Closing vaccine gaps: analysis of adult vaccination rates and predictors of poor uptake

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Introduction

- The Center for American Progress states that increasing vaccination rates among adults has the potential to save over $96 billion in total medical and societal costs.
- These savings may translate into cost avoidance and increased worker productivity for health plans, their members, employers, and society.
- Health plans may introduce additional incentives to increase vaccination rates because it impact quality ratings and reimbursement
- Older adults have increased susceptibility to various diseases. Since vaccines reduce morbidity and mortality, efforts should focus on improving vaccination rates among older adults.
- CDC recommends COVID-19, influenza, pneumococcal, respiratory syncytial virus (RSV), shingles starting at 50 years of age.
- Despite benefits of these vaccines, studies have shown a steady decline in vaccination rates in this population since 2015.

Table 1. CDC Recommended Vaccinations for Older Adults

Vaccine	Schedule
Influenza (Flu)	• **Annually** • **18 - 64 years old:** Afluria Quadrivalent Jet injector • **65 years old and older:** Fluzone High-Dose Quadrivalent inactivated influenza vaccine, Flublok Quadrivalent recombinant influenza vaccine, or Fluad Quadrivalent inactivated influenza vaccine.
Zoster recombinant (Shingrix)	• **50 years old and older:** 2 doses (2-6 months apart) • **19 years old and immunocompromised:** 2 doses (2-6 months apart)
COVID-19 (Moderna, Pfizer-BioNTech or Novavax)	• **Aged 5 – 64 years:** 1 age-appropriate updated COVID-19 vaccine • **Aged 65 years and older:** 2 doses of **Moderna OR Pfizer-BioNTech** (4 months apart) • **Aged 65 years and older:** Two-dose **Novavax plus** any single dose updated 2023–2024 COVID-19 vaccine
Respiratory syncytial virus (RSV) vaccine	• **75 years old and older**: Single dose • **ages 60-74 at increased risk of severe RSV:** Single dose
Pneumococcal conjugate vaccines (PCV15 OR PCV20)	• Age 5 through 64 years old with certain risk conditions **OR** 65 years or older **AND** who never received a PCV: **PCV15 OR PCV20** • 65 year and older who received **PCV13** (at any age) **AND PPSV23** (by 65 years old or older): **PCV20 ONLY** • Adults 65+ who have **received PPSV23** but who have **NOT** received PCV13, PCV15, or PCV20: **PCV15 OR PCV20 (1 year later)**
Pneumococcal polysaccharide vaccine (PPSV23)	• 19 years or older who **previously receive** PCV15: **PPSV23 (one year later)** • Previously received both PCV13 and PPSV23 but NO PPSV23 was received at age 65 years or older: **PCV20 or PPSV23**

Purpose

- By analyzing claims data for pneumococcal, shingles, flu, COVID, and RSV vaccines, we aim to develop targeted educational text messaging to increase vaccination uptake in 2025-2026.
- Our goal is to establish baseline rates of vaccination status in adults ≥ 50 years and further breakdown the data by geography, gender, comorbidities, and channel to identify predictors of poor uptake.

Methods

- We analyzed insurance claims data from **June 1, 2021, to June 30, 2024**, to identify factors affecting vaccination rates **in adults aged 50 and older**.
- We focused on patients with health conditions recognized by the CDC as increasing the risk of severe illness.
- We compared patient groups based on key health and demographic factors, using appropriate statistical methods to determine significant differences.
- A specialized software program **(Minitab v20.2**) was used to analyze the data, with results considered meaningful if the **probability of error was less than 5% (p < 0.05).**

Results

Table 2. Demographic and clinical characteristics*

	No vaccine, n=27,774 (42.5%)	Any vaccine, n=37,602 (57.5%)	P value
Sex			
Female	13,652 (49.2)	21,373 (56.8)	**<0.001**
Male	**14,122 (50.9)**	**16,229 (43.2)**	
Age			
Mean (SD)	58.9 (6.4)	59.5 (5.8)	**<0.001**
Median (IQR)	58 (9)	60 (9)	
State			
KS	7,591 (27.3)	13,207 (35.1)	
MO	**15,065 (54.2)**	**17,953 (47.7)**	**<0.001**
Other	5,118 (18.4)	6,442 (17.1)	
Medical claim			
CVD	88 (0.3)	128 (0.3)	0.602
Diabetes	**6,984 (25.1)**	**6,778 (18)**	**<0.001**
Hypertension	**18,002 (64.8)**	**16,512 (43.9)**	**<0.001**
Smoker	**1,041 (3.7)**	**846 (2.2)**	**<0.001**
BMI > 25 kg/m²	**11,377 (41)**	**12,458 (33.1)**	**<0.001**
Lung disease	**2,347 (8.5)**	**2,240 (6)**	**<0.001**
Asthma	2,078 (7.5)	2,817 (7.5)	0.962
CKD	**1,306 (4.7)**	**1,425 (3.8)**	**<0.001**
Imm Disorder	**446 (1.6)**	**805 (2.1)**	**<0.001**
Imm Rx	10 (0.04)	22 (0.06)	0.183
Sickle Cell	23 (0.08)	24 (0.06)	0.38
Neuro dev disorder	30 (0.1)	37 (0.1)	0.706
Active cancer	**1,608 (5.8)**	**1,994 (5.3)**	**0.007**

