

# Pollen and clinical report in France

## INTRODUCTION

Prevalence of respiratory allergies (allergic rhinitis or asthma) in France affects between 20% and 30% of the population.

The RNSA (Réseau National de Surveillance Aérobiologique) is the French aerobiology organization responsible for studying the pollen contents of air in biological particles and their Health impact.

It implemented a network of “sentinel” clinicians throughout France.

With the help of this network, it produces every week a report of allergenic situation from a *clinical index* that traduces quality and severity of symptoms.

RNSA gathers in a first time pollen contents data. Then it retrieves clinical data from clinicians, and then phenological data from Botanic Gardens of France. Numerical weather forecast supplement information that will be processed and that will give rise to predictions in order to calculate the *allergic risk due to pollen exposure* (RAEP in French). Database is often updated that makes possible the implementation of a pollen prediction system that inform people when the most of allergen appeared and also on the prominence of risk until two or three weeks.

Thanks to the 70 pollen collectors shared among the country, RNSA collects pollen exposure data and thanks to the clinical network, it can correlate these data to health impact.

## METHODS

Since 2005, RNSA is equipped with a clinical database system. This system was developed according to proven procedures.

The network is composed by nearly 150 clinicians divided into 57 cities in France. These clinicians are called “sentinel” clinicians. Most of them are allergists or else they are general practitioners.

Once per week they receive a clinical report from RNSA and a note that explain them how they can fill in the report. According to the severity of symptoms they can prescribe drugs to take during the exposure period.

The clinician supplies information in the clinical report about these following points

**(Figure 1):**

- His name, the number of the week, the city where he works
- If there were pollen symptoms during the week.
- The number of pollen diseases and their evolution, that is to say if this number is increasing, decreasing or just continuous in regard to its value of the previous week.

Bulletin clinique RNSA

RNSA - Bulletin clinique 2009      Dr      Semaine - Ville de

Symptômes polliniques    Oui  Non     Nombre de pollinoses     Evolution / semaine précédente    Augmentation     Stagnation     Diminution

Gravité des symptômes

	Nuls	Faibles	Moyens	Forts
Conjonctivites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rhinites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Toux	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asthme	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signes cutanés ou autres	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Type de pollens incriminés (Facultatif)       Index clinique auto 0 / 18

Observations (Facultatif)       Index clinique manuel  / 18

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Merci de bien remplir tous les champs obligatoires

Figure 1. Clinical report for clinicians.

- The severity of symptoms is presented like qualitative indicators noted “nonexistent” to “serious”. There are four criteria to determine the intensity of severity of symptoms: “incapacitating”; “diurnal”; “nocturnal” symptoms or “with sociological and professional fallout”. If there are any of these criteria, then severity will be nonexistent. It will be minor if there is one or two criterion, medium for three criteria and serious for criteria all together.
- The symptoms in question are: conjunctivitis, rhinitis, lung cough, asthma, cutaneous signs or others.
- Pollens that cause these symptoms
- The clinician can add some details, some commentary.

The clinical index is automatically and manually calculated: we decide to affect a coefficient of 1 to each symptom, except for the rhinitis because we admit that rhinitis is the most representative symptom of pollen disease. We assign another coefficient that goes from “0” to “3” for severity of symptoms. If all the symptoms have the most important severity, we would obtain a maximal clinical index of 18 on 18 (Figure 2).

Thus, for each clinician we get a weekly clinical index. We can also calculate the mean of all clinical indexes of the pollen season, for a town, a region or the whole France.

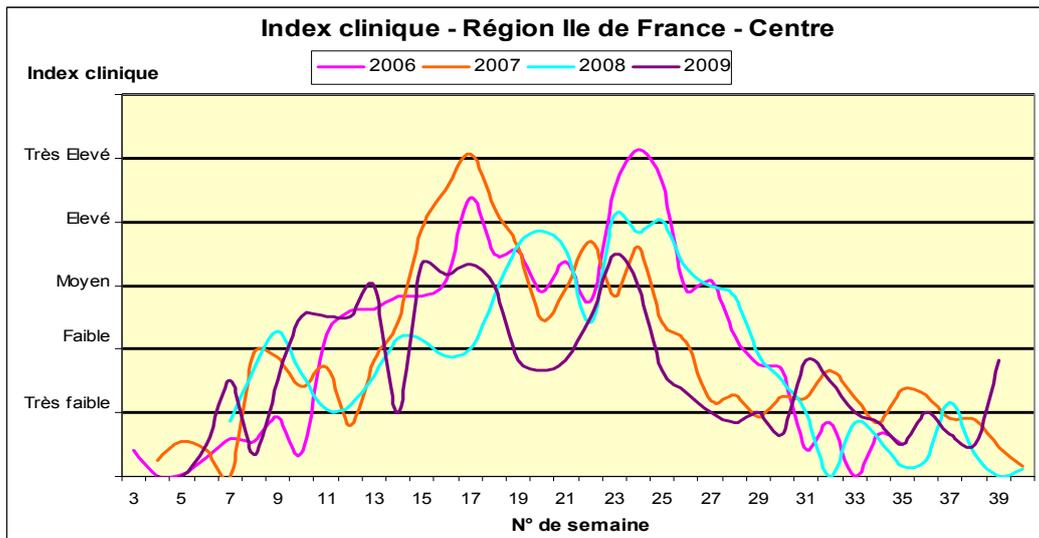
		0	1	2	3
	Gravité des symptômes	Nuls	Faibles	Moyens	Forts
x1	Conjonctivites	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
x2	Rhinites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
x1	Toux	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
x1	Asthme	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
x1	Signes cutanés ou autres	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 2. Table of the clinical indexes.

