FIRST OASES WIDE CONFERENCE
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Promoting evidence-based reforms on medical deserts

How to measure medical deserts?

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Introduction

- OASES Project: 7 countries
- Medical deserts
  - Areas where people have difficulties in accessing healthcare
  - Focus on the spatial dimension of accessibility
- Objectives
  - Knowledge transfer: to share and exchange methods, tools and practices on health care accessibility measures to the countries involved in the project

    Each country takes ownership of the proposed methods (local specificities)
  - To develop an integrated approach to measure potential spatial accessibility to healthcare systems in European countries
- Empirical Methods
  - Measures of accessibility (healthcare)
  - Spatial typology (healthcare and other dimension than healthcare)

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Measures of spatial accessibility

- Classic measures of spatial accessibility
  - Density of HS/HP
  - Distance to the nearest HS/HP
  - Relatively straightforward to compute
  - Unidimensional
- More robust indicator considering both distance and availability simultaneously: X-SFCA indicators (Luo and Wang 2003, Wan et al. 2012; Wan N., Zou B., Sterngerg T. 2012)
  - Specification on supply and demand (Ngui A., Apparicio P. 2011, Lucas-Gabrielli et Mangeney 2019)
  - Require more data & more complex to compute

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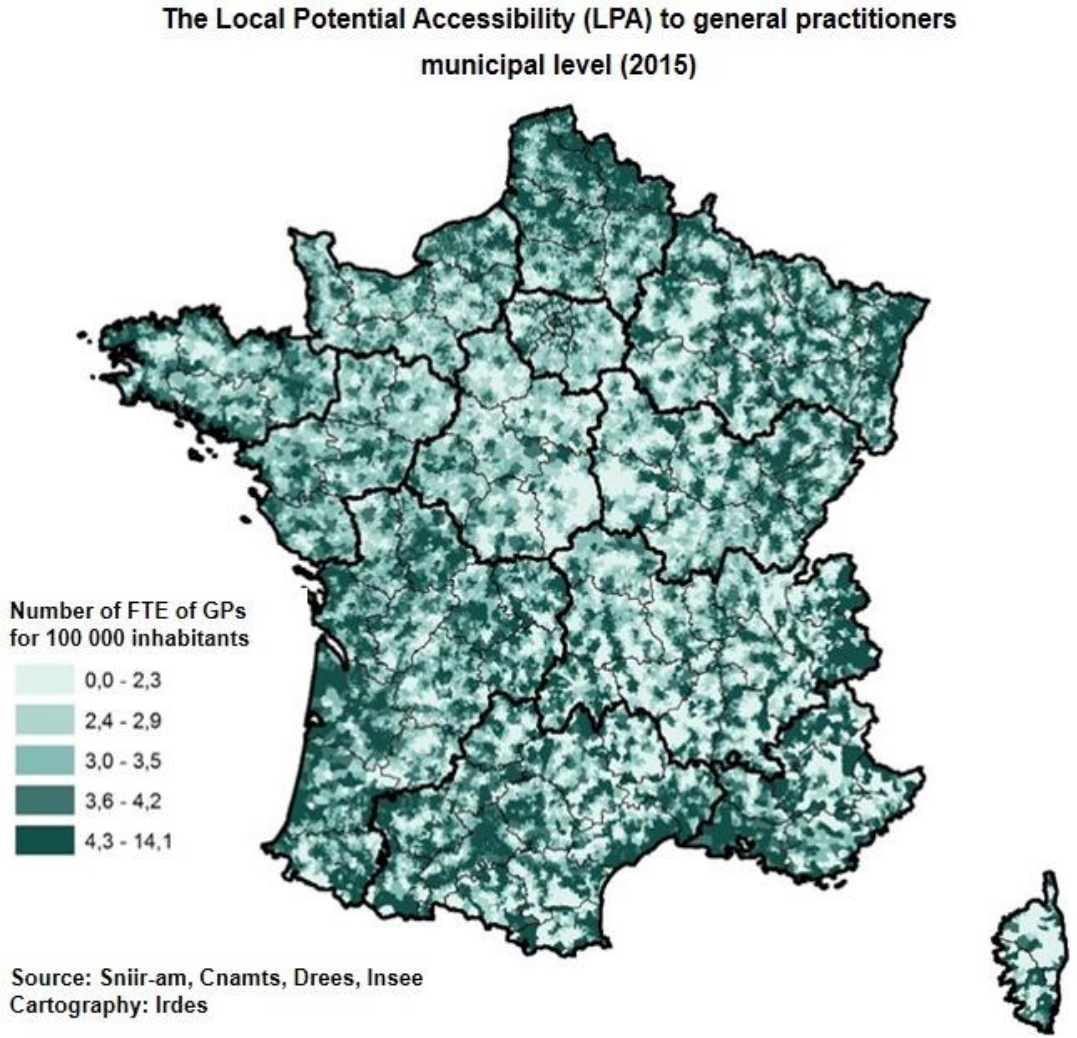
An example for General Practitioners in France

