



Reframing the Conversation about Child and Adolescent Vaccinations

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Introduction

The public conversation about childhood and adolescent vaccinations in the United States has been, at times, controversial, fraught, and in some cases, deeply emotional. How vaccinations are talked about publicly plays a *critically important* role in shaping attitudes about vaccines and their benefits, as well as shaping public support for policies that increase access to vaccines. How those public conversations are framed—what we say, how we say it, what we emphasize, and what we leave unsaid—can help or hinder progress toward the ultimate goal of ensuring the health of children and adolescents through vaccination.

This strategic brief includes five evidence-based recommendations for communicating about vaccinations, based on rigorous framing research conducted by the FrameWorks Institute, in partnership with the American Academy of Pediatrics. The purpose of this brief is to equip physicians, advocates, and public health communicators with the strategies necessary to effectively build understanding of and support for child and adolescent vaccinations.

The Challenge

Despite overwhelming scientific evidence that vaccination is a safe and effective way to prevent the spread of infectious diseases among children and adolescents, there has been a recent legislative push across the country to remove or limit vaccine requirements for children.¹ Physicians and public health experts have expressed concerns that lifting or weakening childhood and adolescent vaccination requirements will result in higher rates of illness and death and will exacerbate existing disparities in access to vaccination services for historically disadvantaged communities and groups.²

At the same time, a cultural shift against vaccination has contributed to falling vaccination rates. The number of children and adolescents getting their routine vaccinations has fallen over the past few years, both before and as a product of the COVID-19 pandemic.³ Previous research on mindsets from the FrameWorks Institute has shown that Americans hold a deep belief that health outcomes are primarily driven by individual choices and behaviors.⁴ As such, people generally believe that individuals are solely responsible for maintaining their own health and preventing illness. Because people tend to view illness prevention and health as largely within their own control, many see vaccination primarily as a personal decision—a decision that is often influenced by the existing public belief that vaccines are inherently risky.⁵ The deeply rooted individualism and overemphasis on risk in public discourse about vaccination in American culture, combined with existing disparities in vaccine access and recent policy changes removing vaccination requirements, present unique challenges for health practitioners, advocates, and public health communicators.

The Opportunity

Along with this challenge comes an opportunity. Our public discourse about vaccination is at a crucial inflection point, and health practitioners and advocates have an important role to play in shaping that discourse. To overcome individualism and an overemphasis on the risks of vaccination in American culture, we need to shift toward a new narrative about vaccinations, one that can change the way people think and talk about the issue, which will in turn build public support for policies that increase access to vaccination for children and adolescents, improving their health and wellbeing.⁶

To get there, we recommend a two-pronged narrative shift:

- 1. Shifting the focus from the individual to the collective:** The American public's understanding of health is grounded in individualistic ideas about what health entails and who's responsible. People think that health is a matter of individual choice and willpower, rather than thinking about the broader communitywide or societywide impacts that affect health. When thinking about vaccination, this individualistic approach gets in the way of understanding the broader benefits that vaccination, and particularly childhood and adolescent vaccination, have on communities and society. It also makes it difficult for people to see how systemic barriers to vaccination access affect people's ability to get their children vaccinated, rather than vaccination simply being about individual choice. Instead, we need to highlight the ways vaccination has a positive impact on society and that improving vaccine access is an issue that affects everyone.
- 2. Shifting the focus from vaccines fighting disease to the immune system preparing itself:** Currently, public thinking about vaccines tends to overemphasize the risks involved. This is because people focus on what vaccines do to the body, which makes them suspicious about the potential harms involved. The widespread misinformation about vaccinations, particularly for measles and COVID-19, stoke this fear about what vaccines might "do" to an individual. Instead, we need to highlight what the immune system does—how it uses vaccines to prepare itself to deal with illness and disease, which will help expand people's understanding of how vaccines work and reduce fear surrounding vaccination.

The recommendations that follow are designed to carry out this overall narrative shift.

Recommendations 1, 2, and 3 have been designed specifically to help shift the focus from the individual to the collective, by tapping into widely shared values and talking about what's at stake in the issue.

Recommendations 4 and 5 are metaphors that have been designed to shift the focus from talking about vaccines fighting a disease, which leads to people overemphasizing risk, to explaining how the immune system prepares the body for the virus. These metaphors expand people's understanding of vaccines as "trainers" that help the body prepare itself to become proficient in fighting illness, reducing fear about what vaccines might do to the body.

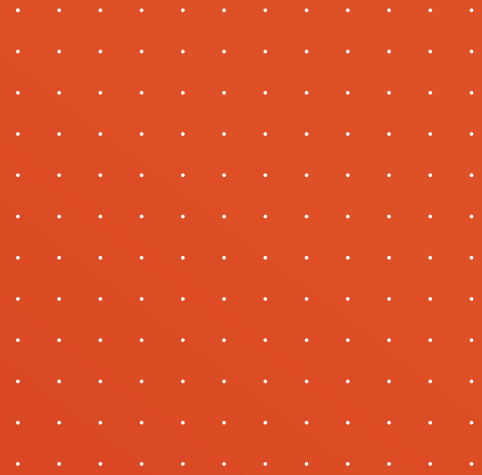
The framing recommendations in this brief are designed to be used flexibly and can be adapted for different audiences, speakers, and messages. This brief can help practitioners and communicators advance a new story about vaccinations—one that is grounded in the latest vaccine science *and* the evidence on communicating about vaccines. The framing strategies we recommend in this brief can build

public understanding of and support for vaccine access for everyone, particularly people who have been marginalized by the health care system.

What is framing?

Framing is making deliberate choices about what we say and how we say it. It's what we emphasize, how we explain an issue, and what we leave unsaid. These choices change how people think, feel, and act. The way a communication is framed shapes how we interpret and respond to that information. When new frames enter public discourse, they can shift how people make sense of an issue—how they understand it, how they decide who is responsible for addressing problems, and what kinds of solutions they support. Frames are thus a critical part of social change. By shifting how the public thinks about an issue, they change the context for collective decision-making and can make new types of action possible.

Unlike a set of key messages, frames can be used and adapted to various contexts, enabling us to tailor communications for different audiences and channels while continuing to talk about our issue in a consistent way. Messages are like a GPS navigator that tells you which specific turn to take on which specific street to get to a specific address. Framing is the compass that gives you your orienting direction. Once you have that direction, you can take many roads to get to your destination, but if you lose sight of your North Star, you could find yourself lost.



SECTION TWO

Recommendations



Recommendations

The following recommendations are part of the overall narrative shift toward a focus on the collective benefits of vaccination and on the way the immune system works, to deemphasize the individualism and overemphasis on risk that currently exist in public thinking about the issue. While these recommendations can help in one-on-one doctor-patient conversations, this project is specifically focused on how to frame childhood and adolescent vaccination more broadly in order to shift public thinking on the issue.

Shifting the focus from the individual to the collective

Because individualism looms so large in public thinking about vaccination, a shift must be made in how we talk about the importance of getting vaccinated. We can minimize the impact of individualistic thinking by talking about vaccination as benefiting the common good, talking about access to vaccination as a preventable public health measure, and focusing on the long-term health benefits of vaccines for all children and adolescents.

RECOMMENDATION #1

Talk about the benefits of vaccination for the common good.

Instead of starting with how vaccination will help an individual child or adolescent, talk about the benefits of childhood and adolescent vaccination for the common good. Then connect those benefits to the individual child or adolescent. This will help people see the benefits of vaccination to everyone in a community and will help contextualize individual children's experiences as part of that community.

Challenge:

People think about health and illness as primarily being about individual choices, and they don't think about the broader societal effects. Members of the public believe that if people, including children, make the right health choices (such as eating "well," exercising, taking vitamins, and not smoking), then their immune systems will be "strong." By this logic, people think that if their immune systems are already strong, vaccination is optional—it is seen as either a helpful boost or as completely unnecessary. When people think about vaccination only in the isolated context of an individual child or adolescent, then the benefits, the risks, and the need of vaccination are individualized. And when people think about only the individual decision-making involved in getting a child vaccinated, there is little room left for people to think about the health benefits of vaccination for the common good of the broader community or society.⁷

The public's focus on individual choice in terms of health and illness gets in the way of building an understanding that the spread of disease happens across a collective population of people, and that the spread of common childhood diseases is effectively contained only when large numbers of children get vaccinated. To increase vaccination coverage among children and adolescents in our communities, we need to build understanding of how vaccination is beneficial to the common good of our society.

What to do:

- Lead with talking about how childhood and adolescent vaccination benefits the common good of society first and foremost, and then talk about the individual benefits, rather than the other way around.
- Give concrete examples of the benefits of childhood and adolescent vaccination to whole communities and societies, to contextualize what benefiting the common good looks like in practice.
- Use the idea of vaccination for the common good to foreground the power of vaccination as a collective responsibility to keep everyone healthy.

Example:

Everyone in our community deserves to be healthy, and part of being healthy means getting vaccinated. It benefits all of us if every child in our community is vaccinated, because it means that all of us are more likely to be healthy.

Why this works:

By framing childhood and adolescent vaccination from the outset in terms of their collective benefits, we can avoid the uphill battle of overcoming individualistic thinking that dominates the conversation when vaccination is discussed primarily in terms of individual health benefits. Once people start thinking about vaccination at the individual level, individual concerns become the starting and end points of the discussion, and there's less room for people to think about collective concerns.

Framing the issue of childhood and adolescent vaccination as something that benefits the common good first and foremost can help overcome people's individualistic focus. Leading with the collective benefits of vaccination and then connecting vaccination to the benefits to individuals helps foreground the societal effects while acknowledging that vaccination is about individuals and the broader community, rather than individuals alone. Talking about the common good of vaccination helps build a sense of collective responsibility to *ensure* everyone in a community is healthy. In the survey experiment, we found that framing vaccination as benefiting the common good increased public agreement with the collective benefits of vaccination, increased people's understandings of vaccine effectiveness, and increased people's sense of collective responsibility for childhood vaccinations. (See Graph 1: Recommendation #1 in Appendix E.)

Furthermore, when vaccination access is framed as a collective responsibility for the common good, people's support for policies that address practical barriers to accessing vaccination services increases.⁸ Framing access as a collective responsibility for the common good also marginally increases people's agreement with the collective benefit of vaccines and the general benefits of childhood vaccination. (See Graph 2: Recommendation #1 in Appendix E.)

In this sense, framing access as a collective responsibility helps shift the focus away from vaccination uptake as an indication of personal choices, to vaccination access as an indication of a commitment to the common good. By foregrounding access ahead of uptake in our communications, we can establish public health policies to improve access to vaccination services as an effective way to increase uptake among children and adolescents. This will help promote public thinking about solutions to the practical and structural barriers to access, especially in underserved communities, rather than focusing solely on a person's individual decision to get their child vaccinated.

Additionally, talking about the common good of childhood and adolescent vaccination helps build people's understanding that a pediatrician's vaccination recommendations are being given to children and parents as members of their community. Framing vaccination as a collective effort with benefits for the whole community can also be used to help address medical racism and create more equitable interactions and communications among pediatricians, parents, and children in historically oppressed and underserved communities. Emphasizing the common good of vaccination (rather than focusing on individual decision-making of parents and children) can help build a sense of collective trust and understanding that is needed to overcome painful histories of medical racism and inequitable treatment.

