BE PEP: PATIENT, EMPATHIC, AND PREPARED

Reducing Needle Phobia through Improved Communication Messages at Pediatric Offices

ABSTRACT

Needle phobia is an anxiety disorder that affects one-quarter of adults and almost two-thirds of children today. This is more than double what it was in 1995. Many cases of needle phobia are linked to a traumatic experience involving needles or medical procedures. People with needle phobia are less likely seek medical care, receive vaccines, and vaccinate their children. While there are several resources available for managing and addressing needle phobia, there are very few resources targeting medical practitioners or how to prevent needle phobia. Using the risk communication CAUSE model, I developed an infographic and website targeting pediatric nurses and parents of young children with suggestions for how to reduce the likelihood of young patients developing needle phobia.

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Risk Communication

Background

What is needle phobia and how does it develop?

In 1995, Hamilton conducted the first study to establish how prolific needle phobia was. He found that it affected approximately 10% of adults and 25% of children. In 2012, needle phobia affected 24% of adults and 63% of children (Taddio et al., 2012). In an analysis of all literature relating to needle fear and needle phobia from 1966 to 2017, McLenon & Rogers (2018) found that needle fear was present in 20-30% of adults and 20-50% of adolescents. Due to the difficulty in diagnosing and studying people with needle phobia—they avoid health care providers—the numbers are varied depending on how respondents are selected. However, all studies show the same trend—cases of needle fear and needle phobia are increasing.

Needle fear is a general dislike of and preferred avoidance of needles, and is much less severe than needle phobia, which is a severe anxiety disorder (American Psychiatric Association, 2013). Needle phobia is characterized by avoidance of situations involving needles, increased anxiety when thinking about needles or situations involving needles (e.g. doctor's offices), and severe distress when in any situation involving needles (American Psychiatric Association, 2013). Hamilton (1995) described the different ways needle phobia manifests, and Cook (2016) synthesized these into four distinct categories: vasovagal, associative, resistive, and hyperalgesia. There is a fifth response—vicarious—however, it is so rare, Hamilton (1995) listed it as a related category and offered no estimation of how many people are affected by it.

A vasovagal response means the person experiences a sharp increase in heart rate and blood pressure, followed by a sharp decrease in heart rate and blood pressure, which results in fainting (Hamilton, 1995). Hamilton (1995) found 23 reported deaths that were due to a vasovagal response during simple medical procedures, such as getting blood drawn. Vasovagal

responses account for approximately 50% of people with needle phobia (Cook, 2016; Hamilton, 1995).

People with associative needle phobia developed it after a traumatic event involving needles or after observing a relative experience a negative reaction or event (Cook, 2016; Hamilton, 1995). They often feel severe anxiety around needles or in anticipation of needles and are prone to panic attacks (Cook, 2016; Hamilton, 1995). Hamilton (1995) estimated associative needle phobia accounts for about 30% of people with needle phobia.

Resistive needle phobia stems from the fear of being pinned down or restrained during a medical procedure (Cook, 2016; Hamilton, 1995). People with this fear were likely forcefully restrained for a past experience, and it left them traumatized (Cook, 2016; Hamilton, 1995). This group is the most likely to become combative during medical procedures (Cook, 2016). Additional causes include threats, lies, and trickery by a medical professional or parent, which can make them distrusting of medical personnel (Cook, 2016). Hamilton (1995) estimated this accounts for 20% of all cases of needle phobia.

People with hyperalgesia are extremely sensitive to touch and pain (Cook, 2016). Their fear does not stem from the needles, but from the extreme, unbearable pain that accompanies it (Cook, 2016; Hamilton, 1995). People with a vicarious fear of needles often experience many of the same symptoms, however they are triggered by watching another person receiving treatment via needles (Cook, 2016; Hamilton, 1995). These two conditions account for a very small fraction of people with needle phobia (Cook, 2016; Hamilton, 1995).

Why is needle phobia increasing and what are the implications?

The number of vaccinations children receive before the age of 6 has drastically increased over the past 35 years. People born before 1983 only received 6 vaccines before the age of 6, and

no more than 2 shots a day (Baxter, Cohen, Burton, Mohammed, & Lawson, 2017). In 2018, that number has increased to at least 31 vaccines before the age of 6, and sometimes as many as five shots a day (CDC, 2018a). This number does not include additional vaccines recommended to high-risk groups, which can increase the number of vaccination shots (CDC, 2018a). Other factors that influence this number are combination vaccinations, which can reduce the total number of vaccination shots (California Department of Public Health, 2017), and delayed vaccination schedules, which can reduce the overall number of vaccination shots received due to missed appointments and doses (CDC, 2018a). Overall, children are receiving *five times* as many vaccination shots than they did 35 years ago.

