

Pathogen-specific incidence of medically-attended acute respiratory illness: 2024-2025 season.



Marshfield Clinic
Research Institute

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Background

Understanding pathogen-specific burden of medically-attended acute respiratory illnesses (MAARI) can guide resource allocation, inform vaccine development, and improve our understanding of patients at highest risk. However, this burden is not well characterized for many pathogens and contemporary data are needed.

Objective

Estimate the pathogen-specific incidence of MAARI, overall and by age and chronic medical condition status.

Methods

Enrolled Population: Patients with MAARI enrolled during or following outpatient or inpatient encounters from July 1, 2024 to June 30, 2025 at Marshfield Clinic in Wisconsin, USA.

Case Definition: ≥1 of cough, sputum production, nasal congestion, runny nose, sore throat, wheezing, or shortness of breath; or fever or “feverishness” in children <3 years.

Study Activities: Participants provided a respiratory swab and completed surveys.

Laboratory Testing: ePlex Respiratory Pathogen Panel 2 for adenovirus, human metapneumovirus (hmpv), influenza (A/H1N1, A/H3N2, B), parainfluenza (1, 2, 3, 4), respiratory syncytial virus (RSV; A, B) rhinovirus/enterovirus, SARS-CoV-2, seasonal coronavirus, *C. pneumoniae*, and *M. pneumoniae*.

Source Population: Service area residents with ≥1 well visits or ≥2 problem visits in the 3 years prior to July 1, 2024.

Chronic Medical Conditions: Defined by ICD-10 code and based on high-risk conditions for respiratory infections as defined by the CDC (<https://www.cdc.gov/flu/highrisk/index.htm>).

Analysis: Pathogen-specific incidence among those enrolled was extrapolated to the source population using Poisson models weighted by age and chronic medical condition strata.

Results

Source Population: 234,804 individuals; 5% were <6 years, 15% were 6-17 years, 51% were 18-64 years, 29% were ≥65 years of age, and 46% had ≥1 chronic medical condition.

Enrolled Population: 2,890 patients with MAARI; 2,748 outpatients and 142 inpatients. Among enrolled, 12%, 25%, 47%, and 21% were <6, 6-17, 18-64, and ≥65 years of age, respectively; 56% of enrolled patients had ≥1 chronic medical condition.

Pathogen Detection: ≥1 respiratory pathogen was detected in 59% of enrolled participants.

Figure 1: Overall incidence was highest for rhinovirus, SARS-CoV-2, and influenza.

Figure 2: Incidence was highest in children <6 years for most pathogens, with the exceptions of SARS-CoV-2 (adults ≥65 years), *M. pneumoniae* (children 6-17 years), and influenza B (children 6-17 years).

Figure 3: For most pathogens, incidence was higher among those with chronic medical conditions with the highest incidence ratios observed for SARS-CoV-2 (3.4), parainfluenza 3 (2.8), hmpv (2.5), and influenza A/H1N1 (1.9).

Figure 1. Estimated MAARI Incidence Proportions, by pathogen, in the Marshfield Clinic Source Population (N=234,804).

