# Vaccine Hesitancy in Rural Pediatric Primary Care

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Vaccine hesitancy (VH) is a pervasive issue resulting in the delay or refusal of vaccines, which are known to protect against life-threatening diseases. The purpose of this quality improvement project was to determine if early identification of VH using the Parent Attitudes about Childhood Vaccines survey and targeted interventions would decrease VH scores. Of the 70 total participants, 11 participants were VH in the preintervention survey group; of those, nine (81.8%) were not VH in the postintervention survey group, and two (18.2%) remained VH ($p = .004$) after the intervention. Routine screening for VH using the Parent Attitudes about Childhood Vaccines survey and implementing interventions successfully decreased VH scores and improved vaccine compliance. J Pediatr Health Care. (2021) 35, 16−22

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## KEY WORDS
Vaccines, immunizations, vaccine hesitancy, pediatric, primary care

## INTRODUCTION
### Statement of the Problem
Vaccine-preventable diseases in the pediatric population are increasing because of caregivers' decisions not to vaccinate their children. The concerning rise in caregiver vaccine hesitancy (VH) has spurred investigational research into the underlying determinants of hesitancy as the 2017 Centers for Disease Control and Prevention immunization survey reported a rise in underimmunized children from 0.3% in 2001 to 1.3% in 2015 (Centers for Disease Control and Prevention [CDC], 2018). This concerning statistic demonstrates a substantial threat to public health and safety as approximately 100,000 children under the age of 4 years are unvaccinated against 14 potentially deadly diseases. Furthermore, the rise in VH and underimmunized children is directly linked to increased health care provider burn out, an increase in emergency department use, and morbidity and mortality rates (CDC, 2018; McClure, Cataldi, & O'Leary, 2017). Research shows that a significant reason for these devastating statistics is caregiver VH, defined as the refusal or delay in acceptance of vaccines despite readily available services owing to a range of factors (World Health Organization, 2020). The 2019 U.S. measles outbreak—which occurred in over 31 states and affected primarily unvaccinated children—along with the escalating threat of coronavirus disease 2019, validates the urgency of understanding, addressing, and eliminating VH. The need to identify and evaluate VH using evidence-based tools and implement interventions is paramount as this pervasive and potentially disastrous issue surges globally.

### Evidence-Based Literature Review
Recent studies have demonstrated a rapidly increasing number of vaccine-hesitant caregivers (VHC) and declining childhood vaccine rates across the United States. As high as

77% of caregivers reported concerns about routine immunizations and nearly 12% of caregivers refused at least one recommended vaccine—posing a significant public health threat to children who are unable to be vaccinated (Opel et al., 2011; Salmon, Dudley, Glanz, & Omer, 2015). The use of evidence-based screening tools to positively identify VHC is trending in the literature as an effective and efficient way to address declining vaccine rates in the pediatric population proactively. The Parent Attitudes about Childhood Vaccines (PACV) survey, developed by Dr. Douglas J. Opel of Seattle Children's Hospital, is a standardized tool that identifies, measures, and classifies the unique concerns and needs of VHC and identifies the underlying determinants of hesitancy (Oladejo et al., 2016; Opel & Bahta, 2014; Boxes 1 and 2). Evidence-based screening tools, such as the PACV, markedly improve the health care provider ability to identify and appreciate VHC concerns and, more importantly, provide tailored interventions to prevent the devastating complications of not vaccinating our pediatric population.

The literature discusses several interventions that aimed to increase vaccine compliance, each with varying success rates. The most commonly cited interventions identified in the literature include presumptive language models, motivational interviewing, and educational dialogue-based interventions (Ames, Glenton, & Lewin, 2017; Eller, Henrikson, & Opel, 2019; Harvey, Reissland, & Mason, 2015; Jacobson, St. Sauver, Griffin, MacLaughlin, & Finney Rutten, 2020; McClure et al., 2017; Salmon et al., 2015). Interventions based on information deficit models that assume misconceptions are due to a lack of knowledge—indicating that the solution is to provide more information—have been disproven to change the minds of VHC effectively and have even shown an increase in VH rates (Gagneur, 2020; McClure et al., 2017; Salmon et al., 2015).

