Collaboration for Vaccine Education and Research

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Resident training on vaccines

• There are no standard methods for training physician residents on important factors related to vaccines and vaccination.

• We assume they are being adequately trained and have sufficient knowledge, but they don’t!

• Majority of pediatric program directors and residents report that vaccine education is valuable and needed.

1CDC, Ten Great Public Health Achievements, MMWR, 2011
2Williams, Formal training in vaccine safety to address parental concerns not routinely conducted in U.S. pediatric residency programs, Vaccine, 2014
What is CoVER?

• The Collaboration for Vaccination Education and Research

• Created to develop, evaluate and improve vaccine education for health care professionals and trainees
  – First project: create a comprehensive curriculum for FM and Pediatric residency programs
Objectives-Pilot

• **Objective 1**: To establish the Collaboration for Vaccination Education and Research (CoVER), its structure, and plan for resident curriculum development.

• **Objective 2**: To design and develop a competency-based vaccine curriculum for pediatric and FM residents that will utilize a flipped learning approach and in–person training.

• **Objective 3**: To implement and evaluate the effectiveness of the vaccine curriculum.

• **Objective 4**: To analyze collected data from the project and disseminate the results.
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CoVER Roundtable 2016

• Medical education experts, vaccine experts and residency program directors met to determine critical components and structure for optimal vaccine resident training.
Roundtable, October 2016

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Children’s Mercy
KANSAS CITY
The CoVER Curriculum

• 4 modules were developed using interactive e-learning software (Rise Articulate)
  – Vaccine fundamentals
  – Vaccine preventable diseases
  – Vaccine safety
  – Vaccine hesitancy and communication

• 1 in-person training guide developed
  – Focus on vaccine communication techniques for HPV and influenza vaccine
The Modules

- Vaccine Fundamentals
- VPDs
- Vaccine Safety
- Vaccine Communication
Objectives

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- **Objective 3:** To implement and evaluate the effectiveness of the vaccine curriculum.

- **Objective 4:** To analyze collected data from the project and disseminate the results.
26 FM and Peds programs participated in an RCT

- July 2017: Pre-Survey
- August 2017 → Randomization
  - adjusting for residency type FM vs Peds
- September 2017-May 2018
  - 14 sites randomized to receive the CoVER Curriculum
  - 12 sites randomized to be Controls
- May - July 2018 : Post-Survey
Anonymous 29-item survey with items including:

1) Vaccine *knowledge*  ^CoVER*  n-14
2) **Attitudes/hesitancy**  n-7
3) Vaccine *confidence*  ^CoVER*  n-3
4) Demographics  ^CoVER*  n-5

*Adapted from Parent Attitudes about Childhood Vaccines (PACV) Survey¹
*Created by CoVER*

¹ Opel, Human Vaccines, 2011
8. A college student presents with the acute onset of fever, difficulty eating, and marked enlargement and tenderness of the parotid gland. Which one of the following is a complication of this suspected vaccine-preventable viral infection?

a. Congenital malformations  
b. Permanent hearing loss  
c. Intussusception  
d. Aplastic anemia
9. Which one of the following conditions is a contraindication to receiving MMR vaccine?

a. HIV infection with 20% of total CD4+ cell count
b. Liver transplant
c. End stage renal disease on hemodialysis
d. Asplenia and persistent complement deficiency

25% correct
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# Survey Completion

<table>
<thead>
<tr>
<th></th>
<th>Pre-Survey</th>
<th>Pre+Post Survey</th>
<th>Post-Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answered</td>
<td>N-737 (51%)</td>
<td>N-268 (19%)</td>
<td>N-540 (37%)</td>
</tr>
<tr>
<td>Excluded (no institution listed)</td>
<td>N-7</td>
<td></td>
<td>N-13</td>
</tr>
<tr>
<td>Total Included</td>
<td>N-730 (50%)</td>
<td>N-268 (19%)</td>
<td>N-527 (36%)</td>
</tr>
<tr>
<td>CoVER</td>
<td>N-400/730 (55%)</td>
<td>N-129 (48%)</td>
<td>N-233/527 (44%)</td>
</tr>
<tr>
<td>Control</td>
<td>N-330/730 (45%)</td>
<td>N-139 (52%)</td>
<td>N-294/527 (56%)</td>
</tr>
</tbody>
</table>
## Demographics Pre & Pre/Post

