



MICHELLE KONDRICH FOR THE BOSTON GLOBE

New mothers were made for times like this

Giving birth provokes profound changes in a woman's brain. That may be especially helpful in a crisis.

BY CHELSEA CONABOY

ALICE OWOLABI MITCHELL watched her husband dancing with their two-week-old daughter and realized something. He was enjoying new parenthood in a way she wasn't. She loved little Everly Rose, born at the end of February, but those first days were all work. Work and worry.

Then and in the weeks that followed, Mitchell worried about things that are common in new motherhood, about whether Everly was latching on correctly when breastfeeding, for example, or whether baby and mother were connecting enough. And she worried in ways that are particular to this moment, to this pandemic.

Was she doing enough to keep the coronavirus out of their home? Would she be able to get help from her doctor or Everly's if something else went wrong? What if Everly developed diaper rash or needed formula, and they couldn't go to the store for supplies? There was, she felt, so little room for error.

Mitchell worried about her breast milk production and whether her own stress could hamper supply. She kept telling herself, "I can't be anxious right now, otherwise she can't eat." But she couldn't help it, not when "the whole world is crumbling."

In normal circumstances, new motherhood can be overwhelming, at once full of joy and anxiety, growth and loss. The emotional rollercoaster of the postpartum period so often is dismissed as the result of sleep deprivation and hormones gone haywire, a moment of hardship in an otherwise happy phase of life that for most mothers will pass.

The truth is that distress and ambivalence are a common part of maternal development, which entails dramatic changes in the structure and function of the brain. Understanding what's happening to the maternal brain can help women to put the intensity of those first months into perspective: All that worry has a point. And it may be especially helpful now, as women grapple with the realities of new motherhood in a world in turmoil.

MATERNAL, K4

I got an experimental COVID-19 vaccine. I'm willing to put it to the ultimate test.

BY IAN HAYDON

ON TUESDAY, I received my second and final dose of an experimental coronavirus vaccine. The pharmacist who injected me confessed that seeing the substance inside the syringe had brought a tear to her eye. "It's translucent, she said, "and it just might save the world."

I am one of 45 healthy volunteers taking part in a Phase 1 clinical trial to assess the safety of mRNA-1273, the first COVID-19 vaccine candidate to be given to humans. If found safe, it will be given to more volunteers to see whether it works.

But while even trials like these are cause for hope, they will take many months. With the world in stasis and lives being lost to COVID-19 every day, it would be great if a safe and effective vaccine could come sooner. One way to speed up testing might be so-called "challenge studies," in which vaccinated volunteers get intentionally exposed to the virus.

This is not how vaccines are normally tested. What usually happens is that after a vaccine is deemed safe in Phase 1, vaccinated subjects in Phases 2 and 3 carry on with their day-to-day lives. Months later, scientists check to see whether the vaccinated group as a whole got fewer infections than a group that got a placebo. This is safe, but takes time. In a challenge study, there is no waiting around. Vaccinated volunteers would be exposed to or injected with live virus in a controlled setting.

With limited treatments for COVID-19, such an experiment would obviously be risky. Even so, I would be willing to sign up — if conditions were right.

I do not consider myself a big risk-taker. I am a teetotaler, I follow speed limits, and my last broken bone was in middle school. I did not sign up to be in a Phase 1 study because I do not care about my health; I did it because by taking on a small amount of risk, I might be able to help many others. I'm not alone in this — thousands applied to be in the study I am in, though just 45 volunteers were needed for this stage of this particular trial.

The vaccine injection could have caused an immediate allergic reaction. I had no issues. It may cause my body to

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MATERNAL

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Many are entering motherhood after a pregnancy and childbirth experience very different from the one they had anticipated and some are facing unexpected financial strain. They are going without visits from family and friends, bearing gifts and meals, that could dispel the loneliness that comes from tending to a cute but nonverbal creature who has not yet figured out the difference between night and day. In-person mothers groups have ceased, along with lactation support programs or walks with friends — places they might typically find answers to a question that looms large for so many new mothers in relation to her baby's development and her own: "Is this normal?"

During pregnancy, every aspect of a woman's body and behavior is measured and scrutinized. Once baby arrives, the attention shifts to child development, to making weight and marking milestones. Maternal development is largely ignored, the hard parts often kept hidden by the desire not to scare an expectant mother.

