Evaluating Parental Perspectives on Pediatric Antibiotic Use following Penicillin Allergy Delabeling

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Problem Description

Penicillin (PCN) allergy is frequently mislabeled and inaccurately diagnosed in children. Approximately 8-25% of the global population report having a past allergic reaction to PCN but only 0.02% to 0.04% of the population is truly allergic (Stone et al., 2020). Additionally, 90-95% of people once considered allergic to PCN are ultimately able to tolerate PCN within 10 years of the initial reaction (Patterson & Stankewicz, 2022). Pediatric patients frequently develop dose-dependent adverse reactions to PCN, including maculopapular rashes and diarrhea in the first week (or early in the second week) of oral PCN treatment, leading to a professional or parental diagnosis of PCN allergy (Vyles et al., 2020). Children labeled as PCN allergic lose the ability to benefit from affordable antibiotics known to be effective against common childhood infections (Centers for Disease Control and Prevention [CDC], 2017). When individuals cannot receive PCN they are often prescribed broad-spectrum antibiotics, which are less effective, associated with a higher risk of adverse effects, and contribute to antibiotic resistance (Vyles et al., 2020). Children falsely labeled as PCN allergic accrue higher healthcare costs while also being at risk for prolonged hospitalization due to adverse effects and lower efficacy of non-PCN antibiotics (Patterson & Stankewicz, 2022). Most patients with low-risk allergy symptoms can undergo a simple, single-dose oral challenge of amoxicillin that, if negative, removes the label of PCN allergy (Vyles et al., 2020). Unfortunately, parents of these patients may relabel their children as PCN allergic due to incomplete understanding of their child's test results or persistent fear of an allergic reaction regardless of the outcome of a negative oral challenge (Stone et al., 2020). Since 75% of PCN allergy labels are assigned by the age of three, education regarding PCN allergy

must be targeted towards the parents of pediatric patients and their caregivers (Yang et al., 2023). There is a growing need for insight into factors that impede the effectiveness of PCN allergy delabeling strategies which may affect the reintroduction of PCN allergy labels into a patient's chart (Stone et al., 2020).

Primary care providers (PCPs) represent the initial point of contact within the healthcare system. PCPs are ideally placed to evaluate parental perspectives towards oral PCN challenge and barriers to parents' acceptance of their child's PCN delabeled status. PCPs can provide primary PCN allergy education and place referrals to allergists for oral challenge. This project took place at a pediatric care center hereafter referred to as the Clinic. The project aims to address the Clinic's ability to obtain and evaluate information regarding parental understanding and acceptance of PCN allergy delabeling post-PCN oral challenge.

Available Knowledge

A PubMed search was performed using the keywords *penicillin delabeling, follow up, survey,* and *parental*, which yielded 13 results. All publication dates were between 2015 to 2023. Accepted studies successfully addressed parental perspectives on PCN delabeling, barriers regarding maintenance of a delabeled penicillin allergy, and interventions to prevent relabeling a child with a PCN allergy. The sources used included cross sectional survey, retrospective chart reviews, focus groups, literature reviews, quality improvement, and expert opinion.

Parental perspectives on PCN delabeling in pediatric patients varied, but the most cited reason for relabeling their child with PCN allergy was fear of a subsequent reaction (Antoon et al., 2023; Vyles et al., 2020; Yang et al., 2023). The occurrence of a prior PCN reaction is often perceived by parents as an allergic reaction, leading to a cycle of concern, which is validated through interactions within the healthcare system and creates behaviors resistant to change

(Antoon et al., 2023). The fact that some parents continue to avoid PCN, even after passing an oral challenge, highlights the profound effect a negative PCN experience can have on a family (Antoon et al., 2023).

Barriers to accepting a PCN delabeled status include a lack of the following: understanding of the oral challenge test results, education regarding the characteristics of a true PCN allergy (including the fact that PCN allergy is not inheritable), and awareness of the negative consequences of inaccurate labels (increased healthcare costs, more resistant infections, increased risk for side effects) (Antoon et al., 2023; Lufteali et al., 2021; Vyles et al., 2020; Yang et al., 2023). Difficulties in maintaining PCN allergy delabeling extends beyond familial perspectives. Several system-based weaknesses contribute to PCN allergy relabeling, including lack of provider understanding regarding characteristics of a true PCN allergy, and communication deficits amongst various members of the healthcare team. Communication issues manifest as a failure to update medical records and notify primary care providers and pharmacists regarding a child's PCN allergy delabeled status. Evidence also suggests that delaying referral for PCN challenge to >1 year after the initial reaction significantly decreases the likelihood that the allergy will be removed from the patient's chart (Jani et al., 2019; Lachover-Roth et al., 2019; Vyles et al., 2018; Bourke et al., 2015).

Several interventions have been proposed to avoid relabeling of PCN allergies after negative oral challenge. Successful implementation requires a multidisciplinary approach. Such approaches use computerized protocols, electronic health record (EHR) alerts, pre- and post-test education by a pharmacist, the use of a wallet card demonstrating negative results, and follow up communication 7-10 days post testing (Jani et al., 2019; Lufteali et al., 2021; Vyles et al., 2018). A quality improvement project implementing these interventions showed a pre-implementation

relabeling rate in about 9-51% of patients with negative oral challenge results followed by a post-implementation relabeling rate of about 2.5-12% (Lufteali et al., 2021). It should be noted that there is a significant lack of research regarding patient and clinician perspectives that impede the effectiveness of PCN allergy delabeling strategies. Parental perspectives on PCN delabeling test results are integral to maintaining a future delabeled status in pediatric patients and, for this reason, are the focus of this project. The resources, effort, and work of delabeling are futile if the results fail to convince patients and their healthcare providers.

