

« Synthetic population : a tool to forecast the future health needs in Belgium, at the municipality level. »

Dumont Morgane (naXys)

Eric Cornélis and Timoteo Carletti (naXys)



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Avec le soutien de la



Wallonie

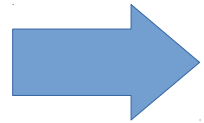
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# 1. Aim of the research

Forecast the future population's health needs

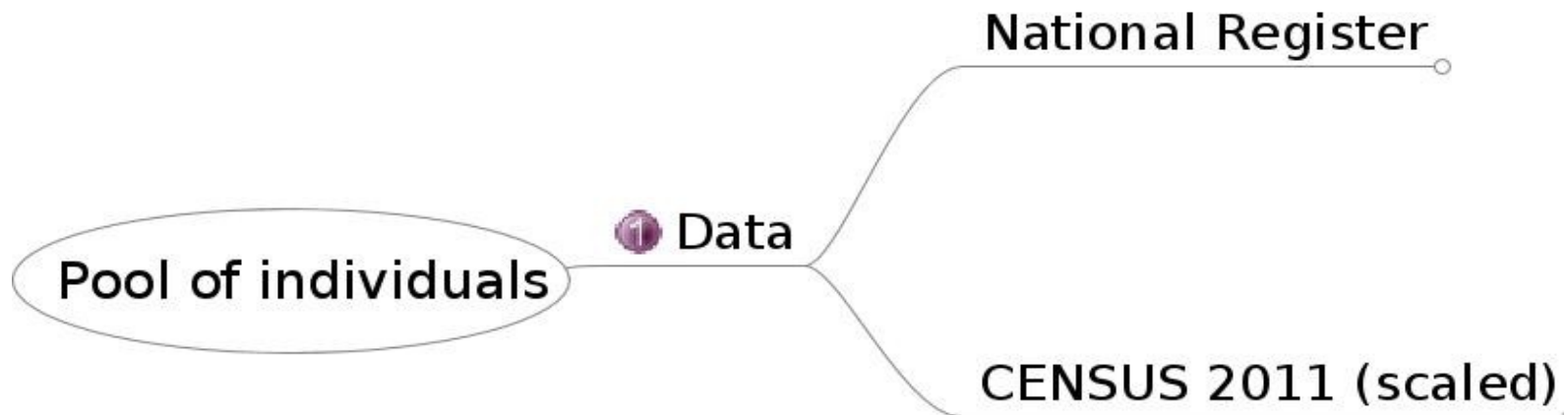
Need of data :