RECOMMENDATION #2

Talk about improving vaccination access as a preventive public health measure.

Talk about access to vaccination as a way to prevent the spread of severe and deadly illnesses in our communities. This will help build an understanding that providing equitable access to vaccination for all children and adolescents improves the health of everyone, and that we're all responsible for making that happen.

Challenge:

When people focus on vaccination as a matter of individual choice, it makes it hard for them to see the practical or structural barriers that can make it difficult for people to access vaccination services. When it comes to children and adolescents in particular, members of the public assume that everyone has free and universal access to vaccination services because schools require vaccination for enrollment. In focus groups, people also generally assumed that the required childhood and adolescent vaccinations are covered fully by health insurance plans. And while people have an understanding that inequities in access to health care exist, they are not clear about how or why those inequities exist, or why that would keep a child from getting vaccinated. Practical barriers, such as the inability of a parent to take time off work or the lack of reliable transportation to get their child or adolescent to a clinic, are largely unseen or misunderstood by the public.⁹

As a result, people often view disparities in childhood and adolescent vaccination rates in terms of personal decision-making to vaccinate one's child or not, rather than as stemming from a lack of access. People's deep sense of individualism and lack of understanding about how structural inequities work also make it difficult for people to see how we, as a society, are collectively responsible for improving access to vaccination by removing the structural barriers that currently exist.

What to do:

- Talk about access to childhood and adolescent vaccination as a way to prevent future disease and ensure the health of our communities and society (essentially, as a matter of public health).
- Be explicit about the ways that improving access to vaccination services for all children and adolescents is our collective responsibility as a society.
- Explain the disparities in access to vaccination services, especially for children and adolescents, before talking about the disparities in uptake.
- Provide examples of concrete policies (both proposed and enacted) that increase access to vaccinations for all children and adolescents to build people's understanding of systemic solutions.

Example:

Vaccination is an issue that affects the health of our whole society, including children and adolescents. Good public health means communities are healthy and able to prevent infectious disease. We have a responsibility to keep our communities healthy by making it easier for children and their parents to access vaccination services to reduce the spread of deadly illnesses.

Why this works:

Talking about improving access to childhood vaccinations as a way to prevent illness and disease for communities and society helps shift people's thinking away from the individual and toward the collective. Moreover, framing vaccination access as a preventive public health measure helps build support for systemic solutions to remove structural barriers to access. In particular, being explicit about the current structural and practical barriers to access (such as a lack of access to public transportation, health care services, and paid time off from work), and giving examples of policies that address those barriers, helps broaden people's understanding of both the problem *and* the solution. In sum, talking about vaccination access as a matter of public health—that is, as a preventive measure to help address societal inequities in health—highlights the interconnectedness of communities. It also helps build a sense of collective responsibility—that we all have a stake in making sure barriers to vaccine access are removed and in improving vaccination access, especially for children. (See Graph 3: Recommendation #2 in Appendix E.)

RECOMMENDATION #3

Focus on how vaccines are beneficial to children's and adolescents' long-term health and wellbeing.

Talk about how vaccines prepare children and adolescents for long-term health and wellbeing instead of focusing on how they protect them from harm. This will help build people's understanding of how childhood and adolescent vaccination prepares people for a long, healthy life and will help minimize people's current focus on the risks of vaccination and individualistic parental decision-making.

Challenge:

While people do prioritize protecting children and adolescents from disease, the focus of this thinking is generally on countering the threats posed to children and adolescents rather than on proactive measures to improve their long-term health and wellbeing. When people focus their thinking on the threats to children and adolescents, this can lead to an overemphasis on the potential risks of the actions they take, including vaccination. In this view, people tend to see the risk of opting out of getting one's child vaccinated as lower than the risk of opting in.¹⁰ When people put so much emphasis on the risks of vaccinating a child or adolescent, it becomes harder for them to see how not being vaccinated can negatively impact the development or overall wellbeing of children and adolescents, including their ability to go to school or get work in adulthood.

In addition, people view parents as solely responsible for the health outcomes of their children, who they understand to be more vulnerable than adults. The responsibility to protect their child, combined with individualistic thinking about health choices, produces high stakes for parents around the decision to vaccinate their child. Viewed this way, a parent who is less certain about vaccination is likely to avoid taking action that could potentially be dangerous because they view the risks of inaction to be less tangible and perhaps less serious.¹¹ This is especially evident with vaccination, where the risks of inaction are particularly intangible and could seem to be minimal: A vaccinated child is maybe less likely to get an illness that they do not already have and are not guaranteed to get—but they also might not get it anyway.¹² To counteract this, we must shift people's focus away from threat protection and toward thinking of vaccination as a proactive tool for supporting the opportunity for all children and adolescents to live long and thriving lives.

What to do:

- Talk about how vaccines prepare children and adolescents for their long-term health, wellbeing, and development, instead of talking about how vaccines protect children from harm.
- Shift the focus from talking about vaccinations as being only about individual health to talking about vaccinations as a *partnership* among the parent, child, doctor, and broader community to ensure the long-term health and wellbeing of children.

Instead of saying ...

It is important for you to vaccinate your child because it protects your child from catching potentially life-threatening diseases.

Try saying ...

Vaccination throughout childhood and adolescence is essential because it equips children's immune systems to recognize and resist disease, so they can develop and live healthy lives into adulthood.

Why this works:

When we frame childhood and adolescent vaccinations as proactive measures to improve the health and wellbeing of children, it helps people look ahead to how vaccination can benefit children's long-term development, even into adulthood. The key is to shift the conversation to one about the long-term health and wellbeing of children and adolescents, not about a short-term threat, which for some parents is a virus, and for others is a vaccine.

Furthermore, talking about children's long-term health and wellbeing helps people think about a collective responsibility that we as a society have to children and adolescents more broadly, not just to one's own individual child. This approach can help overcome the individualistic notion that parents are solely responsible for protecting their children's health, which tends to cue people's focus on the risks rather than the benefits of vaccination.

When the conversation is about preparing children and adolescents rather than protecting them, people's thinking shifts to the benefits of vaccination rather than the risks. Talking about vaccination in terms of the benefits to children's and adolescent's long-term health and wellbeing helps build people's understanding of the importance of getting their children vaccinated, both to keep them healthy now and to position them for good health later in life.

Making the most of history

People generally recognize that vaccination is one of the principal scientific and medical achievements of the past century. Talking about a successful vaccination effort from the past can illustrate the collective benefits of vaccines for the common good, can emphasize the importance of providing access for all children and adolescents to vaccination services to prevent illness and disease, and can show vaccinations as a way to ensure their child's long-term health and wellbeing—all of which are the responsibility of the community or society.

Through historical examples, people can harness time-tested evidence from everyday life of their family, peers, and the public within the context of scientific evidence. In this way, historical examples help people activate a shared historical memory of how vaccination, and how vaccinating children and adolescents specifically, has benefited society and individuals by decreasing the presence and impact of infectious disease.

It is important, however, to use multiple historical examples and to avoid using any historical example in isolation. Focusing on only one example (e.g., polio, measles, coronavirus) can isolate the public's thinking into that single case. As a result, people tend to focus on that particular vaccine's unique successes or failures and lose sight of the overall picture of childhood and adolescent vaccination as a benefit to the common good, a public health achievement, and a key part of ensuring children's and adolescent's long-term health and wellbeing.

This single-case logic is especially evident when using the COVID-19 vaccines as the historical example. People isolate those vaccines in their minds, to the detriment of thinking about vaccines more broadly, because they are new and highly politicized. Therefore, when talking about the COVID-19 vaccines, it is more effective to talk about the history of the mRNA vaccine technology but important to avoid using the COVID-19 vaccine as the historical example. Instead, focus on the historical success of childhood and adolescent vaccination broadly in keeping everyone in a community and society healthy over time.

Shifting the focus from vaccines fighting a disease to the immune system preparing itself

Because people overemphasize thinking about the risks of vaccination, a shift must be made in how we talk about vaccines, what they are, and how they work. We can reduce the emphasis on risk by shifting the focus away from what a vaccine does and toward building an understanding of what the immune system does. Instead of talking about how vaccines fight disease, talking about how the immune system prepares itself helps overcome people's thinking about risk and builds understanding of the central role the immune system plays in vaccination. The immune system becomes the protagonist in its own immunization story, and the vaccine becomes a passive character, reducing fear about what the vaccine does or might do to the body.

People have three main ways of thinking about what vaccines are and how they work: as weapons, as medicines, and as trainers, which they employ in different contexts and different ways. These understandings are described in detail in the previous strategic brief for this project¹⁵ and are outlined in Table 1).

Table 1

Vaccines as weapons	Vaccines as medicine	Vaccines as trainers
They protect the body (as shields or soldiers), not the immune system.	They target specific symptoms, and if one is not ill, they may not be necessary.	They have information that is valuable to prepare the body for potential viruses.
They must block or defeat viruses 100% to be effective.	They “boost” the immune system, so if the body is still healthy, they are not needed.	They train the immune system to respond to a virus, but themselves do not directly act on viruses.
They sit in the body, waiting for a viral attack and could cause long-term effects.	They have warnings about side effects, drug interactions, and overdoses.	They are partners with the body in the vaccination process.

Viewing vaccines as medicines or weapons leads to problematic thinking about risk, because the focus is on what a vaccine does or could potentially do *to* the body. In contrast, viewing vaccines as trainers for the immune system can help people think about vaccines as beneficial partners *with* the body, providing guidance and expertise so the immune system can do its own work to keep the body healthy and safe.

Framing strategies that draw from the existing vaccines as trainers mindset can help overcome an overemphasis on risk by focusing on what the immune system does in response to a vaccine, rather than focusing on what a vaccine does. However, there are more and less effective ways to cue the idea of vaccines as trainers—just using the language of training isn’t necessarily enough to overcome risk thinking (as we found when testing a “coach” metaphor—see pullout box for more details). The metaphors we recommend below—updating a computer and gaining literacy—cue and expand on the idea of vaccines as trainers by focusing on building up the immune system’s proficiency. In different ways, both metaphors help build people’s understanding of how vaccines work and minimize risk thinking.

RECOMMENDATION #4

Use a computer updates metaphor to explain how the immune system improves its performance through vaccination.

Talk about how the immune system works more effectively in response to vaccines, much like a computer system performs more effectively after it has updated its system.

People view computer updates as a common and necessary process to keep computers and smartphones running efficiently. People also view updates as important to keeping computers safe from viral data that travel across networks and can make them vulnerable or even inoperable (i.e., “crash”). In focus groups, people were able to use this metaphor to explain how vaccines work in the body and to explain why it is important for a person to get vaccinated. People understand that a computer needs to be updated so that it does not get a virus and, thus, can perform optimally.

To avoid potentially reinforcing individualism with this metaphor, it’s important to talk about computers as being connected to networks, e.g., the internet, rather than operating entirely on their own. The strength of this metaphor is using it to talk about how updates help computers and computer systems improve their performance, just as vaccines help the immune system “update” itself and improve how it functions.

What to do:

- Use the language of computer “software” updates to explain how vaccines help the body’s immune system operate efficiently and improve its performance.
- Compare vaccines to computer updates to explain how vaccines help the body stay safe from “network” viruses.
- Talk about the impacts that vaccines have on the immune system in terms of “detecting” viruses and responding to them, just like software updates on a computer.

