Public Health Impact of a Mobilization Project for the Control of Ragweed

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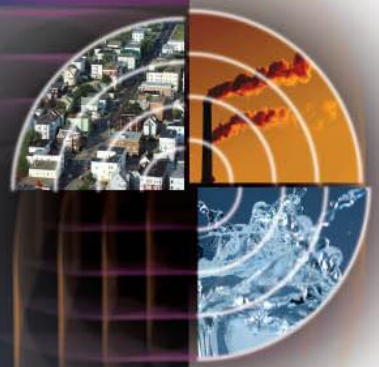
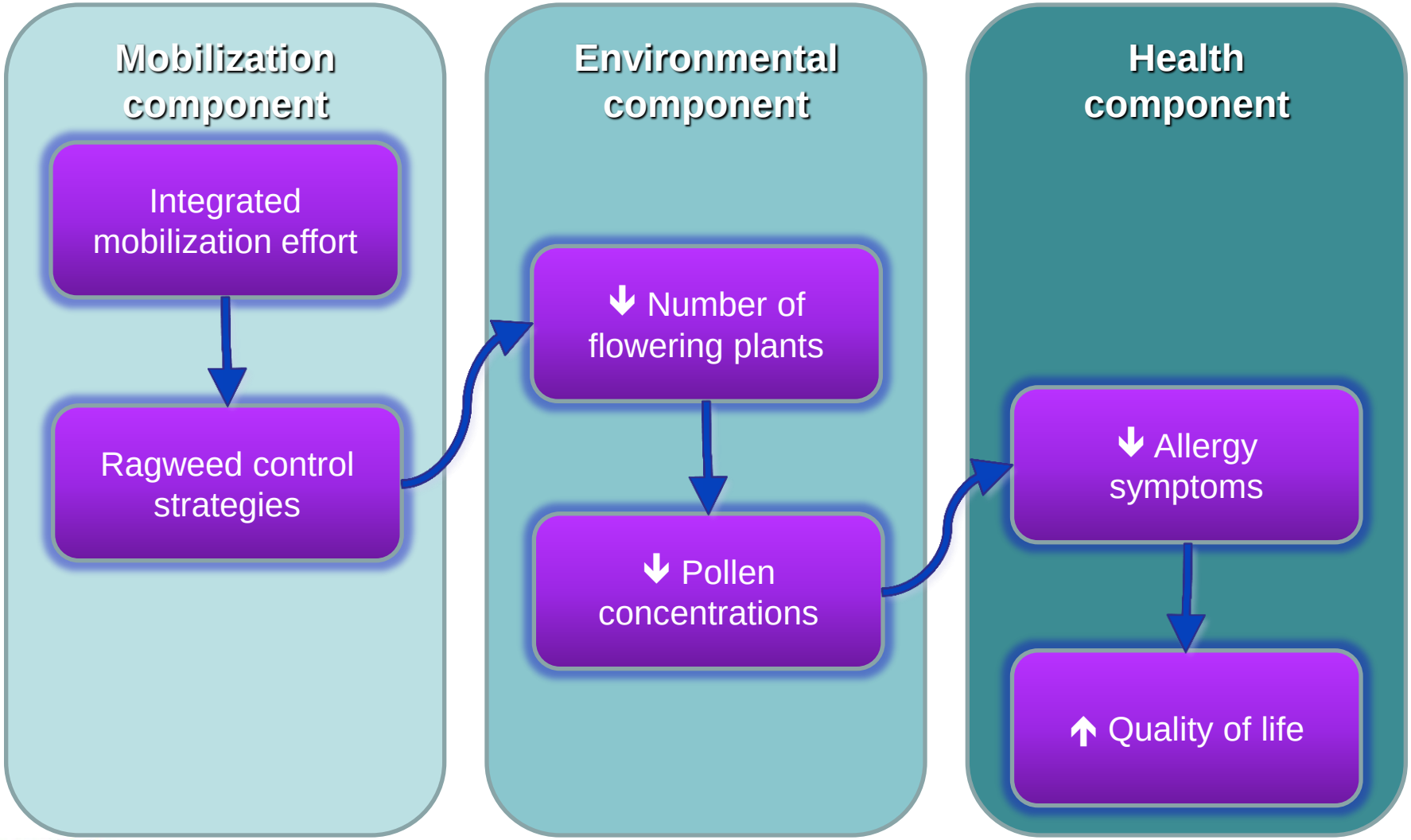


