

“Travellers Beware of Respiratory Tract Infections!”

Travel-related respiratory symptoms and infections in travellers (2000-2022): a systematic review and meta-analysis

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Introduction

Respiratory tract infections (RTIs) are common in travellers due to their exposure to respiratory pathogens and close contact with many individuals.^(1,2) No study has systematically examined the burden of these infections among travellers.

Objectives

“The aim of this systematic review and meta-analysis is to evaluate the prevalence of RTIs and symptoms suggestive of RTIs among travellers by risk groups and/or geographic regions, and to describe the spectrum of RTIs.”

Methods

The study design is a systematic review and meta-analysis registered in PROSPERO (CRD42022311261). We searched Medline, Embase, Scopus, Cochrane Central, Web of Science, Science Direct, and preprint servers MedRxiv, BioRxiv, SSRN, and IEEE Xplore on February 1, 2022. Studies reporting RTIs or symptoms suggestive of RTIs in international travellers after January 1, 2000, were eligible. Data appraisal and extraction were performed by 2 authors, and proportional meta-analyses were used to obtain estimates of the prevalence of respiratory symptoms and RTIs in travellers and predefined risk groups.⁽³⁾

Results

Database searches yielded 2,042 articles. After removing duplicates and screening titles and abstracts, 602 articles remained. After further screening, 268 articles were included. An additional 161 studies were included from references, for a total of 429 studies. (Figure 1)

