Herpes Zoster Risk Among Immunocompromised Adults in the United States: A Retrospective Cohort Analysis

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Conclusions

The incidence and severity of HZ risk are significantly higher among adults on immunosuppressive therapy after matching on and controlling for a range of factors.

Consistently higher incidence rates across age groups suggests that HZ prevention should be considered for immunosuppressed adults irrespective of age.

Background

Multiple prior studies have examined herpes zoster (HZ) risk and synthesized risk estimates by diagnosis, including autoimmune and inflammatory conditions, primary immunocompromising diseases, and comorbidities.[1-3]

Direct comparisons of HZ risk to immunocompetent populations[4-7] and those following immunosuppressive (IS) therapy initiation are lacking among adults with autoimmune or immunocompromising conditions, limiting provider ability to interpret comparative HZ risk and identify opportunities to take preventive measures.

Objective

Estimate and compare HZ incidence between US adults initiating immunosuppressive medications and a general cohort of adults without immunosuppressive medication use.

Methods

Study design
- Retrospective matched cohort study

Data source
- US administrative claims data (Optum Research Database) between October 2015 and December 2022
- Including commercially insured and MAPD health plan members

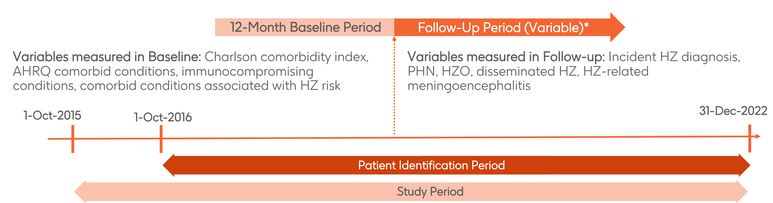
Inclusion criteria
- ≥1 medical administration or pharmacy fill claim for an immunosuppressive medication[8,9]
- Aged ≥18 years
- Continuous enrollment with medical and pharmacy benefits for at least 12 months before the index date (baseline period)

Exclusion criteria
- ≥1 medical claim with diagnosis for HZ during the baseline period
- ≥1 medical or pharmacy claim for HZ immunization prior to the index date (5 years of data prior to the index date)
- Evidence of pregnancy during the baseline period
- Missing demographic information such as age, sex, or geographic region

Non-IS cohort inclusion criteria
- No medical administration or pharmacy fill claim for immunosuppressive medication during the patient identification period

Study period

Index Date
Date of first claim for immunosuppressive therapy during patient identification period (IS cohort); for non-IS cohort, index date was assigned based on month/year of index dates among IS cohort during the 1:1 exact matching procedure



*Starts from the index date and ends with the earlier of incident HZ diagnosis, HZ vaccination, pregnancy, disenrollment from health plan, death, or end of study period

Matching category
- 1:1 exact matching between IS and non-IS cohorts based on age, gender, race/ethnicity, insurance type, and geographic region

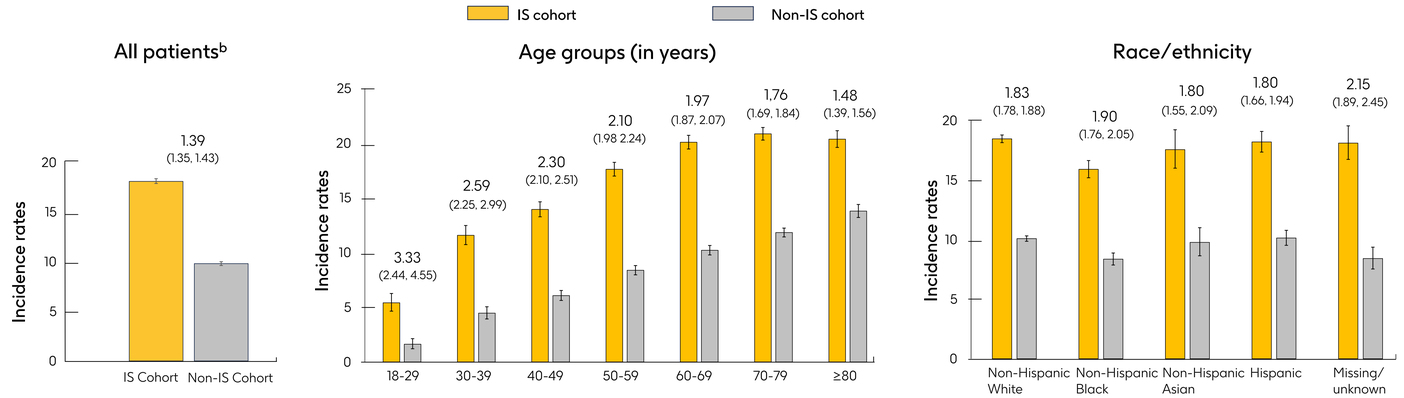
Outcomes
- HZ diagnosis and HZ-related complications