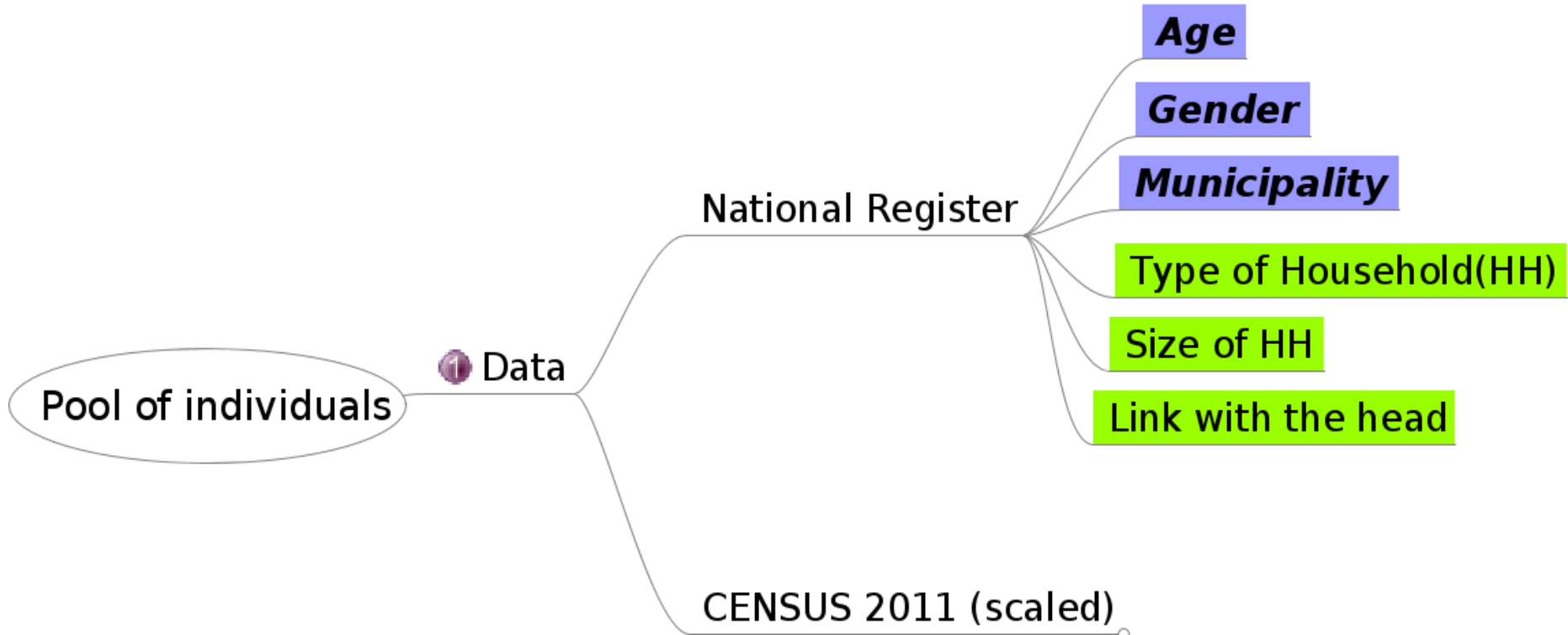


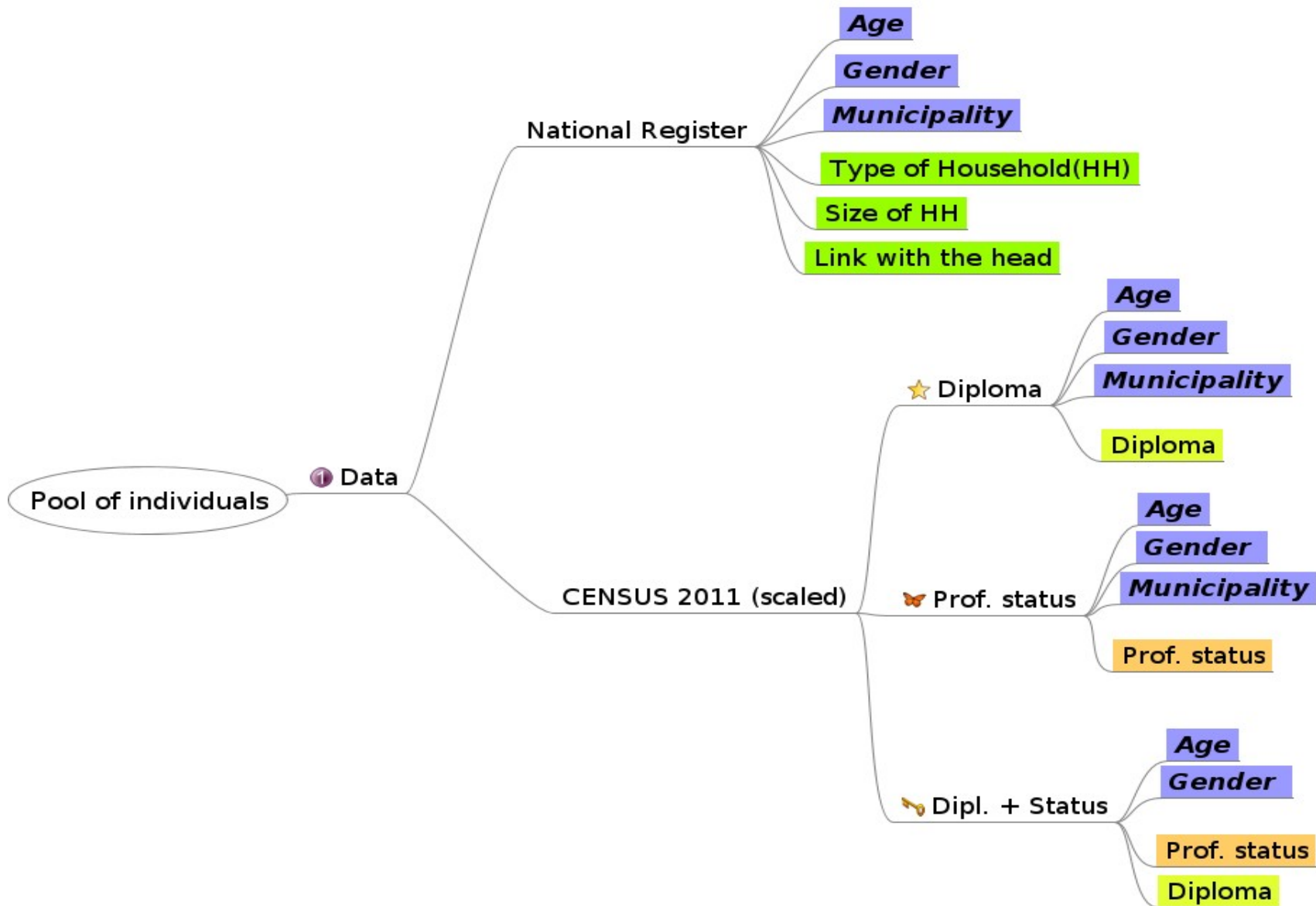
- For static initial population
  - No exhaustive data
  - Privacy
  - **Create a synthetic population of the individuals in Belgium**
- For dynamical evolution

