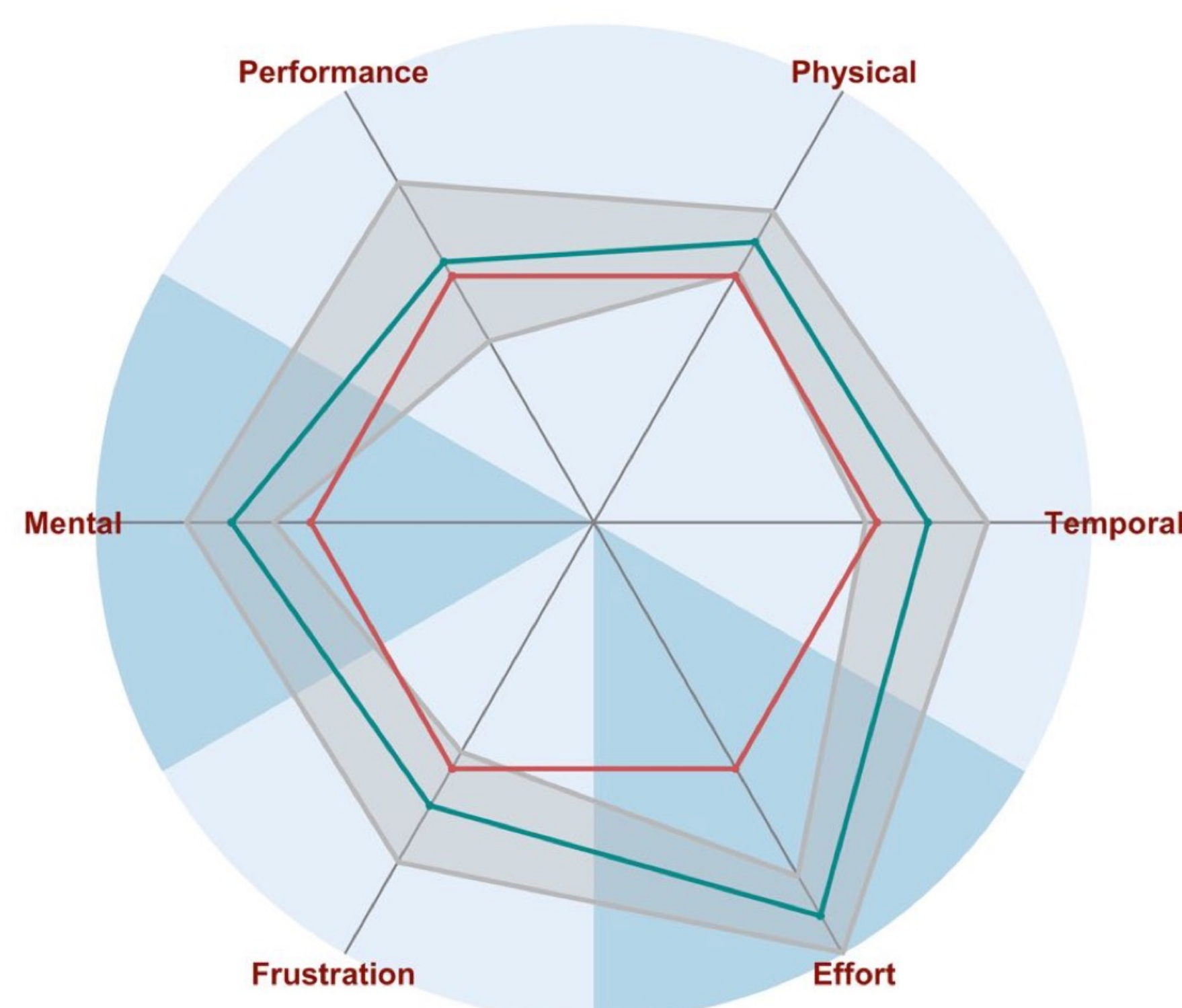
Mariana Restrepo, Dr. Krzysztof Laudanski, Dr. Ken Moon,
Amandeep Singh, and Ying Chen