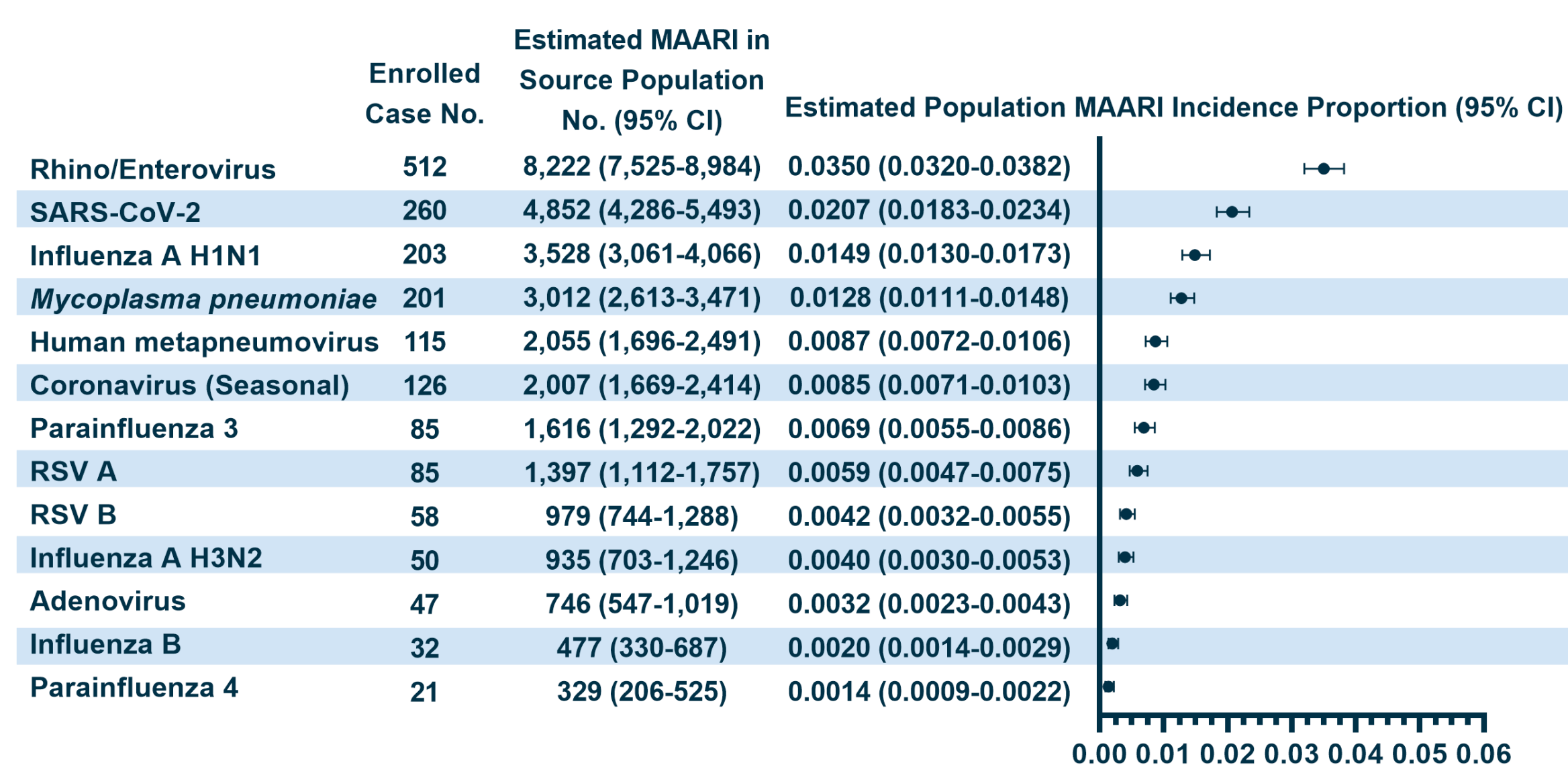


Figure 2. Estimated MAARI Incidence Proportions, by pathogen and age group, in the Marshfield Clinic Source Population (N=234,804).

