



Planning Africa Conference 2014
MAKING GREAT PLACES

Measuring Access to Primary Health Care:

Use of a GIS-Based Accessibility Analysis

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Key topics that will be covered

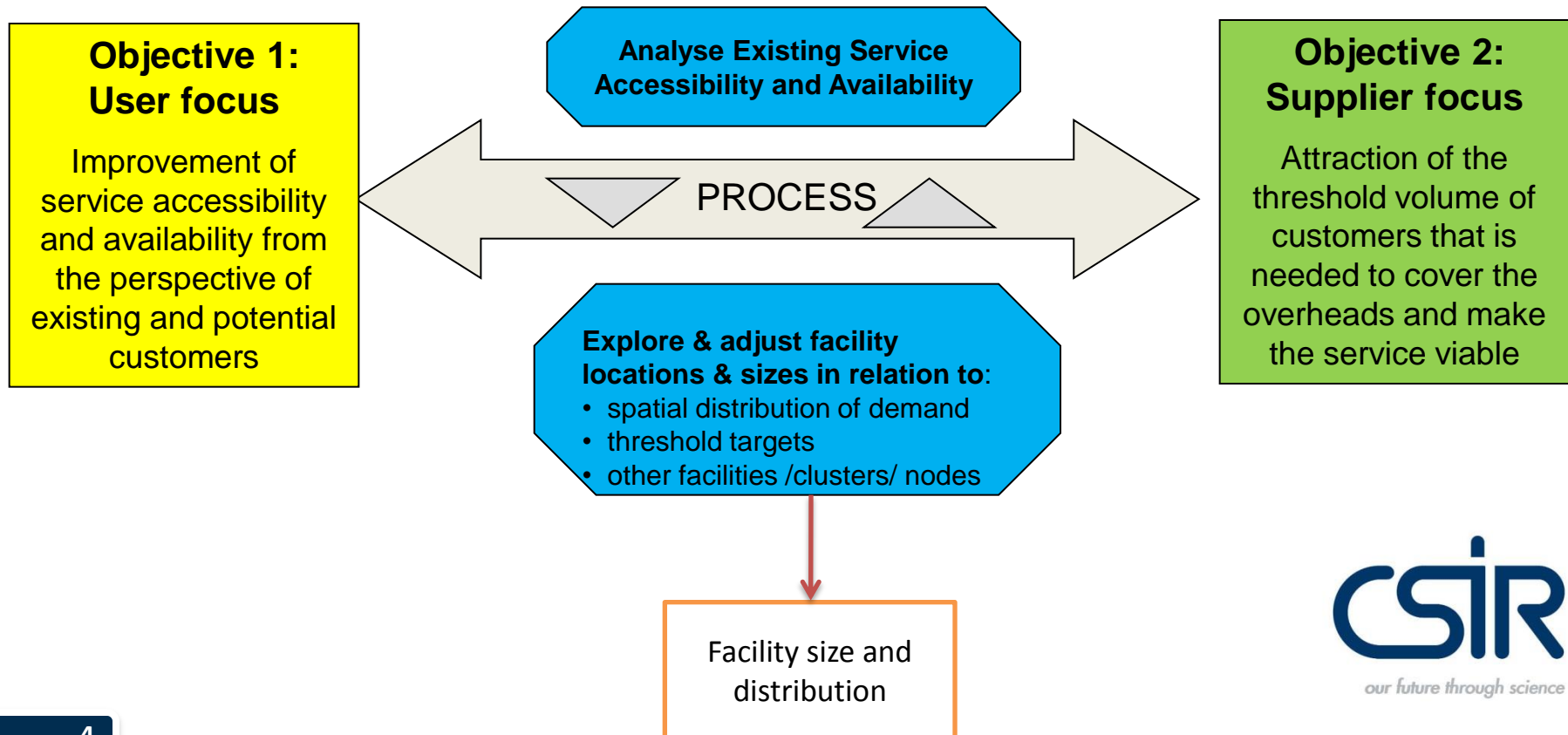
- Concerns in health care provision
- Addressing provision through service access planning
- What inputs are required?
- Key challenges to application
- Overcoming the challenges
 - City of Johannesburg case
 - Results
 - Findings
- Closing remarks