Children begin developing memories that they will keep with them into adulthood at around 4 to 6 years of age (Baxter et al., 2017). As most needle phobias stem from a traumatic event when during childhood (Emanuelson, 2016; Hamilton, 1995), this makes the methods used for early vaccinations crucial for developing a healthy, positive relationship with needles and medical practitioners. Some negative scenarios that can have long lasting impacts on children include: adults not acknowledging the pain of shots; shaming children for their reactions to the pain; forcibly holding down children for shots or other medical procedures; and lying to children about whether they are getting a shot on a given day. These cause immense stress for children, as they do not understand why adults are intentionally causing them pain (Baxter et al., 2017; Du, Jaaniste, Champion, & Yap, 2008; Emanuelson, 2016). These traumatic events, whether caused by pediatric caregivers or parents, can lead to a post-traumatic stress disorder (PTSD) level fear response when exposed to needles later in life (Du et al., 2008; Emanuelson, 2016).

Parents and caregivers should create a positive, supportive environment for children when they receive vaccination shots, or any other medical procedure involving needles. Baxter

(2013) outlined how using age appropriate communication techniques can drastically reduce a child's stress and pain response to needles. She recommended avoiding words such as "sharp pain" and using phrases such as "a pinch" instead, to reduce the anxiety leading up to injections. She also recommended using tools to block the pain signals from the nerve to the receptors in the brain using cold packs, vibrating devices, and analgesic creams. Distraction tools were also recommended, however Baxter (2013) emphasized that this did not mean deceiving children, but rather giving them something to focus on rather than the upcoming injection.

To be clear, it is a good thing that we have vaccines to prevent deadly diseases; however, children with needle phobia retain that phobia into their adult lives, where it has strong, detrimental impacts. Adults with needle phobia often do not get regular check-ups, seek medical care for illnesses donate blood, or go to the dentist (Cook, 2016; Ellinwood & Hamilton, 1991; Hamilton, 1995; Hsü, 1978; Lemasney, Holland, O'Mullane, & O'sullivan, 1989; Marks, 1988). Women with needle phobia are less likely to consider having children because of their fear of needles (Hamilton, 1995; Hsü, 1978; Marks, 1988; Sokolowski, Giovannitti, & Boynes, 2010). Needle phobia is connected with a decrease in HPV vaccine uptake (Baxter et al., 2017). In 2012, a survey by Target Corp. revealed that 23% of adults skipped flu vaccinations because they did not like needles (Betz, 2012).

But most concerning is that people with needle phobia are less likely to vaccinate *their* children. In a case study of vaccine-hesitant parents of young children, parents expressed concern that vaccines caused harm and/or weakened their child's immune system (Salmon et al., 2005). The least-refused vaccine was the polio vaccine, which, at the time, was the vaccine with the greatest chance (albeit, a very small chance) to do exactly what parents feared—overload a child's immune system and cause a them to develop polio (Salmon et al., 2005). However, at the

time of the study, the polio vaccine was oral (CDC, 2018b). This suggests that parents, whether knowingly or not, were avoiding vaccination shots for their children. Today, the only oral vaccine is the rotavirus vaccine, which guards against rotavirus, a disease that causes severe diarrhea in children (CDC, 2018a).

Treating and managing needle phobia

There is a wealth of information available online for how to treat and manage needle phobia. These can be broken into two main categories: managing the pain of shots and managing the fear and anxiety associated with needles. Most of these resources are targeted to people with needle phobia. There are few resources that target physicians and how they can help their patients, however most of these are also selling something, such as a cream or a device.

Ways to manage the pain of shots include devices and creams to block pain receptors, microneedles and jet injections, combination vaccines, and delayed vaccination schedules. Dr. Amy Baxter, a pediatric emergency physician, invented Buzzy®, a small device that fits like a tourniquet and interferes with the pain signal from shots using cold and vibrations (Baxter, Cohen, McElvery, Lawson, & von Baeyer, 2011). She developed the device after watching her son develop needle phobia due to nurses who were insensitive to her child's fear, exacerbated his anxiety, and ignored her concerns for her son (Baxter, 2013). Buzzy® reduces or eliminates pain from shots and IV blood draws by three standard pain scale levels [e.g., out of 0 to 10, a 4 instead of a 7] (Baxter et al., 2011).