In 2018, I wrote in the Boston Sunday Globe Magazine about my own transition to motherhood and the comfort I found in the neuroscience of the maternal brain. Dozens of women wrote to thank me for validating what they were going through, for explaining what they had been through.

The response was heart-warming. It also made me angry. How have we gotten the story of what it means to become a mother so wrong that so many of us are left in the dark? This question grew more urgent when the pandemic arrived.

As I've worried about the health of my elderly relatives and fretted over caring for my family as we shelter at home, I have asked for all the women on the brink of the unmooring that comes with new motherhood. Would they find themselves alone with their baby in the quiet of the early morning asking, is this normal? And, with the coronavirus consuming so much attention, would they find the answers they need?

LET'S START HERE. Women are not born mothers. Maternal instinct as we commonly understand it, as something innate and automatic, particular to women, is a fallacy.

The brain circuitry that supports maternal caregiving develops over time. It is propelled at first by a jolt of hormones at childbirth and then shaped by exposure, by the very act of caring for a baby. And, in fact, a similar parental circuitry develops in fathers, adoptive parents, and likely anyone who fully engages in the work of parenting, though through different mechanisms.

Becoming a mother is a process, one that builds on the nuances of our own neurological disposition and is influenced by the trauma and healing we've experienced, by the stresses and support we encounter as new mothers and beyond. It's a process that our babies are a part of, as people with their own genetic makeup and agency.

There is no "fixed action pattern" for maternal behavior, said Alison Fleming, a retired professor from the University of Toronto Mississauga who has studied the psychobiology of maternal behavior for more than 40 years and is known to some as the mother of mothering research. "It's not like a mechanistic thing that happens automatically. It has its own development."

Early on, that development can feel like obsession. Among dozens of parents interviewed by researchers at the Yale Child Study Center, nearly all reported recurrent thoughts about their child's safety at two weeks postpartum, and many said those thoughts persisted even when they knew their child was fine. Preoccupation was so intense, especially for first-time mothers, that the researchers concluded that new parents experience an "altered mental state."

Mia Edidin sees that to some degree in most of the parents she works with. She is a social worker and clinical director at Perinatal Support Washington, and keeps a short list of topics that come up with nearly every family. It includes the Big One, the massive earthquake due, someday, from the Cascadia subduction zone.

It's a risk people live with daily in the Pacific Northwest. But for

new parents it becomes a real and present danger. They think, "I have actually threatened the safety of this being that I am so intricately tied to that it hurts," Edidin said. And for a new parent, that sense of having put your child in danger "is the worst feeling ever."

Edidin tries to help parents identify anxious thoughts about their baby's well-being that may be irrational. That's harder to do with the coronavirus, she said, when the whole world is in a state of vigilance, but it's not impossible.

"We can use the data that we have right in front of us," she said. "In new motherhood, regardless of COVID, we can look at our baby to determine if our baby is OK."

Scientists have hypothesized that parents' worry and attention helps them to learn their baby's cues, which stimulate further changes in the brain.

A baby's cry is a powerful force, as any mother who has felt its pull in her body knows. That input, but also a baby's smile, her smell, or her sweet expressions, triggers activity in brain regions involved in motivation and salience, or how we assign meaning, including to things that are potentially threatening. They compel a new mother, through worry and joy, to continue interacting with her baby.

Researchers have found activity seems to shift from the "checking and worrying" brain circuits to those that control social cognition as mothers become more confident in reading their baby's cues and as

babies themselves become more engaging.

I've come to think about early parenthood as a kind of boot camp for the brain. It won't always feel as intense as it does in those first weeks, but you'll never be the same.

THAT MAY BE a scary thought. The profound changes women experience in motherhood can make them vulnerable. As many as 1 in 5 women develop a postpartum mood disorder, which can include clinical levels of anxiety that interfere with a mother's well-being or her ability to take care of her child. Plus, our cultural understanding of "mommy brain" is that it is diminished, that mothers are forgetful and frazzled, consumed by their kids. But the research on the maternal brain shows a much more complex picture.