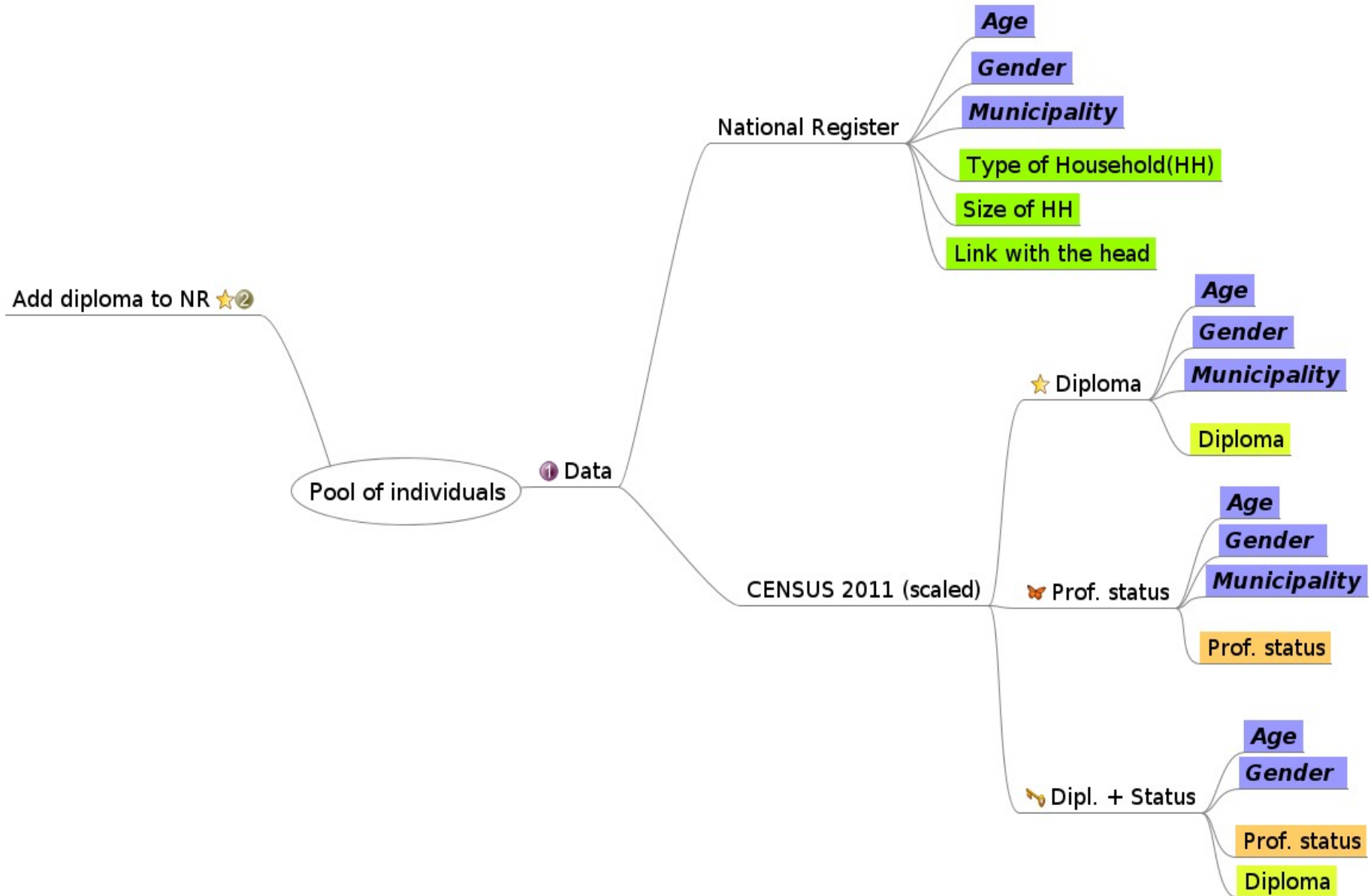
# 2. Pool of individuals

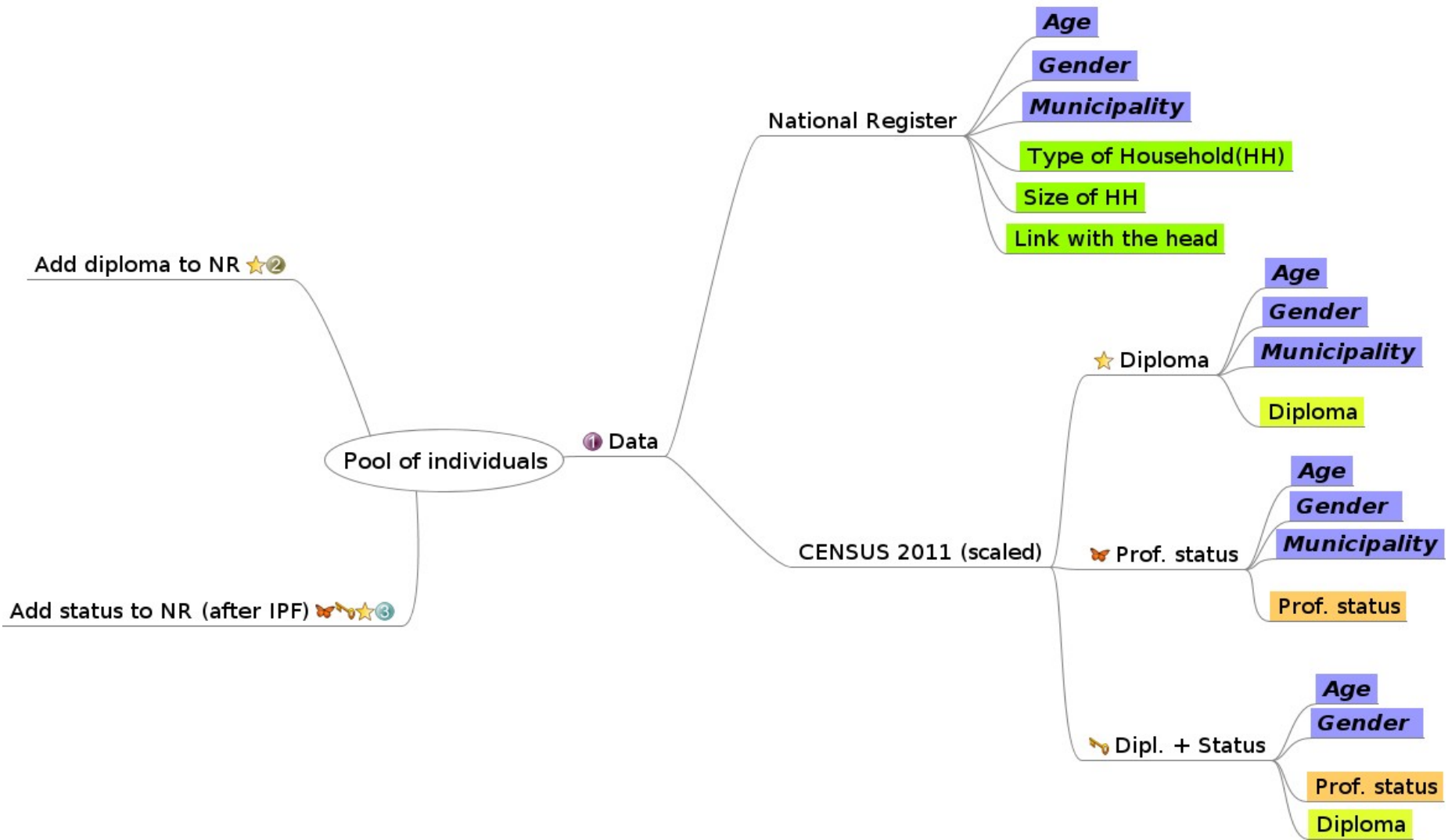
## 2.1. With basic demographics features





