
Kelly Gets a Vaccine
How We Beat Coronavirus
By Lauren Block MD MPH and Adam E. Block PhD.
Illustrated by Debby Rahmalia

About this book

Kelly is excited it is finally time for her COVID-19 vaccine. Her little brother Joey is not so sure he wants a shot. Their mom, a doctor, explains the science behind vaccine development, biology, and history. Kelly and Joey learn how the COVID-19 vaccine works, what to expect, and how the vaccine will help us return to normal life. Authors Lauren Block MD MPH, a physician, and Adam E. Block PhD, a public health professor, help parents explain scientific principles behind coronavirus and vaccination to their kids.

Kelly Gets a Vaccine: How We Beat Coronavirus

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Photo of author Dr. Lauren Block receiving the COVID-19 vaccine on December 19, 2020.

"Can you believe we are finally getting the COVID-19 vaccine?" Kelly asks.
"We are," says Mom. "We are going to the pediatrician's office today."
Joey is worried. He does not like shots. But he has a plan. He is not going to let anyone give him a shot.

"How does the vaccine work?" Kelly asks.

"Vaccines trick our bodies into thinking we have already been infected, so we develop antibodies to protect against illness if we do get exposed to a virus," Mom says.

"Like an antibody test?" asks Kelly.

"That is exactly right," says mom. "People who have had the virus make antibodies, which protect us in case we see the virus again. Some of these people had symptoms and some were asymptomatic, or symptom-free. People who have had the vaccine also make antibodies which protect against infection. Come, let's get in the car."

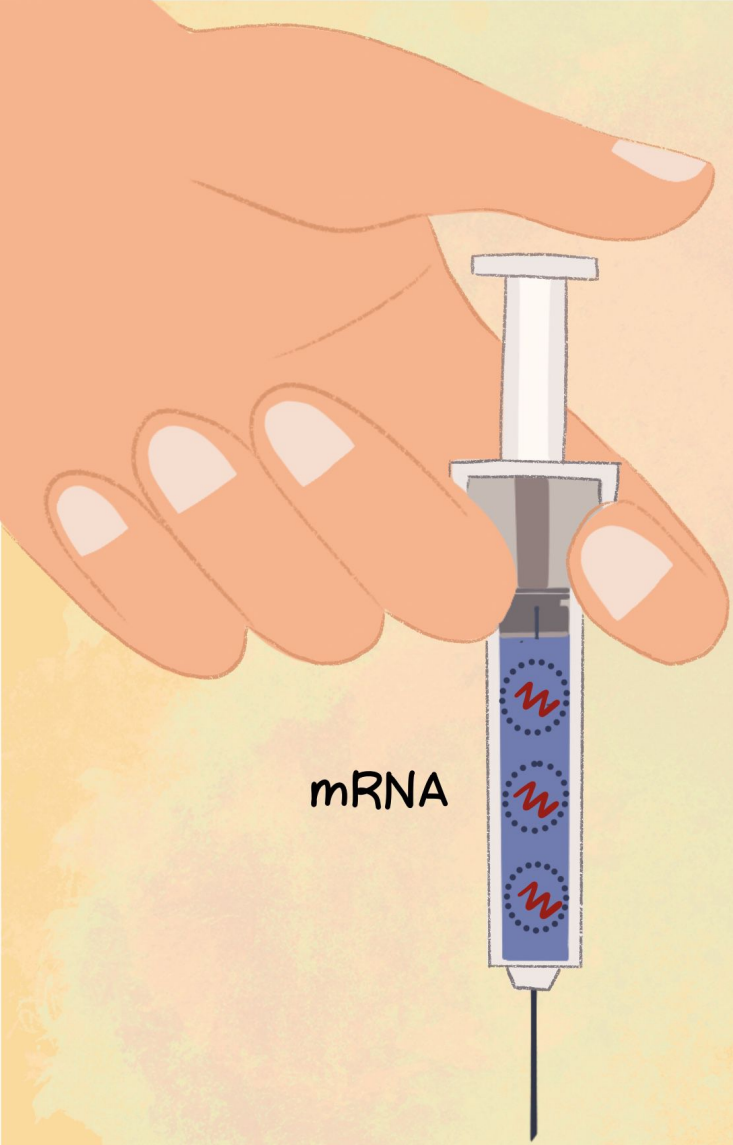
"Do vaccines really work?" Joey asks.
"Yes. Vaccines have saved countless lives. Vaccines work so well that several terrible diseases have been eliminated or close to eliminated. Smallpox was an awful illness that has been completely eradicated, or eliminated from circulation. When Grandma was little, kids got really sick from polio until a vaccine came out. Parents took their children to wait in line for hours to get the vaccine. And now every child gets the vaccine. Look, we're here!"

"Did I get the polio vaccine, Mom?" Kelly asks.
"Yes, you both did. You got your first vaccines when you were just born and only weighed 7 pounds! You got vaccines against hepatitis, polio, measles, rubella, and others. These are standard and required for school, so all kids usually get the same vaccines."

