

A Learning Collaborative to Improve Adult Pneumococcal and Influenza Immunization Rates: A Mixed Methods Study Elizabeth Ciemins, PhD, MPH, MA¹; Jill Powelson, RN, MBA, MPH¹; Michelle Jerry, MS²; Ashton Kennedy²; Earlean Chambers, RN, MS¹; Danielle Casanova, MBA¹; and Jerry Penso, MD, MBA¹ ¹AMGA, Alexandria, VA; ²Optum[®] Analytics, Boston, MA

Background: Pneumococcal

- 50,622 pneumococcal-related deaths in 2014
- Pneumococcal disease kills more people in the US each year than all other vaccine-preventable diseases combined (Immunization Action Coalition, 2017)
- 1.2 million cases of drug resistant pneumonia per year in U.S. (CDC, 2013)
- 63.6% adults ages 65+ have ever received a pneumococcal vaccine (HP2020 goal: 90%)
- 23% high-risk adults ages 19–64 have ever received a pneumococcal vaccine (HP2020: 60%)
- Vaccinating 'at-risk' patients reduces risk of hospitalization (IAC, 2017)

High-Risk and At-Risk Patients

High-risk patients: CSF leaks, cochlear implants, hemoglobinopathies, asplenia, chronic renal failure, nephrotic syndrome, organ transplant, kidney disease, immuno-deficiencies, cancers: leukemia, lymphoma, Hodgkin disease, multiple myeloma, general malignancy

At-risk patients: diabetes, chronic heart, lung or liver disease, smoking, alcoholism

Background: Influenza

- 23,607 average deaths per year; as high as 48,614 in 2003–2004 season
- 90% of deaths are among adults ages 65+
- Flu vaccine reduced flu-related ICU admissions by 74% in children; reduced flu-related hospitalizations by 57% in adults 50+
- 41.7% of adults received the influenza vaccine in 2015–2016 season
- Vaccination rates in adults decreased by 1.9% from the 2014–2015 season to 2015–2016
- Healthy People 2020 Influenza vaccination goal: 70%

Study Objective

To implement and test a learning collaborative approach (intervention) to improving adult immunization rates including identification and sharing of successful clinical strategies

Strategies to Increase Immunization

Easier Strategies	More Advanced Strategies
Passive patient education including signage	Active patient outreach including auto calls
Provider and staff education meetings	Offer vaccines in specialty clinics
Offer vaccines in all primary care clinics	Give shots during Medicare AWVs
Standardize where and how you document	Add pneumococcal to flu shot clinics
Refine vaccine procurement procedure	Point-of-care alerts and advisories
Give shots during patient visits	Standing orders for staff
Walk-in or drive-through flu shot clinics	Transparent performance reporting
Immunization faxes from pharmacies	Bi-directional state immunization registry

Custom Measures for Collaborative*

Measure	Denominator	Numerator		
Pneumo Age 65+	All patients in study, age 65+ Adult Immunization Collaborative Intervention Period Total: 189,701 	All patients in denominator with evidence of pneumococcal vaccine, from age 65+		
Pneumo Age 19-64 High-Risk and At-Risk	All patients in study, age 19-64, With evidence of 1+ High-Risk/At-Risk condition • Adult Immunization Collaborative Intervention Period Total: 243,386	All patients in denominator with evidence of pneumococcal vaccine, from age 19-64. (Patients ≥ 65 with High-Risk/At-Risk conditions fell under measure 1.)		
Influenza Age 18+	All patients in study, age 18+ Adult Immunization Collaborative July 2015 – April 2016 Total: 628,693 	All patients in denominator with any evidence of influenza vaccine, from 7/1 – 6/30 of a given flu year		

*All patients were seen by a PCP, or linked to a PCP, and had at least one E&M visit during the reporting period

Methods

- **SETTING:** Seven U.S. healthcare organizations; six states; same population health platform (Optum[®] One)
- **DESIGN:** Mixed methods observational cohort study; comparison group of non-participating organizations
- Outcome measures: pre/post immunization rates (pre: 3/1/13 2/28/15; post: 3/1/15 4/30/16)
- Semi-structured interviews conducted post-intervention; one member-checking focus group
- **ANALYSES:** Provider-level propensity scores used to match providers on baseline pneumococcal immunization rates; race/ethnic minority, and patient volumes; wellness visit rates; geographic region; and organization type (Table 1 displays an example of the matching diagnostics for pneumococcal 65+)
- Generalized estimating equations were used to compare relative treatment effects between groups
- Consolidated Framework for Implementation Research (CFIR) applied in qualitative analysis
- Qualitative data analyzed using a constant comparison approach to identify themes related to successful clinic- and system-level strategies at each participating clinic

