

# Can Geographic Information Systems (GIS) be of interest for analyzing data of occupational disease surveillance.

## Example with RNV3P network

Assessment of numerator and overlap between OD centres recruitment in Paris area.

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## Background and objectives

The « réseau national de vigilance et de prévention des pathologies professionnelles » is a French vigilance and prevention network spread over 32 hospital-based occupational disease centres. Its database contains the following information on patients: socio-demographic data, exposures, workplace, activity sector, diseases.

The objective of this study was to map the patients origin in order to determine attraction areas of work-related diseases in Paris and its suburbs.

## Methods

Data used were collected between 2001 and 2009 in Paris area's Occupational Disease (OD) centres. Only patients with a correct address and a health problem related to work were selected.

Data on the working population per administrative district were obtained from the French National Statistics Institute (Insee). Data were first geocoded by using Batch Geocoder which is an online free tool converting each address of the geographical database to Latitude/Longitude. Once geocoding done, ArcGIS (9th version) software was used for mapping analysis.

## Results: From geocoding to mapping

### Geocoding addresses in the database

64,291 addresses in database

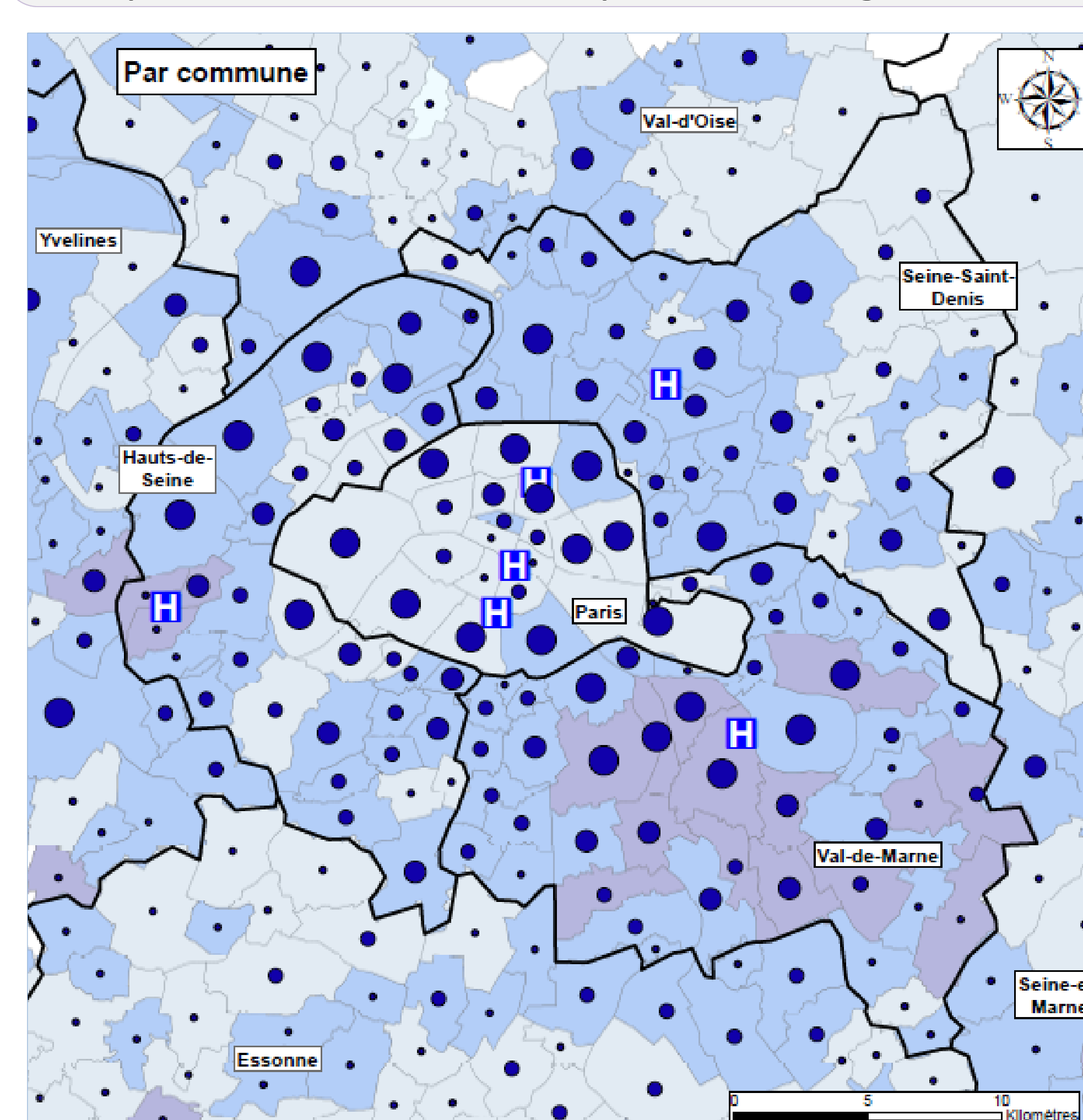
60,993 (95%) addresses with zip code

58,437 (91%) addresses well geocoded

Figure 1: Treatment of addresses

90,7% were well geocoded and used for mapping.

Map 1: Distribution of patients registered between 2001 and 2009 by RNV3P.



