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EXPLORING THE EFFECT OF COVID-19 ON MUNICIPAL WASTE GENERATION WITH SYSTEM DYNAMICS MODELLING

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Abstract

This study examines the dynamic change in population and municipal waste generation during the COVID-19 pandemic. A stock-flow infection modelling was used to link population dynamics with disease transmission parameters (such as probability to catch COVID-19 and population interactions) to estimate municipal waste generation in the province of Tekirdag, Turkey. Three different scenarios (Scenario 1: severe conditions with possible mutation of coronavirus, Scenario 2: moderate conditions with the continuation of the current case and Scenario 3: mild conditions with intensified vaccination) were produced and simulation results were analysed. The results show that it is expected to have a peak with 230 000 people with severe symptoms in Scenario 1. It is also expected to have 1 person/week to pass away due to inadequate health infrastructure if the annual healthcare capacity improvement rate in the province remains at its current rate (1%). The results indicate that the amount of dry recyclables increases over time in the three scenarios. However, in Scenario 3, a total of 450 000 - 780 000 tonnes of dry recyclables are expected to be produced at the end of 3 years. This high amount of waste is likely to cause dynamism in the recycling activities of the province. As far as it is concerned that 750 000 - 1 000 000 tonnes of residual waste (including used masks) are expected to be produced in Scenario 3, capacity improvement for the only landfill site of the province should be made urgently or an alternative solid waste disposal facility should be put into use to meet this need.

Keywords: COVID-19 pandemic, disease transmission, healthcare capacity, infection modelling, municipal waste generation

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