

ESRI International User Conference 2010

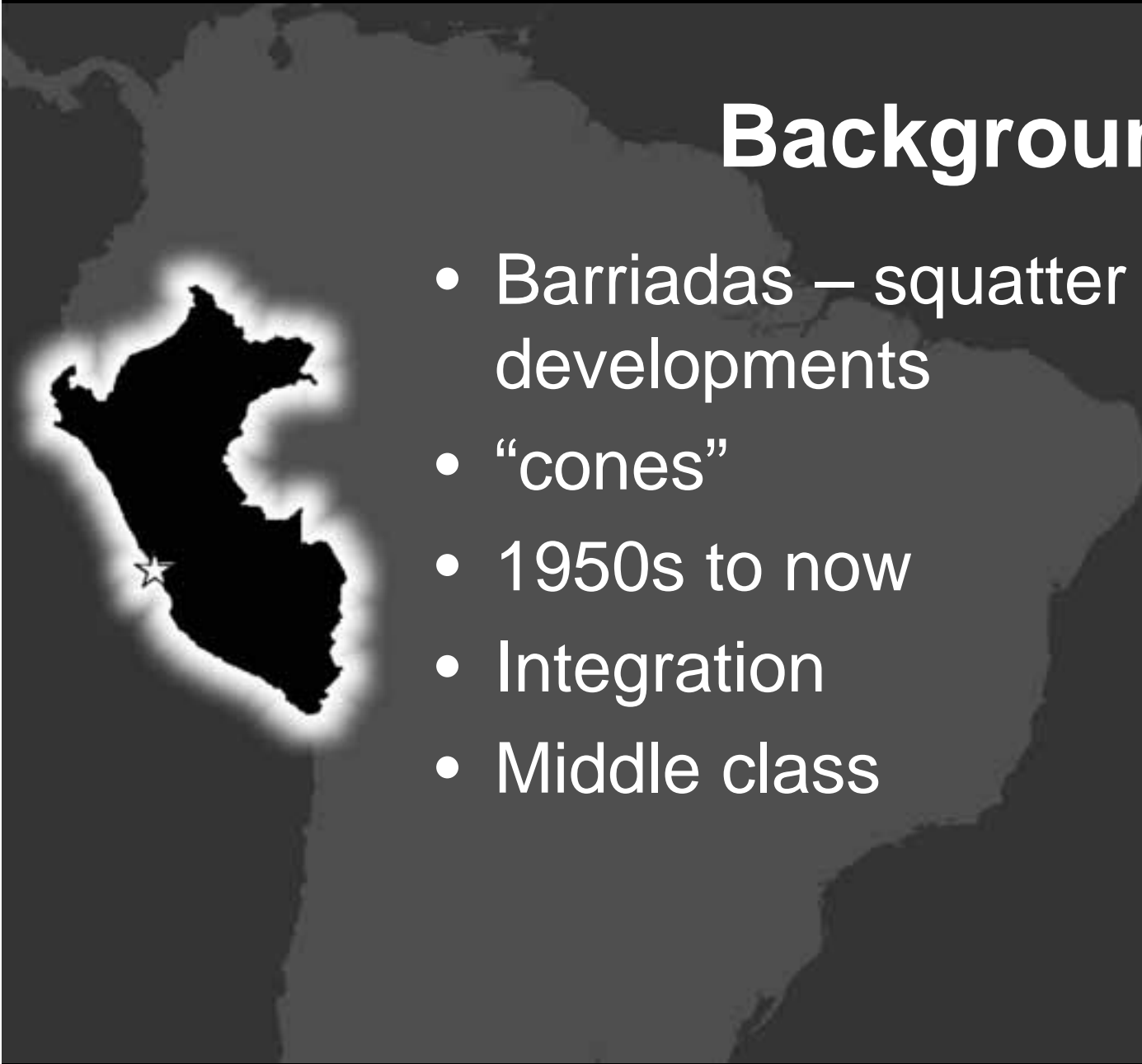
The Development of Barriadas & Access to Medical Services in Lima Peru

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Background

- Barriadas – squatter developments
- “cones”
- 1950s to now
- Integration
- Middle class



Goals

- Do different socioeconomic classes have differing access to these services and if the barriadas have developed to a point where access to medical services is comparable to those in metropolitan central Lima?
- Areas with lower levels of access can be candidates for new facilities.
- Placement of new facility & impact