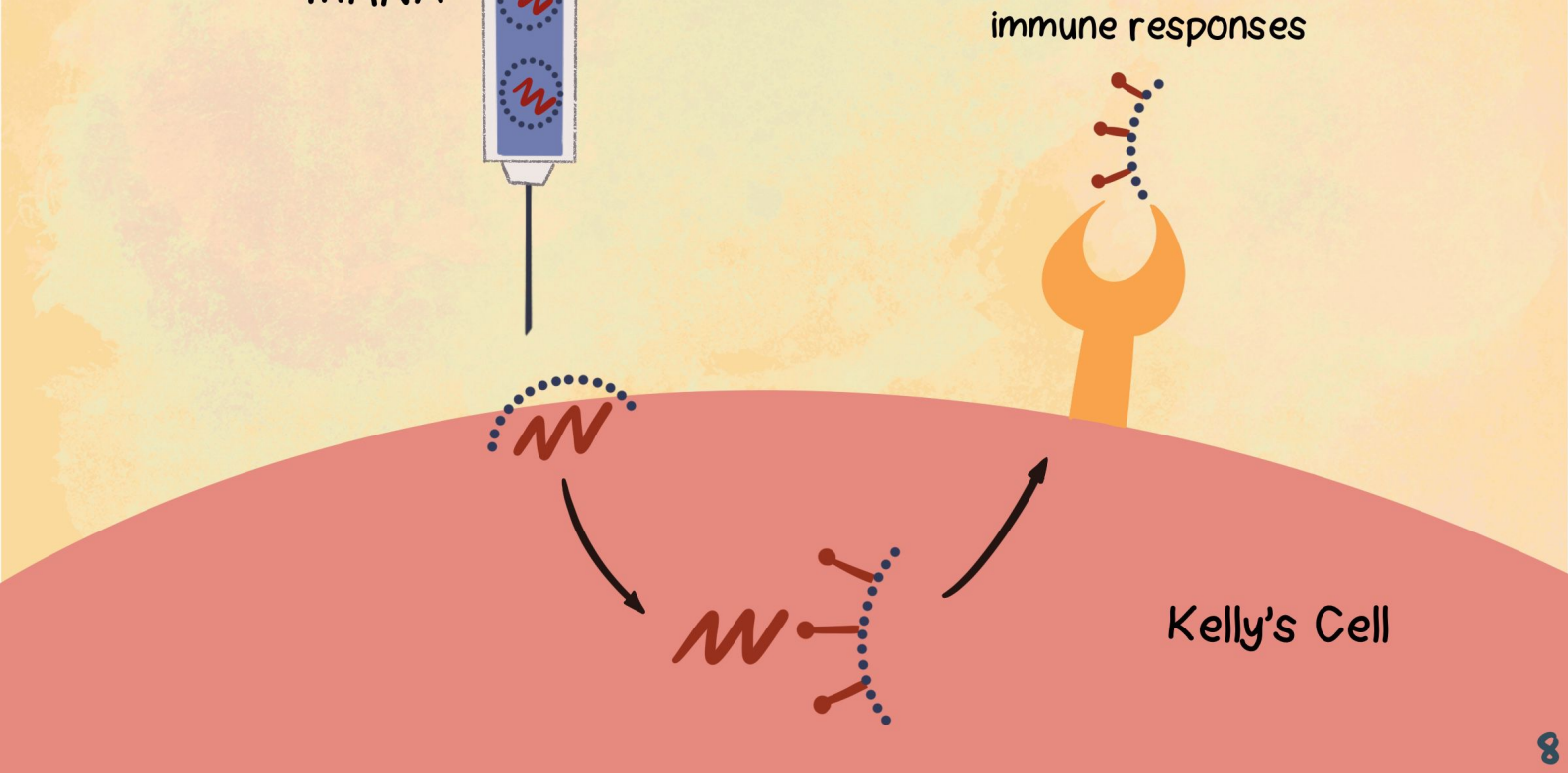
"No fair, grown-ups don't need to get any shots," Joey says. "Grown-ups got these vaccines when we were kids. Or worse. I got chicken pox when I was five. I was itchy all over for my fifth birthday. Now you get a shot and you will never get chicken pox! The chicken pox vaccine you get as a child may last your whole life. But other vaccines, like the flu shot, only last a few months or a year. So adults and kids get the flu shot every year."

"So we need to get this COVID shot every year?" whines Joey. He is still not planning to get the shot.
"Maybe," says Mom. "We do not know yet how long immunity, or antibodies, will last following the vaccine. It may be a year, or two years, and another vaccine might be needed. Some vaccines are only needed once in a lifetime, but others only last about a year."