Analysis
- HZ incidence rates (IRs) per 1,000 person-years, overall and stratified by baseline characteristic and condition
- Significance of incident rate ratios assessed through Z-tests using robust standard errors in OLS regression
- Adjusted HZ hazard ratios and PHN odds ratios among patients with HZ assessed through proportional hazard and logistic regression models, respectively

Results

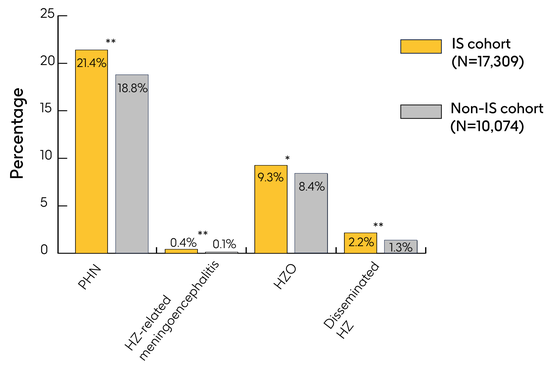
After matching, 517,514 pairs were assessed; demographic characteristics were well-balanced across cohorts, but the baseline prevalence of comorbid conditions was higher among the IS cohort (scan QR code for full details and supplementary data).

Figure 1: Incidence of HZ cases per 1,000 person-years at risk[a]



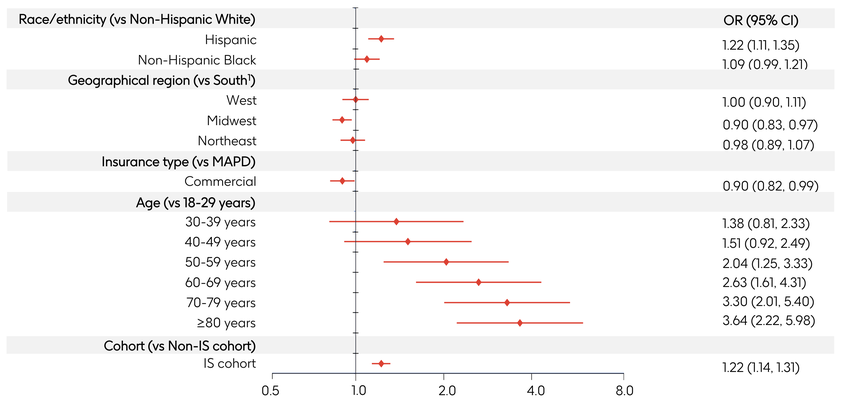
[a]Bar charts show HZ incidence rates per 1,000 person-years at risk with 95% CIs. The values shown above each pair of bars are the HRs (95% CIs).
[b]The number of HZ events among all patients were 17,309 and 10,074, the total person-time were 957,239 and 1,027,567 person-years, and the median duration of follow-up period (IQR) were 495.0 (204.0-1,038.0) and 551.0 (230.0-1,108.0) days for the IS and non-IS cohorts, respectively. Observations read=1,035,028; Observations used=1,035,028. The proportional hazard model compared the incidence rates of HZ by cohort and controlled for: age, gender, race, insurance type, geographic region, baseline CCI, baseline conditions, AHRQ comorbidities, and all-cause HCRU.

Figure 2: HZ-related complications among patients with HZ diagnosis[c]



[c]Denominator is the number of patients with HZ diagnosis during the fixed follow-up period for that complication. PHN and HZ-related meningoencephalitis are measured among HZ patients with ≥6 months of follow-up. HZO and disseminated HZ are measured among HZ patients with ≥30 days of follow-up.
Rao-Scott test was used for binary measures; IS cohort vs Non-IS cohort p-values: **p<0.001; *p<0.05.

Figure 3: Odds of post-herpetic neuralgia among patients with HZ[d]



[d]Observations read=26,422; Observations used=26,422; Likelihood ratio: chi-square=564.862, DF=29, p-value <0.001; Hosmer and Lemeshow: chi-square=15.178, DF=8, p-value=0.056; c statistic=0.600; Modeled among patients with HZ and ≥6 months of follow-up. The logistic regression model compared the odds of PHN by level of covariate across cohorts and controlled for: age, race/ethnicity, insurance type, geographic region, baseline CCI, baseline conditions, AHRQ comorbidities, HZ-related comorbidities, and all-cause HCRU.
[1] South region includes patients from "other" region.

Abbreviations

AHRQ, Agency for Healthcare Research and Quality; CCI, Charlson Comorbidity Index; CI, Confidence Interval; DF, Degree of Freedom; HCRU, Healthcare Resource Utilization; HR, Hazard Ratio; HZ, Herpes Zoster; HZO, Herpes Zoster Ophthalmicus; IR, Incidence Rate; IQR, Interquartile Range; IS, Immunosuppressive; MAPD, Medicare Advantage Part D; OLS, Ordinary Least Squares; OR, Odds Ratio; PHN, Postherpetic Neuralgia; SD, Standard Deviation; US, United States.

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Supplemental data
Narrated summary

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