Rationale

Lack of research and limited data on oral PCN delabelling perspectives impeded the choice of a framework to guide this project. The Theory of Constraints (TOC) was deemed most suitable in addressing this project's long-term goals. Originally developed by Eliyahu M. Goldratt, the TOC is a philosophy of management that focuses on continuous improvement of organizational "constraints." The constraint is defined as the problem that prevents a system from performing at a higher level than it currently exhibits (Goldratt & Cox, 2004). The TOC seeks to identify and address the system's constraint to enhance its performance and facilitate the attainment of the organizational goals. The five steps involved in the TOC include: identify the system's constraint, decide how to exploit it, reconfigure organizational processes to align with these previous decisions, improve the system's constraint, and return to step one, but beware of "inertia" (Goldratt & Cox, 2004). Inertia is the need to elevate other resources to retain the old constraint as opposed to improving the constraint itself. The TOC has been used in a variety of healthcare settings and has been shown to support improvements in both service quality and performance (Ahmed, 2019).

This project focused on the first step of the TOC: identify the system's constraints. Several areas for improvement in the Clinic were identified in a cause-and-effect diagram (Appendix A). Areas included an alert system for PCN allergies in the Clinic's EHR, follow up on referrals, PCP experience with oral challenge program, and limited availability of the in-house allergist (Appendix A). Additionally, social determinants of health, such as low health literacy, were identified (Appendix A). Though several improvements could be made in the Clinic regarding PCN allergy delabeling efforts, the most cited constraint limiting this process was parental fear of subsequent reactions (Antoon et al., 2023; Vyles et al., 2020; Yang et al., 2023). This data suggests that parental perspectives regarding PCN allergy delabeling is one of the most important underlying objectives that must be addressed in healthcare practices. Through surveying the parents whose children were successfully delabeled, the Clinic will glean the necessary information to further inform parental education which may aid in parental acceptance of PCN delabeling. Understanding the barriers to PCN allergy delabeling may also help to increase interventions that combat PCN allergy relabeling. The long-term efforts of this project aim to decrease the number of children who become relabeled with a false PCN allergy while increasing the number of children who can receive effective, low-cost care that does not contribute to antibiotic resistance.

Specific Aims

Between July 5th, 2023, and December 8th, 2023, 100% of the families with children aged 0-21 who have completed a negative oral PCN challenge at the Clinic will respond to a phone survey evaluating parental perspectives of PCN allergy delabeling.

Methods

Context

This project took place at the Clinic, a Federally Qualified Health Center (FQHC) located in urban Oregon. The population cared for by the Clinic is medically underserved and all patients are insured through Medicaid. The Clinic consists of three pediatric providers, an allergist, a clinical pharmacist, a registered nurse, a clinic manager, and three medical assistants (MA). Additional support staff includes two front desk coordinators, four medical billers, and a medical social worker. The Clinic provides pediatric primary health care services to approximately 45 patients per day, ages <21 years old.

Within the Clinic, a pediatrician, pharmacist, or pediatric nurse practitioner identified and referred appropriate patients to the PCN oral challenge program. Front desk staff scheduled patients with the allergist for consults and oral PCN challenges. At the time of this project there was an allergist, a medical doctor (MD), a pharmacist (PharmD), and one registered nurse (RN) working on the oral PCN challenge program at the Clinic. The allergist and pharmacist provided both pre- and post-oral challenge education. The RN monitored patient vital signs and symptoms during the oral challenge and conducted post-oral challenge phone visits.

Most patients at the Clinic are of low health literacy and have several social determinants of health (SDoH), including racial discrimination, limited access to healthcare services, and low socioeconomic status. These SDoH create significant barriers for families regarding the engagement with, and understanding of, their child's health outcomes, including access to specialty healthcare like allergists. This project could greatly impact children labeled as PCN allergic by providing information to close educational gaps and increase positive health

outcomes. The information provided by this project may also increase referral for oral PCN delabeling and improve care coordination.

Interventions

There was a small sample size (n = 9) of pediatric patients who had completed the oral PCN challenge at the Clinic since the program's inception in 2022. To increase the sample size, the DNP student identified qualifying pediatric patients and called their parents or guardians to explain the PCN challenge program. Those who desired to participate were then scheduled with the allergist and included in the study. Qualifying criteria for the oral PCN challenge program were established by the Clinic's pharmacist and allergist and can be viewed in Appendix B.

