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Expanding the value of national surgical systems analyses with GIS and health geography

David Tulloch, Ph.D.

Department of Landscape Architecture

GeoHealth Lab at Grant F. Walton Center for Remote Sensing and Spatial Analysis

Rutgers School of Environmental and Biological Sciences

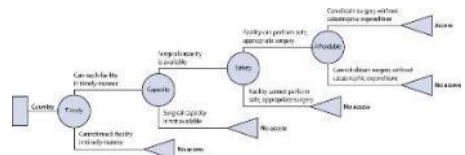


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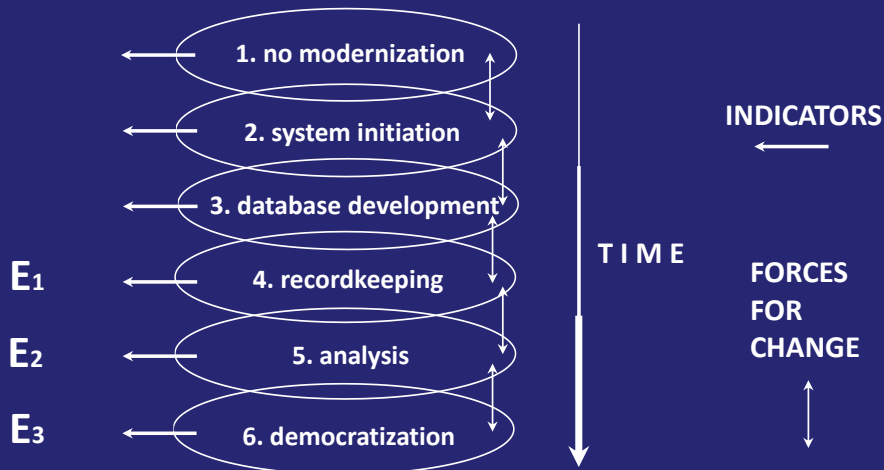
Geospatial tools for measuring human health

- Geographic information science (GIS)
 - Maps
 - Data
 - Analysis
- Mapping crosses boundaries and scales
- Lancet Commission
 - 2 hour access
 - Access is determined by geography



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Blueprint for developing geospatial infrastructure



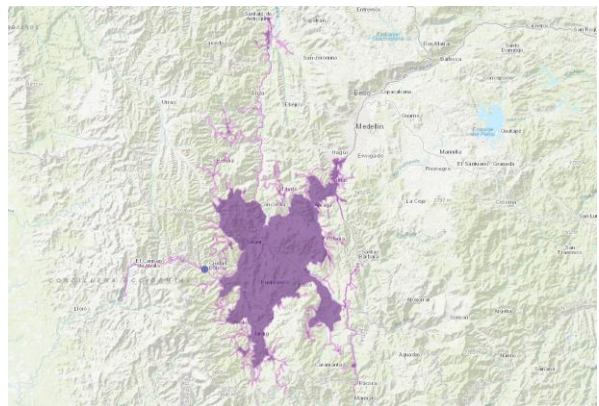
Tulloch, D., and E. Epstein. 2002. "Benefits of Community MPLIS: Efficiency, Effectiveness, and Equity." *Transactions in Geographic Information Systems*, 6 (2): 195-212.

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Potential economic and public benefits

- Three Es
 - Efficiency
 - Effectiveness
 - Equity
- Benefits are accrued by country and communities
- Colombian example helps us consider potential benefits



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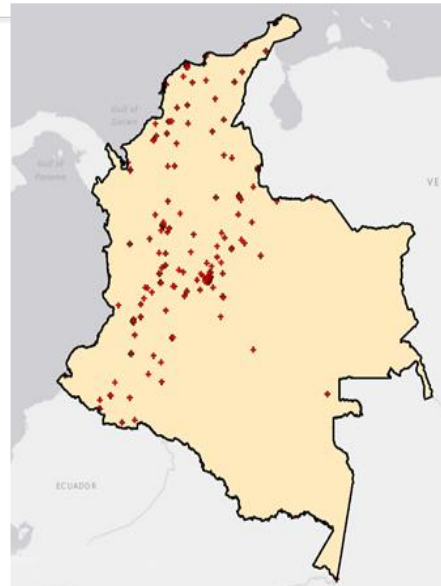
Potential economic and public benefits

- Multiple sources for the ideas behind the Three Es
 - Economics
 - Ejan Mackaay, 1982. *Economics of Information and Law*. Boston, MA, Kluwer-Nijhoff Publishing.
 - Geographic Information Science
 - Tulloch, D., and E. Epstein. 2002. "Benefits of Community MPLIS: Efficiency, Effectiveness, and Equity," *Transactions in Geographic Information Systems*, 6 (2): 195-212.
 - Medicine
 - Committee on Quality of Health Care in America, and Institute of Medicine Staff. *Crossing the quality chasm: A new health system for the 21st century*. National Academies Press, 2001.