Introduction

- Prevalence of allergic rhinitis (Quebec Public Health Survey, 2008)
  - 17% of the general population in the province of Quebec
  - 19% in the Montérégie region
- Allergic rhinitis related to pollen (~80 %)
  - Ragweed is the principal etiologic agent
  - ~10% of the population have already received a diagnosis of ragweed allergy
  - Up to 18% of the population reported to be allergic to ragweed in areas where the plant is abundant
  - Possible underestimation of the cases of ragweed allergy
- Growing issue due to climate change and global warming
  - Spread of the geographic distribution
  - Increased duration of the pollination period
- Uncertainty of the effectiveness of interventions on the environment and health
  - Barrier to the mobilization process

Conceptual framework of the mobilization project for the control of ragweed



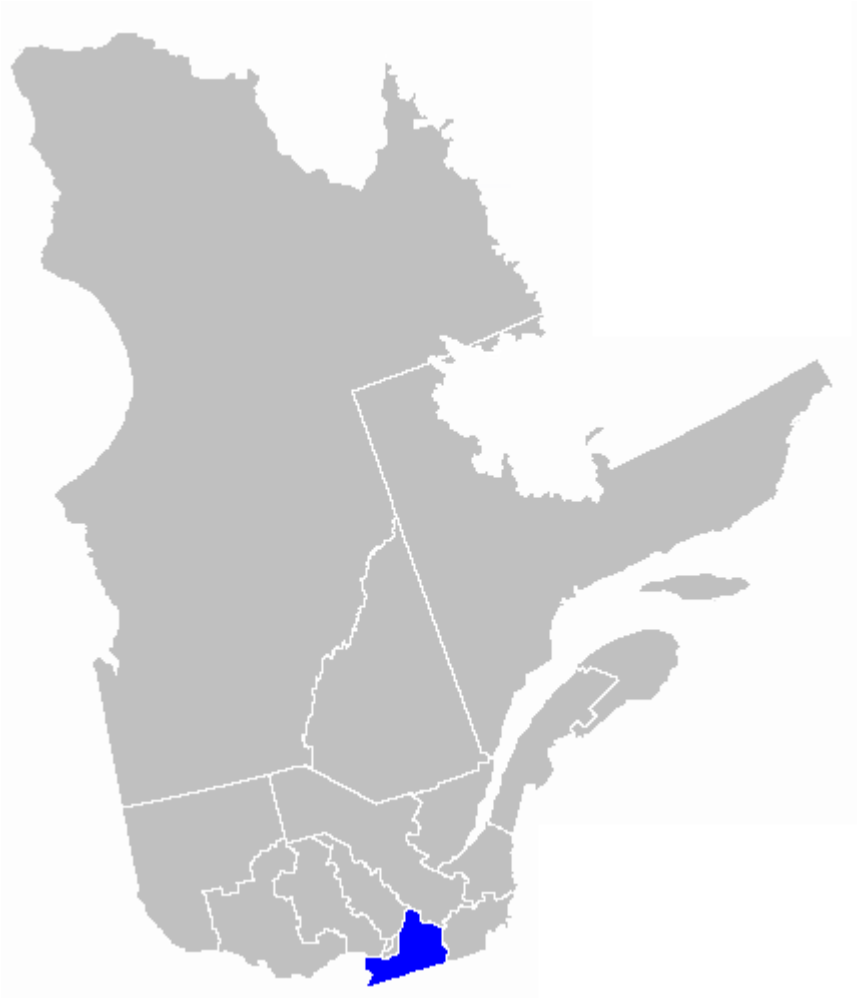
Objectives of the health component