Example:

Getting vaccinated is like updating your computer. Vaccines are like software that contains information for our bodies to improve their performance. Just like our computers know how to detect a virus after they’ve received a software update, the body can remember how to detect and react to a virus even after the vaccine has left the body.

Why this works:

Because the language of virus prevention for computers is already familiar to most people, the computer updates metaphor is relevant. It stays in people’s minds and is easy for people to engage with and use. The metaphor acknowledges that viruses exist and present a threat while presenting a simple, straightforward solution of “updating” the immune system to minimize those threats, which leverages people’s strong desire to limit threats. It also talks about prevention as benefiting both individuals and the collective (individual computers and the entire network), rather than solely focusing on individuals, which can help overcome people’s ingrained individualism about the issue. Additionally, in the survey experiment, we found that the metaphor of updating a computer helps parents understand the collective benefits of vaccination—namely, that high levels of vaccination, rather than individual lifestyle choices, are the best way to prevent disease. (See Graph 4: Recommendation #4 in Appendix E.)

RECOMMENDATION #5

Use a literacy metaphor to explain how the immune system learns how to respond to viruses through vaccination.

Talk about how through the vaccination process, much like when a person learns to read and write, the body learns how to read and comprehend the language of a specific virus and gains greater proficiency in how to respond.

People view literacy as a great benefit to the individual and society, especially when achieved early in life. This metaphor helps expand people’s understanding of the collective benefits of vaccination—participants in the focus groups were able to use the metaphor to talk about how literacy benefits both the individual child and society at large, by having more capable and contributing members. It also productively builds on people’s understanding of vaccines as trainers for the immune system but does so in a way that makes the vaccine even more passive and the immune system more active. The metaphor helps downplay people’s overemphasis on risk, since people have a hard time identifying any risk to increasing one’s literacy.

What to do:

- Talk about vaccination as a process of gaining literacy to explain how the body’s immune system learns to “read” the language of a virus through vaccination.
- Talk about vaccines as “texts” that the body uses to practice learning how to read a virus.
- Use the idea of literacy to explain how the immune system remembers how to detect and react to a virus after the vaccine has left the body, just like how people remember how to read after gaining their literacy skills.

Example:

Getting vaccinated is like learning to read and write a language. Vaccines are like a text that our body uses to practice reading and comprehending a virus. Just like we continue to read and write even after we've become literate, the body can remember how to detect and react to a virus even after the vaccine has left the body.

Why this works:

Talking about vaccines in terms of gaining literacy reinforces the idea that the human body is intelligent and acquires more capability over time and in response to stimulus. It builds people's understanding of the body's natural immune abilities, which improve with the stimulus of the vaccine. The metaphor leverages people's positive views about gaining literacy to build people's understanding of the benefits of vaccination, particularly when begun during childhood. Moreover, by focusing on the *process* of gaining literacy and of vaccination, the metaphor builds people's understanding of how vaccines work over time, rather than in one instant, and helps reduce an overemphasis on the risks of a single shot. Instead, the metaphor positions the body as the "reader" that responds to the "text" of the vaccine to productively learn about a virus over time.

Avoid talking about vaccines as a "coach"

Talking about vaccines being like a coach that instructs the body to develop immunity isn't effective to explain what vaccines do or to de-emphasize risk. In our survey experiment, the coach metaphor had negative effects on how parents in particular thought about the collective benefits and the general effectiveness of vaccines. It also had negative effects on parents' sense of collective responsibility and on their understanding of practical barriers to vaccination. (See Graph 4: Recommendation #4 in Appendix E.)

While talking about vaccines as a coach is built around the idea of vaccines as trainers, in this metaphor, the coach is the active agent, similar to the weapons and medicines mindsets of thinking about vaccines. By coaching the body, the vaccine is seen as doing something to the body, which can lead people to focus on the potential risks of vaccines rather than the benefits. Therefore, it's best to avoid talking about vaccines as a coach and instead use the metaphors of computer updates and literacy to keep the focus on the immune system rather than the vaccine.

Conclusion

To increase childhood and adolescent vaccination and remove barriers to vaccination access in the United States, we must shift how we think and talk about the importance of vaccination and about how vaccines work. An overemphasis on risk in traditional public discourse and the outsized influence of individualism on how Americans think about illness and health present a challenge—but not an insurmountable one.

The recommendations in this strategic brief are meant to help us shift toward a new narrative that focuses on the collective benefits of childhood and adolescent vaccination and the responsibility we have to one another to provide equitable access to vaccination services. Additionally, the new narrative helps people understand how vaccines work—helping the immune system prepare itself—which helps overcome risk thinking. With more effective, evidence-based framing, we can move the public discourse on vaccines from contentious and emotional to productive and inspiring, and in this way build support for necessary policy change to improve access to vaccination for children and adolescents.

For additional resources on framing for social change, visit www.frameworksinstitute.org.

Appendix A: Research Methods and Samples

To arrive at the recommendations in this brief, we applied Strategic Frame Analysis®—an approach to communications research and practice that yields strategies for reframing social issues in order to change the discourse around an issue. This approach has been shown to increase understanding and engagement when communicating about scientific and social issues.

This brief synthesizes the findings from several research methods, which included literature review, interviews with experts in the field of vaccination and public health, in-depth interviews with members of the US public, an analysis of media and field communications, rapid on-the-street interviews with members of the public, survey experiments with a nationally representative sample, and peer discourse sessions with members of the public in the Western United States.

All told, a total of 9,112 participants from across the United States were included in all phases of this research.

Findings from the literature review, interviews with researchers and policy experts on vaccination, and in-depth individual cognitive interviews with members of the public are reported in: *Communicating About Vaccination in the United States: A FrameWorks Strategic Brief*.

To identify effective ways of talking about vaccination in the United States, FrameWorks researchers developed a set of candidate frames. These frames were tested and refined in 2021–2022 using three methods: on-the-screen interviews, survey experiments, and peer discourse sessions. These methods yielded data that have not been written up elsewhere and that add to the analysis that informs the recommendations in this brief.

- **On-the-screen interviews.** Frame design is followed by a set of on-the-street interviews to explore potential framing tools with members of the public. We conducted 48 rapid, face-to-face “on-the-screen” interviews using virtual platforms between April 19 and April 28, 2022, with a representative sample of participants from across the United States. We first asked participants to respond to open-ended questions about vaccination. Participants were then presented with a candidate frame and asked questions that parallel the initial set to explore whether the frame was able to shift understanding, open up new ways of thinking, and give people productive language to use in discussing vaccination. All metaphors tested in OTS can be found in Appendix B.
- **Experimental surveys.** Three waves of online experimental surveys involving a total sample of 9,000 adults were conducted between April and July 2022 to test the effectiveness of frames on public understanding of, attitudes toward, and support for programs and policies. Table 1 provides the demographic breakdown of our nationally representative participant samples from each wave of the experiment.

Table 1: National survey experiments—participant demographic information

Variable	Wave 1 (N = 4,064)	Wave 2 (N = 3,380)	Wave 3 (N = 1,581)
Gender			
Male	45%	47%	43%
Female	54%	52%	57%
Nonbinary/Other	0%	1%	1%
Age			
18–29	19%	21%	21%
30–44	27%	27%	27%
45–59	24%	24%	21%
60+	30%	28%	31%
Income			
0–24,999	23%	24%	24%
25,000–49,999	25%	25%	27%
50,000–99,999	30%	31%	30%
100,000–149,000	13%	13%	12%
150k+	8%	8%	7%
Education			
HS diploma or less	33%	38%	38%
Some college or Associate’s degree	30%	30%	28%
Bachelor’s degree	23%	20%	22%
Graduate/professional degree	14%	13%	13%
Ethnicity			
Caucasian/White (non- Hispanic/Latino)	59%	61%	65%
Hispanic or Latino	18%	18%	14%
Black/African American	12%	11%	12%
Asian	4%	4%	3%
American Indian/Alaska Native	1%	1%	1%
Hawaiian/Pacific Islander	0%	0%	0%
Other/biracial or multiracial	5%	5%	5%
Party Leaning			

Republican/closer to the Republican Party	34%	36%	37%
Democrat/closer to the Democratic Party	50%	47%	48%
Neither	16%	16%	16%

In the surveys, respondents were randomly assigned to either one of several experimental frame treatments or a control condition. Across the three waves, a total of 37 experimental treatments tested metaphors, values, issues, and various other frames that were aimed at understanding the best ways to talk about childhood vaccination. All experimental frames can be found in Appendix C.

Participants who were assigned to an experimental frame condition were asked to read a short message before answering a series of survey questions. Participants who were assigned to the control condition were directed to answer the survey questions without reading a message. All respondents answered an identical series of questions designed to measure outcomes of interest, including knowledge, attitudes, and policy preferences relating to childhood vaccination and vaccination more broadly. Each battery consisted of multiple Likert-type items and were primarily measured using five- or seven-point scales. Several forced-choice questions and open-ended questions requiring free-text answers were also included in the survey. Examples of survey items from each battery are provided in Appendix D.

We used multiple regression analysis to determine whether there were significant differences on the outcomes between each of the frame treatments and the control condition. A threshold of $p < .05$ was used to determine whether the frame treatments had any significant effects. Significant differences were understood as evidence that a frame influenced a particular outcome (for example, policy support). As with all research, it is important to remember that results are based on a sample of the population, not the entire population. As such, all results are subject to margins of error.

— **Peer Discourse Sessions.** Following the survey experiments, six 120-minute peer discourse sessions were conducted using virtual platforms between August 9 and August 11, 2022 with members of the public from across the United States. Each session included six participants and a moderator, for a total of 36 participants. Peer discourse sessions are a qualitative approach to exploring the common patterns of talking—or public discourses—that people use in social settings and how they negotiate and move among these patterned ways of talking. These sessions began with open-ended discussions about vaccination followed by moderator-introduced framed passages—or “primes”—designed to influence the ensuing discussion in specific ways. The sessions involve group exercises in which participants break out into smaller groups tasked with designing a plan to address some part of the larger issue of vaccination.

Pandemic Context

It is important to note that, while this research project is focused on vaccinations broadly and was conceived before the onset of the COVID-19 pandemic, every stage of the research itself was conducted entirely during the pandemic. In this regard, it has been important to account for that context in both the gathering of data and analysis of those data. Throughout the interviews and qualitative testing,

when participants focused primarily or solely on the coronavirus vaccine, researchers would probe to expand the conversation to include other vaccines and other experiences with vaccination beyond the coronavirus. This approach allowed researchers to identify and examine public thinking of childhood and adolescent vaccination beyond the coronavirus vaccine, while also including it. The question of vaccination access and uptake for children and adolescents in the United States that this research intends to address is, after all, not exclusive to the current moment, but is evergreen.

Appendix B: Metaphors Tested in On-the-Screen Interviews

Teacher. A vaccine is like a teacher who helps your body gain the knowledge it needs to stay healthy. The body's immune system continues to learn how to prevent illness and a vaccine teaches fundamental lessons about how viruses look and behave. Much like a teacher prepares students for the real world, a vaccine helps the immune system learn what it needs to know so that it is prepared for a specific virus when it enters a person's body. Once the body has learned its lessons for a virus, it graduates to another level of immunity for that virus. With the instruction it has received from a vaccine, the human body can then independently identify and counter disease and maintain its health.