Concerns in Health Care Provision

- The demand for services will continue to change:
 - Population growth & migration trends.
 - Changing human settlement patterns and demographics.
 - Slow economic growth.
 - Urbanization of poverty.
- Need for:
 - Spatial planning that is equitably & realistically based.
 - More accessible services closer to where people live.
 - Determine service demand to support planning on nature of service and capacity to facilitate service delivery and budget allocation.

Addressing Provision through Service Access Planning

The basic approach to service access planning:
WHO gets WHAT, WHERE and HOW MUCH?

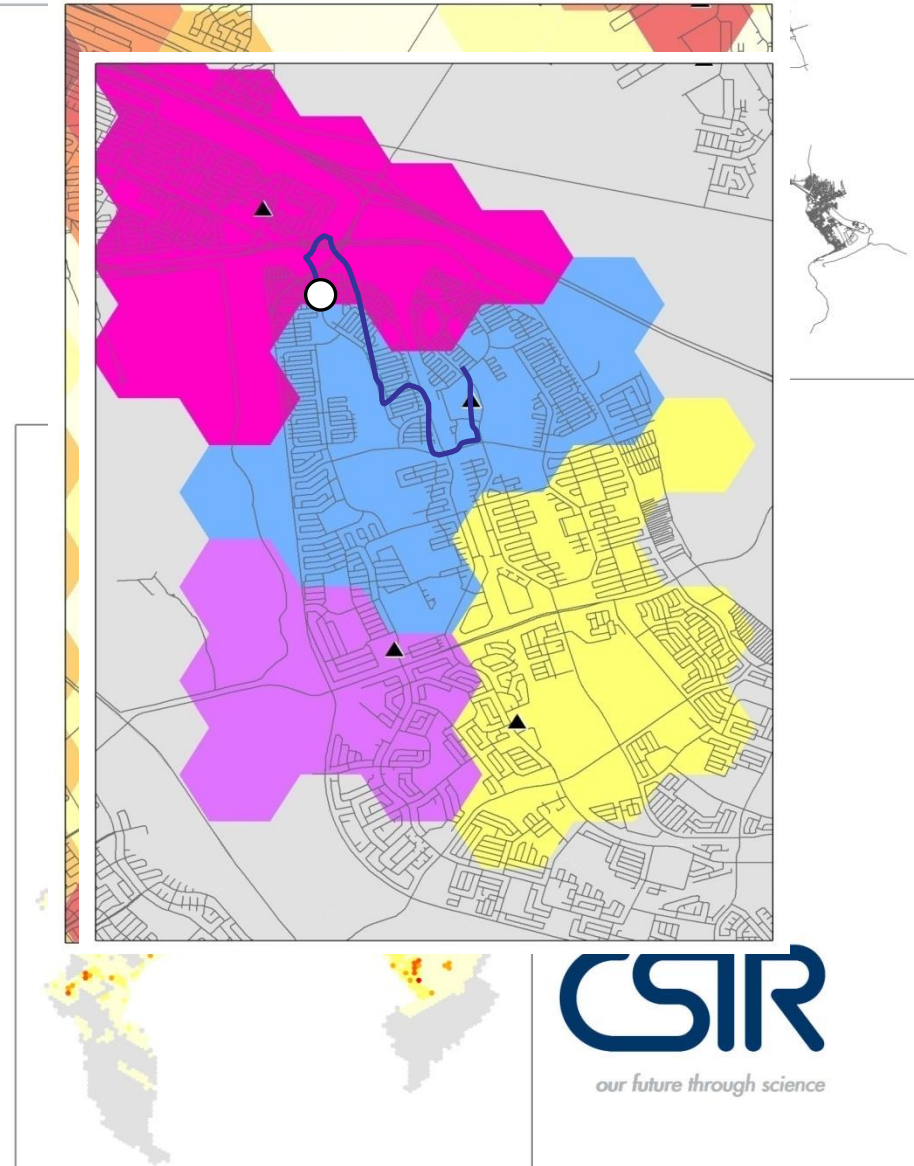


How does it work?