*percentages are rounded and may not equal 100%

Table 3. Vaccine category and utilization (n=65,376)

Vaccine Category	Count	Percent
Covid Only	3,509	5.37%
Flu and Covid	14,876	22.75%
Flu Only	17,087	26.14%
No Flu Or Covid	29,904	45.74%

Table 4. Number of Vaccines per member (n=65,376)

Vaccine Count	Count	Percent
0	27,774	42.48%
1	19,310	29.54%
2	13,446	20.57%
3	4,119	6.30%
4	658	1.01%
5	69	0.11%

Figure 1: Multivariate logistical regression: lower vaccine rate

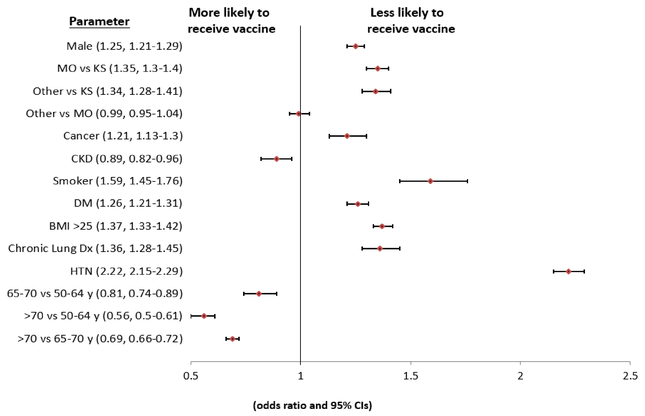
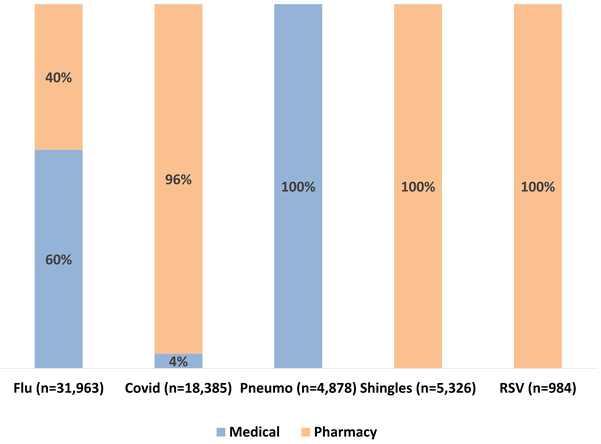


Figure 2. Service provider by vaccine utilization (n=37,602)



Odds ratio for level A relative to level B.

Discussion

We **examined vaccine trends in adults aged 50 and older** to understand why some groups have lower vaccination rates. By identifying gaps—such as differences based **on gender, age, and location**—we can better target efforts to improve vaccine access. The **flu vaccine** often leads to better uptake of other vaccines, and pharmacies play a key role in providing them. Recognizing barriers like chronic illness or mobility issues helps **healthcare providers, insurers, and vaccine manufacturers** work together to improve access. Addressing these gaps can reduce hospital visits, lower costs, and improve overall health for older adults in Colorado.

Next Steps

This project helps identify older adults who may be at higher risk due to age, health conditions, or location. Next steps include:

1. **Direct Outreach via Text Messages** – Engage these individuals through SMS to understand their thoughts on vaccines and provide helpful information about where and how to get vaccinated.
2. **Pharmacy-Based Vaccination Programs** – Support local pharmacists in expanding vaccine access, as they are trusted and convenient healthcare providers for older adults.
3. **Mobile and Home-Based Vaccination Services** – Bring vaccines directly to those with mobility challenges or limited transportation, ensuring easier access for homebound and rural residents.

These efforts aim to improve vaccine access, reduce health risks, and strengthen public health across Colorado.

Limitations

Our analysis has some limitations:

1. **Vaccine Data** – We tracked vaccinations using a specific list of billing codes, which may not capture all vaccines given.
2. **Health Conditions** – We identified risk factors based on a set list of diagnosis codes, using only the primary diagnosis and not additional conditions.
3. **Data Matching** – Our results depend on accurately linking medical and pharmacy records using deidentified member IDs.
4. **Missing Data** – We excluded records with unclear gender or incorrect age information.

Despite these limitations, our findings provide valuable insights to improve vaccine access for older adults in Colorado.

References

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