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Mapping Colombia's Bellwether 3 Facilities

- 300+ facilities
- Geocoded from national database
- Aerial photography
- Faster and cheaper than surveying and paper maps



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Cost distance in all directions

- E.S.E. Hospital la Merced de Ciudad Bolivar
- Map depicts areas within easy driving distance
- Recognizes barriers to travel, including traffic and road design.



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Spatial pattern

Cumulative catchment resembles pattern of urban development
 Virtually impossible with paper maps
 Represents new analyses not previously possible

Effectiveness



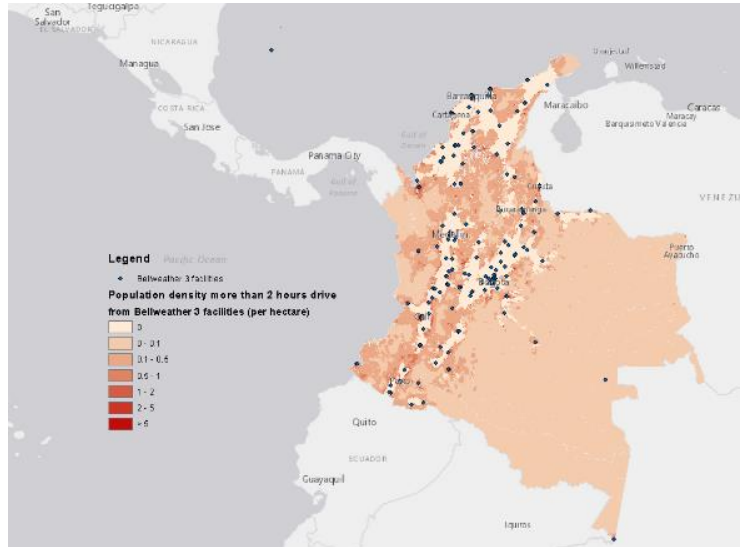
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Effectiveness through integration

GIS allows us to integrate data from different sources

Juxtaposition of population data and hospital catchments generates new analyses of vulnerable populations

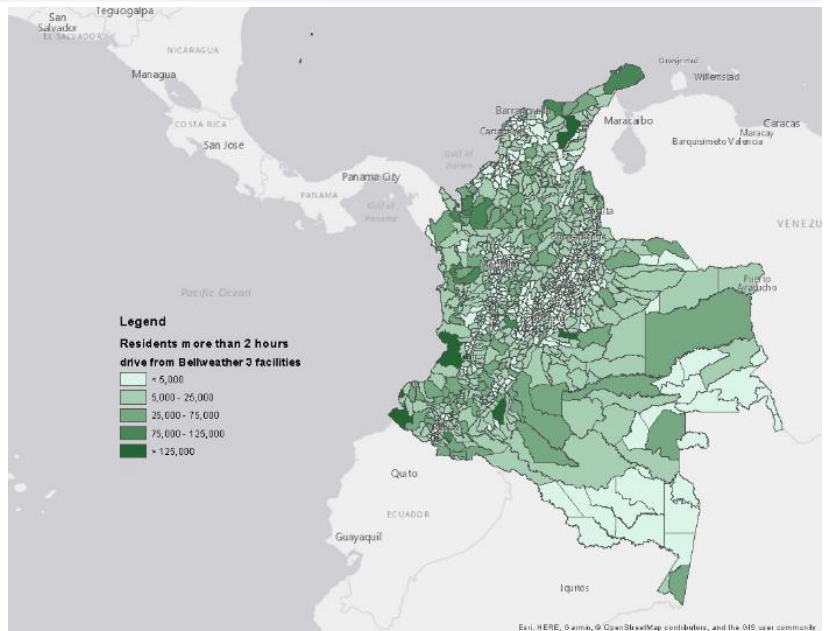
Effectiveness



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Municipios can be the unit of analysis
Has potential to generate conversations about every municipio in Colombia, not just large population centers

