

# Acute coronary syndrome hospital visits comparisons by age and sex before and during the COVID-19 pandemic in Israel: multiple interrupted time series nationwide study

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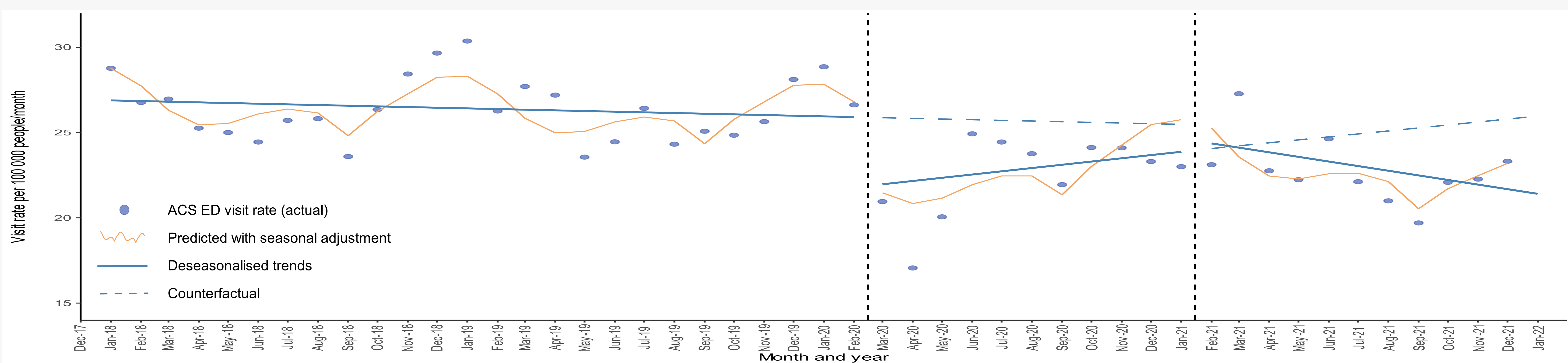