- Accessibility analysis models the access of residents to facilities - assuming people will go to their nearest facility for service.
- If an analysis is done for a large area, this will show whether provision is:
 - Sufficient and
 - Equitable..... if both capacity (threshold) and distance parameters are included.

What inputs are required?

- Data layers used for accessibility analysis:
 - Road network
 - Facility locations with capacity
 - Population distribution
- All three layers interact based on **standards** to determine **what population** travel **how far** to a **facility** with **capacity**.
- Indicate potential catchments.
- Map well and poorly served areas.



Contribution to Service Delivery

- Accessibility modelling - improved means of measuring facility access and of identifying poorly served areas and backlogs (spatially).
- Serves at a strategic level to:
 - Develop well provisioned cities with well located services.
 - Assist in setting service standards and benchmarks.
 - Improve access to social facilities.
 - Equity in social investment.
 - Minimizing investment in ‘white elephants’.
 - Evidence for investment decisions to inform long term plans – forward planning.

Key Challenges to Application

- GIS-based accessibility analysis is proving to be a useful tool for service access planning,

BUT

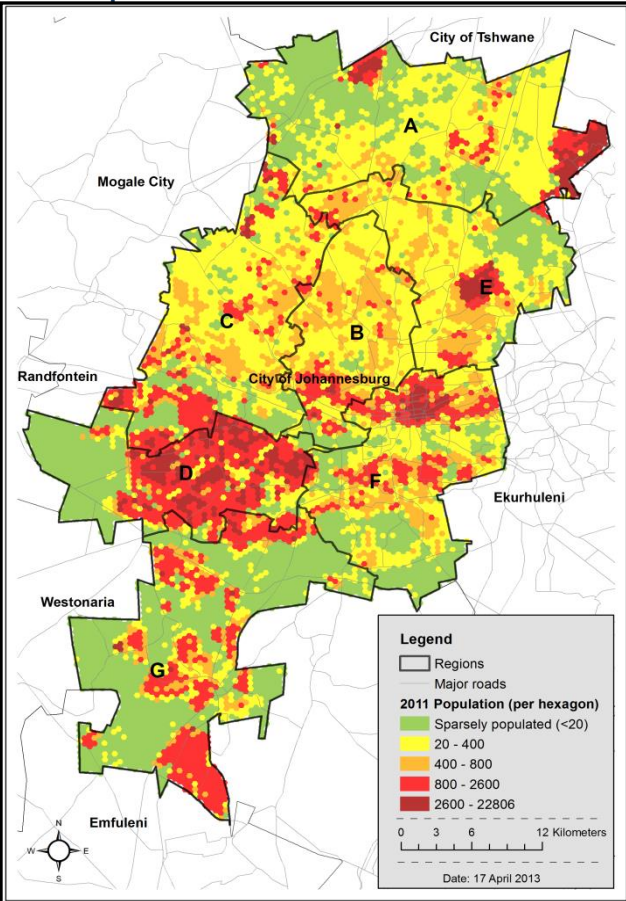
- Based on untested assumptions in measurement.
- Lack of data inputs in many developing countries.
- This raises the question in how far contemporary GIS accessibility analysis is applicable in South African health planning practice of today?

