

Epidemiology of RSV-related Hospitalizations in Infants and Impact of Maternal Vaccination in France

Yasmine Fahfouhi¹, Stephane Fievez¹, Emmanuelle Blanc¹, Lucile Marié², Zoé Densari², Louis Chillotti³, Charlotte Cancelon³, Céline Kernaeguen³, Louise Montez¹, Charles Nuttens¹
1. Pfizer, Paris, France ; 2. Stève consultants HEOR, Paris, France ; 3. Stève consultants RWE, Oullins, France

Introduction

- Respiratory Syncytial Virus (RSV) is the leading cause of acute lower respiratory tract infections among infants and young children^{1,2}. The management of severe forms is symptomatic. Prophylaxis includes monoclonal antibodies and a maternal vaccine recently licensed in Europe and the U.S^{3,4,5}.
- The objectives of this study were to estimate the burden of RSV-related hospitalizations in France for infants aged less than 1 year of age and to assess the impact of the implementation of maternal vaccination.

Methods

- Real-world retrospective study based on the French hospitalization database (PMSI). Every hospitalizations with a diagnosis of RSV among patients aged <1 year between January 1st, 2015, and December 31st, 2021. RSV ICD-10 codes included J121, J205, J210, J219, J45 and R062.
- The main outcomes were: (i) number of RSV hospitalizations and of patients, per month, per year and per epidemic season [October-March], (ii) characteristics of patients at admission, (iii) characterization of the hospitalization, (iv) associated costs, and (v) in-hospital deaths.

Results

RSV-related hospitalizations and patients' characteristics

- A total of 300,951 hospitalizations (46,751 per year on average) were identified. RSV-related hospitalization rate was 5.31 cases per 1,000 person-month when excluding 2020 due to the COVID-19 pandemic.
- Over the study period, excluding 2020, 82.2% of the hospitalizations occurred during RSV seasons (October - March) and 18.2% occurred outside.
- Among the study population, the mean (SD) age was 4.2 (3.1) months. Overall, 11.1% (n=33,383) of RSV stays occurred within the first month of life, 45.9% occurred within the first 3 months, and 73.2% of the stays occurred within the first 6 months of life.