Many women do experience real but generally small deficits in certain kinds of memory during pregnancy and afterward. But motherhood also is thought to fine tune a mother's ability to read and interpret social cues not only from her baby but potentially from her partner and other adults. Over time, it may recalibrate her emotional regulation, so that she can control herself in the face of a screaming child (or a moody teenager) and plan a response. It may even enhance certain kinds of executive functioning related to working memory and the ability to shift attention between tasks. And

one study published last year looked at the brains of more than 12,000 women and found that the more children they had, the younger their brains appeared.

Researchers have a long way to go to fully understand what motherhood means for the brain, but it is clear that the changes a woman goes through, while often grueling at first, are generally adaptive, aimed at making her better able to care for her child and herself.

MITCHELL, WHO TEACHES fifth grade at Match Community Day school, had a plan for baby Everly's arrival. The 29-year-old had worried about childbirth, as a Black woman in a country where the rate of pregnancy-related deaths is more than three times higher for Black women than for white women. When Mitchell was 14, her own mother died of cardiac arrest two weeks after giving birth to a son. Mitchell wanted extra support.

She started seeing a therapist during pregnancy and enlisted help from the Boston Doula Circle. She planned to attend a diverse mothers group in Dorchester and another near her home in Quincy.

"Obviously, I can't do any of that now," she said. "What I envisioned my post-labor, early stages of motherhood to look like has been just completely altered."

Support for new mothers is critical. Pregnancy and the postpartum period already place a heavy demand on the brain's stress-response systems, and researchers are raising alarms about how the stress of the pandemic could compound a crisis in maternal mental health. A lack of social support is a significant risk factor for depression during pregnancy and afterward.

Postpartum support professionals understand this. As the pandemic began, they scrambled to move mothers groups and talk therapy sessions online. Lactation specialists tucked canisters of formula into clients' bags, just in case. Doulas strategized about how to continue supporting women laboring in the hospital and after they returned home.

They repeated advice they give to all newly postpartum mothers: Take a shower. Put on clean clothes. Get fresh air, even if it

Resources for new mothers

- The Massachusetts chapter of Postpartum Support International runs a helpline by phone (866-472-1897) and email (psiofmass@gmail.com)
- Check your local hospital or parenting support center for groups that have moved online.
- These organizations offer free online groups for new parents:

Jewish Family & Children's Services, Center for Early Relationship Support: jfcsboston.org

First Connections, a program of the Justice Resource Institute (scroll down to "First Year of Life" for online listings): jri.org/services/foster-adoption-ecs/first-connections

Group Peer Support has started a group for pregnancy and parenting during the pandemic: groupeersupport.org/gps-upcoming-events/

Giving birth during a pandemic has particular risks for women of color

BY KATRINA MILES

NATIONALLY, HOSPITALS AND health care systems have enacted social distancing and strict visitor policies in order to slow the spread of COVID-19. Here in Massachusetts, many hospitals are allowing just one person to accompany a laboring woman, forcing some pregnant women to choose between doulas and partners, or to connect with coaches and family members online during and after labor.

It's understandable that health officials want to contain the spread of COVID-19 in the hospital, but pregnant women who are already at risk of being ignored or having worse health outcomes are being made even more vulnerable by visitation policies, according to midwives, some healthcare professionals, and other advocates.

"Any emergency [or] any change from the way we do things impacts women of color and poor women disproportionately to other women," said Dr. Kameelah Phillips, an obstetrician and gynecologist at Calla Women's Health in Manhattan. "I think it is incumbent, going forward, for hospitals, doctors, nurses, the medical associations — everyone — to have a keen sense for the most vulnerable, but even more so for women of color."

"In normal circumstances we deal with the effects of implicit bias in medicine," Phillips added. "To lose the people in our lives who would serve as our advocates — there's a potential additional risk to those women in the hospital."

In March in New York City, at the time the epicenter of the coronavirus outbreak in the United States, some private hospitals barred partners and other visitors from labor and delivery rooms, leaving moms to labor alone.

Those policies went against state department of public health guidelines, and the guidance of the World Health Organization and the Centers for Disease Control and Prevention,

which state that that one support person is "essential to patient care throughout labor, delivery and the immediate postpartum period."