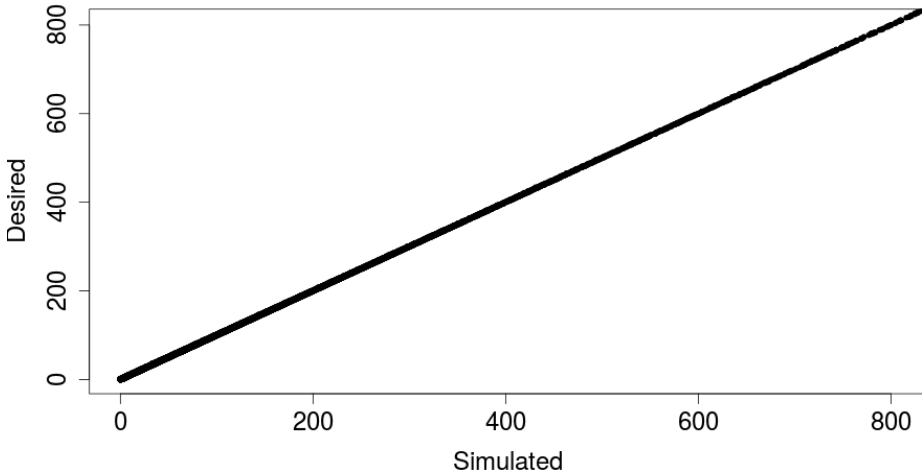




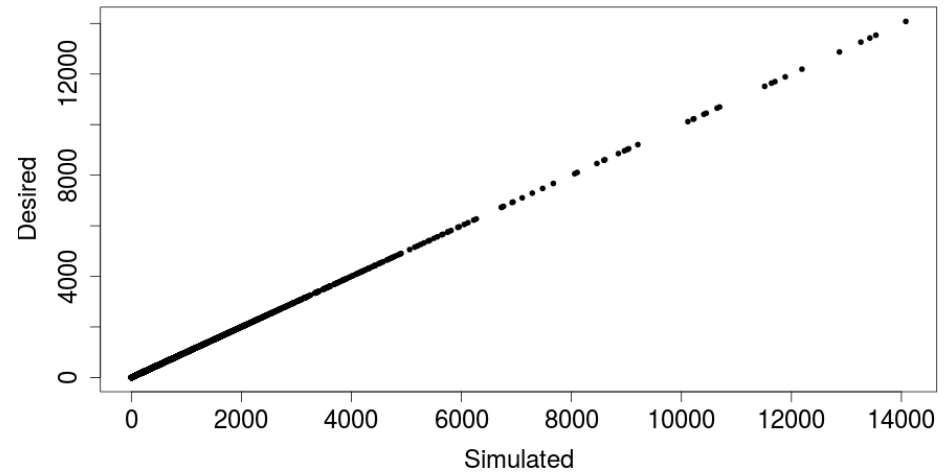




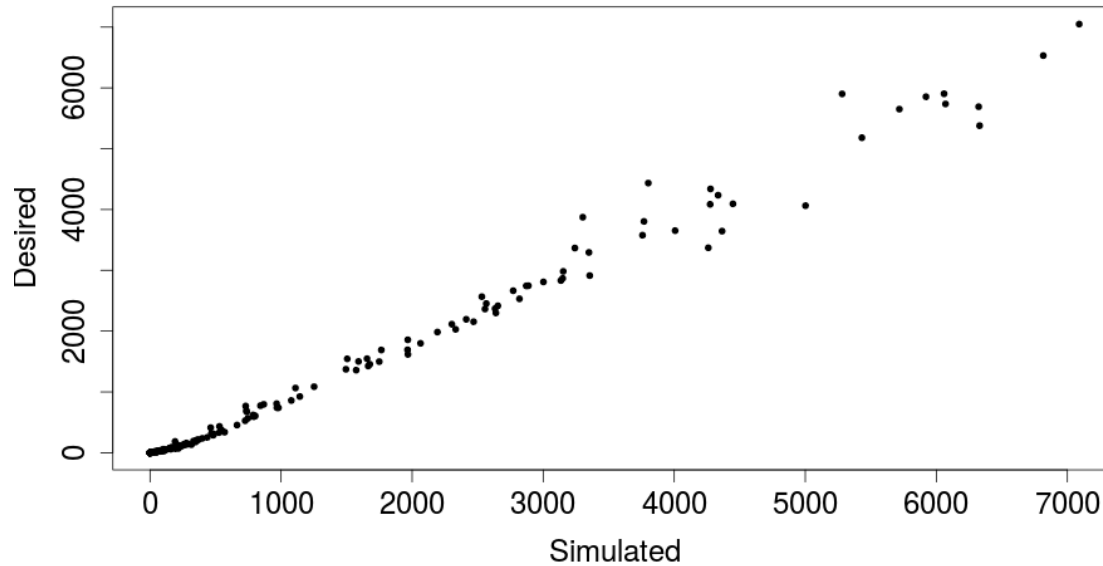
**Number of desired and simulated individuals per education level, municipality, age and sex**



