Collaborative Modeling for Outbreak Responses: Insights from the U.S. Scenario Modeling Hub

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The COVID-19 pandemic underscored the critical role of infectious disease modeling in predicting future epidemic trajectories and informing timely evidence-based public health responses. Nevertheless, when multiple models are applied, their predictions can diverge substantially, often making it challenging for public health authorities to interpret and act upon these projections. To address this, the U.S. Scenario Modeling Hub (SMH), a long-standing collaborative modeling initiative, consolidates outcomes from multiple modeling teams into a single ensemble prediction, offering mid- to long-term projections of epidemic dynamics under varying interventional strategies and epidemiological conditions. By summarizing results from teams working on the same set of scenarios, SMH takes advantage of the proven increased reliability of ensemble-based predictions over individual models. Such ensemble approaches have also proven useful across multiple pathogens (including COVID-19, influenza, and RSV) to inform public health policy, situational awareness, and individual decision-making. In its most recent round, SMH presents projections of COVID-19 hospitalizations and deaths in the U.S. for the upcoming year under two plausible assumptions about immune escape of future viral variants (20% and 50% per year) and three recommendations for the use of annually reformulated vaccines (no recommendation, vaccination for high-risk only, vaccination for all eligible age groups). Despite uncertainty surrounding variant evolution and seasonal dynamics, our projections suggest that vaccines would remain a critical tool to limit the burden of COVID-19 in the U.S. Further, while vaccinating high-risk groups had substantial benefits in reducing disease burden, maintaining a universal vaccination recommendation had the potential to save thousands of additional hospitalizations and deaths.

Biography

Dr. Jung is a Senior Research Fellow at the National University of Singapore. His research focuses on the dynamics and control of infectious diseases, with a focus on predicting epidemic trajectories and evaluating the potential impact of intervention strategies. In particular, he is interested in integrating dynamics and statistical modeling approaches with real-world data and novel data streams to generate actionable insights that advance public health preparedness and outbreak responses.

Lessons learnt in conducting observational epidemiologic studies during the COVID-19 pandemic

Takeshi Arashiro (1,2,3,4,5)

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During the COVID-19 pandemic, there was an urgent public health need to plan, execute, and communicate epidemiologic studies to inform policies and risk communications. The presenter planned and led multiple COVID-19 epidemiologic studies while being involved in evolving national infectious disease surveillance in Japan. These research studies included case reports during the very early phase from the Diamond Princess cruise ship, behavioral risk factor analysis, COVID-19 vaccine breakthrough investigation, COVID-19 vaccine effectiveness studies against mild infection and severe disease (both in Japan and in the Philippines), sero-epidemiologic studies, pilot use of electronic health records for surveillance, and investigative monitoring of risk behavior and anxiety as a complementary tool for conventional case surveillance. After the pandemic, he also led some studies to measure the disease burden of respiratory infectious diseases, such as pediatric RSV infection and influenza, using different commercialized databases. In this presentation, he will discuss the main results from these research activities. He will also reflect on the planning and execution of these studies, providing insights into the next potential pandemics and epidemics. Finally, he will touch on some career considerations as a young epidemiologist/researcher (including public and private sectors as well as academia) working in the field of infectious disease.

Biography

Dr. Arashiro is a junior associate professor at Chiba/Keio Universities and also works in the private sector as a medical manager and evidence generation lead. During the COVID-19 pandemic, he led multiple epidemiologic studies while involved in national surveillance at the National Institute of Infectious Diseases in Japan. His research focuses on epidemiologic and clinical studies of epidemic infectious diseases and emerging infectious diseases, especially respiratory diseases.

Roles of Epidemiologists in Post-Pandemic Japan

Motoi Suzuki (1)

1 : Center for Infectious Disease Epidemiology, National Institute of Infectious Diseases, Japan Institute for Health Security

During the COVID-19 pandemic, Japanese epidemiologists and public health professionals worked under constraints of limited resources and restricted access to data. In response, the Government of Japan revised the National Action Plan for Novel Influenza, etc., established the Cabinet Agency for Infectious Disease Crisis Management and the Japan Institute of Health Security (JIHS), and has been strengthening vaccine research and development (including support for the global 100 Days Mission) as well as promoting healthcare digital transformation (DX). These initiatives can be situated within a global trend toward mission-oriented science, technology, and innovation (STI) and health programs, which integrate R&D and institutional operations across government, academia, and industry under explicit goals and timelines. At the same time, prolonged public-health interventions during the pandemic may have changed public perceptions of public-health agencies, both positively and negatively. This presentation examines how the roles and scope of activities of Japanese epidemiologists and public health professionals can—and should—evolve in this context.

Biography

Dr. Suzuki is the Director of the Center for Infectious Disease Epidemiology at the National Institute of Infectious Diseases, Japan Institute for Health Security. His research focuses on infectious disease surveillance, vaccine epidemiology, and data-driven public health policy.

Understanding the role of epidemiologists for the next pandemic

Yuki Furuse (1)

1 : University of Tokyo

When AMED SCARDA's world-leading vaccine research and development centers were launched, the epidemiology consortium—bringing together researchers in epidemiology and related fields—began reflecting on what contributions we could and should make. Our internal brainstorming produced a wide range of ideas, but we also wanted to know: what do others actually expect from epidemiologists? To explore this, we carried out a qualitative study, interviewing stakeholders from academia, public health agencies, and healthcare professionals about the role of epidemiologists in pandemic preparedness and response. Some of their views aligned closely with our own, while others were surprising and thought-provoking. In this talk, I will share these insights and discuss the future role of epidemiology in pandemics.

Biography

Dr. Furuse is a professor at the University of Tokyo Pandemic Preparedness, Infection and Advanced Research Center. His research focuses on the epidemiology and molecular biology of infectious diseases such as influenza, RSV and COVID-19.