

Shedding light into the dark of unknown Cost-of-Illness and Burden-of-Disease Associated with RSV Across Age Groups in Austria

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Objectives

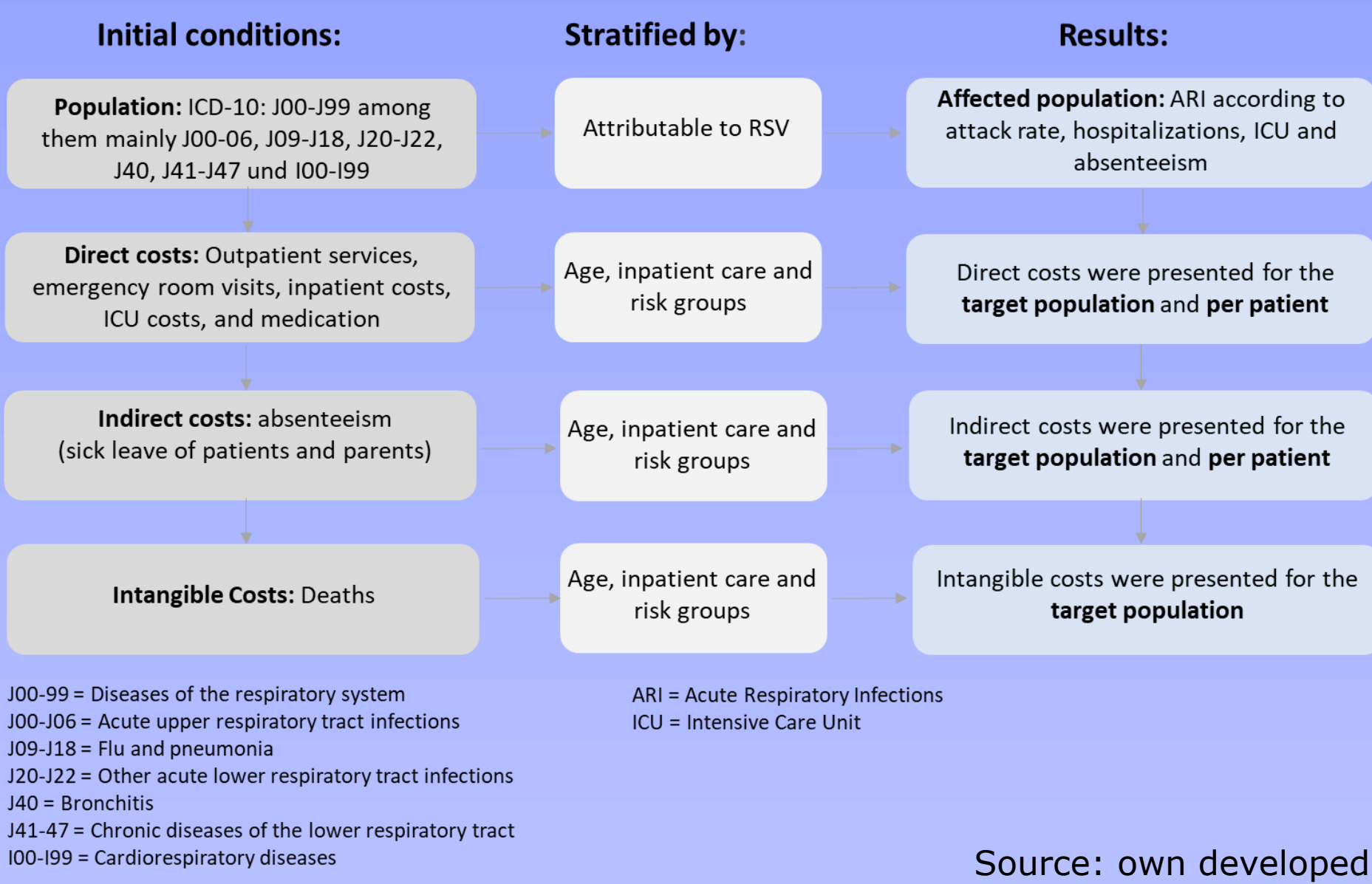
Respiratory syncytial virus related acute respiratory infection (RSV-ARI) constitutes a substantial disease burden in infants, children, and older adults. In infants, it is the most common single cause of respiratory hospitalization. In adults, RSV is an under-recognized cause of deterioration in health, particularly among frail elderly persons. Infection rates typically rise in late autumn and early winter. Little has been published on RSV-related costs for Europe and thus the cost-of-illness (COI) is unknown. Accurate knowledge about COI is essential to formulate/prioritize health-care policies and interventions. The aim is therefore to ascertain the direct and indirect costs associated with RSV-ARI for Austria.