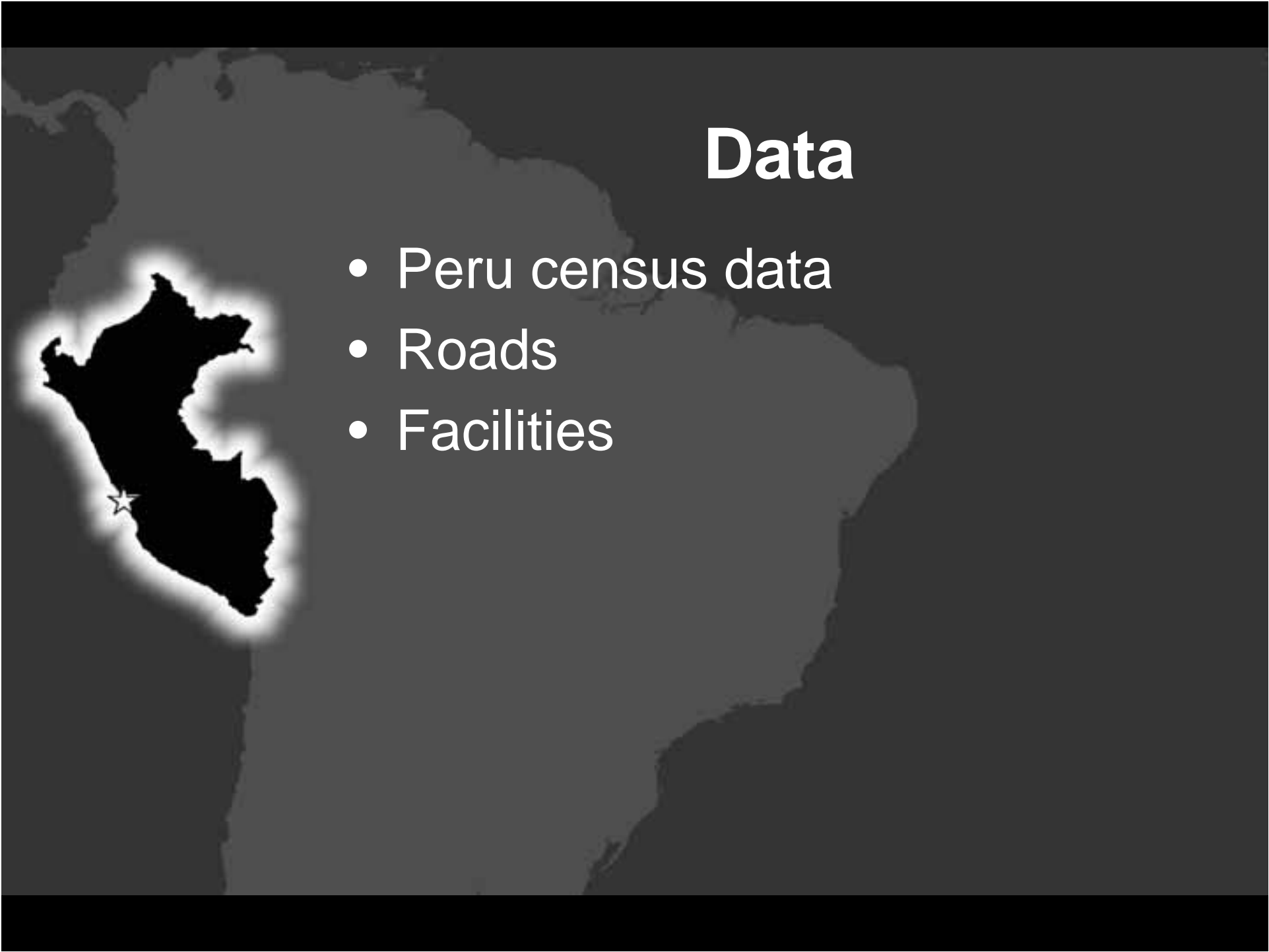


Study Area

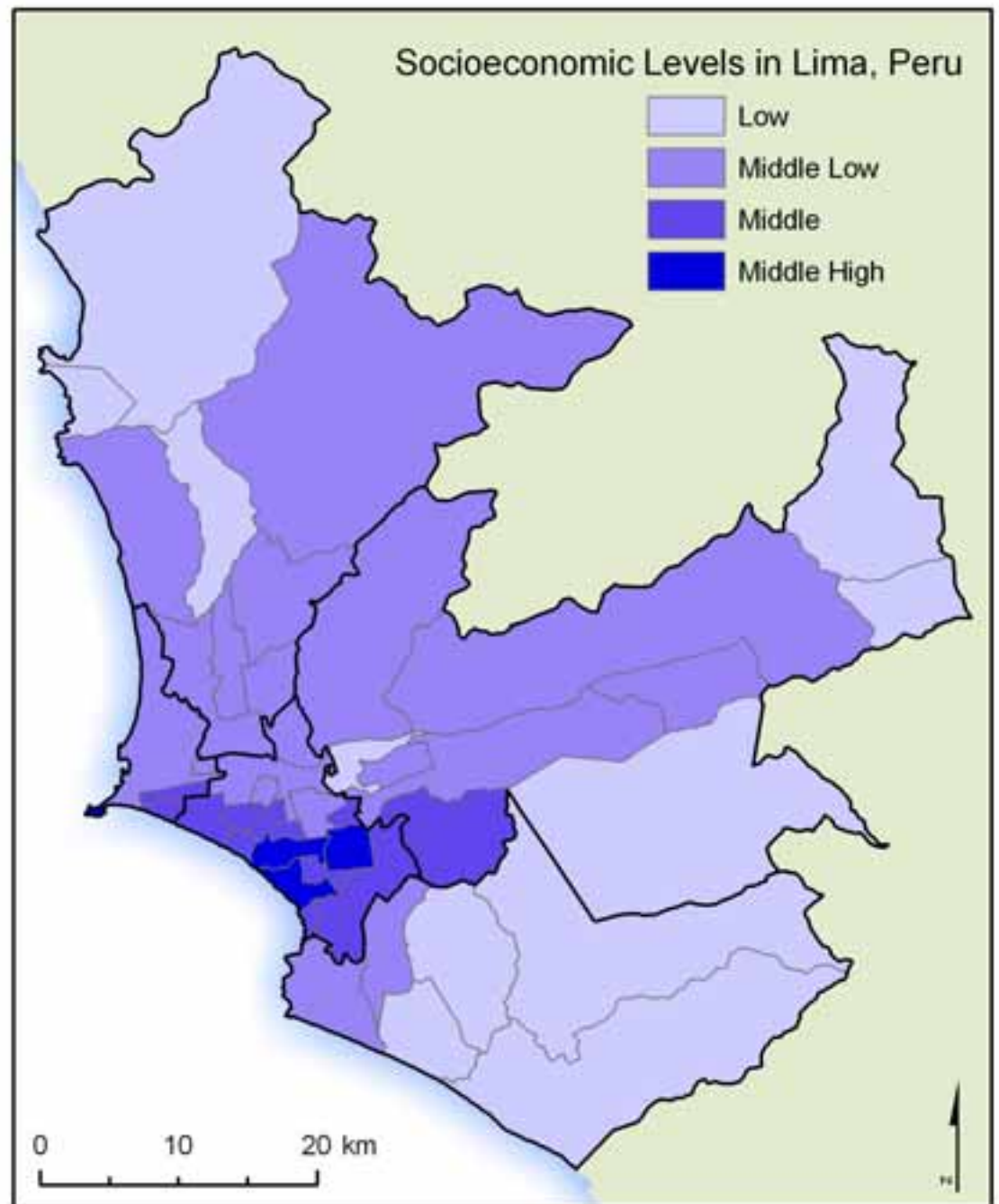


Data

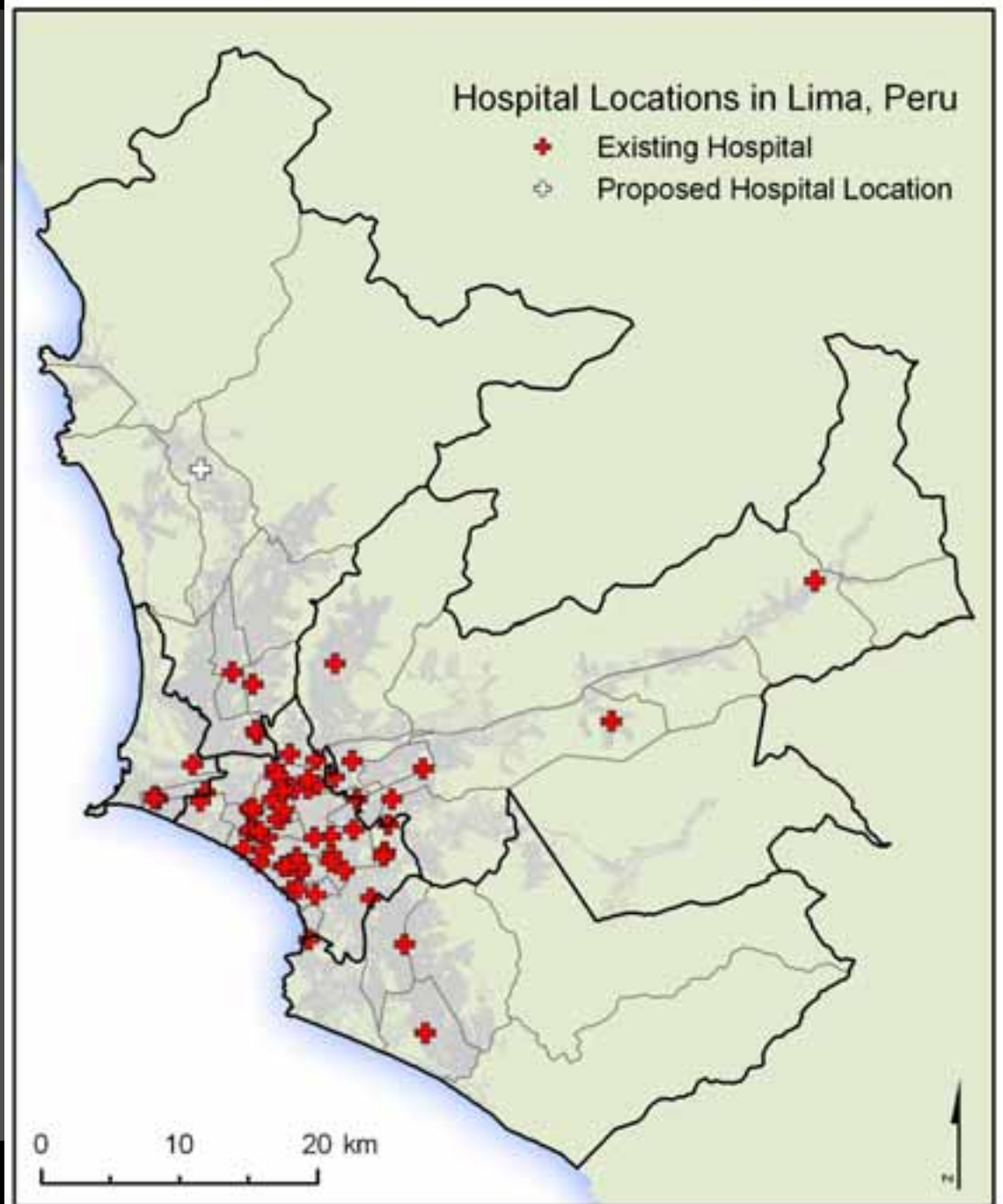