Coach. A vaccine is like a coach who helps your body learn the skills and strategies it needs to stay healthy. The body's immune system must consistently prepare to prevent illness and a vaccine coaches the body to compete against a virus. Much like a coach prepares a team for a game, a vaccine helps the immune system learn what it needs to know so that it is prepared for a specific virus when it enters a person's body. Once the body has learned the strategies for a specific opponent, it executes the game plan against that virus. With the instruction it receives from a vaccine, the human body can then independently identify and counter disease and maintain its health.

Instruction Manual. A vaccine is like an instruction manual for the human immune system to follow. To create immunity to a disease, the body needs detailed directions on how to do the specific task at hand. Much like a set of instructions, a vaccine shows the body a step-by-step "how-to" guide for an effective immune response to a particular virus. Once the immune system has used the vaccine instructions to create the antibodies it needs, it becomes familiar with and prepared to operate against that specific virus. With the instruction it has received from a vaccine, the human body can then independently identify and counter that disease to prevent illness and maintain health.

Blueprint. A vaccine is like a blueprint for the human immune system to follow. To create immunity to a disease, the body needs a detailed plan for the layout of each of the specific projects it is going to undertake. Much like a blueprint, a vaccine provides the body with a technical diagram that the immune system will follow to construct an effective immune response for a particular virus. Once the immune system has the design for the antibodies it needs, it can prepare the construction materials and exact placement of all the components for that specific virus. With the exact dimensions it has received from a vaccine, the human body can then independently identify and counter that disease to prevent illness and maintain health.

Memory (Song). A vaccine interacts with the human body much in the same way that a song reminds you of a specific moment in time or specific person in your life. Much like you laugh or cry, or remember a time in your life, every time you hear a specific song, a vaccine stimulates the immune system to respond to a specific virus when it enters a person's body. Like the memory attached to a song, once the body has a sensory recognition a virus, it responds to it every time. With the sensory memory it has from a vaccine, the human body can then independently identify and counter disease and maintain its health.

Memory (Dog). A vaccine interacts with the human body much in the way that a dog remembers their owner's scent. Much like a dog's sense of smell detects a person's specific pheromones, a vaccine stimulates the immune system to respond to a specific virus when it enters a person's body. Like the recognition of an odor, once the body has a sensory recognition of a virus, it can respond to that stimulus every time it encounters it. With the sensory memory it has from the vaccine, the human body can then independently identify and counter the disease and maintain its health.

Literacy. Getting vaccinated is like learning to read and write a language. The body's immune system must achieve and maintain a certain level of literacy to stay healthy and it uses a vaccine as a tool to decode the text of a virus. As the body's ability to read and comprehend a virus increases, it is then able to write its own book on what to do if it ever comes across that virus. Once the body's immune system has achieved a high enough literacy rate for a specific virus, it can independently engage with a virus when necessary. With the help of a vaccine, the body gains the knowledge to prevent an illness and improve the overall quality of life for the entire body.

Email. Getting vaccinated is like receiving an email. The body's immune system must have the knowledge it needs to stay healthy, and it uses vaccines as a tool to receive the information it needs for a specific virus. Much like an email, the body receives a vaccine that contains a message about what the virus looks like and how to counteract it. Once the immune system has received and read the message, it can now respond to that specific virus and the email that delivered the message can be deleted now that it has the information it needs. With the help of a vaccine, the body has received the knowledge to prevent an illness and improve the overall quality of life for the entire body.

Appendix C: Framing Strategies Tested in Survey Experiments

Wave 1

Metaphors

1. Coach (*n* = 225)

A vaccine is like a coach who helps your body learn the skills and strategies it needs to stay healthy. The body's immune system must practice and sharpen its skills to prevent illness, and a vaccine coaches the

body to respond to a virus. Much like a coach prepares athletes for a game, a vaccine helps the immune system learn what it needs to know so that it is prepared for a specific virus when it enters the body. Once the body has learned the techniques and strategies necessary for a specific opponent, it executes a game plan for that virus.

Vaccines are necessary to coach our bodies how to respond to certain viruses. Just like we remember the lessons from our coaches even after we stop playing a sport, the lessons learned from vaccines stay with our immune systems even after the vaccine has left the body. With the coaching it receives from a vaccine, the human immune system can identify and counter disease, and this improves overall health.

2. Personal trainer (*n* = 225)

A vaccine is like a personal trainer who helps your body learn how to stay healthy through specific training. The body's immune system must maintain its fitness to prevent illness, and a vaccine helps strengthen the body's ability to counter a specific virus. Much like a personal trainer teaches you how to move in ways that build strength and coordination for specific activities, a vaccine helps the immune system get stronger against a specific virus. Once the body has acquired the appropriate coordination and strength, it can do the heavy lifting in response to a specific virus.

Vaccines are necessary to train our bodies to respond to certain viruses. Just like we remember the lessons from a trainer even after we've finished exercising, the lessons learned from vaccines stay with our immune systems even after the vaccine has left the body. With the training it receives from a vaccine, the human immune system can identify and counter disease, and this improves overall health.

3. Memory – Rescue dog (*n* = 225)

A vaccine trains the human body to identify and respond to a virus much like a rescue dog can be trained to pick up a specific scent. The body's immune system must learn how to detect and prevent illness, and a vaccine helps train the body to counter a specific virus. Much like a rescue dog is specially trained to pick up the scent of a person who needs to be rescued, a vaccine specially trains the immune system to detect and react to a specific virus. Once the body is taught to recognize a virus, it can perform when faced with that virus.

Vaccines help the body identify and respond to certain viruses, much like a rescue dog can be trained to pick up a person's scent. Just like a rescue dog can remember the scent it's been trained to detect, the human body can remember the vaccine even after it has left the body. With the memory it has from the vaccine, the human body can identify and counter disease, and this improves overall health.

4. Literacy (*n* = 225)

Getting vaccinated is like learning to read and write a language. The body's immune system needs to achieve and maintain a certain level of literacy to stay healthy, and it uses a vaccine as a tool to understand the language of a specific virus. As the body's ability to read and understand a virus increases, it is then able to communicate what needs to be done to counter that virus if it enters the body. Once the body's immune system can understand the language of a specific virus, it can engage with that virus when necessary.

Vaccines teach the body how to identify and respond to certain viruses, much as we are taught to read and write a language. Just like we can continue to read and write after we've become fluent in a language, the body can remember how to detect and react to a virus even after the vaccine has left the body. With the help of a vaccine, the human immune system gains the literacy it needs to identify and counter disease, and this improves overall health.

5. Email (*n* = 225)

Getting vaccinated is like receiving an email. The body's immune system must have the knowledge it needs to stay healthy, and a vaccine is like a message that delivers information about a specific virus. Much like an email to your inbox, a vaccine contains a message to your body about what a virus looks like and how to counteract it. Once the immune system has received and read the message, it can respond to that specific virus and the email that delivered the information about the virus can be removed from your inbox.

Vaccines are like emails that deliver a message to the body's immune system about how to handle a virus. Just like we can remember the contents of an email after we delete it from our inbox, the body can remember how to detect and react to a virus even after the vaccine has left the body. With the help of a vaccine, the human immune system receives the message about how to identify and counter disease, and this improves overall health.

6. Computer updates (*n* = 225)

Getting vaccinated is like updating your computer. The body's immune system must have the information it needs to stay healthy, and a vaccine is like an update that gives your body the information it needs for a specific virus. Much like software updates give your computer details about how to protect against new threats, a vaccine gives your body details about a specific virus and how to counteract it. Once the immune system has been updated, it can respond to that specific virus.

Vaccines are like updates that give the body information about how to protect against a virus. Just like our computers know how to detect a virus after they've received a software update, the body can remember how to detect and react to a virus even after the vaccine has left the body. With the help of a vaccine, the body gets the update it needs to identify and counter disease, and this improves overall health.

Values

7. Common good (*n* = 225)

As a society, we believe in doing our part for the common good. But too many of us aren't playing our part. Vaccination is the best way to prevent deadly diseases from spreading in our communities, and they're especially important for keeping our children and elderly neighbors from getting sick with deadly illnesses. But when fewer adults and children are vaccinated, it puts all of us at risk. If we truly care about the greater good, we all need to play our role in making sure that our society is healthy and well, and this means being vaccinated.

Vaccines can only keep our communities healthy when we all play our part and get vaccinated. Vaccines

prepare the human immune system to detect and respond to a specific virus, and in doing so, prevent serious illness, disease, and death. In this way, getting vaccinated is a simple measure we can all take to contribute to the common good. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we truly believe in contributing to the common good, we must all do our part and get vaccinated.

The benefits of vaccination only work when we all do our part for the common good. If only some of us get vaccinated, diseases can mutate and spread, threatening the health of everyone in our communities. But if we all play our role, we can prevent the spread of serious illness and ensure that our society stays healthy and well.

8. Moral responsibility (n = 225)

As a society, we have a moral responsibility to care for the health and wellbeing of the most vulnerable in our communities. But we aren't living up to this responsibility. Vaccination is the best way to prevent many different diseases from spreading in our communities, and they're especially important for keeping our children and elderly neighbors from getting sick with deadly illnesses. But when fewer adults and children are vaccinated it puts the health of our most vulnerable community members at risk, and it means we are failing in our basic responsibility to care for each other.

We can live up to this obligation by getting vaccinated. Vaccines prepare the human immune system to detect and respond to a specific virus, and in doing so, vaccines prevent serious illness, disease, or death. In this way, getting vaccinated is a simple measure we can all take to protect the health and wellbeing of our neighbors. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we want to live up to our moral responsibility to care for the most vulnerable people in our communities, we must do what's right and get vaccinated.

We must acknowledge our moral responsibility to get vaccinated for the health and safety of the most vulnerable people in our communities. If only some of us get vaccinated, diseases can mutate and spread, threatening the health of everyone in our communities. But if we all get vaccinated, we can prevent the spread of serious illness and ensure that we are living up to our responsibility to care for each other.

9. Personal Responsibility (n = 225)

As a society, we believe that each of us must take personal responsibility for our actions. But we aren't taking responsibility for how our choices and actions are hurting others. Vaccination is the best way to prevent deadly diseases from spreading in our communities. But when fewer adults and children are vaccinated it causes harm to everyone in our communities, and we must be ready to face the consequences.

We must take personal responsibility for consequences of our actions, including the harm we cause to others by being unvaccinated. Vaccines prepare the human immune system to detect and respond to a specific virus, and in doing so, vaccines prevent serious illness, disease, or death. Because of this, it is irresponsible to be unvaccinated. It is especially careless when we don't vaccinate our children because

their immune systems are vulnerable to serious disease, and without vaccines, their immune systems can't learn how to protect the body as effectively. If too few of us are vaccinated, we must be ready to bear responsibility for the serious illness and death of our loved ones and neighbors.

We believe in holding people accountable for their choices and actions, including those that put the health and wellbeing of others at risk. If only some of us get vaccinated, diseases can mutate and spread, threatening the health of everyone in our communities. If we don't get vaccinated and willingly allow serious illness to spread, we must be ready to accept the consequences for the harm we cause to those we care about.