<table>
<thead>
<tr>
<th></th>
<th>Pre-Survey Only (N=469)</th>
<th>Pre/Post-Survey (N=268)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study Arm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.006 CoVER -- freq. (col%)</td>
<td>271 (58.7%)</td>
<td>129 (48.1%)</td>
</tr>
<tr>
<td><strong>Resident Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY1</td>
<td>164 (35.5%)</td>
<td>98 (36.6%)</td>
</tr>
<tr>
<td>PGY2</td>
<td>138 (29.9%)</td>
<td>92 (34.3%)</td>
</tr>
<tr>
<td>PGY3</td>
<td>145 (31.4%)</td>
<td>74 (27.6%)</td>
</tr>
<tr>
<td>PGY4</td>
<td>15 (3.2%)</td>
<td>4 (1.5%)</td>
</tr>
<tr>
<td><strong>Resident Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pediatrics</td>
<td>273 (58.2%)</td>
<td>165 (61.6%)</td>
</tr>
<tr>
<td>Family Medicine</td>
<td>129 (27.5%)</td>
<td>79 (29.5%)</td>
</tr>
<tr>
<td>Med/Peds</td>
<td>46 (9.8%)</td>
<td>20 (7.5%)</td>
</tr>
<tr>
<td>Other</td>
<td>21 (4.5%)</td>
<td>4 (1.5%)</td>
</tr>
</tbody>
</table>
Resident Knowledge
Knowledge by Arm

- Randomization worked
- Knowledge increased in both groups
  - Cover > control
- Effect based on “intention to treat”

![Chart showing knowledge question correct (%) with comparison between Control and CoVER groups pre and post-survey, with difference-in-difference of 2.1% and p-value of .282]
Knowledge by Program Type

<table>
<thead>
<tr>
<th>Resident Type</th>
<th>Arm</th>
<th>Pre-Survey</th>
<th>Post-Survey</th>
<th>Delta</th>
<th>Difference-in-Difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatrics</td>
<td>Control</td>
<td>54.9%</td>
<td>63.1%</td>
<td>8.2%</td>
<td>1.7%</td>
<td>0.4695</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>56.2%</td>
<td>66.1%</td>
<td>9.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Medicine</td>
<td>Control</td>
<td>51.1%</td>
<td>52.5%</td>
<td>1.4%</td>
<td>6.5%</td>
<td>0.0809</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>47.9%</td>
<td>55.8%</td>
<td>7.9%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- FM started with lower knowledge than Peds
- Greater benefit in FM programs with Cover
Resident Attitudes/Hesitancy
Vaccine Hesitancy

- Express the spectrum of attitudes toward vaccines
- Heterogenous group who tend to have beliefs that fall between those of vaccine acceptors and rejectors on an immunization continuum

Spectrum of Vaccine Hesitancy

Refuse but unsure | Refuse or delay some | Accept but unsure | Accept all

1 Benin, Pediatrics 2006
Overall, how hesitant about childhood vaccines would you consider yourself to be?

- a. Not at all hesitant
- b. Not too hesitant
- c. Not sure
- d. Somewhat hesitant
- e. Very hesitant

‘The response category “not sure” was used in the Likert scale formats because we felt that this was an answer that reflected vaccine hesitancy’

1 Opel, Development of a survey to identify vaccine-hesitant parents, Human Vaccines, 2011
**Overall, how hesitant about childhood vaccines would you consider yourself to be?**

<table>
<thead>
<tr>
<th></th>
<th>Freq (N=730)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all hesitant</td>
<td>627</td>
<td>86.1%</td>
</tr>
<tr>
<td>Not too hesitant</td>
<td>79</td>
<td>10.9%</td>
</tr>
<tr>
<td>Not sure</td>
<td>8</td>
<td>0.1%</td>
</tr>
<tr>
<td>Somewhat hesitant</td>
<td>14</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

*there are two respondents who didn't answer this question

12.9%
How sure are you that following the recommended CDC vaccine schedule is a good idea for your patients?
Children get more vaccines than are good for them

<table>
<thead>
<tr>
<th>Respondents (%)</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Not Sure</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confident</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hesitant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I trust the information I receive about vaccines from the CDC

<table>
<thead>
<tr>
<th>Respondents (%)</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Not Sure</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confident</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hesitant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hesitancy Among Residents who completed both pre and post-survey

• There were 101 hesitant residents in the pre only (12.9%)

