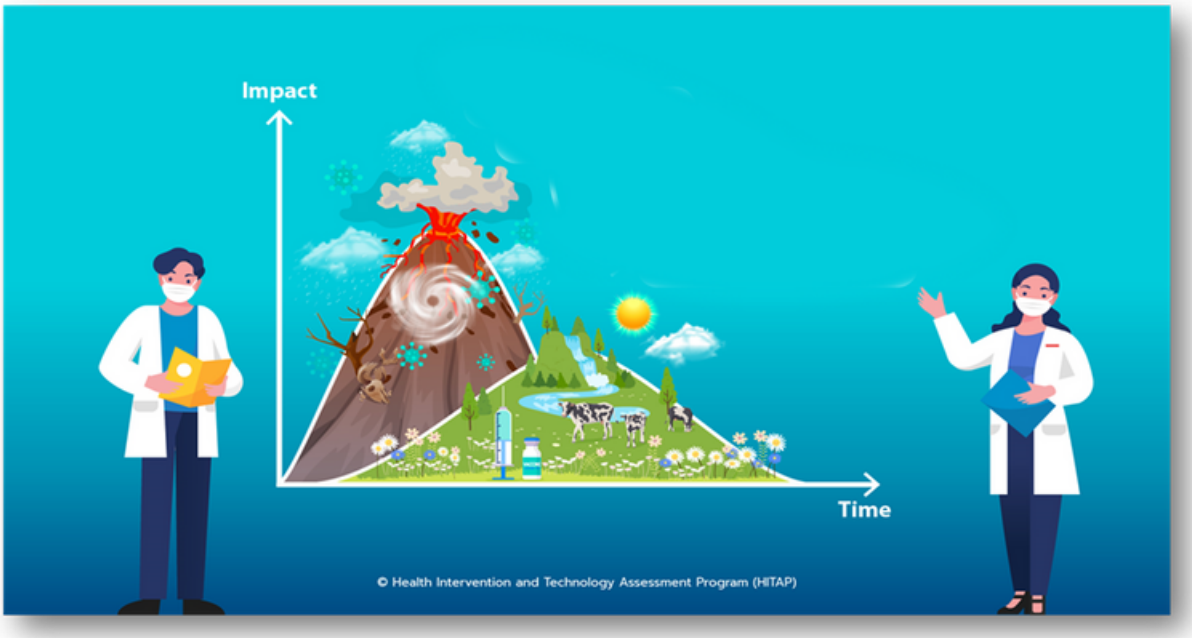
Lancet Commission for Strengthening the Use of Epidemiological Modelling of Emerging and Pandemic Infectious Diseases



THE LANCET

HITAP Health Intervention and Technology Assessment Program

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

NUS National University of Singapore

Background

Epidemiological modelling is an important tool to help public health planners understand potential disease outcomes in the population. The recent visibility of models and their perceived influence in the decision-making processes surrounding the response to the COVID-19 pandemic has led to a great deal of public debate about their usefulness [1, 2]. Making optimal use of these models to inform decisions requires addressing the hurdles that prevent it. These hurdles include the technical aspects of modelling such as identifying relevant parameters, making realistic assumptions for e.g., counterfactual scenarios, availability and quality of local data, adherence to guidelines, and review process, among others. Equally important is the environment surrounding modelling to policy exercise which includes infrastructure that informs models for e.g., surveillance and local data collection, governance and working relationships between decision-makers, their advisors, modellers, field epidemiologists among other interdisciplinary experts, ways in which results are made available and communicated to end-users, etc.

Frameworks currently exist to ensure the models are fit-for-purpose, reliable results are reported in a timely manner, and a collaborative approach to modelling ensures adequate representation from other experts [3]. Nonetheless, several gaps exist including how policy questions are accurately translated into modelling questions to ensure outputs are relevant, how multidisciplinary experts engage in the model development and review process, and how model results and subsequent decisions are effectively communicated for better policy implementation and adherence [4].

Hence, this proposed Lancet Commission will focus to identify and address some of those gaps to improve the usefulness and impact of epidemiological modelling on policymaking and policy implementation.