- Main objective:
  - Assess the health impact of the mobilization project

- Specific objectives
  - Determine whether the project leads to a reduction of ragweed related allergic rhinitis (AR) symptoms
    - Nasal symptoms
    - Ocular symptoms
  - Determine whether the quality of life (QoL) of allergic people improves as a result of ragweed control and a decrease in pollen concentrations
  - Compare the results with a group of allergic adults living in an area without specific ragweed intervention

Location of the areas studied

Location of the areas studied

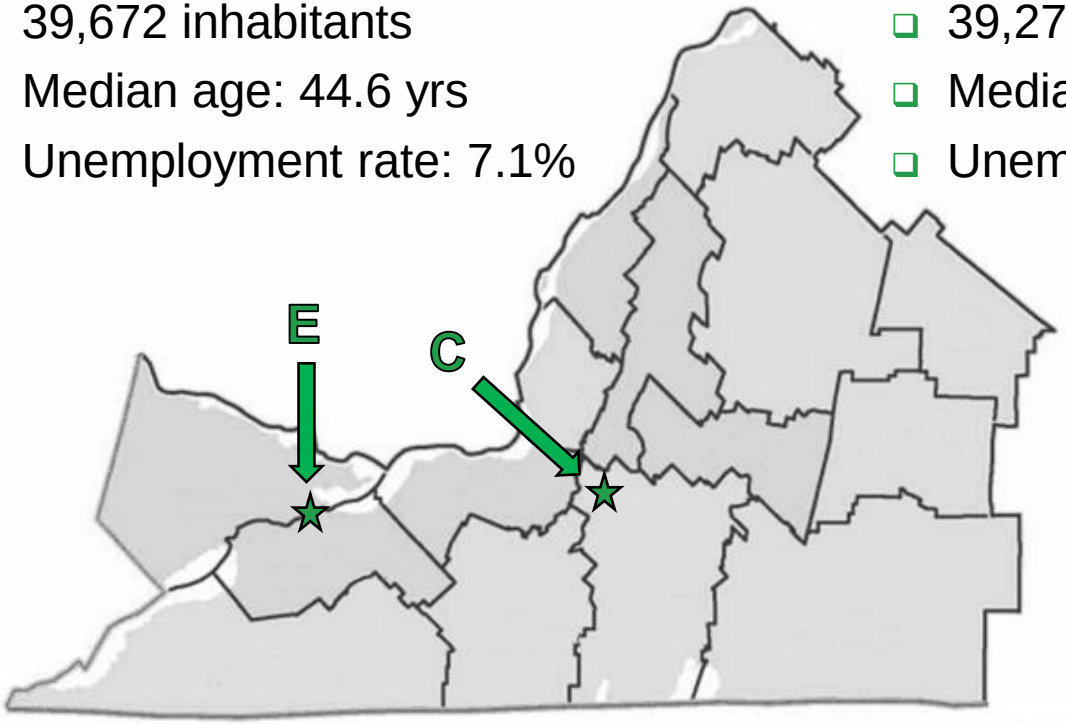


Location of the areas studied

- Main characteristics of the areas studied :
  - Similar environment and economic activities

- Experimental city
  - 39,672 inhabitants
  - Median age: 44.6 yrs
  - Unemployment rate: 7.1%

- Control city
  - 39,274 inhabitants
  - Median age: 43.1 yrs
  - Unemployment rate: 6.0%



