

## AB022. Geospatial mapping of two-hour access to essential surgery in Cambodia

Xuxin Lim<sup>1,2</sup>, Madhumitha Ayyappan<sup>3</sup>,  
Ma Wai Wai Zaw<sup>4</sup>, Nikita Kanumooray Mandyam<sup>5</sup>,  
Hui Xiang Chia<sup>5</sup>, Chhoun Phaek<sup>6</sup>, Savoun Kim<sup>7</sup>

<sup>1</sup>Department of Paediatric Surgery, KK Women's and Children's Hospital, Singapore, Singapore; <sup>2</sup>Program in Global Surgery and Social Change, Department of Global Health and Social Medicine, Harvard Medical School, Boston, MA, USA; <sup>3</sup>Department of Medical Anthropology, Yale-NUS College, Singapore, Singapore; <sup>4</sup>Division of Anesthesiology and Perioperative Medicine, Singapore General Hospital, Singapore, Singapore; <sup>5</sup>Saw Swee Hock School of Public Health, National University of Singapore, Singapore, Singapore; <sup>6</sup>KHANA Center for Population Health Research, Phnom Penh, Cambodia; <sup>7</sup>Department of Hospital Services, Ministry of Health, Phnom Penh, Cambodia

*Correspondence to:* Xuxin Lim, MBChB, MSc, MRCSEd, DPhil. Department of Paediatric Surgery, KK Women's and Children's Hospital, Singapore, Singapore; 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.

**Background:** Access to essential surgery is a part of the universal health coverage and is an integral part of the Sustainable Development Goals (SDG 3). Yet, timely access to safe and affordable surgery in the Kingdom of Cambodia is not well known. The objectives of this study are to firstly, elucidate the proportion of the Cambodian population with 2 hours of a Bellwether capable hospital and secondly, to identify sites in the country with the most surgically underserved populations.

**Methods:** All Cambodian public hospitals with Bellwether capacity (Caesarean section, laparotomy, open fracture management) were identified. The service area tool in ArcGIS Pro was used to determine the population that resides within a two-hour drive to a Bellwether facility. Suitability modelling was also conducted to identify potential sites to build a surgical facility that targets the most underserved regions in Cambodia.

**Results:** In total, 55 surgical facilities which were Bellwether capable were identified in Cambodia. Geospatial

analysis revealed that 84.2% of the population lived within 2 hours of one of these facilities. Twelve provinces did not meet the Lancet Commission of Global Surgery (LCoGS) indicator target of >80% 2-hour access to essential surgery. Suitability modelling identified 2 areas—Otdar Meanchey and Stung Treng which may be ideal sites to build a future hospital to improve access rates.

**Conclusions:** More than 80% of the population in Cambodia can access essential surgical procedures such as laparotomy, Caesarean section and treatment of open fractures within 2 hours. There is significant variability in access rates between the different provinces as most hospitals are concentrated in the Southern region.

**Keywords:** Cambodia; surgical access; bellwether procedures; geospatial mapping; surgical capacity

### Acknowledgments

*Funding:* The study was funded by the SDGHI and SSHPSH Joint Funding Initiative on Global Health Research in Asia, which was administered by Saw Swee Hock School of Public Health, Singapore (grant No. A-0006403-00-00).

### Footnote

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at <https://jphe.amegroups.com/article/view/10.21037/jphe-2023-apru-ab022/coif>). Dr. M.W.W.Z. reported that the SDGHI and SSHPSH Joint Funding Initiative on Global Health Research in Asia, which is administered by Saw Swee Hock School of Public Health, Singapore supported the above-mentioned manuscript and Dr. M.W.W.Z.'s attendance of APRU Global Health Conference 2023. Dr. M.W.W.Z. reported medical stocks (Abbott Labs, Astrazeneca, Becton Dickinson, Edwards Lifesciences, Intuitive Surg, Johnson & Johnson, Medtronic) procured personally and independent of manuscript work. The other authors have no conflicts of interest to declare.

*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.

*Open Access Statement:* This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International

License (CC BY-NC-ND 4.0), which permits the noncommercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

doi: 10.21037/jphe-2023-apru-ab022

**Cite this abstract as:** Lim X, Ayyappan M, Zaw MWW, Mandyam NK, Chia HX, Phaek C, Kim S. AB022. Geospatial mapping of two-hour access to essential surgery in Cambodia. *J Public Health Emerg* 2024;8:AB022.