

To what extent are missed opportunities for pneumococcal vaccination represented in France among at-risk adults ?

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INTRODUCTION - OBJECTIVES

According to the World Health Organization, a missed opportunity for vaccination (MOV) refers to any contact of an individual eligible for vaccination with health services which does not result in the person receiving vaccine doses for which he or she is eligible. To date, there is no data about MOV for pneumococcus in France. We aimed at estimating the number of MOV in adults at risk of pneumococcal infection in France during the year 2020.

MATERIAL AND METHODS

- COVARISQ is a retrospective cohort study with a pre-index date period to identify populations at risk; the duration of this period depends on the pathology sought, and some algorithms can go back as far as 2009. It goes back to 01/01/2009 to estimate vaccination dispensations.
- The data collection relies on the access to the French National health data system. All at-risk adults affiliated in 2020 to this system were included, using algorithms searching for pathologies of interest coded in ICD10, long-term conditions (ALD), history of hospitalizations, treatments and specific biological tests.
- According to the French vaccination guidelines at study time, eligible individuals for pneumococcal primovaccination (PCV13 followed by PPSV23) were patients with a chronic disease putting them at risk of pneumococcal infections, and immunocompromised patients (IC patients).
- Firstly, we identified the pneumococcal vaccines dispensed to these patients between 2009 and 2020.
- Secondly, we calculated a MOV as either a consultation with a clinician or a hospitalization not followed by pneumococcal conjugate vaccine (PCV13) reimbursement.

PATIENTS' CHARACTERISTICS

Between 01/01/2020 and 31/12/2020, a total of 7,336,769 at-risk people were identified:

- 52% were male;
- Mean age was 65 +/- 16 years, and 52.9% were > 65 y/o.
- **84% were patients carrying a chronic underlying disease** predisposing to the occurrence of pneumococcal infection and **24% were immunocompromised patients (IC patients).**
- **6,340,958 eligible patients had not received any PCV13 reimbursement since 2009.**
- **13.6% of all at-risk patients had received at least 1 dose of PCV13 between 2009 and 2020:** 25.3% of IC patients, and 11.7% of chronic ones (details in [Table 1](#)).

| | No PCV13 reimbursement | ≥ 1 dose of PCV13 |
|---------------------------|------------------------|-------------------|
| Number of patients, total | 6 340 958 | 995 811 |
| IC | 1 488 456 | 453 663 |
| Chronic diseases | 5 453 764 | 721 408 |

Table 1. Vaccinal characteristics of pneumococcal at-risk population (2020)

RESULTS: Estimation of MOV for PCV13

- The total number of MOV was 66,011,430 in 2020 [mean (SD) = 10.4 (12.2) by patient].
- **93.8% of patients with no PCV13 dispensed had at least one MOV. The most prevalent types of MOV were those related to a general practitioner (GP) consultation (86% of patients without any dispensation of PCV13).** Details are displayed in [Table 2](#), and [Table 3](#).

| | No PCV13 reimbursement (n= 6 340 958) - MOV | ≥ 1 dose of PCV13 (n= 995 811) - Medical contacts |
|------------------|---|---|
| Total population | 93.8% | 66.0% |
| IC | 96.3% | 70.1% |
| Chronic diseases | 93.4% | 64.0% |

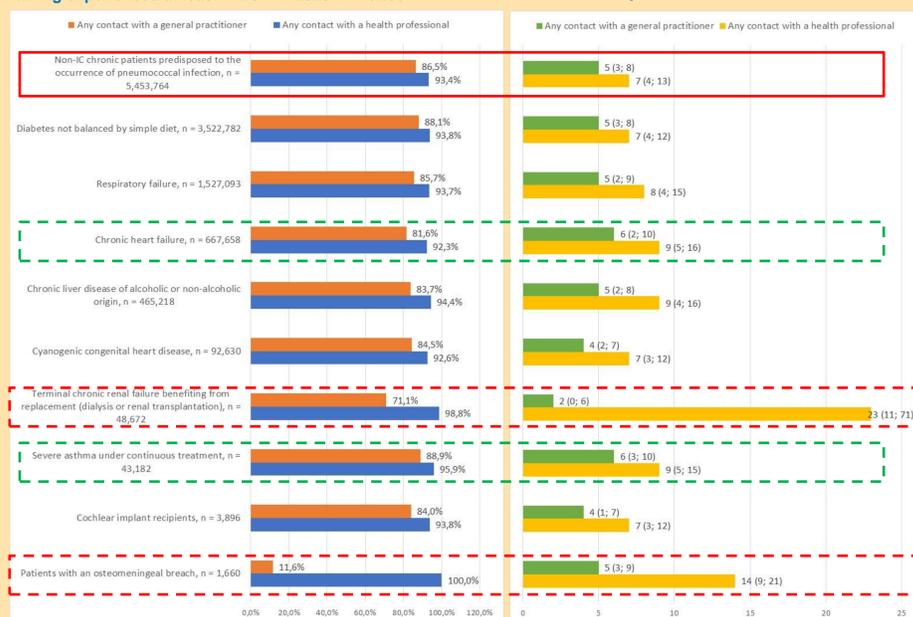
Table 2. Proportion (%) of pneumococcal at-risk patients with MOV or medical contacts (2020)

