Poster RWD17

An algorithm to identify immunocompromised patients in French claims data for rapid preventive or therapeutic interventions

Nicolas Capit[1], Laureen Majed[1], Aleksandra Anchim[1], Cécile Artaud[1], Barbara Lebas[2], Marc Jouve[2], Fanny Vuotto[3], Cécile Janssen[4], Florent Malard[5], Philippe Gatault[6]

[1] AstraZeneca, Courbevoie, France; [2] Sancare, Paris, France; [3] CHU Lille, Lille France; [4] CH Annecy Genevois, Epagny Metz-Tessy, France; [5] AP-HP St Antoine, Paris, France; [6] CHRU Tours, Tours, France

Why did we perform this research?

- Immunocompromised (IC) patients represent a heterogeneous population with increased burden of respiratory infections[1]
- As large administrative databases are increasingly utilized in research, standardized methods for identifying IC status are essential for reproducible studies

Study objective: To assess the performance of an algorithm to identify four major IC patient categories in French hospital claims databases.

Key takeaway

Despite **claims** limitations, **algorithmic IC patient identification** achieved **high sensitivity and specificity**.

How did we perform this research?

- Study design: observational retrospective cross-sectional study based on secondary data
- Index date: date of the first hospitalization in 2023
- Baseline period: 5 years before the index date

6 sites across France

Participants were patients hospitalized at least once

Inclusions from 01/01/2023 to 12/31/2023

Patients' inclusion

1. **Identification of patients >18 y.o. hospitalized in oncology, haematology, nephrology or transplant wards**
2. **225 to 450 patients randomly selected in each group**

Process 1: Medical Review of EMR[1] + claims

Process 2: Algorithmic analysis of claims

1. **Human verification GOLD STANDARD**
2. **IC status identified through algorithms* applied to hospital claims**

1. EMR : Electronic Medical Record

* The existing algorithms were developed within another study[2] to identify IC patients with 1) solid tumors (ST) under active treatment , 2) haematological malignancies (HM), 3) solid organ transplant (SOT), 4) end-stage kidney disease (ESKD) in hospital claims data.

Solid tumor under active treatment

During the year before index date:

≥1 hospitalization with cancer coded as DP, DR or DAS diagnosis AND
≥1 hospitalization for chemotherapy (DP, DAS) or for radiotherapy session (DP, DAS)

Haematological maligancies

During the baseline period:

≥1 hospitalization (DP/DR/DAS) for haematological malignancy, OR
≥1 hospitalization with a DRG for stem-cell transplant, OR
A medical procedure associated to stem-cell transplant

End-stage kidney disease

During the baseline period:

≥1 hospitalization for end-stage renal disease (DP/DR/DAS) OR
≥1 hospitalization or medical procedure (DRG or CCAM) for dialysis

Solid organ transplant

During the baseline period:

Patients hospitalized with a diagnosis (DP/DR/DAS) of organ transplant OR
Patients with a medical procedure corresponding to organ transplant

Outcomes:

Following IC status identification by the two processes, the following outcomes were assessed:

- **Sensitivity**
- **Specificity**
- **Positive Predictive Value**
- **Negative predictive Value**

*DP: main diagnosis, DAS: associated diagnosis DR: related diagnosis, DRG: diagnosis-related group, CCAM: acts classifcation

What did we find?

Table 3. Patients and hospital description

		Number of patients, n=1500			
Center	**Type of hospital**	**ST**	**HM**	**SOT**	**ESKD**
Mâcon	Public Hospital	75	75	0	75
Paris (Foch)	Private Clinic	75	75	150	75
Paris region (Nord-Essonne)	Public Regional Hospital	75	75	0	75
Brive	Public Hospital	75	75	0	75
Troyes	Public Hospital	75	75	0	75
Reims	Public teaching hospital	75	0	150	0
Total		**450**	**375**	**300**	**375**

Table 4. Performances (%) of the algorithms versus EHR, overall and by type of IC patients

Cohort	Sensitivity %	Specificity %	Positive Predictive Value	Negative Predictive Value
Overall	**97.35**	**99.26**	**0.997**	**0.933**
Oncology Ward	97.16	98.98	0.997	0.91
Hematology Ward	97.06	99.03	0.996	0.93
Transplantation Ward	100	100	1	1.00
Nephrology Ward	93.57	99.51	0.994	0.95

The algorithm demonstrated sensitivity of 97.35% and specificity of 99.26%

False negative analysis

When the algorithm failed to identify IC patients, the reasons were the following:

- Textual mention of radiotherapy/chemotherapy/immunosuppressant targeted therapy for cancer within the previous year but not coded as performed outside of the hospital: **48.3%**
- Textual mention of non-coded pathology of interest: **31%**
- Wrong ICD-10 code: **10.3%**
- Patients treated by non-coded immunosuppressive treatment for a pathology of interest diagnosed more than 5 years ago: **3.4%**
- Treated solid cancer within the year but coded D37 not C* **3.4%**

Limitations

- Given the hospital-related nature of the codes used in the algorithm, some patients may be missed, as these data do not contain data on treatments received in community pharmacies and intra-DRG treatments: the algorithm is not able to rely on dispensing of immunosuppressants and biotherapies to identify IC patients, nor to identify patients with only consultations.
- Given that there is no universally agreed upon definition of for immunocompromised patients, the patients targeted by this algorithm correspond to those most at risk of severe viral respiratory infections.

How do these real-world data inform clinical practice?

This algorithm is validated to identify IC patients for four common causes: solid tumors under active treatment, hematological malignancies, end-stage kidney disease, and solid organ transplant

It offers a practical tool for practitioners to support them when they decide to implement timely preventive or therapeutic interventions in high-risk populations.

Acknowledgments

- The authors acknowledge Epimentis for writing the protocol and drafting the poster presentation.
- The authors are grateful to the selected hospitals for data access that was granted.

Disclosures

•F.Vuotto, C. Janssen, F. Malard, P. Gatault received consulting fees from AstraZeneca
•N.Capit, L. Majed, A. Anchim, C. Artaud are employees of AstraZeneca.
• B. Lebas, M. Jouve are employees of Sancare.

References

1. Iark A, Jit M, Warren-Gash C, Guthrie B, et al. Global, regional, and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2020: a modelling study. The Lancet Global Health. 2020;8(8):e1003-e17.
2. Fardeau épidémiologique des virus respiratoires chez les patients immunodéprimés en France. Poster presented at the EMOIS conference, 20-21 March, 2025, Nancy, France

Presented at ISPOR Europe 2025 9-12 November, 2025 | Glasgow, Scotland, UK