10. Interconnectedness (n = 225)

As a society, we are all interconnected, and what affects some of us affects all of us. But many of us have forgotten this, and instead of considering how we can work together to improve health everywhere, we have only been considering ourselves. Vaccination is the best way to prevent deadly disease from spreading in our communities. But when fewer adults and children are vaccinated, it allows illness to spread more easily from one person to the other and it harms all of us.

Because we are interconnected, we can help keep each other healthy by getting vaccinated. Vaccines prepare the human immune system to detect and respond to a specific virus, and in doing so, vaccines prevent serious illness, disease, or death. In this way, getting vaccinated is a simple way to unify our society against serious illness. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we want to ensure our health anywhere, we must encourage vaccination to keep people healthy everywhere.

Our society is interconnected, and what affects some of us will eventually affect all of us. If only some of us get vaccinated, diseases can mutate and spread, threatening to harm all of us no matter where we live. If we all work together and get vaccinated, we can prevent the spread of serious illness anywhere and in turn, keep our communities healthy everywhere.

11. Common sense (n = 225)

As a society, we believe in common sense approaches to solving our problems. But our approach to tackling viruses and disease isn't making sense. Vaccination is the best way to prevent deadly diseases from spreading in our communities. But when fewer adults and children are vaccinated it puts everyone in our communities at greater risk for serious illness or death. This just doesn't make sense.

Getting vaccinated makes sense because vaccines prepare the human immune system to detect and respond to a specific virus, which means that vaccines prevent serious illness, disease, or death. In this way, getting vaccinated is the most common sense approach to keeping our communities healthy. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we want to ensure the health of our children and communities, we must use our better judgment and get vaccinated.

We believe in using common sense to solve our problems as a society. But if we abandon our better judgment, diseases can mutate and spread, threatening to harm everyone in our communities. But if we do what makes sense and get vaccinated, we can prevent the spread of serious illness and ensure that our society stays healthy and well.

Issue Explanations

12. Public health (-) (*n* = 225)

Vaccination is an issue that affects the health of our whole society. Good public health means that most communities are healthy and protected from infectious disease. But when fewer people—including children—are vaccinated, disease spreads too easily in our communities and harms public health. If we don't ensure that everyone has access to healthcare and vaccination services, our public health will suffer.

Vaccines can only keep our communities healthy when enough people are vaccinated. But right now, too many people can't access healthcare or vaccination services, which puts our public health at risk. When people don't have easy access to public transportation, it means they can't easily get to a healthcare provider for themselves or their children. When employers don't offer paid time off, people can't afford to take time away from work to see their doctors or take their children to see a doctor. When people don't have the necessary supports to access healthcare services, adults and children are less likely to be vaccinated and more likely to attend work or school when they are sick, which contributes to community spread and harms public health.

We can't keep our communities healthy if people don't have access to healthcare and vaccination services for themselves and their children. If we don't implement policies that improve access to healthcare and vaccination services in every community, preventable diseases will continue to spread, and it will harm our public health.

13. Public health (+) (*n* = 225)

Vaccination is an issue that affects the health of our whole society. Good public health means that most communities are healthy and protected from infectious disease. When more people—including children—are vaccinated, disease doesn't spread as easily in our communities. In this way, making sure that everyone has access to healthcare and vaccination services is critical for protecting our public health.

Vaccines can only keep our communities healthy when enough people are vaccinated. When everyone can access healthcare or vaccination services, it protects our public health. When people have easy access to public transportation, it means they can easily get to a healthcare provider for themselves or their children. When employers offer paid time off, people can afford to take time away from work to see their doctors or take their children to see a doctor. When people have the right supports to access healthcare services, adults and children are more likely to be vaccinated and less likely to attend work or school when they are sick, which prevents community spread and improves public health.

We can keep our communities healthy if we make it easier for everyone to access healthcare and vaccination services for themselves and their children. If we implement policies that improve access to healthcare and vaccination services in every community, we can reduce the spread of preventable

disease and ensure good public health.

14. Child Health (-) (n = 225)

Vaccination is a child health issue. Children's bodies need to build up immunity against viruses and diseases, and vaccines help their immune systems do this more effectively. When children aren't vaccinated, their immune systems don't get what they need to become strong against specific diseases, and they are more susceptible to illness. If we don't ensure that all families have access to healthcare and vaccination services, it's harder for children to stay healthy or develop well.

Vaccines keep children healthy by helping their immune systems grow and learn how to protect the body from certain illnesses. But when families don't have access to healthcare or vaccination services, children are less likely to be vaccinated, and it means they aren't as healthy as they could be. When families don't have easy access to public transportation, it means they can't easily get to a healthcare provider for their children. When employers don't offer paid time off, people can't afford to take time away from work to take their children to see a doctor. When families don't have the right supports to access healthcare services, their children are less likely to be vaccinated and more likely to get seriously ill with a preventable disease.

We can't protect child health if families don't have access healthcare and vaccination services for their children. If we don't implement policies that improve access to healthcare and vaccination services in every community, more children will get sick with preventable diseases, and it will damage their health and development.

15. Child Health (+) (n = 225)

Vaccination is a child health issue. Children's bodies need to build up immunity against viruses and diseases, and vaccines help their immune systems do this more effectively. When children are vaccinated, their immune systems get what they need to become strong against specific diseases. In this way, making sure that all families have access to healthcare and vaccination services is critical for ensuring that children are healthy and develop well.

Vaccines keep children healthy by helping their immune systems grow and learn how to protect the body from certain illnesses. When families have access to healthcare and vaccination services, children are more likely to be vaccinated and healthy. When families have easy access to public transportation, it means they can easily get to a healthcare provider for their children. When employers offer paid time off, people can afford to take time away from work to take their children to see a doctor. When families have the right supports to access healthcare services, their children are more likely to be vaccinated and less likely to get seriously ill with a preventable disease.

We can protect child health if we make it easier for families to access healthcare and vaccination services for their children. If we implement policies that improve access to healthcare and vaccination services in every community, fewer children will get sick with preventable diseases, and it will help them stay healthy and develop well.

16. Economic (-) (n = 225)

Vaccination is an economic issue. Our economy thrives when we have a healthy workforce. When adults and children are vaccinated, communities stay healthy and people can work, earn, and spend money. But, when fewer people are vaccinated, the costs for our society are steep. If we don't ensure that everyone has access to healthcare and vaccination services, our workforce and economy will suffer.

Vaccines are critical for our economy because when more people are vaccinated, they stay healthy and can continue to work, save, and spend the money they earn. But right now, too many people can't access healthcare or vaccination services, and it puts our economy at risk. When people don't have easy access to public transportation, it means they can't easily get to a healthcare provider for themselves or their children. When employers don't offer paid time off, people can't afford to take time away from work to see their doctors or take their children to see a doctor. When people don't have the right supports to access healthcare services, adults and children are less likely to be vaccinated and more likely to get seriously ill with preventable disease. When this happens, the economy suffers because our workforce is reduced.

Our economy can't thrive if people don't have access to healthcare and vaccination services. If we don't implement policies that improve access to healthcare and vaccination services in every community, more people in the workforce will get sick with preventable diseases, and it will hurt our whole economy.

17. Economic (+) (n = 225)

Vaccination is an economic issue. Our economy thrives when we have a healthy workforce. When adults and children are vaccinated, communities stay healthy and people can work, earn, and spend money. When more people are vaccinated, there are major benefits for our society. In this way, making sure that everyone has access to healthcare and vaccination services is critical for a healthy workforce and economy.

Vaccines are critical for our economy because when more people are vaccinated, they stay healthy and can continue to work, save, and spend the money they earn. When people have access to healthcare or vaccination services, it keeps our economy moving. When people have easy access to public transportation, it means they can easily get to a healthcare provider for themselves or their children. When employers offer paid time off, people can afford to take time away from work to see their doctors or take their children to see a doctor. When people have the right supports to access healthcare services, adults and children are more likely to be vaccinated and less likely to get seriously ill with preventable disease. When this happens, the economy thrives because our workforce stays healthy.

To help our economy thrive, we need to make it easier for people to access healthcare and vaccination services. By implementing policies that improve access to healthcare and vaccination services in every community, fewer people will get sick with preventable diseases, and it will strengthen our economy.

Wave 2

Issue frames

1. Public health (*n* = 225)

Vaccination is an issue that affects the health of our whole society. Good public health means that most communities are healthy and protected from infectious disease. When more of us are vaccinated, disease doesn't spread as easily in our communities. In this way, making sure that everyone has easy access to vaccination services is critical for protecting our overall public health.

Vaccines can only keep our communities healthy when enough people are vaccinated. When everyone has access to vaccination services, it protects our public health. When vaccine sites are available in every community, it's easier for people to get vaccinated because they don't have to travel very far. When health providers offer vaccine information in multiple languages and have time to answer questions, they can better help people understand the benefits of getting vaccinated. And, when employers offer paid time off, people can afford to take time away from work to get vaccinated, which means that people are less likely to attend work or school when they are sick and spread illness in the community. When systems are in place that improve access to vaccination services, it protects our public health by reducing the spread of deadly illnesses in our communities.

We can keep our communities healthy if we make it easier for everyone to access vaccination services. If we implement policies that increase the number of vaccination sites, improve education about vaccines, and require that employers offer paid time off for their employees to get vaccinated, we can increase vaccination rates in our communities and protect public health.

2. Child health (*n*=225)

Vaccination is a child health issue. Children's bodies need to build up immunity against viruses and diseases, and vaccines help their immune systems do this more effectively. When children are vaccinated, their immune systems get what they need to become strong against specific diseases. In this way, making sure that all children have access to vaccination services is critical for ensuring that kids are healthy and develop well.

Vaccines keep children healthy by giving their immune systems the tools to protect the body from illnesses that would be deadly for them to fight on their own. When all children have access to vaccination services, it ensures that they can develop well and live a healthy life. When vaccine sites are available in every community and offer extended hours, it's easier for kids to get vaccinated and stay healthy. When pediatricians offer vaccine information in multiple languages and have time to answer questions, they can better help parents and caregivers understand the benefits of vaccinating their children, which keeps kids from getting sick with preventable diseases. And, when the costs of child vaccines are reduced or eliminated, people can better afford to vaccinate their children, which means that their kids stay healthy and are less likely to spread illness to other children at school. When systems are in place that improve access to child vaccination services, it keeps children healthy.

We can keep children healthy if we make it easier for families to access vaccination services. If we implement policies that increase the number of child vaccination sites, improve education about child vaccines, and reduce the costs of child vaccines, we can increase child vaccination rates and ensure that children live long, healthy lives.

3. Healthcare Access (n=225)

Vaccination is an issue of healthcare access. When people have easy access to healthcare, this makes it possible for them to get the routine care they need, including vaccines. When more people are vaccinated, they are less likely to get seriously ill or die from a preventable disease. In this way, making sure that everyone has easy access to healthcare is critical for ensuring that people can get vaccinated and live longer, healthier lives.