Methods

The analysis was conducted in two steps. First a comprehensive systematic literature review was undertaken. Second, a probability pathway model was developed based on defined patient populations stratified by age and risk to estimate the direct and indirect costs. Costs (2023 €) are determined bottom-up from the societal perspective.

The analysis considers all cases with ARI (inpatient and outpatient) that can be attributed to RSV infection (RSV-ARI attack rate).

Figure 1: Design of the COI analysis



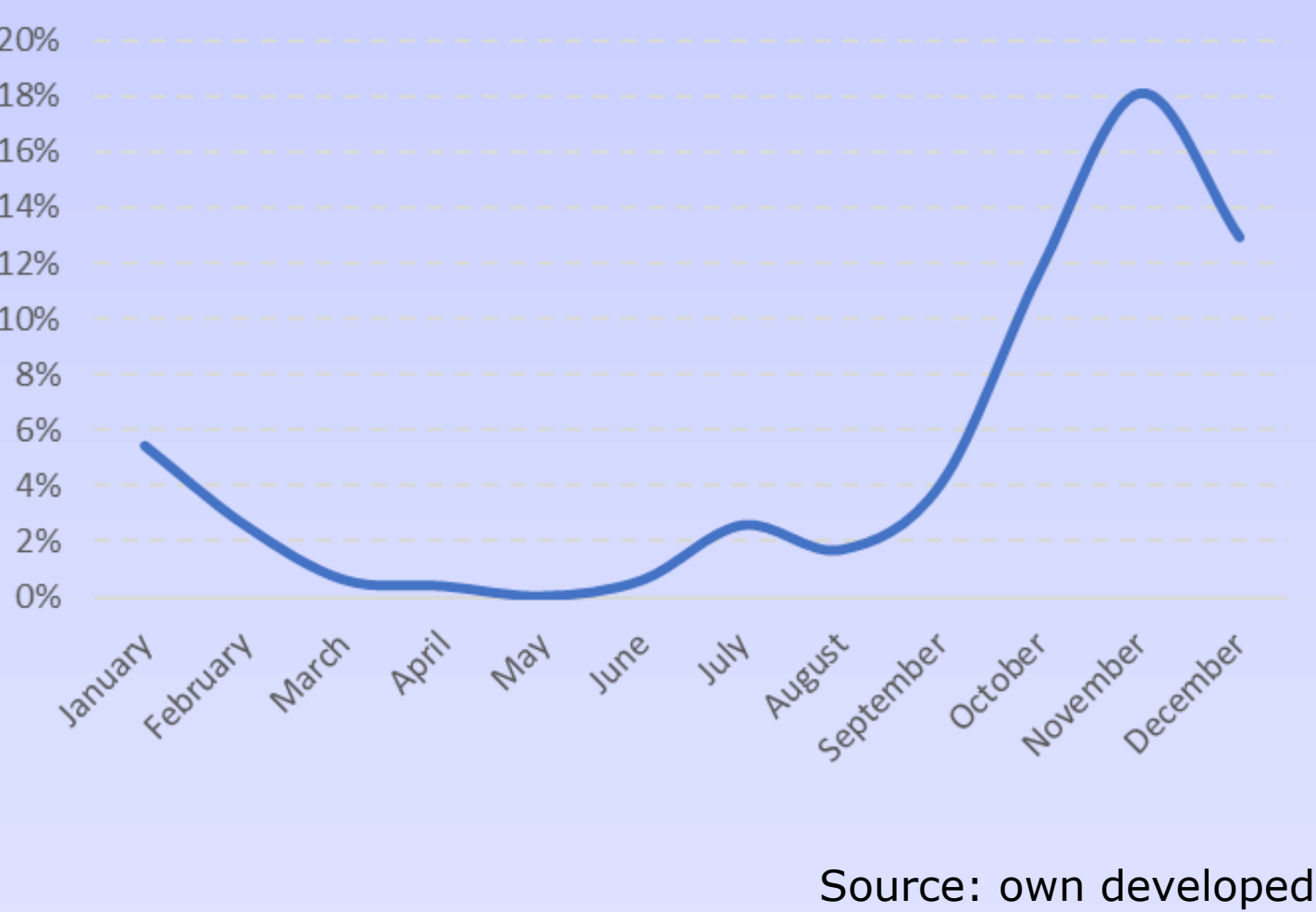
Cases are identified for the following age groups:

- Infants: < 90 days and 91 days - 12 months
- Children: 12 - 24 months and 2-5 years
- Children & teenagers: 6-17 years
- Adults: 18-49 years old, 50-59 years old, 60-69 years old, 70-79 years old and ≥ 80 years old

Epidemiological

The analysis assumes a positive virus detection rate of 5.47%, which corresponds to the average of the years 2015 to 2023. The RSV-ARI attack rate (incidence) by age and risk group was primarily determined from European sources.

Figure 2: Annual distribution of positive virus detections



Source: own developed

Figure 3: Patientflow of RSV infections

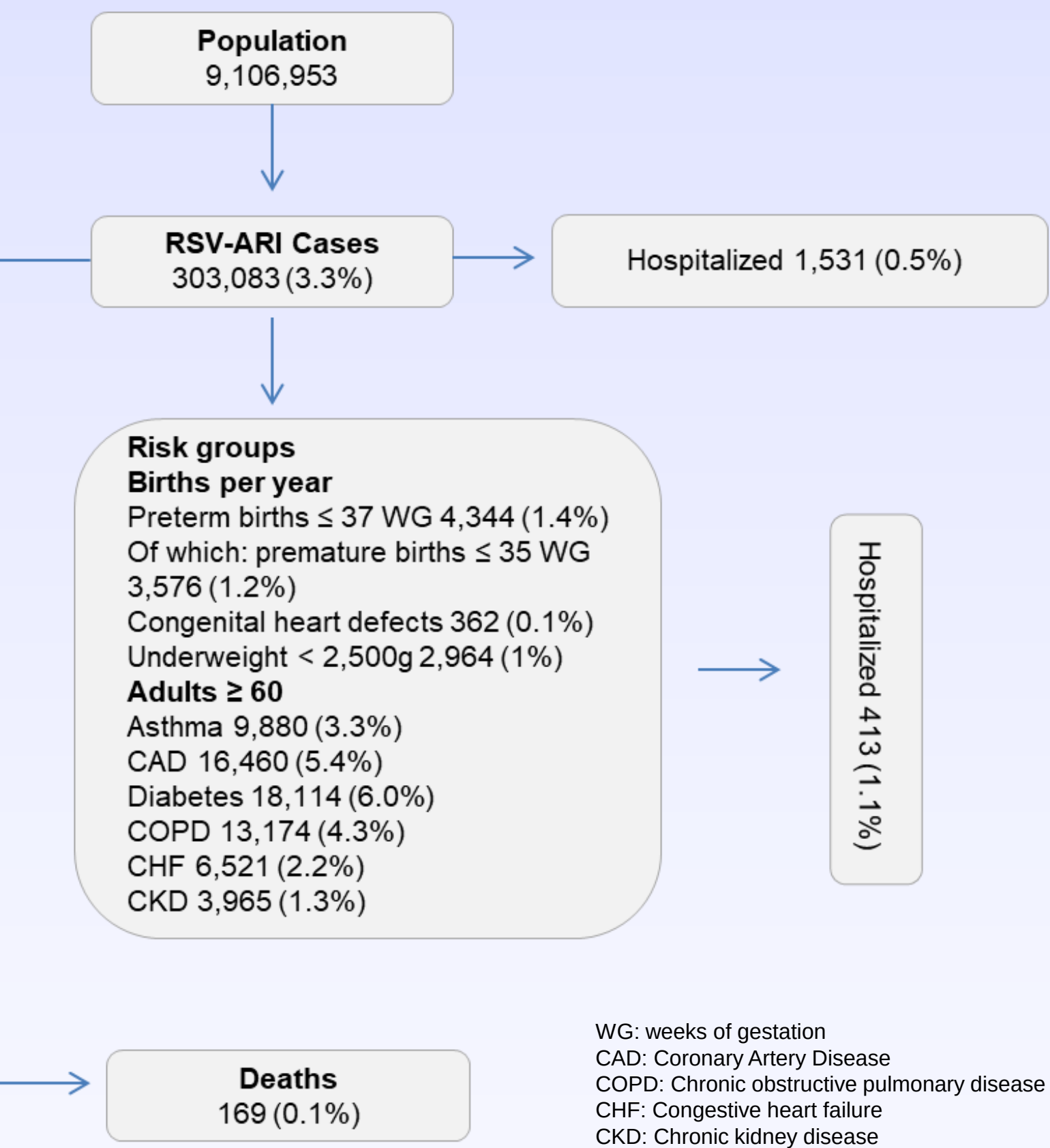


Table 1: Attack-rates of age groups

Population	Age	RSV-ARI Attack-rate
Infants ¹	< 90 days	24.5%
	91 days - 12 months	57.0%
Children ¹	12 - 24 months	29.1%
	2-5 years	16.2%
Children & teenagers ¹	6-17 years	2.3%
Adults ²	18-49 years	2.3%
	50-59 years	2.2%
	60-69 years	1.6%
	70-79 years	1.6%
	≥ 80 years	1.6%

1 Taylor et al. 2016; 2 Savic et al. 2022

- Based on the Austrian population, around 3.3% of the population develops RSV-ARI per year.^{1,2}
- Each year, 1,531 patients are hospitalized due to RSV infection; 85.4% in the first year of life.³
- Risk groups have a higher attack rate (incidence), as well as hospitalization rates. It mainly affects premature babies⁴ and adults ≥ 60 years of age with chronic diseases.^{4,5,6}