Abstract

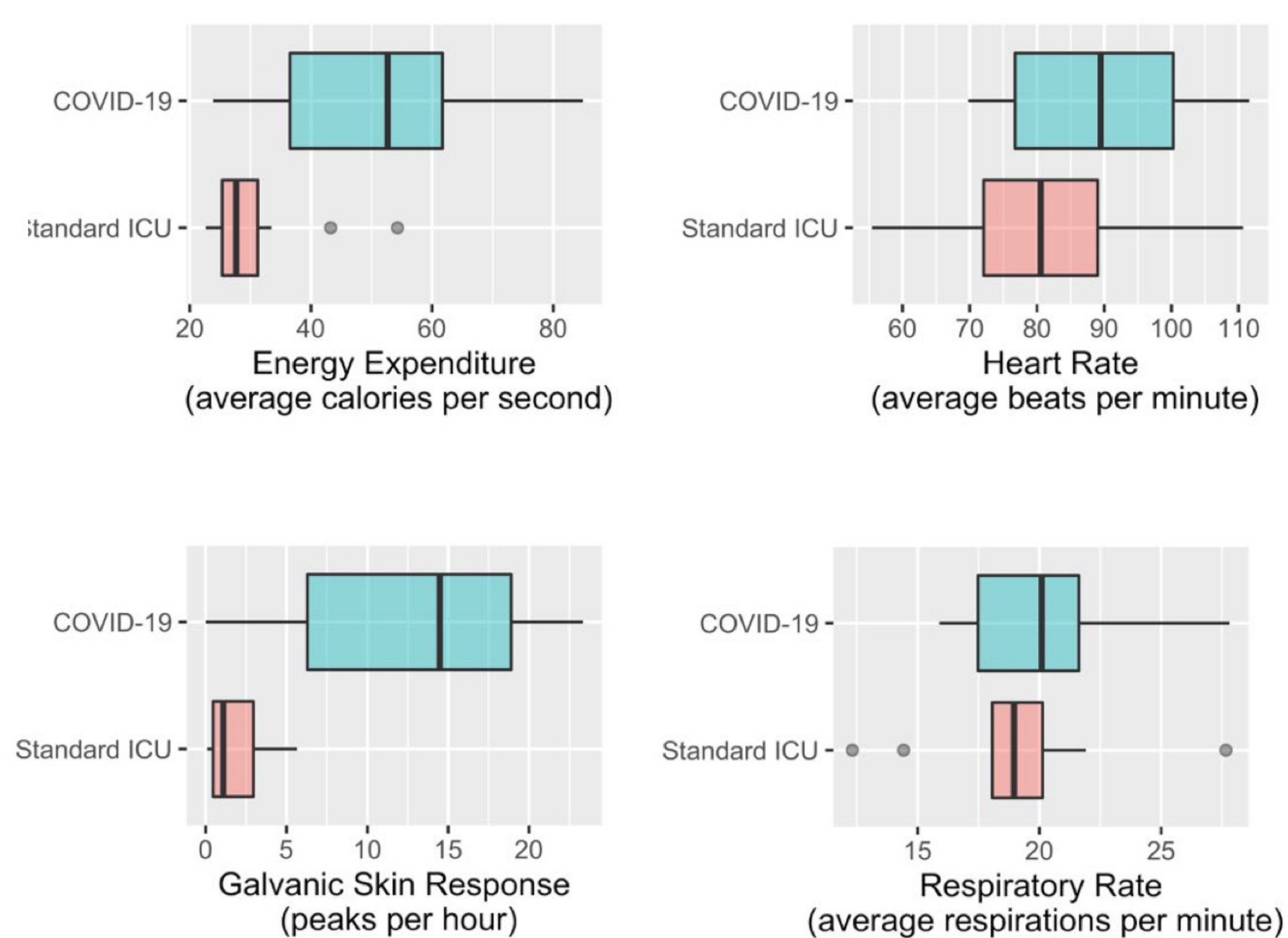
- **Background:** Critical care staff faced unprecedented challenges in the wake of the COVID-19 pandemic that may be reflected by physiological and psychological strain.
- **Objectives:** To objectively and subjectively measure the burden of the dynamic COVID-19 landscape on ICU nurses.
- **Methods:** Vital signs were collected in conjunction with survey responses for nurses who worked 12-hour shifts in COVID-19-specific ICUs and standard ICUs.
- **Conclusions:** COVID-19-unit nurses endured heightened energy expenditure and mental demand compared to their standard ICU unit counterparts.

Results

- COVID-staffing nurses self-reported elevated effort consistent with more strenuous physical activity ($p < 0.001$).
- Phasic galvanic skin responses indicating the arrival of stress-inducing stimuli were observed more frequently among COVID-staffed nurses ($p = 0.03$).
- Self-reported perception of burden demonstrated increased mental strain for COVID-19 RNs ($p = 0.02$).
- TLX Survey Results



Biosensor Measurements



Methods

- 39 Registered Nurses (RNs) staffing 12-hour shifts at two ICUs throughout May 2020 were assigned to either COVID-19 or standard critical care patients.
- FDA-approved Everion™ biosensors continuously measured RNs' skin temperature, galvanic skin response, blood pulse wave, energy expenditure, pedometer, heart rate, and respiratory rate.
- NASA Task Loading Index (TLX) surveys were used for the self-reporting of effort, frustration, mental demand, physical demand, temporal demand (i.e., time pressure), and performance satisfaction while caring for patients.

Background

- The COVID-19 pandemic presents a uniquely challenging environment for frontline healthcare workers due to complex treatments, novel PPE protocols, and the infectiousness of the virus.
- The lack of knowledge pertaining to the burden nursing personnel experience when caring for COVID-19 patients leads us to objectively assess the physical demand of caring for these patients as well as collect survey-based measures of psychological strain.

Implications

- This is the first study demonstrating increased strain on nurses while caring for COVID-19 patients.
- RNs providing COVID-19-specific intensive care endured heightened levels of energy expenditure and mental demand over standard intensive care.
- This can be attributed to increased skin temperature most likely secondary to wearing multilayer personal protective equipment as the number of steps was comparable between two cohorts.
- Recognizing and alleviating the strain on staff may figure critically in maintaining quality of care and cost-effectiveness going forward.