Vaccines can only keep our communities healthy when enough people have access to healthcare and vaccination services. When more health care centers are available in every community and offer extended hours, it's easier for people to see a doctor and get vaccinated. When out of pocket health costs are reduced or eliminated, people are more likely to visit their doctors for preventive care, including vaccinations. And, when healthcare providers speak multiple languages or are sensitive to different cultural concerns, people can build trusting relationships with their providers, which increases the likelihood that they will get vaccinated when recommended. When systems are in place that improve access to healthcare, people are more likely to be vaccinated and stay healthy.

We need to make it easier for all communities in the U.S. to access healthcare and vaccination services. If we implement policies that increase the number of health care centers, reduce healthcare costs, and improve trust between providers and patients, fewer people will get sick or die from preventable illnesses, and it will help everyone live longer, healthier lives.

Blended Historical Examples

4. Null Polio (n=225)

In the late 19th and early 20th centuries, polio was one of the most feared diseases in the U.S. In 1952, polio cases dramatically surged among children, and one year later, the first polio vaccine was tested. Because of a successful vaccination program that provided everyone with easy access to the polio vaccine, polio was declared as eliminated from the U.S. in 1979 and is nearly eradicated around the world. Thanks to the polio vaccine, nearly 2 million people can walk today who otherwise would have been paralyzed, and it is estimated that the polio vaccine prevented the deaths of 1.5 million children.

5. Null Measles (n=225)

Measles is one of the most contagious viruses to ever exist. It is estimated that about 500,000 people were infected in the U.S. each year before the measles vaccine was developed in 1963. Because of a successful vaccination program that provided everyone with easy access to the measles vaccine, measles was declared as eliminated from the US in 2000. Thanks to the measles vaccine, nearly 17 million lives have been saved worldwide. Unfortunately, anti-vaccination efforts in the U.S. have led to a reduction in measles vaccinations, and cases of the measles have been rising in unvaccinated children across the country.

6. Polio + Public Health (n=225)

Vaccination is an issue that affects the health of our whole society. Good public health means that most communities are healthy and protected from infectious disease. When more people are vaccinated, disease cannot spread as easily in our communities. In this way, making sure that everyone has easy access to vaccination services is critical for protecting our overall public health.

The polio vaccine is an example of how vaccines help to protect our public health. In the late 19th and early 20th centuries, polio was one of the most feared diseases in the U.S. In 1952, polio cases dramatically surged among children, and one year later, the first polio vaccine was tested. Because of a successful vaccination program that provided everyone with easy access to the polio vaccine, polio was declared as eliminated from the U.S. in 1979 and is nearly eradicated around the world. Nearly 2 million people can walk today who otherwise would have been paralyzed, and it is estimated that the polio vaccine prevented the deaths of 1.5 million children. Thanks to the polio vaccine, our overall public health has drastically improved.

When everyone has easy access to vaccination services, it protects the health of our whole society. This is made clear when we think about the polio vaccine. As more and more people were vaccinated against polio, the disease couldn't spread throughout our communities, and the virus could no longer survive. Because we made it easy for everyone to get vaccinated, polio was eliminated, and our public health is better for it.

7. Measles + Public Health (n=225)

Vaccination is an issue that affects the health of our whole society. Good public health means that most communities are healthy and protected from infectious disease. When more people are vaccinated, disease cannot spread as easily in our communities. In this way, making sure that everyone has easy access to vaccination services is critical for protecting our overall public health.

The measles vaccine is an example of how vaccines help to protect our public health. It is estimated that about 500,000 people were infected in the U.S. each year before the measles vaccine was developed in 1963. Because of a successful vaccination program that provided everyone with easy access to the measles vaccine, measles was declared as eliminated from the US in 2000. Thanks to the measles vaccine, nearly 17 million lives have been saved worldwide, and our public health was drastically improved for a time. Unfortunately, anti-vaccination efforts in the U.S. mean that cases of measles are rising across the country. To protect our public health, we need to bring vaccination rates back up.

When everyone has easy access to vaccination services, it protects the health of our whole society. This is made clear when we think about the measles vaccine. As more and more people were vaccinated against the measles, the disease couldn't spread throughout our communities, and the virus could no longer survive. Because we made it easy for everyone to get vaccinated, measles was eliminated, and our public health benefitted for nearly two decades. We can continue to protect the health of our whole society by making sure that everyone gets vaccinated for measles.

8. Polio + Moral Responsibility (n=225)

As a society, we have a moral responsibility to care for the health and wellbeing of our community members who are most likely to get sick. Vaccination is the best way to prevent many different diseases from spreading in our communities, and they're especially important for keeping our children and elderly neighbors from getting sick with deadly illnesses. But when vaccination rates are low, it risks the health of our communities, and it means we are failing in our collective responsibility to care for each other.

The polio vaccine is an example of how we lived up to our moral obligations. In the late 19th and early 20th centuries, polio was one of the most feared diseases in the U.S. In 1952, polio cases dramatically surged among children, and one year later, the first polio vaccine was tested. Because of a successful vaccination program that provided everyone with easy access to the polio vaccine, polio was declared as eliminated from the U.S. in 1979 and is nearly eradicated around the world. With the help of the polio vaccine, our society lived up to our moral responsibilities to care for the health and wellbeing of everyone in our communities. Nearly 2 million people can walk today who otherwise would have been paralyzed, and it is estimated that the polio vaccine prevented the deaths of 1.5 million children.

When we all do what's right and get vaccinated, we live up to our moral responsibility to protect the people in our communities who are most likely to get sick. This is made clear when we think about the polio vaccine. As more and more people were vaccinated against polio, the disease couldn't spread throughout our communities, and the virus could no longer survive. Because we came together as a society and did what was right, polio was eliminated, and we fulfilled our moral obligation to care for each other.

9. Measles + Moral Responsibility (n=225)

As a society, we have a moral responsibility to care for the health and wellbeing of our community members who are most likely to get sick. Vaccination is the best way to prevent many different diseases from spreading in our communities, and they're especially important for keeping our children and elderly neighbors from getting sick with deadly illnesses. But when vaccination rates are low, it risks the health of our communities, and it means we are failing in our collective responsibility to care for each other.

The measles vaccine is an example of how we lived up to this obligation. It is estimated that about 500,000 people were infected in the U.S. each year before the measles vaccine was developed in 1963. Because of a successful vaccination program that provided everyone with easy access to the measles vaccine, measles was declared as eradicated from the US in 2000. With the help of the measles vaccine, our society lived up to our moral responsibilities to care for the health and wellbeing of everyone in our communities, and nearly 17 million lives have been saved worldwide. Unfortunately, anti-vaccination efforts in the U.S. mean that cases of measles are rising across the country. To truly live up to our moral responsibility, we need to bring vaccination rates back up.

When we all do what's right and get vaccinated, we live up to our moral responsibility to protect the people in our communities who are most likely to get sick. This is made clear when we think about the measles vaccine. As more and more people were vaccinated against the measles, the disease couldn't spread throughout our communities, and the virus could no longer survive. If we do what's right and get vaccinated, we can fulfill our moral obligation to care for each other.

10. Polio + Common Good (n=225)

As a society, we believe in advancing the common good. But right now, we're not doing what's best for all of us. Vaccination is the best way to prevent deadly diseases from spreading, but when vaccination rates are low, it puts everyone in our communities at greater risk for serious illness or death. If we truly care about the greater good, we need to take the right steps to ensure that our society is healthy and well, and this means being vaccinated.

The polio vaccine is an example of how our society came together to promote the common good. In the late 19th and early 20th centuries, polio was one of the most feared diseases in the U.S. In 1952, polio cases dramatically surged among children, and one year later, the first polio vaccine was tested. Because of a successful vaccination program that provided everyone with easy access to the polio vaccine, polio was declared as eliminated from the U.S. in 1979 and is now nearly eradicated around the world. Because we did what was best for all of us and made sure that everyone was vaccinated for polio, the deaths of 1.5 million children were prevented and nearly 2 million people can walk today who otherwise would have been paralyzed.

The benefits of vaccinations only work when we take the right steps to advance the common good. This is clear when we think about the polio vaccine. As more and more people were vaccinated against polio, the disease couldn't spread through our communities, and the virus could no longer survive. When we commit to doing what's best for all of us and get vaccinated, we can prevent the spread of serious illness and ensure that our society stays healthy and well.

11. Measles + Common Good (n=225)

As a society, we believe in advancing the common good. But right now, we're not doing what's best for all of us. Vaccination is the best way to prevent deadly diseases from spreading, but when vaccination rates are low, it puts everyone in our communities at greater risk for serious illness or death. If we truly care about the greater good, we need to take the right steps to ensure that our society is healthy and well, and this means being vaccinated.

The measles vaccine is an example of how our society came together to promote the common good. It is estimated that about 500,000 people were infected in the U.S. each year before the measles vaccine was developed in 1963. Because of a successful vaccination program that provided everyone with easy access to the measles vaccine, measles was declared as eliminated from the US in 2000. Because we did what was best for all of us and made sure that everyone was vaccinated for measles, nearly 17 million lives have been saved worldwide. Unfortunately, recent anti-vaccination efforts in the U.S. are bad for all of us. As vaccination rates decline, measles cases are on the rise across the country.

The benefits of vaccinations only work when we take the right steps to advance the common good. This is clear when we think about the measles vaccine. As more and more people were vaccinated against the measles, the disease couldn't spread throughout our communities, and the virus could no longer survive. When we commit to doing what's best for all of us and get vaccinated, we can prevent the spread of serious illness and ensure that our society stays healthy and well.

Metaphors

12. Taste (*n*=225)

A vaccine helps the human body identify and respond to a virus much like taste buds help the human brain recognize certain foods. Our taste buds help us recognize tastes like salty, sweet, or bitter, which helps us identify certain foods. In the same way, a vaccine helps the immune system identify and counter a specific virus and keep the body healthy. Much like the taste buds on your tongue collect information about specific flavors from foods when you eat them, your immune system collects information about a specific virus from a vaccine. Once the body is taught to recognize the characteristics of a virus, it can respond properly when faced with that virus.

Vaccines help the body identify and respond to certain viruses, much like taste buds help your body identify and respond to the flavors of different foods. Just like taste buds can remember the distinct flavors of foods long after we've eaten them, the body's immune system can recognize the characteristics of a virus even after the vaccine has left the body. With the memory it develops from the vaccine, the human body can better identify and counter disease, which improves overall health.

13. Computer Updates + Common Good (*n*=225)

As a society, we believe in advancing the common good. But right now, we're not doing what's best for all of us. Vaccination is the best way to prevent deadly diseases from spreading in our communities, and they're especially important for keeping our children and elderly neighbors from getting sick with deadly illnesses. But when vaccination rates are low, it puts all of us at risk. If we truly care about the greater good, we need to take the right steps to ensure that our society is healthy and well, and this means being vaccinated.

Getting vaccinated is like updating your computer. The body's immune system must have the information it needs to stay healthy, and a vaccine is like an update that gives your body the information it needs for a specific virus. Much like software updates give your computer details about how to protect against new threats, a vaccine gives your body details about a specific virus and how to counteract it. Once the immune system has been updated, it can respond to that specific virus.

To promote the common good, we need to take the right steps so that everyone can update their immune system with vaccines. If only some of us get vaccinated, diseases can mutate and spread, threatening the health of everyone in our communities. But when we commit to doing what's best for all of us and get vaccinated, we can prevent the spread of serious illness and ensure that our society stays healthy and well.