- 0.1% or 169 people die as a result of RSV infection.^{7,4,8}

1 Taylor et al. 2016
2 Savic et al. 2022
3 BMSG, Austrian DRG data
4 Cai et al. 2020
5 Shi et al. 2022
6 Wyffels et al. 2020
7 Resch et al. 2012
8 Jansen et al. 2007

High-risk groups have an increased risk of RSV-ARI, as well as hospitalization and possible intensive care. Shi et al. (2022) used an SLR and meta-analysis to estimate a probability of developing RSV-ARI for the adult population to be 4.1 compared to individuals without comorbidity (odds ratio [OR], 1.6–10.4). ORs for hospitalizations and ICU are derived from German data from 8,761 patients with RSV detection (Cai et al. 2020).

Mortality rates were extracted exclusively from European publications (Austria, Germany and the Netherlands). Based on the data, 169 deaths can be attributed to RSV. Patients ≥ 65 years of age have an increased risk of mortality than younger adults 5.01 OR [1.31-19.15] (Cai et al. 2020).

Direct costs

The COI study includes costs of inpatient and outpatient RSV-ARI treatment, including medication and the inpatient and outpatient setting. Costs were presented from the payer perspective.

- The RU data on hospitalizations were derived from the Austrian DRG system for all age groups.
- Medication costs, especially for Synagis® for infants, are derived from the IQVIA data (DPMÖ 2022).
- RU data in the outpatient setting were obtained using the literature.

