

Reducing Racial Disparities in Influenza Vaccination Among Children With Asthma

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ABSTRACT

Introduction: A multifaceted intervention to raise influenza vaccination rates was tested among children with asthma.

Methods: In a pre/post study design, 18 primary care practices implemented the 4 Pillars Immunization Toolkit along with other strategies. The primary outcome was the difference in influenza vaccination rates at each practice among children with asthma between the baseline year (before the intervention) and at the end of year 2 (after the intervention), both overall and by race (White vs. non-White).

Results: Influenza vaccination rates increased significantly in 13 of 18 practices. The percentage of vaccinated non-White children increased from 46% to 61% ($p < .01$), and the percentage of vaccinated White children increased from 58% to 65% ($p < .001$). Likelihood of vaccination was significantly lower for non-White children before the intervention (odds ratio = 0.66; 95% confidence interval = 0.59-0.73; $p < .001$), but this difference was eliminated after the intervention (odds ratio = 0.95; 95% confidence interval = 0.85-1.05; $p = .289$).

Discussion: A multi-strategy, evidence-based intervention significantly increased influenza vaccination uptake and reduced racial disparities among children with asthma. *J Pediatr Health Care.* (2016) 30, 208-215.

KEY WORDS

Asthma, racial disparities, children, influenza vaccine

The prevalence of asthma among U.S. children has increased over time to an estimated 6.9 million children in 2012 (9% of the population younger than 18 years). Asthma prevalence is higher among low-income and disadvantaged children (13%) than among higher income groups (7% to 9%) and higher among Black children (16%) than among White and Asian children (5%

to 8%; [Centers for Disease Control and Prevention \[CDC\], 2013b](#)).

Persons with asthma are considered to be at high risk for complications of influenza infection. For this reason, annual influenza vaccination is an essential element of prevention. Inactivated influenza vaccine has been recommended for persons with asthma who are older than 6 months since the earliest recommendations of the Advisory Committee on Immunization Practices ([CDC, 1964](#)). Although the most recent national influenza vaccination rate for all children with asthma (2010-2011) of 53% ([CDC, 2013b](#)) is similar to the rate reported among all children aged 6 months to 17 years during the same period (51%; [CDC, 2011](#)), it is far below the Healthy People 2020 goal of 70% ([U.S. Department of Health and Human Services, 2013](#)). Moreover, among children with asthma, disparities exist in influenza vaccine uptake, which is lower among Black children (45%) than among White children (51%) and lower among socioeconomically disadvantaged children (47%) than among higher income children (54%; [CDC, 2013b](#)).

Since the 2008 universal recommendation for influenza vaccination of all children 6 months or older who do not have a contraindication ([Fiore et al., 2008](#)), little research has focused on increasing influenza vaccine uptake, specifically among children with asthma or other high-risk conditions. Moreover, disparities in the rates of influenza vaccination among minority and disadvantaged children with asthma have not been addressed.

Recent research among children of all ages has shown that a multi-strategy intervention that includes a practice improvement toolkit, staff education, feedback, and early delivery of vaccines for disadvantaged children, can successfully raise influenza vaccination rates and reduce racial disparities ([Nowalk et al., 2014a](#); [Zimmerman et al., 2014](#)). The purpose of this study was to examine the impact of that intervention on influenza vaccine uptake among a subgroup of those children, that is, those with an asthma diagnosis, and to test the intervention's effectiveness for reducing racial disparities in influenza vaccination rates in this population.

METHODS

The study was approved by the University of Pittsburgh Institutional Review Board. Methods for sample size calculation and randomization have previously been published ([Zimmerman et al., 2014](#)). The parent randomized cluster trial, which met all Consolidated Standards of Reporting Trials (CONSORT) criteria ([Campbell, Piaggio, Elbourne, & Altman, 2012](#)), was designed to test the effectiveness of a multi-strategy intervention to increase childhood influenza vaccination rates among all children in primary care practices. The study took place during three influenza seasons;

2010-2011 was the baseline year for all sites, 2011-2012 was the active intervention year for half of the sites and the control year for the other half, and 2012-2013 was the maintenance year for the Year 1 intervention sites and the active intervention year for the Year 2 intervention sites. The intervention was the same during both years. At the end of Year 2, vaccination rates for all children in both intervention arms were similar ([Nowalk et al., in press](#)). This analysis includes only children with asthma, comparing baseline (preintervention) with Year 2 (postintervention) vaccination in a pre/post study design.

Site Selection

To be eligible, each site must have had a patient population of at least 200 children ages 6 months to 18 years (to satisfy sample size requirements for the cluster trial), access to vaccination and asthma diagnosis data via an electronic medical record (EMR), and willingness to implement the intervention. Two sites from the parent study were excluded because they did not provide asthma information. Primary care pediatric and family medicine practices from two practice-based research networks (<http://www.familymedicine.pitt.edu/content.asp?id=2353>) and (<http://www.pedspittnet.pitt.edu/>) in Southwestern Pennsylvania were included. All included sites used a common EMR.

Interventions

The intervention was designed using the Diffusion of Innovations Theory ([Oldenburg & Parcel, 2002](#)), and included the 4 Pillars Immunization Toolkit (<http://www.pittvax.pitt.edu/child-flu-toolkit>), as well as provider education, early delivery of donated vaccines for disadvantaged children, and feedback on practices regarding influenza vaccines given and missed opportunities. A description of the intervention and the results for the first year of intervention have been published ([Zimmerman et al., 2014](#)). A summary of the strategies is provided in the [Box](#). The 4 Pillars Immunization Toolkit, a practice improvement toolkit, was initially developed for use in raising adult immunization rates ([Nowalk et al., 2012](#); [Nowalk et al., 2014b](#)) and is based on the following four key evidence-based ([Melinkovich, Hammer, Staudenmaier, & Berg, 2007](#); [Task Force on Community Preventive Services, 2012](#)) strategies: Pillar 1, convenient vaccination services; Pillar 2, notification of patients about the importance of immunization and the availability of vaccines; Pillar 3, enhanced office systems to facilitate immunization; and Pillar 4, motivation through an office immunization champion. The toolkit includes background on the importance of protecting children against influenza, barriers to increasing influenza vaccination from both provider and parent/patient perspectives, and strategies to eliminate those barriers. Practices were expected to implement strategies from each of the four pillars.

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