## RESULTS

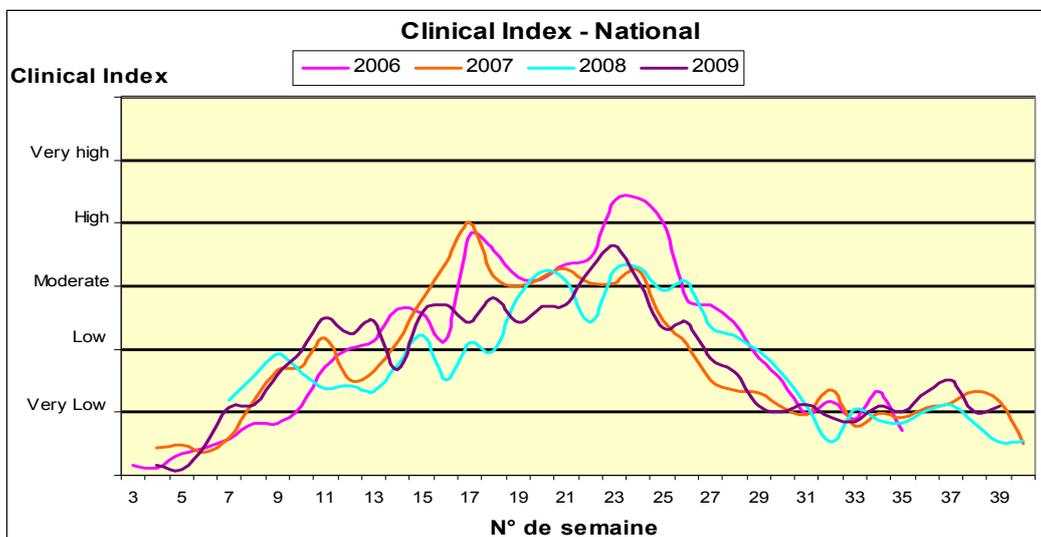
RNSA gets all the clinical indexes, since that moment it can calculate the mean of these indexes for each town. Once this work done, RNSA establishes course curves of clinical index contingent on the presence of pollen in the air. So, it is possible to overlay curves of different years according to a town, an area (**Figure 3**) or France (**Figure 4**). It is conceivable to construct curves showing trends of health effects contingent on pollen exposure during a same period.

Equally, RNSA can establish a clinical index for each area for different time scales: days, weeks, months or years.