Figure 1: PRISMA Flow Diagram 2020

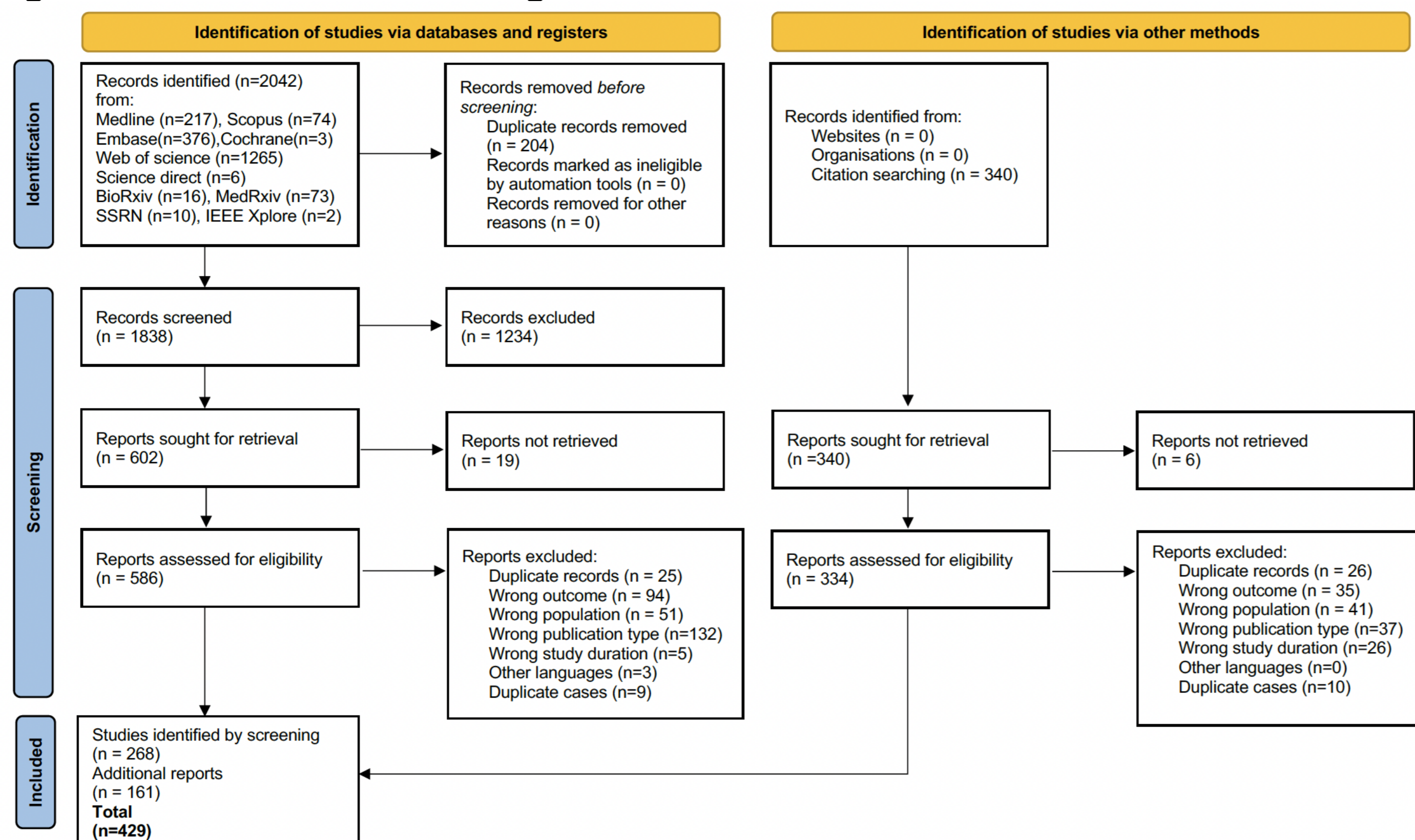


Table 1: Number of respiratory cases and symptoms, and distribution by region and specific group.

UN Region/Specific cases	Symptomes	Cases
Total (n)	86841	807632
Africa	250 (1.77%)	4233 (3.08%)
Americas	1166 (8.27%)	5263 (3.84%)
Asia	687 (4.87%)	19812 (14.44%)
Europe	59 (0.42%)	11167 (8.14%)
Oceania	1 (0.01%)	788 (0.57%)
Airplane	93 (0.66%)	451 (0.33%)
Cruise or Merchant Vessel	465 (3.3%)	2478 (1.81%)
Refugee and Asylum-Seeker	341 (2.42%)	11179 (8.15%)
Mass gatherings events	11033 (78.28%)	81862(59.66%)

Table 2: Prevalence of respiratory symptoms and RTIs in travellers from 2000 to 2022 with subgroup analysis by UN region and specific groups.

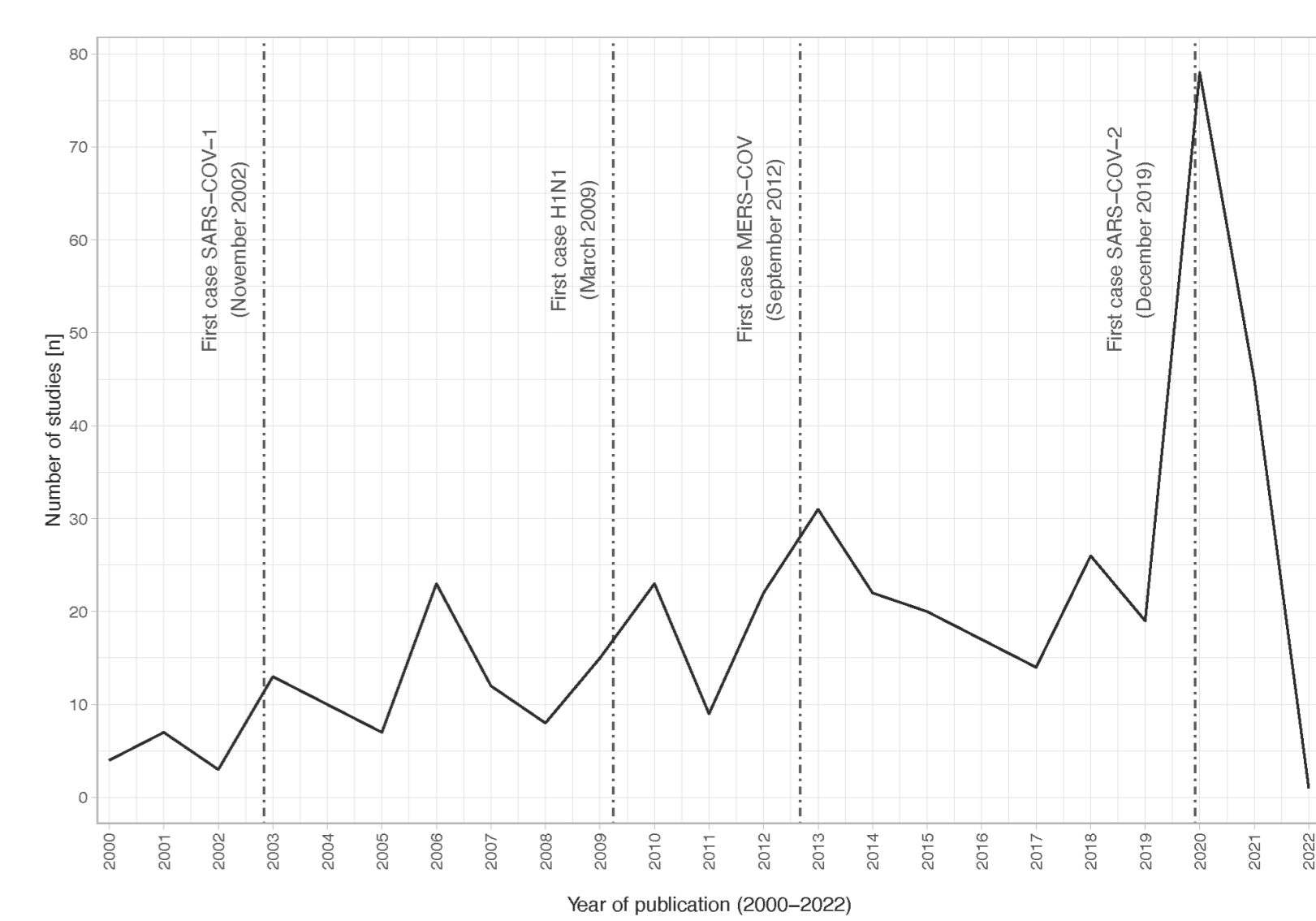
Category	Respiratory symptoms	Diagnosed RTIs
Overall	0.38 [0.28;0.49]	0.12 [0.09; 0.16]
MGs	0.64 [0.51; 0.75]	0.18 [0.12; 0.28]
Americas	0.43 [0.10; 0.84]	0.16 [0.05; 0.42]
Asia	0.31 [0.17; 0.49]	0.06 [0.02; 0.14]
Cruise/Merchant Vessel	0.22 [0.03; 0.70]	0.08 [0.03;0.20]
Multiple	0.13 [0.08; 0.23]	0.10 [0.06; 0.16]
Airplane	0.08 [0.04; 0.14]	0.08 [0.04; 0.16]
Refugee or Asylum-Seeker	N/A	0.19 [0.01; 0.87]