Current studies have reported that presumptive language models and motivational interviewing techniques are consistently the most effective interventions to address VH and increase vaccination rates (Gagneur, 2020; Jacobson et al., 2020; McClure et al., 2017). When providers used the presumptive language model in vaccine discussions, it strengthened the recommendation by offering a matter-of-fact approach and shared confidence in the provider recommendation. One study demonstrated 73% vaccine compliance when presumptive language was used compared with 22% vaccine compliance without presumptive language, and another study showed that caregivers were 17.5 times more likely to accept recommended vaccines when presumptive language was used (Jacobson et al., 2020; Sturm et al., 2017). Strong evidence has shown that the participatory language approach, which allows for shared decision-making and open-ended discussions, increased caregiver hesitations resulting in increased VH and lower vaccination rates. Presumptive language is a simple, nonconfrontation, and effective method for health care providers employ in the clinical setting.

Motivational interviewing (MI) is the next appropriate intervention in changing behaviors when presumptive language is not sufficient. MI is a well-researched strategy that has consistently demonstrated effective results compared with interventions without MI techniques (Borrelli, Tooley, & Scott-Sheldon, 2015; Castro, 2016; Lindson-Hawley, Thompson, & Begh, 2015; McGrane, Galvin, Cusack, & Stokes, 2015). MI is more than replacing myth with facts, but rather assesses an individual's readiness to change with the goal of drawing upon the person's own willingness rather than the provider desire for them to change (McClure et al., 2017). Providers are encouraged to foster a nonthreatening space by avoiding argumentative discussions or lecturing formats. The provider main goal is to be an active listener and reflect the caregiver's hesitations, demonstrating both respect and empathy to develop a trusting relationship further. MI requires the health care provider to cultivate a collaborative partnership through compassion, empathy, and understanding to strengthen a caregiver's motivation to change their beliefs and behaviors regarding VH.

## METHODS
### Sample and Setting
A convenience sample was used for this quality improvement (QI) project. The sample included caregivers of pediatric patients aged 2 months to 5 years presenting for well-child checks at a privately owned pediatric primary care clinic. This clinic primarily provides outpatient pediatric primary care for Hispanic and Latino patients (~92%) with Medicaid coverage (~99%). Caregiver participation was voluntary. Inclusion criteria for the initial sampling were caregivers presenting with their child aged 2 months to 5 years for well-child visits. Exclusion criteria for initial sampling were caregivers presenting for sick visits or well-child checks with children aged < 2 months or ≥ 6 years. The goal sample size for this QI project was 70 participants ($n = 70$), which was successfully achieved in 3 months. Only one provider (RM) completed all interventions to ensure consistency.

### Project Design
Participants who met inclusion criteria were given the preintervention PACV survey on paper at check-in. The pre-PACV survey was 23 items, written at a sixth-grade level, available in English and Spanish, and required approximately 5 min for caregivers to complete. Following the completion of the survey, clinical staff scored the survey and entered the results in a secured database. The provider reviewed the presurvey results before the initiation of the visit to determine appropriate interventions. The presumptive language model was used for non-VHC participants, and any questions were addressed during the visit. VHC participants received the following interventions: presumptive language model, MI, and education-based dialogue aimed at identifying underlying determinants of VH. The goal of these interventions was to convey confidence in medical management and recommendations and to adequately ameliorate concerns and address questions related to VH using evidence-based techniques.

The Centers for Disease Control and Prevention and World Health Organization resources were used to develop

**BOX 1. Parent Attitudes about Childhood Vaccine survey (in English)**



**20.** What is the highest level of education that you have reached?
- ☐ 8th grade or less
- ☐ Some high school, but not a graduate
- ☐ High school graduate or GED
- ☐ Some college or 2 year degree
- ☐ 4-year college degree
- ☐ More than 4-year college degree

**21.** What is your approximate household income?
- ☐ $30,000 or less
- ☐ $30,001-50,000
- ☐ $50,001-75,000
- ☐ $75,001 or more

**22.** How many children are in your household?
- ☐ One
- ☐ Two
- ☐ Three
- ☐ Four or more

**23.** What is your race/ethnicity? Please check all that apply.
- ☐ White
- ☐ Black or African American
- ☐ Hispanic/Latino
- ☐ Asian
- ☐ Native Hawaiian or other Pacific Islander
- ☐ American Indian or Alaska Native
- ☐ Other: _____