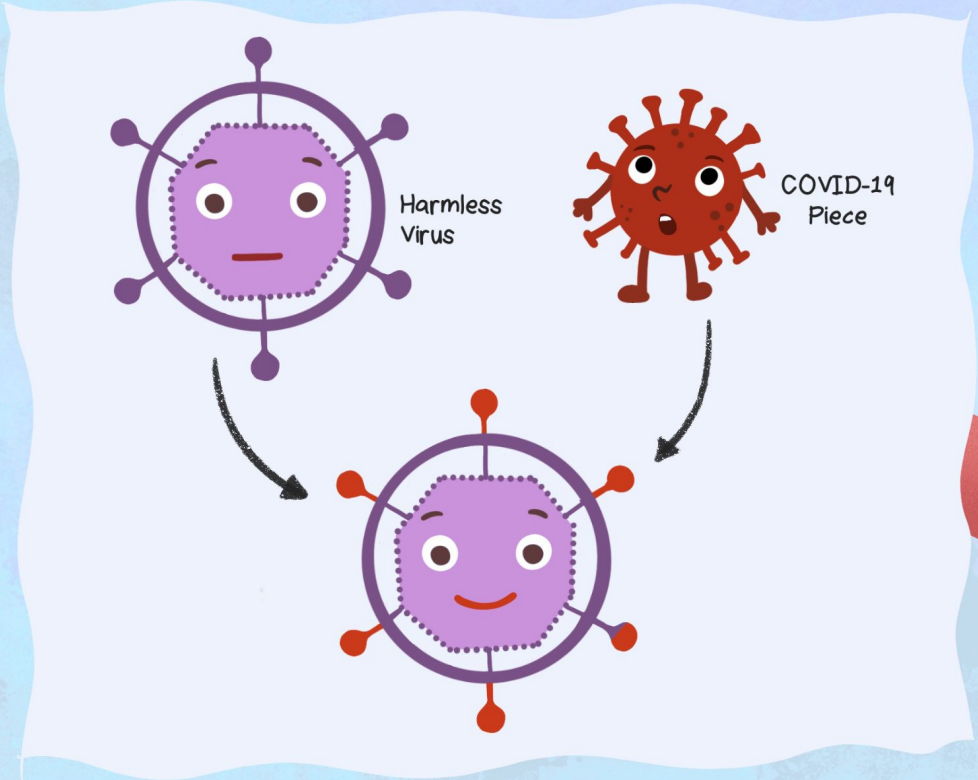

"Why has it taken SO LONG to make the coronavirus vaccine?" asks Kelly. "I feel like we've been waiting forever!"
"Actually, most vaccines take ten years or more to make. Scientists around the world worked together and were able to make the COVID-19 vaccine in less than ONE year. Governments across the world, from China to Russia to Europe to the US, gave money to help scientists develop a vaccine."



"How does it work?" asks Kelly.
"One type of vaccine is called an mRNA vaccine. This is a new kind of vaccine made using a protein that the COVID-19 virus has that people do not have. Remember the crown around the virus?" asks mom.
"Yes, the corona!" Says Kelly.
"Right! The COVID-19 virus has a protein called a spike-protein surrounding it. The vaccine teaches our cells to make this spike protein, which is harmless by itself. Cells which display this spike protein trigger the body to make antibodies against viruses which display the spike protein, helping protect us against COVID-19."



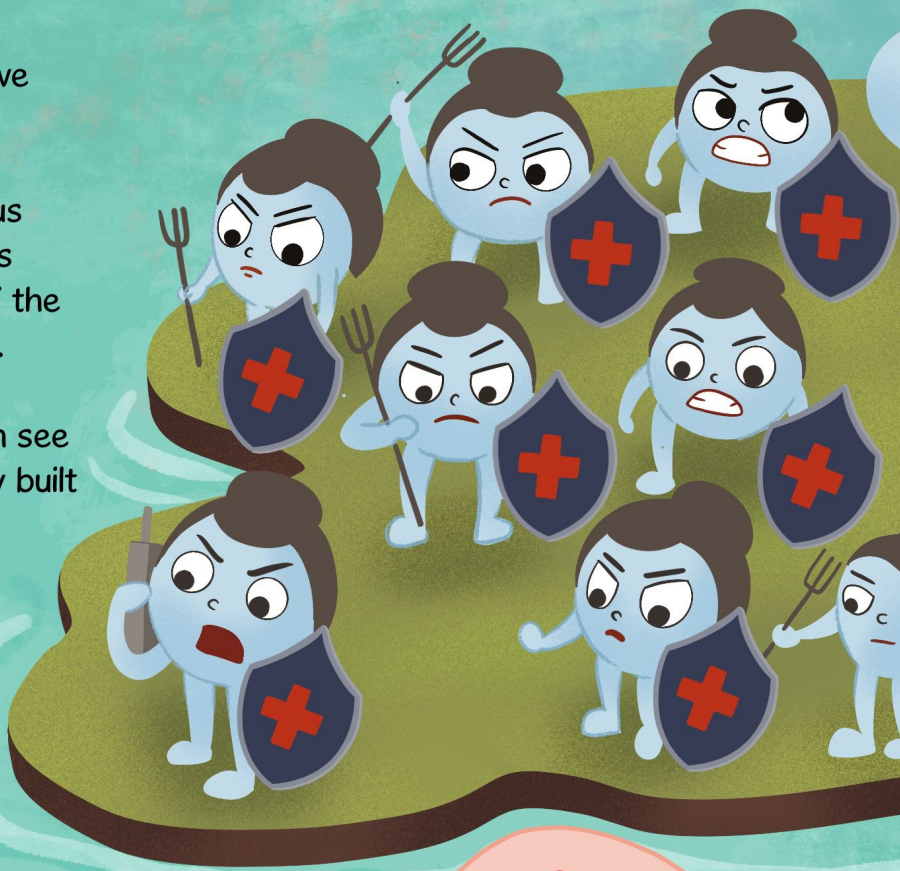
"Another vaccine was created in a totally different way. The other one uses a harmless virus, called a viral vector. This is combined with pieces of the COVID-19 virus inserted into it. Once inside human cells, these cells begin to make COVID-19 proteins. And these proteins trigger an antibody response just like the mRNA vaccines."