• There were 44 resident that completed the pre-post defined as hesitant
  – FM 24/44 (54.5%)
  – One third of them (n-14/44) moved to the confident category in the post.
    • 9/14 were FM (64%)
Resident Confidence
## Confidence

On a scale of [1-100] do you consider yourself a vaccine novice or expert?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Pre-Survey</th>
<th>Post-Survey</th>
<th>Change</th>
<th>p-value</th>
<th>Difference</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Non-CoVER</td>
<td>48.97</td>
<td>56.71</td>
<td>7.73</td>
<td>0.0001</td>
<td>8.95</td>
<td>0.001</td>
</tr>
<tr>
<td>CoVER</td>
<td>47.06</td>
<td>63.74</td>
<td>16.68</td>
<td>&lt;.0001</td>
<td>8.95</td>
<td>0.001</td>
</tr>
</tbody>
</table>

*a After adjusting for residency year and type*
# Vaccine Scale by Program

<table>
<thead>
<tr>
<th>Resident Type</th>
<th>Arm</th>
<th>Pre-Survey</th>
<th>Post-Survey</th>
<th>Delta</th>
<th>Difference-in-Delta</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatrics</td>
<td>Control</td>
<td>49.03</td>
<td>56.81</td>
<td>7.78</td>
<td>7.96</td>
<td>0.0278</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>49.84</td>
<td>65.59</td>
<td>15.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Medicine</td>
<td>Control</td>
<td>48.78</td>
<td>47.71</td>
<td>-1.06</td>
<td>19.51</td>
<td>0.0012</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>41.93</td>
<td>60.38</td>
<td>18.45</td>
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<tr>
<td>Med/Peds</td>
<td>Control</td>
<td>52.98</td>
<td>63.47</td>
<td>10.49</td>
<td>11.84</td>
<td>0.335</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>50.00</td>
<td>72.33</td>
<td>22.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Control</td>
<td>47.88</td>
<td>79.25</td>
<td>31.37</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>36.00</td>
<td>---</td>
<td>---</td>
<td></td>
<td>---</td>
</tr>
</tbody>
</table>
Vaccine Scale by Program

Do You Consider Yourself a Vaccine Expert or Novice [1-100]

Pediatrics

Family Medicine

Control

CoVER
### Vaccine Scale by PGYs

<table>
<thead>
<tr>
<th>Resident Year</th>
<th>Arm</th>
<th>Pre-Survey</th>
<th>Post-Survey</th>
<th>Delta</th>
<th>Difference-in-Difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGY1</td>
<td>Control</td>
<td>41.58</td>
<td>51.54</td>
<td>9.96</td>
<td>15.93</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>36.89</td>
<td>62.77</td>
<td>25.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY2</td>
<td>Control</td>
<td>51.16</td>
<td>55.39</td>
<td>4.24</td>
<td>9.17</td>
<td>0.0499</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>50.23</td>
<td>63.63</td>
<td>13.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY3</td>
<td>Control</td>
<td>56.23</td>
<td>64.41</td>
<td>8.17</td>
<td>-0.20</td>
<td>0.965</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>55.94</td>
<td>63.91</td>
<td>7.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY4</td>
<td>Control</td>
<td>55.90</td>
<td>74.00</td>
<td>18.10</td>
<td>-5.93</td>
<td>0.710</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>64.17</td>
<td>76.33</td>
<td>12.17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How confident do you feel in your ability to discuss vaccines with a parent who would like to delay or withhold one or more vaccines? [scale 1-100]

<table>
<thead>
<tr>
<th></th>
<th>Adjusted a</th>
<th>Score</th>
<th>Delta</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre, Control</td>
<td></td>
<td>56.30</td>
<td>-6.25</td>
<td>0.001</td>
<td>-9.93, -2.57</td>
</tr>
<tr>
<td>Post, Control</td>
<td></td>
<td>62.54</td>
<td>-ref-</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Pre, CoVER</td>
<td></td>
<td>54.08</td>
<td>-8.46</td>
<td>&lt;.001</td>
<td>-13.20, -3.72</td>
</tr>
<tr>
<td>Post, CoVER</td>
<td></td>
<td>70.45</td>
<td>7.91</td>
<td>0.005</td>
<td>2.42, 13.40</td>
</tr>
</tbody>
</table>

a After adjusting for residency year and type
Confidence in Ability to Discuss Vaccines with a Parent Who Wants to Delay Vaccination

- **PGY1**
  - Pre-Survey
  - Post-Survey

- **PGY2**
  - Pre-Survey
  - Post-Survey

- **PGY3**
  - Pre-Survey
  - Post-Survey

- **PGY4**
  - Pre-Survey
  - Post-Survey

Legend:
- **Control**
- **CoVER**
How well prepared do you feel to answer parental concerns regarding vaccines [scale 1-100]?

