

Mobility impact in the spreading of COVID-19 in Ecuador

Jordy Cevallos-Chavez^{1,*}, Carlos Bustamante-Orellana¹, Cesar Montalvo-Clavijo¹, Jeff Sullivan², Edwin Michael³, Anuj Mubayi^{2,4}

¹ *Simon A. Levin Mathematical Computational and Modeling Science Center, Arizona State University, Tempe*

² *PRECISIONheor, Precision Medicine Group, Los Angeles*

³ *Department of Biological Sciences, University of Notre Dame, South Bend*

⁴ *College of Health Solutions, Arizona State University, Tempe*

jcevall1@asu.edu

Ecuador has reported one of the highest per capita death rates of COVID-19 in the world, with more than 5000 deaths in a country of approximately 17 million people. Transmission of COVID-19 infection in Ecuador has been the result of contact patterns, mobility structure of the population, regional epidemiology, and efficacy of public health interventions. In this study, we link provincial-level demographic, epidemiological, and transportation information with the spread of COVID-19 outbreak to understand the role of local patterns of low and high-density provinces on the infection growth rate at the country level. The analysis is carried out using best (with no interprovincial movement) and worst (with movement patterns similar to before COVID-19 outbreak) case scenarios in Ecuador. The results suggest that human movement (instead of local epidemiology) has primarily been shaping transmission dynamics of COVID-19 in Ecuador by introducing infected individuals regularly into low-risk provinces.