- Peru census data
- Roads
- Facilities



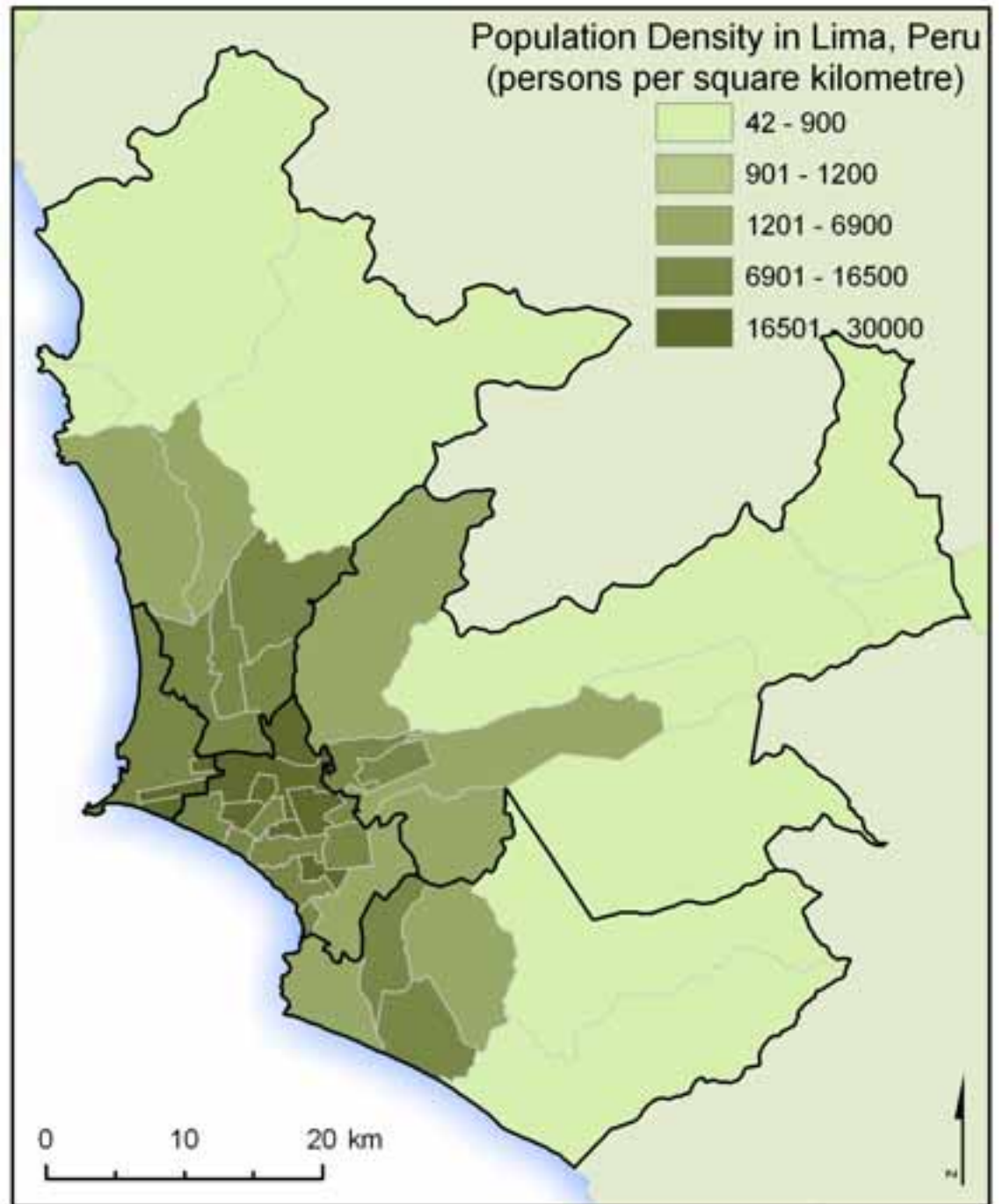
Socioeconomics



Medical Facilities