Our aims

We aim is to bring multidisciplinary stakeholders from different settings who are involved in the modelling for policy implementation eco-system to:

1. Understand the governing structures and process of modelling for policymaking practiced by different countries including the teams involved (policymakers, scientific advisors, modellers, etc.), the process of setting priorities (which policy questions to address) and exchanging information (policy questions, model results), the process of communicating policies resulting from models to the media and public, etc.
2. Understand how parameters and assumptions are defined, how their relevance and validity are assessed, and identify stakeholders involved in this process.
3. Examine how model results are made available, reviewed, interpreted, and synthesised by different groups including government advisors and national committees such as the national COVID-19 taskforces, national immunization technical advisory groups (NITAGs), scientific journals, media, etc.
4. Understand how model results and related uncertainties are communicated to different audience and the role and impact of communication (for e.g., risk communication via national briefings, media) on policy implementation.
5. Make recommendations based on the outcome of the Commission.
6. Communicate and socialise final recommendations with a launch at a major international conference and other means to be determined.

We anticipate the proposed outcomes to help strengthen the usefulness of epidemiological modelling to inform national and regional disease control such the World Health Organization (including its regional centres), ASEAN Center for Public Health Emergencies and Emerging Diseases (ACPHEED), the Africa Centre for Disease Control (ACDC), European Centre for Disease Prevention and Control (ECDC), US Centers for Disease Control and Prevention (US CDC), and other regional and national public health institutes.

Our approach

Our team will comprise Commissioners who are experts from the modelling community, field epidemiology, health economics, climate change, behavioural science and anthropology, ethics, policy analysis and involve stakeholders from governments, intergovernmental agencies, scientific journals, funders, and other relevant groups. The Commissioners will meet face-to-face initially to conceptualise and develop a workplan, begin deliberations, and establish working groups on specific topics. Subsequent meetings may be held virtually or in-person, as deemed necessary. The recommendations from the commission will be disseminated via several channels including published reports, policy briefs, conferences, and webinars.

Our partners:

This commission is being supported by the Bill and Melinda Gates Foundation (BMGF) and the Access and Delivery Partnership (ADP) – hosted by the United Nations Development Programme (UNDP).

Our team

Co-chairs

Photo	Name	Short bio
	**Mark Jit, PhD** https://www.lshtm.ac.uk/aboutus/people/jit.mark Professor of Vaccine Epidemiology and Head of Department of Infectious Disease Epidemiology and Co-Director at Global Health Economics Centre, London School of Hygiene and Tropical Medicine (LSHTM), UK Visiting Professor, NUS Saw Swee Hock School of Public Health and HKU School of Public Health	Mark Jit is an economist, epidemiologist, and modeller. His research focuses on understanding the economic and epidemiological impact of vaccines for informed public health decision-making. Since 2020, a major focus of his work has been on COVID-19. He organizes and contributes to courses worldwide on vaccine modelling, economics, and decision science. Dr. Jit was elected as a Fellow of the UK's Academy of Medical Sciences this year.
	**Wanrudee 'Mink' Isaranuwatchai, PhD** https://www.hitap.net/en/staff/172294 Program Leader (Director) and Senior Researcher, Health Intervention and Technology Assessment Program (HITAP), Thailand Associate Professor, Institute of Health Policy, Management and Evaluation, University of Toronto, Canada Health Economist, Centre for Excellence in Economic Analysis Research (CLEAR), St. Michael's Hospital, Canada	Wanrudee Isaranuwatchai is a health economist with expertise in applying health economics and health technology assessment (HTA) in real-world settings, specifically advancing economic evaluation methods. She specializes in using diverse approaches for economic evaluations, including big data analysis. Dr. Isaranuwatchai also contributes to training programs on health systems and universal health coverage in Asia, Africa, and North America.