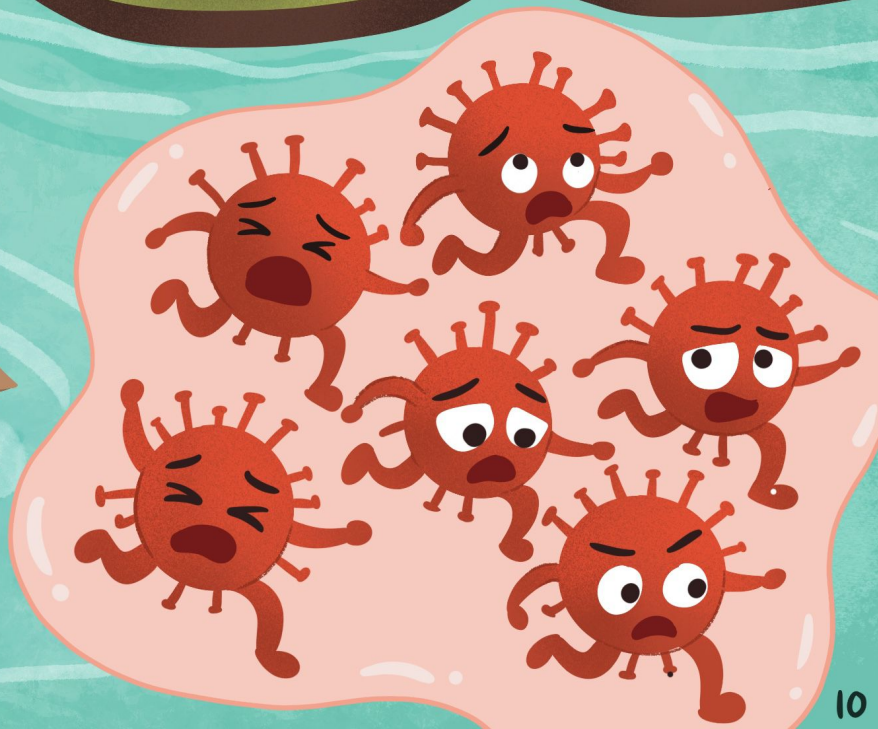


“They inject you with a virus? I thought we were trying to avoid the virus?” exclaims Joey in disbelief.

“We are, Joey. But the small piece of virus you are injected with is harmless. It tricks your cells to make the outside coating of the coronavirus without the rest of the virus.

