



Risk factors for RSV severity in immunocompetent and immunocompromised adults presenting in an emergency department

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INTRODUCTION

- In immunocompetent adults, RSV infection is generally considered as a mild disease that spontaneously resolve without complications.
- For the last ten years, data shows that RSV infections can also be associated with severe clinical outcomes in adults leading to hospitalisation for respiratory disease in the elderly or in patients with chronic obstructive pulmonary disease
- Combined clinical and immuno-virologic data remain inconsistent and insufficient in order to identify populations at risk for severe disease and edit a consensual management of adult patients with RSV.

OBJECTIVE

- To identify risk factors for RSV severity in infected adults presenting in an emergency department including :
 - Baseline clinical features and clinical outcome
 - Dynamics of virological molecular characteristics and host response

METHODS

Preliminary study : adults admitted in the emergency dpt of Henri Mondor hospital (France) between March 2016 and February 2018 for acute respiratory disease



acute
respiratory
symptoms



RSV/Influenza test

Positive : Flu
and/or **RSV**

negative



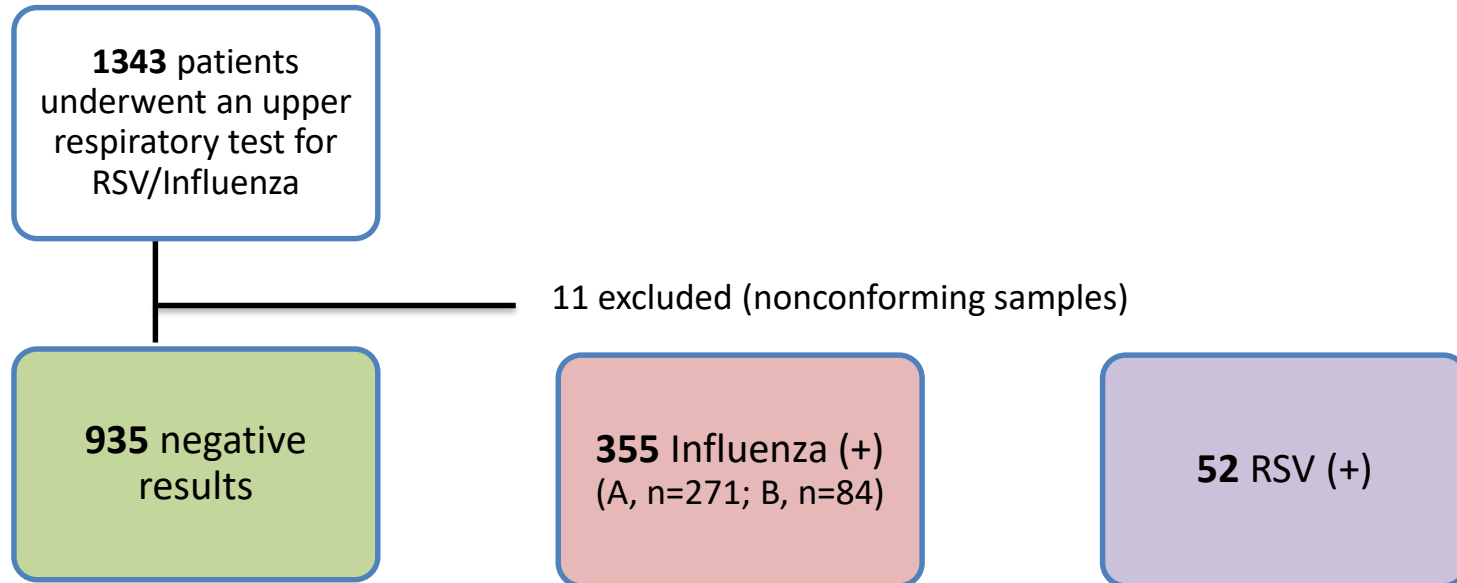
Baseline
characteristics

Clinical outcome

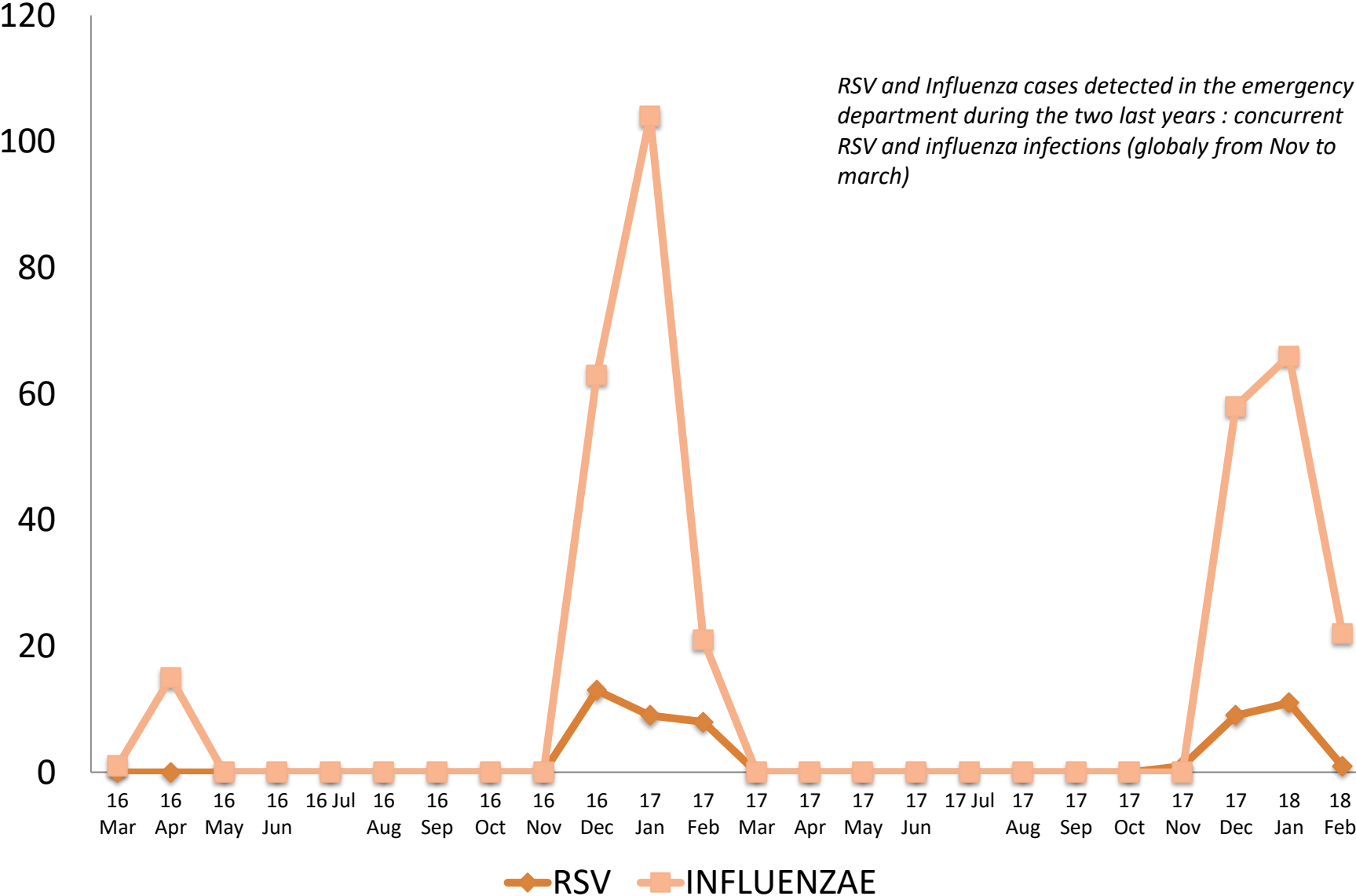


Shot gun Metagenomics
Whole-length genome viral
sequencing, viral load and host
transcriptome