<table>
<thead>
<tr>
<th></th>
<th>Score</th>
<th>Delta</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre, Control</td>
<td>56.87</td>
<td>-5.23</td>
<td>0.004</td>
<td>-8.77, -1.68</td>
</tr>
<tr>
<td>Post, Control</td>
<td>62.10</td>
<td>-ref-</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Pre, CoVER</td>
<td>55.51</td>
<td>-6.58</td>
<td>0.013</td>
<td>-11.76, -1.40</td>
</tr>
<tr>
<td>Post, CoVER</td>
<td>71.18</td>
<td>7.03</td>
<td>0.002</td>
<td>3.27, 14.90</td>
</tr>
</tbody>
</table>

*After adjusting for residency year and type*
Focus Group Comments-Pros

“I liked the length and the amount of information contained within them. I thought it was a very good resource, just a quick reference, a good reminder of the timing of the vaccines and whatnot.”

“It was super easy to click through everything, and there was interactions through it.”

“It didn't take hours to complete it, and I think it hit the top facts that you need to know and gave resources if you wanted more information on further things.”
Focus Group Comments - Pros

“I struggled with a family that did not want to immunize their children, and after taking all the modules, I was able to talk to them with my new found knowledge and confidence and the family is now immunized!”

“It was nice having that in my pocket. It gave me more to talk with those families and engage with them as best as possible.”
Focus Group Comments - Pros

“They're far and away the best modules that we have to do. They blow the others out of the water by miles.”

“I have noticed as I practice for the boards that I can get all the vaccine questions right, and now they seem super easy after taking the CoVER curriculum.”
Conclusions - Residents

• Peds and FM resident trainees have baseline sub-optimal confidence in ability to counsel families about vaccines

• FM lower knowledge \((p<0.001)\) at baseline and higher hesitancy

• Vaccine hesitancy exists among Peds and FM resident US trainees, ranging from 2-13%
Conclusions - CoVER Impact

- Knowledge improved more with CoVER curriculum, especially among FM (p=0.08)
- Self reported vaccine expertise increased significantly with CoVER (p <0.001), especially among FM (p=0.0012) and PGY1s (p=0.002)
- Confidence discussing vaccine questions with parents (p=0.002) and vaccine delays (p=0.005) increased with CoVER
Next Steps

• Roundtable Discussion, Kansas City November 2018

• R01
  – Develop PGY2 and PGY3 training modules
  – Create/Validate HCP hesitancy survey (volunteers? Call me!)
  – **Behavior**- Evaluate impact on vaccination rates (?)
  – Not optional, but mandatory training program
    • Data analytics on module use
    • CME, MOC possibilities?

• Other HCP- rural, med students, nurses, etc
The Modules

- Vaccine Fundamentals
- VPDs
- Vaccine Safety
- Vaccine Communication
Lead Institutions:
- Children’s Mercy Hospital, Kansas City, MO (Received CoVER Curriculum – Pediatrics)
- Vanderbilt University, Nashville, TN (Received CoVER Curriculum – Pediatrics)
- Society for Teachers of Family Medicine, Leawood, KS

CoVER Sites:
- University of Maryland Prince Georges Hospital Center, Cheverly, MD
- University of Pittsburgh, Pittsburgh Medical Center, St. Margaret, Philadelphia, PA
- University of Pittsburgh Medical Center Altoona, Altoona, PA
- University of Pittsburgh Medical Center Shadyside, Shadyside, PA
- Truman Medical Center, Kansas City, MO
- University of Michigan, Ann Arbor, MI
- Children’s Mercy Hospital, Kansas City, MO
- Vanderbilt University, Nashville, TN
- University of California, Los Angeles, Los Angeles, CA
- Children’s Hospital Los Angeles, Los Angeles, CA
- Kansas University Medical Center, Kansas City, KS
- East Tennessee State University, Johnson City, TN
- Weill Cornell Medical College, Toledo, OH
- University of Toledo, Toledo, OH