| | No PCV13 reimbursement (n= 6 340 958) - MOV | | ≥ 1 dose of PCV13 (n= 995 811) - Medical contacts | |
|----------------------------|---|-----------|---|-----------|
| | % | Mean (SD) | % | Mean (SD) |
| General practitioner visit | 86.0% | 5.9 (5.5) | 58.3% | 3.5 (5.0) |
| Liberal specialist visit | 48.5% | 1.7 (5.7) | 33.4% | 1.3 (5.8) |
| Ambulatory hospital visit | 41.2% | 1.3 (2.8) | 34.8% | 1.2 (2.6) |
| Hospitalization | 34.3% | 1.4 (6.5) | 25.7% | 1.7 (9.6) |
| Others | 4.2% | 0.1 (1.9) | 3.4% | 0.2 (2.7) |

Table 3. MOV and medical contacts for pneumococcal at-risk patients (2020)

- Regardless of healthcare professional's subgroups, the GP was the most prevalent one and thus the only presented in tables and figures.
- **The median (Q1;Q3) number of MOV for non-PCV13 patients was 8 (4;13), and more specifically 5 (2;8) related to a GP's visit.** Details regarding each category and sub-category of patients are presented in [Figure 1](#), [Figure 2](#), [Figure 3](#), and [Figure 4](#).
- **Patients with chronic conditions had a higher proportion of visits with the GPs compared with other type of healthcare contact, except for osteomeningeal breach and terminal kidney failure patients (Figure 2).** Patients with chronic heart failure and patients with severe asthma resorted the most in proportion to the GPs.
- **On the contrary, for IC patients, visits to GP did not account for the majority of MOV (Figure 4).**
- Even though the median number of consultations with a GP was the same for IC patients and patients with chronic conditions, it is in proportion less important among IC patients (5 GP MOV/11 MOV in total), due to a more important recourse to other types of care or medical contacts.

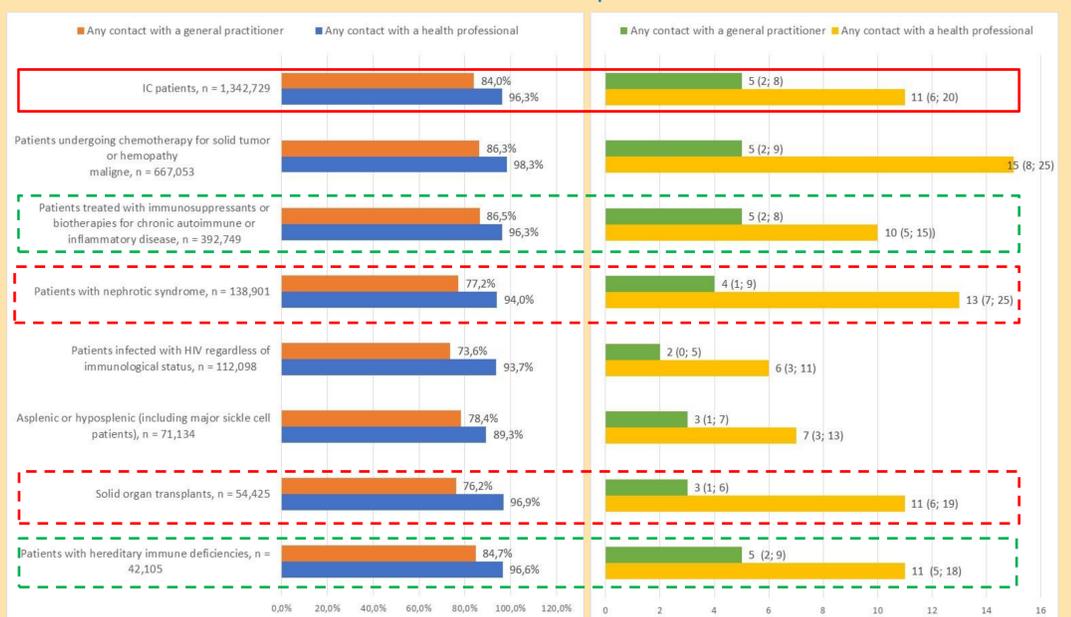
Figure 1. Proportion (%) of non-PCV13 chronic patients having experienced at least 1 MOV in 2020 in France



For all graphs, « health professionals » refer to medical doctors (GP or specialist), regardless of community- or hospital-based encounter.

