# VACCINATION AND POTENTIAL MISSED OPPORTUNITIES AMONG ADULTS IN THE UNITED STATES DURING THE AFFORDABLE CARE ACT ERA

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# BACKGROUND AND OBJECTIVE

- Provisions in the Affordable Care Act (ACA) aimed at improving health care access by eliminating cost-sharing for a range of preventive services, including routinely recommended adult vaccinations. However, many adults still do not receive influenza, herpes zoster (HZ), and/or pneumococcal vaccinations.<sup>2</sup>
- Adult health care utilization may be infrequent, potentially leading to limited opportunities for vaccinations. Little contemporary evidence exists on how patterns and characteristics of health care utilization among adults may influence vaccination after implementation of the ACA.
- Study Objective: Evaluate health care utilization during the time-period influenza vaccination was most likely to occur and around the ages when HZ and pneumococcal vaccination were first recommended, and to identify factors associated with adult vaccination and potential missed opportunities.

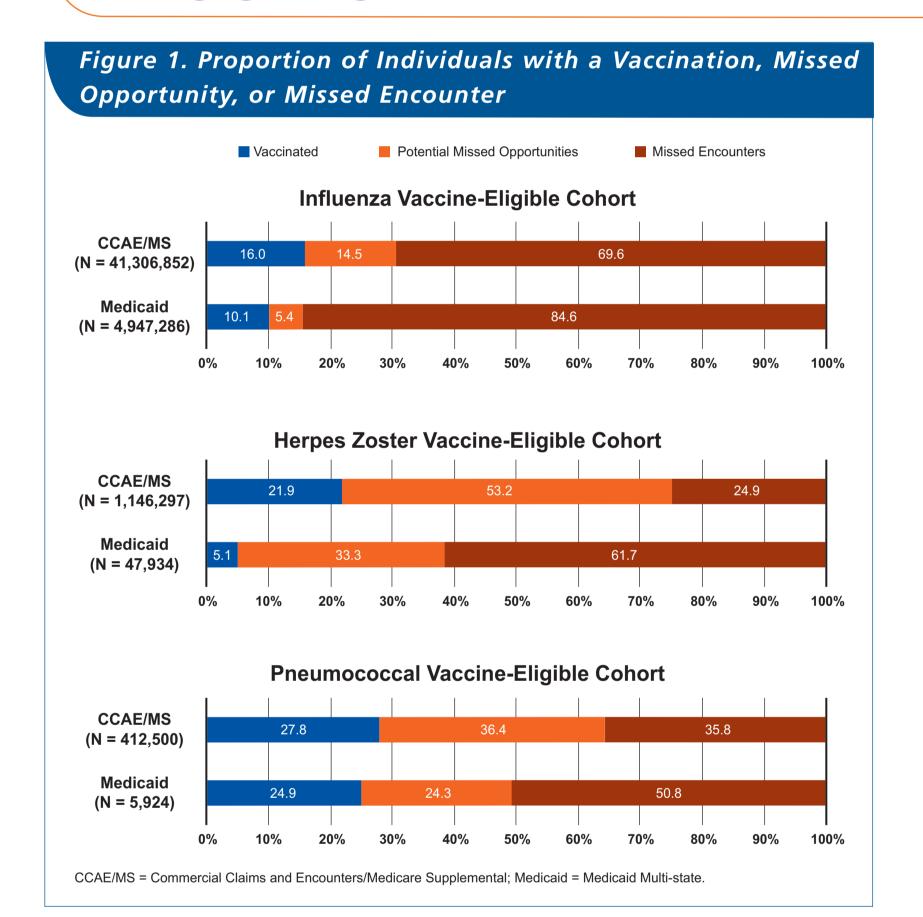
## CONCLUSIONS

- In the post-ACA era, adult vaccination uptake in the United States continues to be suboptimal.
- Patients' interactions with the healthcare system need to be better leveraged to ensure adequate adherence to recommended vaccinations.
- ° Adherence to regular annual visits may increase opportunities to offer and administer eligible vaccines.
- ° Regardless of the type of visit, increased contact with providers may facilitate vaccination.
- **▶ Family and internal medicine providers and pharmacists** remain key adult vaccination stewards.
- **►** Alternative providers who practice in the outpatient setting could administer vaccines to adults who may not have a primary care provider or are seeking regular care through specialists.

# METHODS

- Three non-mutually exclusive cohorts were selected from the 2011-2016 MarketScan Commercial Claims and Encounters, Medicare Supplemental (CCAE/MS) and Medicaid databases:
  - 1. Influenza vaccination-eligible cohort: Individuals aged 19+ years and continuously enrolled during at least one influenza vaccination season (September through February).
- 2. **HZ vaccination-eligible cohort:** Individuals continuously enrolled during a 36-month period starting January 1<sup>st</sup> in year the individual became 60 years of age.
- 3. **Pneumococcal vaccination-eligible cohort:** Individuals continuously enrolled during a 36-month period starting January 1<sup>st</sup> in the year the individual became 65 years of age.
- Vaccination receipt was assessed during the observation windows for the respective cohorts, based on the presence of a CPT or NDC code.
  - Unvaccinated individuals in each cohort were categorized as having one of the following during the respective observation window:
  - Potential missed opportunity: Had at least one well-visit (i.e., received preventive care or other vaccine during the encounter) but did not receive the vaccine of interest during the observation window.
  - Missed encounters: Did not have any well-visits during the observation window.
  - Multivariable logistic regression was used to identify factors associated with vaccination and potential missed opportunities by vaccineeligible cohort and payer type (CCAE/MS and Medicaid).

