Geospatial mapping of two-hour access to timely essential surgery in the Philippines

Authors: Meghan Xuxin Lim MBChB MSc MRCSEd DPhil 1,2, Ayyappan Madhumitha BA (Hons) 3, Ma Wai Wai Zaw MBBS MMed (Anaes) 4, Nikita Kanumoory Mandyam BSc (Hons) 5, Chia Hui Xiang BA (Hons) 5, Don Eliseo III Lucero-Prisno MSc MPH MD PhD 6,7

1 Department of Paediatric Surgery, KK Women’s and Children’s Hospital, 100 Bukit Timah Road Singapore 229899.
2 Program in Global Surgery and Social Change, Department of Global Health and Social Medicine, Harvard Medical School, 641 Huntington Ave, Boston, MA 02115, USA.
3 Yale-NUS College, 16 College Avenue West, 01-220 Singapore 138527.
4 Division of Anesthesiology and Perioperative Medicine, Singapore General Hospital,
5 National University of Singapore, Saw Swee Hock School of Public Health, Singapore.
6 Faculty of Management and Development Studies, University of Philippines (Open University), Los Banos, Laguna, Philippines.
7 World Surgical Foundation, Philippines, Manila, Philippines.

Corresponding author:
Dr Meghan Xuxin Lim
Program in Global Surgery and Social Change,
Department of Global Health and Social Medicine,
Harvard Medical School,
641 Huntington Ave, Boston,
MA 02115, USA.
Email: Meghan_lim@hms.harvard.edu
Tel: +65-91777542
Abstract

Background: Timely access to safe and affordable surgery is essential for universal health coverage. To date, there are no studies evaluating the 2-hour access to Bellwether procedures (Caesarean section, laparotomy, open fracture management) in the Philippines. Thus, the objectives of this study are firstly, to measure the proportion of the population able to reach a Bellwether hospital within 2 hours in the Philippines and secondly, to identify areas in the country with the most surgically underserved populations.

Method: All Philippines public hospitals with Bellwether capacities were identified from the Ministry of Health website. The service area tool in ArcGIS Pro was used to determine the population within a two-hour drive time of a Bellwether facility. Finally, suitability modelling was done to identify potential future sites for a surgical facility that targets the most underserved regions in the Philippines.

Results: 428 Bellwether capable hospitals were identified. 85.1% of the population lived within 2 hours of one of these facilities. However, 7 regions had less than 80% of its population living within 2 hours of a Bellwether capable facility - Bicol, Eastern Visayas, Zamboanga, Cordillera, Autonomous region of Muslim Mindanao, Caraga and Mimaropa. Suitability analysis identified 4 regions - Caraga, Mimaropa, Calabarzon and Zamboanga - which are ideal locations to build a new hospital with surgical capacity.

Conclusion: The Philippines is a country which provides good access to essential and emergency surgical services to its population. More than 80% of its population can access Bellwether procedures within 2 hours. However, regional disparities in terms of access still need to be addressed. Surgical capacity needs to be improved in regions which do not meet the Lancet Commission of Global Surgery (LCoGS) indicator target for 2-hour access to essential surgery of at least 80%.
Acknowledgement
Funding: None

Footnote
Conflicts of interest: None

Ethical statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.