Health Care Resource Use Associated With Respiratory Syncytial Virus Infection in Infants and Young Children in Germany: Evidence From the PAPI Study

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INTRODUCTION

Respiratory syncytial virus (RSV) is a leading cause of lower respiratory tract infection (LRTI) worldwide, particularly in infants and young children.

Understanding the epidemiological and economic burden of RSV infection is essential for developing and evaluating public health interventions.

OBJECTIVE

This study aims to quantify the health care resource use (HCRU) and parental work absenteeism associated with RSV infections in infants and young children in Germany.

METHODS

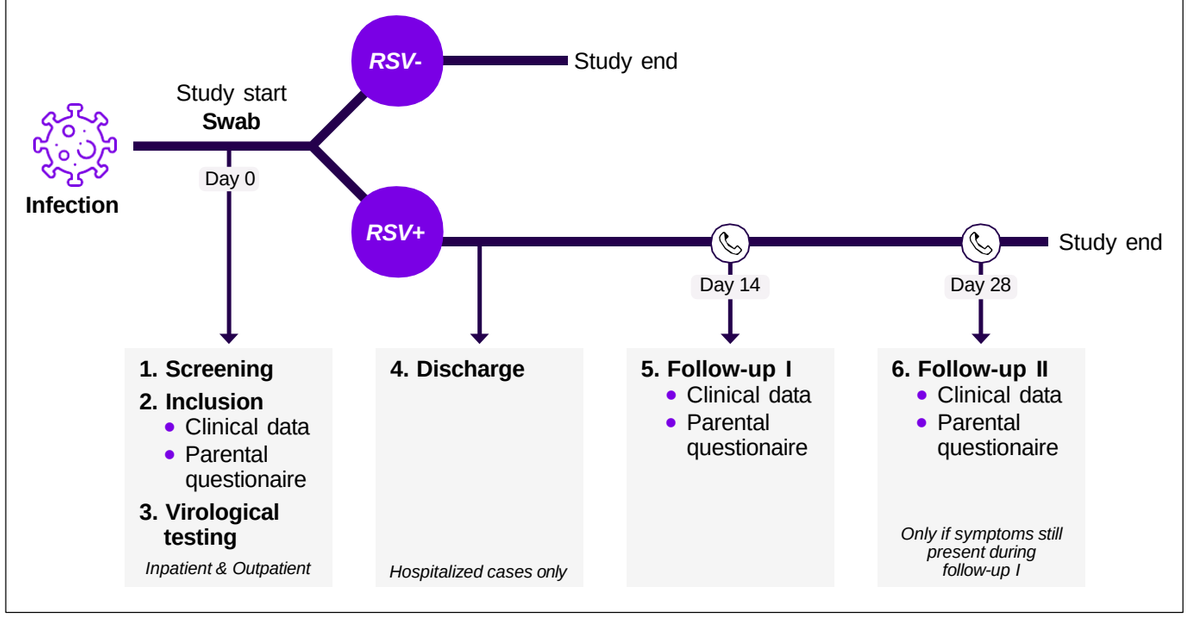
- The PAPI study is a prospective, multicentric observational study conducted in Germany between 2021 and 2023.
- Twelve pediatric clinics and five pediatric practices across fourteen different locations in Germany participated in the PAPI study.
- Infants (age 0-11 months) and toddlers (12-23 months) with LRTI were PCR-tested for respiratory viruses.
- Parents filled questionnaires at hospital admission (inpatient) or at the ambulatory (outpatient) visit (day 0) and were phone-interviewed after 14 days. If symptoms were present after 14 days, an additional interview was conducted after 28 days (see **Figure 1** for details on the PAPI study).
- Information from the parental questionnaire and phone interviews included additional HCRU (outpatient, emergency room and hospital visits), parental out-of-pocket expenses for medicine, informal care (care or assistance by family members, friends or others), and parental work absenteeism.
- To estimate productivity losses, the human capital approach was applied. Days of parental work loss were valued with a mean wage of €232 per working day in 2023 based on national statistics.

Age Group
< 24 months

Study Period
2021 – 2023

Study Location
Germany (nationwide)

