

# But Why: A Podcast for Curious Kids

## [Why is it a shot? Kids' questions about the COVID vaccine](#)

October 22, 2021

**Jane** 00:21

This is But Why: a Podcast for Curious Kids from Vermont Public Radio. I'm Jane Lindholm. On this show, we take the things that you're wondering, worried or excited about, and help you get more information. Usually you lead the way by sending us your questions. But in today's episode, while we still have questions from you to us, we decided we were going to do something on this even if we didn't have many questions from you, because it's important to know more about and we know many of the adults in your lives are probably thinking and wondering about this too, so they can listen in as well.

**Jane** 00:56

It's been almost two years since the Coronavirus, known as COVID-19 was first discovered. And this pandemic has changed life for so many people around the world. In the last 10 months or so, one of the ways people have been trying to protect themselves from the virus and maybe eventually get back to normal is by getting something called a vaccine. A vaccine is a type of medicine that helps your body learn how to fight back if it ever comes in contact with a specific illness. Adults in many parts of the world and now some older kids aged 12 and above have been able to get a COVID vaccine to help prevent them from getting the virus and to help protect them from very serious illness if they still do get the virus after they're vaccinated.

**Jane** 01:45

Some of you have seen the adults around you getting a COVID vaccine. And maybe you've been wondering when it will be your turn. We're doing this episode today because the US federal government is expected to give emergency approval for a COVID vaccine very soon for kids ages five to 11. So we wanted to make sure you have all the information you need as your time approaches. We know that not all of you are listening in the United States, and your country may not have approved a vaccine for kids yet. But this information should be helpful for you to know for whenever you're able to get this protection.

**Jane** 02:23

Even though up until now the vaccine hasn't been available for most kids, a few thousand kids in the United States and other countries have already been vaccinated. That's because before the government will approve any kind of medicine for everybody to use. The company that makes that medicine first does several trials, where they give the medicine to a lot of people who've signed up to go first to make sure it works.

**Jane** 02:49

In early trials companies give the medicine to a small number of people and try to figure out the right dose and if it seems safe. If they think they've figured both of those things out, then they give it to more people to make sure it works in a lot of different kinds of people and really is as safe as they think in all different kinds of people. There are several companies that have been running trials of their COVID vaccines for kids, and one has already finished its trials and submitted its results to the US government. It's actually a combination of two companies, Pfizer and Biontech. They teamed up to make a COVID vaccine. Their vaccine is one of the ones some of the adults and big kids you know may have gotten and their version for younger kids is the same medicine but in a different dose.

**Jane** 03:37

We wanted to know what it was like for the kids who took part in the trial to see if the vaccine is safe for kids. So we tracked down a family of them.

**Renee** 03:46

I'm Renee.

**Sofia** 03:47

I'm Sofia.

**Nico** 03:48

I'm Nico.

**Miguel** 03:50

I'm Miguel Chavez.

**Sofia** 03:52

I'm six.

**Nico** 03:53

I'm nine.

**Sofia** 03:53

Sophia is the one who's six. Nico is nine. Miguel is their dad, and Renee is their mom.

**Renee** 04:00

I'm actually an ICU nurse here in the Bay Area. And I had been on the lookout for either Moderna or Pfizer and whether or not they would be doing pediatric trials.

**Renee** 04:11

And we happen to get an email at work. I work at Stanford, and it said that Stanford was going to be one of the study sites for the trial. We had all gotten vaccinated as the adults in our family and we just really wanted a way to keep our kids safe as well.

**Jane** 04:25

So the family signed up Sofia and Nico in March, and they actually got started in June. For Nico and Sofia to participate, not only did their parents have to sign lots of paperwork, but they also had to agree separately to make sure they were really sure they wanted to do this. Here's why Sofia said she wanted to be part of the trial and maybe get the vaccine early.

**Sofia** 04:47

So I guess thought that if we get it then we can do a lot more things than just stay at home and just talk to friends like on the phone, we can, like, after that you can do lots more things than just staying at home.

**Jane** 05:07

And as for Nico.

**Nico** 05:08

I said yes, because I get to see all my friends and maybe we can go to Universal Studios.

**Renee** 05:13

So for the record, he has said Universal Studios of his own accord. And hopefully somebody listening, because I think my kids deserve tickets to Universal Studios, anyway.

**Jane** 05:28

But what did they actually do when they were in the trial? Well, they had to tell the researchers who were running the trial a lot about themselves, and then they had to get two shots, just like the adult version.