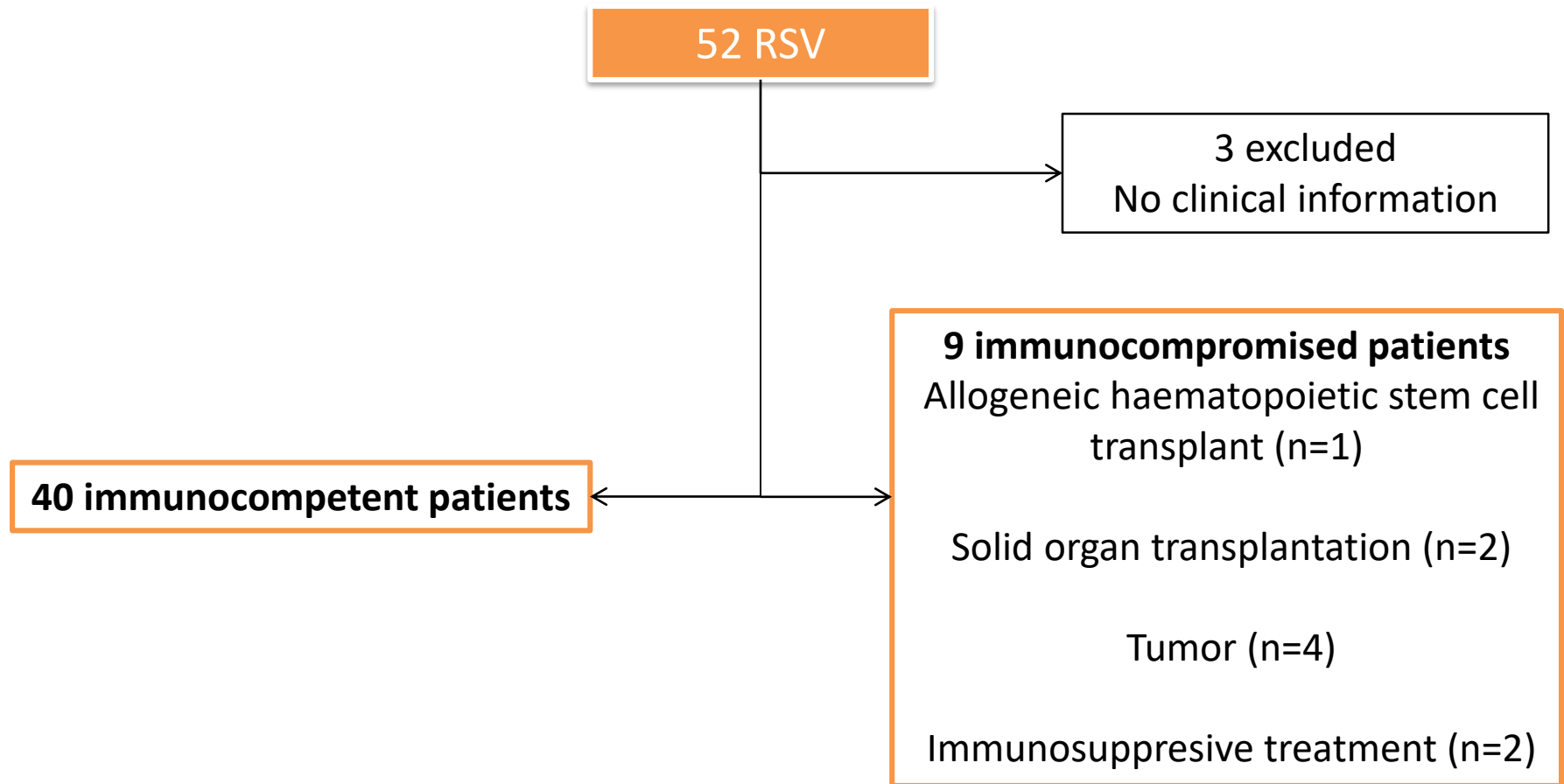
RESULTS: RSV/Influenzae Tests



RESULTS: RSV seasonality



RESULTS: Clinical characteristics



RESULTS: Baseline characteristics

The 40 immunocompetent RSV infected patients were matched (age/sex/comorbidities) to patients with a negative FLU/RSV test.

Variable	RSV group (N=40)	NEG group (N=40)
Age (mean)	78	78
Sex		
Male	35%	35%
Symptom onset to admission (mean days)	4.5	4.5
Fever (>37.5)	40%	40%
Cough	73%	78%
Sputum production	25%	33%
Runny nose	10%	20%
Inflammatory reaction	45%*	28%

*p<0,05

RESULTS: Population characteristics: clinical outcome

The 40 immunocompetent RSV infected patients were matched (age/sex/comorbidities) to patients with a negative FLU/RSV test.

Variable	RSV group (N=40)	NEG group (N=40)	P
Hospitalization	28 (72.5%)	25 (62.5%)	0.454
Duration of hospitalization	6.82 (10.26)	5.97 (9.12)	0.903
Any Complication*	30 (75%)	20 (50%)	0.031
Respiratory decompensation/hypoxemia	18 (45%)	9 (22.5%)	0.049
Cardiac decompensation	10 (25%)	8 (20%)	0.754
Bacterial superinfection	9 (22.5%)		
Severity **	5 (12.5%)	2 (5%)	0.453
Supplementary oxygen therapy	52.5%	25%	0.035
Antibiotic	27.5%	15%	0.302

*chronic disease decompensation such as COPD/asthma exacerbation, acute coronary or cardiovascular events, acute renal failure, septic shock, bacterial superinfection

** ICU admission, death

RESULTS: subgroups of RSV-infected patients

Immunocompetent RSV infected patients (n=40) could be classified into 3 categories :