Microneedles have been developed as a more effective method to administer vaccines. Microneedles, as their name implies, are much smaller than standard hypodermic needles. The standard hypodermic needle width is approximately 800 μm (Gill & Prausnitz, 2007). Comparatively, microneedles are approximately 200 μm wide (Gill & Prausnitz, 2007).

Microneedles are about one quarter the size of standard hypodermic needles. Additionally, microneedles are designed penetrate as shallowly as possible and still be effective. Haq et al. (2009) compared the relative pain of a hypodermic needle injection and a microneedle injection and found that microneedles caused “significantly less” pain than hypodermic needles, as indicated by participants.

Microneedles have been successful in delivering vaccines, including influenza and tuberculosis (TB), in animal and clinical trials (Hiraishi et al., 2011; Prausnitz, Mikszta, Cormier, & Andrianov, 2009; Quan et al., 2013). In 2012, after seeing that many people avoided vaccines because of needles, Target Corp. announced that it would begin offering the flu vaccine via a microneedle patch (Betz, 2012). In 2017, the National Institutes of Health released a press release indicating the success of an influenza vaccine using a patch with dissolving microneedles (NIH, 2017). Dr. Roderic I Pettigrew, director of the National Institute of Biomedical Imaging and Bioengineering, emphasized that with the way this patch was designed, it could be “delivered in the mail and self-administered” (NIH, 2017). Providing that this technology serves its function and is not damaged during delivery, this could not only save patients time and money, but for those with needle phobia, it could drastically reduce their anxiety levels by removing the fear associated with doctor’s offices.

Managing the fear and anxiety associated with needles is much more time intensive and difficult. The most effective treatments include cognitive behavioral therapy (CBT), psychotherapy, exposure therapy, breathing exercises and meditation, and applied tension. CBT helps patients develop mental tools and techniques to mitigate the fear response when needles are involved. Part of the therapy includes addressing what past event initially triggered the fear response (Lilliecreutz, Josefsson, & Sydsjö, 2010; Willemsen, Chowdhury, & Briscall, 2002).

Psychotherapy is similar to CBT in that it encourages patients to talk through what is triggering their anxiety, however, CBT is a much more intensive process where patients ‘relive’ a traumatic memory, while in a safe space, and build positive associations with the memory. Exposure therapy is where a patient is exposed to a needle over several sessions until the fear response is relaxed due to a lack of triggering events while around the needle. Generally, a therapist will have a needle in the room, possibly on the desk, and at subsequent visits with the patient, move the needle progressively closer to the patient. It is a slow process that is entirely dependent on the patient’s comfort levels. The end goal is for the needle to be in the patient’s lap, or otherwise close to their body (without piercing it), with the patient able to carry on normal behavior and not react to the presence of the needle. This requires a strong and dedicated patient, as it is one of the most stressful methods of addressing needle phobia (Du et al., 2008; Fernandes, 2003; Hamilton, 1995; Orenius, LicPsych, Säilä, Mikola, & Ristolainen, 2018; Sokolowski et al., 2010). Applied tension is used to reduce the likelihood of a patient fainting during a procedure involving needles (Ditto, Byrne, & Holly, 2009). Breathing and meditation exercises are used to reduce heartrate during panic attacks (Baxter, 2013a).

Addressing Needle Phobia using the CAUSE model

The CAUSE model was developed by Rowan, Sparks, Pecchioni, & Villagran (2003) to improve cancer risk communication between doctors and patients. It identifies the conflicts and short-comings in risk communication messaging. The 'C' represents a lack of confidence in communicators, whether it be the accuracy of their message or trust that they are operating in people's best interests. The 'A' represents a lack of awareness of the risk, which includes knowing the risk exists and identifying the risk when in any given situation. The 'U' represents a

lack of understand of the risk, whether it is identifying what makes something a risk or understand a message strategy about a given risk. The 'S' refers to a lack of satisfaction with the solutions to address the risk. This can arise from people underestimating the severity of an issue or their susceptibility to it. The 'E' represents a lack of enactment of risk solutions. People may not adopt risk solutions because it requires too much change to their lifestyles and routines or because of decision fatigue when asked to do too much.