**Number of desired and simulated individuals per activity status, municipality, age and sex**



**Number of desired and simulated individuals per education level, activity status, age and sex**

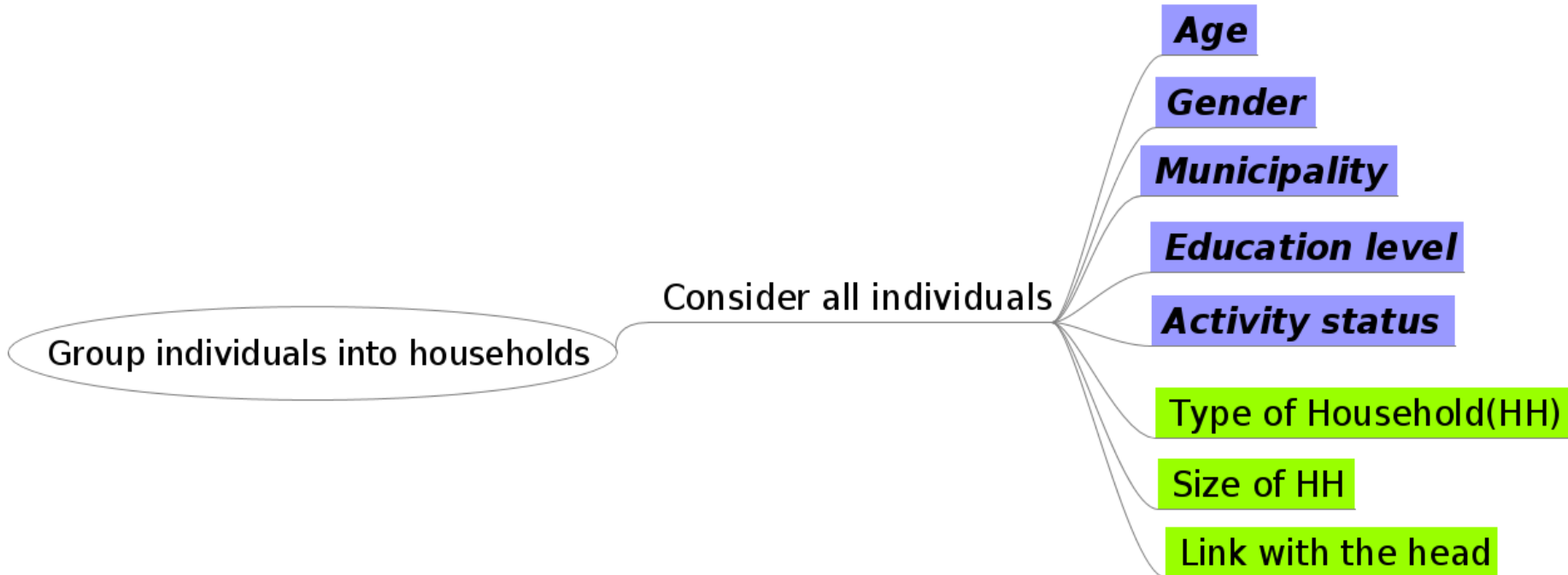


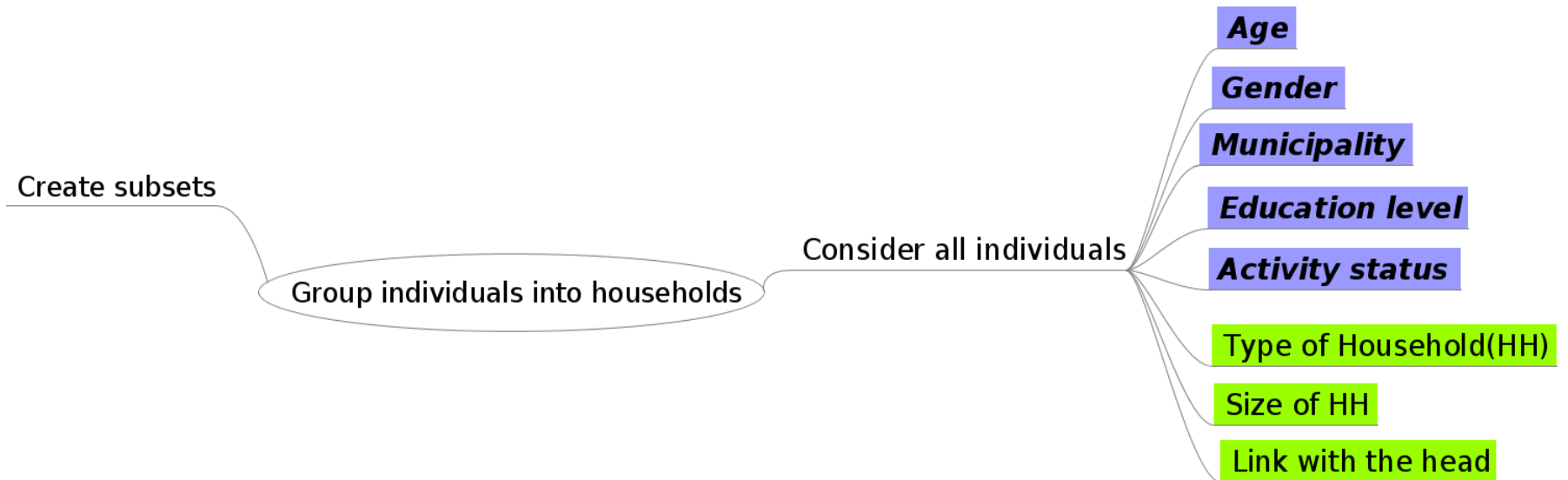
# 2. Pool of individuals

## 2.2. With the addition of health features

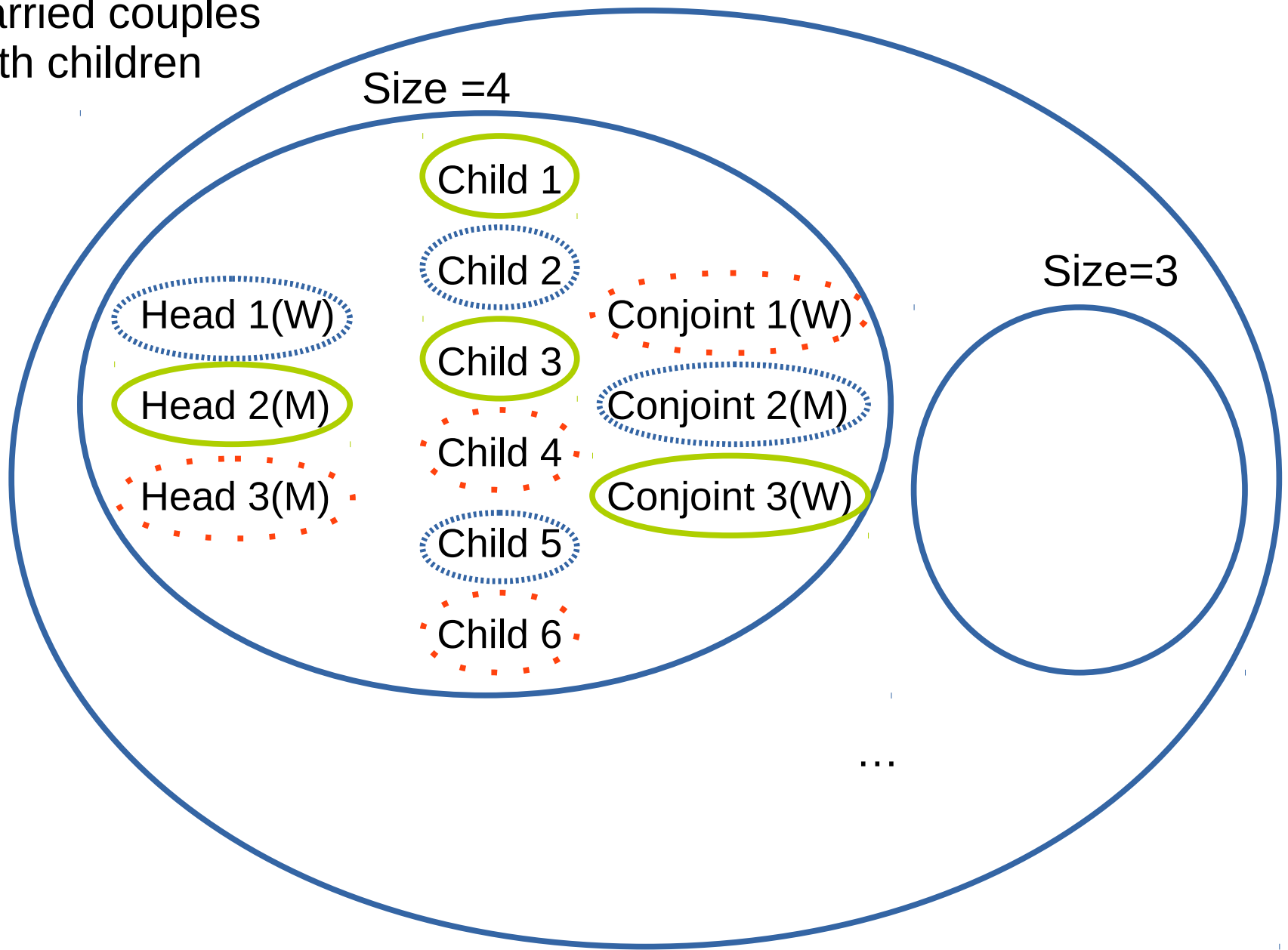
1. Identify pertinent variables to be added (illnesses : diabetes, Parkinson, chronic pain, BPCO and osteoporose)
2. Data coming from the reimbursed medicines (Pharmanet), by sex, age and municipality
3. Add the illnesses following the data

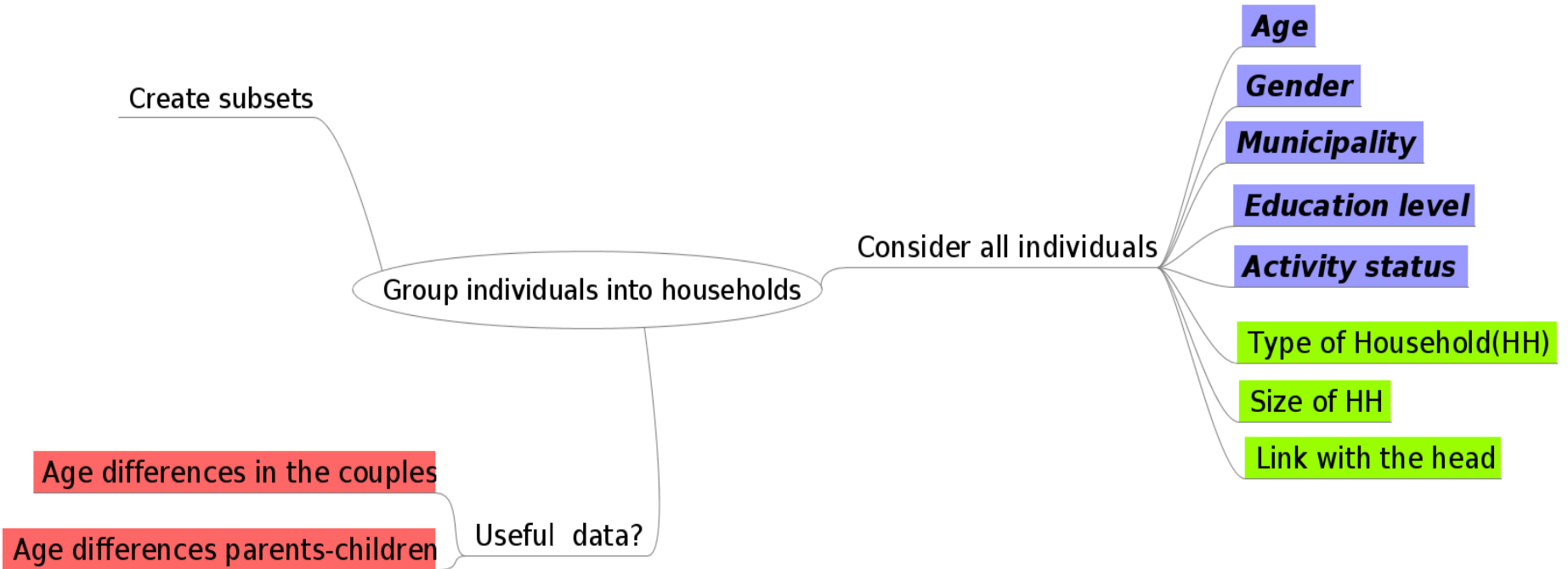
# 3. Group the individuals into households