- **How to quantify supply of GPs:**
  - Exclusion of specific practices (acupuncture, sport, etc.) (12%)
  - Taking into account principal and secondary practice office
  - Taking into account the level of activity
- **Introducing health care needs:**

  Weighting of the number of inhabitants, according to age and consumption of care

  approximately 1 for 50-54 years; 0.74 for 25-29 years; 1.9 for 75-79 years
- **Scale of measure**: municipality level
- Measure of distance: empirical evidence
  - Type of distance: access time by car by road
  - Distance threshold : 10, 15, 20 minutes?

Source: the National Health Insurance database



FTE: Full-Time Equivalent

See also:
- Lucas-Gabrielli V. and Mangeney C. (2019). How can the methods for measuring the spatial inequalities of access to general Inequalities of Access to general practitioners be improved? Illustration in Ile-de-France QES n°246
- Gao F., Languille C., Karzari K., Guhl M. Boukebous B., Deguen S. (2021). "Efficiency of fine scale and spatial regresions in modelling associations between healthcare service spatial accessibility and their utilization", International Journal of Health Geographics, 20: 22.

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Measures of spatial accessibility

- Various measures are possible
  - Accessibility to GP (+ recent devt. of e-health?)
  - Various primary care + specialists
  - Hospital care and social care (institution, etc.)
- Requirements
  - A spatial unit of reference (Block, city, region,…)
  - An aggregation method (Sum of units,…)
  - A measure of accessibility (Density, distance,…)
  - A type of distance (Straight line, time distances)

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Scenarios on accessibility measure according to available data

	Spatial unit of reference	Aggregation methods		Supply/Demand volume		Accessibility measures	Types of distance
		Health services/professionnals (HS/HP)	Population	HS/HP	Population		
Elementary ↓ **Advanced**	- Region - Department - Postal codes - Census tracts - Census blocks The choice depending on data availability of each participating country Data : Maps shapefiles (.shp)	- At spatial unit's centroid Data : geocoded centroid of spatial unit (latitude, longitude) - At their professional addresses Data : geocoded professional addresses (latitude, longitude)	- At spatial unit's centroid Data : geocoded centroid of spatial unit (latitude, longitude) - population-weighted mean centre Data : distribution of population / residential buildings maps	- HS/HP number Data : number of HS/HP by type for each Spatial unit - HP FTE Data : full time equivalent (FTE) of HP by type by Spatial unit	- Population volume Data : population distribution by age and sexe for each spatial unit	- Physician-to-population ratio - Distance to the closest HS/HP - Two-step floating catchment area (2SFCA) methods - Enhanced 2SFCA with decay function Data : global travel behaviour of patients when they look for a type of health services / health professionals	- Euclidean distance - Shortest network distances - Shortest network travel time on foot, by car, by bicycle, or by public transit Data : road network, sources of data on bicycle paths, general transit feed specification (GTFS) files

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Spatial typology

To qualify territories through several dimensions:

- Health care accessibility for a basket of HS/HP
- Additionnal factors influencing access
- Temporal dimension of indicators for predictive purpose

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Practical issues

Trade-offs

- Accuracy & homogeneity of indicators btw countries depend on :

Data availability

- Data collection within information systems
- Data linkages technical possibilities
- Legal aspects (linkage, access, diffusion)

Human knowledge

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Thank you!

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