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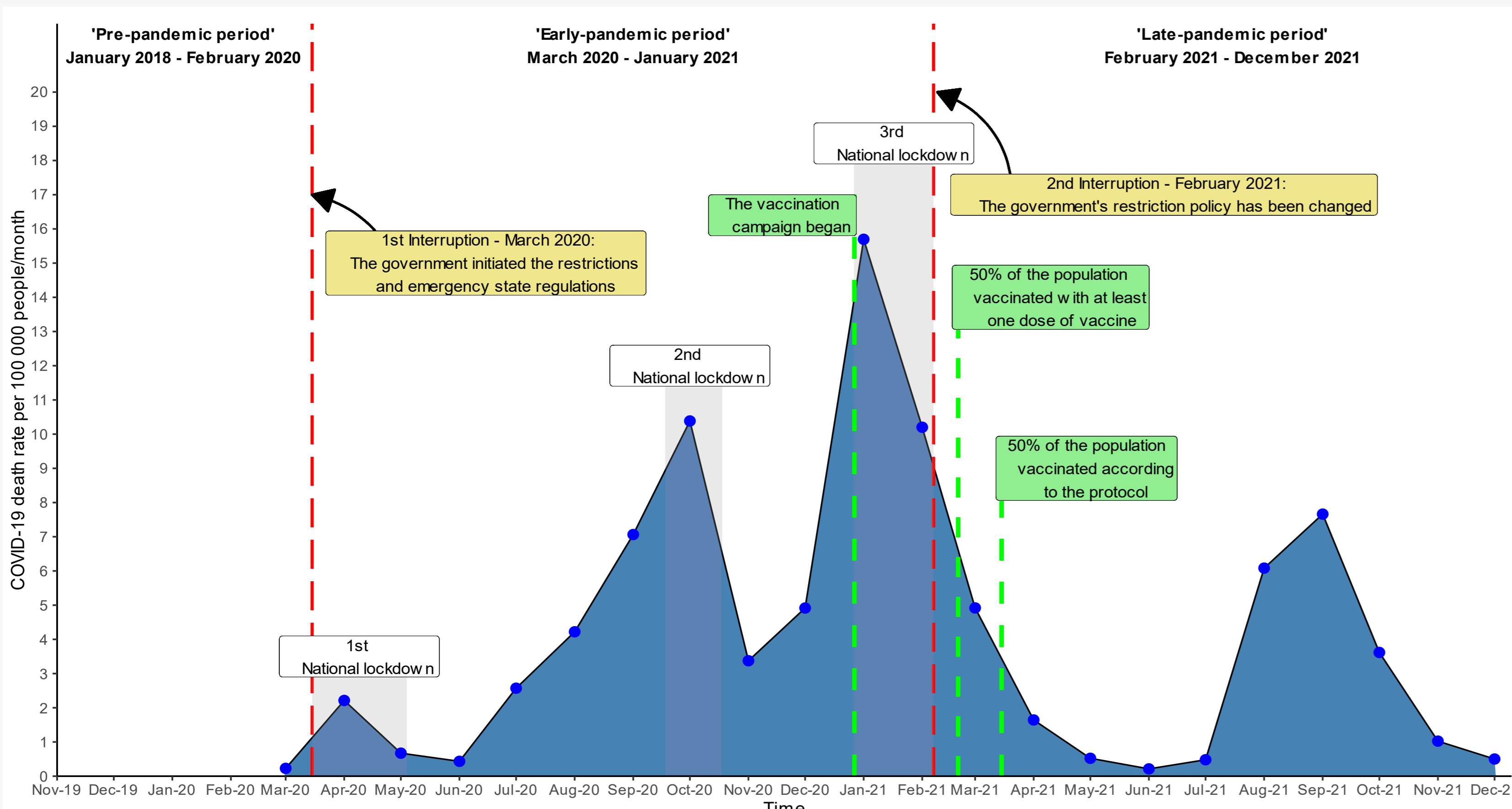
**Research question:** How did acute coronary syndrome (ACS) hospital visits changed across age and sex subgroups before and during different phases of the COVID-19 pandemic in Israel?