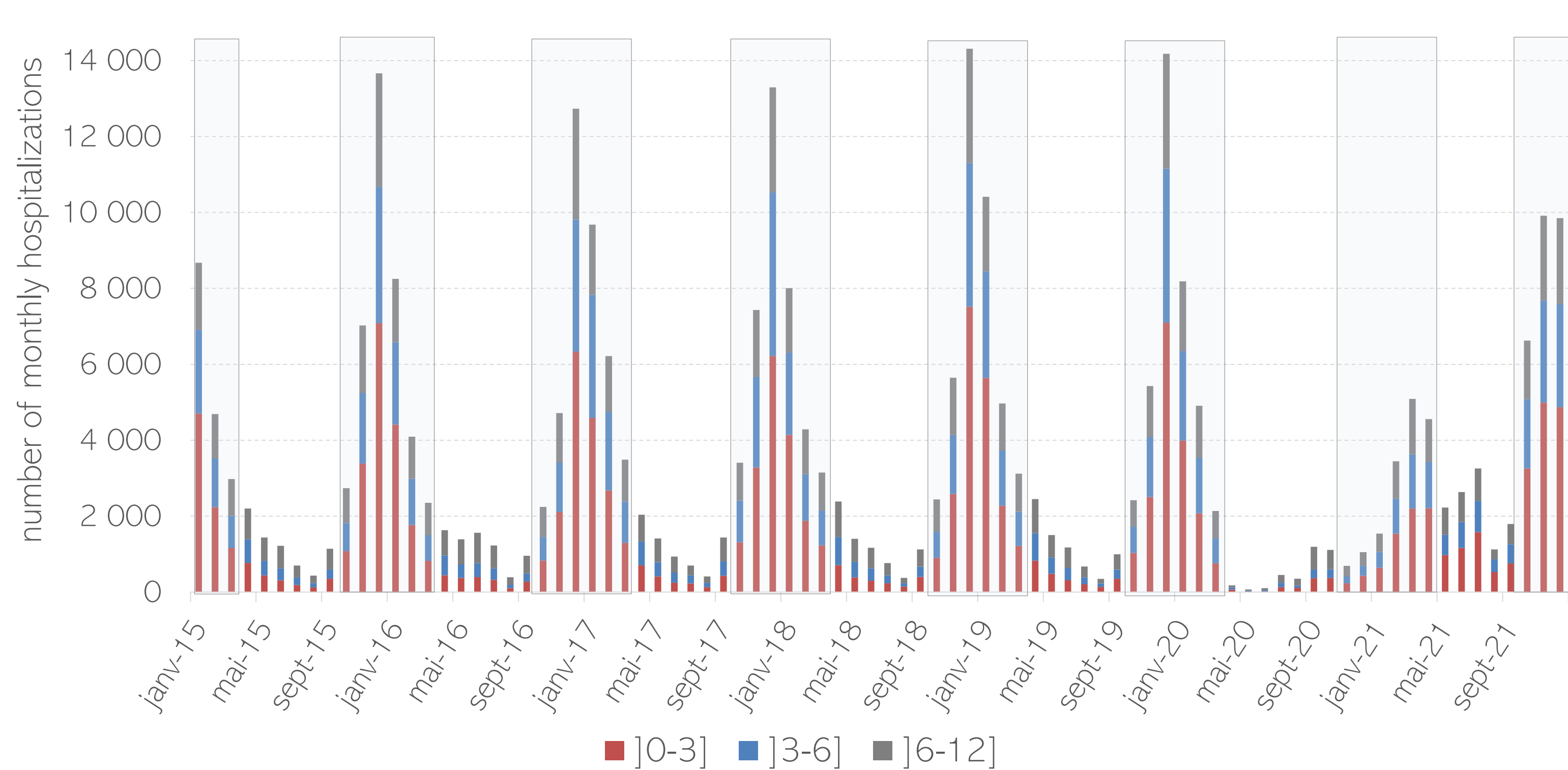


Figure 1. Monthly number of RSV-related stays - epidemic seasons highlighted (OCT-MAR)