Commissioners

Photo	Name	Short bio
	**Edwine Barasa, PhD** https://ideal.kemri-wellcome.org/team/dr-edwine-barasa/ Director, KEMRI-Wellcome Trust Research Programme, Kenya Visiting Professor of Health Economics, University of Oxford, UK	Edwine Barasa is a health economist with expertise in health financing and system performance. His research focuses on economic evaluation, equity and governance in healthcare. Dr. Barasa advises the Kenya Ministry of Health and provides technical support to international organizations like the World Bank and WHO across Sub-Saharan Africa. He serves on advisory boards for the Africa CDC's Health Economic Unit and the Africa Universal Health Coverage Commission.
	**Alex R. Cook, PhD** https://sph.nus.edu.sg/faculty-directory/cook-alex-richard/ Vice Dean (Research) and Domain Leader (Biostatistics & Modelling), Saw Swee Hock School of Public Health, National University of Singapore (NUS), Singapore Associate Professor, Department of Statistics and Applied Probability, NUS Yong Loo Lin School of Medicine and the Program in Health Services and Systems Research, Duke-NUS Graduate Medical School Singapore (Joint)	Alex Cook is a statistician and infectious disease modeller working on dengue, COVID-19, influenza and other respiratory pathogens, and on population modelling to assess the effect of evolving demographics on non-communicable diseases, such as diabetes. His multidisciplinary team brings together researchers from the fields of statistics, computational biology, computer engineering, mathematics, geography and environmental sciences.

	**Zulma M. Cucunuba, MD, MPH, PhD** https://medicina.javeriana.edu.co/w/tracelac-equipo-zulma-cucunuba?redirect=%2Ftrace-lac Assistant Professor of Infectious Disease Epidemiology, Faculty of Medicine, Pontificia Universidad Javeriana, Colombia Honorary Lecturer, MRC Centre for Global Infectious Disease Analysis, Imperial College London, UK	Zulma Cucunuba is an infectious disease epidemiologist with more than 10 years of experience in the field. Dr. Cucunuba's research focuses on using statistical and mathematical models to understand infectious disease spread and the impact of interventions with a particular focus on Latin America. She co-leads the Epiverse TRACE-LAC initiative, concentrating on open-source software development, analytics, and training programmes for public health crises. She has assisted the Colombian government in formulating effective strategies during the COVID-19 crisis.
	**Janan Dietrich, MPsych, PhD** https://www.wits.ac.za/staff/academic-a-z-listing/d/janandietrichwitsacza/ Associate Professor and Bio-Behavioural Research Director, Clinical Medicine Department, Faculty of Health Sciences, University of the Witwatersrand, South Africa Executive Director, African Social Sciences Unit of Research and Evaluation (ASSURE) Early Career Investigator, South African Medical Research Council	Janan Dietrich is a social and behavioral sciences researcher. As the lead Perinatal HIV Research Unit's (PHRU) lead social scientist, Dr. Dietrich has been involved in health research for almost 17 years with specific expertise in HIV vaccines clinic research. She is also a research psychologist working within clinical research and biomedical sciences.

	**Ruth R. Faden, PhD** https://bioethics.jhu.edu/people/profile/ruth-faden/ Philip Franklin Wagley Professor of Biomedical Ethics and Founder, Berman Institute of Bioethics, John Hopkins University (JHU), USA	Ruth Faden, a scientist and academic, founded the Johns Hopkins Berman Institute of Bioethics and served as its director from 1995 to 2016. Her research focuses on structural justice theory and on national and global challenges in food and agriculture, learning health care systems, women's health, the rights and interests of pregnant women, health systems design and priority setting, and advances in science and technology. Dr. Faden has received lifetime achievement awards for her contributions to bioethics.
	**Gabriel M. Leung, MD, MPH** https://en.wikipedia.org/wiki/Gabriel_Leung Executive Director (Charities and Communities), Hong Kong Jockey Club Honorary Clinical Professor, HKU School of Public Health	Gabriel Leung is a specialist in public health medicine, epidemiologist and global health exponent. Dr Leung's research defined the epidemiology of three epidemics: SARS in 2003, H7N9 influenza in 2013 and COVID-19. Dr. Leung was Dean of Medicine and inaugural Helen and Francis Zimmern Professor in Population Health at the University of Hong Kong. He was Hong Kong's Under Secretary for Food and Health and Director of the Office of the Chief Executive of Hong Kong. He is a member of the US National Academy of Medicine and serves on Wellcome Trust's Board of Governors.

