

# Risk of Infectious Diseases Among Older US Adults with Alzheimer's Disease Compared with Those Without in Nursing Home and Community Settings: A Claims-Based Cohort Study

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## Background

Emerging evidence suggests a link between Alzheimer's disease (AD) and infection.<sup>1</sup> Most studies have examined whether infections may contribute to the development of AD, but few have assessed the risk of infection among patients with AD. In US nursing homes, approximately 2 million infections occur each year.<sup>2</sup>

## Objective

This study evaluated whether patients with AD have a higher risk of infections compared with those without AD, across nursing home and community settings.

## Methods

- This retrospective cohort study included adults aged ≥65 years who were continuously enrolled in commercial, Medicaid, or Medicare Advantage plans in the Oracle Life Sciences closed claims database from September 2022 through May 2024.
- Patients with an AD diagnosis, defined by an ICD-10-CM code of G30.X during baseline (September 2022 – August 2023), comprised the AD group, while those without an AD diagnosis during baseline or follow-up (September 2022 – May 2024) comprised the non-AD group.
- Exposure groups were further stratified by care setting (nursing home or community-dwelling) based on the presence of a healthcare visit with place of service in a nursing home during baseline or follow-up.
- During follow-up, risks of COVID-19, respiratory syncytial virus (RSV), influenza, pneumonia, and meningitis were assessed and compared between exposure groups using risk ratios (RRs) (Table 1).
- Results were adjusted by age groups (65-74 vs. ≥75) using Mantel-Haenszel approach.