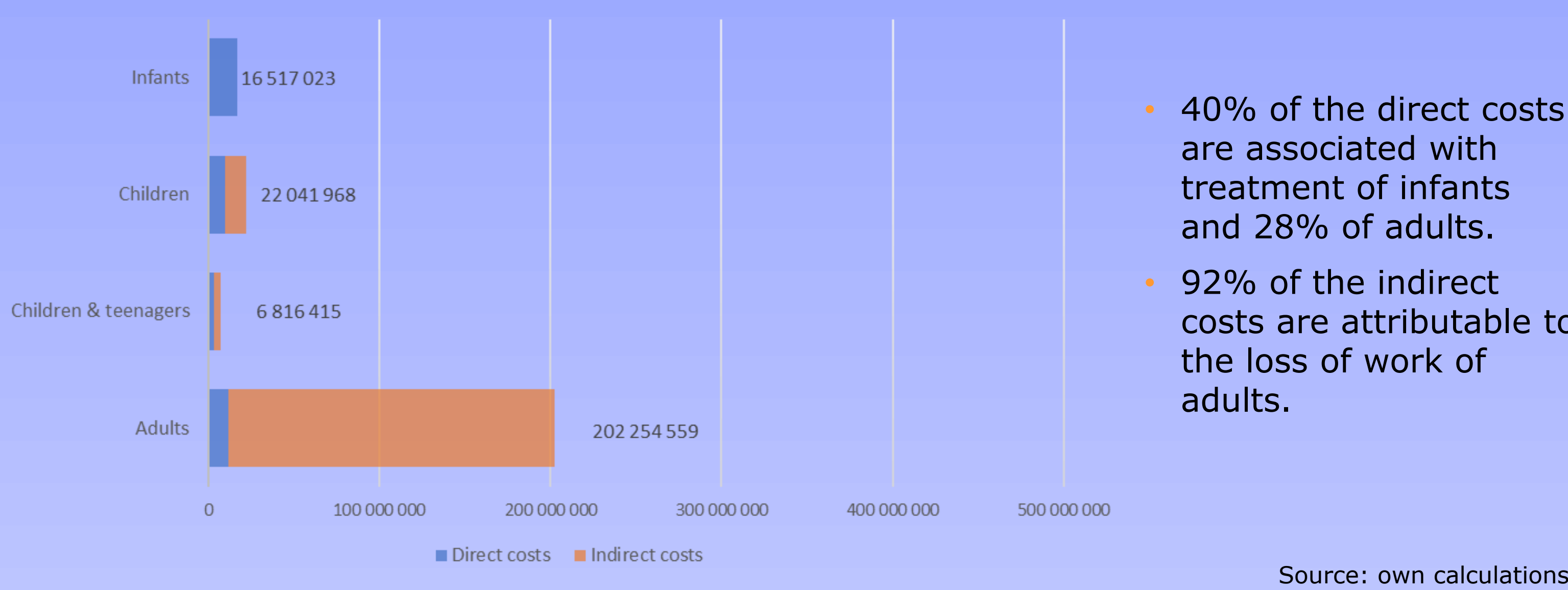
Indirect costs

The costs of work loss associated with RSV-ARI are classified as indirect costs. Indirect costs include the loss of work of the sick person and the parents of sick children (care leave for children <12 years). Indirect costs are calculated on the basis of the employment rate by age group (proportion of the population in employment). The duration of work loss is calculated for each disease associated with HPV infection. Costs were presented from the societal perspective.