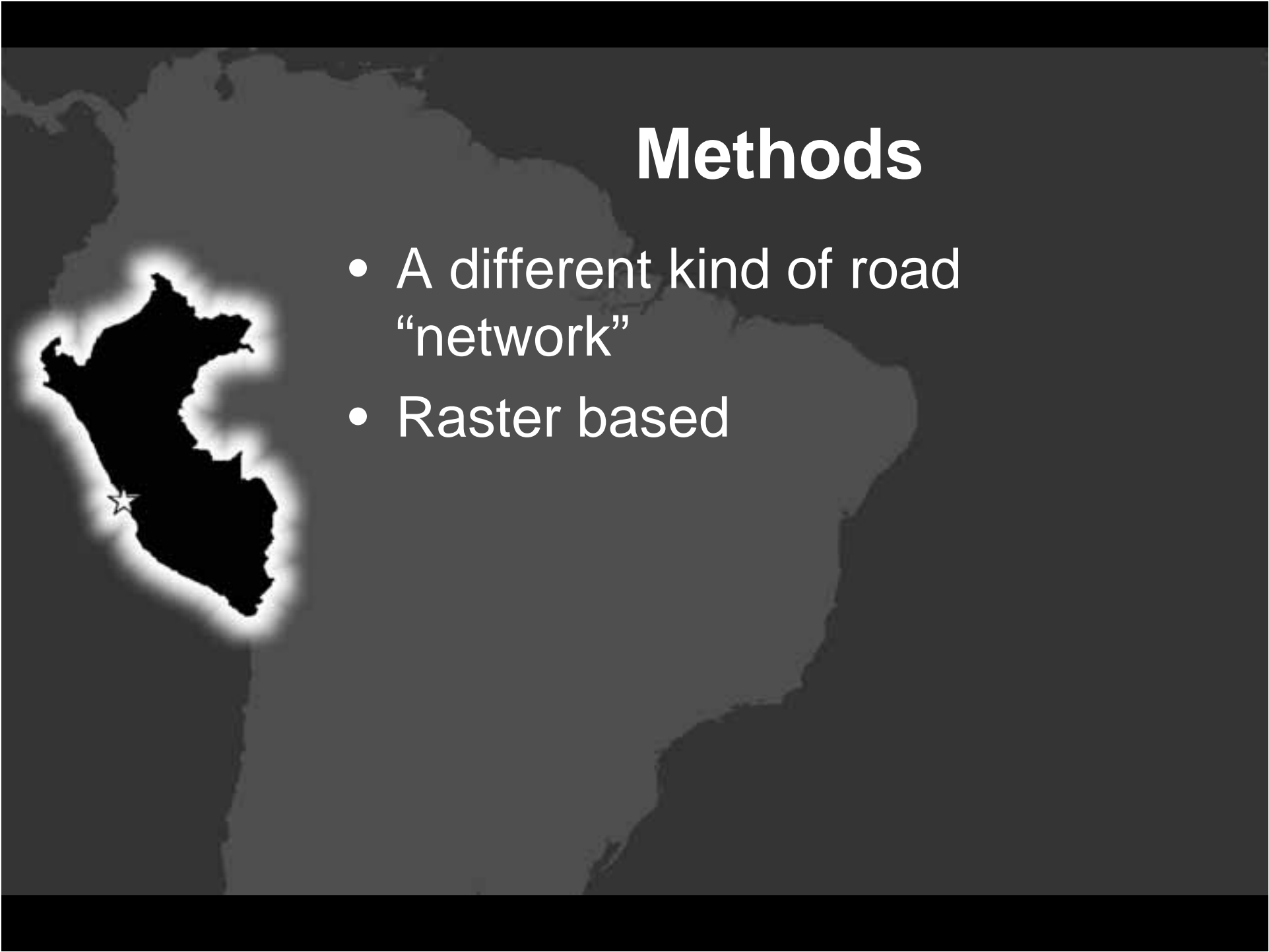


Population Density



Methods

- A different kind of road “network”
- Raster based

