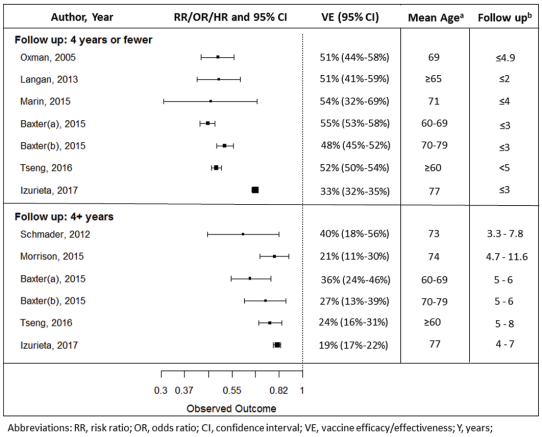
immunocompetent recipients ≤ 60 years old. Selected articles were abstracted, independently reviewed, and discrepancies adjudicated. We attempted to locate relevant unpublished work and contacted authors for additional data, where necessary. Measures of association were illustrated on a forest plot and converted to VE (1-hazard ratio or risk ratio or odds ratio).

Results. We screened 1302 articles; 17 underwent full text review and 8 met inclusion criteria and were abstracted for this review. Selected studies included 1 phase III randomized controlled trial, 2 quasi experimental and 5 observational studies. One experimental and 5 observational studies estimated VE during the period from vaccination up to 4 years following vaccination; estimates across studies ranged from 33%-55%. Two quasi experimental and 3 observational studies estimated VE for ≥ 4 years following vaccination; estimates ranged from 19%-40%; the median estimate was 24% (Figure). Pooled VE was not calculated due to heterogeneity in length of follow up, age distribution of study subjects, as well as adjustment for factors such as underlying medical conditions.

Conclusion. Most experimental and observational studies estimate VE just above 50% during the 3 years following receipt of ZVL. Beyond 3 years, ZVL protection wanes, with most studies estimating a VE of ≤24% after 4 years. Information on overall efficacy and duration of protection from ZVL will guide policy decisions regarding its use.

Figure. Comparative VE of ZVL (Zostavax) for the prevention of herpes zoster, by length of follow-up time post-vaccination



Abbreviations: RR, risk ratio; OR, odds ratio; CI, confidence interval; VE, vaccine efficacy/effectiveness; Y, years;
[a]Mean age reported in years. If mean age was not available, age range for study participants was reported.
[b]Length of study follow-up period post ZVL vaccination in years.

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1338. Assessment of the Potential Herpes Zoster and Post Herpetic Neuralgia Case Avoidance with Vaccination in the United States

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Session: 152. Herpes Zoster Vaccine
Friday, October 6, 2017: 12:30 PM

Background. Herpes zoster (HZ), commonly referred to as shingles, is a reactivation of latent varicella zoster virus in patients previously infected. Clinical characteristics of HZ include painful rash with potential complications, including post herpetic neuralgia (PHN). Care for HZ and PHN incurs significant costs and vaccination is beneficial. The aim of this study was to compare the impact on HZ and PHN case avoidance of two HZ vaccines, an available live-attenuated zoster vaccine (zoster vaccine live [ZVL]) vs. a candidate non-live adjuvanted HZ subunit vaccine (HZ/su), in the US population.

Methods. A Markov model called ZONA (ZOster ecoNomic Analyses) was developed following two age cohorts (≥60 years to represent the current ACIP recommendation and ≥65 years to represent the Medicare population) over their lifetimes from the year of vaccination. Demographic data were obtained from the US Census, whereas HZ incidence and the proportion of HZ individuals developing PHN were derived from published US-specific sources. Age-specific vaccine efficacy and waning rates were based on published clinical trial data. Vaccine coverage for both vaccines was assumed to be 30.6% and 34.2% in the two age cohorts, respectively, based on CDC data; compliance of the second dose of the HZ/su vaccine was 69%, based on data from clinical trials and Hepatitis B seconddose completion. Sensitivity analyses demonstrated robustness of the base analysis findings.

Results. In the US, for cohorts of 66.83 million (M) persons aged 60+ and 47.76M aged 65+ it was estimated that the HZ/su vaccine would reduce the number of HZ cases by 2.12M and 1.55M in the two age cohorts, respectively, compared with 0.65M and 0.45M using the ZVL. Furthermore, the HZ/su vaccine would reduce the number of PHN cases by 0.23M and 0.18M in the two age cohorts, respectively, compared with 0.10M and 0.09 using the ZVL. The number needed to vaccinate to prevent one HZ case were 10 and 11, in the respective cohorts, using the HZ/su vaccine compared with 31 and 37, in the respective cohorts, using the ZVL.

