



# A Parcel-based Health Information System in Turkey

H. Ebru COLAK  
&  
Bayram UZUN & Halilibrahim INAN



KARADENIZ TECHNICAL UNIVERSITY, GISLab, Trabzon, TURKEY



## Introduction

- The environment affects people's health and well-being.
- Many public health problems have a geographic component.
- GIS is used increasingly in public health research.
- GIS can be used to map and analyze the geographical distributions of populations at risk, health outcomes, and risk factors.
- Hospitals, health systems, public health agencies and decision makers increasingly use GIS as a tool for understanding population health and program planning.

2

## **Health GIS and NHIS**

- Spatial analysis and mapping in epidemiology have a long history but until recently, their use in public health has been limited in the world .
- In Turkey, Health GIS concept is a new approach which is realized over the past 5 years.
- The spatial epidemiology applications using GIS are carried out by different academicians such as GIS expert, geographer, or surveying engineering rather than epidemiologist.
- The National Health Information System (NHIS), proposed by Turkish Ministry of Health, was started to perform the major reforms implemented under Turkish Health Transformation Program since 2003.
- It is planned to establish an Electronic Health Records (EHR) for 72.5 million people which are the population of the country.

3

## **Aims..**

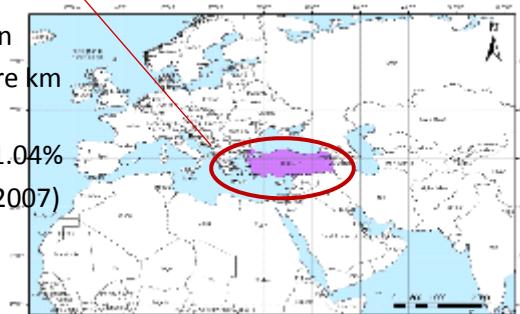
- This study aims at designing a parcel-based health information system that evaluates the health data, personal information and spatial information all together.
- It was also aimed to necessity of a parcel-based health information system for Turkey which is a model integrating together with the NHIS and The Address Based Population Registration System (ABPRS) including demographic data
- and to evaluate it together with spatial information through maps.

4



## REPUBLIC OF TURKEY

- Turkey is a democratic, secular and constitutional republic.
- Turkey was established in 1923.
- Area is 774.815 square km
- The population
  - is approximately 72.5 million
  - density is 93 person /square km (Census 2009)
  - population growth rate is 1.04%
  - 50 % of is female (Census 2007)



## Health System in Turkey

- The Turkish health care system is a highly complex structure, centralized and fragmented at the same time.
- The health care service is provided by public, social security, university, private and other organizations.
- In Turkey (2003) there was one doctor for every 700 people and one nurse for every 590 people, and one hospital bed for every 400 people.

## Turkish Health Transition Project

In the recent years, there were many health research has been carried out in Turkey.

For example:

- ✓ The Ministry of Health has developed **the Health Transition Project** (2003).

The project aims were;

- to achieve more efficient and effective health services in Turkey.
- health data are organized digitally the national and international health data standards.
- health services are integrated GIS in order to ensure knowledge to decision makers. (Turkish Ministry of Health Report)

7

## Health Information System

- WHO had long time ago indicated that health information systems were a criteria to reach to “health for all” in 2000.
- It is also emphasized that advanced health information systems were required for an effective management.
- National Health Information System (NHIS) initiative has started with the launch of the Health Transformation Programme in 2003.
- NHIS provides a nation-wide infrastructure for easy and efficient sharing of electronic health records.

8

## **Address Based Population Registration System (ABPRS)**

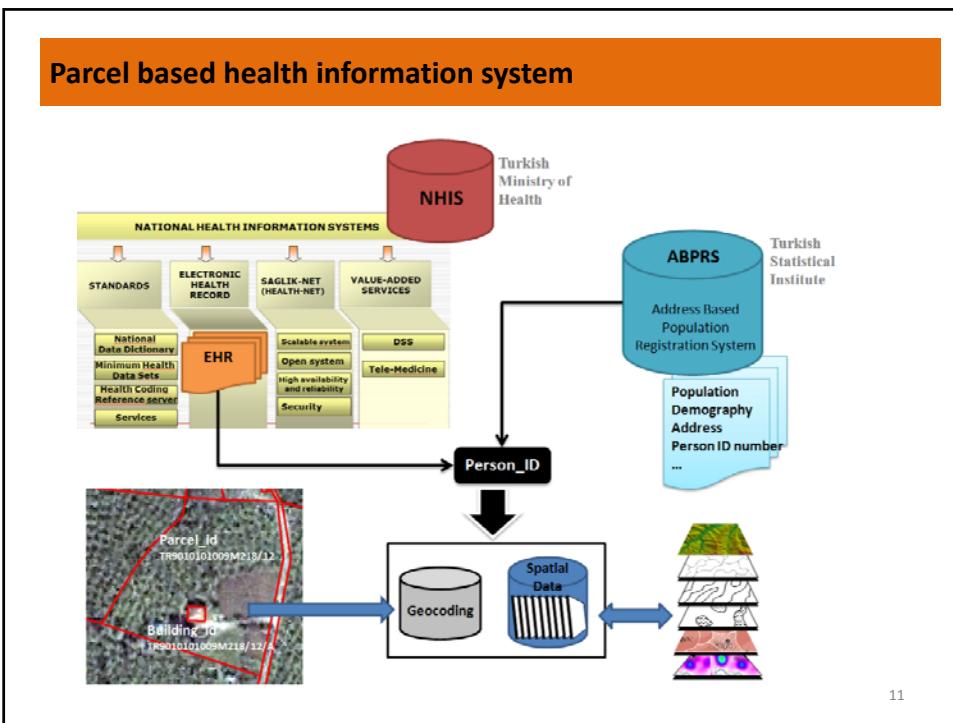
- ABPRS is set up by TURKSAT in order to record updated population information of localities and monitor population movements.
- Address Based Population Registration System is established by setting up the National Address Database and matching usual residence addresses and the MERNIS (Central Population Registration System) registers according to the Turkish Republic identification numbers.