## RESULTS



Enrollee Characteristics	Vaccine-Eligible Cohort Influenza HZ Pneumococcal					
	CCAE/MS	Medicaid	CCAE/MS	Medicaid	CCAE/MS	Medicaid
Total individuals (N)	98,060,151	10,518,295	1,146,297	47,934	412,500	5,924
Sex (%)						
Male	46.9	30.5	46.0	43.7	48.5	35.3
Female	53.1	69.5	54.0	56.3	51.5	64.7
Race (%)						
White		51.7		49.1		56.2
Black		33.0		37.1		32.7
Hispanic		2.3		1.5		2.7
Other/Unknown		13.0		12.3		8.4
Other vaccines receive	d during the o	bservation pe	riod (%)			
None	95.9	96.9	70.4	75.2	70.9	79.7
Only influenza			6.7	4.0	3.9	5.1
Only HZ	0.6	0.1			11.4	4.4
Only pneumococcal	1.0	0.9	54	8.8		
Only Tdap	2.2	2.0	11.5	7.0	8.5	7.5
Influenza + HZ					1.3	1.0
Influenza + pneumococcal			1.3	1.4		
Influenza + Tdap			2.0	0.7	0.8	1.0
Pneumococcal + HZ	0.05	0.02				
Tdap + HZ	0.05	0.01			2.8	1.0
Tdap + pneumococcal	0.1	0.1	2.0	2.5		
Influenza + Tdap + HZ					0.4	0.2
Influenza + Tdap + pneumococcal			0.5	0.4		
Tdap + pneumococcal + HZ	0.01	0.00				

CCAE/MS = Commercial Claims and Encounters/Medicare Supplemental; HZ = herpes zoster; N = population size;

Han X, et al. Has recommended preventive service use increased after elimination of

2. Hung MC, et al. Vaccination Coverage Among Adults in the United States,

2016.html. Accessed: January 7, 2019.

imz-managers/coverage/adultvaxview/pubs-resources/NHIS-

cost-sharing as part of the Affordable Care Act in the United States? Prev Med.

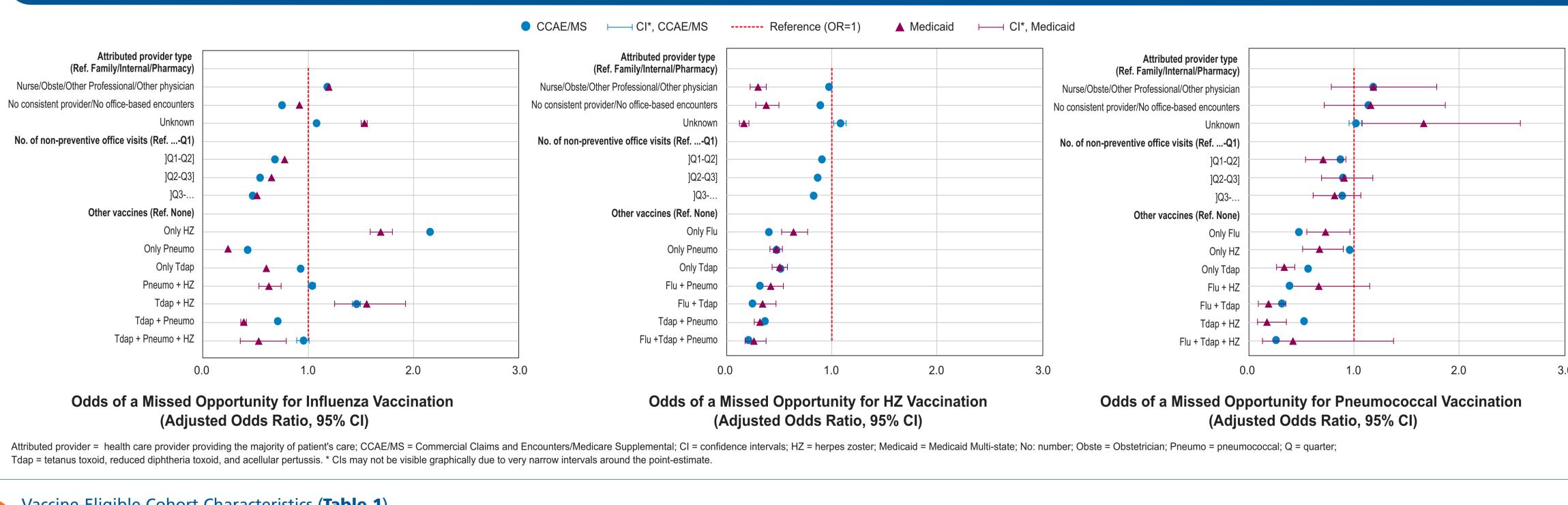
National Health Interview Survey, 2016. 2018.