A survey, written at the 6th grade reading level, was created in both English and Spanish. The survey, demonstrated in Appendix C, was administered via phone call to parents of pediatric patients who completed an oral challenge that resulted in a PCN allergy delabeled status. Survey participants included the parents of all patients who completed an oral PCN challenge within the project's timeline as well as those who completed the oral PCN challenge within the 12 months prior. This survey was created based on post-PCN delabeling surveys found in the research by Vyles et al. (2018), Lanchover-Roth et al. (2019), Bourke et al. (2015), and expert opinion per the allergist and pharmacist. The structure of this newly created survey utilized close-ended questions because open-ended questions often result in incomplete or missing answers due to response fatigue (Story & Tait, 2019). The close-ended questions primarily utilized a Likert Scale; however, the surveys did include an "Other" option, allowing the respondents to freely comment on both the topic and the survey itself (Story & Tait, 2019). Researcher bias was addressed through maintaining neutrality and avoiding emotionally charged descriptors that could inherently sway responses. To combat self-report bias, all participants were assured that

their responses were anonymous. Following a successful oral PCN challenge, patients were added to a list which, complying with HIPAA measures, was sent to the DNP student. The DNP student then used the MRN and EHR to call the patient's parent, obtained consent to participate in this study, and administered the survey in Appendix C. Survey implementation took place between July 5th, 2023 and December 8th, 2023. After completing the surveys, the DNP student entered the information into an Excel file. Quantitative survey responses were tracked using a run chart and qualitative survey responses were grouped based on analysis of key words, recurring themes, opinions, and beliefs.

Study of the Interventions

The study of the interventions was multifaceted. To avoid time limitations, the surveys were created to take five minutes or less. The limited number of survey questions helped to avoid "satisficing," which occurs in long surveys when respondents lose the ability to carefully consider survey questions and provide unsubatantial answers (Story & Tait, 2019). The survey in Appendix C was intentionally administered after completion of the allergist's office visit, so parents had the opportunity to ask questions and receive education from the allergist and RN prior to responding.

Measures

The primary outcome measure for this project was the percentage of parents who felt very comfortable, comfortable, somewhat comfortable, uncomfortable, or very uncomfortable in their PCN delabeled child being prescribed PCN in the future. Other salient outcome measures included the reason that some parents felt uncomfortable or very uncomfortable with their child using PCN in the future, how many patients had used PCN post oral challenge, and how many

patients had maintained their delabeled status. Outcome measures were analyzed using Microsoft Excel.

Process measures for this project included the number of available allergist appointments per week and the number of providers referring pediatric patients for PCN challenge. This data was available in the EHR at the Clinic. Additionally, this project measured the number of surveys completed after a successful PCN oral challenge, and the number of eligible patients successfully scheduled for PCN allergy consultation.

Balancing measures considered with this project included increased burden on the pediatric RN and MA, parental survey fatigue, and the possibility that survey implementation could alter patient education. To address these variables, the DNP student met with the pediatric RN and MA monthly to assess barriers to survey implementation. The survey was designed to be short and easy to understand. The survey was not made available to the allergist to avoid educational biases. This intervention did not increase clinic cost and provided the allergist and PCPs with useful information regarding education on PCN allergy and PCN oral challenge. The survey was evaluated by the DNP student and the DNP Project Chair to ensure its efficiency. To assess that the data was complete, the DNP student randomly reviewed charts of children who underwent oral PCN challenge each month during the project's intervention and correlated that tally with the number of completed surveys. This process served as an effective measure of completeness and accuracy.

Analysis

The plan for data analysis in this project involved utilization of Microsoft Excel and graphical analysis. The DNP student entered data from collected surveys into an Excel file. Quantitative survey responses, such as the Likert scale ratings, were tracked in graphical format.

Qualitative survey responses would have been analyzed for key words, recurring themes, opinions, and beliefs; however, no qualitative responses were provided by study participants. The data, expressed as a percentage, reflected how comfortable the parents were in their PCN delabeled child being prescribed PCN in the future. Additionally, data expressed the percentage of parents who agreed with their child's PCN allergy delabeled status and those who had the Clinic's provided wallet card with their child's test results.

Ethical Considerations

Important ethical considerations when conducting a survey are informed consent, confidentiality, primary language, and level of literacy. To address informed consent, all surveys contained a paragraph explaining the project and the implications of the participant's involvement (Appendix C). The DNP student verbalized this paragraph to the patient's parent or guardian and ensured that their involvement was confidential. Any Spanish speaking parents were provided the survey in Spanish. The DNP student is a Spanish speaker and was able to address Spanish speaking parents and guardians as needed. To address confidentiality, all surveys were conducted within the confines of the Clinic to ensure there was no violation of patient privacy. The surveys did not require any patient or parental identifiers for completion or analysis.

Results

Between July 5th, 2023, and December 8th, 2023, 100% of the families with children aged 0-21 who completed a negative oral PCN challenge at the Clinic responded to a phone survey evaluating parental perspectives of PCN allergy delabelling (n = 17). During this time, there were 12 patients who met eligibility criteria (as determined by Appendix B) to undergo a PCN oral challenge, of which 8 were scheduled. Four of the 12 eligible patients (33%) were not

scheduled due to a variety of reasons: having the wrong phone number in their chart, insurance coverage issues, and no response despite several phone call and voicemail attempts. The remaining 9 patients (n = 17) had completed a negative oral PCN challenge prior to the initiation of this project (April of 2022 or beyond).