**Nico** 05:39

I got my first shot first, it didn't hurt but the second time, it sort of hurt

**Sofia** 05:44

it so for the first time, it didn't hurt a lot. And I was before I was nervous. And but the second time when I got the flu shot it hurts, like more, but it wasn't too bad. It was after the shot that it hurt. And like kind of when the shot was going in.

**Jane** 06:09

Nico and Sofia both said getting the shots actually heard a little less than some of the other shots they've had over the years. Some adults have noticed that they feel a little crummy after getting the COVID vaccine. And that's actually normal. Some kids feel a little lousy as well. But it's generally nothing to be concerned about, it actually means your body is doing what it's supposed to and given an immune response to the vaccine. You should tell your adults how you're feeling after any shot though. And if you feel really sick, they can call a doctor and get some good advice.

**Jane** 06:42

In addition to talking with the Chavez family, we called up one of the doctors who has been working on one of these trials with kids. Dr. Jenna Bollyky, is a pediatric doctor, meaning she works with kids. And she studies infectious diseases for Stanford University. She has been working on the trial that Nico and Sofia are in. Dr. Bollyky told us there's a lot more to being in a trial like this than just getting two shots.

**Jenna 07:09**

I am so grateful and excited to meet kids and families who are interested in participating in science and participating in clinical research trials. It does take a lot of work. Their job, when they come is to tell us all about their health and to tell us about anything that they have from a medical standpoint that we need to know about before we start, and then they're given an injection. And this allows us to follow people over time and capture any symptoms that they have. So that's the next thing that you have to do as part of a clinical trial. They work with their parents to report back to our study team, anything that happens to them if they develop a fever if they develop soreness of the arm where the injection happened if they develop anything else rashes, anything else within that first week after they get an injection. And then even every week, we ask them to fill out an online diary to tell us how they're feeling. And that goes on for two whole years.

**Jane 08:07**

Sofia told us the researchers gave her and Nico some cool technology so they could track their symptoms after getting the shots.

**Sofia 08:14**

So they gave us like these phones that have these study things. And at night, they like it asks you like questions like, like, did they get like a bump where like, they got the shots? And you can say yes or no.

**Renee 08:37**

So after each injection, it was seven days of really specific symptom questions. And then in between for the two weeks, it was just a weekly.:Do you have any symptoms of COVID? Yes, no. But we're going to be submitting that data weekly for two years.

**Jane 08:55**

That's right. There'll be monitored for two years. Dr. Bollyky says the kids have to keep coming back to check in with the team of doctors and researchers over those years.

**Jenna 09:04**

They come back to give blood as well. And by giving blood that allows us the scientists and then the company Pfizer to look to make sure that the response that the immune system is creating is strong enough to combat the virus, should they ever come in contact to the virus. So we call that efficacy is the vaccine effective and making a good immune response. And then we're measuring with all of those communications through online and they have logbooks, the safety if there's any kind of bad things that happen.

**Jane 09:36**

Sofia and Nico's mom, Renee says she thinks that's really important for people to know, a vaccine trial isn't just here's your injection. We get it approved and we're done. You know, the safety is followed for a really long time and the commitment to that both the, you know, research team and the physicians involved and the participants too I mean, it's a, it's a really long commitment.

**Jane 10:01**

There's one other thing you should know about a vaccine trial like this, because the doctors and researchers are trying to figure out whether getting the vaccine protects you more than getting no vaccine. Not everyone in a trial actually gets the medicine, the vaccine, Sofia and Nico don't know whether they got the medicine or just got a shot with salt water in it called a placebo. If it turns out, they didn't get the vaccine, the doctors will let them know so they can go get it along with other kids their ages. In most trials, you have to wait until the trial is all the way over before you can find out if you got the medicine or the placebo. Let's go back to Dr. Bollyky for a bit to answer some of the questions you have sent us about the COVID vaccine and just vaccines in general.

**Opal 10:48**

My name is Opal from Fort Wayne, Indiana. And my question is, how do vaccines work?

**Sebastian 10:55**

My name is Sebastian and I am nine years old. And I live in Playa Del Carmen Mexico. And I would like to know, how do vaccines work?

**Jenna 11:13**

In general, we vaccines are part of a way to train your immune system without actually having to get sick.