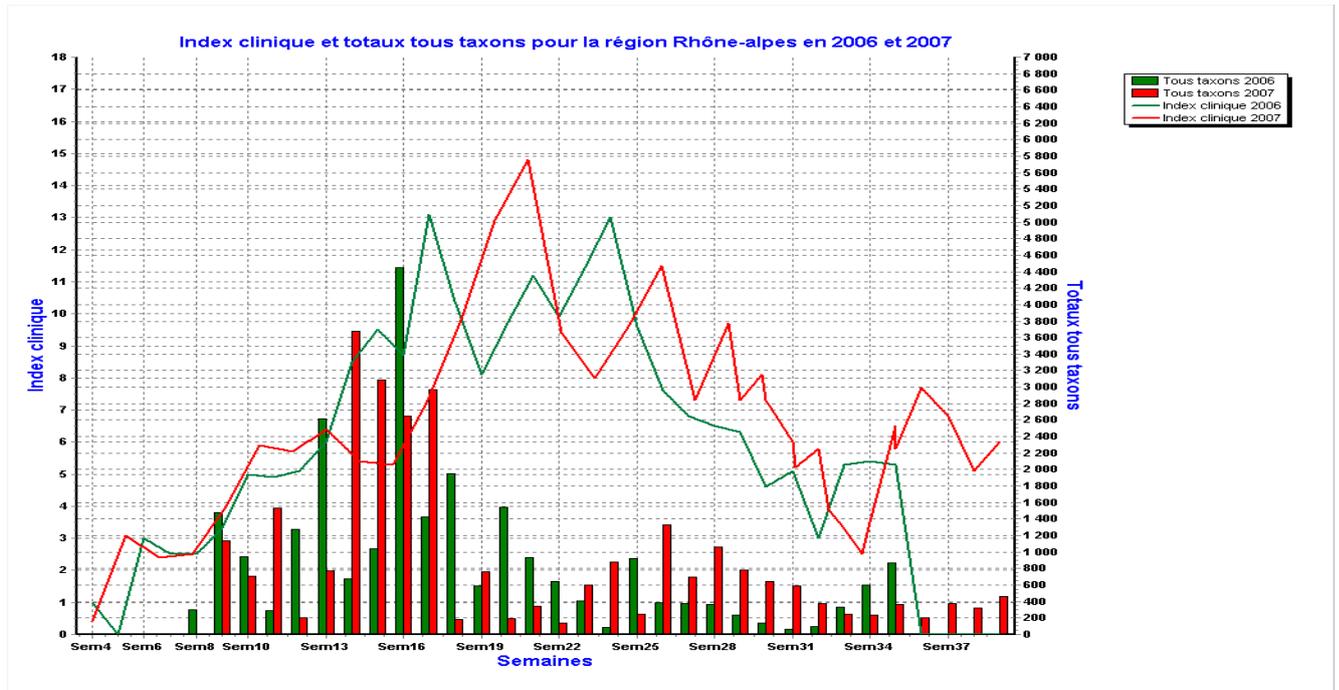
**Figure 3.** Weekly clinical index (very low to very high) of areas of Ile-de-France and Centre, in France, from 2006 to 2009.

Clinical index for these two areas is likely the same from one year to the other. Mostly, index peaks are placed between week 14 and week 27 (that is to say between the beginning of April and July). The year 2008 presents a little move back in comparison to the others years, and that, until June.



**Figure 4.** Weekly clinical index at national level (very low to very high), from 2006 to 2009.

Watching the curves of national clinical indexes we notice that symptoms do not really present any differences. This trend proves true for the years 2006 to 2009. The clinical index begins to rise from April and becomes high in May. It remains high during several weeks but it slowly lowers from the middle of July.



**Figure 5.** Weekly clinical index (1 - 18) all taxa with the levels of airborne pollen (number of particles per cubic meters and per week) in the Rhône-Alpes area in 2006 and 2007.

The interest of this graph consists in a comparison of clinical index and the number of pollen all taxa taken together, during the same period of the year in 2006 and 2007, in the Rhône-Alpes area. It is interesting to see that until the end of March the clinical index is comparatively the same in 2006 and 2007. There is a change in April where the 2007's clinical index is lightly put back in comparison with the clinical index of 2006. In June the quantity of pollen sharply decreases even if the clinical index remains high. It can be explained by the fact that symptoms are probably due to significant allergy potency. It is true that grasses have a high allergy potency with a lower quantity of grain.

Thus we realize that 2007 was more trying for allergic people than 2006, for both quantitative plan (pollen concentration) and clinical plan (severity of symptoms) in the Rhône-Alpes area. Indeed, in 2007, the mean of airborne pollen is 900/m<sup>3</sup>/week (whereas 894/m<sup>3</sup>/week in 2006). The mean of clinical index in 2007 is 6.7 (whereas in 2006 it is 5.9).

## DISCUSSION

RNSA calculates another index: the allergic risk due to pollen exposure. This risk is calculated from several data like: the clinical index, the period of the pollen season, numerical weather forecast, the type of pollen (that is its allergy potency), the number of airborne pollen and finally the geographic site in question. The risk is noted from 0 to 5 (**Figure 6**):

- 0 when the risk is nonexistent.
- 1 when it is very low.
- 2 when it is low.
- 3 when it is moderate.
- 4 when it is high.
- 5 when it is very high.

The allergy potency inheres in the plant, the more it is high, the less we need an important quantity of pollen to lead to an allergic reaction.

Before the reaction occurs, the person has to be intimate contact with the allergen. Then, in response to the exposure he develops an abnormal immune reaction. This phase is called "phase of recognition of the allergen". None of the symptoms appeared in that moment. After repeated exposures (sometimes after a second exposure in some cases), first clinical manifestations appeared. All people do not react in the same way; they can be more or less sensitive to the allergy potency of the plant.