Based on personal experience, reviewing the literature, and interviewing people, I established that the primary issues surrounding needle phobia are a lack of awareness that the risk exists and understanding of how the risk develops. Most everyone I interviewed was unaware of how prolific needle phobia is becoming and did not understand how early childhood introductions to needles and vaccines could shape the rest of a child's life. During a review of the literature, I noticed that there are numerous methods to treat and manage needle phobia, but less than five resources for how to prevent it. Of those, three targeted physicians and were promoting a product. Of the other two, one targeted parents and the other targeted doctors and nurses. Using this knowledge, I created an infographic illustrating the rise of needle phobia cases, how an increase in vaccination shots has contributed to this, how needle phobia impacts a person's life, and how all these risks could be reduced through patient, empathic care at the doctor's office (Appendix II).

My primary audience for this infographic is pediatric physicians and nurses. My secondary audience is parents of young children who might see this message on a wall in doctor’s office. My third audience is people with needle phobia and is unrelated to the first two audiences. I asked two people from each of my audience groups—nurses, parents, and people

with needle phobia—to review the message and give me feedback regarding their understanding of the message and how it applies to them (Appendix I).

To make my primary message for the infographic easily memorable, I dubbed it "Be PEP." The general idea is that physicians and nurses should be patient, empathic, and prepared when young children are getting any procedure involving needles. Nurses should take a few extra minutes to create an environment of safety and trust, such as talking or playing with the child to set them at ease. Nurses and parents should not trivialize the pain associated with shots but should offer comfort instead. Lastly, nurses and parents should have tools on hand to quickly reduce injection pain and fear, such as numbing creams, ice packs, and distraction kits.

Most of the feedback was positive. People liked that minimal text was used, action items were not only included, but were "easy-to-follow points," and that sources for the information were included at the end. Some suggestions to make this more useful for nurses were to remove the *What is Being Done* section, bold any mention of reduced vaccine uptake to make it stand out to nurses, elaborate on the action items, and add a QR code that links to additional resources as "[nurses] are too busy to take the time to type in a [web address]." Using this feedback, I created a web site to host the final, revised infographic (Appendix III) and my final paper. Ideally, this website will be later edited to include links to resources for varies concerns surrounding needle phobia.

Some of the more enlightening feedback I received came from the two nurses I interviewed. Nurse 1, age 32, is in school to receive her nursing certification and was going through the pediatric portion of her schooling when I interviewed her. She was excited to learn additional ways she could help her patients and intrigued to learn how early childhood vaccine methods can influence a person later in life. "I would *love* to know what I can do to help

children." She had a very positive outlook on the entire message. Nurse 2, age 58, was recently retired from nursing and had a neutral outlook on the message. She agreed that it was something of which pediatric nurses "should be aware." However, she also remarked the increase in needle phobia was because "children are wimps, because their parents are pampering them." The younger nurse showed a much greater level of empathy than the older nurse. I was intrigued to see how much the message of how to engage with children has changed over the last 25 years. This indicates that with continued, improved messaging strategy, it is possible to shift how children are introduced to routine healthcare and vaccinations.

Appendix I—Feedback on First Draft of *Needle Phobia & Vaccine Hesitancy* Infographic

I interviewed participants in person for active monologues or asked them to review the infographic and answer the questions below. I have included a summary of the responses below, separated by active monologues and questions. Those who just answered the questions were my secondary audience, parents of young children.

1. Were you aware of this issue before reading this?
2. What, if any, points are unclear? Confusing?
3. Is there anything you want more information regarding?
4. Are the end points useful to you? Why or why not?
5. Are there any other changes you would like to see?

Primary Audience—Pediatric Nurses, Nurse Practitioners, and Nurses in Training

Initial Thoughts & Visual Appeal

- First impression after reading title: "Are you raising awareness…? I'm confused as to the purpose of this infographic."
- *The Implications:* Bold "vaccinate their kids", because this is "a huge thing [everyone] talks about."
- *The Implications:* These make sense.

Points for Clarity

- What is the age range for "children"? In pediatrics, this is a very specific age range. But what does it mean for this infographic?
- *What Is Being Done*: To which of the statements does "increased cost" refer?

    - Suggested I remove the Buzzy bullet, as it is someone implied in the action items and elaborate that these options cost more, because insurances do not always cover the entire cost.

