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Impact of a clinical interventions bundle on uptake of HPV vaccine at an OB/GYN clinic

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ABSTRACT

Introduction: HPV vaccine uptake is lowest among young adults. Little is known about the most effective way to decrease missed opportunities (MO) and increase uptake of the vaccine in this vulnerable population.
Objectives: To determine the impact of a clinical intervention bundle on the rate of MO and uptake of the vaccine among young adult women.
Methods: From 2/2014 to 7/2015, an intervention bundle (designating physician and nurse champions, pre-screening patients' charts, empowering nurses to recommend immunization, providing no-cost vaccinations, placing prompts in clinic note templates, eliminating requirement for pre-vaccination pregnancy test) was implemented at an urban, hospital-based OB/GYN clinic. Medical records were reviewed for all vaccine-eligible (non-pregnant, 11–26 years) women seen between 2/2013 and 9/2016. Impact of the bundled interventions on the monthly rates of MO and vaccine uptake was estimated by analyzing immunization trends with an interrupted time-series model using counterfactual comparison groups in order to control for pre-existing trends.
Results: There were 6,463 vaccine-eligible visits during our study period. The prevalence of women who had both completed and initiated the series was significantly higher, 20.3% and 29.7% respectively, in the last month, compared to their counterfactuals ($p < 0.01$). In the last study month, the rate of MO was significantly lower than its counterfactual (19.73 per 100 encounters lower, $p < 0.01$). Hispanic women had attributable reductions in their rates of MO that were twice that of White women. Statistically significant attributable reductions were also seen among Spanish speakers, publicly insured, and uninsured women.
Conclusions: Implementation of this intervention bundle effectively reduced the monthly rate of MO and increased the prevalence of women who had initiated and completed the HPV vaccine series. The reduction of MO was most drastic among Hispanic, publicly insured and uninsured women compared to White and privately insured.

1. Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) and leads to approximately 31,500 cases of anogenital and oropharyngeal cancers annually in the U.S. [1]. An efficacious vaccine that prevents infection from 9 HPV types responsible for over 80% of cervical cancers is available for females and males aged 9–26 years [2–4]. Despite its proven safety and efficacy [5], HPV immunization rates in the U.S. are low, particularly relative to other vaccines recommended for adolescents [6]. HPV vaccine initiation and completion also remain low for women

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18–26 years-old [7–9]. Additionally, racial disparities exist. Despite their significantly higher cervical cancer burden [9–12], multiple studies have demonstrated lower rates of HPV vaccine initiation among Black and Hispanic women 19–26 years-old, compared to their White counterparts [7,8,13,14].

Interventions to improve HPV immunization in ambulatory settings have been well studied. Most interventions focus on vaccine uptake among adolescents through pediatric or school-based health centers [15–19]. Although early immunization before sexual exposure to HPV is ideal, most young adult women are seronegative to the majority of vaccine-type HPV strains, and therefore will benefit from the vaccine [20,21]. As long as adolescent vaccination rates remain suboptimal, efforts to immunize young adult women and eliminate missed opportunities (MO) to prevent HPV disease are critical. Studies including adult women are lacking, and even fewer have evaluated HPV vaccine interventions specifically within obstetrics and gynecology (OB/GYN) clinics where young female patients often exclusively seek medical care [22].

We therefore implemented a clinical intervention bundle with the aims of reducing MO to vaccinate and improving HPV immunization uptake among eligible patients at an urban, hospital-based OB/GYN clinic serving a diverse, low-income patient population.

2. Methods

2.1. Intervention bundle elements

Bundle elements were implemented from 2/1/14-7/31/15 (see Fig. 1) and were selected from intervention strategies that have proven effective in other clinical settings [23,24]. Prior research from our clinic found MO for HPV immunization were most common during nursing visits for depot medroxyprogesterone acetate injections and STI screening [25]. Thus, on 2/1/14, we began educating nurses on HPV vaccine and training them to pre-screen charts for vaccine eligibility among patients scheduled for nursing visits so vaccine orders could be placed in advance. Through this education and training, nurses were empowered to knowledgeably recommend the vaccine to eligible patients, developed the confidence to answer vaccine-related questions from patients, and were authorized to vaccinate appropriate patients without direct clinician involvement. Furthermore, we designated physician and nurse champions responsible for actively promoting HPV immunization at staff meetings [26,27].