Equity



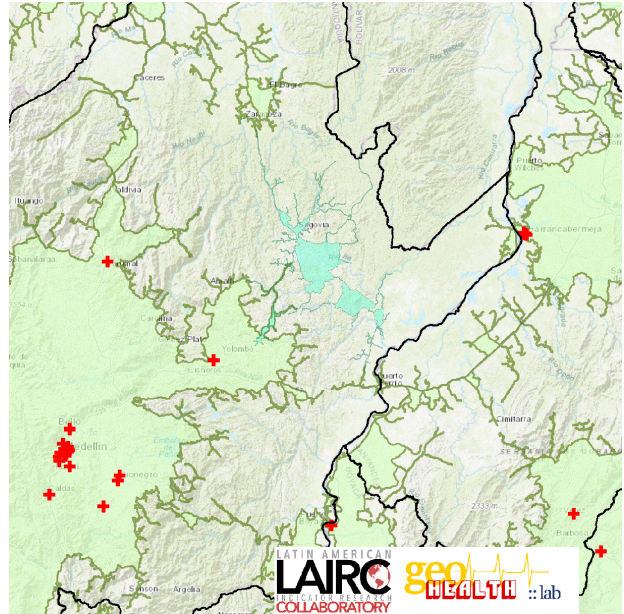
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Expanded capabilities

Accessible data supports new analyses and innovative solutions

Accessible data allows advocacy and multiple voices

Accessible data can support conversation about alternative approaches

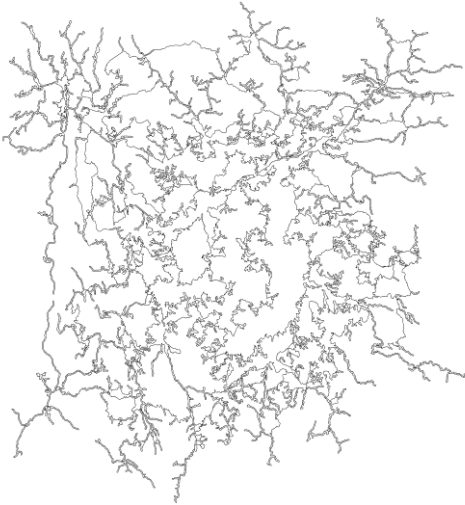


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How does Colombia accrue all three Es?

- Build multipurpose national geohealth information infrastructure
 - Rapidly updated, accessible location-based data
 - Expect the unexpected
- Allows us to target areas of greatest need
 - Preparedness and service delivery with affordability (cost protection) consistent with World Development Indicators (World Bank)
- Support use of data
 - Online map tools, access to software and training, support from within
- Better data can lead to better decisions and outcomes
 - Health data, hospital data, census data, roads data
- Multiple connections to GDP
 - Products and services, increased facilities, transportation improvements, data and information industry, support for increased staff sizes

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Concentric drive envelopes around Medellin General Hospital

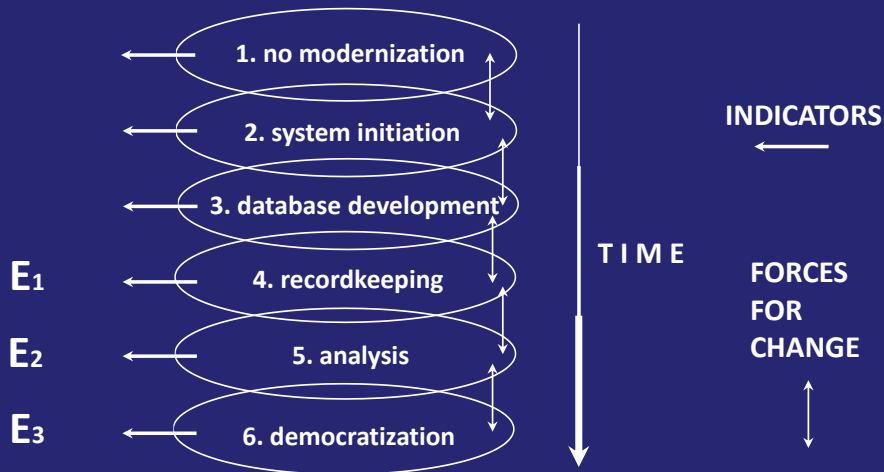


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<https://crssa.rutgers.edu/projects/geohealth/>

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