Total of at-risk patients, by great sub-category (Chronic patients Figures 1. 2. / Immunocompromised patients Figures 3.4.)

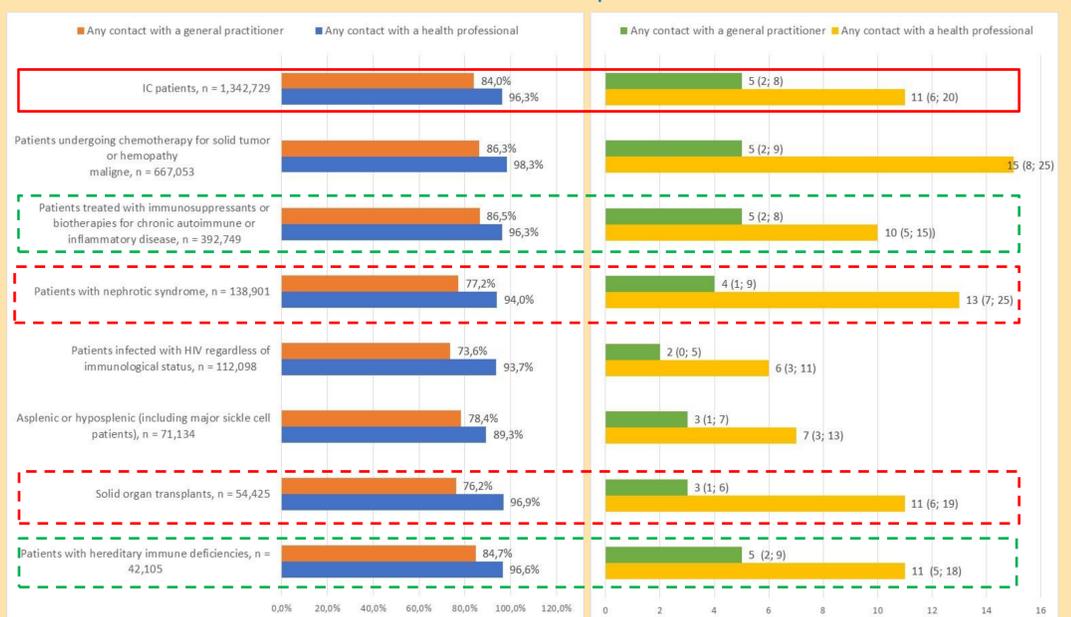
Figure 2. Median number of MOV (Q1; Q3) in non-PCV13 chronic patients in 2020 in France



For all graphs, « health professionals » refer to medical doctors (GP or specialist), regardless of community- or hospital-based encounter.

Total of at-risk patients, by great sub-category (Chronic patients Figures 1. 2. / Immunocompromised patients Figures 3.4.)

Figure 3. Proportion (%) of non-PCV13 IC patients having experienced at least 1 MOV in 2020 in France



For all graphs, « health professionals » refer to medical doctors (GP or specialist), regardless of community- or hospital-based encounter.

Total of at-risk patients, by great sub-category (Chronic patients Figures 1. 2. / Immunocompromised patients Figures 3.4.)

DISCUSSION - CONCLUSION

- **This work highlights the important number of MOV for pneumococcus in France.**
- Only 13.6% of all at-risk patients for pneumococcal infections (immunocompromised and chronic diseases) had received at least 1 dose of PCV13 between 2009 and 2020, and as few as 5.1% were considered primo-vaccinated. Meanwhile, 93.8% of non-PCV13 patients experienced at least 1 MOV, 86% related to GP's visits. It seems necessary to make GPs aware of this opportunity to carry out vaccination prevention work.
- **Besides GP, all medical actors (regardless of community- or hospital based) should be concerned by MOV. Depending on the disease for which patients are followed, MOV may be more associated with GP's consultations or with consultations/hospitalizations other than with a GP.**
- **Limits do this study are:** 1. Data collection (collection of reimbursement data not systematically correlated to the vaccination act + non-capture of vaccinations carried out during hospital stay), 2. Period considered: 2020, a year impacted by Covid-19 with possible repercussions on patient pathways, 3. In 2020, the GP was the only liberal actor (apart from private specialist doctors) who could prescribe a vaccination; as of 2024, pneumococcal vaccination can be carried out by a pharmacist, a nurse or a midwife, with a probable impact on the number of MOV and vaccination coverage.
- **Additional studies should be carried out to investigate the reasons leading to MOV: reasons related to both health professionals and patients.**