TWO MAIN CHALLENGES

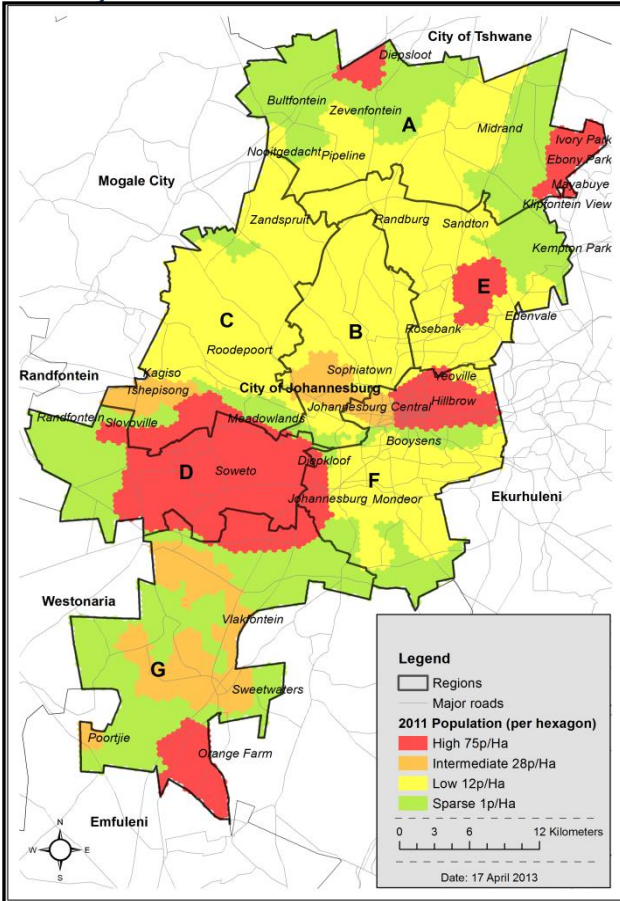
- (a) What method is the best in determining health service demand in the absence of accurate databases indicating public versus private health care usage?
- (b) How accurate is a rational choice based model regarding people's actual decisions?