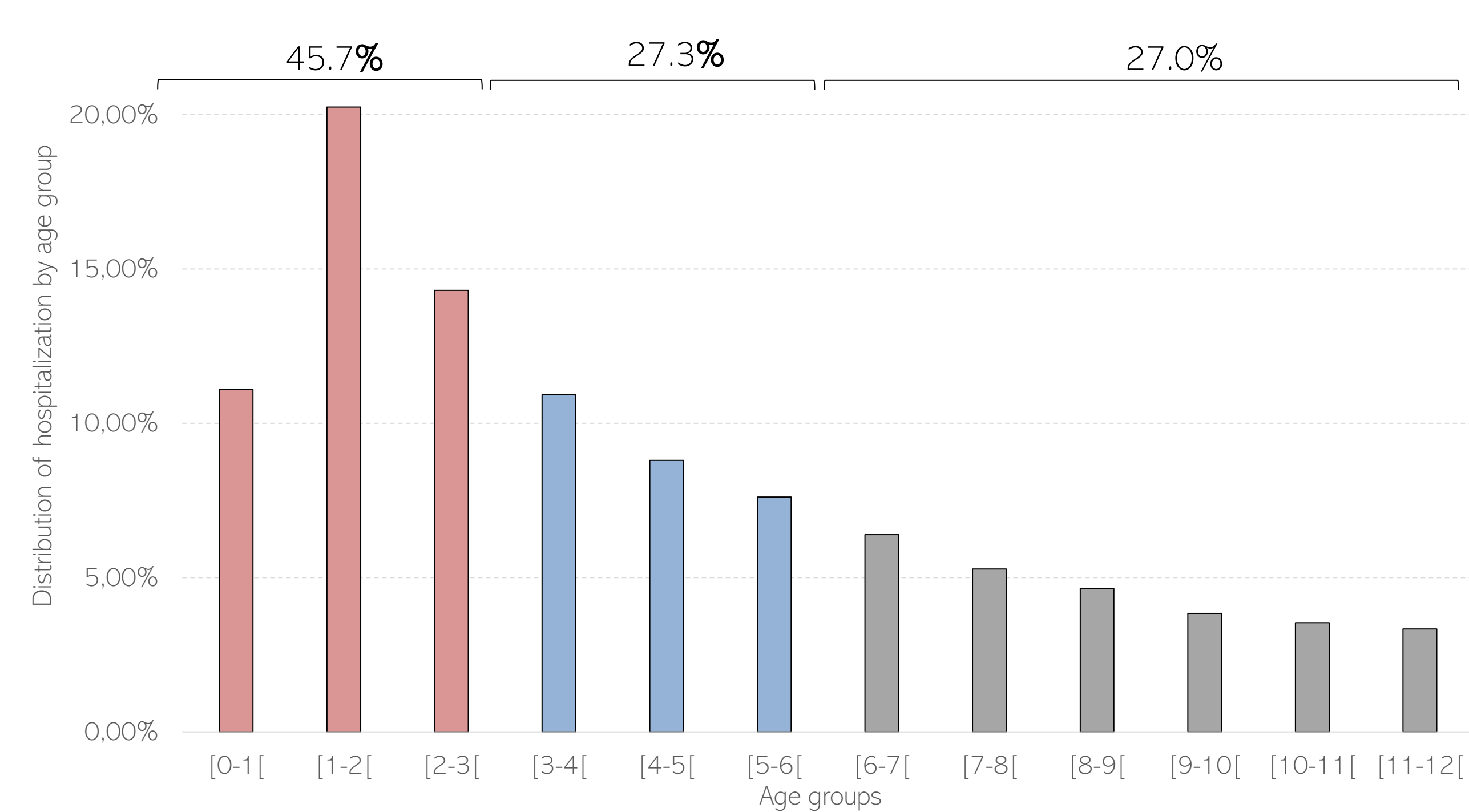


Figure 2. Percentage of RSV stays by month of age

Healthcare resources used during hospitalizations and economic burden

- Mean (SD) hospital length of stay (LOS) was 3.5 (3.7) days. Mean LOS in intensive care unit (ICU) and resuscitation were 3.6 (4.1) days and 5.0 (5.6) days, respectively. Overall, more than half (53.4%) of the cumulative length of stay involved patients ≤3 months, reaching 79.0% for patients ≤6 months.
- The proportion of stays with an admission from emergency room (ER) was 83.4%. The proportion of stays with intensive care unit (ICU) was 20.1%, of which 56.6% involved patients aged ≤3 months. The proportion of stays with resuscitation ward was 4.6%, of which 79.8% involved patients aged ≤3 months.
- A total of 56 in-hospital deaths were identified, representing an overall case-fatality rate (CFR) of 0.02%. The CFR was higher among patients aged <6 months, with 0.021%, against 0.012% among older patients.
- The average cost per stay was €2,565, decreasing with age from €3,100 among patients aged <1 month, to €2,207 among those aged >6 months.
- The burden of RSV hospitalizations was 120.34 million € in 2015 and reached 134.16 million € in 2021. Of these, 77.0% involved infants aged ≤6 months.