**Thank you!**

| | Strongly Agree | Agree | Not Sure | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 6. Children get more shots than are good for them. | 2 | 2 | 1 | 0 | 0 |
| 7. I believe that many of the illnesses that shots prevent are severe. | 0 | 0 | 1 | 2 | 2 |
| 8. It is better for my child to develop immunity by getting sick than to get a shot. | 2 | 2 | 1 | 0 | 0 |
| 9. It is better for children to get fewer vaccines at the same time. | 2 | 2 | 1 | 0 | 0 |

| | Not at all Concerned | Not too Concerned | Not Sure | Somewhat Concerned | Very Concerned |
|---|---|---|---|---|---|
| 10. How concerned are you that your child might have a serious side effect from a shot? | 0 | 0 | 1 | 2 | 2 |
| 11. How concerned are you that anyone of the childhood shots might not be safe? | 0 | 0 | 1 | 2 | 2 |
| 12. How concerned are you that a shot might not prevent the disease? | 0 | 0 | 1 | 2 | 2 |

| | Yes | No | Don't Know |
|---|---|---|---|
| 13. If you had another infant today, would you want him/her to get all the recommended shots? | 0 | 2 | 1 |

| | Not at all Hesitant | Not too Hesitant | Not Sure | Somewhat Hesitant | Very Hesitant |
|---|---|---|---|---|---|
| 14. Overall, how hesitant about childhood shots would you consider yourself to be? | 0 | 0 | 1 | 2 | 2 |

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**SCORED VERSION**

**Parent Attitudes about Childhood Vaccines**

**UW Medicine** SCHOOL OF MEDICINE

**READ THIS FIRST:**

We are interested in your opinions about childhood shots (vaccines). Your child's doctor or nurse gives shots like MMR (measles, mumps and rubella) or Polio at check-ups to help keep your child from getting sick.

THIS SURVEY IS NOT ABOUT SEASONAL FLU OR SWINE FLU (H1N1) SHOTS.

When filling out the survey, please answer each questions with the child whose appointment is today in mind. The answers to these questions will help us improve how doctors and nurses talk to parents about childhood shots.

Please check only one answer to each of the questions below.

**1.** Is this child your first born?  ☐ Yes  ☐ No

**2.** What is your relationship to this child?  ☐ Mother  ☐ Father  ☐ Other _____

| | Yes | No | Don't Know |
|---|---|---|---|
| 3. Have you ever delayed having your child get a shot (not including seasonal flu or swine flu (H1N1) shots) for reasons other than illness or allergy? | 2 | 0 | excluded |
| 4. Have you ever decided not to have your child get a shot (not including seasonal flu or swine flu (H1N1) shots) for reasons other than illness or allergy? | 2 | 0 | excluded |

**5.** How sure are you that following the recommended shot schedule is a good idea for your child? Please answer on a scale of 0 to 10, where 0 is *Not at all sure* and 10 is *Completely sure*.

| Not at all Sure | | | | | | | | | | Completely Sure |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |

| | Strongly Agree | Agree | Not Sure | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 15. I trust the information I receive about shots. | 0 | 0 | 1 | 2 | 2 |
| 16. I am able to openly discuss my concerns about shots with my child's doctor. | 0 | 0 | 1 | 2 | 2 |

**17.** All things considered, how much do you trust your child's doctor? Please answer on a scale of 0 to 10, where 0 is *Do not trust at all* and 10 is *Completely trust*.

| Do Not Trust at All | | | | | | | | | | Completely Trust |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 |

**The last questions are about you. Please check only one answer to each question.**

**18.** How old are you?
- ☐ 18-29 years old
- ☐ 30 years or older

**19.** What is your current marital status?
- ☐ Single
- ☐ Married
- ☐ Living with a partner
- ☐ Widowed
- ☐ Separated
- ☐ Divorced

Note. *Adapted from Opel et al. (2011).*

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specific presumptive language scripts for VHC to ensure uniform and effective communication. All interactions began with the assumption that the caregiver would accept all recommended vaccines: "your child needs three shots today," compared with participatory language such as, "what do you think about your child getting their shots today?"

**BOX 2. Parent Attitudes about Childhood Vaccine survey (in Spanish)**

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**Actitudes de los Padres ante las Vacunas en los Niños**

Texas Children's Hospital®

**PRIMERO LEA LO SIGUIENTE:**

Nos interesa conocer su opinión sobre las vacunas en los niños. El médico o la enfermera de su hijo(a) aplican vacunas como la triple vírica (sarampión, parotiditis y rubéola) o la antipoliomielítica durante las revisiones a fin de evitar que su hijo(a) se enferme.