	**Stephen Lim, PhD** https://www.healthdata.org/about/stephen-lim Professor of Health Metrics Sciences and Senior Director of Science and Engineering, Institute for Health Metrics and Evaluation (IHME), University of Washington, USA	Stephen Lim is a health economist and epidemiologist. Dr. Lim leads projects on global health evaluation and the Global Burden of Disease study. He is actively involved in various areas of work, including the Global Fund Prospective Country Evaluations and monitoring intervention coverage. Dr. Lim's expertise spans health information systems, cost-effectiveness analysis, and choosing effective interventions. Before joining IHME, he held senior positions at the University of Queensland and the World Health Organization.
	**Marc Lipsitch, DPhil** https://www.hsph.harvard.edu/profile/marc-lipsitch/ Professor of Epidemiology, Director of the Center for Communicable Disease Dynamics, and Faculty Affiliate in Immunology and Infectious Diseases, Harvard T.H. Chan School of Public Health (HSPH), Harvard University, USA Inaugural Director and Senior Advisor, Center for Forecasting and Outbreak Analytics, US CDC	Marc Lipsitch, an infectious disease epidemiologist and microbiologist, specializes in infectious disease transmission modeling. He was involved in scientific research and public communication during the COVID-19 pandemic. His expertise includes using transmission-dynamic simulations to enhance the design of studies on infectious disease interventions. He also focuses on bioethics related to infectious diseases and clinical trials in emergencies. Dr. Lipsitch is a Fellow of the American Academy of Microbiology and the National Academy of Medicine.

	**Rachel Lowe, PhD** https://www.icrea.cat/Web/ScientificStaff/rachel-lowe-363310 ICREA Research Professor and Global Health Resilience Team Leader, Barcelona Supercomputing Center (BSC), Spain Royal Society Dorothy Hodgkin Fellow, LSHTM, UK Director, Lancet Countdown in Europe	Rachel Lowe is a researcher and infectious disease epidemiologist. Prof. Lowe's work focuses on mathematical modeling of infectious diseases and the development of policy-relevant methodologies to enhance surveillance, preparedness, and response to climate-sensitive disease outbreaks. She has contributed to the integration of seasonal climate forecasts in early warning systems for infectious diseases, publishing impactful research in Latin America, the Caribbean, and Southeast Asia. Prof. Lowe leads multiple projects that utilize digital technology and modeling tools to build local resilience against emerging infectious disease threats in climate change hotspots.
	**Jodie McVernon, MBBS, PhD** https://www.doherty.edu.au/people/professor-jodie-mcvernon Professor and Director of Doherty Epidemiology, The Peter Doherty Institute for Infection and Immunity, Australia Director, Strengthening Preparedness in the Asia-Pacific Region through Knowledge (SPARK) and Supporting Participatory Evidence Generation to Control Transmissible Disease in our Region Using Modelling (SPECTRUM) Consortia	Jodie McVernon is a medical doctor specialized in paediatrics, public health, and vaccinology. With expertise in clinical vaccine trials, epidemiologic studies, and mathematical modeling of infectious diseases, she leads a research group that utilizes biostatistical and epidemiological methods to understand infectious disease epidemiology and evaluate interventions. Dr. McVernon has developed infectious diseases modeling capabilities in Australia and the Asia Pacific Region, contributing to pandemic preparedness and response strategies, including the H1N1 influenza and COVID-19 pandemics. Dr. McVernon actively advises national and global