The allergic risk due to pollen exposure includes all these aspects but it is a probability: it is estimation that allows warning allergic people. That risk is very useful for clinicians and patients. Moreover the influence of these parameters leads to measurable differences both from an area to another one and from a season to another. So measures have to be continuous all the time in order to know health impact due to pollen.

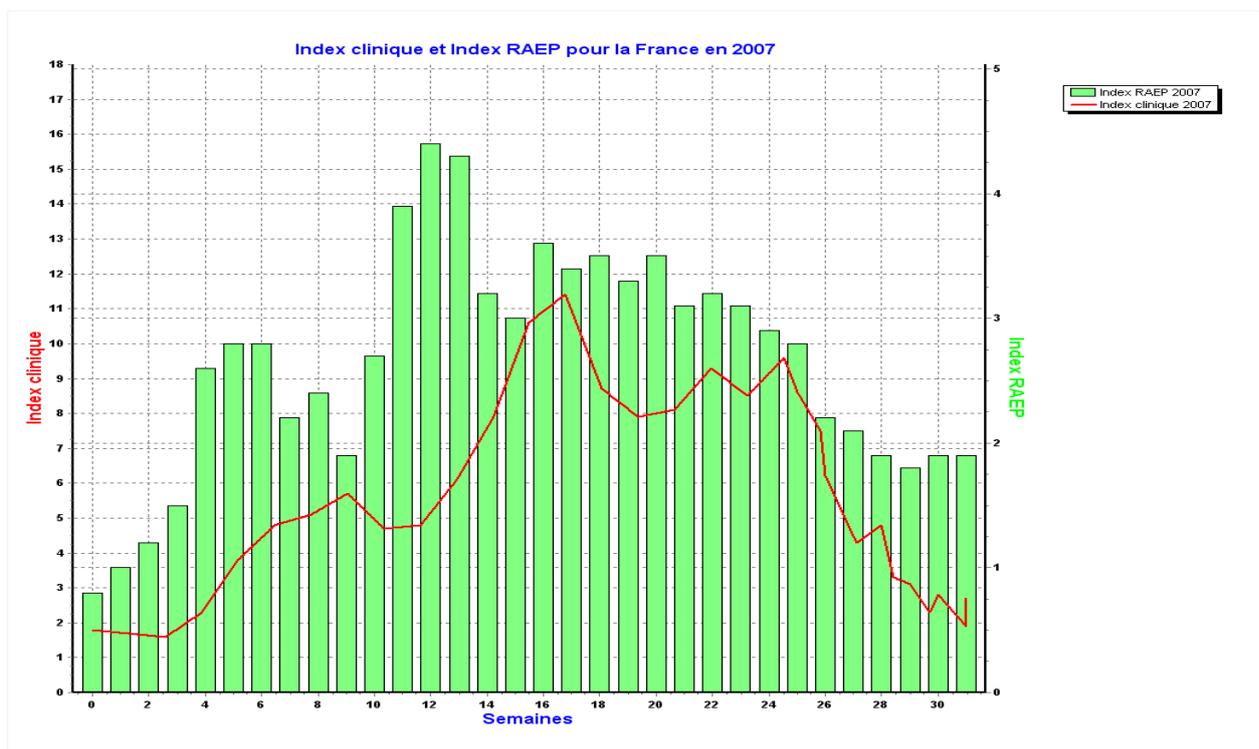


Figure 6. Clinical index and allergen risk due to pollen exposure in France, during week 0 to 31.

Comparison of clinical index with the risk makes the correlation between symptoms and an allergic risk for the population easier to understand. We notice that during week 10 and 11 of March in 2007, the allergic risk due to pollen exposure is high, it has a value over 4 but on the other hand, the clinical index is rather low. As it was explained previously, the risk does not only includes the clinical index but also includes others factors; like: a dry weather with clear

sky and day windy. In this case pollens will be easier dispersed than rainy weather that would make pollens cling to the ground.

## CONCLUSION

Allergic rhinitis remains a significant health problem in France due to the high prevalence of this persistent disease in patients, as well as to the impact of the disease on health-related quality of life.

Clinical index is a tool that permits to monitor trends of allergic symptoms, their importance and their severity.

It is necessary in order to paint trends of health impact related to pollen exposure.

Systematically, correlation between abundance of pollen and symptoms is useful to report the allergenic situation.

Functioning of RNSA would be impossible within the participation of a large number of actors like the analysts, clinicians, epidemiologists and also national organizations.

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