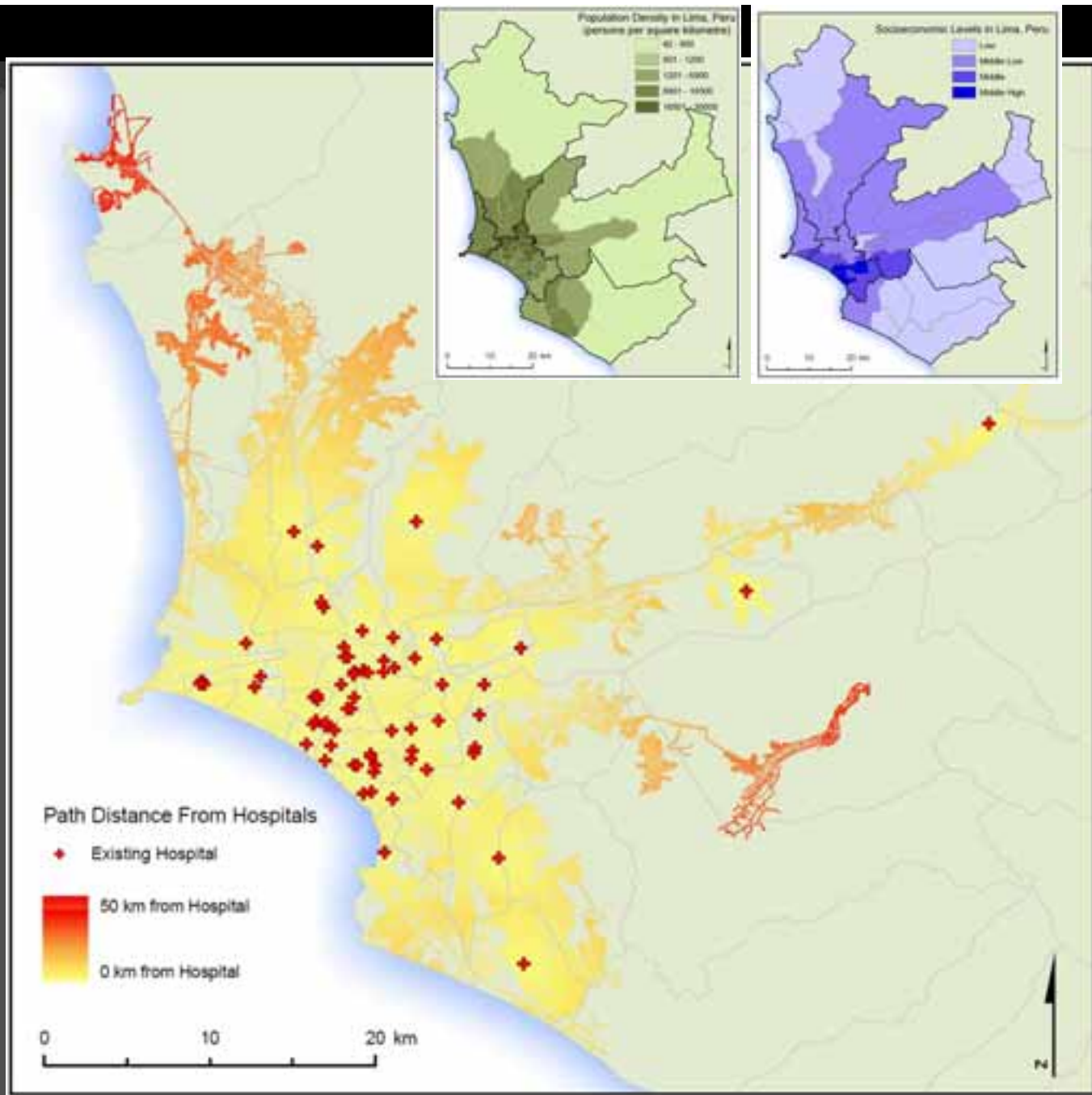


Methods

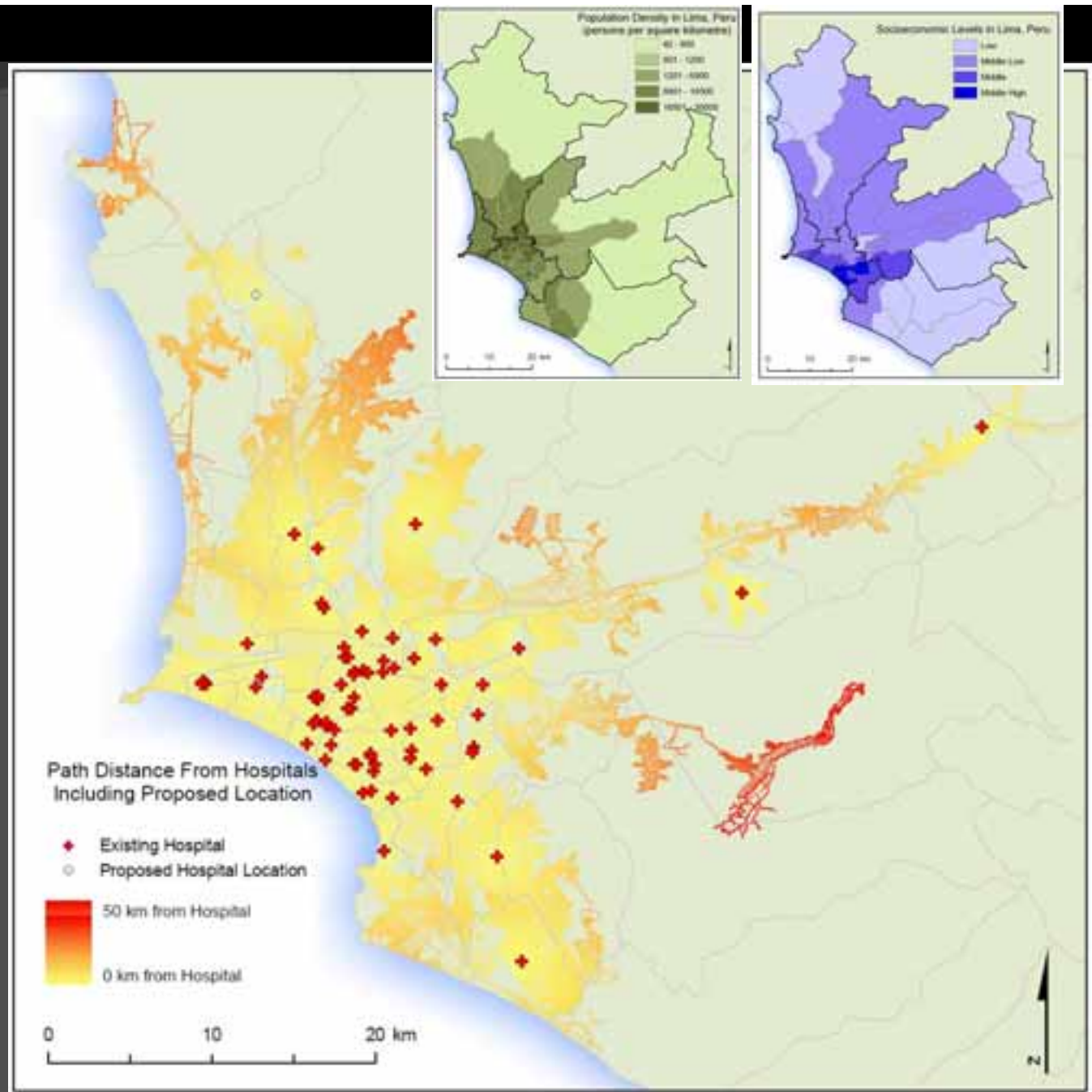
- Dasymmetric Modelling for population locating