- *What Can You Do?*: Point 3: condense to "Keep numbing cream, ice packs, and distraction tools on hand to quickly reduce injection pain."
- *What Can You Do?*: One respondent incorrectly thought this meant: "Yeah, I know shots hurt. And it's ok because I still have to give it."
    - This section is intended to reduce shaming culture that can lead to needle phobia.
    - Suggestion from respondent: "Shots hurt. Acknowledge it and offer comfort."
- *The Cause:* Flip these two points, as the sub-sentence under the first point makes more sense after reading the second point.
- *The Issue*: "I had to read this several times before I understood it."
- *The Cause*: "Do these numbers include combination vaccines? Because that would reduce the number of shots."
- *The Cause*: [regarding total number of recommended vaccination shots] "Not all children get the flu vaccine, even though they recommend it."

Questions Raised by Information Presented

- *What Can You Do?*: What does be patient mean? Few extra minutes doing *what*?? "I would love to know *what* I can *do* to help children in those few extra minutes!"
- Asked for clarification that audience is indeed healthcare professionals. I specified pediatric healthcare professionals.

- *What Can You Do?*: Tell me more of what I can do. One respondent, after some discussion, suggested "create an environment of safety", because what that means is understood by healthcare providers.
- *What Can You Do?*: Please elaborate on what point 2: "Shots hurt, and that's ok." I need to know what I can do here.
    - One respondent incorrectly thought this meant: "Yeah, I know shots hurt. And it's ok because I still have to give it."
    - This section is intended to reduce shaming culture that can lead to needle phobia.
- *The Issue*: "Where did your numbers come from?" Perception: are they valid?
- *The Cause*: "Children are wimps, because their parents are pampering them."

Things I Liked/Loved

- "I am intrigued by the increase in needle phobia."
- "Yay! [You] included your sources at the end!"
- "I like that you used minimal text. Too many infographics use too much text."
- "I loved the action points at the end. Tell me what I can DO!"
- "I loved that this is easy-to-follow points."

Additional Thoughts?

- Add a QR code nurses can scan for additional information.
    - "Don't use an html website. We're too busy to take the time to type that in. Give me something I can quickly scan in the 2 seconds I'm not busy."
- "If you're posting this in a nurse's office, the [action points] should be higher, because we aren't going to spend that much time reading this."

- "You can probably remove "what is being done" if posting in a nurse's office, because I was already aware of all of these."
- "Just give me: What is the problem, why is it bad, what is causing it, and what can I do."
- "I would have to say yes [I was aware of this issue before reading this], because I work with kids."
- "I was surprised by how many shots they get now."
- [Regarding useful of the action points at the end] "Since I'm not working anymore, no. *laughs* But as a nurse working with children, yes that is something you should be aware of."

Secondary Audience—Parents of Young Children

Initial Thoughts & Visual Appeal

- Very visually appealing
- First numbers need percentage sign in the bubble
- Adjust hanging formatting of adult percentages
- Change "kids" in *The Implications* to "children"

Points for Clarity

- "The end point about being empathetic was somewhat useful but it made me wonder if you can be empathetic and your kid will still get needle phobia?"
- *The Cause* contents and heading seem to clash or not answer the question
    - I took this to mean I needed to clarify how vaccines and needle phobia were connected
- *What Is Being Done* had some repetitive and unnecessary information

  - One respondent did not like the information on the product Buzzy
  - Did not see how cost was connected to the rest of the points

Questions Raised by Information Presented

- "Do we know what actually helps kids and prevents them from developing needle phobia?"

Additional Thoughts?

- N/A

Tertiary Audience—People with Needle Phobia

[This group was, unsurprisingly, the least reticent to share with me their thoughts regarding the infographic or experiences with needles. Below I have summarized the short responses I received.]

Respondent 1: "I don't like needles, shots, or blood draws because [nurses and doctors] don't explain *why* its important. They just try to stab me with no reasoning. So, I don't go. Whenever they try to bring a needle out, I just get up and walk out. I won't go to the dentist, because they do the same thing."