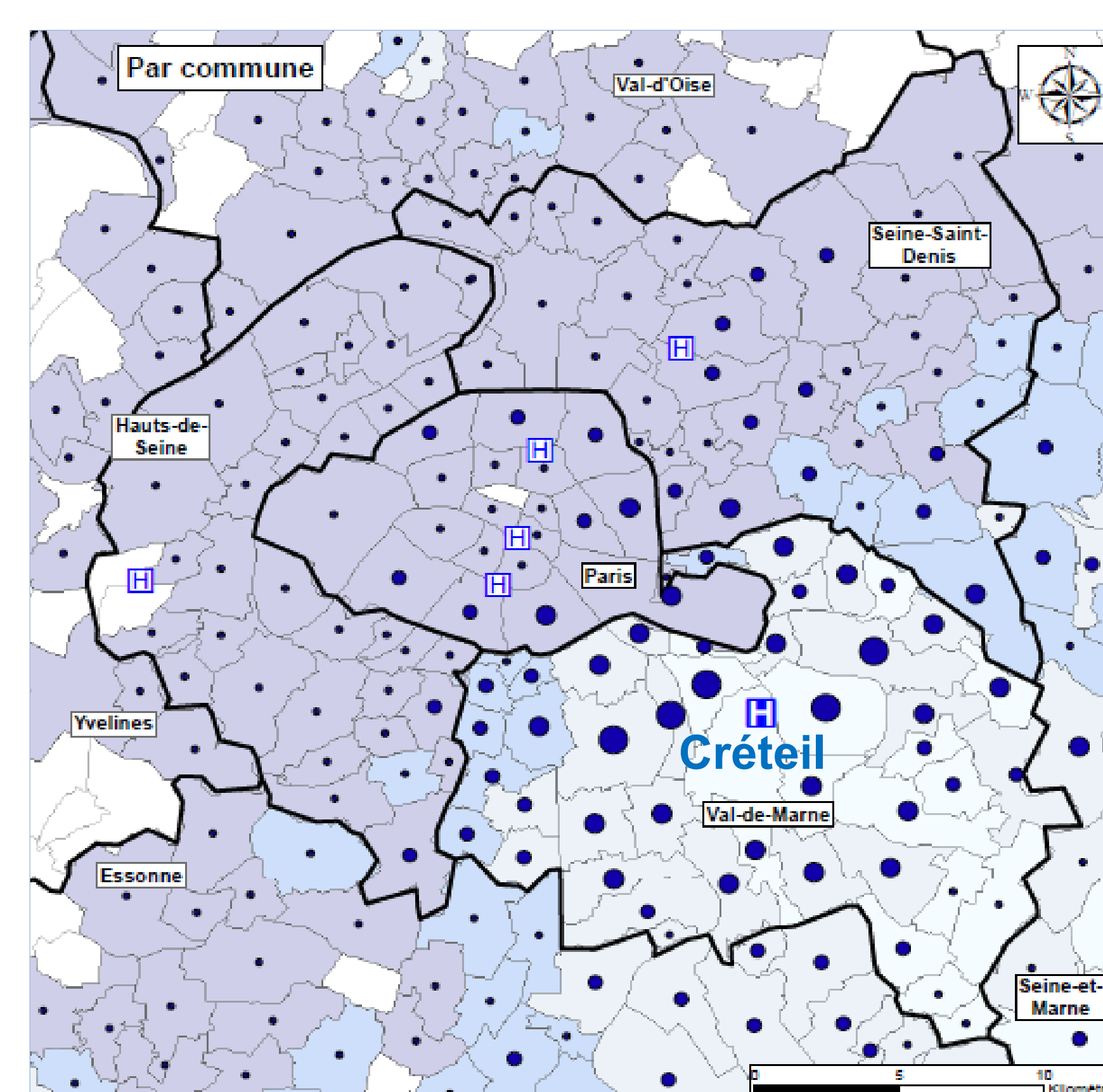
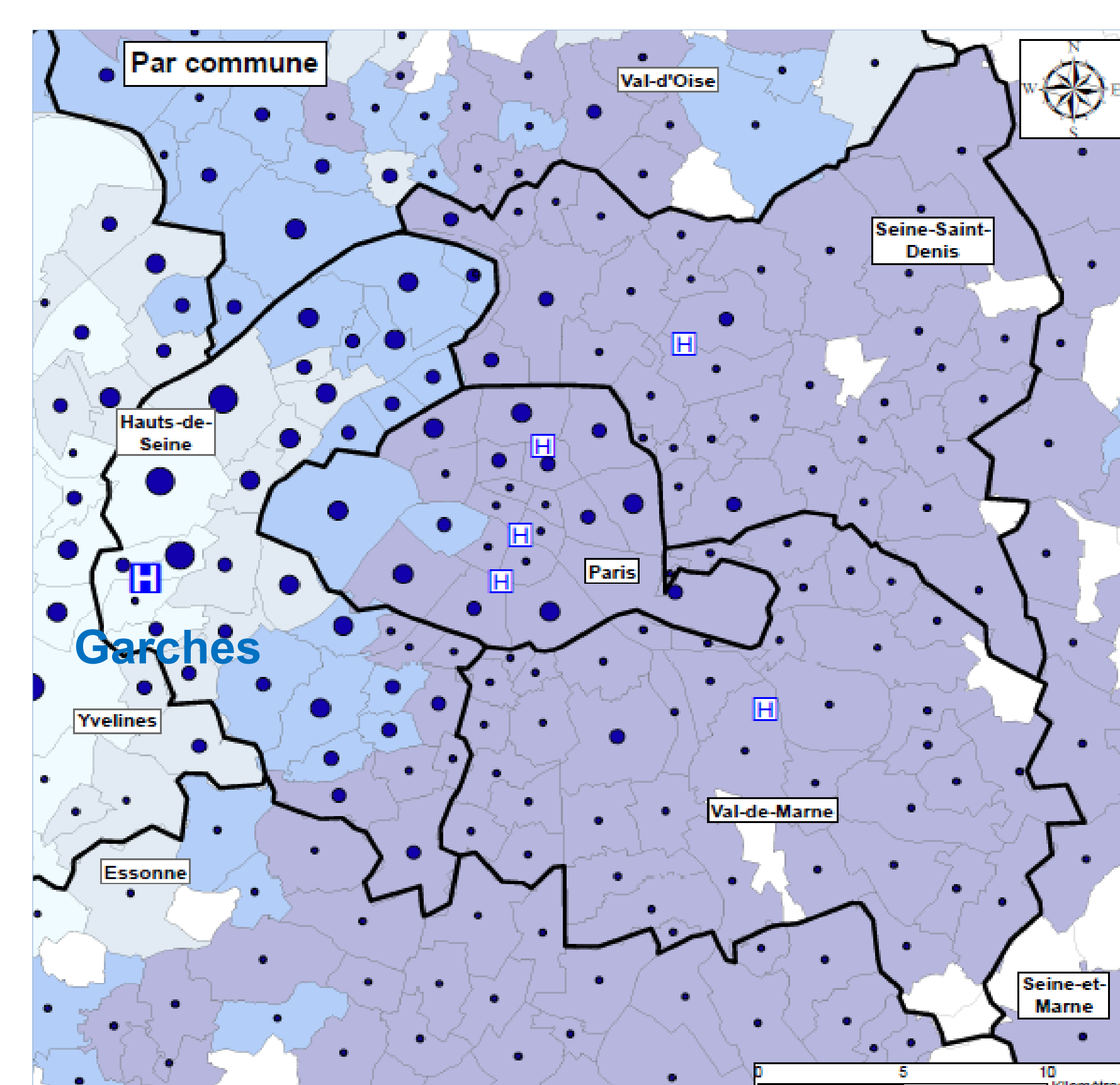
This map represents the patients origin.

Recruitment occurred mainly in Paris and the 3 bordering departments.