**Figure 1.** Interrupted time series model for acute coronary syndrome in the general population (aged 25+)

Dashed vertical lines indicate the policy changes in March 2020 and February 2021. The counterfactual trend lines for both pandemic periods derive from ITS models. The first counterfactual represents a scenario without the pandemic and the restrictions, while the second reflects a scenario where pandemic and emergency restrictions continued. Abbreviations: ACS, acute coronary syndrome. ED, emergency department. ITS, interrupted time series.

**Background:** There have been reports of sharp declines in acute coronary syndrome (ACS) during the COVID-19 pandemic. **The study aims to assess nationwide ACS ED visits across age and sex subgroups and the general population, with a comparison before and throughout the pandemic's various phases.**

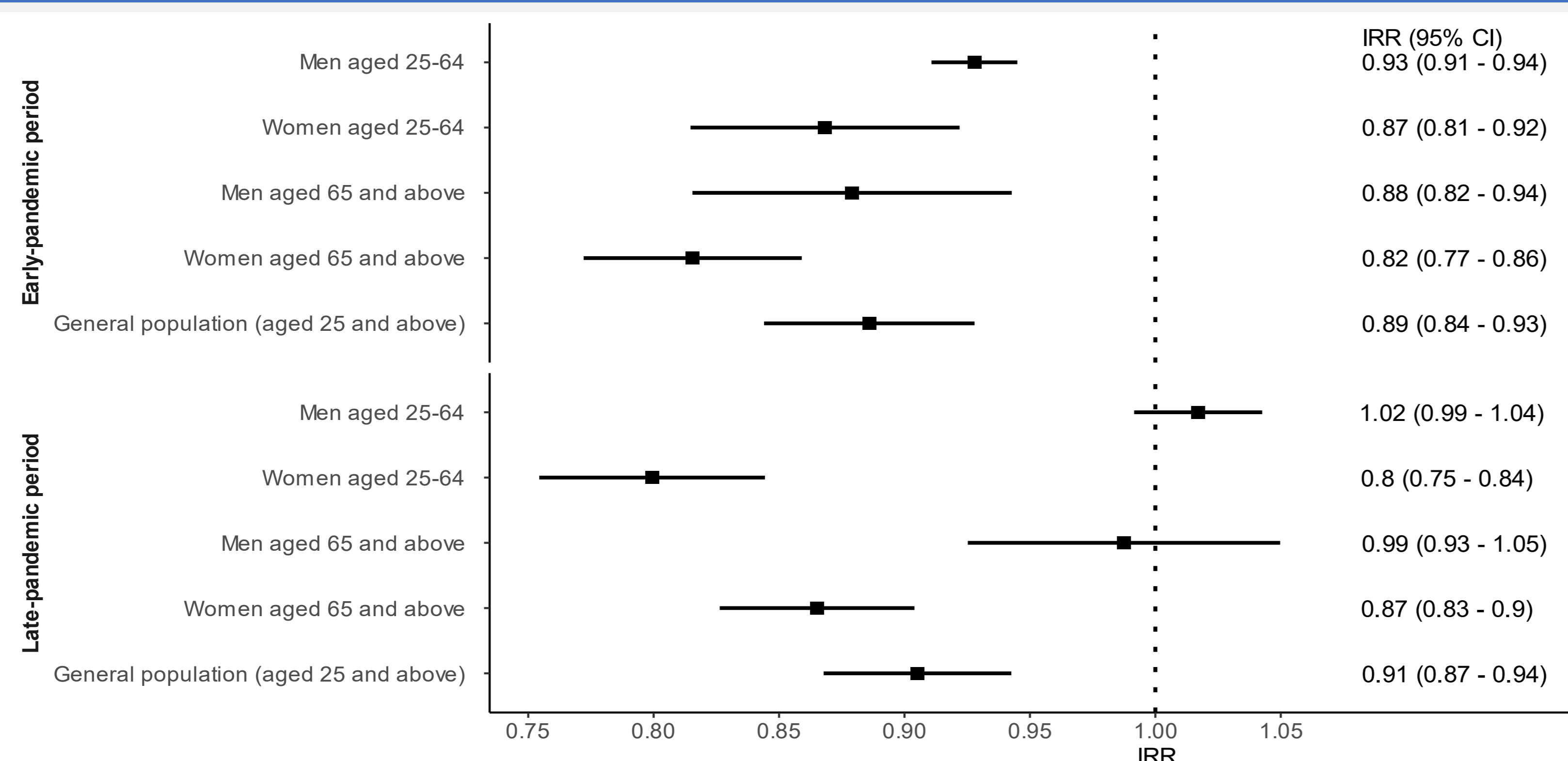


**Figure 2.** Monthly COVID-19 fatality rates per 100 000 people, study periods and major pandemic events, Israel 2020-2021