Hospitals quickly reversed course after Governor Andrew Cuomo issued an executive order stating that women

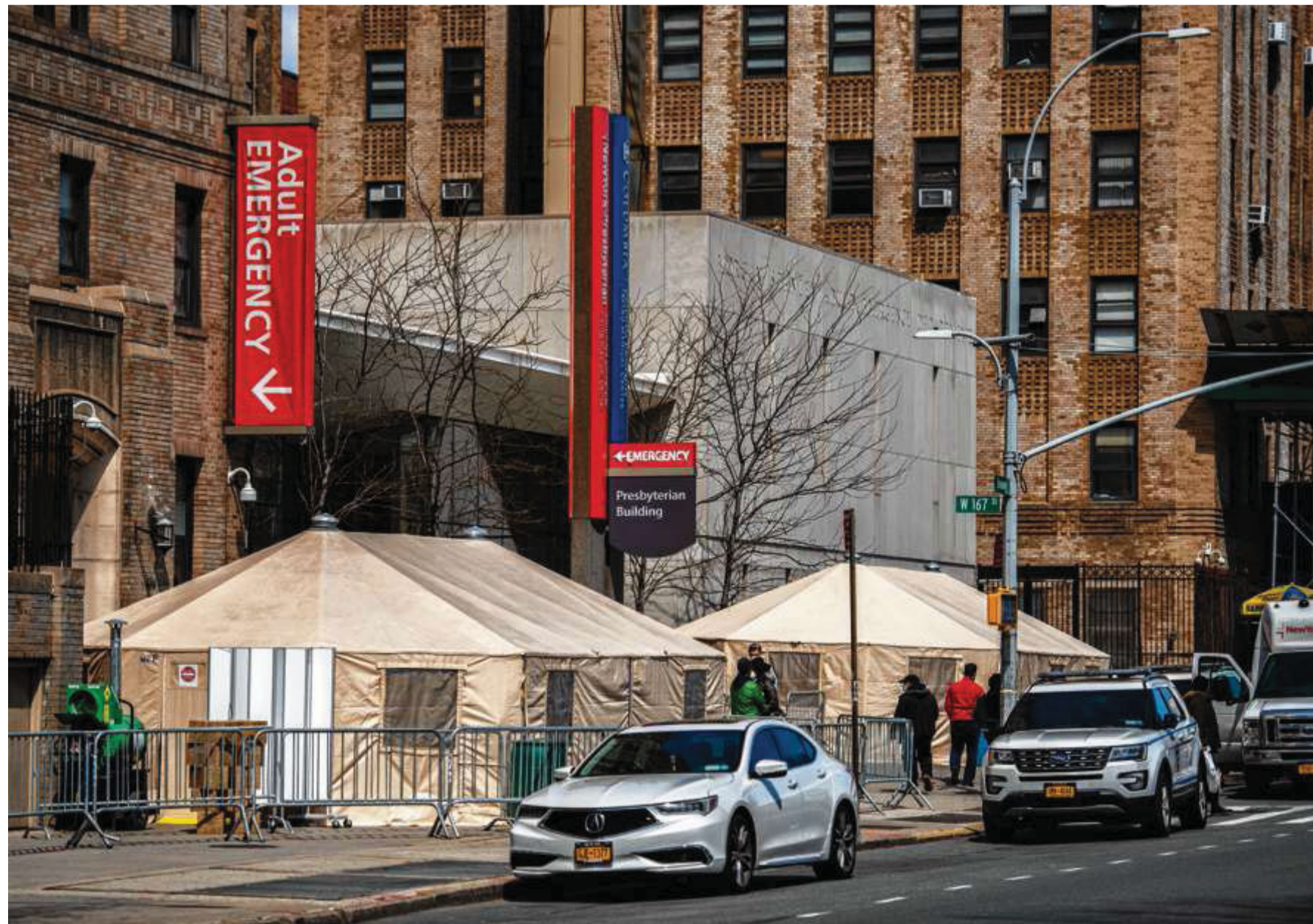
would not have to endure labor alone or remain isolated from their partners and families.

Hospitals had enacted the policies to protect maternity patients at a time when very little was — or is still — known about how the disease affects

an expectant mother or her unborn child. Doctors and other health care practitioners were conflicted about the policy because they must balance the perspectives of both patients and clinicians who are also vulnerable.