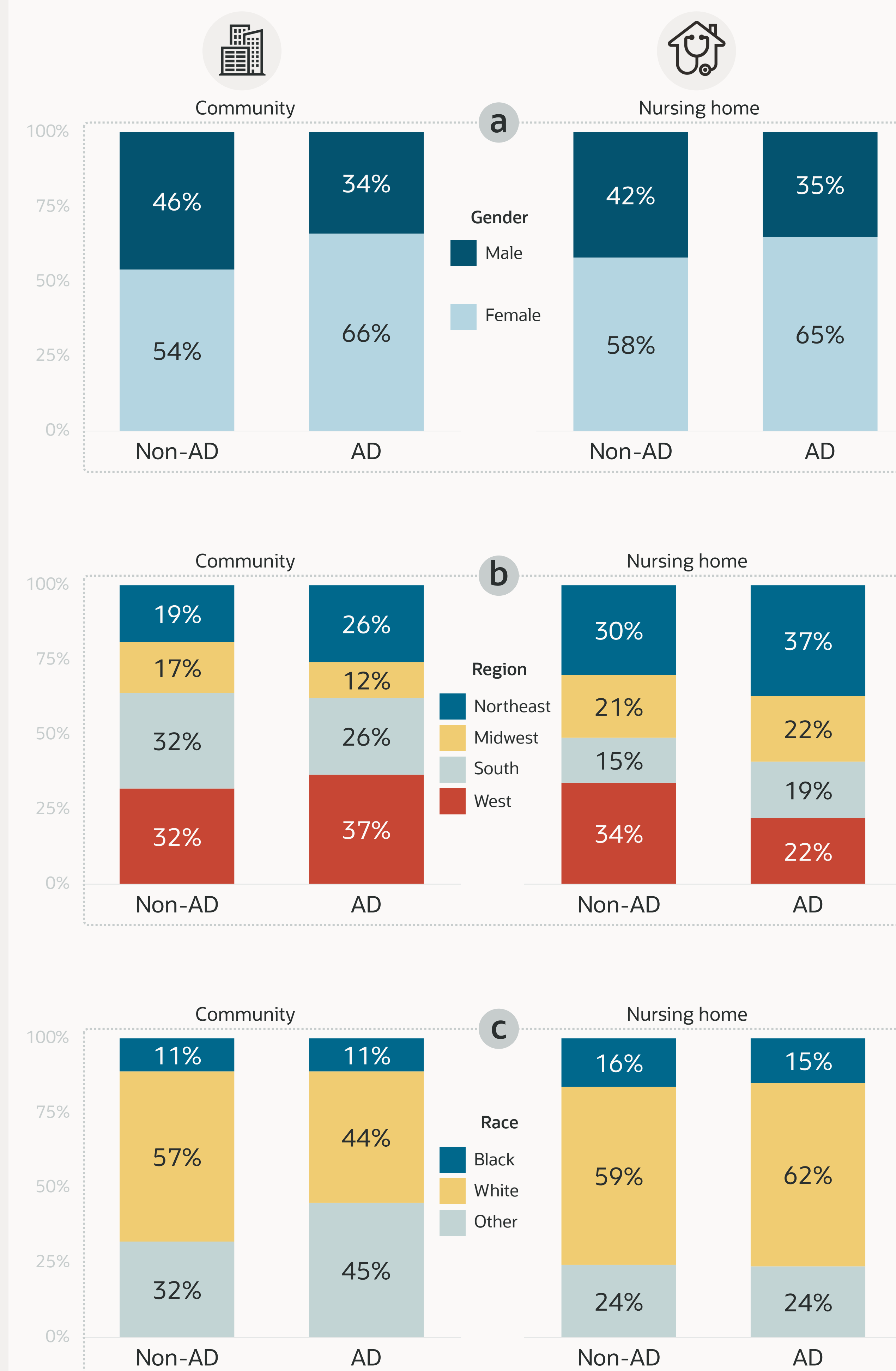
Table 1. ICD-10-CM codes of infection

Outcome	ICD-10-CM code
COVID-19	U00, U07.1, U49
RSV	J12.1, J20.5, J21.0
Influenza	J09.X through J11.X
Pneumonia	J10.0, J11.0, J12.X through J18.X
Meningitis	G00.X through G03.X, A39.0, A87.X