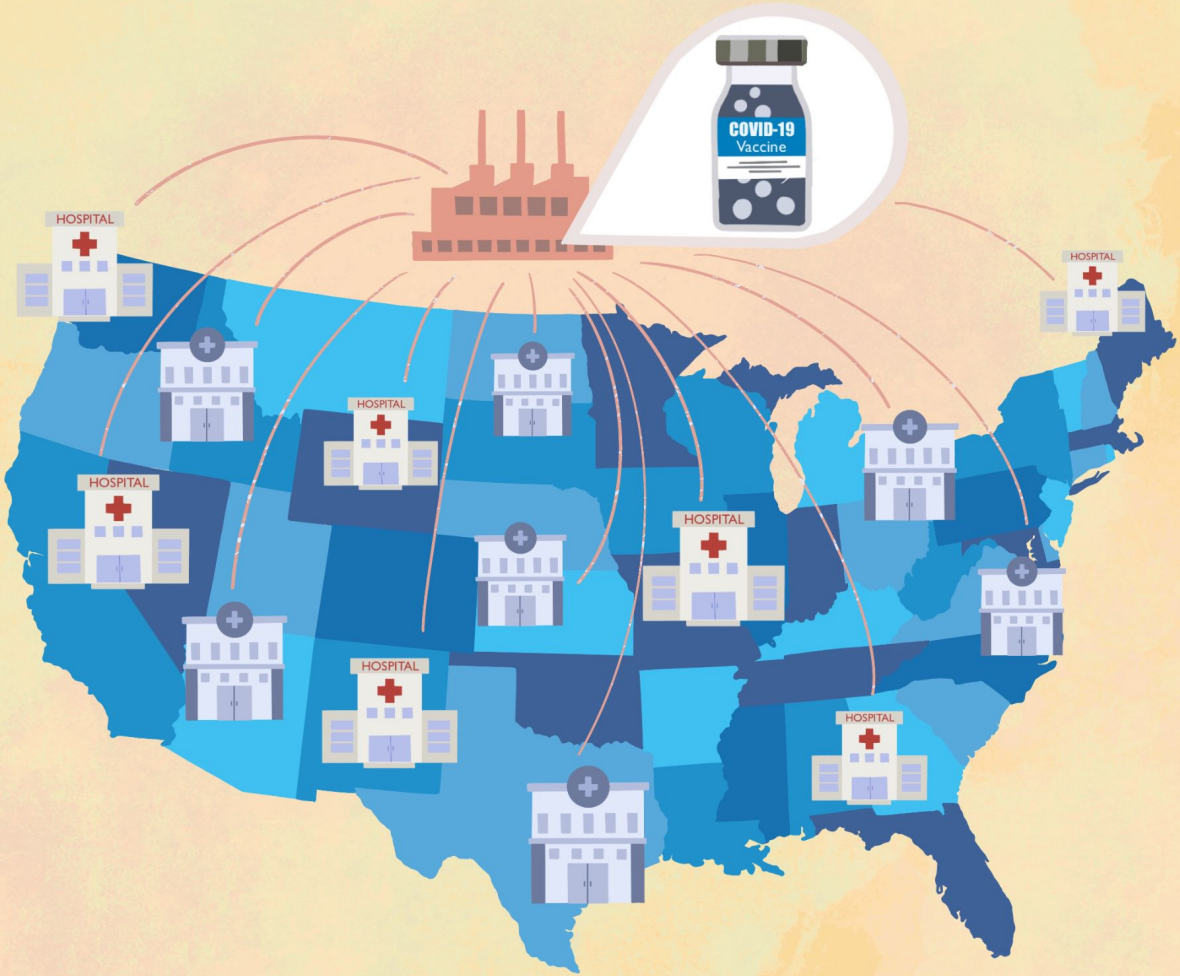
Once your body makes the coronavirus protein coating, your immune system can see if any coronavirus enters and has already built an army to attack it.”





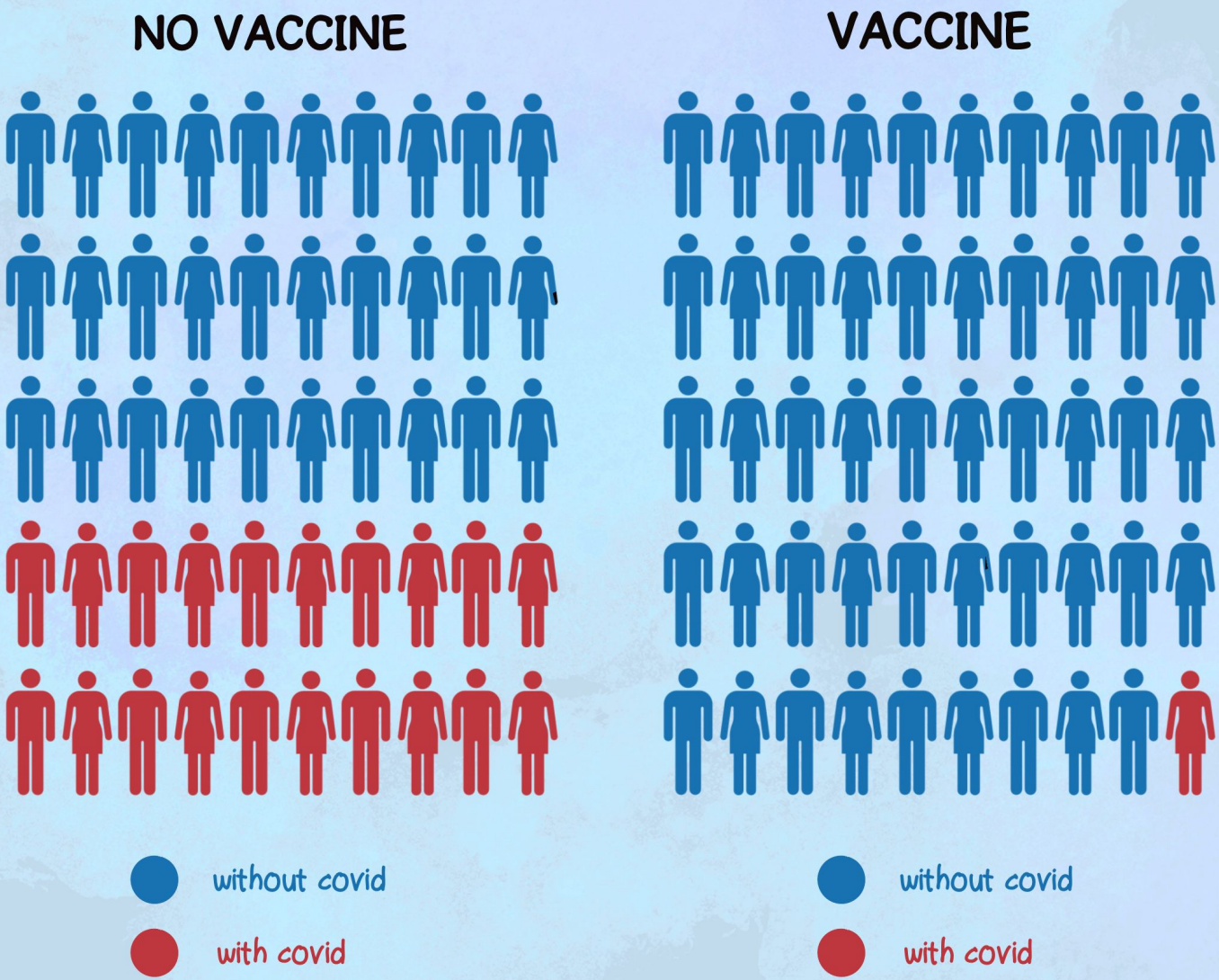
“How do we REALLY know this vaccine works?” asks Joey, who still really didn’t want to get a shot.
“We know these vaccines work well in the studies, which is called efficacy. Scientists design clinical trials, which are tests of whether the vaccines work in thousands of people. Brave volunteers sign up to participate in these trials. Phase 1 trials are small trials done to see if the vaccine is safe and what dose to use. Phase 2 trials are slightly larger and done to see if the vaccine is effective.”