Survey responses were overwhelmingly positive with 64.7% of parents reporting they would be very comfortable with their child receiving a PCN antibiotic in the future, 17.6 % were comfortable, and 17.6% were somewhat comfortable (Figure 1). Four of the 17 parents surveyed had given their child amoxicillin since the negative oral PCN challenge without any subsequent reaction (Figure 2). All but one parent endorsed possession of the wallet card with their child's oral PCN challenge results on it given to them by the Clinic (Figure 2). Additionally, 58.8% of parents answered "strongly agree" when asked if they believed their child was no longer allergic to PCN and 41.1% of parents answered "agree" (Figure 3).

Two of the three pediatric providers at the Clinic placed patient referrals to the PCN oral challenge program. The one outlying provider had joined the practice only one month prior to the initiation of the project, which likely explains their lack of participation in the referral process. At the beginning of the project, patient access to the allergist posed concerns, as the allergist was booked several weeks out and only had five available appointment slots each week. To meet the scheduling demands of this project, the allergist increased his weekly appointment visits by 60%, which allowed eligible patients to be seen with no longer than a one week wait.

Discussion

Summary

This DNP project sought to evaluate parental perspectives on PCN allergy delabeling in pediatric patients who completed a successful oral PCN challenge. This evaluation was

performed at a pediatric primary care department of a Federally Qualified Health Center between the dates of July 5th, 2023, and December 8th, 2023. This project applied the Theory of Constraints by focusing on the first step: identify a system's constraints (Goldratt & Cox, 2004). The desired outcome of this intervention was to better understand parental perspectives and their level of acceptance of their child's PCN delabeled status after completing a PCN oral challenge. Through the use of phone surveys, created based on expert opinion and research by Vyles et al. (2018), Lanchover-Roth et al. (2019), and Bourke et al. (2015), we were able to survey 100% of participant's parents (n = 17). Participants included pediatric patients who had completed a PCN oral challenge during the project's timeline or within 1 year prior to the project's initiation. Parents responded with overwhelming positivity to the surveys, with greater than 60% reporting they would be very comfortable with their child receiving PCN in the future and 100% of parents agreeing that their child was no longer allergic to PCN.

Interpretation

Survey results from this project showed that parental perspectives after oral PCN challenge are more positive than those viewed in the literature, even when surveyed at 12 months post-challenge. None of the parents surveyed felt 'uncomfortable' or 'very uncomfortable' with their child receiving PCN in the future; in fact, 4 of the 17 parents surveyed had given their child amoxicillin since their PCN challenge with no subsequent reactions (Figure 2). Additionally, 100% of survey responders agreed that their child was no longer allergic to PCN after going through oral PCN challenge (Figure 3). Current literature suggests that parents of children with a PCN allergy label have significant concerns about oral PCN challenges. Parental concerns include the following: if their child is truly allergic to PCN, the necessity of the oral challenge, trust in the provider to make the safest choice for their child, and the ability of the healthcare

facility to respond to an allergic response (Vyles et al., 2020; Yang et al., 2023). Research has also shown that parents have strong feelings regarding which providers and healthcare settings are entrusted to perform a PCN allergy evaluation (Antoon et al., 2023). At the Clinic, 100% of the parents reached via phone call to schedule a consult were willing to see the Clinic's allergists after hearing a short description of the oral PCN challenge process (Appendix D). Furthermore, 100% of the parents who attended the consult with the allergist completed the oral PCN challenge testing. This suggests that specialist consultation is likely the best approach to foster trust amongst parents and providers in pursuit of oral PCN challenge. However, PCPs often make the initial discovery of PCN allergy-like symptoms and provide education regarding PCN allergy status. Since PCPs are poised to develop lasting and trusting relationships with patients, primary care settings are ideal environments for the discussion of PCN allergy and oral PCN challenge. PCN allergy delabelling would preferably be addressed in the primary care setting, especially when considering that patient access to specialists is an increasingly common issue, particularly in rural and underserved areas (Waibel & Perry, 2022). Further research is necessary to understand how oral PCN programs can be successfully translated to primary care.

Though unlikely to hold any statistical weight due to the small sample size (n = 5), 100% of the Spanish speakers who were surveyed answered at the highest end of the Likert scale ('strongly agree' and 'very comfortable') in all categories whereas English speakers (n = 12) had greater response fluctuation. Half of the English-speaking parents answered 'somewhat comfortable' or 'comfortable' when asked about their child taking PCN in the future and 58% of English-speaking parents answered 'agree' instead of 'strongly agree' when asked their opinion on whether their child was allergic to PCN (Table 1; Table 2). Limited literature exists analyzing survey responses from Spanish-speakers, however, Latino respondents more frequently select

response scale endpoints (Davis et al., 2011). Future research should include demographic data and an increased sample size to provide more clarity surrounding these suspected cultural differences.

Limitations

The generalizability of this project may be limited for several reasons. Although all patients with PCN allergies in their chart were evaluated using eligibility criteria, the sample size of this project was small. This project utilized phone surveys which are limited in their outreach ability, consequently the sample size was reduced due to some eligible patients being unreachable. Additionally, this project was tailored to a specific population and clinic setting during a limited time frame. However, the interventions described could be utilized in other clinical settings with both adult and pediatric populations. Since this project did not include a comparison to other clinics offering oral PCN challenge it is difficult to conclude why the Clinic's oral PCN program had such positive survey results. Data analysis did not evaluate differences between patients who recently completed oral PCN challenge versus those who completed a challenge closer to one year prior. Additionally, the project did not include a survey of parental perspective prior to the oral PCN challenge. The utility of a pre-survey may have been limited since parents who consent to oral challenge are presumably accepting of the fact that their child may not have a true PCN allergy.