**Jane 11:21**

Your immune system is how your body works to fight off sickness from things like viruses. Most vaccines use a small protein from the virus you want to fight or a similar virus. And they put a little bit of that protein in your body to help your body learn how to fight the real invader. Here's how Dr. Bollyky explains it.

**Jenna 11:41**

The vaccines you get as babies and as kindergarteners are often attenuated real viruses. So viruses that have been changed in a way to make them safe again, but it's the actual virus that causes the disease has been changed in a way to again train your immune system so that if it does come into contact of the dangerous virus, it'll have knowledge of the virus with this pretend mutated changed virus that that was given as part of the vaccine. The other way we can do it is to give a small piece of virus in a vector. So a vector means some other way to bring in the piece of virus to cells. And we can do that with common cold viruses that that don't cause you to get sick. And they can bring in this special piece of the virus that you're trying to develop a vaccine against. And the viruses on their own generally use the machinery of our own cells to replicate themselves. By doing now we trick the viral vector into making some of those pieces of the virus that we want to generate an immune response.

**Jane** 12:52

When your body encounters This changed virus, it fights it off. And since it's only a little bit of the virus, and changed, it doesn't make you very sick. And now your body will know how to fight the real virus if you're ever exposed to it.

**Jenna** 13:06

So all of the vaccines work in a similar way by creating a protein that will train your immune system to develop a response so that when you see that virus again, you won't have a bad sickness.

**Jane** 13:19

But researchers are excited about some of these COVID vaccines, including the Pfizer one because they don't use the viruses in this vaccine. This new type of vaccine uses something called mRNA.

**Jenna** 13:31

So m RNA, their initials, and they stand for messenger ribonucleic acid. And that's a lot of words. But basically, it's the recipe for yourselves to make a protein. And so it's instructions or a recipe. So when we give this to our bodies, the cells in our bodies are able to take that those instructions and use building blocks that we have in our own bodies to make these parts of the Coronavirus without making the whole dangerous virus but just the parts of it. And that will train our immune systems to fight the infection if we ever come into contact with it.

**Jane** 14:09

Well, this is the first vaccine to use mRNA. The technology behind it has been studied for decades.

**Jenna** 14:15

This new technology or the mRNA vaccines, it works in a very similar way. It's just a different part of that pathway. And so I think that I'm very reassured when I see how the vaccines have been working that from a theoretical standpoint, I would imagine it would work just like all the other vaccines. And the good news is that we have really rigorous testing systems in our country. The companies that develop these vaccines, as well as the scientists and doctors like myself who participate in clinical research trials, do very careful studies to make sure that the vaccines are safe. One thing we know about vaccines from decades and decades of studying them is that most side effects happen in the first two months after someone receives a vaccine, and every once in a while, very rarely there can be a complication or a bad reaction to the vaccines. And this is the same with the Coronavirus vaccine. But the chances of those are so small and so rare that the scientists and the government have determined that the benefits far outweigh the risks.

**Jane** 15:24

How is the kid version of the Pfizer vaccine different than the adult version?

**Jenna** 15:30

Well, the medication is exactly the same, but the adult version is 30 micrograms. And for children ages five to 11, or up until 12, it's 10 microgram dose. So it's one-third, the amount of the medication. And then for children, less than five, it's three micrograms.

**Jane 15:52**

We got a question from one parent who says: my son is 11 and a half years old, he's likely to be eligible for the vaccine soon, which means by the time he gets it, he'll be close to 12, but not quite. How do professionals know what dose is right for him? And how do you know what dose is right for all kids? Because kids between the ages of five and 11, or 12, can be very different sizes and shapes? So how do you make sure that that dose is right for all these different kinds and shapes and sizes of kids?

**Jenna 16:22**

That's a super question. What we do, and this is a well studied sort of pathway, is to start with something called a dose-finding study. And that's a phase one study. So when the medication is developed, it gets first trialed on adults, and then ultimately, children at different doses. And we're looking for the same thing, we're looking for safety, and we're looking for an immune response that's large enough to you know, protect an individual, the sometimes over time, we see different types of responses that suggest maybe the dose is too high, or the dose is too low. Probably it's most obvious to think about the size of a body as being an important in determining the dose, it also has to do with how active immune systems are in children versus teenagers versus adults versus the elderly. And so there are many factors that sort of go into determining the dose. But it's determined empirically or by these trials to make sure that we get a good response and ensure that it's safe.