## Results

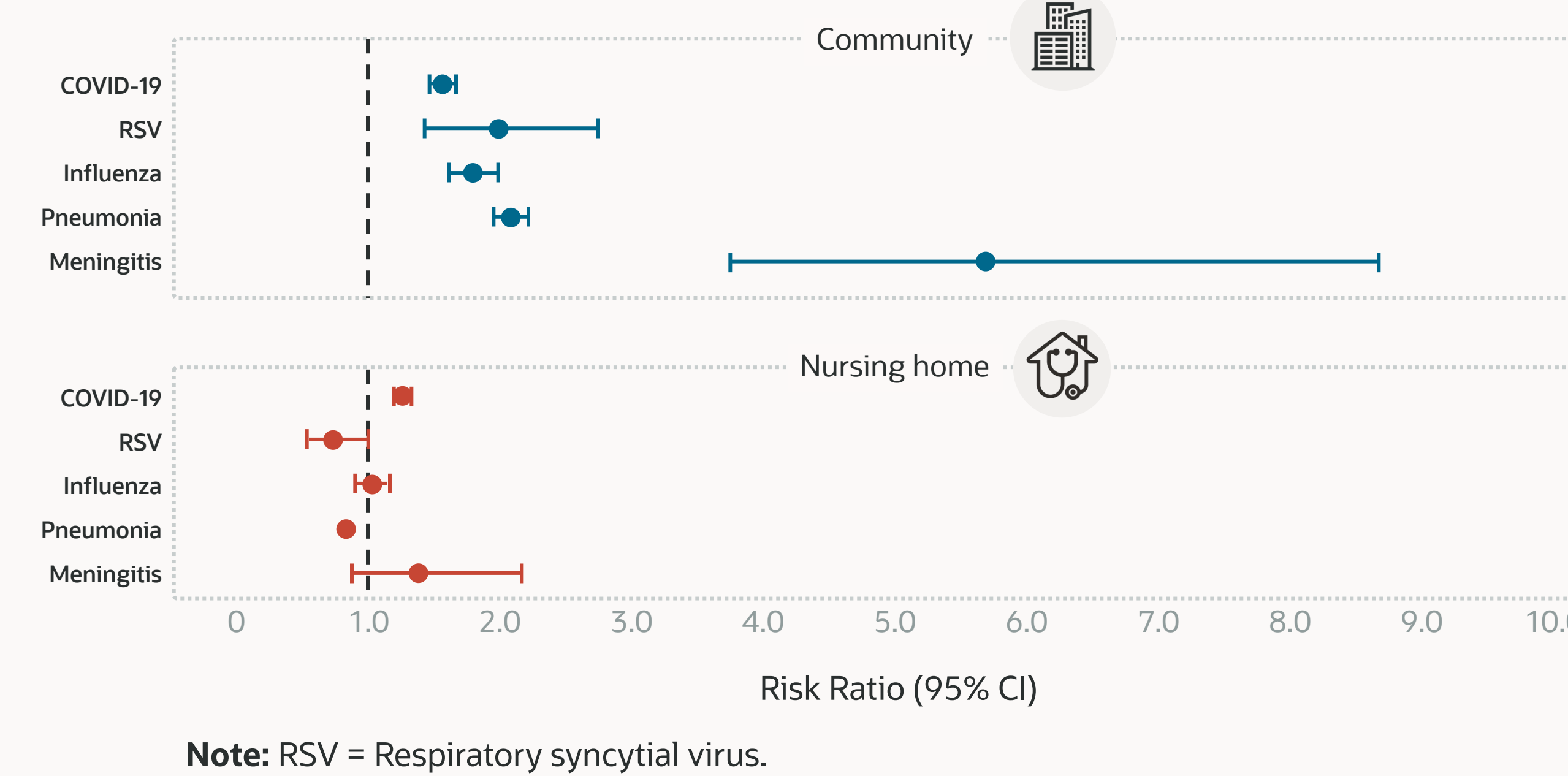
- Patients with AD were older than those without AD in both nursing home (mean age: 77 vs. 73 years) and community settings (76 vs. 72 years).
- Patients with AD were more likely to be female and reside in the Northeast region compared with those without AD (Figures 1a, 1b). Patients in nursing homes were more likely to be White, regardless of AD presence (Figure 1c).
- In the community, risk of all infections were 1.6-5.7 times higher among patients with AD compared with those without AD (all p<0.001), after adjusting for age groups (Figure 2).
- Within nursing homes, the risk of COVID-19 was significantly higher among patients with AD compared with those without AD (RR=1.3; p<0.001), whereas the risk of pneumonia was significantly lower among patients with AD (RR=0.83; p<0.001) (Figure 2).

Figure 1. Distribution of gender(a), region(b), and race(c) of patients with Alzheimer's disease (AD) and those without AD, across nursing home and community settings



Note: AD = Alzheimer's disease. Other race includes Asian or Pacific Islander, Hispanic or Latino, and other races.