Conclusions

In this project, parental perspectives were evaluated after their children had completed a successful PCN oral challenge resulting in PCN allergy delabeling. Results showed that parents had an overwhelming acceptance of their child's delabeled status, even when reporting from an oral challenge that occurred more than 1 year prior to the start of the project. These results

support the need to expand oral PCN challenge programs into primary care settings to reach more patients, especially in rural or underserved communities. Future research may include larger sample sizes with both adult and pediatric populations, evaluation of which educational topics make oral challenge programs successful, and how oral PCN challenge programs can be accommodated in primary care settings.

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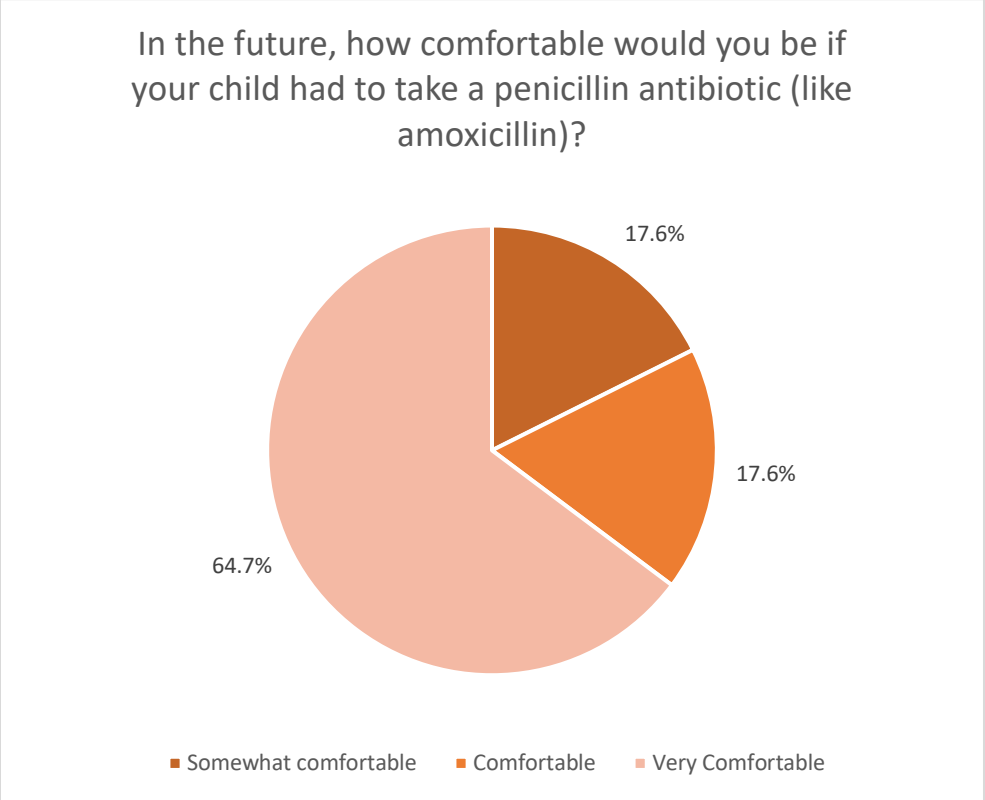
Figure 1

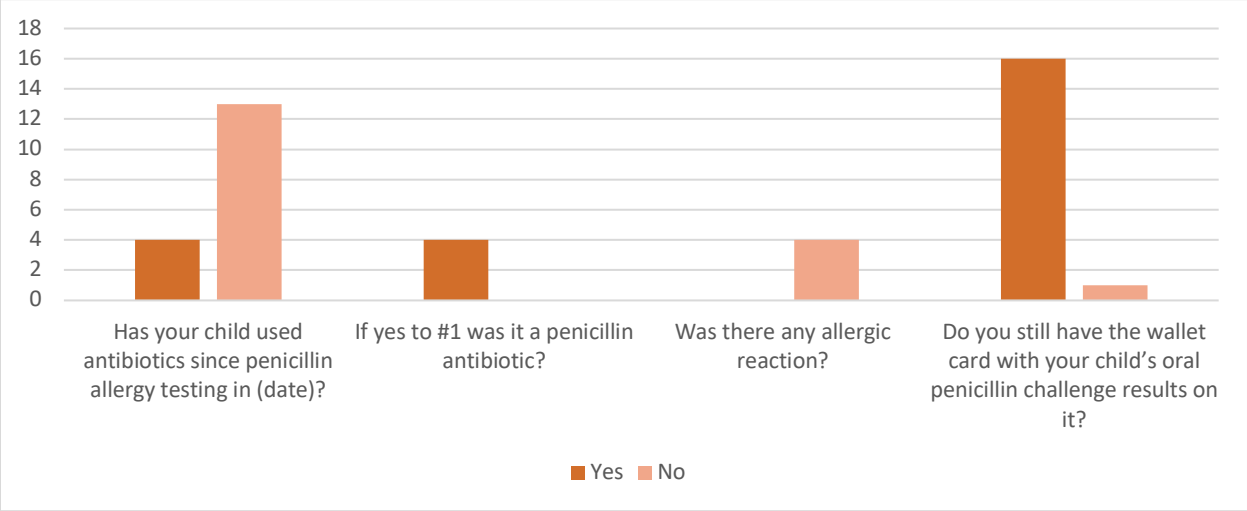
Parental Perspective on Future Penicillin Use after Oral PCN Challenge



Note: Survey included a Likert scale with the following options – 'very uncomfortable', 'uncomfortable', 'somewhat comfortable', 'comfortable', 'very comfortable'.

