

GIS and healthcare decision making for End-Stage Renal Disease

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The aim of our project is to study, via an interactive interface, the temporal evolution of End-Stage Renal Disease (ESRD) and the spatial relationships between the supply and the demand of care for ESRD. We present a Web-based Geographical Information System, set up with on-line mapping technologies: the SIGNe (Système d'Information Géographique en Néphrologie).

In order to increase medical, epidemiological and organisational knowledge of ESRD, a national network has been set up: the Renal Epidemiology and Information Network (REIN). This program involves the main national organizations acting in the care, epidemiological analysis and healthcare planning of ESRD. An informational decision system defined at the national level has been developed to ensure collection, organisation, analysis and diffusion of ESRD data [1]. The Multi-Source Information System (MSIS-REIN) is dedicated to collect all ESRD minimal patients' records [2].

After clinical research assistants have performed the control of exhaustiveness and quality, data are then integrated into a data warehouse. This data warehouse also includes demographical and geographical data that allows to dynamically localising both care units and patients' place of residence. Nominative data are protected according to the French law and the European guidelines. They are encrypted using secured Internet (https).

At present 11,500 patients' records have been included and followed-up in nine French regions since 2002.

The SIGNe offers interactive data exploration with cartographic, statistical and tabular views [3]. It provides a fast and an easy access to the detailed and aggregated data concerning ESRD: spatial and temporal epidemiological views at regional and national levels, maps matching the offer of care to the demand [4]. GIS approach is helpful to analyse spatial trends of the demand of care and to visualize health care accessibility. Enriched with models of estimation of travel-time distance, it could also be used to assess the quality of healthcare location according to patients' place of residence. Other aspects are approached concerning the trajectory of care for a given patient and scenarios of implementation of new care units according to the demand.

This work is presented with insights on the design and underlying technologies. It offers an intuitive way of accessing and mining large health care information database, for professionals and public health care decision-makers in the domain of ESRD.

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