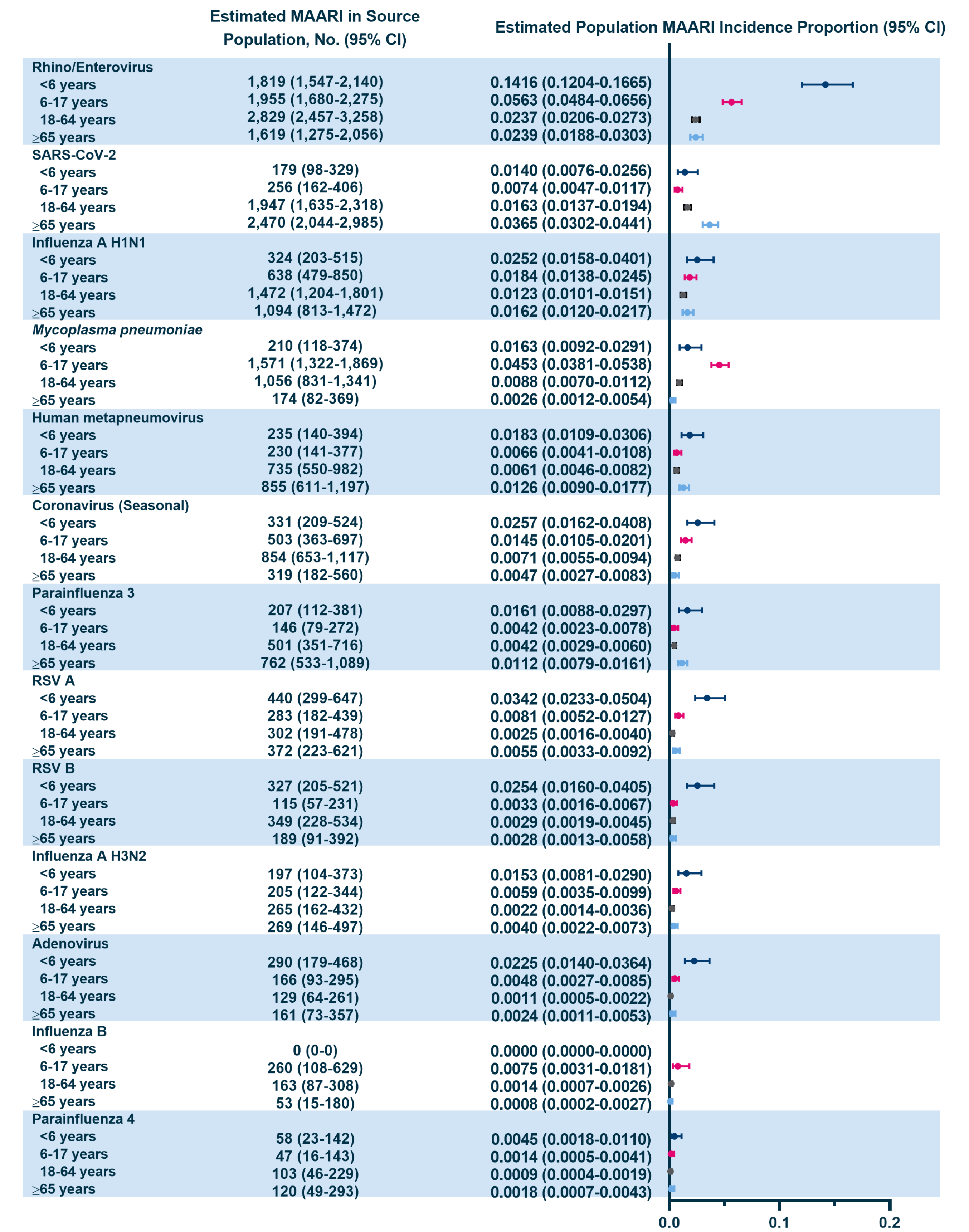
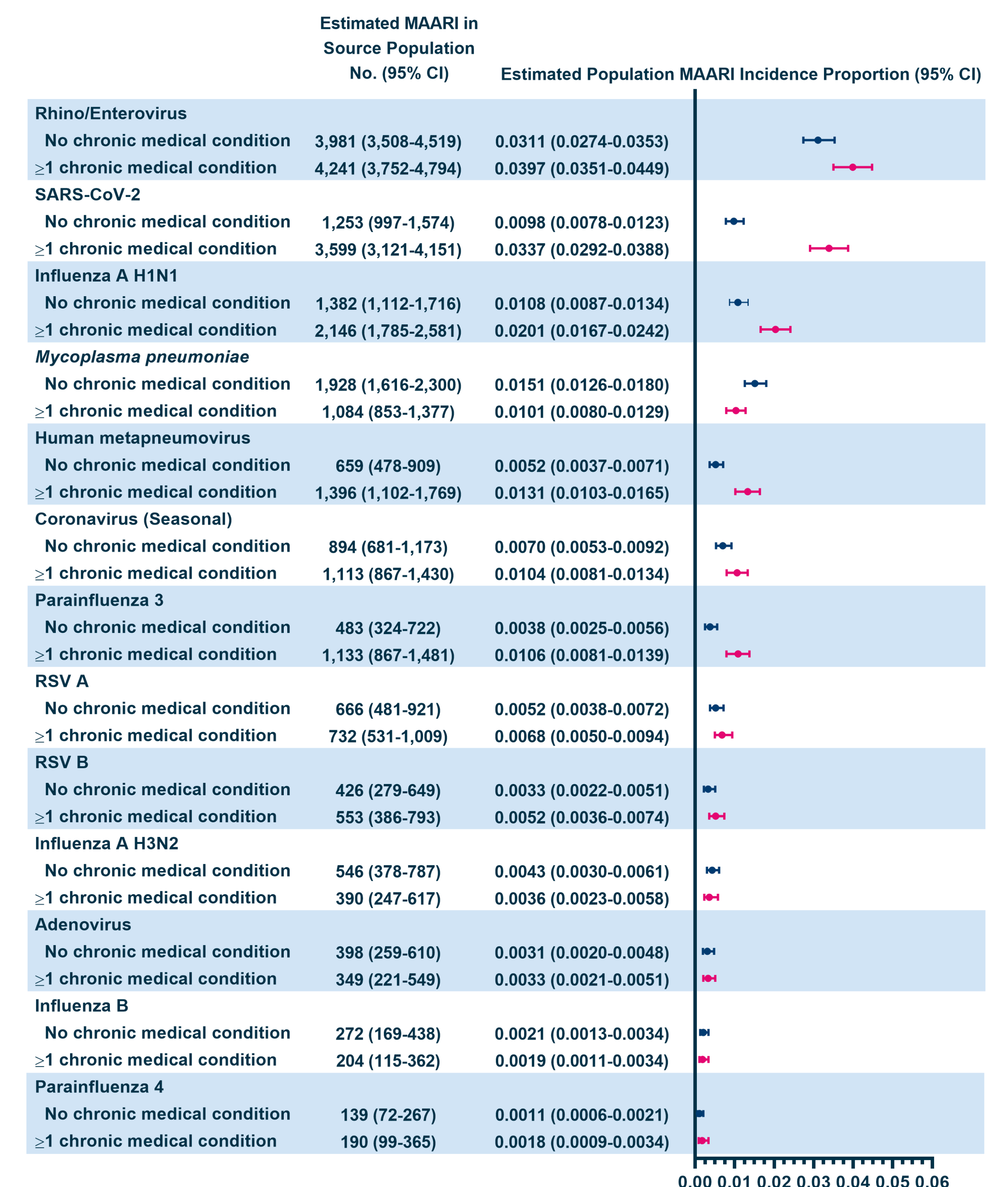


Figure 3. Estimated MAARI Incidence Proportions, by pathogen and chronic medical condition status, in the Marshfield Clinic Source Population (N=234,804).



Conclusions

Overall MAARI incidence was highest for rhinovirus, SARS-CoV-2, and influenza.

Potentially vaccine preventable viruses including influenza, RSV, and SARS-CoV-2, accounted for 25% of MAARI.

Incidence was highest among children for all pathogens except SARS-CoV-2 where the highest incidence was observed among older adults.

Incidence of SARS-CoV-2, parainfluenza 3, hmpv, and influenza A/H1N1 was about 2 to 3 times higher among those with chronic medical conditions compared to those without.

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