Included studies reported 86,841 symptoms and 807,632 confirmed RTIs. 78% of reported respiratory symptoms occurred at mass gatherings events. The most represented UN region for respiratory symptom acquisition was the Americas with 8%. Of the confirmed respiratory illness cases with known area of acquisition, 60% were from mass gatherings events and the most represented UN region of acquisition was Asia where 14% of respiratory cases were acquired. (Table 1)

Sixty studies were included in the meta-analysis for respiratory symptoms. All included studies yielded a prevalence of respiratory symptoms in travellers of **38% [28%; 49%]** for the years 2000 to 2022. Subgroup analysis shows that this estimate varies by exposure group, with the reported prevalence of respiratory

symptoms in mass gatherings reaching 64% [51%; 75%], whereas after air travel only 8% [4%; 14%] of travellers had respiratory symptoms. For respiratory infection cases, 123 studies were included in the meta-analysis. The prevalence of confirmed respiratory illness among travellers was estimated to be **12% [9%; 16%]**. Refugees and mass gatherings attendees were the groups at highest risk, with 19% [1%; 87%] and 18% [12%; 28%], respectively. Asia had a lower than average risk of 6% [2%; 14%].

Figure 2: Time-series plot of the absolute annual frequency of included studies with the date of the first observed case of the four epidemics/pandemics of respiratory infections of the 21st century.



The year of publication of included studies ranged from 2000 to 2022, with most studies (n=78) coming from 2020 and fewest from 2002 containing the fewest (n=3). The largest difference between years was 2019 (n=19) and 2020 (n=78) with 4 times more studies than the previous year. (Figure 2) shows the number of included studies per year compared with the date of the first observed case of the four epidemics/pandemics of respiratory infections of the 21st century.

Next Steps

Further studies are needed to better assess the true impact of these travel-acquired respiratory infections in terms of morbidity and quality of life impact. New digital tools such as mobile applications will allow researchers access to real-time data on travellers' illness throughout their journey and allow for rapid response to emerging respiratory infections.⁽⁴⁾

Conclusion

This study demonstrates a high burden of RTIs among travellers and highlights the usefulness of travellers as sentinels for respiratory infection outbreaks. These findings have important implications for understanding and managing RTIs among travellers.

References

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