Check for updates

RESEARCH ARTICLE

Assessing fitness-for-purpose and comparing the suitability of COVID-19 multi-country models for local contexts and users [version 1; peer review: 1 approved, 1 approved with reservations]

Hannah Clapham[1], Mohamed Gad[2], Adrian Gheorghe[2], Raymond Hutubessy[3], Itamar Megiddo[4], Christopher Painter[5], Francis Ruiz[2], Nejma Cheikh[6], Marelize Gorgens[6], Thomas Wilkinson[6], Marc Brisson[7], Nigel Gay[8], Jane Labadin[9], Jodie McVernon[10], Paula M. Luz[11], Wilfred Ndifon[12], Brooke E. Nichols[13-15], Shankar Prinja[16], Joshua Salomon[17], Akhona Tshangela[18]

[1]National University of Singapore, Singapore, Singapore
[2]Imperial College London, London, UK
[3]World Health Organization, Geneva, Switzerland
[4]University of Strathclyde, Glasgow, UK
[5]Health Intervention and Technology Assessment Program, Nonthaburi, Thailand
[6]World Bank Group, Washington D.C., USA
[7]Laval University, Quebec City, Canada
[8]Independent Researcher, London, UK
[9]Universiti Malaysia Sarawak, Sarawak, Malaysia
[10]The Peter Docherty Institute for Infection and Immunity, Melbourne, Australia
[11]Oswaldo Cruz Foundation, Rio de Janeiro, Brazil
[12]African Institute for Mathematical Sciences, Kigali, Rwanda
[13]Department of Global Health, Boston University School of Public Health, Boston, USA
[14]Health Economics and Epidemiology Research Office, Department of Internal Medicine, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa
[15]Department of Medical Microbiology, Amsterdam University Medical Centre, Amsterdam, The Netherlands
[16]Postgraduate Institute of Medical Education and Research, Chandigarh, India
[17]Stanford University, Stanford, USA
[18]Africa CDC, Addis Ababa, Ethiopia

v1 **First published:** 12 May 2021, **5**:79
https://doi.org/10.12688/gatesopenres.13224.1
Latest published: 12 May 2021, **5**:79
https://doi.org/10.12688/gatesopenres.13224.1

Abstract

Background: Mathematical models have been used throughout the COVID-19 pandemic to inform policymaking decisions. The COVID-19 Multi-Model Comparison Collaboration (CMCC) was established to provide country governments, particularly low- and middle-income countries (LMICs), and other model users with an overview of the aims, capabilities and limits of the main multi-country COVID-19

Open Peer Review

Approval Status ✓ ?

	1	2
version 1 12 May 2021	✓ view	? view

1. **Borwornsom Leerapan**, Mahidol

models to optimise their usefulness in the COVID-19 response.
Methods: Seven models were identified that satisfied the inclusion criteria for the model comparison and had creators that were willing to participate in this analysis. A questionnaire, extraction tables and interview structure were developed to be used for each model, these tools had the aim of capturing the model characteristics deemed of greatest importance based on discussions with the Policy Group. The questionnaires were first completed by the CMCC Technical group using publicly available information, before further clarification and verification was obtained during interviews with the model developers. The fitness-for-purpose flow chart for assessing the appropriateness for use of different COVID-19 models was developed jointly by the CMCC Technical Group and Policy Group.
Results: A flow chart of key questions to assess the fitness-for-purpose of commonly used COVID-19 epidemiological models was developed, with focus placed on their use in LMICs. Furthermore, each model was summarised with a description of the main characteristics, as well as the level of engagement and expertise required to use or adapt these models to LMIC settings.
Conclusions: This work formalises a process for engagement with models, which is often done on an ad-hoc basis, with recommendations for both policymakers and model developers and should improve modelling use in policy decision making.

Keywords
COVID-19, mathematical modelling, health economics, epidemiological modelling, policymaking.

University, Bangkok, Thailand

2. **Gang Sun**, School of Health Management, Southern Medical University, Guangzhou, China

Any reports and responses or comments on the article can be found at the end of the article.