“So then the vaccine comes out?” Kelly bursts in.
“There are a few more steps,” explains mom. “Phase 3 trials are the largest and done at several different hospitals or offices. These last longer and compare the vaccine to a placebo, or fake vaccine that looks like the real vaccine. Both people and the scientists don’t know who gets the real vaccine and who gets the fake. Then the scientists wait and see how many people who got the vaccine get sick and how many people who got the placebo get sick.”



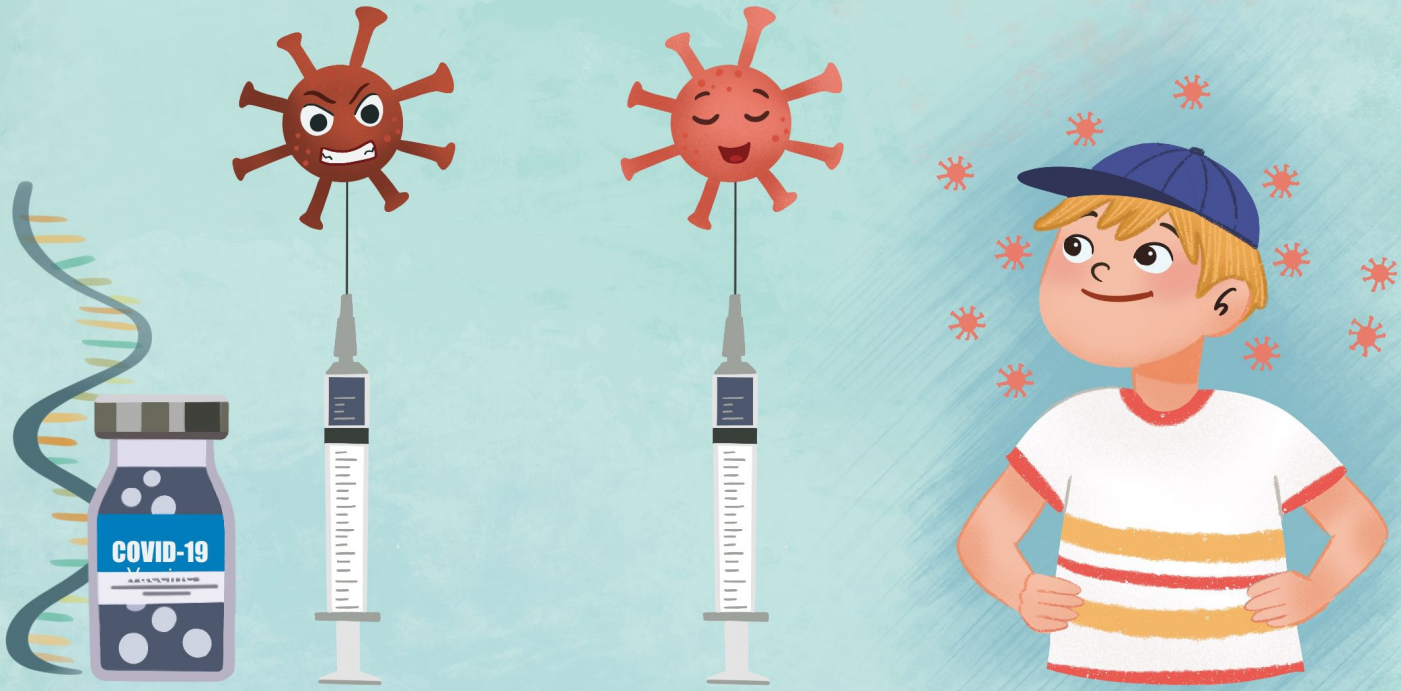
"So then the vaccine FINALLY comes out?" asks Kelly.
"Almost," says mom. "The government works closely with the company during these trials. All the information is made available to the public. If the vaccine passes the phase 1, 2, and 3 trials, a part of the government called the Food and Drug Administration, or FDA, will approve the vaccine. In the case of COVID-19, because everyone wants this vaccine as soon as possible, the FDA gives emergency approval for the vaccine. But they keep watching for other developments and side effects after the vaccine comes out."
"And then?" urges Kelly.
"Then the drug company, with the government's help, has to make enough of the vaccine to get to people throughout the country, and doctors and nurses have to figure out how to give the vaccine to their patients. This can take months."