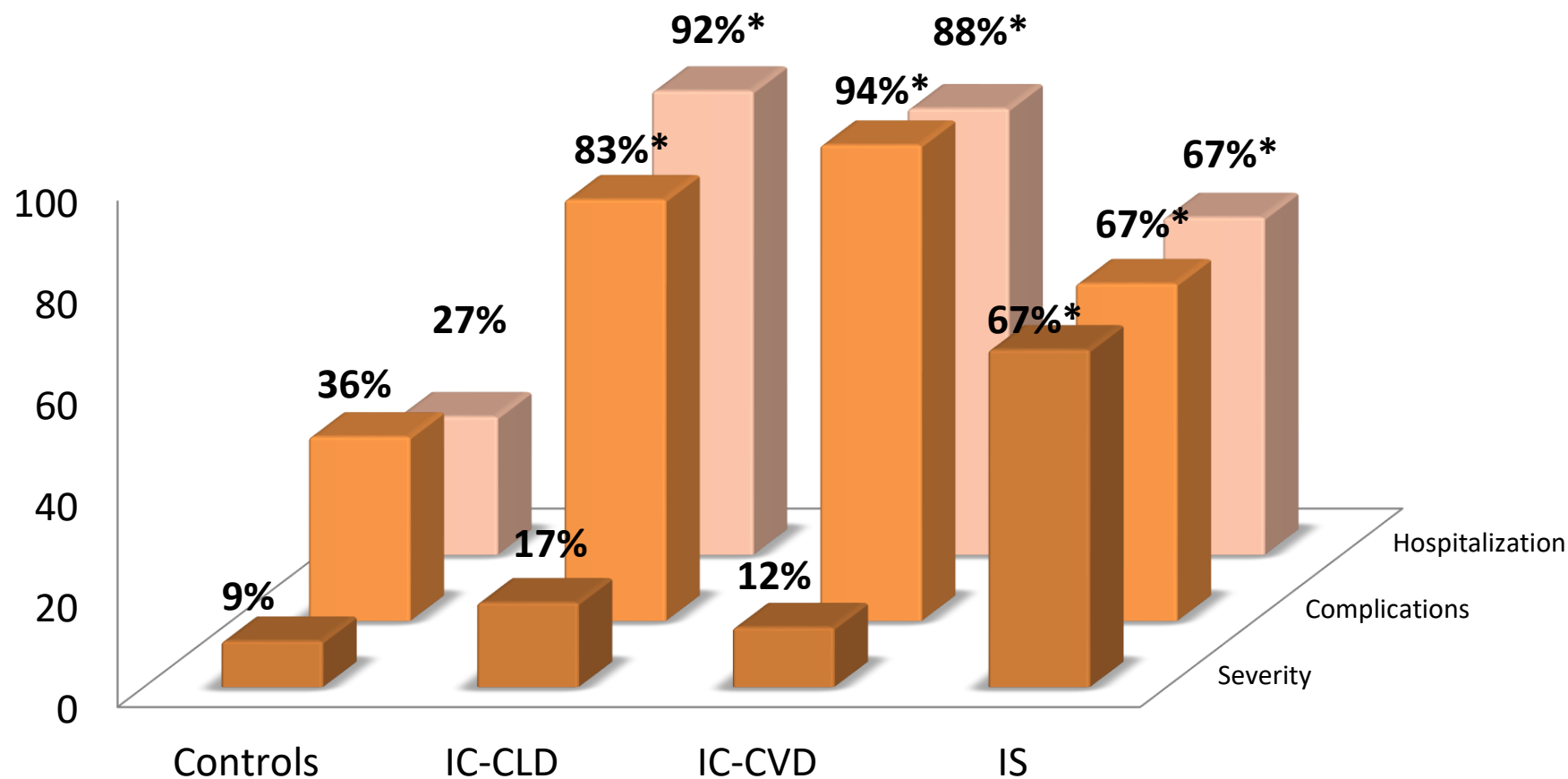
- absence of relevant comorbidity (n=11)
- Chronic lung disease (CLD)* (n=12)
- Cardiovascular disease (CVD)** (n=17)

	No relevant morbidity (Controls) (N=11)	IC-CLD* (N=12)	IC-CVD** (N=17)	Immunocompromised (n=9)
Age (mean)	69	77	83	70
Sex Male	36%	33%	35%	44,4%

*CLD : chronic obstructive pulmonary disease (COPD), asthma, bronchiectasis, fibrosis, lung ablation, obstructive sleep apnea syndrome, and obesity hypoventilation syndrome.

** CVD included dilated/hypertensive/ischemic cardiomyopathy, treated cardiac arrhythmia, valvular heart disease, acute stroke (AS), and chronic obliterative arteriopathy.