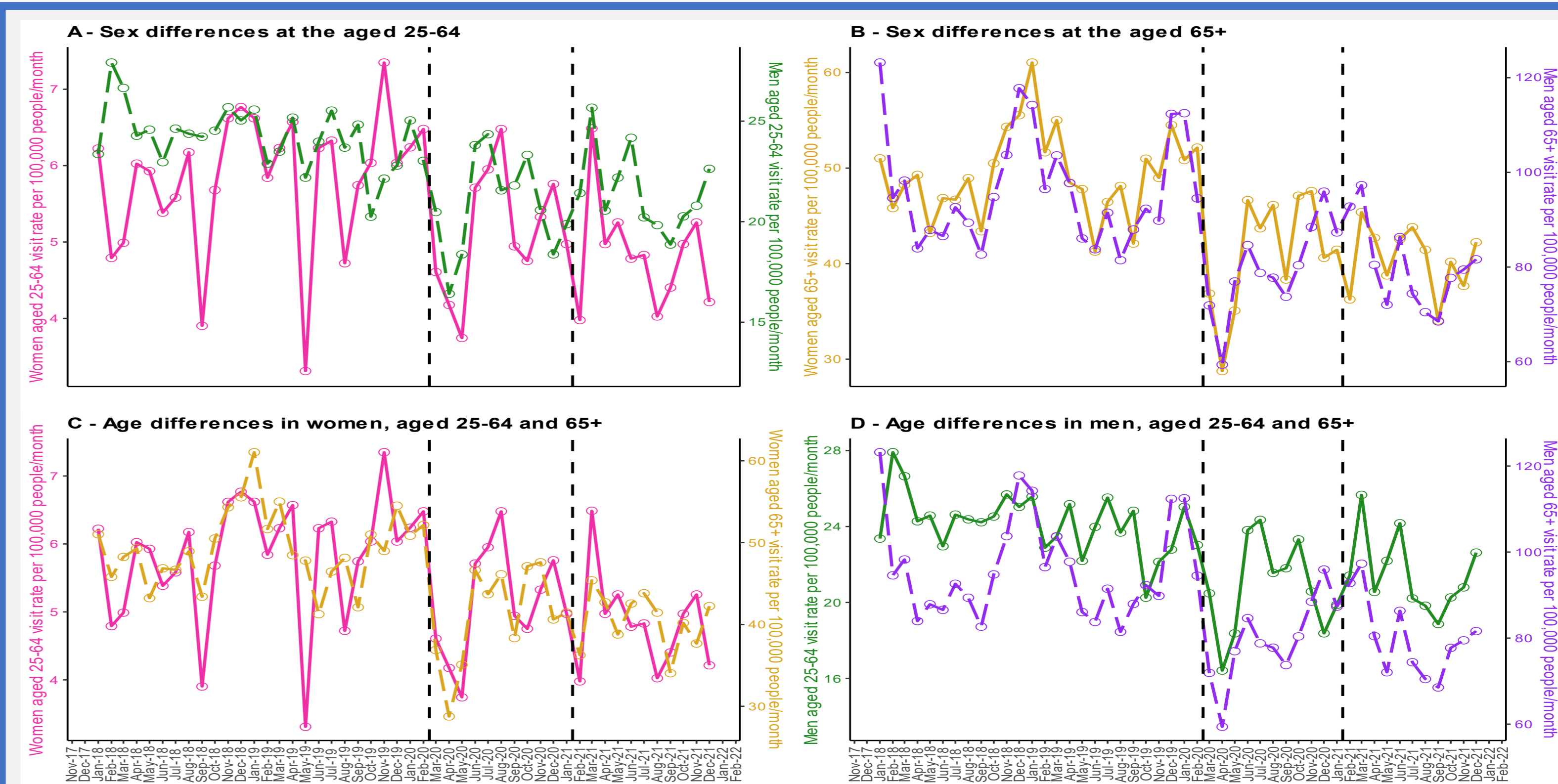
**Methods:** Interrupted time series analysis (ITS) was used to assess 61349 ACS nationwide hospital visits sourced from the Israel Ministry of Health from January 2018 to December 2021 at monthly intervals. The study period was divided into three periods: January 2018 – February 2020 (Pre-pandemic period); March 2020 – January 2021 (Early-pandemic period); February 2021 – December 2021 (Late-pandemic period). The ACS diagnoses were identified by ICD-9 codes 410 and 411. Generalized least squares (GLS) segmented regression seasonally adjusted (Fourier terms—harmonics) with autoregressive moving average (ARMA) structure was used to build predictive models with an estimated reference trendline (counterfactual).

**Results:** The median age of ACS patients was 66, with 69.7% men. Over 11 months of the early-pandemic period (lockdowns), the largest decrease in visits was seen in women aged 65 and above, of 18.4% (Incidence rate ratio [IRR] 0.82 [95% CI 0.77-0.86]). The lowest decrease was observed in men aged 25-64, of 7.2% (IRR 0.93 [0.91-0.94]). During the late-pandemic period, which included high vaccination coverage and no lockdowns, the largest further decrease was in women aged 25-64 of 20.1% (IRR 0.80 [0.75-0.84]) on average.

**Conclusions:** The pandemic influenced ACS ED visits variably, with substantial declines during phases of high COVID-19 morbidity and mortality. Older individuals, particularly women, demonstrated the largest decrease in ACS ED visits, highlighting the need for tailored public health strategies to maintain public confidence in access to critical care during future health emergencies.



**Figure 3.** Incidence rate ratios mean summary results for the pandemic periods



**Figure 4.** Two-y-axis comparison between age and sex subgroups, Israel 2018-2021