ESTA ENCUESTA NO SE REFIERE A NINGUNA VACUNA ANTIGRIPAL (ESTACIONAL, H1N1, AVIAR U OTRA).

Al contestar la encuesta, responda cada pregunta tomando en cuenta al niño(a) cuya cita se llevará a cabo el día de hoy. Las respuestas a estas preguntas nos ayudarán a mejorar la manera en que los médicos y las enfermeras hablan con los padres acerca de las vacunas en los niños.

Elija una sola respuesta para cada una de las siguientes preguntas.

1. ¿Este niño(a) es su primer hijo(a)?  ☐ Sí  ☐ No

2. ¿Cuál es su parentesco con este niño(a)?  ☐ Madre  ☐ Padre  ☐ Otro _____

3. ¿Alguna vez ha retrasado alguna vacuna para su hijo(a) (sin incluir la vacuna antigripal) por motivos distintos a una enfermedad o alergia?  Sí ☐  No ☐  No lo sé ☐

4. ¿Alguna vez ha decidido no darle una vacuna a su hijo(a) (sin incluir la vacuna antigripal) por motivos distintos a una enfermedad o alergia?  Sí ☐  No ☐  No lo sé ☐

5. ¿Qué tan seguro(a) está usted de que recibir las vacunas recomendadas es bueno para su hijo(a)? Conteste en una escala de 0 a 10, donde 0 significa *No estoy para nada seguro(a)* y 10 significa *Estoy totalmente seguro(a)*.

No estoy para nada seguro(a): 0 1 2 3 4 5 6 7 8 9 10 :Estoy totalmente seguro(a)

| | Sumamente de acuerdo | De acuerdo | No estoy seguro(a) | En desacuerdo | Sumamente en desacuerdo |
|---|---|---|---|---|---|
| 6. Creo que los niños reciben más vacunas de las que son buenas para ellos. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. Creo que muchas de las enfermedades que son prevenidas por las vacunas son graves. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. Creo que es mejor que mi hijo(a) desarrolle protección a través de una enfermedad natural que a través de una vacuna. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. Creo que es mejor que el número de vacunas que los niños reciban a la vez sea menor. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | Nada preocupado(a) | Poco preocupado(a) | No estoy seguro(a) | Algo preocupado(a) | Muy preocupado(a) |
|---|---|---|---|---|---|
| 10. ¿Qué tan preocupado(a) está de que su hijo(a) pudiera tener algún efecto secundario grave por una vacuna? | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. ¿Qué tan preocupado(a) está usted de que alguna de las vacunas para los niños pueda no ser segura? | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. ¿Qué tan preocupado(a) está usted de que la vacuna no pudiera prevenir la enfermedad? | ☐ | ☐ | ☐ | ☐ | ☐ |

| | Sí | No | No lo sé |
|---|---|---|---|
| 13. Si tuviera otro bebé ahora, ¿quisiera que recibiera todas las vacunas recomendadas? | ☐ | ☐ | ☐ |

| | Nada Inseguro(a) | Poco inseguro(a) | No sé | Algo inseguro(a) | Muy inseguro(a) |
|---|---|---|---|---|---|
| 14. En general, ¿qué tan inseguro(a) se siente con respecto a las vacunas para los niños? | ☐ | ☐ | ☐ | ☐ | ☐ |

Continúe en la siguiente página.

| | Sumamente de acuerdo | De acuerdo | No estoy seguro(a) | En desacuerdo | Sumamente en desacuerdo |
|---|---|---|---|---|---|
| 15. Confío en la información que recibo sobre las vacunas. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. Puedo hablar abiertamente con el médico de mi hijo(a) sobre mis inquietudes con respecto a las vacunas. | ☐ | ☐ | ☐ | ☐ | ☐ |

17. Tomando todo en cuenta, ¿qué tanto confía en el médico de su hijo(a)? Conteste en una escala de 0 a 10, donde 0 significa *No confío para nada* y 10 significa *Confío totalmente*.