Design of the study and sampling procedures

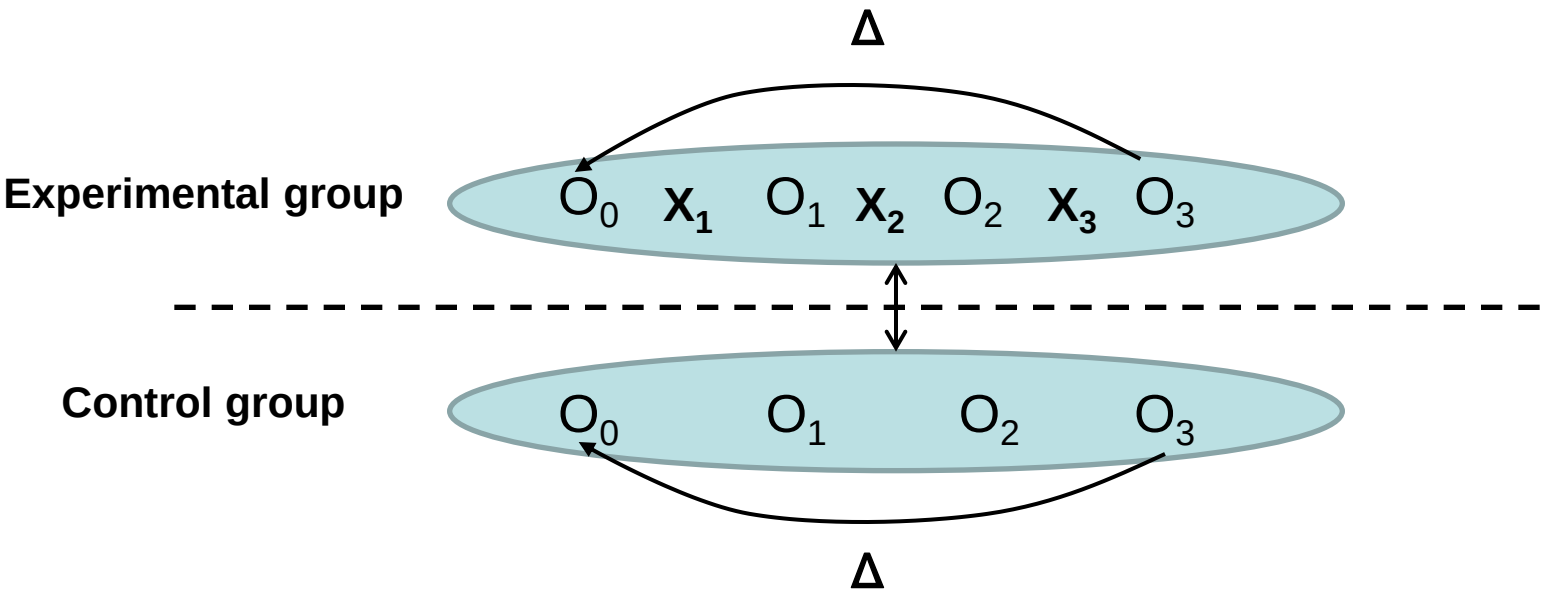
- Quasi experimental study (pre/post)

- Sample size: 440 individuals
  - Experimental group: 220 adults allergic to ragweed recruited in the city with the mobilization project
  - Control group: 220 adults allergic to ragweed recruited in a city without specific ragweed control strategies

- Main inclusion and exclusion factors
  - Residence located within the study area
  - Age: over 18 years of age
  - French or English as a common/usual language
  - Ragweed allergy diagnosed or reported without perennial rhinitis
  - No cancer or autoimmune disease

Methods

- Study design



Methods

- Rhinoconjunctivitis Quality of Life Questionnaire (Juniper & Guyatt, 1991)
  - Available in French and English
  - Scores assessing the health impact
    - Nasal symptom severity
    - Ocular symptom severity
    - Quality of life
  - 7-point Likert-type scale
  - Documentation of potentially confounding variables, i.e.:
    - Other allergies
    - Tobacco use
    - Domestic animals
- Data collected over four years (T_0, T_1, T_2, and T_3)
  - Self-administered questionnaire sent by regular mail
  - Phone-administered questionnaire in other cases