"Labor and delivery is a time of

happiness and joy and families," said Phillips, who is also affiliated with Lenox Hill Hospital, which did not adopt the strict no-visitor rule. "But, we had another doctor test positive . . . So leadership is having to make very painful and hard decisions to keep



Triage tents outside NewYork-Presbyterian/Columbia University Irving Medical Center in New York in April.

ANDREW SENG/THE NEW YORK TIMES

means simply opening the window. Limit your news consumption. Stay connected to the people who support you best. Get help if you are struggling.

Sharon Dekel, assistant professor of psychology at Harvard Medical School, whose lab at Massachusetts General Hospital is focused on maternal mental health and traumatic childbirth, began thinking through how to measure the pandemic's effects.

"The question was: How are mothers managing the transition

into the postpartum period, when you have this kind of unpredictable, unpredicted stressor at a very kind of large scale?" she said.

Dekel has collected stories from hundreds of women about their childbirth experiences and their postpartum mental state. She and her colleagues took a questionnaire from that work and adapted it for the COVID-19 era, asking about how hospital policies affected birth experiences and what caring for a newborn is like while social distancing.

More than 1,700 women have enrolled in that study so far, and Dekel plans to launch versions in Spanish, Arabic, Chinese and other languages soon. One factor Dekel will look for in their responses is signs of growth.

Her prior work examined post-traumatic growth in people who experienced war, captivity, and disaster, including the Sept. 11 attacks on the World Trade Center. Post-traumatic growth unfolds over time, she said, and in many ways it is a product of distress,

which can shake a person's worldview and make them reevaluate their choices.

Someone who has just had a baby may be struggling and mourning the childbirth or postpartum experience they thought they would have. But over time, they may recognize their own strength. The story becomes, "you did it, and you were still taking care of your baby," Dekel said.

Mitchell said she and her husband, who also care for her little brother, now 14, are trying to fill

their house with as much joy as possible. She's celebrating the little changes she sees in herself and in Everly, like when Mitchell lets out her warm, bubbling laughter, and Everly seems to startle in recognition.

"We're learning each other," she said.

Chelsea Conaboy is a writer and editor who lives in Maine. She is writing a book about the maternal brain, forthcoming from Henry Holt & Co.



PAT GREENHOUSE/GLOBE STAFF

Alice Owolabi Mitchell had a plan for the birth of her daughter, Everly Rose. But she didn't expect to give birth during a pandemic. Now, her whole family is adjusting.

people safe. And it's not just us. It's the family down the hall who also just had a new baby."

Sascha Conterelli, president of the New York State Association of Licensed Midwives (NYSALM), said that the pandemic will exacerbate health disparities in our country.

"We can expect to see an increased rate of C-sections and operative deliveries. . . . We can expect to see a much higher rate of morbidity," she said. "I pray to God not an increase in mortality."

NYSALM is in talks with other health care providers and hospitals about creating designated birthing centers during the coronavirus crisis, including designating clinics or specific wings separate from other general practice areas. The goal is to keep healthy laboring women from interacting with a general hospital population.

At many hospitals, including in

'To lose the people in our lives who would serve as our advocates — there's a potential additional risk to those women in the hospital.'

DR. KAMEELAH PHILLIPSOB-GYN
at *Calla Women's Health in Manhattan*

Massachusetts, other precautions, such as requiring all hospital visitors to wear masks, and testing laboring women for COVID-19, are also being taken.

Public health researchers are also working to bring awareness about the impact of the virus to marginalized populations because of factors outside the hospital that affect their health. Marginalized women often work in low-wage occupations with increased exposure risk, such as service industries. Even if they seek health services, they may live in areas with limited access to those services or face barriers to care that could be exacerbated by the pandemic.

"Right now the biggest risk for mothers and babies in marginalized communities may be from the health systems reducing essential services, or

widespread panic about hospital visitation policies," said Betty Bekemier, the director of the Northwest Center for Public Health Practice at the University of Washington School of Public Health and a professor at the University of Washington School of Nursing. "My point is: All of these things, if they were bad [before], they're going to be worse [now] because we're not paying attention to it [because] . . . we have a crisis on our hands. All these things that we do, and try to do for marginalized populations are basically on hold. And yet those needs continue."