RESULTS: Clinical outcomes



* : significant difference between IC-CLD, IC-CVD, IS and controls ($p < 0.05$)

complications : respiratory decompensation, cardiac decompensation, bacterial superinfection

severity: ICU admission, death

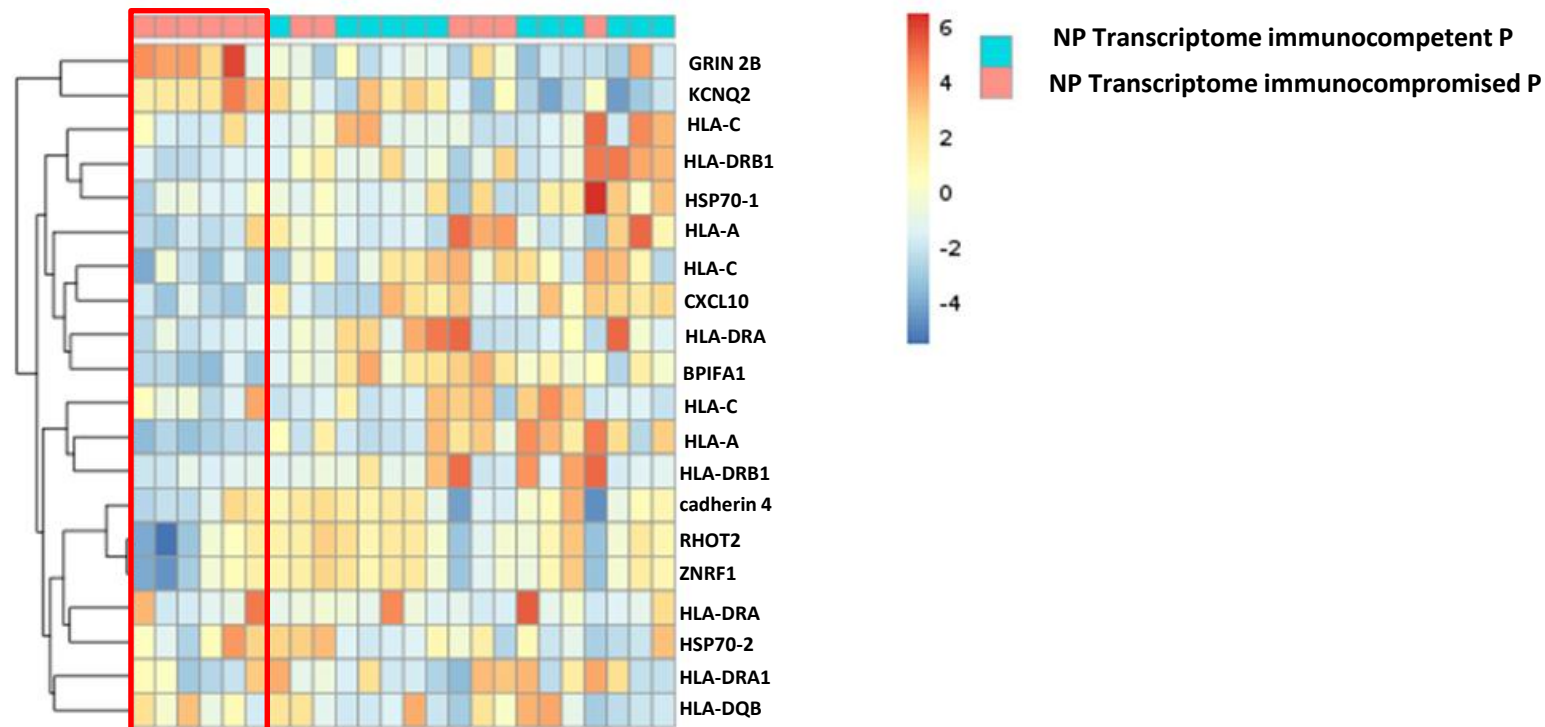
ONGOING ANALYSES

-Prospective longitudinal study on severe RSV infected patients

-We are performing RNA metagenomics on nasopharyngeal swabs to :

(1) Characterize the RSV full-length genome diversity between immunocompromised infected adults and immunocompetent infected patients

(2) identify differentially host expressed gene transcripts between the two groups



DISCUSSION

- As expected, immunocompromised patients infected with RSV showed higher rate of complications and presented a more severe disease
- Lung or cardio-vascular comorbidities are key features to consider in the context of RSV infection in immunocompetent adults to identify populations at risk for severe RSV infection.
- The clinical course of RSV disease results from a complex interaction between the host immunity capacities and possibly RSV strain characteristics.
- Using metagenomics will allow to have a global view on viral molecular factors on one hand associated with the host transcriptome on the other hand to tend to decipher the respective role of each component in the severity of the disease

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