Numbers of patients are equivalent between Paris *arrondissements* and Val-de-Marne cities (south-east of the map). On the opposite, numbers reported to the working population (penetration rate), highlight an important industrial area in Val-de-Marne.

**Note:** the penetration rate is equal to the total number of patients of all OD centres reported to the number of employees for each town X 1,000.

Map 2: Examples of Garches (i) and Creteil (ii) OD centre attraction areas.

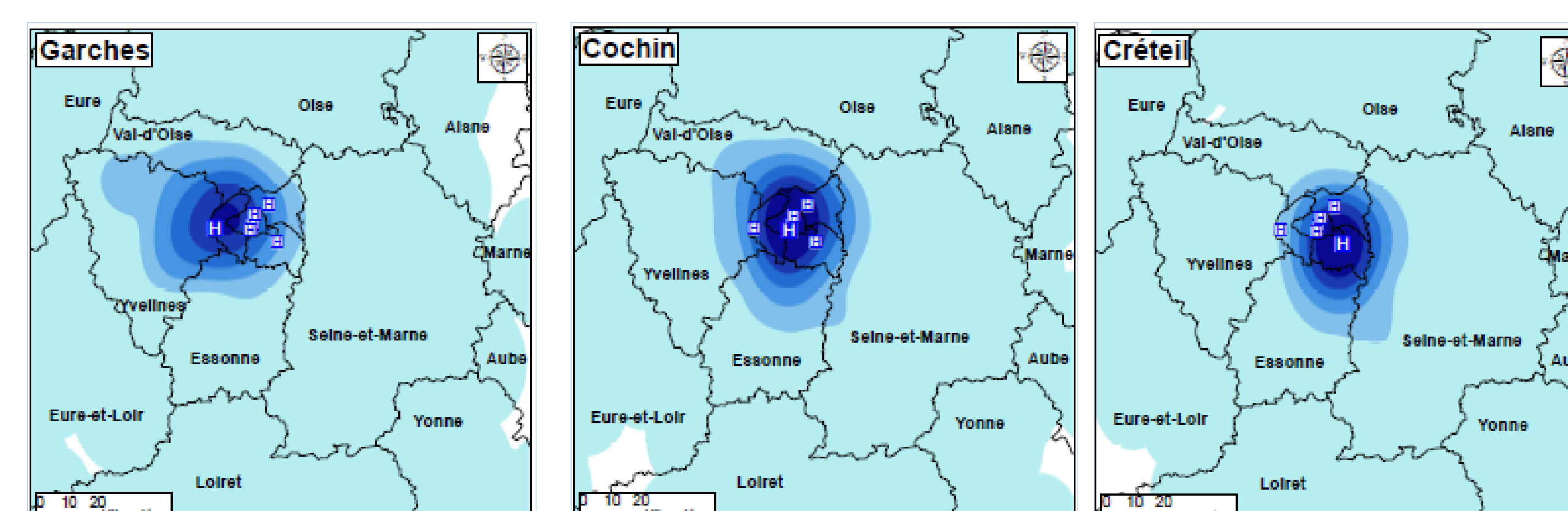


**Note:** the penetration rate is calculated by excluding patients of the represented OD centre. The light color explains the OD centre attraction

Map 2 underlines that the patients recruitment is predominantly in the department where the OD centre is implanted or close to it.

In Garches OD centre for instance, patients come mainly from Hauts-de-Seine department but also from Yvelines department (on the left).

Map 3: Area of influence for three of the six centres in the Paris region.



**OD centres influence area (number of patients / km<sup>2</sup>)**

< 4	11 - 20	36 - 55	No Patients
4 - 10	21 - 35	> 55	

## Discussion and perspectives

This study was a first step on assessing geographical influence on OD centers recruitment.

This work will continue as a collaborative work between clinicians and geographers in order to appreciate on the one hand geographical biases in patients recruitment and on the other hand industries or activities possibly associated with work-related diseases.

This work will highlight the relevance of GIS use for prevention.

The above maps describe the attraction area of each OD centre. Recruitment areas are almost concentric around each OD centre but overlaps are present too.

For Creteil it is concentrated in the Val-de-Marne and in the south-east of the region (Essonne and Seine-et-Marne). For Garches the main core is around Hauts-de-Seine OD centre. On the opposite, Cochin recruitment is equally spread over Paris *intra muros*.

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3 Cochin OD centre, Paris

4 Garches OD centre, Hauts-de-Seine

5 Creteil OD centre, Val-de-Marne