Married couples  
With children





# Simulated annealing (for Namur) :

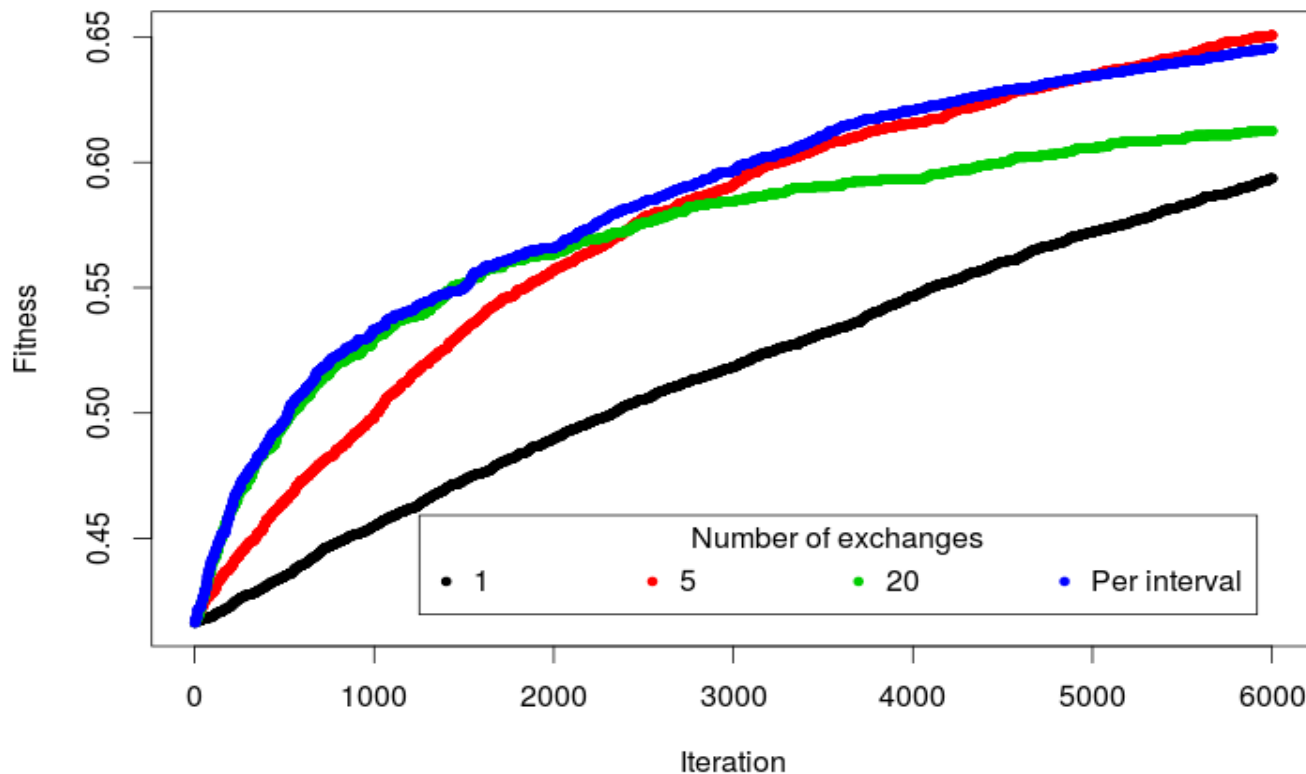
From a random basis, try exchanges :

If better : keep new configuration

If worst : keep new configuration with

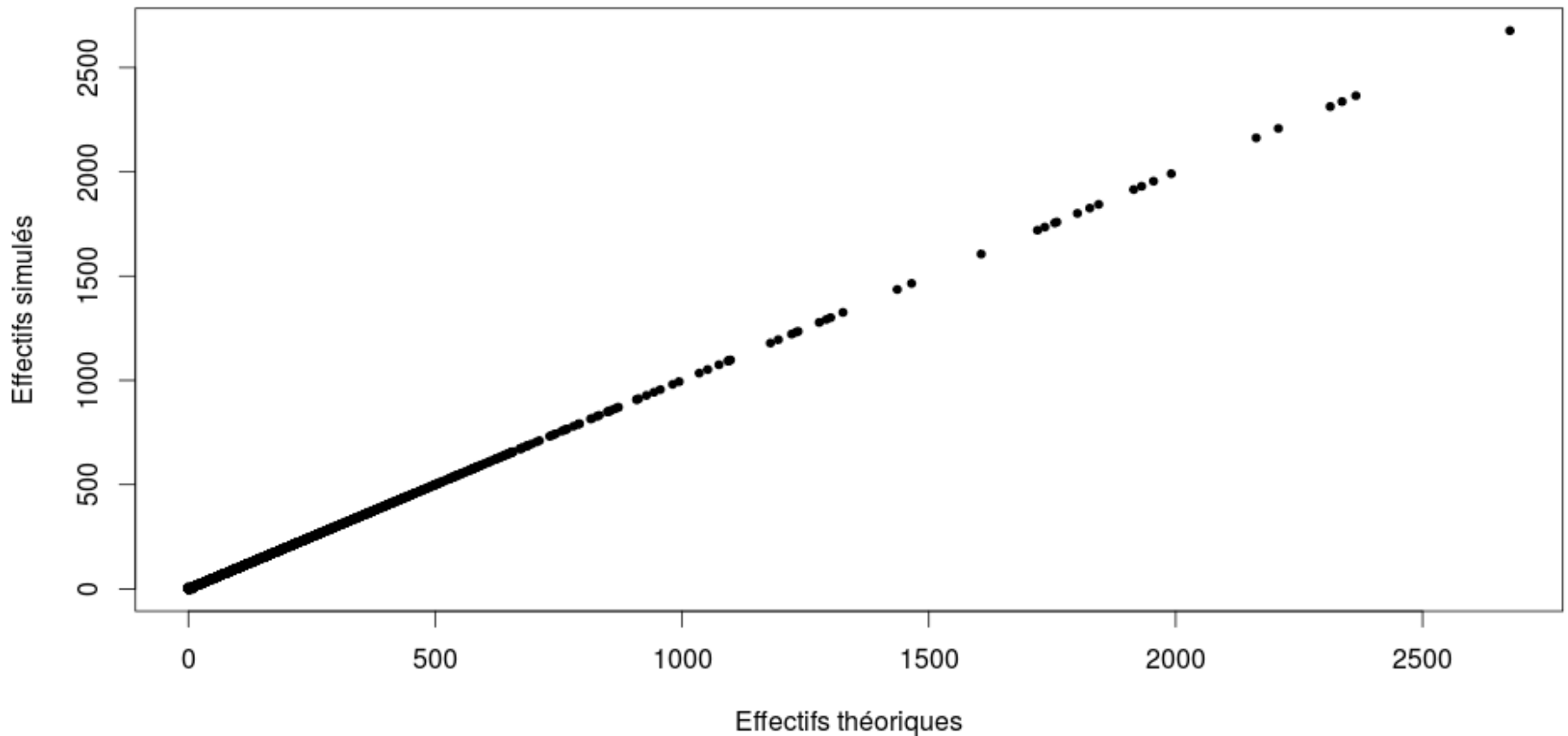
$$p = \exp(-\text{Error}/\text{Temperature}(i))$$

