income (AHI) were largest among Pneu < 65 (17.1%) and smallest among Pneu ≥ 65 (3.8%). In contrast, the largest proportion of subjects with ≥ $100k AHI was among Pneu ≥ 65 (25.3%) and the smallest among Pneu < 65 (15.8%).

Table 1. Sociodemographic characteristics of subjects in the All of Us research program based on vaccine receipt

	Influenza (N=15346)		Hepatitis B (N=6123)		Human papillomavirus (N=2125)		Pneumococcal (<65) (N=15217)		Pneumococcal (≥65) (N=15300)		All (N=152297)	
	N (%)	95% CI	N (%)	95% CI	N (%)	95% CI	N (%)	95% CI	N (%)	95% CI	N (%)	95% CI
Race												
White	10611 (69.1)	68.4-69.9	3907 (61.8)	60.6-63.0	1308 (61.6)	59.5-63.6	8404 (55.2)	54.4-56.0	12116 (80.2)	79.6-80.9	116917 (52.9)	52.8-53.1
Black or African American	2181 (14.2)	13.7-14.8	1092 (17.5)	16.4-18.2	371 (12.8)	11.4-14.3	3996 (26.9)	25.6-27.0	1321 (8.7)	8.3-9.2	68112 (21.6)	21.5-21.8
Asian	360 (2.3)	2.1-2.6	159 (2.5)	2.1-2.9	108 (5.1)	4.2-6.1	236 (1.6)	1.4-1.8	219 (1.5)	1.3-1.7	10562 (3.4)	3.3-3.4
Ethnicity												
Not Hispanic or Latino	13941 (86.9)	86.4-87.5	5218 (82.7)	81.7-83.6	1741 (81.9)	80.2-83.5	12782 (84.0)	83.4-84.6	13758 (91.1)	90.7-91.6	246940 (78.3)	78.2-78.5
Hispanic or Latino	1561 (10.3)	9.8-10.8	900 (14.2)	13.4-15.1	345 (16.2)	14.7-17.9	1950 (12.9)	12.3-13.4	865 (5.7)	5.4-6.1	59285 (18.8)	18.7-18.9
Highest education level												
No high school degree	948 (6.2)	5.8-6.6	498 (7.9)	7.2-8.6	80 (3.8)	3.0-4.7	1494 (9.8)	9.4-10.3	655 (4.3)	4.0-4.7	31984 (10.1)	10.0-10.3
High school graduate	2535 (16.5)	15.9-17.1	1081 (17.1)	16.2-18.1	360 (16.9)	15.4-18.6	3344 (22.0)	21.3-22.6	1891 (12.4)	12.0-13.1	64006 (20.3)	20.2-20.4
College One to Three	3763 (24.5)	23.9-25.2	1556 (24.6)	23.6-25.7	525 (24.7)	22.9-26.6	4476 (29.4)	28.7-30.2	3414 (22.6)	21.9-23.3	80110 (25.4)	25.3-25.6
College graduate or advanced degree	7814 (50.9)	50.1-51.7	3059 (48.3)	47.1-49.5	1150 (53.2)	51.0-55.3	5548 (36.5)	35.7-37.2	8907 (59.0)	58.2-59.8	131462 (41.7)	41.5-41.9
Annual household income												
Less than $10,000	1446 (9.4)	9.0-9.9	873 (13.8)	13.0-14.7	271 (12.8)	11.4-14.3	2597 (17.1)	16.5-17.7	571 (3.8)	3.5-4.1	49697 (15.8)	15.6-15.9
$10,000 - $49,999	4614 (30.1)	29.3-30.8	1874 (29.6)	28.5-30.8	676 (31.8)	29.8-33.8	4926 (32.4)	31.6-33.1	4250 (28.1)	27.2-28.7	85941 (27.2)	27.1-27.4
$50,000 - $99,999	3188 (20.8)	20.1-21.4	1156 (18.5)	17.3-19.3	416 (19.6)	17.9-21.3	2517 (16.5)	16.0-17.1	3768 (24.9)	24.1-25.5	55640 (17.6)	17.5-17.8
$100,000 or more	3572 (23.3)	22.6-24.0	1419 (22.4)	21.4-23.5	464 (21.8)	20.1-23.7	2405 (15.8)	15.2-16.4	3827 (25.3)	24.5-25.9	61287 (19.4)	19.3-19.6
Prefer not to answer, skipped, or missing	2526 (16.5)	15.9-17.1	1001 (15.8)	14.9-16.8	298 (14)	12.6-15.6	2772 (18.2)	17.6-18.8	2684 (17.8)	17.0-18.3	62832 (19.9)	19.8-20.1

Conclusion. Racial and ethnic disparities in vaccinations were apparent. Pneumococcal vaccination at age 65 years and above was more prevalent among white, non-Hispanic/Latino subjects who were also more educated and affluent. Conversely, those receiving pneumococcal vaccination before age 65 years were less educated and had lower AHI.