		organizations on infectious disease hazards.
	**Gautam I. Menon, PhD** https://www.ashoka.edu.in/profile/gautam-menon-2/ Professor of Physics and Biology, Ashoka University, India & Director, Centre for Climate Change and Sustainability, Ashoka University	Gautam I. Menon is a professor of physics and biology, who works on biophysical problems, the modeling of infectious disease and OneHealth approaches. His recent work developed mathematical and computational models for COVID-19 spread in India, using models to inform public policy. He was a founding member of the Indian Scientists' Response to COVID-19 (ISRC), and a member of the Expert Group on Education for the Science, Technology and Innovation Policy of India (2020). He is interested in science communication and academic ethics. He serves on the scientific review committees of several international and national agencies, including the Human Frontier Science Program and the Wellcome Trust-DBT India Alliance.
	**Juliet Pulliam, PhD** https://www.sacema.org/people/staffdetail/Pulliam/ Professor of Applied Mathematics and Director, The South African Centre for Epidemiological Modelling and Analysis (SACEMA), Stellenbosch University, South Africa	Juliet Pulliam is a mathematical modeller focusing on applied questions in infectious disease epidemiology, particularly in resource-limited settings. Most of her work to date has focused on emerging, vector-borne, and zoonotic viruses, including Ebola, Nipah, Japanese encephalitis, dengue, and SARS-CoV-2 viruses. Before moving to SACEMA in 2016, she was an Assistant Professor in the Department of Biology and Emerging Pathogens Institute at the University of Florida and a Research and Policy for Infectious Disease Dynamics

		(RAPIDD) Program Fellow in the Division of International Epidemiology and Population Studies at the US NIH's Fogarty International Center.
	**Yot Teerawattananon, MD, PhD** https://www.hitap.net/en/staff/10463 Secretary General of the Foundation, Founding Leader and Senior Researcher, Health Intervention and Technology Assessment Program (HITAP), Thailand Visiting Professor, Saw Swee Hock School of Public Health, National University of Singapore (NUS), Singapore	Yot Teerawattananon is a medical doctor and health economist. Yot's work has been used to inform policy decisions in Thailand regarding the adoption of medicines, medical devices, health promotion and disease prevention programmes under the Universal Health Coverage Scheme and the national pharmaceutical reimbursement list, the National List of Essential Medicines. He provides technical advice to national and international agencies, such as the Gates Foundation, WHO, World Bank, Asian Development Bank and the Centre for Global Development. Yot is also a co-founder of the HTAsiaLink and the international Decision Support Initiative (iDSI).
	**Erica Thompson, PhD** https://www.ericathompson.co.uk/ Associate Professor of Modelling for Decision Making, Department of Science, Technology, Engineering and Public Policy, University College London (UCL), UK Fellow, London Mathematical Laboratory, UK	Erica Thompson is an interdisciplinary academic who works on the appropriate use of mathematical modelling to support real-world decisions, from mathematical and statistical questions about methodologies of inference from models, to psycho-social questions about the formation of confidence and the role of expert judgement. Her application areas of interest include climate change, climate adaptation, 'green finance', economic and financial modelling, public health, insurance, disaster risk modelling/financing, machine learning and autonomous

		systems. In 2022, Dr. Thompson published the book 'Escape from Model Land'.

Secretariat

Photo	Name	Short bio
	**Crystal Chua, BCom** https://www.linkedin.com/in/crystal-chua-67579496/ Assistant Manager, Saw Swee Hock School of Public Health, National University of Singapore (NUS), Singapore	Crystal Chua is a management professional with over a decade of experience at the NUS School of Public Health, where she plays a vital role in supporting the School's efficient operations and strategic initiatives. Crystal helps organise the Modelling Infectious Diseases in Southeast Asia (MIDSEA) Network, a consortium that brings together modellers from Southeast Asia.
	**Hannah Clapham, PhD** https://sph.nus.edu.sg/faculty-directory/clapham-hannah/ Assistant Professor and Infectious Diseases Programme Leader, Saw Swee Hock School of Public Health, National University of Singapore (NUS), Singapore	Hannah Clapham is an infectious disease epidemiologist and mathematical modeller. Dr. Clapham's research areas of interest include infectious disease dynamics and control, impact of vaccination, inference from serological data, and the epidemiology and control of flaviviruses, including dengue and Japanese Encephalitis, and more recently COVID-19. She was previously Head of the Mathematical Modelling group in the Oxford University Clinical Research Unit (OUCRU) in Vietnam.