Methods

- Excerpt from the questionnaire

NASAL SYMPTOMS

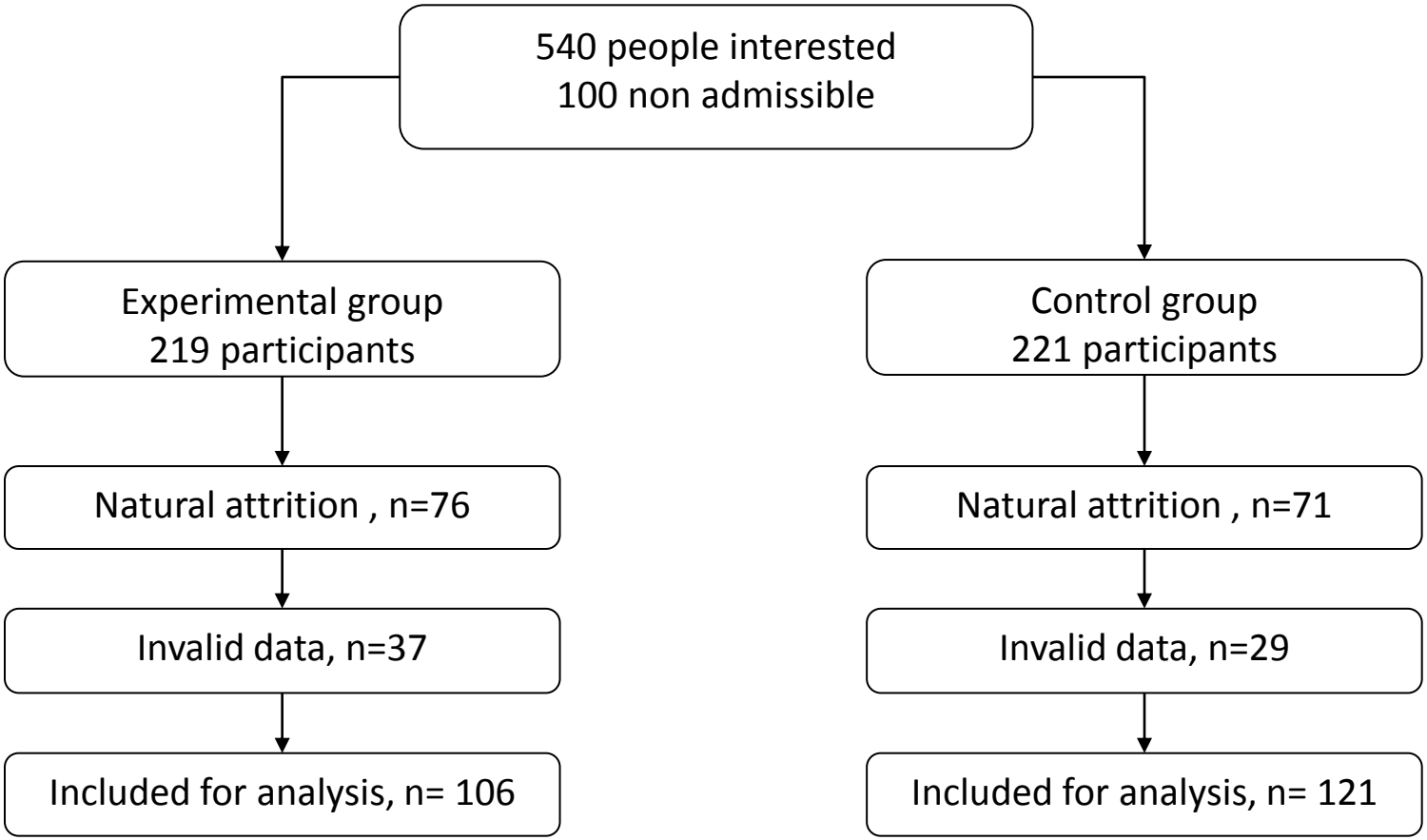
HOW **TROUBLED** HAVE YOU BEEN BY EACH OF THESE SYMPTOMS DURING THE LAST WEEK?