9

## **Designing parcel based health information system**

- In this study, designing a geographical information system that evaluates the health data, personal information and spatial information all together was aimed.
- In the designed system, there is a relationship between electronic health registers lying under the NHIS and the ABPRS.
- The identification number of each individual enables the relationship between these two databases.
- Health data could be geocoded by the address information of the person id from the ABPRS and by person id number from the electronic health records.
- It is possible to access to both health registrations and demographic data with the person id numbers of individuals residing on the buildings on each parcel.
- In this study, Geographic Information System is being used as the most effective tool, in which both spatial and non-spatial data could be evaluated all together and the relationship with the related database could be provided.

10

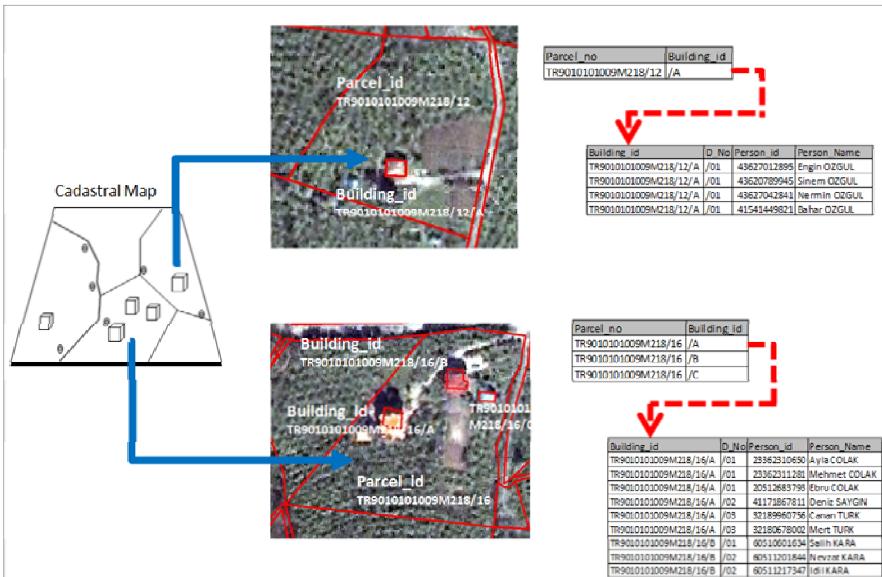


11

- The parcels available on the cadastral structure have a unique code.
- The buildings on these parcels and flat door numbers which are independent sections on these buildings are described as in relation with that parcel number.
- The relationship between parcels and the houses on each parcel is provided by these unique codes.
- The individuals residing on each house are also described by associating the person id number and the building id number.
- This association is carried out by being geocoded on the cadastral map according to address information of individuals in the ABPRS.
- The individuals are positioned as geographically by geocoding.
- Unique address code, in which the address is defined in accordance with individual address information from the national address database is taken as base in the geocoding process.

12

## The geographic relationship between parcel, building and person



13

## Conclusion

- In this paper, it was planned to design an integrated geographical information system associate with geography to the Turkey Health Information System.
- In this designed system, Turkey Health Information System and the ABPRS are evaluated all together and also their relationship is enabled spatially.
- Therefore, it was aimed to follow the distributions of health services and events on geography.

14

## Conclusion

- Through the designed parcel based health information system for Turkey, it is enable to information about parcels, the buildings on the parcels and even the residents in these buildings.
- These information constitute the basis of the epidemiologic studies, in which the health events related to these individuals are examined and demographic information are evaluated all together.

15



**Ress. Ass. H.Ebru COLAK (PhD)**  
Karadeniz Technical University  
Dept. of Surveying Engineering  
GISLab - 61080  
Trabzon / Turkey  
[ecolak@ktu.edu.tr](mailto:ecolak@ktu.edu.tr)  
[www.jeodezi.ktu.edu.tr/ecolak](http://www.jeodezi.ktu.edu.tr/ecolak)

[www.gislab.ktu.edu.tr](http://www.gislab.ktu.edu.tr)

**Thanks for listening...**

**gisLab**  
Geospatial Information Science Laboratory

16