https://www.cdc.gov/vaccines/

Tdap = tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis

### Figure 2. Select Characteristics Associated with the Likelihood of Influenza, HZ, or Pneumococcal Vaccination During the Observation Periods Attributed provider type (Ref. Family/Internal/Pharmacy) (Ref. Family/Internal/Pharmacv) Nurse/Obste/Other Professional/Other physician Nurse/Obste/Other Professional/Other physician No consistent provider/No office-based encounters No consistent provider/No office-based encounters No consistent provider/No office-based encounters Unknown No. of preventive care visits (Ref. 0) No. of preventive care visits (Ref. 0 Had at least one preventive care visit No. of non-preventive office visits (Ref. ...-Q1) No. of non-preventive office visits (Ref. ...-Q1) No. of non-preventive office visits (Ref. ...-Q1) ]Q1-Q2] ]Q3-. ]Q2-Q3] [Q2-Q3] Other vaccines (Ref. None) ]Q3-.. ]Q3-.. Other vaccines (Ref. None) Other vaccines (Ref. None) Only Flu Only Pneumo Only Tdap Pneumo + HZ Flu + Pneumo Flu + HZ Tdap + HZ Flu + Tdap Flu + Tdap\* Tdap + Pneumo Tdap + Pneumo Tdap + HZ\* Tdap + Pneumo + HZ Flu +Tdap + Pneumo Flu + Tdap + HZ 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 3.0 4.0 5.0 6.0 7.0 Odds of Influenza Vaccination **Odds of HZ Vaccination Odds of Pneumococcal Vaccination** (Adjusted Odds Ratio, 95% CI) (Adjusted Odds Ratio, 95% CI) (Adjusted Odds Ratio, 95% CI) Attributed provider = health care provider provi \* CIs may not be visible graphically due to very narrow intervals around the point-estimate

Figure 3. Select Characteristics Associated with the Likelihood of Having at Least One Potential Missed Opportunity for Influenza, HZ, or Pneumococcal Vaccination During the **Observation Periods** 



- Vaccine-Eligible Cohort Characteristics (Table 1)
  - The cohorts were similar in distribution by sex and race. • CCAE/MS samples were predominantly enrolled in preferred provider organization plans; Medicaid samples
  - were predominantly enrolled in comprehensive or health maintenance organizations plans.
  - Vaccinated, Potential Missed Opportunities, and Missed Encounters (Figure 1) • Few patients were vaccinated during the observation windows.
- Most individuals in the vaccine-eligible cohorts had either a missed encounter or a potential missed opportunity for vaccination.
- The influenza vaccine-eligible cohort had the largest proportion of patients with missed encounters compared to other vaccines, which was likely due to shorter observation windows.
- ► Factors Associated with Vaccination (Figure 2)
- Preventive care visits (i.e., an encounter coded with a preventive care code, does not include vaccine-only visits), non-well-visits in the office setting, and receipt of other vaccines were associated with increased odds of vaccination in most models.
- Having a nurse, obstetrician, other professional, or other physician type as an attributed provider or no consistent provider/no office-based encounter, rather than a family/internal medicine or pharmacy provider, was associated with decreased odds of vaccination in the influenza and pneumococcal vaccine-eligible cohorts for both payer types, while the Medicaid HZ vaccination model indicated that such attributed providers were significantly associated with increased odds of HZ vaccination.
- Factors Associated with Missed Opportunities (Figure 3):
- Across all models, having non-preventive office visits was associated with reduced odds of having a potential missed opportunity.
- Receipt of other vaccinations during the observed periods around the age of 60 years and around the age of 65 years was associated with reduced odds of having a potential missed opportunity during the respective observation periods in both payer cohorts.

- → Only year of birth was available for this analysis, therefore calculating a patient's exact periods of age eligibility for pneumococcal and HZ vaccines was not feasible.
- Vaccinations occurring outside of the reimbursable CCAE/MS or Medicaid systems (e.g., some workplace vaccinations, traditional Medicare) were not captured.
- Limiting potential missed opportunities to well-visits is a conservative approach to identifying visits; many visits for treatment of acute or chronic conditions may also be appropriate for vaccine administration.

### **Disclosures**

### **Acknowledgments**

Authors would like to thank Business & Decision Life Sciences platform for editorial assistance and publication coordination, on behalf of GSK. Amandine Radziejwoski coordinated publication development and editorial support.

### **Funding**

GlaxoSmithKline Biologicals SA funded this study (GSK study identifier: HO-17-18478) and all costs associated with the development of related publications.

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