Epidemiology and burden of hospitalisations for viral lower respiratory tract disease: a French nationwide retrospective cohort study 2022-2024 (VINCA study)

Laurent Guilleminault[1], Paul Loubet[2], Caroline Fabry-Vendrand[3], Ophélie Rouxel[3], Delphine Leynaud[3], Aurélien Carlicchi[4], Camille Nevoret[4], Stéphane Bouée[4], Nicolas de Prost[5]

1.Pôle des voies respiratoires, Hôpital Larrey, CHU de Toulouse, Toulouse, France
2.Service des maladies infectieuses, CHU Nîmes, Nîmes, France
3.AstraZeneca, Courbevoie, France
4.CEMKA, Bourg la Reine, France
5.Service de Médecine Intensive Réanimation, GHU Henri-Mondor, Créteil, France

Introduction

- Several million cases of viral lower respiratory tract disease (vLRTD) occur each year in France, with many leading to hospitalisations, primarily among the most vulnerable individuals. However, available epidemiological data remain limited, making it difficult to accurately estimate the burden associated with hospitalisation due to vLRTD.
- **This study aims to estimate the burden of hospitalisations for vLRTD in France.**

Material and methods

Hospitalisation Data (PMSI)

Patients hospitalised in MSO (at least one ICD10 code for vLRTD)

2 epidemic seasons:
- 01/09/2022 - 31/08/2023
- 01/09/2023 - 31/08/2024

An episode where a patient was hospitalised with viral LRTD was defined as:

- Either a principal diagnosis (PD) of vLRTD

OR

- Secondary associated diagnosis (DAS) of vLRTD associated with one of the following conditions: Oxygen therapy, ICU admission, Association with DP or DAS of acute respiratory failure / asthma exacerbation / COPD exacerbation

PMSI data were analyzed to :

- Describe hospitalisations for vLRTD
- Characterize the profile of patients hospitalised for a vLRTD

N=911,818 hospitalisations for identified LRTD

N=345,050 caused by a virus (38% ; study population)

N=208,687 identified COVID-19 (62%)

27% with ≥ 1 respiratory comorbidity

68% with ≥ 1 cardiovascular comorbidity

7.2% of mortality during index hospitalisation

Conclusion

The burden of hospitalisations related to vLRTD is substantial, with notably high mortality and 90-day readmission rates. This burden may be underestimated, given the likely contribution of viral etiologies among patients with no identified etiological diagnosis (40.7%).

ABRÉVIATIONS:
AD (Associated diagnosis); RD (Related diagnosis); COPD (Chronic Obstructive Pulmonary disease); ICD10 (international classification of diseases, 10th revision), ECMO (Extracorporeal Membrane Oxygenation); HFOT (High-flow oxygen therapy); ILD (Interstitial Lung Disease); ICU (Intensive care unit (ICU); HMPV (Human Metapneumovirus); IMV (Invasive mechanical ventilation) ; LRTDs (Lower Respiratory Tract Diseases); MSO (medecine, surgery, obstetric); PMSI (programme de médicalisation des systèmes d'information), PP (Prone positioning); TIA (Transient Ischemic Attack); RSV respiratory syncytial virus; vLRTD (viral lower respiratory tract diseases)

COI: Guilleminault L., Loubet P., and de Prost N. received honoraria for their participation in the study scientific committee; Fabry-Vendrand C., Rouxel O., and Leynaud D. are employees of AstraZeneca, the study sponsor; Carlicchi A., Nevoret C., and Bouée S. are employees of Cemka, which was responsible for conducting the study.

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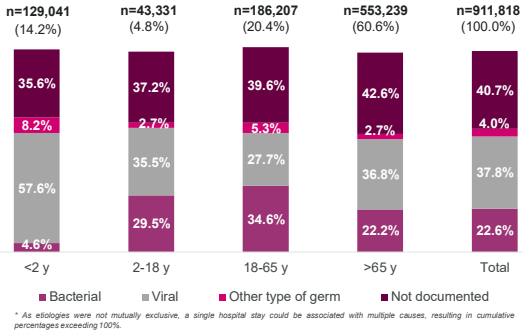
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Results

Number of hospitalisations

Over the two epidemic years studied, 911,818 hospitalisations for lower respiratory tract disease (LRTD) were identified, of which 37.8% (n=345,050) were of viral origin (vLRTD study population). The remaining cases were of undocumented origin in 40.7%, bacterial origin in 22.6%, and attributable to another pathogen in 4.0%.

Figure 1: Etiology of LRTDs by age ranges (n=911,818)*



* As etiologies were not mutually exclusive, a single hospital stay could be associated with multiple causes, resulting in cumulative percentages exceeding 100%.

Figure 2: Characteristics of patients hospitalised for vLRTD (n=345,050)

Mean age: 56.0 years (SD: 35.1 years; median: 71.0 years)

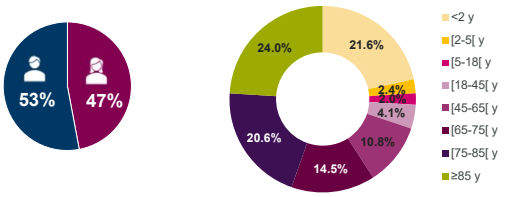
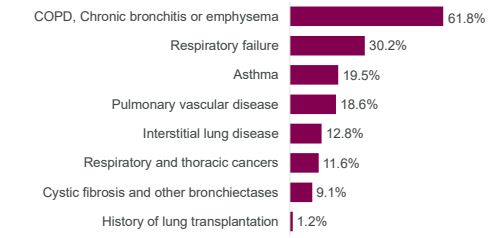


