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Where should we build the next maternal health facilities in Ethiopia? A geospatial approach to emergency obstetric and newborn care facility allocation

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Background: Emergency Obstetric and Newborn Care (EmONC) facilities are scarce in Ethiopia and concentrated in bigger cities. Using geospatial analysis, this study modeled the optimal locations for new EmONC facilities such that the maximum number of women could access EmONC facilities.
Methods: We used data from the 2016 EmONC Assessment encompassing 3,804 health facilities (including 370 EmONC facilities). Using OpenStreetMap data, we created a road network with different speed assumptions for different road types. We assumed women would walk to the nearest available road and use public transport afterward. We modeled the upgrade of health facilities using a location-allocation analysis based on the existing distribution of facilities and population and road conditions. Three scenarios—conservative (25% gap closure), moderate (50% gap closure), and ideal (100% gap closure)—were modeled to enhance EmONC facility numbers to recommended levels.
Findings: The majority of Ethiopian women live over two hours, the maximum suggested travel time, away from EmONC facilities, with significant regional variations. In all three scenarios, upgrades mostly targeted facilities in Oromia, Amhara, and Southern Nations Nationalities and Peoples regions, with minimal facilities selected in Addis Ababa, Dire Dawa, and Harari.
Conclusion: Modeling the location of new facilities has shown considerable potential in enhancing geographic accessibility and reducing regional disparities. Nonetheless, even under the most favorable scenario, a substantial portion of the country still lacks geographic access to EmONC facilities. Therefore, strategic health facility upgrades should be complemented by expanding or enhancing road infrastructure.

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