No confío para nada: 0 1 2 3 4 5 6 7 8 9 10 :Confío totalmente

**Las últimas preguntas se refieren a usted. Elija una sola respuesta para cada pregunta.**

18. ¿Qué edad tiene usted?
☐ Entre 18 y 29 años de edad
☐ 30 años o más

19. ¿Cuál es su estado civil actual?
☐ Soltero(a)
☐ Casado(a)
☐ Vivo con mi pareja
☐ Viudo(a)
☐ Separado(a)
☐ Divorciado(a)

20. ¿Cuál es su máximo nivel de estudios?
☐ 8° grado o menos
☐ No terminé el 12° grado
☐ Terminé el 12° grado o su equivalente (GED)
☐ Título de 2 años o no terminé la universidad
☐ Terminé la universidad (4 años)
☐ Posgrado

21. ¿Cuál es el ingreso aproximado de su hogar?
☐ $30,000 o menos
☐ De $30,001 a $50,000
☐ De $50,001 a $75,000
☐ $75,001 o más

22. ¿Cuántos niños viven en su casa?
☐ Uno
☐ Dos
☐ Tres
☐ Cuatro o más

23. ¿Cuál es su raza o grupo étnico? Marque todas las opciones que correspondan.
☐ Blanca
☐ Negra o afroamericana
☐ Hispana o latina
☐ Asiática
☐ Nativa de Hawái u otra isla del Pacífico
☐ Amerindia o nativa de Alaska
☐ Otra: _____

Note. *Adapted from Opel et al. (2011).*

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Research has shown that strong and confident language from a trusted medical provider resulted in higher vaccination rates by VHC (Jacobson et al., 2020) If the caregiver consented without hesitation or questions, all recommended vaccines were administered by the nurse at the end of the visit. If the caregiver expressed concern to the presumptive language cue, the provider would proceed by giving confidence and caring recommendation as to their trusted medical provider: "I strongly recommend your child get these vaccines today as they are very important to protect him from serious disease." If the caregiver continued to demonstrate hesitancy, the provider listened and responded to their questions with MI techniques and educational-based dialogue specific to their concerns. Demonstrating a willingness to listen to their concerns and answer their questions helped build trust in the provider recommendation.

For VHC who resisted presumptive language, scripted MI responses were used to strengthen the caregivers' motivation to change their beliefs and behaviors through a shared sense of trust, partnership, and compassion. For this approach, the provider used the OARS (open-ended, affirming, reflective listening, summarizing) model for MI dialogue, which focused on open-ended questions, positive affirmations, reflective listening, and summary reflections (Miller & Rollnick, 2013). Open-ended questions focused on understanding the caregiver's concerns in their own words and avoiding yes or no responses: "What can you tell me about your concerns regarding the vaccines your child will be receiving today?" This open-ended question aided in the provider understanding of the main determinants of hesitation to ensure the appropriate educational-based dialogue was provided.

Positive affirmation statements and gestures were given to promote confidence and trust, including gestures as small as a smile. Positive affirmations used in this project included, "I appreciate the consideration you've given to making sure your child is receiving the safest care" and "I appreciate that you've come with these questions today." VHC appreciated the judgment-free acknowledgment, which aided in their willingness to learn and make changes in a positive direction. Reflective listening was a critical skill of MI as it showed active engagement with the VHC's concerns and avoided assumptions and interpretations. The provider used reflective listening by responding to the VHC concern's with statements such as "It sounds like your main concern is the ingredients in the vaccines, is this correct?" and "So you feel like 3 injections is too many for your child to receive in one visit?"

Summaries of reflective listening are how the provider concluded the MI intervention as the main transition point. The provider structured the summary with an opening statement such as "here is what I've heard, tell me if I'm missing anything." The provider would then give a positive change statement made by the VHC to emphasize their willingness to change, such as "you believe the ingredients in the vaccines aren't safe but, you aren't sure if the information you read online is accurate." The provider provided specific educational-based information to inform their concerns in an empathetic and concise manner as not to overwhelm or confuse the caregiver. Finally, MI ended with an invitation to follow up questions and an assessment of the VHC's willingness to change: "Anything you'd like to add or correct? Did that address your concerns today? Would you like to move forward with the recommended vaccines today?" MI techniques were more time consuming, increasing the visit time by an average of 5−10 min, but resulted in decreased VH scores with increased vaccine compliance rates.