Study Area: City of Johannesburg

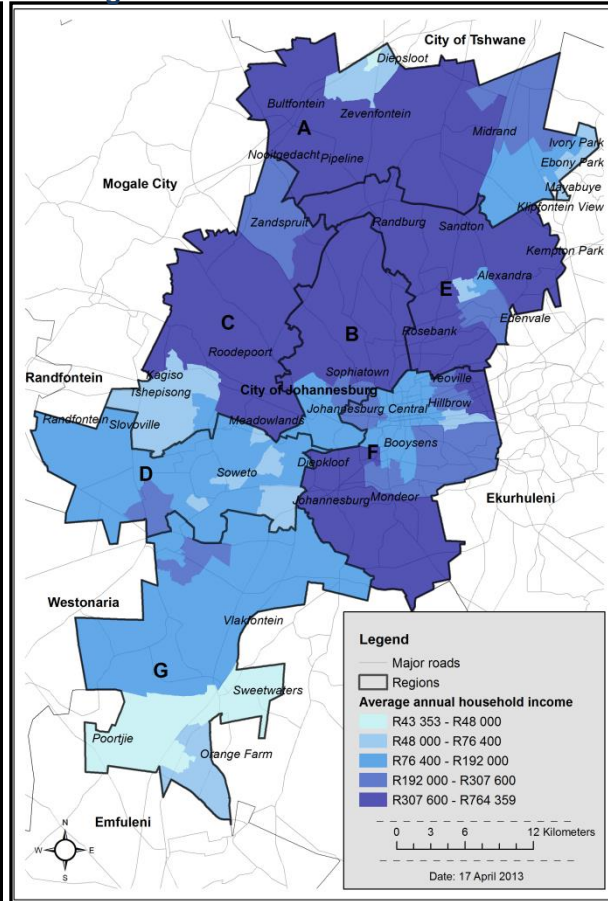
2011 Population



Density zones