In the meantime, women are also assessing whether home birth is an option. "We need to destigmatize midwifery and home birth for those for whom it is appropriate," Conterelli said. "Midwives have standards that we adhere to. We work within the framework of the medical establishment. We are partners with doctors and nurses."

She added, "There's absolutely no reason why, unless they choose it, a healthy woman should have to labor in a hospital."

Even during a pandemic, public health and health care officials need to think critically about how to ensure that pregnant women get the information they need to seek care at the right time and place. This is particularly urgent for pregnant women of color, and those in marginalized populations, to ensure they aren't being left behind.

"In the best of times we know that Black mothers don't always get the best treatment and that their concerns aren't always listened to and their babies don't always have the best outcomes," said Tamara Winfrey Harris, author of "Sisters are Alright: Changing the Broken Narratives of Black Women in America" and vice president of Community Leadership and Effective Philanthropy at the Central Indiana Community Foundation, which is responding to the coronavirus outbreak locally. "In a society where Black lives don't matter, what happens to the most vulnerable of us in a health crisis?"

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VACCINE

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produce antibodies that make later coronavirus infection more likely, as has rarely happened with other experimental vaccines. But I am 29 years old and in good health. Even if my odds of catching COVID-19 go up, I would likely have mild illness and then fully recover.

Which brings me to challenge studies.

The idea of exposing volunteers to an infectious agent to definitively assess whether a vaccine is working is not new. It has been done in the United States for influenza and typhoid fever, yielding approved vaccines, and across Africa for malaria, though that parasitic infection can be managed with known antibiotics, which lowers risk for volunteers. All told, more than 6,500 people have participated in challenge studies for diseases other than COVID-19.

Not all challenge studies are ethically equivalent. For each, potential benefit must be weighed against potential harm. A planned challenge study for Zika virus was called off in 2018 in part over objections from a panel of bioethicists who found "substantial uncertainty" about the risks to would-be volunteers. These

concerns extended to those in the community where such a trial might take place. Zika's spread is difficult to detect and is linked with birth defects. Can a challenge study be ethical if it puts additional children at risk?

There is a lot we do not know about SARS-CoV-2, the virus behind COVID-19. A challenge study would clearly need to omit pregnant women and people most likely to die from infection. Volunteers would have to be kept in strict isolation, potentially for weeks or months. Experts estimate that 100 healthy subjects would be needed.

A growing number of bioethicists argue that we should seriously consider COVID-19 challenge studies. The public health and economic burden of the pandemic is extraordinary. Even one day shaved off vaccine testing could save many lives.

I would agree to participate in such a challenge trial if three conditions were met.

First, the Food and Drug Administration would have to sign off. This would signify both that the conditions for preparing and handling the virus are up to par with other approved challenge studies and that the country's chief regulatory body is willing to accept the results.

Second, it would need to be clear that no matter the outcome, the experiment would have value. If all the subjects in a challenge avoid infection, then clearly the vaccine should be fast-tracked. If they all get sick, it should be scrapped. But what if protection is only partial, as is the case with many vaccines? Would traditional testing of the vaccine resume? If so, what really would have been gained by the challenge trial? The answers to these questions would need to be decided ahead of time.

Third, I would need to know that I had a good chance of avoiding infection altogether. As of today, I am making no assumption that I am immune. My experimental vaccine, made by Cambridge-based Moderna, may not produce any effect. But if laboratory testing could indicate before a challenge trial that my immune system is already producing neutralizing antibodies as a result of the vaccination, I would consider the personal risk low enough. I know lab testing isn't foolproof, but it would at least put my mind at ease.

You might disagree with the moral calculus I've laid out. To some, human challenge trials are clearly too dangerous, making informed consent impossible. To others, the need to act swiftly — even if it means that exposing 100 volunteers to the coronavirus leads to 100 more COVID-19 cases — makes human challenge studies the obvious choice. In the end, it's a judgment call.

Though no human challenge studies are being planned at the moment, the organization 1DaySooner has begun soliciting volunteers online. More than 10,000 people have said that if enough precautions were in place, they would be willing to sign up — including me.

Ian Haydon is a press officer at the University of Washington in Seattle. Follow him on Twitter @ichaydon.



IAN HAYDON

The second shot of the author's experimental vaccine.