Table 1. Pneumococcal 65+ Descriptive Statistics of Baseline Variables: Full Dataset versus Matched Dataset

	Original Sample (Unadjusted)			1:1 Caliper Matched Set (Adjusted)		
	Collaborative PCPs (N=878)	Non-Collaborative PCPs (N=68,912)	Standardized Difference	Collaborative PCPs (N=876)	Non-Collaborative PCPs (N=876)	Standardized Difference
Count Patients	226 ± 263	30 ± 114	0.965	226 ± 263	228 ± 248	0.007
Baseline Immunization ¹	0.44 ± 0.29	0.28 ± 0.35	0.495	0.44 ± 0.29	0.41 ± 0.32	0.108
Minority Rate	0.10 ± 0.18	0.10 ± 0.24	0.006	0.10 ± 0.18	0.10 ± 0.22	0.003
Wellness Visit Rate	0.21 ± 0.26	0.08 ± 0.21	0.548	0.21 ± 0.26	0.21 ± 0.28	0.006
Census Region						
Northeast	284 (32%)	3,338 (5%)	0.756	284 (32%)	301 (34%)	0.041
Southeast	84 (10%)	8,991 (13%)	0.110	84 (10%)	75 (9%)	0.036
South Atlantic	94 (11%)	687 (1%)	0.423	92 (11%)	93 (11%)	0.004
Midwest	416 (47%)	55,896 (81%)	0.752	416 (47%)	407 (46%)	0.021
Group Type						
Ambulatory	271 (31%)	4,996 (7%)	0.630	269 (31%)	267 (30%)	0.005
Integrated Delivery System	607 (69%)	63,916 (93%)	0.630	607 (69%)	609 (70%)	0.005

¹Baseline immunization is calculated as the proportion of patients with an outpatient E&M visit who are immunized with any pneumococcal vaccine, i.e., PPSV, PCV, or unknown type

Consolidated Framework for Implementation Research Applied Constructs: Inner Setting: Networks and Communication, Culture, Learning Climate





Influenza

Pneumococcus

Figure 1. Pneumococcal (65+) and Influenza Immunization Rates Adjusted Odds Ratios and Confidence Intervals



Comparative Analysis using CFIR

High Performing Organizations ¹	Lower Performing Organizations ²
Learning Climate (+)	Learning Climate (-)
Culture (collaborative, education, good communication, patient-centered, prevention, population health/ community, quality)	Culture (top down, siloed, non-collaborative)

¹Adjusted average absolute treatment effect Pneumo 65+: 12% to 22%; ²Adjusted average absolute treatment effect Pneumo 65+: -1.2% to -3.4%

Results

- Among patients 65 years and older seeing providers in intervention organizations, the odds of receiving recommended pneumococcal vaccinations nearly doubled (P < .0001) (Figure 1)
- Improvement achieved by integrated delivery system providers was nearly 25% greater than that achieved by providers in ambulatory-only systems (n.s. result)
- Pneumococcal vaccination rates for high-risk patients also significantly improved (P < .05), and influenza rates saw a modest increase (OR=1.065; CI: 1.022–1.110)
- Comparative analyses using CFIR found that a positive learning climate and a collaborative, patient-centered culture were associated with positive outcomes

Conclusions

- Significant increases in immunization rates were achieved over a relatively short time (14 months) Key factors for success include, but are not limited to:
 - Importance of provider buy-in/ownership and provider champions
 - Organizational support, focus and prioritization
 - Collaboration and learning between organizations
 - Empowerment of staff through standing orders
- HP2020 goal of 90% for pneumococcal ages 65+ appears achievable; improvements are needed to reach goals of 60% and 70% for flu and pneumococcal high-risk
- Organizational characteristics, e.g., positive learning climate and culture, may play a role in improved immunization rates, but can be difficult to achieve
- Other barriers, e.g., documentation, data/technology, knowledge of disease processes, may be easier to address
- In a healthcare environment shifting from volume to value, low-cost preventive efforts such as adult immunizations are a win-win

Implications for D&I Research

Learning collaboratives may be a practical approach to disseminate important public and population health programs across the country. The successful implementation strategies and organizational characteristics identified in this study may assist in the widespread dissemination of this and other population health strategies. This is particularly relevant in the current healthcare environmental shift from volume to value, in which rapid learning about population health management demands such approaches.