Distance

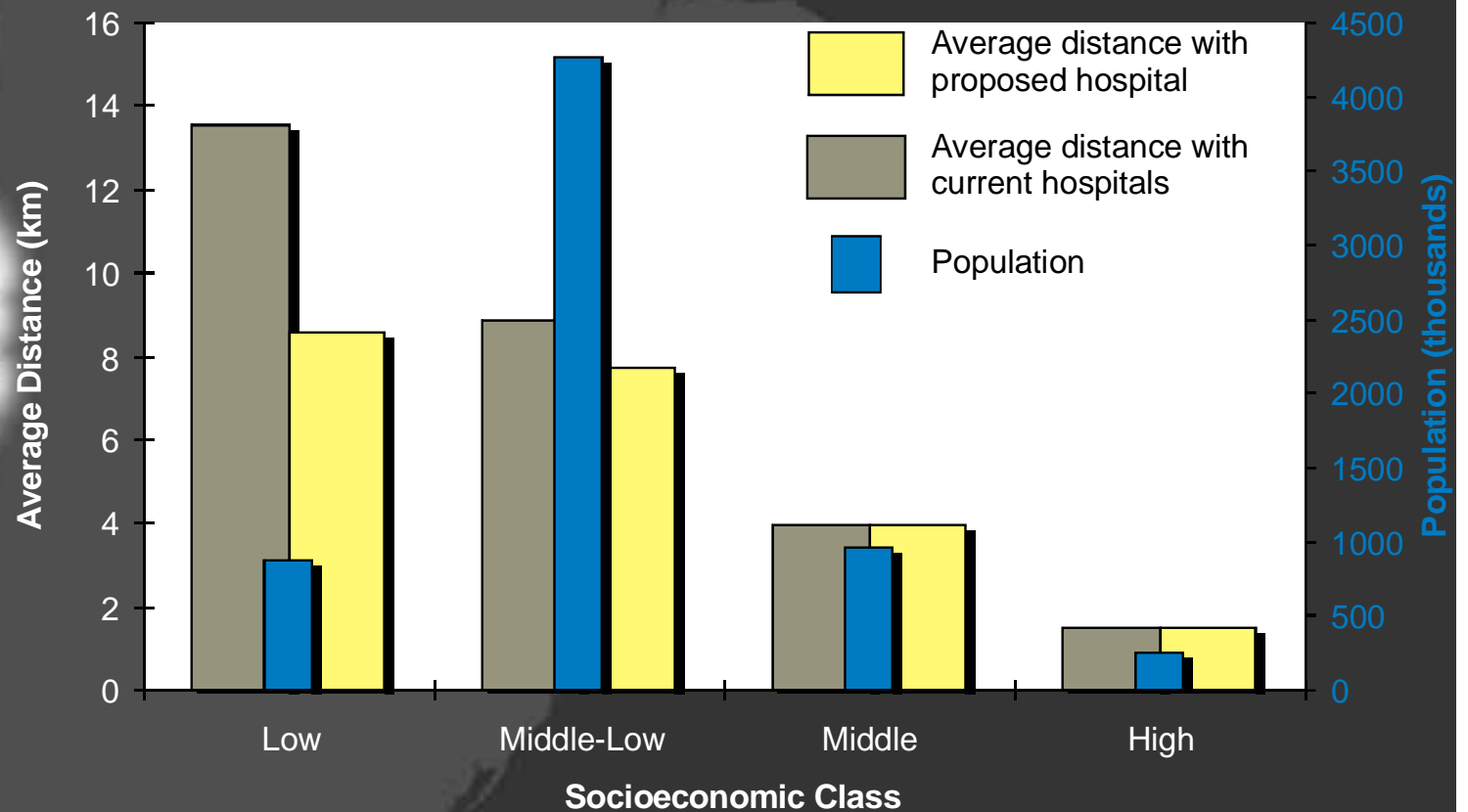


Distance with a new Facility



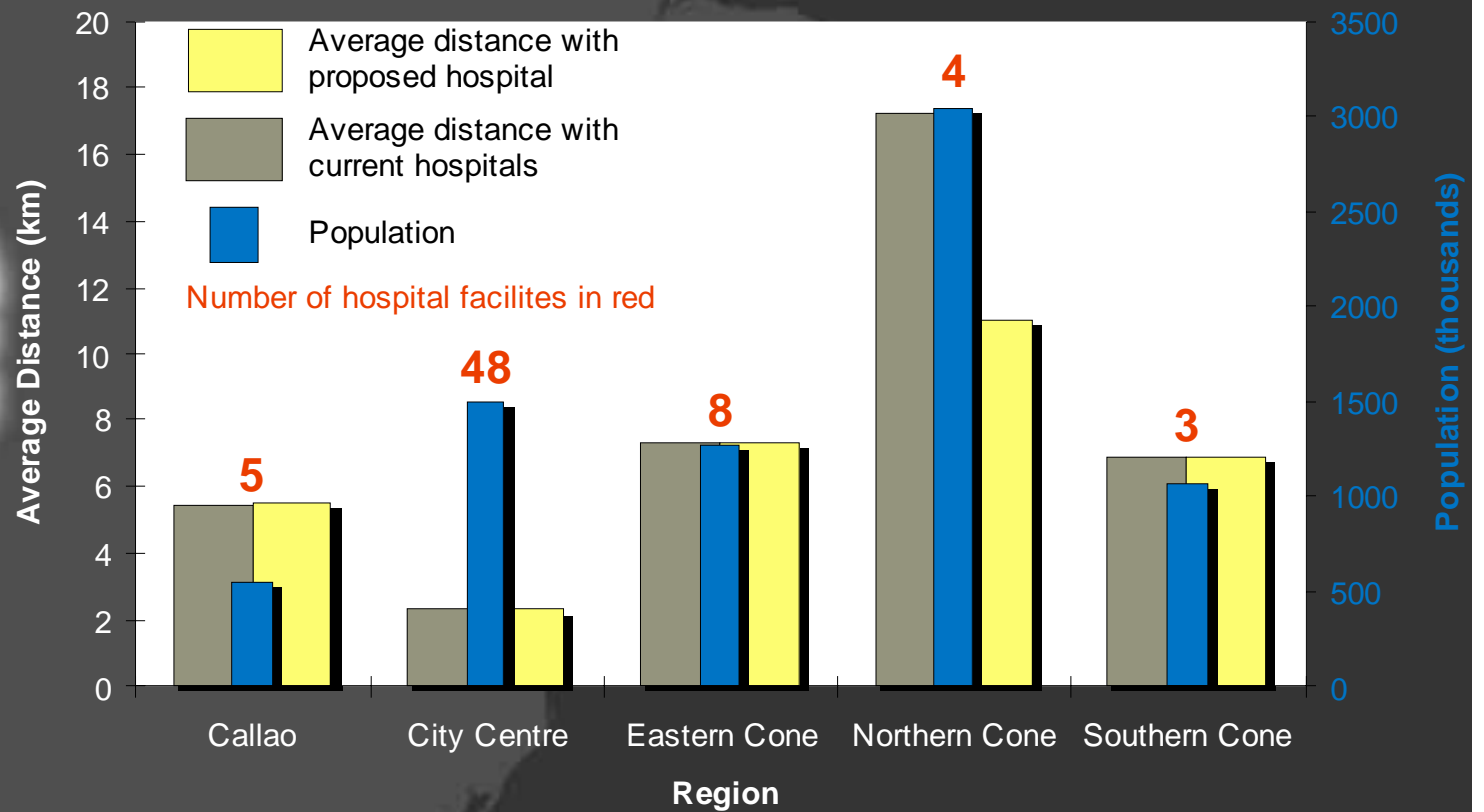
Distance by Class

Average Distance to a Hospital by Socioeconomic Class



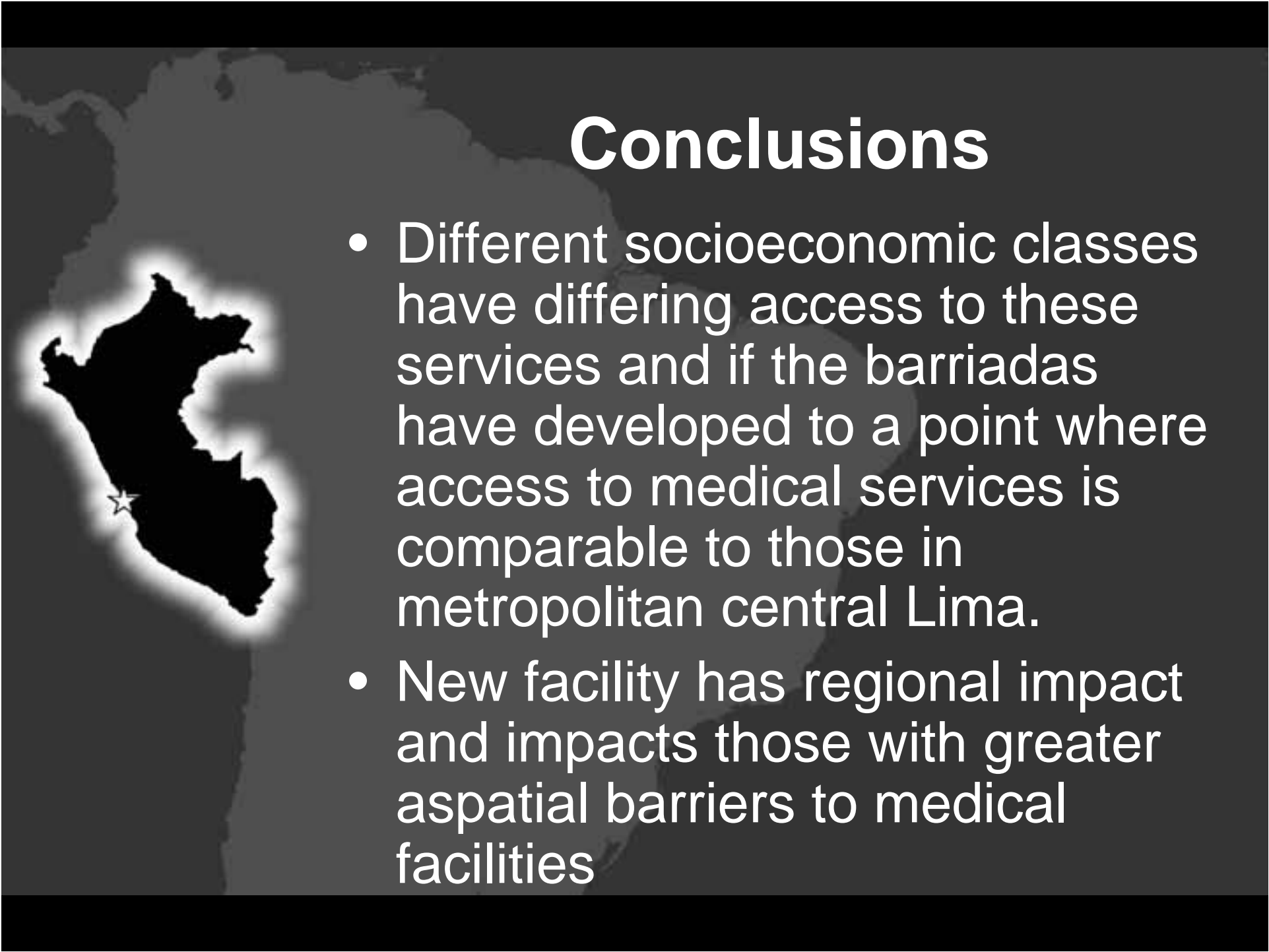
Distance by Region

Average Distance to a Hospital by Region



Conclusions

- Different socioeconomic classes have differing access to these services and if the *barriadas* have developed to a point where access to medical services is comparable to those in metropolitan central Lima.
- New facility has regional impact and impacts those with greater aspatial barriers to medical facilities