Control Sites:
- South Nassau Communities Hospital, Oceanside, NY
- Indiana University School of Medicine, Indianapolis, IN
- St. Christopher’s Hospital for Children, Philadelphia, PA
- University of Missouri, Columbia, MO
- Children’s Hospital of Orange County, Orange, CA
- Baystate Children’s Hospital/University of Massachusetts Medical School, Springfield, MA
- West Virginia University, Morgantown, WV
- Nemours Alfred I. duPont Hospital for Children, Wilmington, DE
- Ventura County Medical Center/Ventura Family Medicine, Ventura, CA
- University of Pittsburgh Medical Center McKeesport, McKeesport, PA
- Methodist Charlton Medical Center, Dallas, TX
- Albany Medical Center/Albany Medical College, Albany, NY
Limitations

• Resident uptake of self-led training is challenging given time constraints and overlapping obligations

• Limited amount of material in modules due to Program Director request

• Ability to evaluate impact on resident knowledge, attitudes/hesitancy and confidence depends on resident completion of end-of-year survey
  – Survey not validated for healthcare professionals

• Did not determine impact on patient vaccine uptake
The Sky Is The Limit!

$
## Knowledge by PGY-Year

PGY1 < PGY2 < PGY3

<table>
<thead>
<tr>
<th>Resident Year</th>
<th>Arm</th>
<th>Pre-Survey</th>
<th>Post-Survey</th>
<th>Delta</th>
<th>Difference-in-Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PGY1</strong></td>
<td>Control</td>
<td>49.4%</td>
<td>59.3%</td>
<td>9.9%</td>
<td>-0.9%</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>49.2%</td>
<td>58.2%</td>
<td>9.0%</td>
<td></td>
</tr>
<tr>
<td><strong>PGY2</strong></td>
<td>Control</td>
<td>53.2%</td>
<td>58.1%</td>
<td>4.9%</td>
<td>3.4%</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>56.1%</td>
<td>64.4%</td>
<td>8.3%</td>
<td></td>
</tr>
<tr>
<td><strong>PGY3</strong></td>
<td>Control</td>
<td>55.8%</td>
<td>60.9%</td>
<td>5.1%</td>
<td>1.9%</td>
</tr>
<tr>
<td></td>
<td>CoVER</td>
<td>52.9%</td>
<td>59.9%</td>
<td>7.0%</td>
<td></td>
</tr>
</tbody>
</table>
## Demographics Pre and Pre/Post

<table>
<thead>
<tr>
<th>Age (in Years)</th>
<th>Pre-Survey Only (N=469)</th>
<th>Pre- and Post-Survey (N=268)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>328 (70.2%)</td>
<td>206 (76.9%)</td>
</tr>
<tr>
<td>30-34</td>
<td>109 (23.3%)</td>
<td>54 (20.1%)</td>
</tr>
<tr>
<td>35-39</td>
<td>19 (4.1%)</td>
<td>3 (1.1%)</td>
</tr>
<tr>
<td>40+</td>
<td>3 (0.6%)</td>
<td>3 (1.1%)</td>
</tr>
<tr>
<td>Refused</td>
<td>8 (1.7%)</td>
<td>2 (0.7%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Pre-Survey Only (N=469)</th>
<th>Pre- and Post-Survey (N=268)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>313 (67.3%)</td>
<td>191 (71.3%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race</th>
<th>Pre-Survey Only (N=469)</th>
<th>Pre- and Post-Survey (N=268)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>286 (61.0%)</td>
<td>179 (66.8%)</td>
</tr>
<tr>
<td>Black</td>
<td>18 (3.8%)</td>
<td>11 (4.1%)</td>
</tr>
<tr>
<td>Asian</td>
<td>86 (18.3%)</td>
<td>42 (15.7%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>30 (6.4%)</td>
<td>9 (3.4%)</td>
</tr>
<tr>
<td>Other</td>
<td>11 (2.3%)</td>
<td>4 (1.5%)</td>
</tr>
<tr>
<td>Unknown/Refused</td>
<td>38 (8.1%)</td>
<td>23 (8.6%)</td>
</tr>
</tbody>
</table>
Knowledge by Programs+Arm

Graph showing the percentage of questions answered correctly in Non-CoVER and CoVER groups, comparing pre-survey and post-survey data.