		Not troubled 0	Hardly troubled at all 1	Somewhat troubled 2	Moderately troubled 3	Quite a bit troubled 4	Very troubled 5	Extremely troubled 6
17.	Stuffy blocked	☐	☐	☐	☐	☐	☐	☐
18.	Runny	☐	☐	☐	☐	☐	☐	☐
19.	Sneezing	☐	☐	☐	☐	☐	☐	☐
20.	Post nasal drip	☐	☐	☐	☐	☐	☐	☐

Methods

- Statistical analysis
  - Sample size determined a priori to obtain adequate statistical power
  - Descriptive statistics
  - Statistical tests: Chi-square and t-test
    - Comparison of the two groups at the beginning of the study (T_0)
    - Intra group score evolution (difference T_0 and T_3)
    - Inter group comparison
    - $$\text{Relative change}\,(\%) = \frac{\text{score}_{T_3} - \text{score}_{T_0}}{\text{score}_{T_0}} \times 100$$
  - Multiple linear regressions

Results


540 people interested
100 non admissible
Experimental group
219 participants
Control group
221 participants
Natural attrition , n=76
Natural attrition , n=71
Invalid data, n=37
Invalid data, n=29
Included for analysis, n= 106
Included for analysis, n= 121

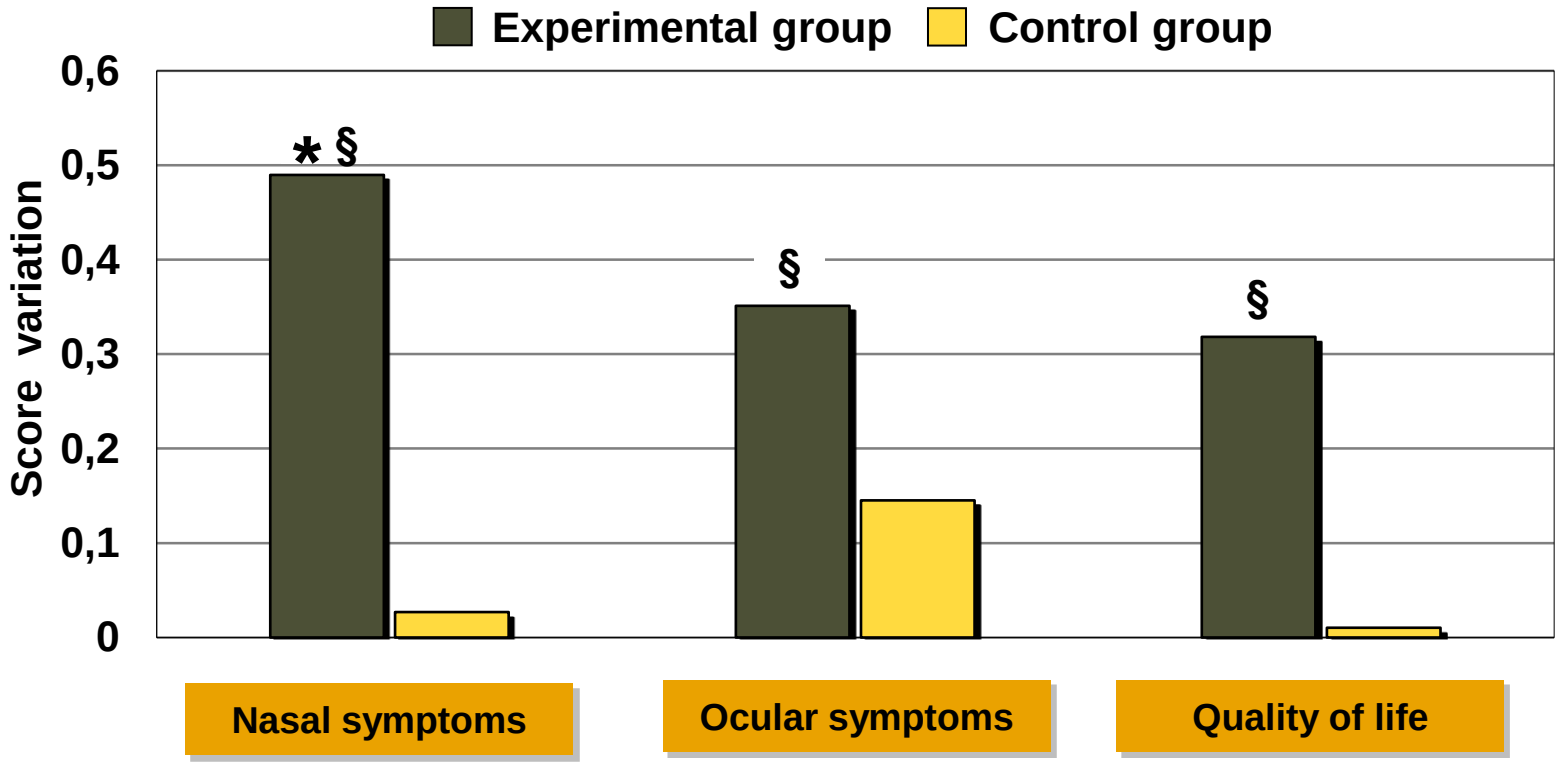
Results

- Comparison of the groups at the beginning of the study (T_0)

Characteristics	Experimental group N=106	Control group N=121
Age (AM±SD)	43.1 (±13.0)	45.9 (±15.0)
Gender (n (%))		
Male	40 (38%)	33 (27%)
Female	66 (62%)	88 (73%)
Score of symptoms (AM±SD)		
Nasal symptoms	3.46 (±1.31)	3.25 (±1.37)
Ocular symptoms	3.05 (±1.52)	3.17 (±1.51)