Figure 1: Overview of the prospective PAPI study & data collection



RESULTS

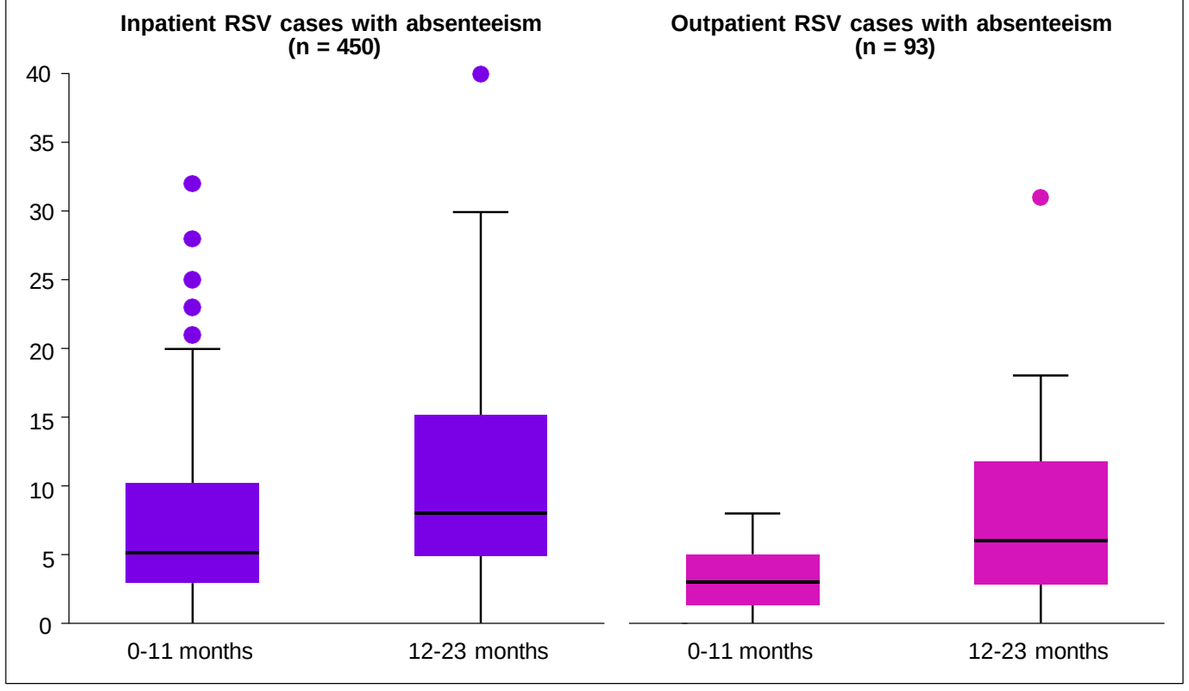
- A total of 1607 infants and young children aged <24 months hospitalized with LRTI were tested, of which 57.1% (n=918) tested RSV-positive.
- For 714 hospitalized cases data from questionnaires and phone interviews were available on day 0 and day 14. One case was further excluded due to missing age.
- In the outpatient setting, 250 cases aged <24 months were included after initially testing 1442 LRTI cases, of which 286 tested positive for RSV (positivity rate 19.8%).
- Of hospitalized RSV cases in children aged <24 months, 91.3% (n=652) were associated with additional primary care visits before or after the index hospitalization, with 2.7 mean primary care visits in infants and 2.9 in toddlers (see **Table 1**).
- The hospitalization rate observed among outpatient RSV cases was low (<1%).

Table 1: HCRU and parental absenteeism related to RSV infections, by age and recruitment setting, Germany, 2021-2023

	Inpatient RSV cases		Outpatient RSV cases	
	0-11 mo.	*12-23 mo.*	*0-11 mo.*	*12-23 mo.*
Included RSV cases	**588**	**125**	**137**	**113**
HCRU				
≥1 additional primary care visit, %	91.7	89.6	73.0	73.5
Mean no. of additional primary care visits, (SD)	2.7 (1.9)	2.9 (1.8)	2.5 (1.9)	2.3 (1.5)
≥1 emergency room visit, %	36.6	31.2	10.2	7.1
Mean no. of emergency room visits, (SD)	1.3 (0.6)	1.1 (0.4)	1.1 (0.4)	1.2 (0.5)
≥1 additional hospitalizations, %	9.4	18.4	0.7	0.9
Mean no. of additional hospitalizations, (SD)	1.1 (0.3)	1.1 (0.4)	1.0 (-)	1.0 (-)
Any OTC medication used, %	46.3	48.8	58.4	57.5
Mean expenses for OTC medication, € (SD)	47.2 (36.2)	26.4 (16.9)	29.1 (23.8)	34.6 (25.7)
Any informal care, %	66.5	59.2	30.7	38.9
Mean days with informal care, (SD)	7.6 (6.2)	7.0 (5.9)	4.0 (3.5)	3.9 (2.5)
Any companion overnight stay, %	83.2	83.2	-	-
Mean days of companion overnight stay, (SD)	5.9 (2.9)	4.4 (2.1)	-	-
Parental absenteeism from work				
Any RSV-related parental absenteeism, %	61.0	79.0	24.3	53.1
Mean days absent from work, (SD)	6.9 (5.2)	10.8 (8.4)	3.6 (2.0)	7.6 (5.6)

- In 63.0% (n=450) of RSV hospitalization cases aged <24 months, parental absenteeism from work associated with the RSV infection was reported, opposed to 37.2% (n=93) in the outpatient RSV cases (see **Table 1**).
- In these cases, parental absenteeism was highest among hospitalized toddlers (10.8 mean days, SD 8.4) and lowest in infants with RSV recruited in the outpatient setting (3.6 mean days, SD 2.0).
- **Figure 2** displays the days of parental absenteeism in RSV cases associated with any parental work loss.
- The parental productivity loss per hospitalized RSV cases associated with any work loss was estimated at €1612 and €2508 for infants and for toddlers, respectively. This corresponds to mean €935 for infants and €1927 for toddlers per any RSV hospitalization case.
- In the outpatient setting, RSV cases associated with work loss were estimated to cause mean productivity losses of €834 in infants and €1769 in toddlers, translating to mean costs of €195 and €924 per any infant and toddler with RSV infection recruited in the ambulatory setting, respectively.

Figure 2: Days of parental absenteeism in RSV cases associated with parental work loss, by age and recruitment setting, Germany, 2021-2023



CONCLUSION

- Our study is the first to investigate work loss associated with RSV infection in infants and young children in Germany.
- We found that inpatient and outpatient RSV episodes are associated with high health care resource use and parental work loss.
- Our data contributes to describe more comprehensively the overall RSV societal burden and to better inform decision-making regarding preventive interventions against RSV in Germany.

ABBREVIATIONS
HCRU: health care resource use; LRTI: lower respiratory tract infection; mo: months; OTC: over the counter; PCR: polymerase chain reaction; RSV: respiratory syncytial virus; SD: standard deviation

CONFLICT OF INTEREST
MWi, OD, RK, MB and SS are employees of Sanofi and may hold shares and/or stock options in the company. JB, FE, GBN and DT disclose no conflicts of interest. MWe has received fees for lectures and consulting activities from AstraZeneca, Novartis, Sanofi, Pfizer, and GSK. CH received research funding from Novartis and Pari unrelated to this study.

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