**Jane 17:28**

We wanted to get another take on this question of whether someone who is almost 12, but not 12, yet should get the kid vaccine. So we asked Vermont's Health Commissioner, Dr. Mark Levine to share an answer as well.

**Mark 17:41**

The quick answer is don't wait. As soon as there's a vaccine for a kid, the kid should get vaccinated, so parents can feel good about doing it as well. And kids will be protected.

**Mark 17:55**

The way we know if a vaccine works in an adult or a kid, is to do studies on them, experiments that show that the people who got the vaccine had great benefit from it without any major side effects. And those who didn't get the vaccine might have actually gotten the illness that the vaccine is designed to prevent.

**Mark 18:18**

Suffice it to say that 12 to 15 year olds had their own study testing the dose that they get. And five to 11 year olds had their own studies, testing the dose that was meant for them. There are enough 11 year olds and enough 12 year olds in each of those studies that we know that if the results came out showing great benefit and great safety, we can rely on them for the appropriate age kid. So what we found is that kids that are almost but not quite 12 will still be protected against COVID with the doses that are approved for 11 year olds. So please get your vaccine as soon as it's ready for you.

**Jane 19:05**

Coming up. Doctors say it's really essential that we all get vaccines to protect us from illnesses that could make us very sick. But why do they have to be shots?

**Jane 19:16**

This is But Why: a Podcast for Curious Kids. I'm Jane Lindholm and today we're talking about the COVID-19 vaccine for kids. But let's talk about vaccines more generally for a bit.

**Piper 19:28**

My name is Piper and I'm five. I live in Bozeman, Montana. And my question is, why do shots hurt?

**Hannah 19:36**

Hi, my name is Hannah. I live in Shelburne, Vermont. I'm seven years old. And my question is, does it hurt when you get the COVID vaccine? Thank you.

**Julius 19:48**

Hi, my name is Julius. I'm eight years old. I live in Ottawa, Ontario, Canada. And my question is, why does your arm hurt after you get your vaccine?

**Jane 19:59**

Here's Dr. Jenna Bollyky from Stanford University.

**Jenna 20:02**

Oh, that's a great question. It's too bad that it does have to hurt a little bit, I think the first thing that happens is you have a poke of a needle, that doesn't feel good. What generally happens though, is that it hurts a little bit later in the day after you get your injection. And that's because the immune cells are coming to be educated, the cells around where the medicine was delivered, are doing their job. They're taking in those the messenger RNA or the viral vector, or even the protein if it was a different a different version of the vaccine, and starting to train your immune system. So that immune response is exactly what you want to sort of teach your body to fight the infection should should your body see the real one later.

**Jane 20:45**

And here's how vermont health commissioner Dr. Mark Levine describes it?

**Mark 20:49**

Well, the sort of scientific answer is we have these nerve receptors in our skin, that sense pain. That's why anytime you get injured in a way that breaks the skin, you feel it. We're of course, causing an injury by sticking a needle through your skin into your muscle in your upper arm. But the fact is, this is a very thin needle. And turns out, thinking about the pain is much worse than it usually is most of the time. Lots of people don't even know it happened.

**Eloise 21:29**

My name is Eloise. I live in Austin, Texas. I'm five years old. And my question is, why can't we just drink this and to keep us safe from the virus not have it just pumped into our muscles or anything? Poked!

**Harlan 21:47**

Hello, my name is Harlan. I'm nine years old. I live in Middlebury, Vermont. And my question is, why are some medicines delivered in shots, others in pills, and others in drinks?

**Nina 22:01**

My name is Nina, and from Riverdale, Maryland, and I'm six. And I want to know why they use needles for shots?

**Jane 22:11**

They would like to know, you know, why is some medicine delivered in one way like a drink or a pill and some is delivered as a shot?

**Jenna 22:20**

That's a great question. So whenever we want to give a protein or something that turns into a protein, the stomach environment, the acid in the stomach, it does a really good job of breaking down that protein. So it's really hard to get a vaccine as a pill. Because usually a vaccine involves some kind of protein that your body is mounting an immune response to.

**Jane 22:42**

I mean, it's kind of amazing, right? That your body can respond to these different medicines in different ways. And so if you were to swallow something, all of the things that break down the food in your body and help you digest things might not actually be good for the medicine that you're trying to get into your body. And so you know, the people like you are trying to figure out the best way to keep us safe and healthy. And not just trying to make us have a shot that hurts in our arm or leg or our butt.