Average income

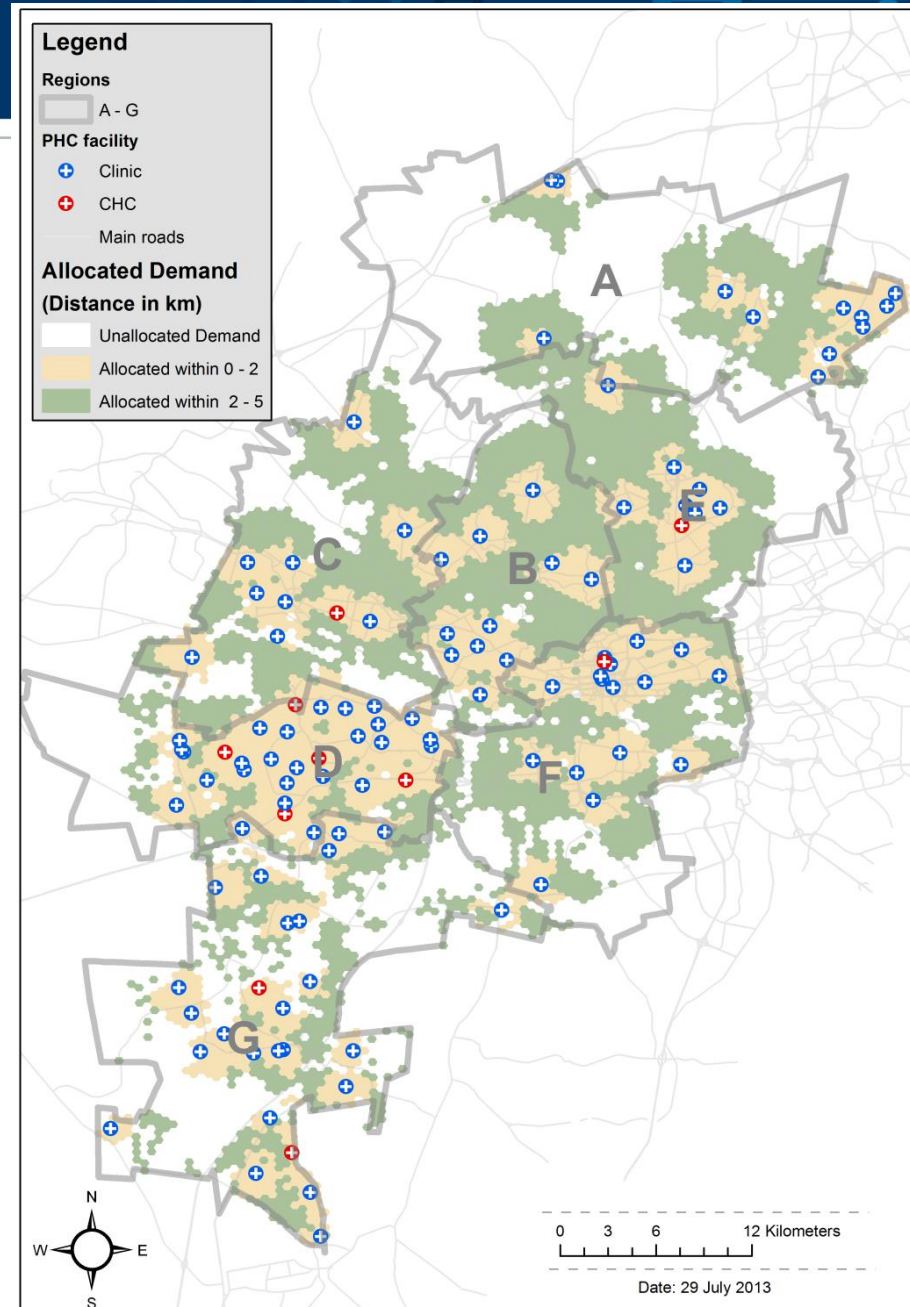
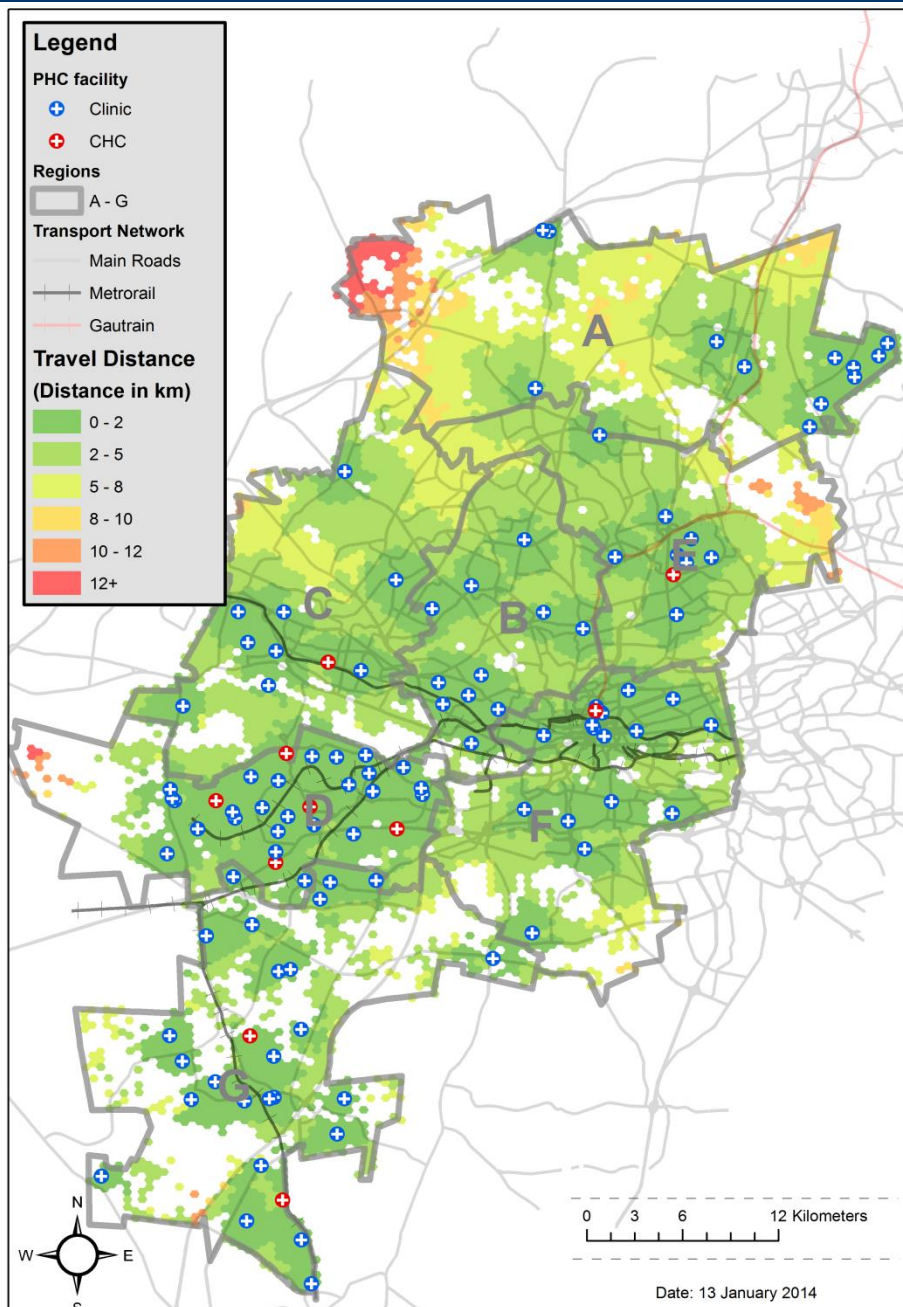