"The good news is that these studies have shown that the new vaccines work really well. In the studies, the vaccines prevented 95% of coronavirus cases. And people who got coronavirus were less likely to die or go to the hospital."
"Wow, that is really effective!" says Kelly. "I know the shot is going to hurt a little, but I am happy to get it today."



"It doesn't hurt very much, Kelly," says her mom. "I got my first dose a month ago and just got my second dose this month. My arm hurt a little for a few days and I felt chills the day after, but otherwise, I'm fine. We can relax at home if you don't feel well tomorrow."
"You had to get the shot twice?" exclaims Joey. There was no way he was getting two shots.
"Yes. This is a two-dose vaccine. Like many vaccines, two shots 3-4 weeks apart are needed to prevent future infection. You become immune, or protected, one week after the second shot."

MRNA CORONAVIRUS VACCINE



“No fair, why did you get it first?” asked Kelly.
“Physicians and other health care workers got it first because we are exposed to people with coronavirus every day as part of our jobs helping people who are sick. Many doctors, nurses and other clinical workers have gotten sick and some even died helping treat others for coronavirus. Older and high risk people also got the shot first”.

"That didn't hurt too much," Kelly says after getting the shot. "Now I can go back to camp, vacation, and birthday parties!"

"Not so fast, kiddo. We won a battle against coronavirus today, but the war is not over. It will take time for us to beat coronavirus. Getting an effective vaccine is a big step, but coronavirus does not end the second you get the vaccine. How well the vaccine works in the real world depends on how many people get the vaccine, and how well the vaccine works in a range of people. This is called effectiveness."


"Joey, are you ready for your shot?" his mom asks.
"I'm not getting it. I don't care if I get sick!" Joey says.
"You know getting a shot doesn't just help you. You are also doing it to help others."
"I am?" asks Joey.
"Yes," says mom. "Everyone who gets vaccinated helps promote herd immunity."

"Herd immunity means that when most people are immune, the virus cannot spread widely. Scientists believe we need 70% immune to reach herd immunity. So, if the vaccine is 90% effective, and 80% of people get the vaccine, we will have (80% x 90%) = 72% immunity. This is about enough needed to reach herd immunity".

"Great, so I don't need to get it. I can be one of the 20% of people who don't get it," Joey says, triumphantly. "Some people may not be able to get vaccines due to illnesses or medications they take which weaken their immune system. People who can't get the vaccine, including kids who have cancer or other diseases, are depending on you, Joey to get the vaccine like Kelly did, so we get to herd immunity to protect everyone."