After the intervention, clinical staff provided the participating caregiver with the postintervention PACV survey after the visit to assess for a decrease in VH scores. The post-PACV survey consisted of the same questions, however, questions 1, 2, and 18−23 were omitted as these questions pertained to the caregiver's socioeconomic status, education level, and ethnicity. The postsurvey responses were scored and entered into a secure database by the trained staff member or provider.

For this project, successful outcomes were achieved when preintervention PACV survey scores of $\geq 15$ were decreased to $\leq 14$ postintervention. This approach demonstrates that early identification of VH allowed targeted intervention to address determinants of vaccine hesitation. The data collected for analysis included pre- and postintervention PACV survey scores, which were coded as nominal scores for VH scores pre- and postintervention (yes or no). These data were inputted into a $2 \times 2$ contingency table for analysis (Table).

## Data Analysis

The clinical data were evaluated and analyzed using IBM SPSS software 2019 (version 26; IBM, Corp., Armonk, NY). Given the sample size and project objectives, a McNemar test was used for data analysis to find proportion changes for paired nominal data.

## RESULTS

Of the 70 total participants, 41 were aged 0−1 year, 14 were aged 1−2 years, 2 were aged 3−4 years, and 13 were aged 4−5 years. Twenty-three identified as Caucasian, 41 identified as Hispanic, five identified as African American, and one identified as Asian American. Eleven were classified as VH and 59 as non-VH from the preintervention survey. All 70 participants received an intervention during the visit with

### TABLE. Vaccine hesitancy pre-/postintervention contingency table

| VH postintervention | VH preintervention | | |
| --- | --- | --- | --- |
| | No | Yes | Total |
| No | 59 | 9 | 68 |
| Yes | 0 | 2 | 2 |
| Total | 59 | 11 | 70 |

Note. VH, vaccine hesitancy.

the provider assessing if postintervention VH scores decreased after the intervention. The 11 participants that classified as VH from the preintervention survey received targeted, evidence-based interventions, including the presumptive language model, MI, and education-based dialogue, to address the underlying determinants of VH. After the intervention, postintervention PACV surveys were administered to all 70 participants. No participants scored higher on the postintervention PACV survey. Of the 11 VH participants, post-PACV survey scores showed nine (81.8%) were no longer classified as VH, and two (18.2%) remained VH ($p = .004$).

Of the 11 VH participants, six were primarily concerned about the ingredients in vaccines, two were concerned with the safety regarding the number of vaccines received at one time, one reported they did not believe vaccines were necessary, one had a self-reported family history of adverse reactions to an unknown vaccine, and one did not believe they had enough information at the time of the visit to make an informed decision. Of the 11 VH participants, four adhered to Dr. Robert Sears's delayed vaccine schedules, whereas the other seven were not sure what, if any, vaccines should be received.

## DISCUSSION

Childhood vaccines are proven to be effective in keeping the population safe from preventable diseases that can result in severe complications, including death. Vaccinations have been the subject of harsh critique and rigorous testing for the past 50 years and continue to demonstrate safety, efficacy, and value. As the childhood vaccine schedule has been enhanced in the past decade with the advent of new vaccines, caregivers have been concerned with the number of injections and the conflicting information in social media. Pediatric health care providers, infectious disease specialists, and scientists have demonstrated the life-saving benefits of vaccines and must actively advocate and educate caregivers and patients daily. In the face of the coronavirus disease 2019 pandemic and virulent flu season of 2020, now is the time to arm providers with tools that educate and empower VHC to understand and believe that vaccines work, vaccines are safe, and vaccines are necessary.

Routine monitoring with VH screening tools, such as the PACV survey, offers proactive measures of identifying VHC to decrease hesitations and increase pediatric vaccination rates. Presumptive language should be used when discussing the recommended pediatric vaccines to instill confidence and reassure caregivers of safe medical management. When necessary, MI and educational-based dialogue should be employed to advocate for caregiver acceptance of recommended vaccines. The significant findings of this project confirm the effectiveness of using VH screening tools to identify VHC and providing targeted interventions to decrease their hesitancy and increase vaccine compliance rates. Although most of the participants were not VH, most of those who were classified as VH from the preintervention survey benefited from the interventions. Given the increasing rate of VHC,

