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ABSTRACT BOOK



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0051

CHALLENGES FOR PRECISE ESTIMATION OF CHILD IMMUNIZATION COVERAGE AND DROP-OUT RATE IN MANDERA COUNTY IN KENYA

Bentinck S. Ochieng¹, Misiko T. Linda¹, Hassan Mumin¹, Cynthia A. Ngesa¹, Rashed Shah²

¹Save the Children International Kenya, Nairobi, Kenya, ²Save the Children US, Washington, DC, United States

Precision in estimating child immunization coverage and drop-out rates is dependent on census data, specifically on estimating population in an area which leads to set the target for immunizing children in that particular area. Achieving the precision in child immunization report becomes challenging more specifically in the area where in- and out-migration rate is higher, for example in areas with abundant nomadic population or in the informal settlement or slum areas. Child immunization coverage in such areas often suffers low precision which may include coverage estimates far beyond or below 100%. Similarly, inaccuracy in drop-out reporting is also noticed in reported immunization data from those areas. We conducted a community population based survey in 2020 in three sub-counties (Mandera North, Mandera South and Mandera West) in Kenya and compared the survey results with reported data through District Health Information System (DHIS) for same period. Our survey results revealed fully immunization coverage among children below 1 year as 61% which was reported through DHIS data as 97.6%; a similar difference was shown for DPT-Hepatitis-Hib drop-out rate, while survey result (17.6%) and DHIS data (4.3%) were compared. The DHIS sets immunization targets using census data which are obtained usually every 10 years. Census data are then used to project population data in a specific area for later years until another round of census is conducted. Such projections often misestimate real population data which leads to under- or over-estimated coverage and drop-out rate in a specific area. The significant differences we found between survey results and DHIS reported data between child immunization coverage and drop-out rates are greatly misleading the project managers and implementers in those sub-counties to plan the implementation focus, especially for prioritizing needs to address the real inadequacy of immunization services in the area.

0052

MULTIAGENT SIMULATION MODEL OF THE COVID-19 EPIDEMIC PROCESS WITH SOCIAL FACTORS

Olga Salun¹, Dmytro Chumachenko², Olena Muradyan³, Tetyana Chumachenko¹

¹Kharkiv National Medical University, Kharkiv, Ukraine, ²National Aerospace University "Kharkiv Aviation Institute", Kharkiv, Ukraine, ³V.N. Karazin Kharkiv National University, Kharkiv, Ukraine

Agent-based approach to simulation is an effective tool for studying the spread of COVID-19. Modeling makes it possible to identify the parameters that affect the development of the epidemic process and to understand social aspects influencing COVID-19 propagation. To build a multi-agent model of the epidemic process, we used data provided by the Public Health Center under the Ministry of Health of Ukraine on the incidence of COVID-19 distributed by age and incorporated the results of a sociological study on adherence to vaccination against COVID-19 and other control measures (437 blood plasma donors, 797 healthcare workers, 150 students). The agent-based model was realized using C# language. The objects of the model were age, gender, and knowledge base, including adherence to vaccination and readiness to comply with control measures. We simulated the spread of COVID-19 through an artificial population with the same characteristics of our study population. Transmission occurred probabilistically based on traits of the individual agents (e.g., vaccination status and adherence, control measure acceptance, age, etc.). The model was verified by comparing the retrospective forecast with registered cases of COVID-19. The simulation results showed that the population can be divided into three groups concerning vaccination: skeptics (43%), conformists (32%), and loyalists

(25%). This division is observed in all three groups of respondents (plasma donors, healthcare workers, and students). But within each social group, the ratio of these subgroups varied. Using sociological data and methods of intelligent decision-making in conditions of uncertainty, we found that attitude to vaccination correlates with the attitude to compliance with control measures. Our model allows us to study the effectiveness of control measures, accounting for important individual traits such as attitudes toward vaccination, which is an important advantage over other models. The model can also be useful in the development of educational programs aimed at certain social groups.

0053

SYSTEMATIC REVIEW OF MATHEMATICAL MODELING OF INFECTIOUS DISEASE WITH HUMAN MOVEMENT DATA

Aniruddha Deshpande, Kristin Nelson

Emory University, Atlanta, GA, United States

Human movement plays a key role in determining the dynamics of infectious disease epidemiology. Population mixing rates and travel affect the rate of epidemic growth, distribution of infections, and total population size. Therefore, we conducted a systematic review of studies using human movement data in mathematical mechanistic models of infectious disease. We searched PubMed until July 11th, 2021, and retrieved over 1,700 articles. After review, we identified 107 articles that met inclusion criteria. We extracted metadata for each included article including modeling approach, type of mobility data used, location of study, and disease system of interest. Airborne transmission was the most studied transmission route with COVID19 with 62% of studies and influenza being the most frequently studied diseases with 23% of the articles[NK1]. Historically, census data or population counts were the most utilized data types to parameterize movement models, but location-based services - software monitoring location data -- are increasingly common[NK2]. Considering this, most studies were set in the US, Europe, and China. While mobility is fundamental to all infectious disease, the literature has been skewed to disease systems and locations where such studies are the most easily implemented - airborne transmission in high-income settings. [NK3] This highlights the need to increase the study of the role of human movement in infectious disease dynamics in Africa, Asia, and Latin America as they bear disproportionate burden. Furthermore, research needs to expand beyond airborne transmission as enteric and vector-borne diseases comprise a large proportion of the burden of infectious diseases and human movement has implications on population dynamics for these diseases. Our review provides an atlas of current literature as a reference to enable future studies by showcasing implementation of in areas of greatest burden.

0054

COMPARATIVE REPRESENTATIVENESS OF A MOBILE PHONE-BASED VS. IN PERSON SURVEY-BASED COVERAGE EVALUATION SURVEYS FOLLOWING MASS DRUG ADMINISTRATION FOR SOIL-TRANSMITTED HELMINTHS: INDIA

Rohan Michael Ramesh¹, William Edward Oswald², Gideon John Israel¹, Kumudha Aruldass¹, Sean Galagan³, Arianna Rubin Means³, Hugo Legge², Saravanakumar Puthupalayam Kaliappan¹, Judd L. Watson³, Katherine Elizabeth Halliday², Sitara S.R. Ajjampur¹

¹Christian Medical College, Vellore, India, ²London School of Hygiene & Tropical Medicine, London, United Kingdom, ³University of Washington, Seattle, WA, United States

With increasing mobile phone subscriptions in low- and middle-income countries, telephone-based surveys are becoming increasingly popular for public health programs and research. Despite advantages, such as cost-effectiveness, time efficiency, reach, sharing of information, and comparable quality to in-person data collection, systematic exclusion of participants without access to mobile phones, or for other reasons, may limit representativeness. For DeWorm3, a large, ongoing randomized,

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