**Simulated Annealing when proba to keep a less effective = 0**



# Consider the distribution directly for Belgium (fitness = 1) Age distribution inside couples

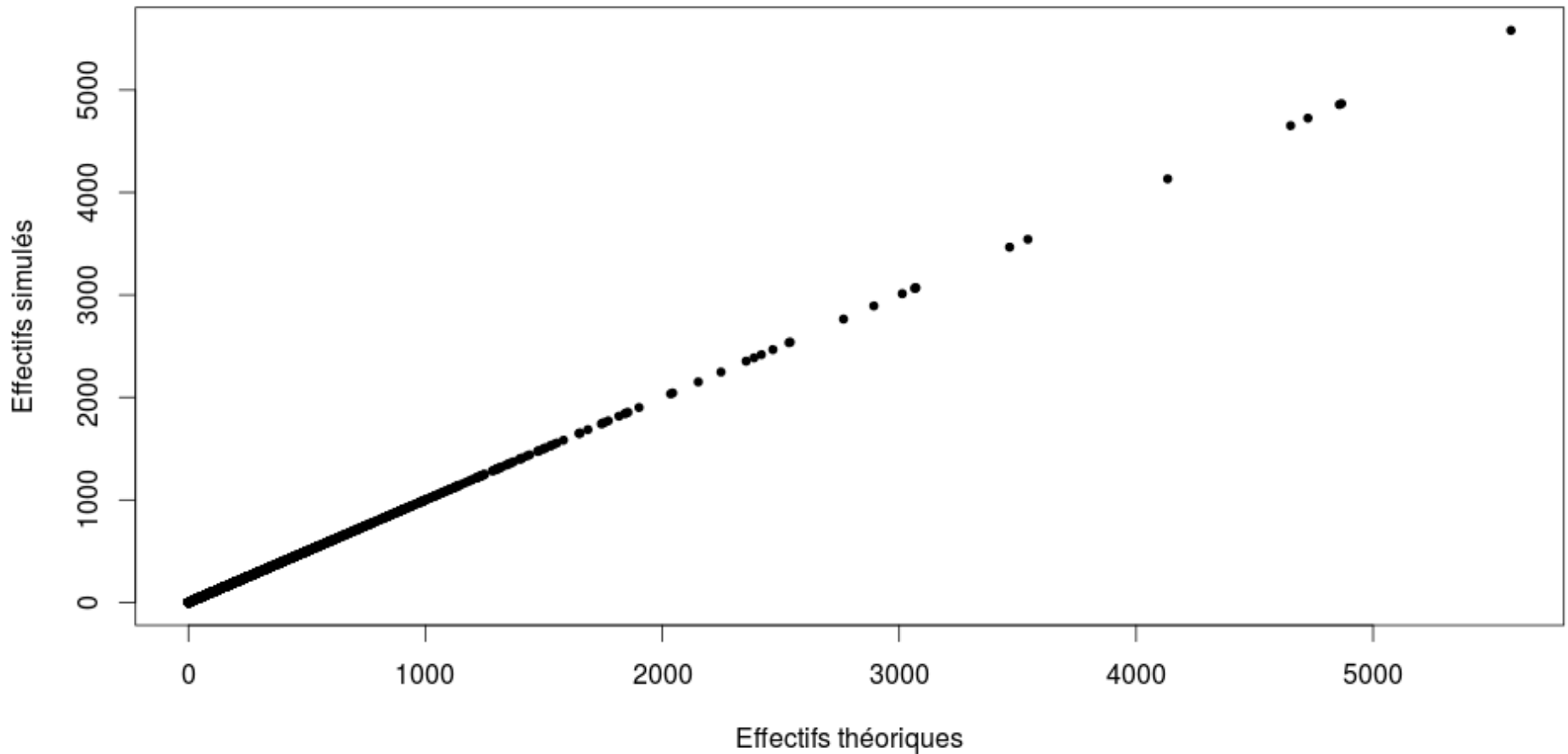
Distribution d'âge dans les couples (CAE et CSE)