On 8/1/14, the clinic Care Coordinator began reviewing charts for *all* age-eligible patients before their appointments with clinicians, and began annotating their electronic medical records (EMR) problem list and appointment note to alert clinicians to the need for HPV immunization.

Each HPV vaccine dose can cost $150-$200, creating a significant immunization barrier for un- or underinsured patients [8,28,29]. Thus, on 11/1/14, in collaboration with hospital pharmacy, we introduced Merck's Financial Assistance Program (MFAP) to provide free immunization to uninsured patients 19–26 years old.

Studies have also shown that in primary care clinics, EMR-generated provider prompts significantly increase vaccine initiation in adolescents and young adults [30,31]. Consequently, on 3/1/15, an EMR-generated prompt was added to note templates, reminding providers to screen patients for vaccine eligibility.

HPV vaccination is currently not recommended during pregnancy. Many providers thus require a pregnancy test before immunization [32]. The vaccine, however, is not associated with adverse maternal or fetal outcomes, and the CDC's Advisory Committee on Immunization Practices (ACIP) does not recommend a pregnancy test before immunization [21]. Therefore, on 6/1/15, we eliminated the pre-immunization pregnancy test requirement.

2.2. Data collection

Demographic and immunization data were collected for all 11–26 year-old females seen at our clinic from 2/1/13–9/30/16, including 12 months pre- and 15 months post-implementation of the intervention bundle. Pregnant patients were not vaccine-eligible and were excluded.

2.3. Data validation

Data were extracted from patients' medical records electronically by Yale's Joint Data Analytics team. Data were validated by first reviewing a random sample (10%) of medical records of all women who had a visit during each study year. Clinic schedules were also audited to identify all women seen on the first clinic day of each month and verify that no visits were missed during data extraction. No inaccuracies were identified.

2.4. Study definitions

A missed opportunity was defined as a vaccine-eligible visit when the patient was due for an HPV vaccine dose but none was administered. Vaccine eligibility was determined by CDC/ACIP guidelines [3]. A vaccine-eligible visit was any visit where the

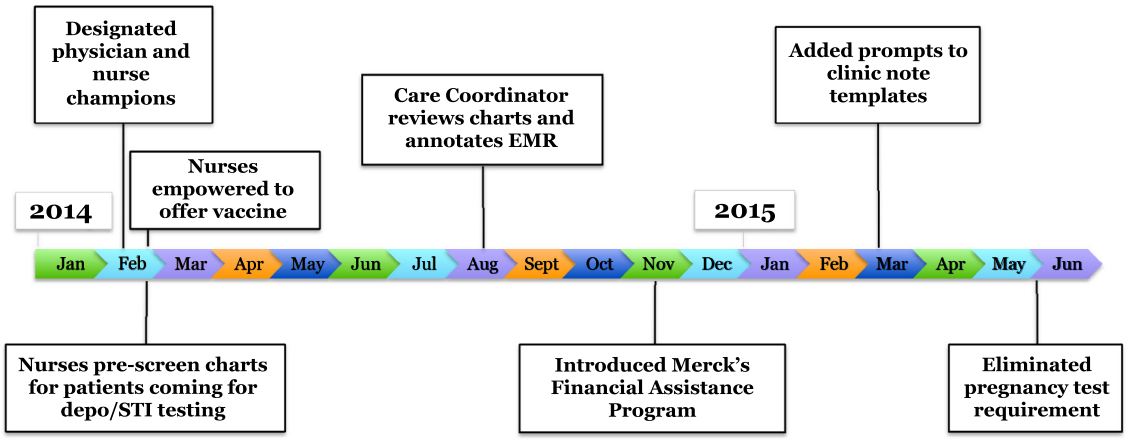

Fig. 1. Timeline depicting the introduction of each intervention bundle element from February 2014 to July 2015.