Figure 2

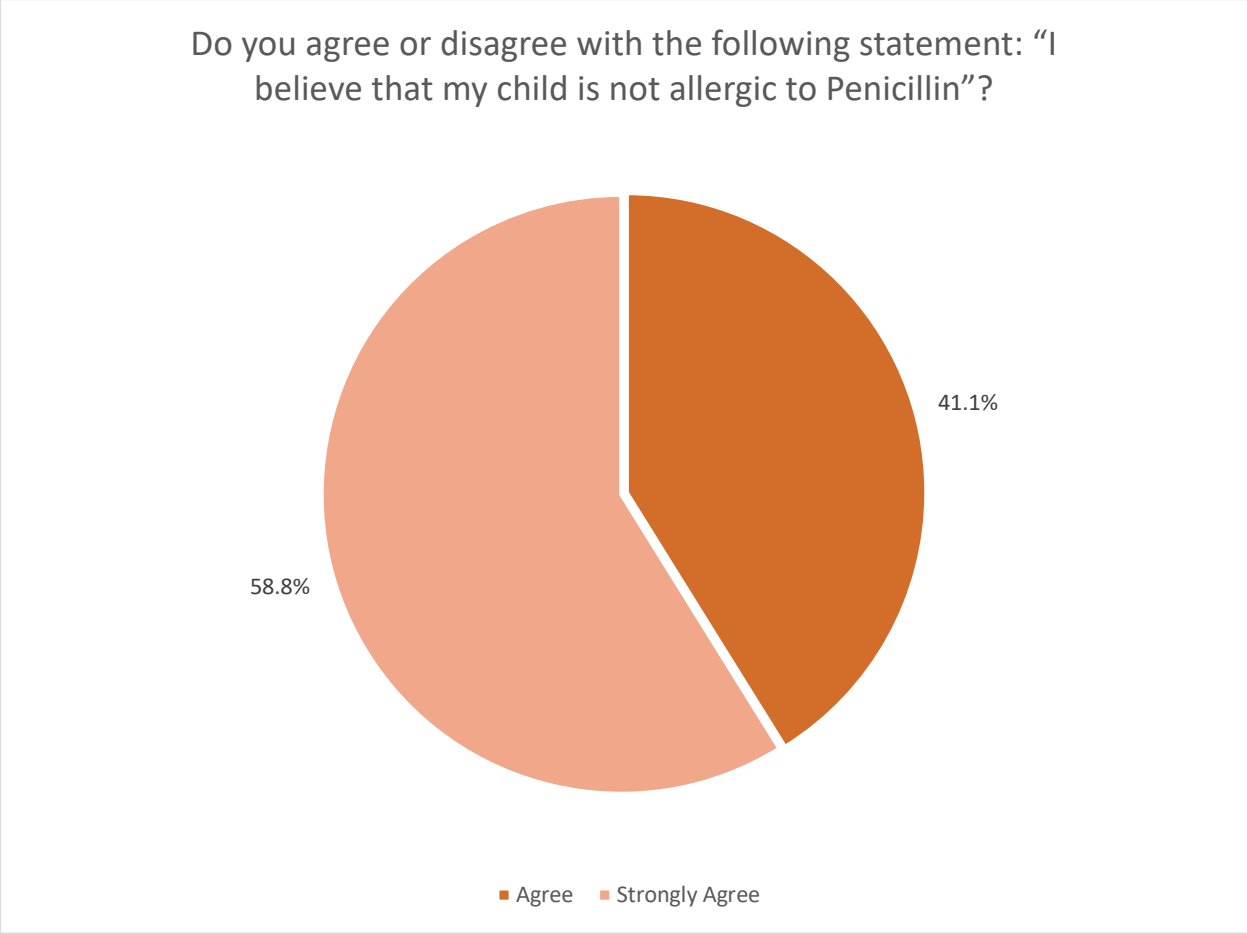
Antibiotic use after PCN Oral Challenge and Possession of Wallet Card



Note: All antibiotics taken after successful oral PCN challenge were reported to be amoxicillin.

Figure 3

Parental Perspectives on their Child's PCN Allergy Status after Oral PCN Challenge



Note: Survey included a Likert scale with the following options – 'strongly disagree', 'disagree', 'slightly agree', 'agree', 'strongly agree'.

Table 1

Differences in Parental Perspectives on Future PCN use by Primary Language

Language Spoken	**Somewhat comfortable**	**Comfortable**	**Very Comfortable**
English-Speaking Parents (n = 12)	3	3	6
Spanish Speaking Parents (n = 5)	0	0	5

Note: Survey question was "In the future, how comfortable would you be if your child had to take a penicillin antibiotic (like amoxicillin)?."