Table 1: Distribution of comorbidities in patients hospitalised with vLRTD ≥18 years (n=255,290; 74% of patients)

Patients hospitalised with vLRTD ≥18 years with at least one comorbidity of interest	**199,859 (78.3%)**
At least one cardiovascular comorbidity	**172,899 (67.7%)**
Hypertension	131,095 (51.4%)
Atrial fibrillation or flutter	57,587 (22.6%)
Chronic ischemic heart disease	51,393 (20.1%)
Stroke, TIA	22,748 (8.9%)
At least one immunosuppressive factor	**66,559 (26.1%)**
Malignant tumor	48,656 (19.1%)
Patients treated with immunosuppressive drug	17,788 (7.0%)
Autoimmune or inflammatory disease	7,279 (2.9%)
At least one respiratory comorbidity (see details in Figure 3)	**69,046 (27.0%)**

27% of adult patients had at least one respiratory comorbidity (details in figure 3)

Figure 3: Distribution of respiratory comorbidities among adult patients hospitalised with vLRTD with ≥1 respiratory comorbidity (n=69,046)

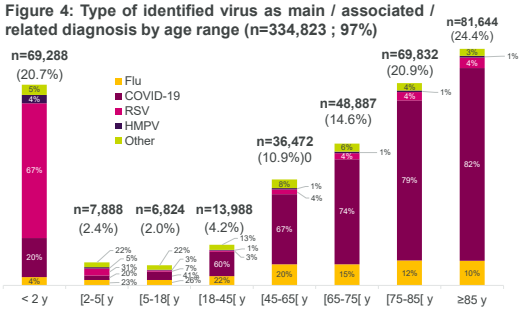


COVID-19 was the most common viral etiology

For nearly all hospitalisations (97%), only one virus was identified*. COVID-19 was the most frequently identified virus across all age groups (n=208,687; 62%), except among children under 2 years of age.

* 3% of patients had multiple viruses identified (co-infections)

Figure 4: Type of identified virus as main / associated / related diagnosis by age range (n=334,823 ; 97%)



Description of hospitalisations for vLRTDs (n=345,050)

79.2% Emergency unit admission

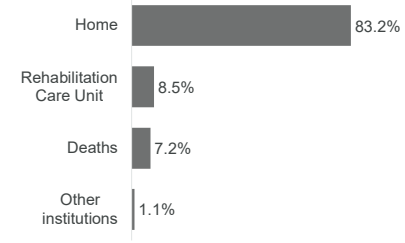
9.8 days Mean length of stay

7.7 days Mean length of stay in an intensive care unit (ICU), intermediate care unit, or continuous monitoring unit

The mean length of stay was approximately 5.5 days among patients under 45 years of age, compared with 11.6 days among those aged 45 years and older.

A new hospitalisation within 90 days following discharge from the index stay occurred for 101,113 (31.8%) stays, including 7,343 (2.3%) for a viral LRTD and 2,085 (0.7%) for a bacterial LRTD.

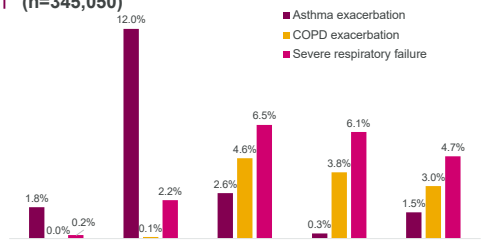
Figure 5: Discharge destinations following the index hospitalisation for vLRTD (n=345,050)



Exacerbations reported among patients hospitalised for vLRTD (n=345,050)

An asthma exacerbation was reported for 5,072 hospitalisations (1.5%), and COPD exacerbation for 10,179 (3.0%).

Figure 6: Respiratory complications by age range (n=345,050)



Index of severity for patients hospitalised for vLRTD

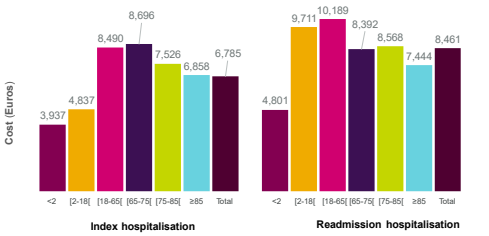
13.3% Respiratory support **(n=45,734)**

31.0% Admission to the ICU or intensive care unit **(n=106,821)**

Table 2: Distribution of respiratory support by age range

(n=45,734)	<2 y	[2-18[y	[18-65[y	≥65 y	Total
High-flow oxygen therapy (HFOT)	10,591 (90.9%)	1,358 (72.7%)	5,297 (48.8%)	13,565 (63.5%)	30,811 (67.4%)
Invasive mechanical ventilation (IMV) or prone positioning (PP)	1,059 (9.1%)	501 (26.8%)	5,478 (50.4%)	7,756 (36.3%)	14,794 (32.3%)
ECMO	7 (0.1%)	9 (0.5%)	85 (0.8%)	28 (0.1%)	129 (0.3%)
Total	**11,657**	**1,868**	**10,860**	**21,349**	**45,734**

Figure 7: Costs at index hospitalisation and within 90-day all-cause readmissions after discharge by age range



Mortality of patients hospitalised for vLRTD

7.2% Death during index hospitalisation **(n=24,803)**

9.8% Death during index hospitalisation or in the 90 days following **(n=33,375)**

10.7% Death during index hospitalisation with ICU stay **(n=11,460)**