Conclusion. Due to higher and sustained vaccine efficacy, the candidate HZ/su vaccine demonstrated superior public health impact in the US compared with the currently available ZVL.

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1339. Effectiveness of Live Zoster Vaccine in Preventing Herpes Zoster Ophthalmicus (HZO)

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Session: 152. Herpes Zoster Vaccine
Friday, October 6, 2017: 12:30 PM

Background. Herpes zoster ophthalmicus (HZO), caused by reactivation of varicella-zoster virus in or around the eye, can be severe and often results in care-seeking that may be less discretionary than for uncomplicated herpes zoster (HZ). We compared the vaccine effectiveness (VE) of live zoster vaccine against HZO with the VE against HZ overall.

Methods. Kaiser Permanente Northern California (KPNC) members enter the ongoing cohort study when age-eligible for zoster vaccine starting in 2007. Incident HZ was defined as a new diagnosis of HZ with an antiviral prescription or a positive varicella viral test. Among those, an HZO case was defined as having an HZO diagnosis during an ophthalmology visit within 30 days of the initial HZ diagnosis. VE by age at vaccination and time since vaccination was estimated using Cox regression adjusted for age, race, sex and time-varying measures of healthcare use, comorbidities and immunocompromise status. Average VE over the first 5 years following vaccination was calculated as a weighted average of annual VE estimates.

Results. During 2007–2014, ~1.3 million individuals ≥50 years of age entered the study population and 29% were vaccinated. Among 48,889 incident HZ cases, 2,858 (6%) had HZO, 87% of whom were unvaccinated. For all ages combined, VE against HZO was 72% (95% CI, 64%-79%) in year 1, similar to 68% (95% CI, 65%-70%) against HZ. VE fell in years 2, 3, 4, and 5 to 47%, 45%, 42% and 27% for HZO and to 47%, 39%, 41% and 37% for HZ. For age groups 60 – 69 and 70 – 79, where we have the most data, initial VE and waning were similar for HZO and HZ. Numbers of HZO cases for 50–59 year olds were too small to evaluate at this time. Average VE against HZO over the first 5 years following vaccination was 52% (95% CI, 42%–60%) for ages 60–69, 51% (95% CI, 39%–61%) for ages 70-79, and 39% (95% CI, 14%-57%) for ages 80+; similarly, 5-year average VE against HZ was 49%, 46%, and 44% for these 3 age groups.

Conclusion. VE against HZO was similar to VE against HZ regardless of age at vaccination or time since vaccination. Effectiveness of live zoster vaccine in preventing HZO was highest in year one with subsequent waning.

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1340. Immune Senescence Factors Associated with the Immunogenicity of a Live Attenuated Zoster Vaccine (ZV) in Older Adults

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Session: 152. Herpes Zoster Vaccine
Friday, October 6, 2017: 12:30 PM

Background. ZV confers protection against herpes zoster by increasing the cell-mediated immunity (CMI) to varicella-zoster virus (VZV). ZV immunogenicity and protection decrease with increasing age. We investigated effects of age and immune senescence on ZV immunogenicity.

Methods. 399 adults ≥50 years had VZV T-cell helper 1 (Th1) CMI measured by ex vivo VZV-stimulated IL2/IFNg ELISPOT and blood T-cell nonspecific immune senescence by flow cytometric characterization of FOXP3, CD25, IL10, TGFb, PD1, CD28, CD57 and CD31 expression before and at 1, 6 and 52 weeks after ZV. In a subset of 95 vaccinees, VZV-stimulated T cell expression of CD107, Granzyme B, FOXP3, CD25, IL10, TGFb, CD39 and PD1 were also measured. Multivariate regression analysis was used to identify independent effects of age and immune senescence on VZV Th1 CMI ($P < 0.025$).

Results. IL2+ and IL2+IFNg+ Th1 *memory* VZV CMI peaked at 6 weeks after ZV and remained elevated at 1 year. *Effectors*, including VZV-specific IFNg+ Th1, and CD8+CD107+% and CD4+/CD8+Granzyme B+% cytotoxic T lymphocytes (CTL), peaked at 1 week, but only the IFNg+ Th1 effectors remained elevated at 1 year. There was also a transient increase in blood CD8+PD1+% exhausted T cells 1