Results

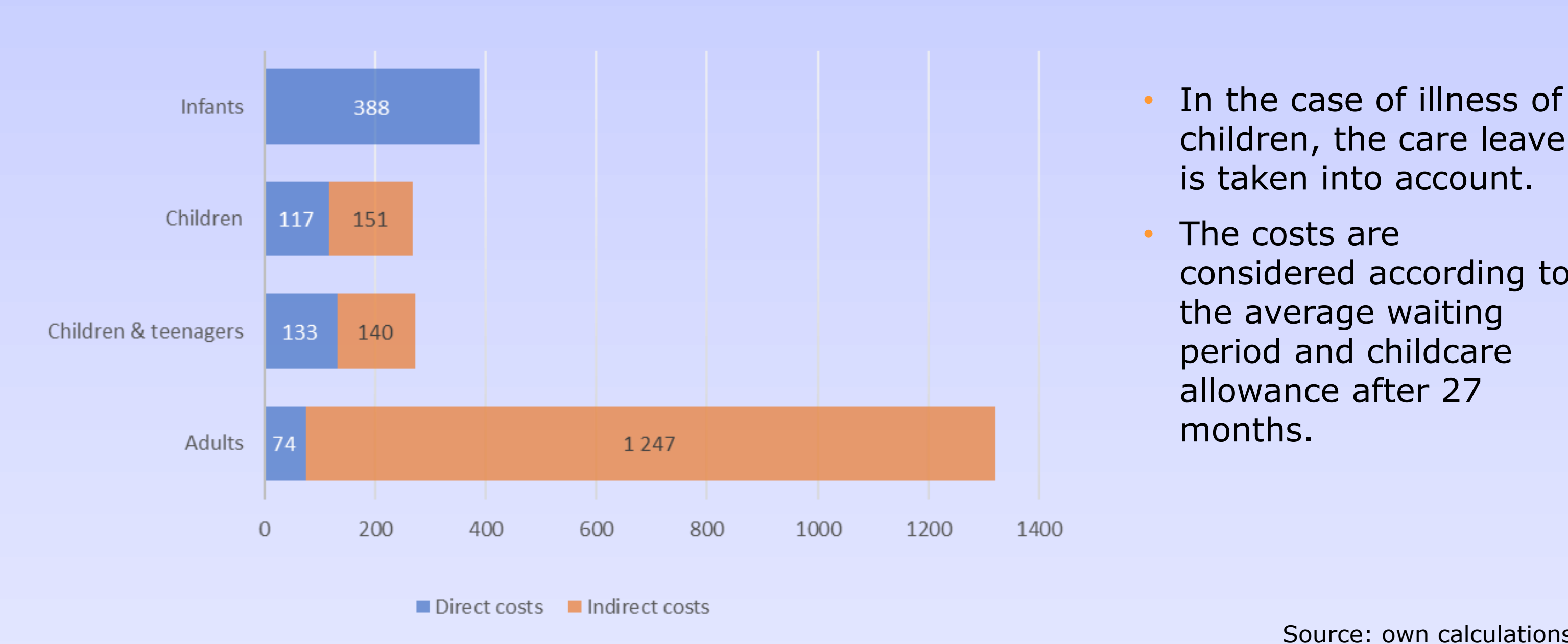
The total COI due to RSV-ARI amount to 247.63 million € per year; with direct costs accounting for 16.5% or 40.82 million € and indirect costs for 83.5% or 206.81 million €. In terms of cost components, doctor's consultations accounted for the largest share of 14.19 million € (34.8%), followed by the costs of inpatient stays of 9.62 million € plus 1.04 million € for ICU stays (16.1% in total). 8.41 million € (20.6%) is attributable to pharmaceuticals.

