Impact of a Clinical Interventions Bundle on Uptake of HPV Vaccine at an Urban, Hospital-based OB/GYN Clinic

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Disclosures

• No financial relationships or conflict of interest to disclose.
Background

- HPV vaccination rates remain low in the United States.
- Estimated vaccine coverage for American girls 13-17 yo (CDC, 2015):
  - 62.8% ≥ 1 dose
  - 41.9% ≥ 3 doses
Several barriers to vaccination exist, including:

- Lack of knowledge/awareness by patients/providers
- Failure of providers to identify eligible patients and recommend the vaccine
- Tendency by providers to minimize its importance
- Lack of systems support
Evidence-Based Intervention Strategies

- Team-based approach and staff engagement
- Chart reviews and reminders for providers in patient charts
- Reminders and prompts in the EMR
- Elimination of unnecessary pre-vaccination requirements
- Removal of cost barriers for uninsured patients
Quality Improvement Initiative for HPV Immunization

• Single-site hospital-based ob/gyn clinic within a primary care center in an urban setting

• Serving a diverse, low-income patient population:
  • 37% black, 13% white, 1% Asian; 45% Hispanic
  • 73% Medicaid (2015), 13% uninsured

• Interdisciplinary provider team:
  • Patient-care associates (PCAs)
  • RNs
  • Nurse-midwives, APRNs, PAs, Attending & resident MDs
Clinic-Based Intervention Bundle

- Designated physician and nurse champions
- Nurses pre-screen charts for patients coming for depo
- Care Coordinator reviews charts and annotates EMR
- Introduced Merck’s Financial Assistance Program
- Added prompts to clinic note templates
- Eliminated pregnancy test requirement

2014:
- Nurses empowered to offer vaccine

2015:
Objective and Hypothesis

• The aim of our study is to evaluate the impact of a clinical intervention bundle on uptake of HPV vaccine.

• Hypothesis:
  • The intervention bundle will be associated with a decrease in missed opportunities to administer the HPV vaccine, and an increase in vaccine initiation and series completion rates among eligible clinic patients.
## Study Design

Chart review of patients seen from Feb 1, 2013 through Sept 30, 2016:

<table>
<thead>
<tr>
<th>STUDY PERIOD</th>
<th>DATES</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-implementation</td>
<td>Feb 1, 2013 – Jan 31, 2014</td>
<td>12-month period prior to interventions</td>
</tr>
<tr>
<td>During implementation</td>
<td>Feb 1, 2014 – June 30, 2015</td>
<td>17-month period during implementation of interventions</td>
</tr>
<tr>
<td>Post-implementation</td>
<td>July 1, 2015 – Sept 30, 2016</td>
<td>15-month period after implementation of last intervention</td>
</tr>
</tbody>
</table>
Inclusion/Exclusion Criteria

- **Inclusion Criteria:**
  - Patients eligible to receive the HPV vaccine (have had fewer than 3 doses)
  - Patients 18-26-years-old at the time of their clinic visit.

- **Exclusion Criteria:**
  - Pregnancy (including any patient with ongoing management of abnormal pregnancies such as ectopic or spontaneous abortions)
  - Documented completion of 3-dose vaccine series
Data Analysis

• Descriptive analysis and comparison of the pre- and post-implementation patient populations using Chi-square and Mann-Whitney U tests.

• Interrupted time series models to analyze trends in missed opportunities, as well as initiation and series completion rates.

• Counterfactual predictions to assess the trends that would have been expected had the bundled interventions not been introduced.
Definitions

Missed Opportunity: A vaccine-eligible encounter when a patient was due for an HPV vaccine dose but none was administered.

Vaccine-Eligible Encounter: An encounter where the patient was between 18-26 years of age, not pregnant, was under-immunized (had previously received < 3 doses of the HPV vaccine), and was due for the vaccine.
Results

• Total 4,035 women with 6,451 vaccine-eligible encounters

• Demographics:
  • Median age 23 yo
  • 47% Black, 40% Hispanic
  • 14% Spanish-speaking
  • 84% Unmarried
  • 80% Public Insurance

• Significantly more women were white (15% vs 10%) and had public insurance (85% vs 75%) in the post- compared with pre-implementation group
Results

Impact of Bundled Interventions on the Proportion of Missed Opportunities

- 0.23%/month (p<0.01)
- 1.1%/month 5 times faster (p<0.01)
- 0.56%/month 2 times faster (p<0.01)

Regression with Newey-West standard errors - lag(1)
Results

- 0.02%/month (p=0.74)
- 0.9%/month (p<0.01)
- 0.21%/month, 8 times faster (p<0.01)

Impact of Bundled Interventions on Initiation Rate

Date

Monthly Initiation Rate per 100 Women

0 10 20 30

Observed Data

Counterfactual

Predicted

Predicted
Results

Impact of Bundled Interventions on Completion Rate

- 0.68%/month (p=0.05)
- 2.4%/month (p<0.01)
- 0.11%/month (p<0.01)
- 1.5%
- 41.6%
Study Limitations

• Lack of control group and use of a pre- and post-design
• Retrospective study with possibly incomplete immunization records
• Dynamic nature of data inputs in EMR
Summary