Criteria and processes for public primary health care analyses

Description	The facilities selected for the analysis are mainly those that offered public primary health care services and acted as first point of contact with the health service delivery system. Attached to the facility data are attribute data indicating the capacity of the facility.
Facilities analysed	116 primary health care facilities with fixed locations (Clinics and Community Health Centres)
Service Demand (Population)	<p>A. Scenario 1 = 7 124 518 visits per annum</p> <p>B. Scenario 2 = 7 149 055 visits per annum</p> <p>C. Scenario 3 = 7 416 886 visits per annum</p>
Supply	Each facility was separately specified a capacity, i.e. translated into the potential to accommodate visits (visits to a professional nurse in a facility).
Travel mode and access distance	Transport via existing road network, with a distance travel standard: Facilities must be accessed within 5km (National Health Standard)
Analyses undertaken	<ol style="list-style-type: none"> i. Model catchment areas of facilities for each scenario based on capacity and maximum travel distance standard ii. Compare utilisation data (in the form of headcounts) with the current capacity or threshold and also with the demand that has been allocated in terms of the catchment area analysis iii. Using the patient register, examine whether the patients used their closest facility

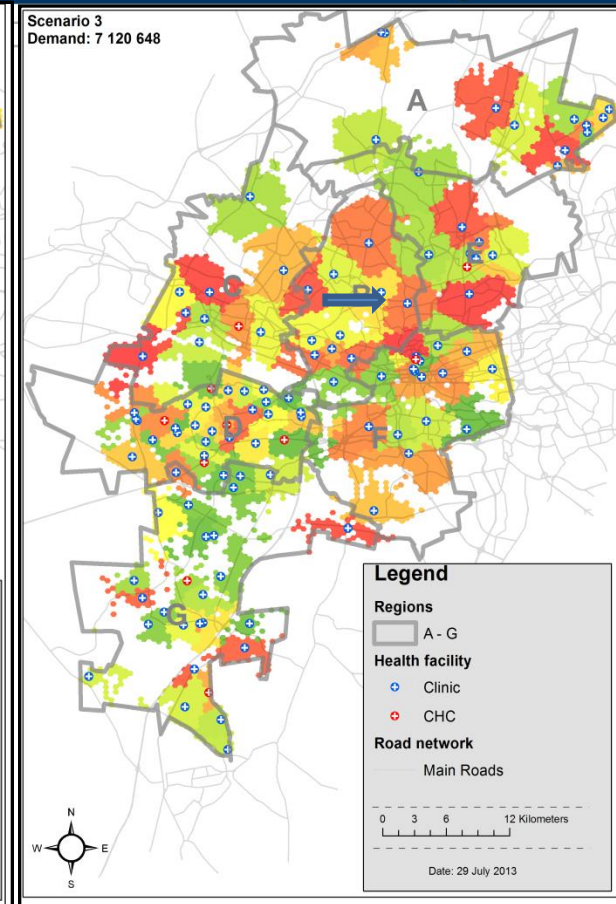
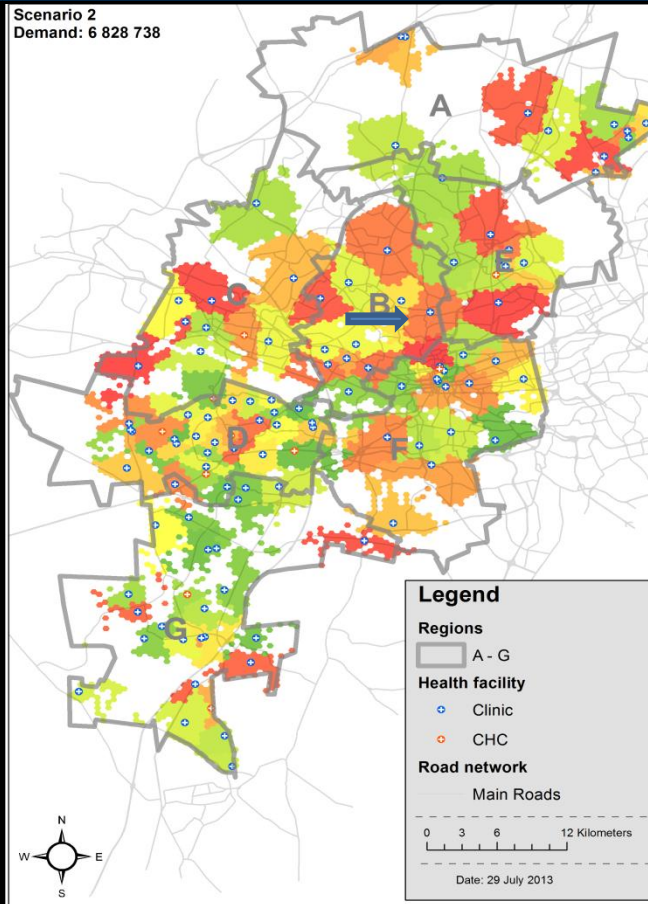
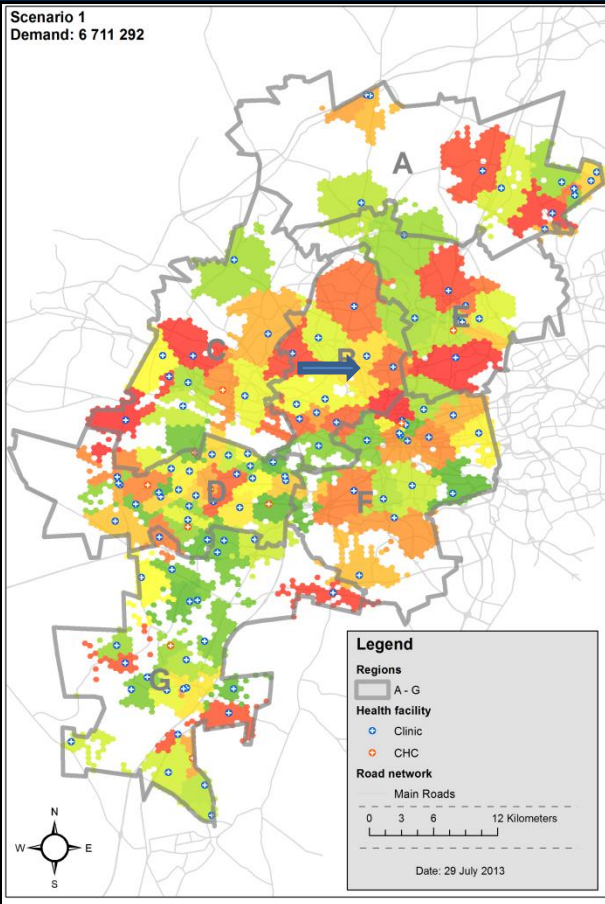
Travel distance to closest facility

