

Modelling and Minimizing the Impacts of Infection Control Routines on Nurse Workload in Acute Care under Varying COVID-19 Outbreak Scenarios

Sadeem M. Qureshi^{1*}
Nancy Purdy²

Helen Kelly³
Sue Bookey-Bassett²

Anne vanDeursen⁴
Michael A. Greig¹

Nicole Woods⁵
Patrick Neumann^{1*}

¹ *Human Factors Engineering Lab, Ryerson University*

² *Daphne Cockwell School of Nursing, Ryerson University*

³ *Collaborative Academic Practice, University Health Network*

⁴ *Toronto Western Hospital, University Health Network*

⁵ *The Wilson Centre, University Health Network*

s1qureshi@ryerson.ca

COVID-19 is taking a significant toll on the front-line healthcare workers (HCW), with over 230,000 HCWs infected globally and 600 deaths to date. It is no surprise that nurses are questioning the safety of current SARS-CoV-2 infection control routines. These routines also pose extra work in a system where nurses are already working to capacity. If nurses are overworked, then fatigue develops, and errors start to occur. Anticipating the demands and required extra personnel for an unknown number of incoming coronavirus patients is difficult.

Our research program is focused on the development and testing of a simulation modelling tool that models the process of care delivery and manipulates variables such as patient, care tasks, nurse and other work environment characteristics. By modelling the care delivery process we are able to see the impact of varying severities of coronavirus outbreaks on the nursing team and, ultimately, how this extra workload affects their ability to deliver the care required to all patients in the unit. In addition to this simulation tool, we will also work with nurses and senior infection control professionals to refine their infection control routines so as to minimize the workload while simultaneously creating highly reliable safety routines.

These models provide next-generation decision making support for managers who have to anticipate the unknown impacts of COVID-19 and would like to be prepared to deliver the highest care quality in ways that are safe for both patients and nurses. In this study, we are creating simulation models of medical-surgical units and two emergency departments with front-line responsibility for coronavirus patient treatment. These models can be readily adapted to other similar units across Canada.

FUNDING: The project is currently in its launching phase and is funded by *Canadian Institutes of Health Research's (CIHR) Rapid Research Funding program for 2019 Novel Coronavirus (COVID-19)*.