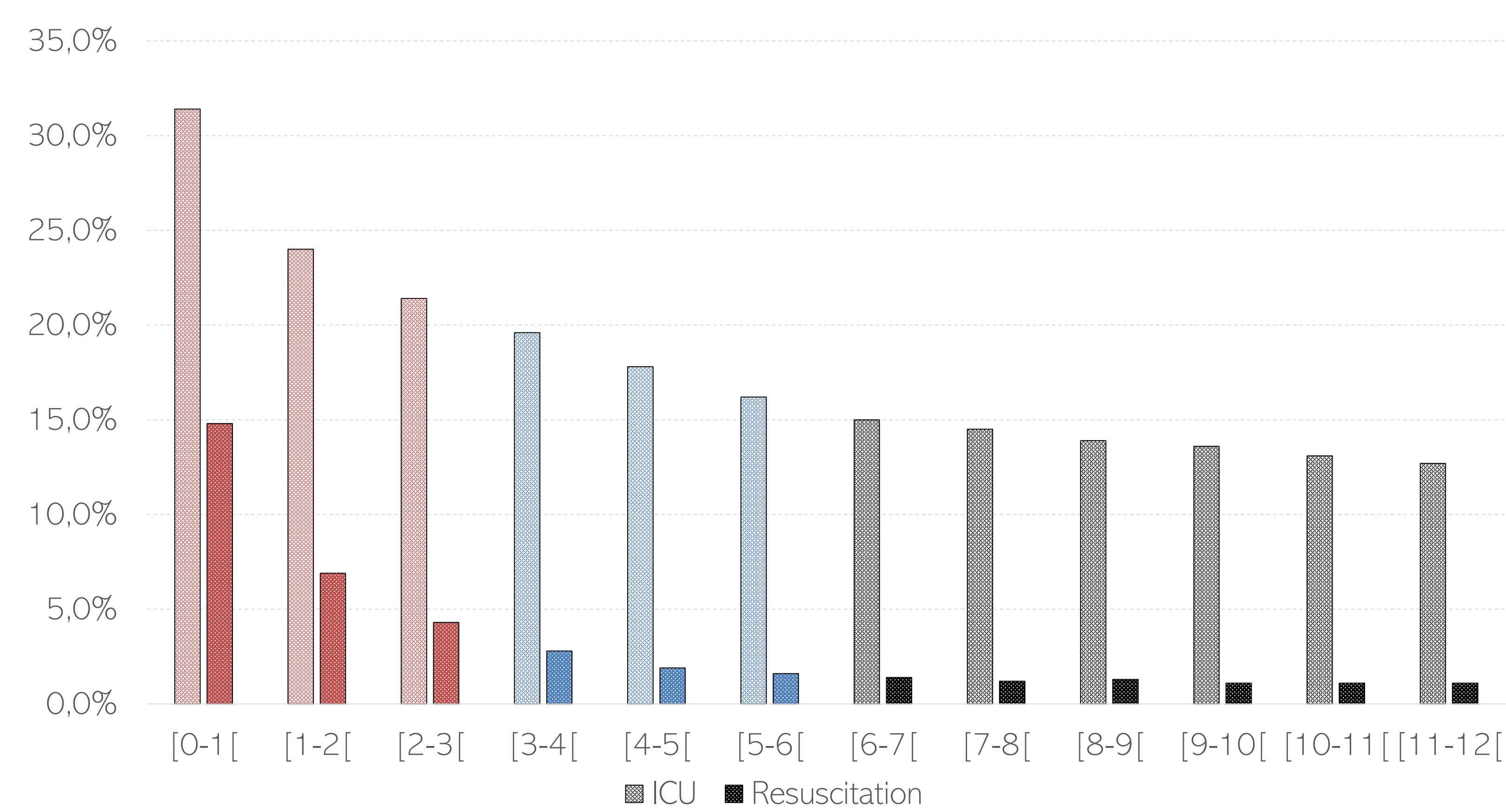


Figure 3. Proportion of stays with ICU or resuscitation ward by age

Impact of the maternal vaccination

- The Markov model was developed comparing a cohort with vaccinated pregnant women and a cohort without vaccination.
- The efficacy of maternal vaccination on severe medically-attended lower respiratory tract infections, measured in the MATISSE trial was applied to model the reduction of RSV-related hospitalisations.
- By applying the efficacy of maternal vaccination to the RSV-related hospitalizations, a reduction of 25 470 (-59%) of hospitalizations was estimated, resulting in a cost saving of more than 75 million of euros in hospital costs.

Table 1. Impact of vaccination of RSV-hospitalizations burden

	No vaccination	Vaccination	Difference
Number of pregnant women	739,375		-
Number of newborns	751,261		-
RSV-related hospitalization	43,356	17,886	- 25,470
Cost of RSV-related hospitalization (€)	49,346,949	124,702,911	-75,355,962

Conclusion

RSV infection represents a considerable burden in hospital setting in France, with more than 46,000 hospitalizations each year among patients aged less than 1 year. In this population, RSV clinical and economic burden is maximal during the first 6 months of life, which represents almost 80% of total RSV hospital costs. Maternal vaccination have the potential to significantly prevent this burden.

References

- Li et al. Lancet Lond Engl. 2022
- Demont et al. BMC Infect Dis. 2021
- Meijas et al. Ann All Asthma Immunol. 2022
- MATISSE clinical trial NCT04032093
- Cunningham et al. AmJRespCritCareMed. 2023