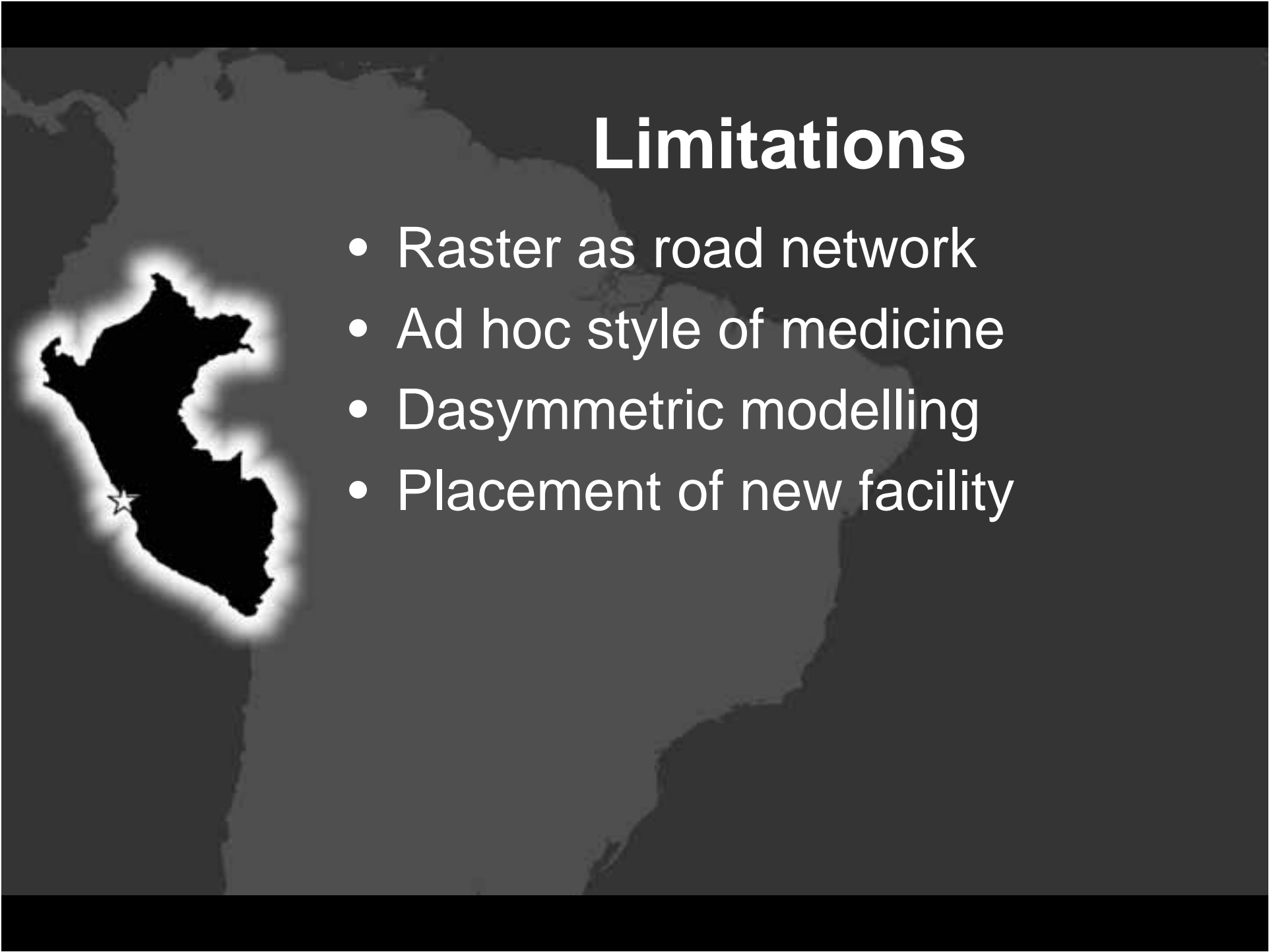
Impacts

- Who is impacted?
- Why does it matter?
- Informed planning



Limitations

- Raster as road network
- Ad hoc style of medicine
- Dasymmetric modelling
- Placement of new facility



Acknowledgements

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Thank you

Questions or Comments?

References

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- Brabyn L, and Skelly C 2002 *Modeling population access to New Zealand public hospitals*. International Journal of Health Geographics 1:3
 - Christie C, and Fone D 2003 *Equity of access to tertiary hospitals in Wales: a travel time analysis*. Journal of Public Health Medicine 25 (4): 344-350
 - Chung K, Yang D, and Bell R 2004 *Health and GIS: Toward Spatial Statistical Analyses*. Journal of Medical Systems 28 (4): 349-360
 - Environmental Systems Research Institute 2000 *Using the ArcView Spatial Analyst*. San Diego, ESRI Press
 - Fernández-Maldonado, A 2006 *Barriadas and elite in Lima, Peru: Recent trends of urban integration and disintegration*. WWW document, http://www.mckinleyville.com/cart/cabinet/cab_cartprinc.html
 - Galea S, and Vlahov D 2005 *Urban health: evidence, challenges and directions* Annu. Rev. Public Health 26:341-365
 - Gar-On Yeh A, and Chow MH 1996 *An integrated GIS and location-allocation approach to public facilities planning – an example of open space planning*. Computers Environment and Urban Systems 20 (4/5): 339-350
 - Google Earth WWW application <http://earth.google.com>
 - Jumpa M, Jan S, and Mills A 2007 *The role of regulation in influencing income-generating activities among public sector doctors in Peru*. Human Resources for Health 5:5
 - Kohli S, Sahlen K, Silvertun A, Lofman O, Trelle E, and Wigertz O 1995 *Distance from the primary health center: A GIS method to study geographical access to health care*. Journal of Medical Systems 19(6): 425-436
 - Kruk ME, and Freedman L 2008 *Assessing health system performance in developing countries*. Health Policy 85: 263-276
 - Langford M, and Higgs, G 2006 *Measuring potential access to primary healthcare services: The influence of alternative spatial representations of population*. The Professional Geographer 58(3): 294-306
 - Minot N, and Baulch B 2005 *Poverty mapping with aggregate census data: What is the loss in precision*. Review of Development Economics 9 (1): 5-24
 - Pérez, RCG, and Pérez, R. 2008 *Analyzing Urban Poverty: GIS for the Developing World*. Redlands, ESRI Press
 - Peters P, and Skop E 2007 *Socio-spatial segregation in Metropolitan Lima, Peru*. Journal of Latin American Geography 6 (1): 149-171
 - Rosero-Bixby, L 2004 *Spatial access to health care in Costa Rica and its equity: a GIS based study*. Social Science and Medicine 58: 1271-1284
 - Vaughan L, Clark, DLC, Sahbaz, O, and Haklay, M 2005 *Space and exclusion: does urban morphology play a part in social deprivation?* Area 37.4, 402 -412.
 - Wade T, Wickham J, Nash M, Neale A, Riitters K, Jones KB 2003 *A comparison of vector and raster GIS methods for calculating landscape metrics used in environmental assessments*. Photogrammetric Engineering and Remote Sensing 69 (12) 1399-1405
 - Wang F, and Luo W 2004 *Assessing spatial and nonspatial factors for healthcare access: towards an integrated approach to defining health professional shortage areas*. Health and Place 11: 131-146
 - Wikimapia WWW application. <http://www.wikimapia.org>