• Implementation of our intervention bundle was feasible and was associated with
  • a reduction in missed opportunities to administer the HPV vaccine.
  • improvement in vaccine series initiation and completion.
• While the proportion of women who completed the series was higher at the end of the study period, the rate of series completion slowed.
• Despite improvements, the overall proportion of under-vaccinated patients in our clinic remains high.
Future Directions

• Compare our vaccination rates during the study period with those seen in similar OB/GYN clinics in our region.
• Evaluate impact of individual bundle elements.
• Develop/improve specific, targeted interventions that were most effective or have potential to have largest impact.
• Introduce new interventions (standing orders, provider audit/feedback).
• Consider adaptation of these interventions for application in other similar urban, hospital-based clinics.
Acknowledgements

Co-Authors:
- Carlos R. Oliveira MD
- Susan Griggs BSN, MS
- Emily Coleman
- Lital Avni-Singer
- Shefali Pathy MD, MPH
- Eugene D. Shapiro MD
- Sangini S. Sheth MD, MPH (Principal Investigator)

Clinic patients and providers
Staff at the Yale Women’s Center Clinic
Joint Data Analytics Team (JDAT)


Thank you!

Questions?
Extra Slides
Definitions

Proportion of Missed Opportunities:
Missed opportunities/Total # of vaccine-eligible encounters per month.

Initiation Rate:
Women who received 1st dose/ Total # of women who never received a dose per 100 women per month.

Completion Rate:
Women who received 3rd dose/Total # women who had previously received 2 doses per 100 women per month.
Merck Financial Assistance Program

Complete online form:
- No additional documentation needed;
- Must provide annual household income;

Form is faxed:
- Response in 15-30 min
- Vaccine order placed in EMR
- Vaccine is administered.

Repeat process for each dose.
<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total, No. (%)</strong></td>
<td>928 (42.1)</td>
<td>1,274 (57.9)</td>
</tr>
<tr>
<td><strong>Age, median (IQR), y</strong></td>
<td>23 (21-25)</td>
<td>23 (21-25)</td>
</tr>
<tr>
<td><em><em>Race,</em> No. (%)</em>*</td>
<td>874 (94.2)</td>
<td>1,191 (93.5)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>354 (40.5)</td>
<td>449 (37.7)</td>
</tr>
<tr>
<td>White</td>
<td>89 (10.2)</td>
<td>179 (15.0)</td>
</tr>
<tr>
<td>Black</td>
<td>418 (47.8)</td>
<td>543 (45.6)</td>
</tr>
<tr>
<td>Other</td>
<td>14 (1.6)</td>
<td>20 (1.7)</td>
</tr>
<tr>
<td><strong>Religion, No. (%)</strong></td>
<td>894 (96.3)</td>
<td>1,173 (92.1)</td>
</tr>
<tr>
<td>Protestant</td>
<td>365 (40.8)</td>
<td>441 (37.6)</td>
</tr>
<tr>
<td>Catholic</td>
<td>194 (21.7)</td>
<td>229 (19.5)</td>
</tr>
<tr>
<td>Muslim</td>
<td>22 (2.5)</td>
<td>39 (3.3)</td>
</tr>
<tr>
<td>Other</td>
<td>15 (1.7)</td>
<td>24 (2.1)</td>
</tr>
<tr>
<td>No Religion</td>
<td>298 (33.3)</td>
<td>440 (38.0)</td>
</tr>
<tr>
<td><strong>Language, No. (%)</strong></td>
<td>927 (99.8)</td>
<td>1,272 (99.8)</td>
</tr>
<tr>
<td>English</td>
<td>755 (81.5)</td>
<td>1,045 (82.1)</td>
</tr>
<tr>
<td>Spanish</td>
<td>140 (15.1)</td>
<td>161 (12.6)</td>
</tr>
<tr>
<td>Arabic</td>
<td>8 (0.9)</td>
<td>13 (4.2)</td>
</tr>
<tr>
<td><strong>Marital Status, No. (%)</strong></td>
<td>928 (100)</td>
<td>1,269 (99.6)</td>
</tr>
<tr>
<td>Married</td>
<td>144 (15.5)</td>
<td>163 (12.8)</td>
</tr>
<tr>
<td>Single</td>
<td>765 (82.4)</td>
<td>1,078 (85.0)</td>
</tr>
<tr>
<td>Other</td>
<td>19 (2.0)</td>
<td>28 (2.2)</td>
</tr>
<tr>
<td><em><em>Insurance,</em> No. (%)</em>*</td>
<td>928 (100)</td>
<td>1,274 (100)</td>
</tr>
<tr>
<td>Private</td>
<td>75 (8.1)</td>
<td>75 (5.9)</td>
</tr>
<tr>
<td><strong>Public</strong></td>
<td>691 (74.5)</td>
<td>1,086 (85.2)</td>
</tr>
<tr>
<td>Uninsured</td>
<td>162 (17.5)</td>
<td>113 (8.9)</td>
</tr>
<tr>
<td>Smoking status</td>
<td>898 (96.7)</td>
<td>1,243 (97.6)</td>
</tr>
<tr>
<td>Previous or Current smoker</td>
<td>390 (43.4)</td>
<td>467 (37.6)</td>
</tr>
</tbody>
</table>

* p<0.05