**Jenna 23:09**

That's exactly right. If we could give it as a pill, we would, absolutely.

**Jane 23:14**

And here's Dr. Levine.

**Mark 23:16**

Unfortunately, if you designed a vaccine, that could be given by mouth as a pill or a drink, it would still be subject to all the actions of these enzymes. And then it turns out, some of the components of that vaccine might not be in the right forum to allow your body to create the right immune response against it. That works much better through injection. So though there are occasional vaccines that through history have been given by mouth, the majority are given by injection. It's all about allowing your body to develop the immunity that you want to have against the infection you're trying to prevent.

**Jane 24:06**

How long do vaccines generally? And how long does this vaccine stay in your body?

**Jenna 24:13**

If we're talking about the medicine, or what's injected into your body, you may have heard that the messenger RNA vaccines need to be very, very cold to stay alive, or to stay active. They have to be in very cold freezers, and they really don't last very long outside of the freezer, really just about 12 hours. And so what is being injected into your arm doesn't last very long at all because your body's quite warm. But as we mentioned, the medication that's injected gets taken up by your own cells and starts to make proteins and then the effects of those proteins, so the immune response to those proteins is what lasts a long time.

**Jane 24:52**

The immune response from a vaccine, how long you're protected from the illness could last a season or it may last many years it's different for different vaccines. The flu shot for example you might get every year but other vaccines you might get every five or 10 years or even only once.

**Rohan 25:10**

My name is Rohan and I live in Singapore. I am 11 years old.

**Rafa 25:15**

My name is Rafa and I'm nine years old.

**Rohan 25:17**

Why does a COVID vaccination need two doses?

**Rafa 25:20**

Not one.

**Jenna 25:22**

It's not uncommon to need two doses and about that far apart to try to boost the immune response. And so when the body first sees something that's brand new, it has might have a small response. But it might not be big enough to teach all of the immune cells in your body, what's needed. And so having that the second dose of the vaccine to complete the full course of the vaccine is just another opportunity for the cells in your body to see that same safe virus and mount, an immune response and train those immune cells to be ready to see the virus in the future should you come into contact with it.

**Jane 26:04**

Many of the kids who listen to our podcast are not in the United States. And so for some of the kids who are listening to this episode, they may not be getting a vaccine right away in the next couple of weeks or months. Could you talk a little bit about the fairness of how vaccines become available in different places at different times, and sometimes different vaccines.

**Jenna 26:27**

That is a great, great point, it's been very hard thing to watch as a doctor, how vaccines become available to some people and not others. Sometimes it's an economic issue, sometimes it's related to how those vaccines need to be stored. So there could be areas of the world where it's hard to have these very, very cold freezers, and to transport medications to these very, you know, in these these

minus 80 freezers, which are very, very cold. And politically, there's there there are forces that I wouldn't be smart enough to tell you about. But you know, each country's working really hard to make sure they have enough vaccine for their own population. And I think sometimes we fight over these things in a way that that probably is the best for the whole world in general. So it's my hope that we're able to get these vaccines to everyone around the whole world who could benefit from them.

**Jane** 27:19

If you are wondering when you might be able to get a COVID vaccine, you can ask the adults in your life to help look up some news articles explaining where your country is in this process. It is going to take a long time for vaccines to reach everyone. But if you do have the chance to get vaccinated, everyone we talked to for today's episode urges you to do it.

**Jenna** 27:41

The vaccine is really safe. All of our research show that it's really safe. So I think it's really important to think about it and get the vaccine to help us all, you know, sort of get our world back to normal.

**Nico** 27:54

Get vaccinated!

**Sofia** 27:56

Get vaccinated to be more safe, and to not have to stay home and just be bored.

**Jane** 28:03

Let's leave it there for today. If you have more questions about the COVID pandemic, or about vaccines or anything else, send them to us. You can have your adults record you using a free audio app that comes on most smartphones. Tell us your first name, where you live and how old you are, along with what you want us to do an episode on next, and send the file to [questions@butwhykids.org](mailto:questions@butwhykids.org). Thank you so much to Dr. Jenna Bollyky from Stanford University, Dr. Mark Levine, Vermont's Health Commissioner, and especially to the Chavez family for sharing their experience with us. But Why is produced by Melody Bodette and me, Jane Lindholm at Vermont Public Radio and distributed by PRX. Our theme music is by Luke Reynolds. We'll be back in two weeks with an all new episode. Until then, stay curious.