Figure 4: Total direct and indirect costs due to RSV-ARI



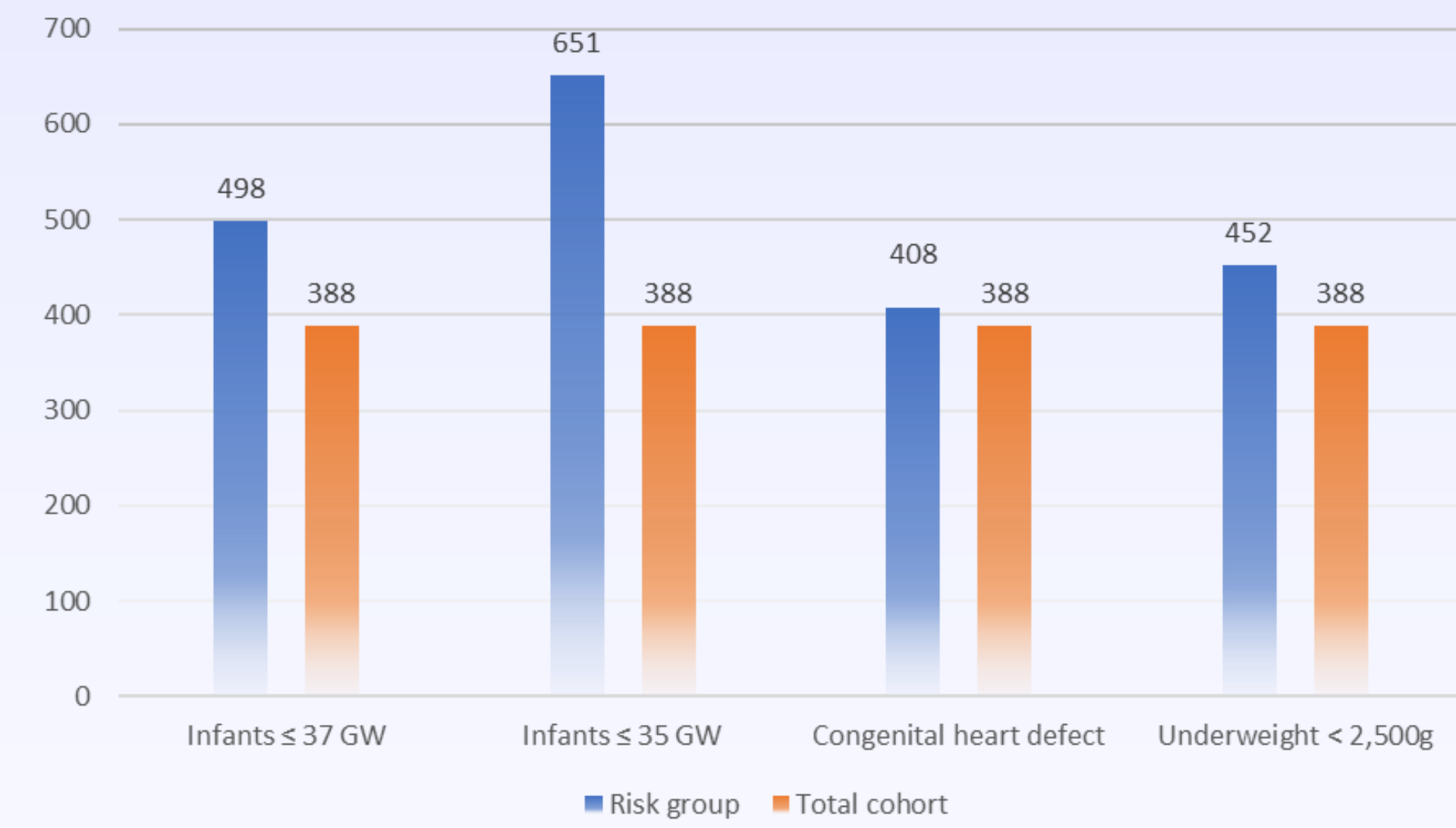
Due to the high cost of lost work, the total per patient costs are highest in the adult group at 1,321.18€ per case. Due to the higher hospitalization rate, infants are in second place with 387.97€.

Figure 5: Costs per patient



High-risk groups have higher average costs per patient. For example, premature babies ≤week 35 have 1.7 times higher costs than the average cohort. In the adult ≥60 group, the costs of the at-risk groups are 1.2 times higher than those of the entire cohort.

Figure 6: Direct cost per patient of the entire cohort of infants vs. of risk groups



Conclusion

Our findings demonstrate a substantial annual RSV-attributable healthcare resource-use and costs in Austria across different age groups, with the highest burden in infants and those aged ≥60 years. These data may be useful for policymakers to guide future RSV vaccination programs.

References

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Additional literature with the author

