Proceedings of the Annual General Donald R. Keith Memorial Conference
West Point, New York, USA
May 2, 2019
A Regional Conference of the Society for Industrial and Systems Engineering

Modeling the Effects of the Growing Anti-Vaccine Movement on the Measles Outbreak in Italy

Sarah Juhn and Jose Jimenez

Department of Systems Engineering
United States Military Academy, West Point, NY

Corresponding author: Sarah.Juhn@westpoint.edu

Author Note: Cadet Sarah Juhn is a system engineering major at the United States Military Academy's (USMA's) Department of Systems Engineering (DSE). Cadet Sarah Juhn will commission as a second lieutenant as an officer in the United States Army Signal Corps in May 2019. Dr. Jose Jimenez is currently an assistant professor within the same Department and serves the United States Army Reserve as a Captain in the Medical Service Corps.

Abstract: Largely due to low vaccination rates, Italy has the second highest reported cases of measles within the European Union and European Economic Area (EU/EEA). Despite the effectiveness of the Measles, Mumps, and Rubella (MMR) vaccine, the anti-vaccine movement is increasingly prolific, backed by current the majority political party: 5 Star Movement (M5S), which pushed for an amendment to relax vaccination laws for school children. Furthermore, the anti-vaccine movement has found a broader platform through social media to influence primarily vaccine-hesitant parents. Using the basic Susceptible, Exposed, Infected, Recovered (SEIR) and Bass diffusion model, this research studies the relationship between social media and vaccine-hesitancy. Creating a system dynamics simulation, we will determine the most appropriate individual or combination of socio-technical intervention, such as Facebook's decision to ban anti-vaccine related content or statewide mandated vaccines, in order to increase the vaccination rate, and thus reducing morbidity in the population.

Keywords: Measles, Systems Dynamics, Anti-Vaccine Movement, Socio-Technical Interventions

ISBN: 97819384961-6-5