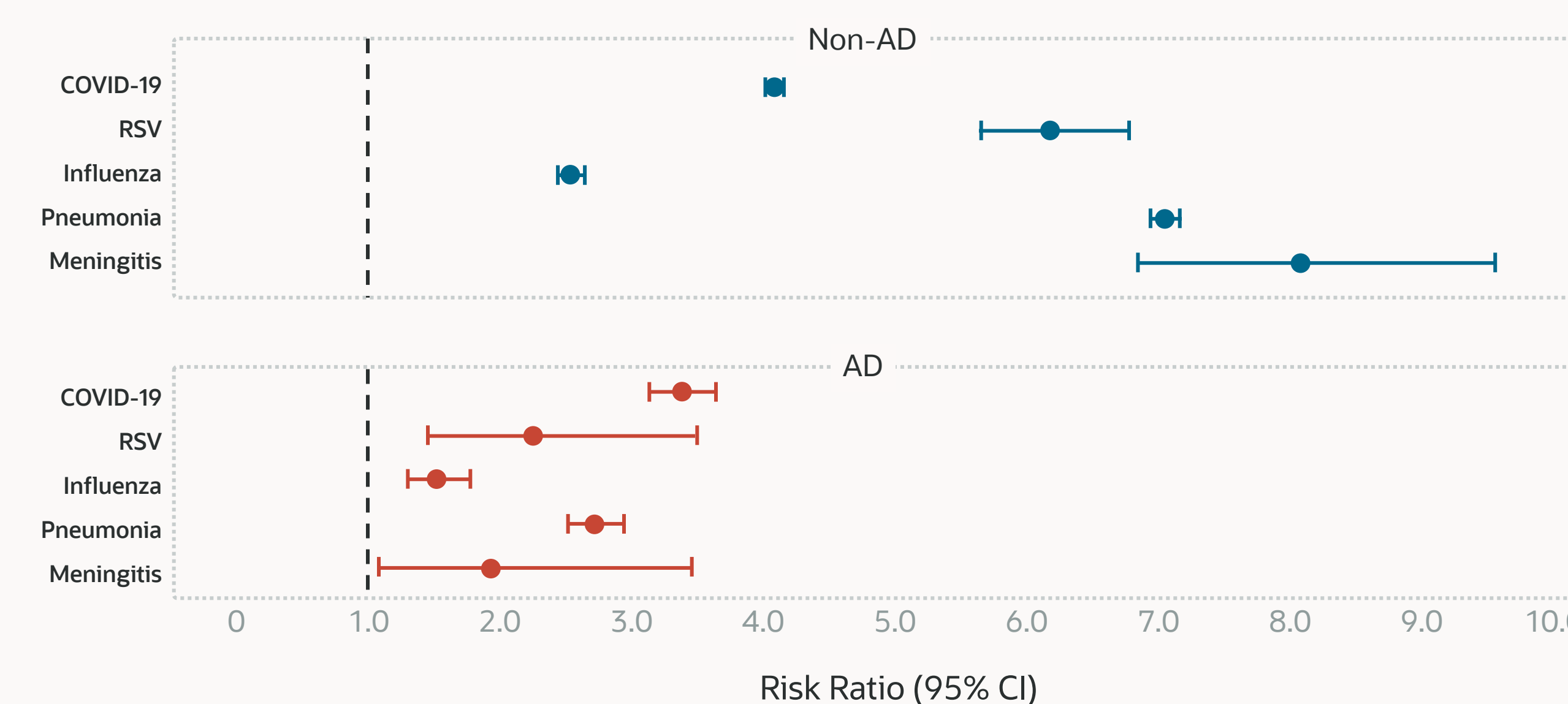
Figure 2. Risk ratios of infection comparing Alzheimer's disease (AD) with those without AD, across community settings and nursing home, adjusted for age groups (65-74 vs. ≥75)



Note: RSV = Respiratory syncytial virus.

- Infection risks were higher in nursing homes than in the community, with larger differences observed among the non-AD population (1.5-3.4 times higher among patients with AD and 2.5-7.8 times higher among those without AD; all p<0.05) (Figure 3).

Figure 3. Risk ratios of infection comparing nursing home with community setting, across non-Alzheimer's disease (AD) and AD, adjusting for age groups (65-74 vs. ≥75)



Note: AD = Alzheimer's disease, RSV = Respiratory syncytial virus.

## Conclusion

- Patients with AD exhibited a higher risk of infection in community settings.
- Residence in a nursing home was associated with additional risk among both AD and non-AD populations.
- These findings highlight the need for targeted infection-prevention strategies for patients with AD in the community setting, as well as enhanced protections for nursing home residents regardless of AD status.

## Limitations

- There is potential for selection bias due to the lack of Medicare data for non-Advantage patients.
- Infection outcomes identified using claims data may be subject to underdiagnosis.<sup>3</sup>
- Small sample sizes for the RSV and meningitis outcomes resulted in low-precision estimates, limiting the reliability of the findings.



## References

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