Table 2

Differences in Parental Perspectives PCN Allergy Label by Primary Language

Language Spoken	**Agree**	**Strongly Agree**
English-Speaking Parents (n = 12)	7	5
Spanish Speaking Parents (n = 5)	0	5

Note: Survey question was "Do you agree or disagree with the following statement: 'I believe that my child is not allergic to Penicillin'?".

Appendix A

Cause and Effect Diagram

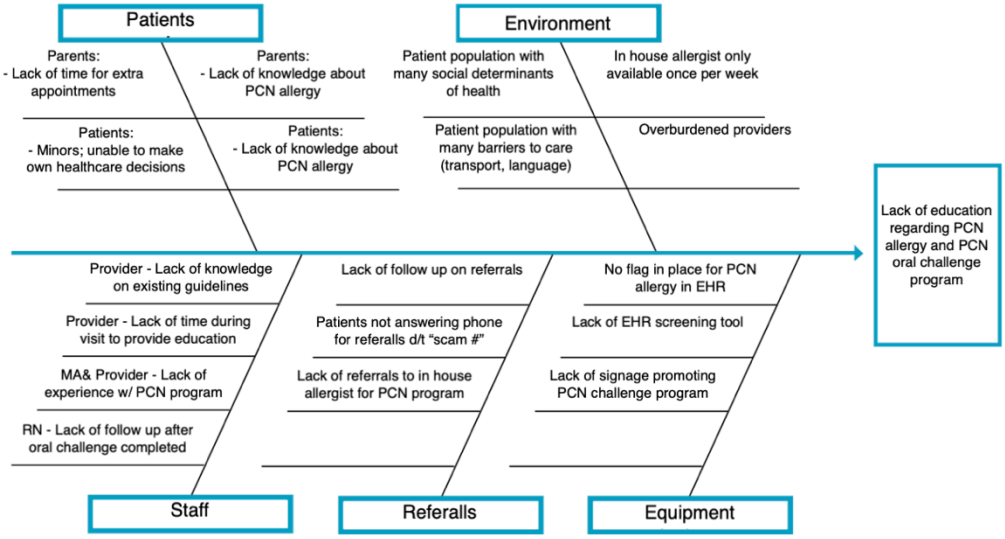
QI ESSENTIALS TOOLKIT: Cause and Effect Diagram

Before filling out this template, first save the file on your computer. Then open and use that version of the tool. Otherwise, your changes will not be saved.

Template: Cause and Effect Diagram

Team: Megan Hunt **Project:** Oral Penicillin (PCN) Challenge Education

1) Input the effect you'd like to influence.
2) Input categories of causes for the effect (or keep the classic five).
3) Input causes within each category.



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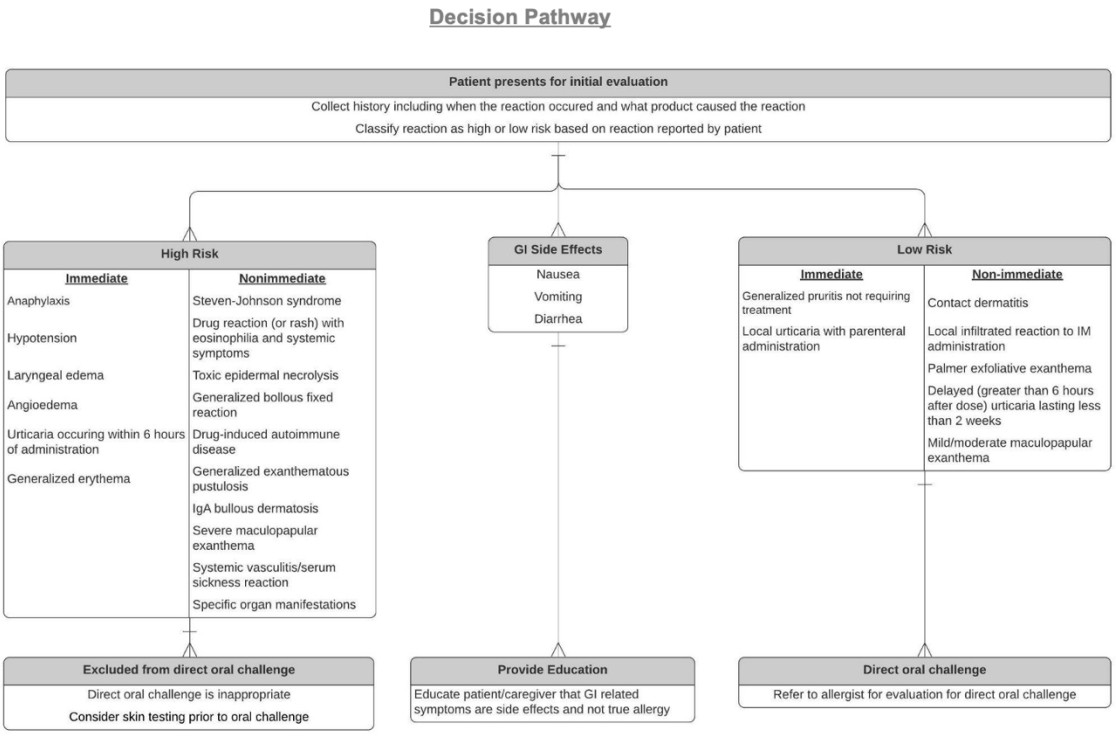
Appendix B

Decision Criteria Evaluating Eligibility of Pediatric Patients to Undergo Oral Penicillin Challenge



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Appendix C

Phone Administered Post-PCN Challenge Survey (English)

We are providing this survey as a part of a project to help understand viewpoints of parents whose child completed an oral penicillin challenge. Your participation in this research is **completely anonymous** and will help us to better educate families.