it is imperative that health care providers are proactive, not reactive, in our efforts to avert the spread of vaccine-preventable diseases.
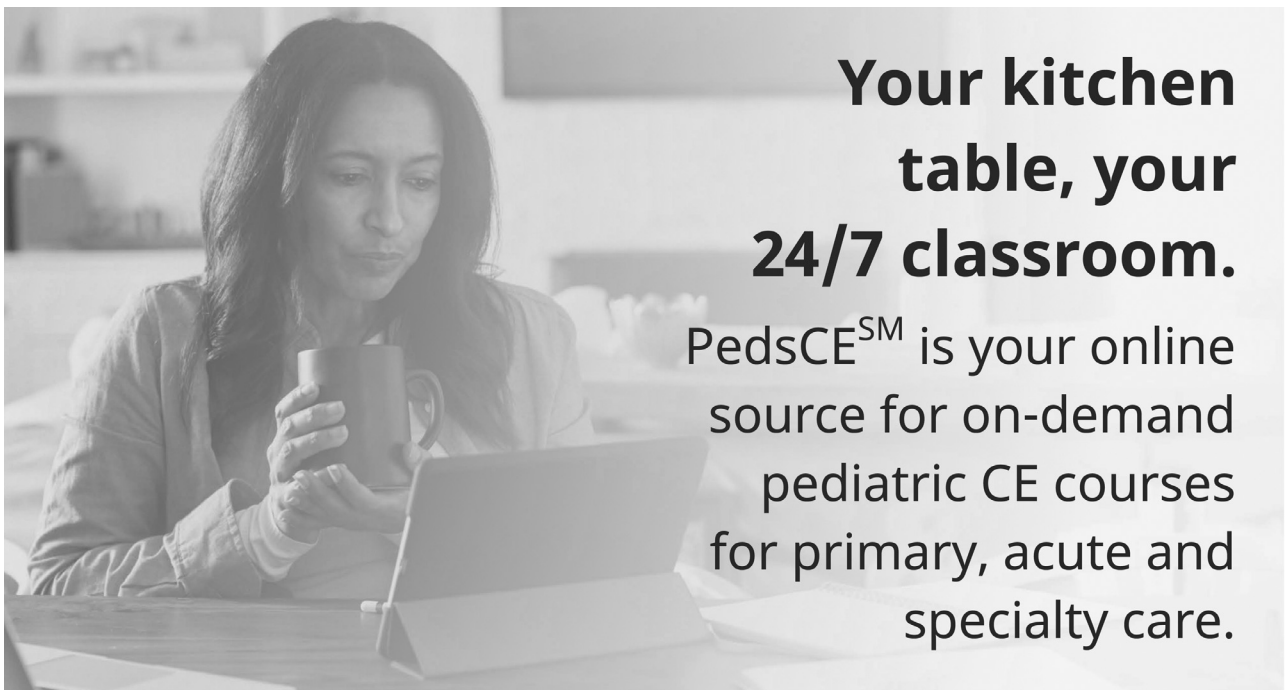
## Next Steps

This QI project successfully showed the significant impact of early identification and intervention in addressing VH in the rural pediatric primary care setting. Making routine VH screening and intervention a standard of care is recommended for primary care providers. Furthermore, this project has shown the effectiveness of engaging in presumptive language when discussing vaccines with caregivers. Studies have reported that parents are 17.5 times more likely to accept the recommended vaccines by providers when presumptive language is used. However, < 15% of providers used presumptive language resulting in weak recommendations, surged hesitations, and decreased vaccine compliance rates (Jacobson et al., 2020; Opel et al., 2013). Given recent vaccine-preventable disease outbreaks, it is imperative for health care providers to implement current evidence-based practices to achieve vaccine compliance and promote the safety and efficacy of vaccines with confidence and compassion.

Moving forward, this project and current literature identify the critical need for further investigation and research for evidence-based tools and strategies to consistently and methodically provide interventions to address VH and improve compliance rates. Efforts to develop standardized, evidence-based guidelines and tools to improve and sustain vaccination rates are at the forefront of research and development with an emphasis on simplified, accessible tools for medical staff to use. Ideally, medical organizations and governing bodies would require the use of VH screening tools and intervention protocols into their patient-centered medical home requirements to improve vaccine rates. Research studies that identify the significance of early screening and interventions to promote vaccination rates, such as this project, serve to advocate and inform larger-scale research endeavors to identify, intervene, and improve VH.

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