Facility catchments (distance & capacity constrained)



Facility catchments (Distance & Capacity Constrained)

Service Demand Scenarios 1, 2 & 3



Findings

- Clear indication that facilities are very well distributed in the city and that problems are more related to issues of service capacity than to travel distance.
- Different service demand scenarios tested show no significant difference in the spatial extent of catchment areas of facilities.
- **Facility utilisation:**
 - Total headcounts from the city exceed the totals from each of the 3 service demand scenarios.
 - Allocated demand from service demand scenario 3 more in line with facility headcounts – positive correlation.
- **Rational behaviour - Use of closest facility:**
 - 1% residing outside the city boundary.
 - 44% not residing in catchment areas of the facility they visited.
 - Significant flows in the direction of Johannesburg CBD.
 - Model under-predicts the use of facilities that are further away.

Concluding Remarks

- Incorporating utilisation data when measuring access, and not simply measuring by the presence of a facility.
- Utilisation may reflect need and it may also reflect contextual and service related factors such as service affordability.
- **Implications for this project:**
 - Improved algorithm to estimate service demand.
 - Development of detailed patient registers – Master Patient Register.
 - Calculate the probability variance of rational choice vs. actual choice based on a distance measure to further enhance the model's capabilities.
 - Availability of spatially linked population employment data so that measures can be constructed by computing the measure separately for different trip purposes; from workplace and place of residence.

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Thank You!



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