Please answer the following questions.

1) **Has your child used antibiotics since penicillin allergy testing in (date)?**

Yes	No

2) **If yes to #1**
   a. **Was it a penicillin antibiotic?** Provide examples as necessary: amoxicillin, Augmentin, Unasyn, ampicillin, carbenicillin, dicloxacillin, nafcillin, oxacillin, Penicillin G, Penicillin V.
      i. **If Yes:**
         1. Was there any allergic reaction?
         2. What happened in the allergic reaction?
      ii. **If No:**
         1. Please describe why not
            a. I still prefer to avoid penicillin.
            b. My child's healthcare provider prefers that my child avoid penicillin.
            c. I do not fully understand the results of my child's oral penicillin challenge.
            d. Other
3) **Do you still have the wallet card with your child's oral penicillin challenge results on it?**

Yes	No

4) **In the future, how comfortable would you be if your child had to take a penicillin antibiotic (like amoxicillin)?**

Very uncomfortable	Uncomfortable	Somewhat comfortable	Comfortable	Very Comfortable

5) **If you answered uncomfortable or very uncomfortable in question number 2, please describe your concerns (select all that apply)**:
   a. I am afraid my child will have a reaction to penicillin antibiotics.
   b. I do not understand the results of my child's oral challenge test.
   c. I do not believe that the results of the oral challenge test are accurate.
   d. I do not feel like the staff provided enough reassurance.

   e. I do not feel like the staff provided enough education.
   f. Other (please specify below):

   _____

   _____

   _____

6) **Do you agree or disagree with the following statement: "I believe that my child is not allergic to Penicillin"?**

Strongly Disagree	Disagree	Slightly agree	Agree	Strongly Agree

Appendix C

Phone Administered Post-PCN Challenge Survey (Spanish)

Estamos proporcionando esta encuesta como parte de un proyecto para ayudar a comprender los puntos de vista de los padres cuyo hijo completó un desafío de penicilina oral. Su participación en esta investigación es **completamente anónima** y nos ayudará a educar mejor a las familias.

Por favor, responda a las siguientes preguntas.

1) **1) ¿Su hijo ha usado antibióticos desde la prueba de alergia a la penicilina en (fecha)?**

Sí	No

2) **Si respondieron sí al #1**
   a. **¿Era un antibiótico de penicilina?** Proporcione ejemplos según sea necesario: amoxicilina, Augmentin, Unasyn, ampicilina, carbenicilina, dicloxacilina, nafcilina, oxacilina, penicilina G, penicilina V.
      i. **Sí:**
         1. ¿Hubo alguna reacción alérgica?
         2. ¿Qué sucedió en la reacción alérgica?
      ii. **No:**
         1. Por favor describe por que no
            a. Sigo prefiriendo evitar las penicilinas
            b. El proveedor de atención médica de mi hijo prefiere que mi hijo evite las penicilinas.
            c. No entiendo completamente los resultados del desafío de penicilina oral de mi hijo.
            d. Otro

3) **¿Todavía tiene la tarjeta con los resultados del desafío oral de penicilina de su hijo?**

Sí	No

4) **En el futuro, ¿qué tan cómodo se sentiría si su hijo tuviera que tomar un antibiótico de penicilina (como amoxicilina)?**

Muy incómodo	Incómodo	Ligeratmente cómodo	Cómodo	Muy cómodo

5) **Si respondió incómodo o muy incómodo en la pregunta número 2, ¿cuáles son sus preocupaciones? (Seleccione todas las que correspondan):**
   a. Tengo miedo de que mi hijo tenga una reacción a los antibióticos de penicilina
   b. No entiendo los resultados de la prueba de penicilina oral de mi hijo.
   c. No creo que los resultados de la prueba sean exactos.
   d. No siento que el personal haya proporcionado suficiente tranquilidad.

   e. No siento que el personal haya proporcionado suficiente educación.
   f. Otros (especifique a continuación):

   _____

   _____

   _____

6) **¿Está de acuerdo o en desacuerdo con la siguiente afirmación: "Creo que mi hijo no es alérgico a la penicilina"?**

Totalmente en desacuerdo	En desacuerdo	Ligeramente de acuerdo	De acuerdo	Totalmente de acuerdo

Appendix D

PCN Allergy Consult Phone Script

Script: Hi, this is (your name) calling from (PCP name). He/She has reviewed your child's chart, and it looks like they had a possible reaction to penicillin antibiotic in the past. We now have an allergist that works at our Riverstone clinic that can do testing to see if your child is truly allergic. We know that 90% of people who report a mild reaction to a penicillin drug are found not to be truly allergic to penicillin related drugs. It is important if they are not allergic, to remove this from their medical record so that other antibiotics which may have more side effect are not used.