Quality of life	3.18 (±1.11)	3.09 (±1.09)
Consumption of medication (n (%))	82 (77%)	90 (74%)
Number of medication (AM±SD)	1.62 (±1.37)	1.56 (±1.33)
Other allergies (n (%))	85 (80%)	86 (71%)
Number of allergies (AM±SD)	1.51 (±1.26)	1.55 (±1.44)
Immunotherapy (n (%))	6 (6%)	5 (4%)
Health problems (n (%))	71 (67%)*	63 (52%)
Number of health problem (AM±SD)	1.20 (±1.23)	0.94 (±1.20)
Domestic animals (n (%)	56 (53%)	62 (51%)
Tobacco use (n (%))	20 (19%)	13 (11%)
Second hand tobacco smoke (n (%))	11 (10%)	5 (4%)

Results

Improvements in rhinoconjunctivitis symptoms and quality of life between T_0 and T_3



Results

- Multiple linear regressions
  - Consideration of fixed and variable covariates
  - Numerous variables are not significant
    - No confounding factor among studied variables
  - Only significant covariates:
    - Immunotherapy ($p = 0.012$)
    - Domestic animals ($p = 0.026$)
  - Weak but very significant regressions for:
    - Nasal symptoms ($R^2 = 0.065$, $p = 0.002$)
    - Quality of life ($R^2 = 0.046$, $p = 0.006$)

Discussion

- Positive impact of the mobilization project on the effect on health (nasal symptoms and quality of life)

- Limits of the study
  - Lack of power for the ocular symptoms
  - Ecological bias and possible misclassification

- Next steps
  - Integration of spatial modeling for the concentrations of pollen
  - Attempt to attribute individual levels of exposure

Herbe à poux

Thank you !