Figure 1. Population-weighted ZCTA-level HPV vaccination doses per capita by month

Table 1. Individual-level logistic regression model for receiving 9vHPV vaccine type after July 2015

Background and Research Objectives

Human Papillomavirus (HPV) Vaccination
- Most common sexually transmitted infection in the United States
- Causes genital warts, and is associated with cervical, vaginal, vulvar, anal, penile, and throat cancers
- Routine vaccination at age 11 or 12 years has been recommended by the Advisory Committee on Immunization Practices (ACIP) since 2006 for females and since 2011 for males

HPV Vaccination Rates
- In 2015, completion of the three-dose series among adolescents ages 13 to 17 was:
  - 42% for girls
  - 28% for boys
- HPV vaccination coverage also lags far behind childhood and other adolescent vaccines.

HPV Vaccine Types
- Quadrivalent HPV vaccine (4vHPV) and 9-valent HPV vaccine (9vHPV) are currently licensed and indicated for use among both females and males in the US to protect against several of the most common HPV types associated with cancer.
- Binax HPV vaccine (9vHPV) is indicated for females only.
- 9vHPV is the most recent HPV vaccine to enter the market
  - Food and Drug Administration approval in December 2014
  - ACIP recommendation in February 2015

Objectives:
- The primary objective was to evaluate the impact of 9vHPV vaccine on
  - HPV vaccination uptake (# doses)
  - Initiation (1 dose)
  - Completion (≥2 doses)
  - Completion (≥3 doses within 1 year)
- The secondary objective was to describe timing of administration and characteristics of children who received 9vHPV compared to those who received another HPV vaccine (2vHPV or 4vHPV): beginning in July 2015.

Impact of 9-Valent Human Papillomavirus Vaccine on HPV Vaccination Coverage of Youths, Ages 9-17, in North Carolina
Justin T. Trogdon, PhD; Paul Shaffer, MA; Brianna Lindsey, MPH PhD; Teresa Coyne-Bradley, MD MPH

Methodology

Primary objective
- Introduction of 9vHPV was not associated with changes in HPV vaccination rates in NC as measured by doses per capita or initiation, completion or compliance rates
- Results did not change when we also included ZCTA-level characteristics and allowed for auto-correlation in the error terms.

Secondary objective
- Following the introduction of 9vHPV, youth receiving the 9vHPV vaccine were more likely to receive 9vHPV than other HPV vaccine types if they lived in a ZCTA with
  - a larger age-eii (i.e., 1 to 17 population, a health professional shortage area, or
  - a higher number of annual outpatient visits per capita.
- Following the introduction of 9vHPV, youth receiving the 9vHPV vaccine were less likely to receive 9vHPV than other HPV vaccine types if they:
  - were older,
  - received a publicly-funded dose, or
  - lived in a ZCTA with a higher percentage of the population with less than a high school education or
  - a higher number of religious organizations.

Limitations
- NCIR does not include complete coverage of privately funded vaccines, vaccines given by pharmacies or to providers who may have moved out of state
- Full representative of U.S. or areas of country with different demographics and regional patterns of care
- Bias could remain from changes in unobserved confounding coincident with the introduction of 9vHPV (e.g., changes in outreach policies in the state)

Summary
- Introduction of 9vHPV was not associated with changes in HPV vaccination rates in NC
- Transition from 4vHPV to 9vHPV was quick
- Disparities in the diffusion of 9vHPV across areas of NC

Department of Health Policy and Management, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Email: justintrogdon@unc.edu; Merck & Co., Inc.; Department of Pediatrics, University of North Carolina at Chapel Hill