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25. Relative Effectiveness of Adjuvanted Trivalent Influenza Vaccine Compared to Egg-Based Trivalent High-Dose Influenza Vaccine among U.S. Older Adults during 2019-20 Influenza Season

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Session: P-02. Adult Vaccines

Background. According to the Centers for Disease Control and Prevention (CDC), during the 2019-20 U.S. influenza season, influenza resulted in almost 180,000 hospitalizations and over 13,000 deaths in adults ≥ 65 years. The current study evaluated the relative vaccine effectiveness (rVE) of adjuvanted trivalent influenza vaccine (aTIV) compared to high-dose trivalent influenza vaccine (TIV-HD), against influenza-related hospitalizations/emergency room (ER) visits, all-cause hospitalizations and hospitalizations/ER visits for cardio-respiratory disease (CRD) among adults ≥65 years for the 2019-20 influenza season.

Methods. A retrospective cohort analysis of older adults (≥ 65 years) was conducted using IQVIA's professional fee, prescription claims and hospital charge master data in the U.S. Baseline characteristics included age, gender, payer type, geographic region, Charlson Comorbidity Index (CCI), comorbidities, indicators of frail health status, and pre-index hospitalization rates. To avoid any influenza outcome misclassification with COVID-19 infection, the study period ended March 7, 2020. Adjusted analyses were conducted through inverse probability of treatment weighting (IPTW) to control for selection bias. Poisson regression was used to estimate the adjusted pairwise rVE against influenza-related hospitalizations/ER visits, all-cause hospitalizations and any hospitalization/ER visit for CRD. An unrelated negative control outcome, urinary tract infection (UTI) hospitalization was included.

Results. During the 2019-20 influenza season, following IPTW, 798,987 recipients of aTIV and 1,655,979 recipients of TIV-HD were identified. After IPTW adjustment and Poisson regression, aTIV was statistically comparable to TIV-HD for prevention of influenza-related hospitalizations/ER visits (3.1%; 95% CI: -2.8%-8.6%) and all-cause hospitalizations (-0.7%; 95% CI: -1.6%-0.3%). Similar comparable outcomes were found for reduction of any hospitalization/ER visit for CRD (0.9%; 95% CI: 0.0%-1.7%). No treatment effect was identified for the negative control outcome.

Conclusion. aTIV and TIV-HD demonstrated comparable reductions in influenza-related hospitalizations/ER visits, all-cause hospitalizations and hospitalizations/ER visits for CRD.

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26. Is There a Correlation Between Reactogenicity and Immune Responses of the Adjuvanted Recombinant Zoster Vaccine (RZV)? A Post-hoc Analysis

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Session: P-02. Adult Vaccines

Background. RZV (GSK) contains the varicella-zoster virus antigen glycoprotein E (gE) and the adjuvant system $AS01_B$ that enhances gE-specific immune responses through stimulating innate immunity. $AS01_B$ may contribute to the development of transient local or systemic post-vaccination reactions. A hypothesis that the magnitude of those reactions is predictive of immunogenicity and efficacy (i.e., "no pain, no gain") remains untested. To evaluate potential correlations between RZV's reactogenicity and immunogenicity in adults aged ≥ 50 years, a *post-hoc* analysis was conducted using data from 2 large phase 3 studies (NCT01165177, NCT01165229).

Methods. Reactogenicity was calculated as a single score per symptom (maximum grade recorded over 7 days post-vaccination). A global score obtained by adding each maximum severity for all reported symptoms (multivariate reactogenicity models) and a score for each reactogenicity symptom (univariate reactogenicity models) were estimated.

Results. The analysis included 904 and 147 RZV recipients with completed post-vaccination symptom diary cards and with anti-gE antibody results or cell-mediated immunity (CMI) results, respectively. The global score of reactogenicity post-dose 2 was significantly associated with anti-gE antibody response (p< 0.001, estimate 0.112) although the absolute antibody increase associated with reactogenicity was minimal (1.29-fold increase), while the association with CMI response was not statistically significant (p=0.073, estimate 0.230). There was a weak, but statistically significant association between gE-specific immune responses and the maximum pain post-dose 2 score (p=0.001, estimate 0.041), irrespective of post-vaccination time. Nevertheless, there are observations of immune responses in participants for whom pain was not reported.

Conclusion. A weak but statistically significant correlation was found between injection site pain intensity and immune responses in adult RZV recipients aged ≥ 50 years. However, participants reporting no pain were also able to mount a strong immune response, therefore pain cannot be a surrogate marker to inform on the level of immune response or on likelihood of being protected against herpes zoster.

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27. Immunologic Hyporesponsiveness with Subsequent Dosing of Meningococcal Vaccines: Re-Evaluating the Current Paradigm

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Session: P-02. Adult Vaccines

Background. Immunologic hyporesponsiveness (HyR) is considered as an inability to mount immune responses to vaccination of at least the same degree as earlier doses. For meningococcal vaccines, HyR has classically been associated with unconjugated but not conjugated polysaccharide (PS) vaccine dosing, but the clinical relevance is unclear.

Methods. To characterize meningococcal vaccine HyR, a PubMed search was conducted without date limits as follows: (hyporespons*) AND (meningococcal) AND (vaccine OR mechanism OR MOA OR causes). Papers from the authors' files, including HyR insights with other vaccines, were included.

Results. Classic HyR with repeat unconjugated PS vaccine (MPV) dosing is thought to be associated with memory B-cell (BC) depletion, causing reduced responses on redosing with the same PS. This lack of immunologic memory and interference is seen years after MPV dosing across age groups. As data is added, other examples seem to fit the HyR definition but differ from the classical mechanism and its implications. First, passively transferred maternal antibodies (Abs) may interfere with neonatal adaptive immune response and ultimately those of childhood vaccination