Bed Pathways and Hospital Length of Stay: A non-concurrent cohort study of Colombia COVID-19 patients: An unCoVer network project

Ruiz Galvis, Lina Marcela[1*]; Perez Aguirre, Carlos Andres[2]; Pérez Bedoya, Juan Pablo[3]; Mendoza Cardozo, Oscar Ignacio[3]; Barengo, Noël Christopher[4]; Sanchez Escudero, Juan Pablo[3]; Cardona Jimenez, Jonathan[5]; Diaz Valencia, Paula Andrea[3]

1 Grupo de Fundamentos y Enseñanza de la Física y los Sistemas Dinámicos, Natural Science Deparment, University of Antioquia, Cl. 67 #53-108, Aranjuez, Medellín, Colombia. *Corresponding author: lina.ruiz2@udea.edu.co, (+57) 305 339 81 39

2 School of Statistics at Science Faculty, National University of Colombia; Cra. 65 #59a-110, Medellín, Robledo, Medellín, Antioquia

3 Epidemiology group at National College of Public Health, University of Antioquia, Colombia; Cl. 62 #52-59, Medellín, La Candelaria, Medellín, Colombia

4 Herbert Wertheim College of Medicine & Robert Stempel College of Public Health and Social Work, Florida International University, Florida, United States.

5 Facultad de Ingeniería, Institución Universitaria Pascual Bravo, Medellín, Colombia

Predictions of hospital bed occupancy is essential to manage resource allocation in health-care. This prediction depends on hospital admission rates and the length of stay (LoS) according to bed type (hospital and Intensive Care Unit (ICU) beds). The objective of this study was to describe the LoS of COVID-19 hospital patients in Colombia during 2020-2021. Accelerated failure time models were used to estimate the LoS distribution according to each bed type and throughout each bed pathway. Acceleration factors and 95% confidence intervals (CI) were calculated to measure the effect on LoS of the outcome, sex, age, admission period during the epidemic (i.e., epidemic waves, peaks or valleys, and before/after vaccination period), and patients geographic origin. Most of the admitted COVID-19 patients occupied a hospital bed (80.56%). Approximately 14% were admitted to the ICU and the remaining patients occupied both a hospital and an ICU bed during their treatment at the hospital. Patients who recovered from Covid 19 spent more time in the hospital and ICU than deceased patients. Men had larger LoS for both hospital and ICU beds than women. In general, the LoS in the hospital and ICU increased with age. Finally, the LoS in both hospital and ICU beds varied along epidemic waves. It was lower in epidemic valleys than peaks, and became shorter after vaccinations began in Colombia than before it. Our study highlights the necessity of analyzing local data on hospital admission rates and LoS to design strategies to prioritize hospital beds resources during current and future pandemics.

COVID-19; Length of stay; bed occupancy; hospital bed capacity; statistical models; survival analysis; evidence-based practice