14. Literacy + Common Good (*n*=225)

As a society, we believe in advancing the common good. But right now, we're not doing what's best for all of us. Vaccination is the best way to prevent deadly diseases from spreading in our communities, and they're especially important for keeping our children and elderly neighbors from getting sick with deadly illnesses. But when vaccination rates are low, it puts all of us at risk. If we truly care about the

greater good, we need to take the right steps to ensure that our society is healthy and well, and this means being vaccinated.

Getting vaccinated is like learning to read and write a language. The body's immune system needs to achieve and maintain a certain level of literacy to stay healthy, and it uses a vaccine as a tool to understand the language of a specific virus. As the body's ability to read and understand a virus increases, it is then able to communicate what needs to be done to counter that virus if it enters the body. Once the body's immune system can understand the language of a specific virus, it can engage with that virus when necessary.

To promote the common good, we need to take the right steps so that everyone's immune systems can gain the literacy they need to identify and counter disease. If only some of us get vaccinated, diseases can mutate and spread, threatening the health of everyone in our communities. But when we commit to doing what's best for all of us and get vaccinated, we can prevent the spread of serious illness and ensure that our society stays healthy and well.

Wave 3

Value frames

1. Common Good (Collective, V2) (n=225)

As a society, we believe in advancing the common good. But right now, we're not doing what's best for all of us. Vaccines are the best way to prevent deadly diseases from spreading in our communities, and they're especially important for keeping our children and neighbors with weakened immune systems from getting sick with deadly illnesses. But when fewer adults and children are vaccinated, it puts all of us at risk. If we truly care about the common good, we need to take the right steps to ensure that our society is healthy and well, and this means being vaccinated.

Vaccines can only keep our communities healthy when we do what's best for all of us and get vaccinated. Vaccines prepare the human immune system to detect and respond to a specific virus, and in doing so, prevent serious illness, disease, and death. In this way, getting vaccinated is a simple measure we can all take to contribute to the common good. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we truly believe in contributing to the common good, we must all work together and get vaccinated.

The benefits of vaccinations only work when we take the right steps to advance the common good. When only some of us are vaccinated, diseases can mutate or spread, threatening the health of everyone in our communities. But when we commit to doing what's best for all of us, we can prevent the spread of serious illness and ensure that our society stays healthy and well.

2. Common Good (Collective Responsibility, V3) (n = 225)

As a society, we have a responsibility to promote the common good. But right now, we are failing in this responsibility. Vaccines are the best way to prevent deadly diseases from spreading in our communities,

and they're especially important for keeping our children and neighbors with weakened immune systems from getting sick with deadly illnesses. But when fewer adults and children are vaccinated, it puts all of us at risk. If we truly care about the common good, we all need to take responsibility for ensuring that our society is healthy and well, and this means being vaccinated.

Vaccines can only keep our communities healthy when we are serious about our collective responsibility to promote the common good. Vaccines prepare the human immune system to detect and respond to a specific virus, and in doing so, prevent serious illness, disease, and death. In this way, getting vaccinated is a simple measure we are obligated to take to contribute to the common good. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we truly believe in contributing to the common good, we must all live up to our responsibility and get vaccinated.

The benefits of vaccinations only work when we all take responsibility for advancing the common good. When only some of us are vaccinated, diseases can mutate or spread, threatening the health of everyone in our communities. But when we fulfill our obligations to society, we can prevent the spread of serious illness and ensure that everyone stays healthy and well.

3. Common Good (V1 + Access) (n = 225)

As a society, we believe in doing our part for the common good. But too many of us aren't playing our part. Vaccines are the best way to prevent deadly diseases from spreading in our communities, and they're especially important for keeping our children and neighbors with weakened immune systems from getting sick with deadly illnesses. But right now, there are adults and children who don't have easy access to vaccines, and when fewer people are vaccinated, it puts all of us at risk. If we truly care about the common good, we all need to play our role in making sure that our society is healthy and well, and this means making sure that everyone has easy access to vaccination services.

Vaccines can only keep our communities healthy when we all have easy access to vaccination services. Vaccines prepare the human immune system to detect and respond to a specific virus, and in doing so, prevent serious illness, disease, and death. In this way, getting vaccinated is a simple measure we can all take to contribute to the common good. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we truly believe in contributing to the common good, we must all do our part and make sure that everyone in our communities can get vaccinated.

The benefits of vaccinations only work when we all do our part for the common good. If only some of us are able to access vaccine services, diseases can mutate and spread, threatening the health of everyone in our communities. But when we all play our role in making sure that everyone can easily get vaccinated, we can prevent the spread of serious illness and keep our society healthy and well.

4. Common Good (V2 + Access) (n=225)

As a society, we believe in advancing the common good. But right now, we're not doing what's best for all of us. Vaccines are the best way to prevent deadly diseases from spreading in our communities, and they're especially important for keeping our children and neighbors with weakened immune systems from

getting sick with deadly illnesses. But right now, there are adults and children who don't have easy access to vaccines, and when fewer people are vaccinated, it puts all of us at risk. If we truly care about the common good, we need to take the right steps to ensure that everyone has easy access to vaccination services.

Vaccines can only keep our communities healthy when we all have easy access to vaccination services. Vaccines prepare the human immune system to detect and respond to a specific virus, and in doing so, prevent serious illness, disease, and death. In this way, getting vaccinated is a simple measure we can all take to contribute to the common good. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we truly believe in contributing to the common good, we must all work together to make sure that everyone in our communities can get vaccinated.

The benefits of vaccinations only work when we take the right steps to advance the common good. If only some of us are able to access vaccine services, diseases can mutate or spread, threatening the health of everyone in our communities. But when we commit to doing what's best for all of us, we can make sure that everyone can easily get vaccinated, prevent the spread of serious illness, and keep our society healthy and well.

5. Common Good (V3 + Access) (n = 225)

As a society, we have a responsibility to promote the common good. But right now, we are failing in this responsibility. Vaccines are the best way to prevent deadly diseases from spreading in our communities, and they're especially important for keeping our children and neighbors with weakened immune systems from getting sick with deadly illnesses. But right now, there are adults and children who don't have easy access to vaccines, and when fewer people are vaccinated, it puts all of us at risk. If we truly care about the common good, we all need to take responsibility for ensuring that everyone has easy access to vaccination services.

Vaccines can only keep our communities healthy when we all have easy access to vaccination services. Vaccines prepare the human immune system to detect and respond to a specific virus, and in doing so, prevent serious illness, disease, and death. In this way, getting vaccinated is a simple measure we are obligated to take to contribute to the common good. This is especially true when we vaccinate our children because their immune systems are vulnerable to serious disease, and vaccines help their immune systems grow and learn how to protect the body. If we truly believe in contributing to the common good, we must live up to our responsibility and make sure that everyone in our communities can get vaccinated.

The benefits of vaccinations only work when we all take responsibility for advancing the common good. If only some of us are able to access vaccine services, diseases can mutate or spread, threatening the health of everyone in our communities. But when we fulfill our obligations to society, we can make sure that everyone can easily get vaccinated, prevent the spread of serious illness, and keep our society healthy and well.

Appendix D: Sample Survey Items

Battery A: Understanding Vaccines

Please read the following statements:

- a. A vaccine trains the immune system to recognize and respond to a specific virus.
- b. A vaccine attacks and defeats viruses that invade the body.

1. If you had to choose one statement, which do you agree with more?

- a. A
- b. B

When you get a vaccine, how worried are you about the following things? [5-pt: 1 – not worried; 2 – a little worried; 3 – moderately worried; 4 – very worried; 5 – extremely worried]

- 2. That the vaccine will have long-term side effects
- 3. That the vaccine will make you sick
- 4. That the vaccine will cause long-term health problems

Please read the following statements:

- a. A vaccine is considered effective when it prevents vaccinated people from getting a virus 100% of the time.
- b. A vaccine is considered effective when it prevents most vaccinated people from getting seriously ill with the virus.

5. If you had to choose one statement, which do you agree with more?

- a. A
- b. B

Please rate how much you agree with the following statements [1: strongly disagree; 4: neither agree nor disagree; 7: strongly agree]:

- 6. Vaccines are more effective when more people take them.
- 7. A vaccine is effective if it prevents a vaccinated person from getting seriously ill with the virus.
- 8. A vaccine is effective when it slows a virus from spreading in the community.

Battery B: Vaccine Benefits

1. Please choose the option that is closest to your opinion:
 - a. The individual risks of getting vaccinated outweigh the public health benefits.
 - b. The public health benefits of getting vaccinated outweigh the individual risks.

Please rate how much you agree or disagree with the following statements [1: *strongly disagree*; 4: *neither agree nor disagree*; 7: *strongly agree*]:

2. When more people are vaccinated, our economy does better.
3. When vaccination rates are high, our communities are healthier.
4. High vaccination rates keep children healthier.

Battery C: Childhood Vaccinations

Please rate how much you agree or disagree with the following statements [1: *strongly disagree*; 4: *neither agree nor disagree*; 7: *strongly agree*]:

1. Childhood vaccines pose major risks to children's health.
2. Vaccines given during childhood are not very effective.
3. Childhood vaccines can cause disabilities.

Please rate how much you agree or disagree with the following statements [1: *strongly disagree*; 4: *neither agree nor disagree*; 7: *strongly agree*]:

4. We, as a society, have a responsibility to ensure that all children are vaccinated.
5. As a society, we are obligated to vaccinate all children.
6. We, as a society, are responsible for making sure that all children get vaccinated.

Battery D: Practical and Structural Barriers to Vaccination

Please choose the option that is closest to your opinion:

- a. The main reason why people don't get vaccinated is because of individual values and beliefs.
- b. The main reason why people don't get vaccinated is because of systemic barriers that make it hard to access health services.

There are vaccines for many different viruses, yet for each, there are people who don't get vaccinated. Please indicate how large of a role you think each of the following factors plays in **why people don't get vaccinated**: [5-point Likert scale: "No role"; "A small role"; "A moderate role"; "A large role"; "A very large role"]

2. A person's religious beliefs.
3. Inability to take time off from work to get vaccinated.
4. A person's individual health conditions
5. Lack of reliable transportation to get vaccinated.