	**Saudamini Dabak, MA** https://www.hitap.net/en/staff/170776 Technical Advisor and Head of International Unit, Health Intervention and Technology Assessment Program (HITAP), Thailand	Saudamini Dabak is a health economist. She started working at HITAP as an Overseas Development Institute (ODI) Fellow in 2015. At HITAP, Saudamini has supported HTA initiatives in Asia and Africa and has also been involved in conducting health systems research. Prior to working at HITAP, Saudamini worked at the World Bank Group.
	**David Heymann, MD, DTM&H, CBE** https://www.lshtm.ac.uk/aboutus/people/heymann.david Professor, London School of Hygiene and Tropical Medicine (LSHTM), UK Chair, Strategic and Technical Advisory Group on Infectious Hazards (STAG-IH), World Health Organization (WHO), Switzerland Member of International Advisory Panel, Saw Swee Hock School of Public Health, National University of Singapore (NUS), Singapore	David Heymann is a global health expert who previously served as the WHO's assistant director-general for health security and environment, leading the response to SARS. Dr. Heymann was a medical epidemiologist in sub-Saharan Africa, combating Ebola and supporting efforts against malaria, measles, and tuberculosis. In 2009, he was appointed an honorary Commander of the Most Excellent Order of the British Empire (CBE) for service to global public health.
	**Sarin K C, MSc** https://www.hitap.net/en/staff/174795 Project Associate, Health Intervention and Technology Assessment Program (HITAP), Thailand	Sarin K C conducts health economics research to inform policies across LMICs. In addition, he focuses on building the technical capacity of researchers and policymakers and fostering research networks and partnerships in LMICs. Prior to HITAP, Sarin worked as a researcher at LSE, UK and the Ministry of Health and Population, Nepal.

	**Jennifer Kealy, MPH** https://www.linkedin.com/in/jennifer-kealy-562ba8/ Consultant, Scientist, Essential Medicines and Health Products, World Health Organization (WHO), Switzerland Lecturer, University Hospital Basel, Switzerland	Jennifer has 25+ years of experience in research and development of medicines, vaccines and in-vitro diagnostics for non-communicable and infectious diseases. Currently, Jennifer is a scientist with the World Health Organization (WHO) Access to Medicines and Health Products Division where she is involved with regulatory systems strengthening in Low- and Middle-Income Countries and prequalification assessments of vaccines. Previously she served as Head of Quality, Clinical and Regulatory Affairs at the Foundation for Innovative New Diagnostics (FIND) and Head of Quality Management Services and Senior Project Leader at the Swiss Tropical & Public Health Institute. She is a part-time doctoral candidate (DrPH) at LSHTM.
	**Chris Mercado, RN, MPH, MSc** https://www.researchgate.net/profile/Chris-Mercado-3 Research Associate, Saw Swee Hock School of Public Health, National University of Singapore (NUS), Singapore	Chris Mercado is a public health researcher interested in the link between evidence generation and public health policy. Before joining NUS, Chris has supported research and advocacy projects on malaria at the Mahidol Oxford Tropical Medicine Research Unit (MORU) and the Asia Pacific Malaria Elimination Network (APMEN). He is a member of several modelling networks, including CoMo Consortium, SPARK and MIDSEA.

	**Chayapat 'Prayfa' Rachatan, BA** https://www.hitap.net/en/staff/180193 Project Associate, Health Intervention and Technology Assessment Program (HITAP), Thailand	Chayapat Rachatan is currently a Project Associate at HITAP. She supports the HTA and health system research. Her past and ongoing research studies focus on COVID-19 policy research and decision support, effectiveness evaluation of COVID-19 vaccine chatbot, cost analysis of governance system in health sector, situational analysis of infectious disease modelling in Thailand and Thai traditional medicine. She graduated with a Bachelor's degree in Politics and International Relations from Thammasat University.

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