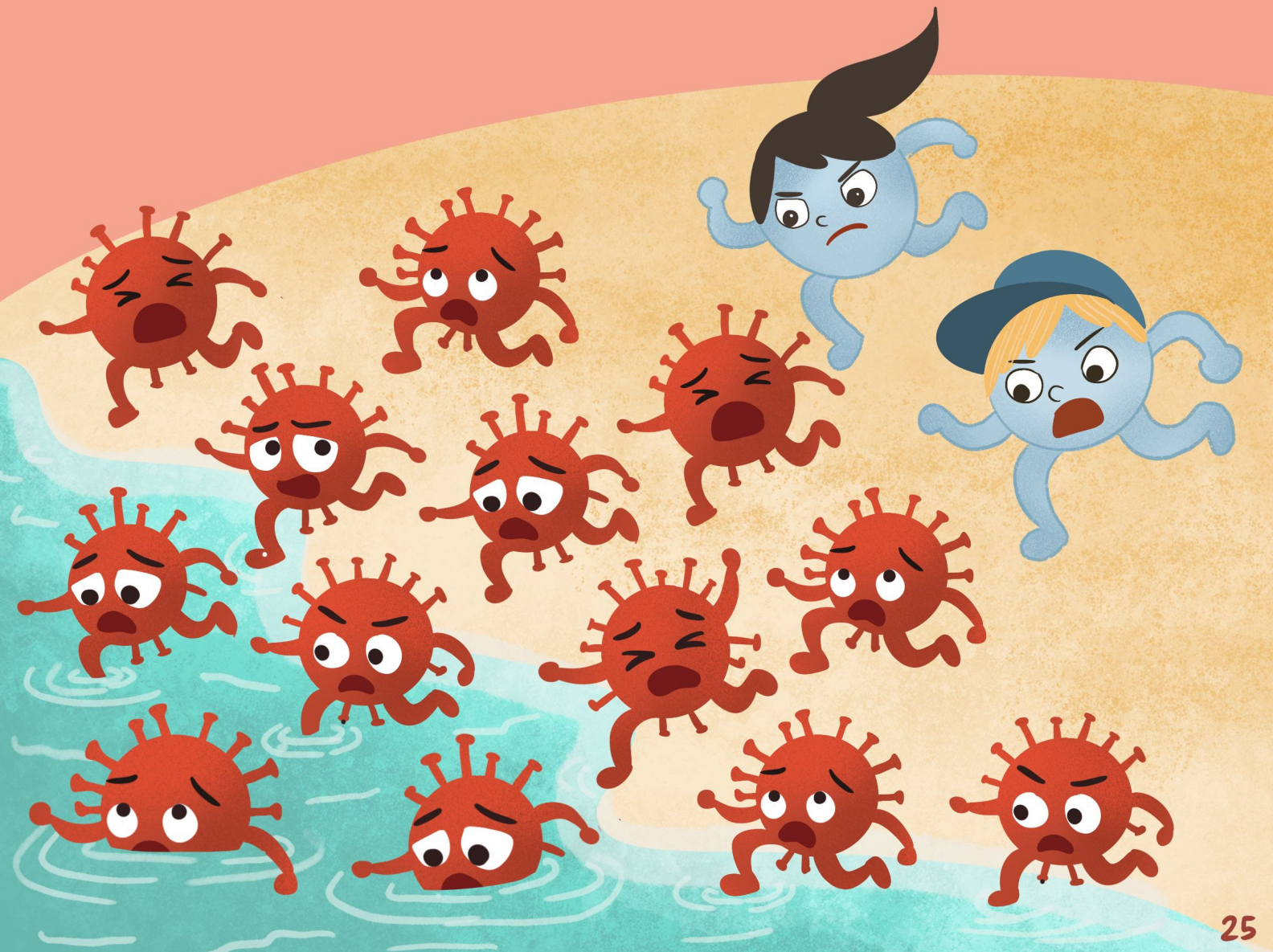
"So if I get it, it will help kids who can't get the vaccine?" says Joey.
"Yes, getting vaccinations is something everyone can do to help people who are too sick to be able to take a vaccine or do not have access to the vaccine."
"I'll do it," Joey says proudly.


"My friend Erica says her parents won't let her get the shot. She said vaccines are too risky."
"Every parent is different and every parent gets to choose whether their family gets the vaccine. Some people are hesitant, or afraid of potential side effects. However, the science behind vaccines is clear. Vaccines are safe and kids who get vaccines are healthier than kids who do not."

“Does it cost a lot of money?” asks Kelly.
“No, the government has paid for the vaccine to be affordable for Americans. The vaccine is covered by insurance and available for a small fee for people who do not have insurance. Some other countries will also have the vaccine widely available, but in other countries it may be harder for some people to get the vaccine.”

“What about people who still get sick?” asks Kelly.
“Some people will still get sick, probably for a long time. Thankfully doctors and other healthcare providers now know treatments that work better for really sick patients. Steroid medicines prevent the immune system from attacking organs in the body. New antibody treatments help give people antibodies once they get sick to prevent serious complications from the infection. We keep getting better at treating people who get sick.”

"So then can we get back to normal?" asks Joey. "By my birthday in May?"
"Once we are all able to get the vaccine, we can start to get closer to normal. Schools and businesses can start to re-open. Masks will be part of our lives for some time. We will also need to continue to keep our distance, wash our hands, and avoid big crowds. It will probably take a long time before we can get back to big parties. But since you two got the vaccine today, we are one step closer to beating coronavirus."



Discover along with eight-year-old Kelly the science behind the COVID-19 vaccine, what to expect during and after the vaccine, and how vaccination helps us begin to move beyond the pandemic.

Lauren Block MD MPH is a primary care physician, Associate Professor at Zucker School of Medicine, and mom of three. She graduated from Yale College, Harvard Medical School, and Johns Hopkins Bloomberg School of Public Health. She was one of the first healthcare workers in New York to receive the COVID-19 vaccine.

Adam E. Block PhD is a health economist, Assistant Professor of Public Health at New York Medical College, and father of three. He received his PhD from Harvard and worked in Washington, DC helping to draft and implement the Affordable Care Act.

Debby Rahmalia grew up with the love of art. She actively participated in art competition from national to international level since she was a child. She now spends her time illustrating books for children. Visit her on instagram www.instagram.com/debbyrahmalia.