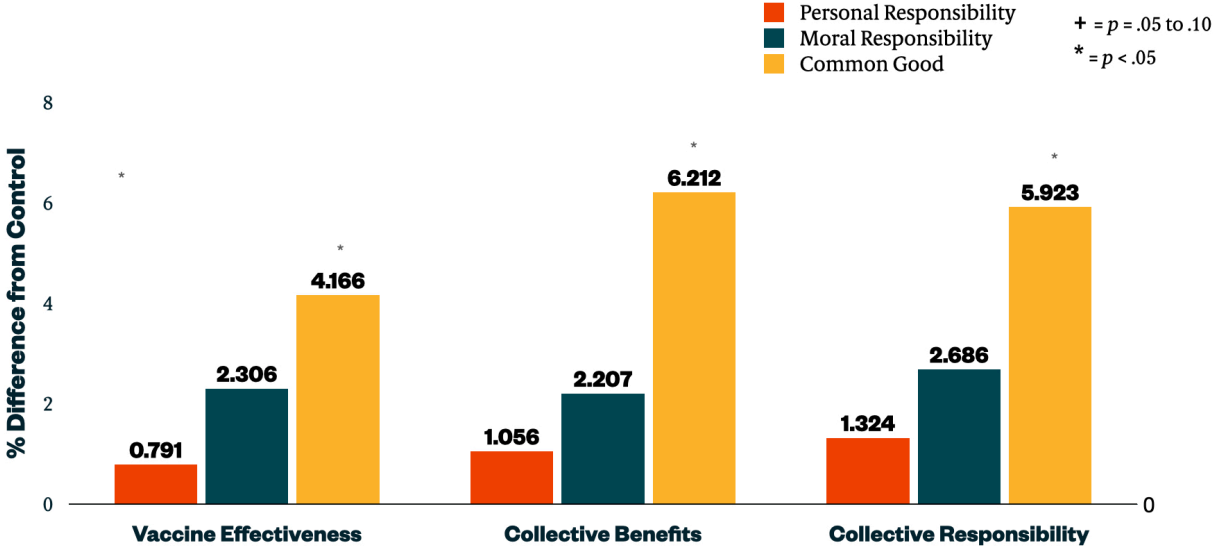
Battery E: Policy Support

Please rate how much you favor or oppose the following policies. Please keep in mind that implementing these policies may require an increase in state or federal taxes. [1: *strongly oppose*; 4: *neither favor nor oppose*; 7: *strongly favor*]

1. Set up federally funded vaccination centers that operate year-round in every community in the U.S.
2. Create a government-funded healthcare system that would expand access to vaccines.
3. Require, without exceptions, that all children be vaccinated in order to attend school.
4. Legally require employers to provide paid leave for their employees to take their children to be vaccinated.

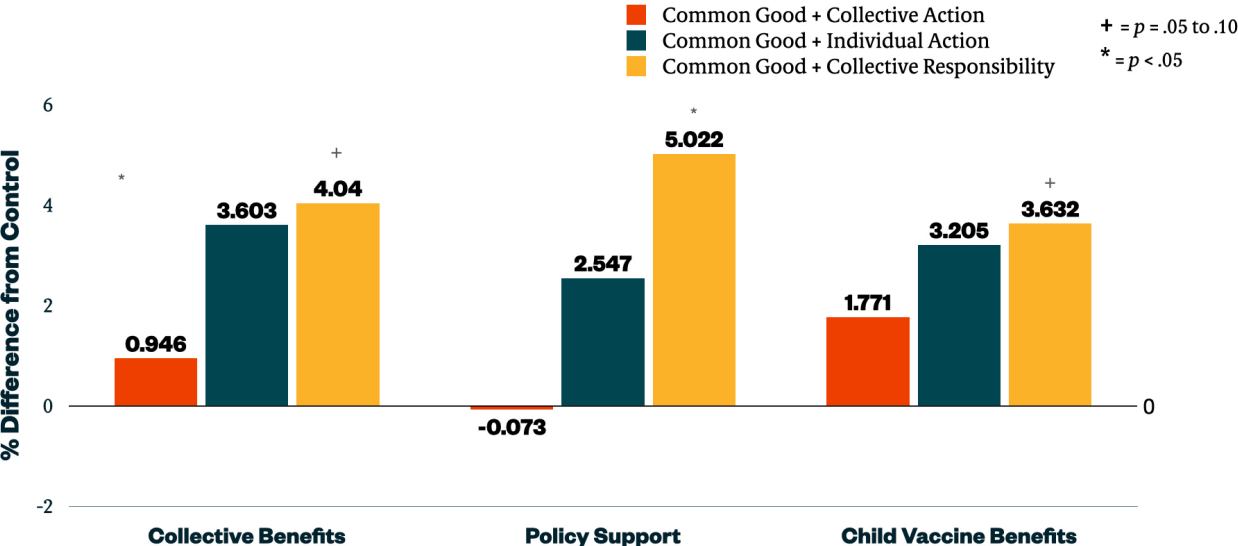
Appendix E: Select Results from Survey Experiments

Graph 1: Recommendation #1



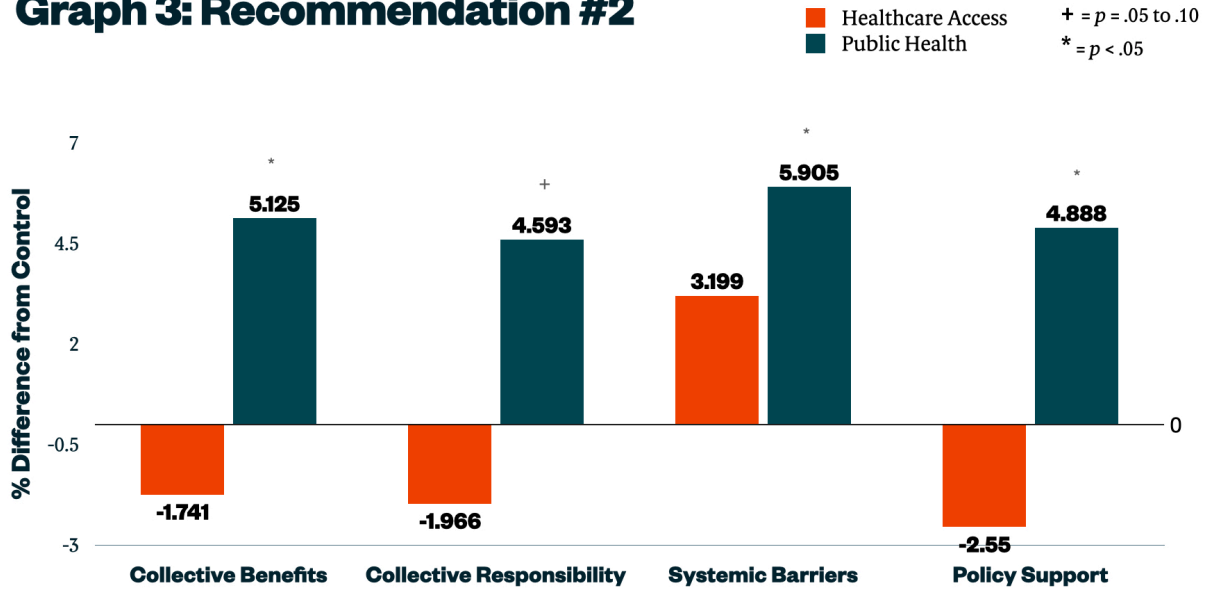
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Graph 2: Recommendation #1



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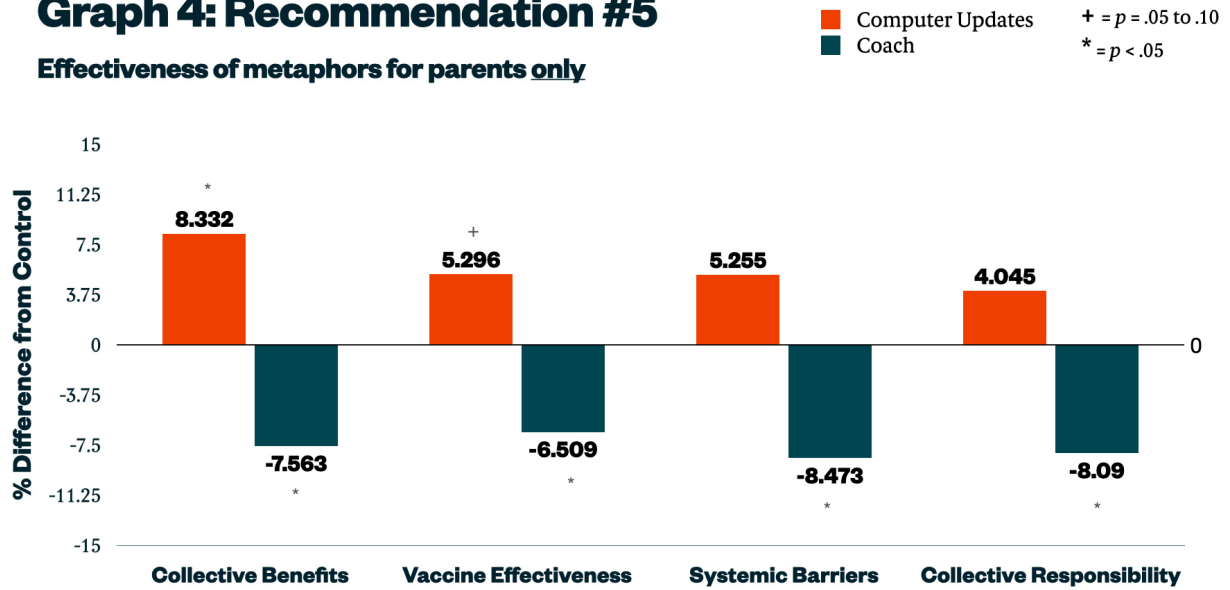
Graph 3: Recommendation #2



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Graph 4: Recommendation #5

Effectiveness of metaphors for parents only



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Appendix F: Framing Strategies Tested in Peer Discourse Sessions

Public Health

Vaccination is an issue that affects the health of our whole society, including children. Good public health means that most communities are healthy and protected from infectious disease. We can keep our communities healthy if we make it easier for adults and children to access vaccination services to reduce the spread of deadly illnesses in our communities.

Child Health

Vaccination is an issue that affects the health of children. Making sure that all children are protected from infectious disease is critical for ensuring that kids are healthy and develop well. We can keep children healthy if we make it easier for families to access vaccination services.

Literacy

Getting vaccinated is like learning to read and write a language. Vaccines teach the body how to identify and respond to certain viruses, much as we learn to read and write a language. Just like we continue to read and write even after we've become fluent in a language, the body remembers how to detect and react to a virus even after the vaccine has left the body.

Computer Updates

Getting vaccinated is like updating your computer. Vaccines are like updates that give the body information about how to protect against a virus. Just like our computers know how to detect a virus after they've received a software update, the body can remember how to detect and react to a virus even after the vaccine has left the body.

Taste

A vaccine helps the human body identify and respond to a virus much like taste buds help the human brain recognize certain foods. Getting vaccinated is like the sense of taste that gives the body information about how to respond to different things it tastes. Just like taste buds can remember the distinct flavors of foods long after we've eaten them, the body's immune system can recognize the characteristics of a virus even after the vaccine has left the body.

Measles

Measles is one of the most contagious viruses to ever exist. Because of a successful vaccination program that's existed since 1963 to provide everyone with easy access to the measles vaccine, measles was declared as eliminated from the US in 2000. Thanks to the measles vaccine, nearly 17 million lives have been saved worldwide. Unfortunately, anti-vaccination efforts in the U.S. have led to a reduction in measles vaccinations, and cases of measles have been rising in unvaccinated children across the country.

COVID-19

COVID-19 has officially claimed over 6 million lives worldwide. Because of increased vaccination to COVID-19, the death toll has decreased. The COVID-19 vaccines authorized for children in the US use Messenger RNA, or mRNA. Discovered in the early 1960s, after decades of research and innovation, mRNA vaccine technology was ready when the COVID-19 pandemic hit the US in 2020. Now, mRNA vaccines are being developed to protect against other respiratory viruses such as the flu, as well as possible future application against HIV.

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Reframing the Conversation about Child and Adolescent Vaccinations

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