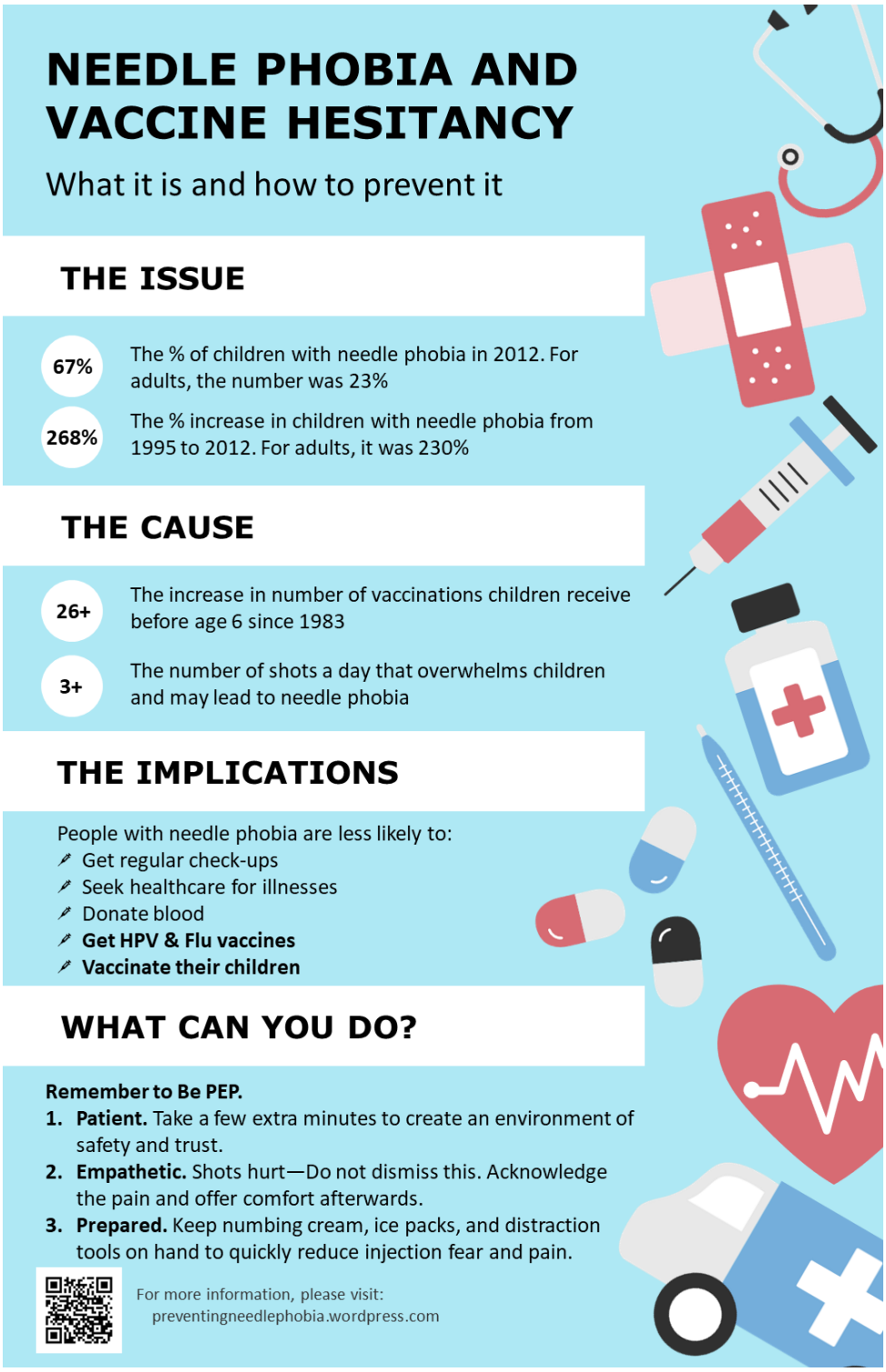
Respondent 2: "I really just hate needles. It completely freaks me out when someone tries to give me a shot…A few years ago, I decided to try to get over my fear. So, I signed up to donate blood…As I was finishing donating blood, [the nurse] asked if I wanted to donate plasma. [I agreed.] No one explained to me that you had to sit with a needle in your arm for 15-30 *minutes*. I was freaking out a few minutes into it, and then the machine *broke*. They couldn't release me until they repaired the machine, so I had to sit there with a needle in my arm for an *hour*. I decided never again after that. It probably made my fear even worse, now that I think about it."

Appendix II—Original Infographic

File would not fit in document. Please see attached file labeled *Pedicord.Initial Draft.Be PEP.Reducing Needle Phobia.pdf*.

Appendix III—Final Infographic

This can be seen in the attached file labeled *Pedicord.Final Draft.Be PEP.Reducing Needle Phobia.pdf*. It can also be viewed at preventingneedlephobia.wordpress.com.



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