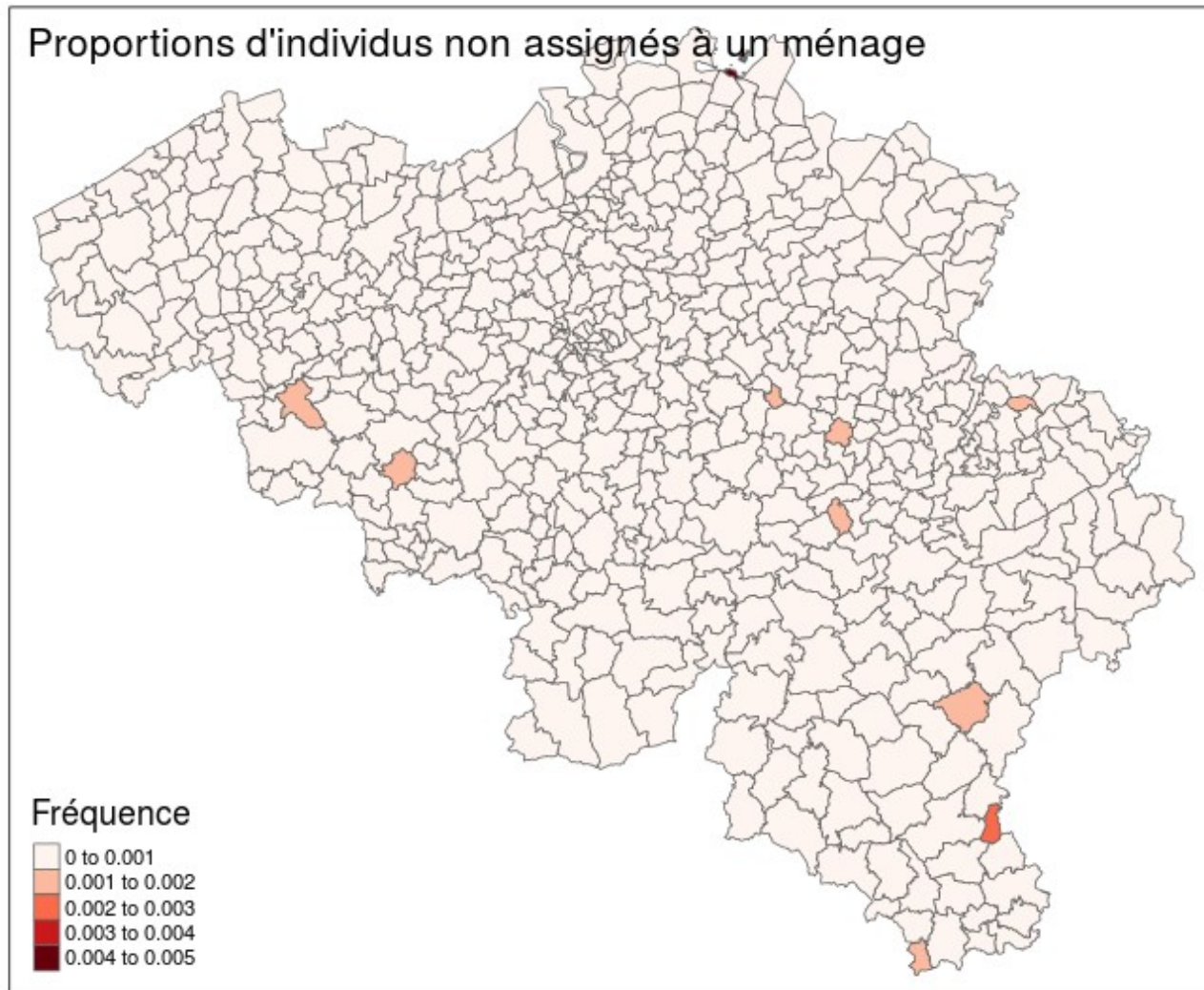
# Consider the distribution directly for Belgium (fitness = 1) Age distribution head - child

Distribution d'âges des enfants par rapport à l'âge du chef

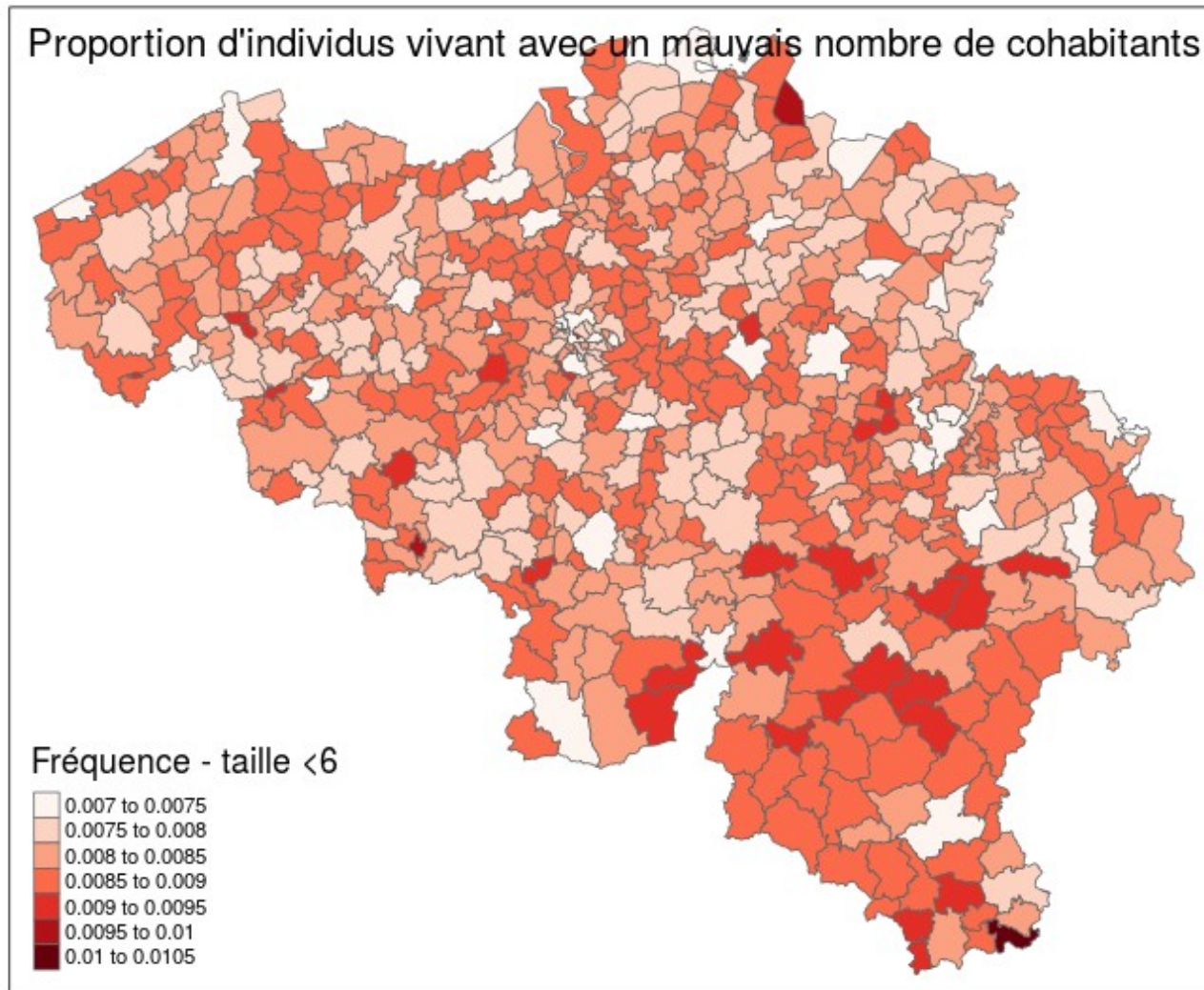


# Proportions of individuals non assigned to a household

Worst : Baarle-Hertog (0.41%) et Martelange (0.26%)



# Proportions of individuals with wrong size of HH. Worst : Aubange (1%)



# 4. Perspectives

1. Add the dynamical evolution :  
birth, aging, death, marriages,  
divorces, moves,...

2. Conclude for the future health  
needs in 2030

# 5. Conclusion

1. Population as close as possible to the real population.
2. Containing health characteristics.
3. No privacy law problems.
4. Grouped into households.
5. Applicable in a lot of fields.