

Supplementary Material*

Cho B, Weinbaum C, Tsai Y, et al. Influenza vaccine uptake and missed opportunities among the Medicare-covered population with high-risk conditions during the 2018 to 2019 influenza season. A retrospective cohort study. *Ann Intern Med*. 16 November 2021. [Epub ahead of print]. doi:10.7326/M21-1550

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* This supplementary material was provided by the authors to give readers further details on their article. The material was reviewed but not copyedited.

Supplement Methods 1. Eligibility Criteria Information

Medicare Part A and B enrollment

While all adults aged ≥ 65 are generally eligible for Medicare enrollment, there are eligibility criteria; according to the US Census Bureau, in 2018, 94.1% of adults aged ≥ 65 were covered by a public plan (primarily Medicare) (<https://www.census.gov/content/dam/Census/library/publications/2019/demo/p60-267.pdf>).

Fee-for-Service Only

In order to include only fee-for-service (FFS)-covered beneficiaries, we used monthly Medicare Advantage indicator variables (HMO_ind_xx values ['0', '4']). For Medicare/Medicaid dually eligible status, we checked the State-reported dual eligibility status code (dual_stus_cd_xx). However, the variable does not provide any further detail regarding full- or partial-benefits eligibility of the beneficiaries.

Supplement Methods 2. Seasonal Influenza Vaccination Identification Using CPT/HCPCS Codes

We extracted influenza vaccination claims using Current Procedural Terminology (CPT) and Healthcare Common Procedure Coding System (HCPCS) codes for seasonal influenza vaccines and vaccine administration (G0008, 90630, 90653, 90654, 90655, 90656, 90657, 90658, 90659, 90661, 90662, 90672, 90673, 90674, 90682, 90685, 90686, 90687, 90688, 90756, Q2035, Q2036, Q2037, Q2038, and Q2039) (12). We also used a quality code (G8482) for “influenza immunization administered or previously received” to identify and confirm prior influenza vaccination receipt.

Supplement Methods 3. Evaluation and Management Visit Identification Using CPT/HCPCS Codes

- We allowed a 1-month grace period after the start of influenza season (i.e., August) to avoid any possibility of flu vaccine unavailability in the first month of flu season, i.e., a situation where the only factor influencing a missed opportunity was supply, rather than the factors we examined. We also allowed one month of grace period before April for beneficiaries to receive flu vaccination after consultation during an evaluation and management (E/M) visit.
- American Medical Association's Current Procedural Terminology® (CPT) or Healthcare Common Procedure Coding System (HCPCS) codes for Evaluation and Management (E/M) visits were obtained from the specifications sheet of National Quality Measure – Influenza Immunization (2019).
- These codes are used to capture the denominator of the measure to assess the percentage of patients seen for a visit during a study period who received an influenza vaccine. It is an extended set of codes from E/M office or other outpatient visits (CPT codes 99201-99215); additional codes include End-Stage Renal Disease (ESRD) services codes (90951-90970), consultation (99241-99245), nursing facility services or home visits (99304-99316, 99324-99350, 99512), preventive medicine services (99381-99429) and Medicare annual wellness visits codes (G0438, G0439).
- Full CPT code list: 90945, 90947, 90951, 90952, 90953, 90954, 90955, 90956, 90957, 90958, 90959, 90960, 90961, 90962, 90963, 90964, 90965, 90966, 90967, 90968, 90969, 90970, 99201, 99202, 99203, 99204, 99205, 99212, 99213, 99214, 99215, 99241, 99242, 99243, 99244, 99245, 99304, 99305, 99306, 99307, 99308, 99309, 99310, 99315, 99316, 99324, 99325, 99326, 99327, 99328, 99334, 99335, 99336, 99337, 99341, 99342, 99343, 99344, 99345, 99347, 99348, 99349, 99350, 99381, 99382, 99383, 99384, 99385, 99386, 99387, 99391, 99392, 99393, 99394, 99395, 99396, 99397, 99401, 99402, 99403, 99404, 99411, 99412, 99429, 99512, G0438, G0439

Supplement Methods 4. Provider Type Category

- If healthcare provider specialty was missing from the E/M claims, we matched the rendering provider's National Provider Identifier with the Medicare FFS Public Provider Enrollment Data file to identify the primary provider's specialty.
- Primary care physicians include general practice, family practice, internal medicine, osteopathic manipulative medicine, hospice and palliative care, pediatric medicine, geriatric medicine, preventative medicine, and obstetrics and gynecology (OB/GYN).
- Medical specialists include providers with the specialties of allergy/immunology, cardiovascular disease (cardiology, interventional cardiology), dermatology, gastroenterology, neurology, cardiac electrophysiology, pulmonary disease, nephrology, infectious disease, endocrinology, rheumatology, addiction medicine, hematology, hematology/oncology, medical oncology, sleep medicine, advanced heart failure and transplant cardiology, medical toxicology, hematopoietic cell transplantation and cellular therapy, and medical genetics and genomics.
- Non-physician practitioners include nurse practitioners, clinical nurse specialists, and physician assistants.
- All other specialties were defined as "Others."