FLORIDA STATE UNIVERSITY

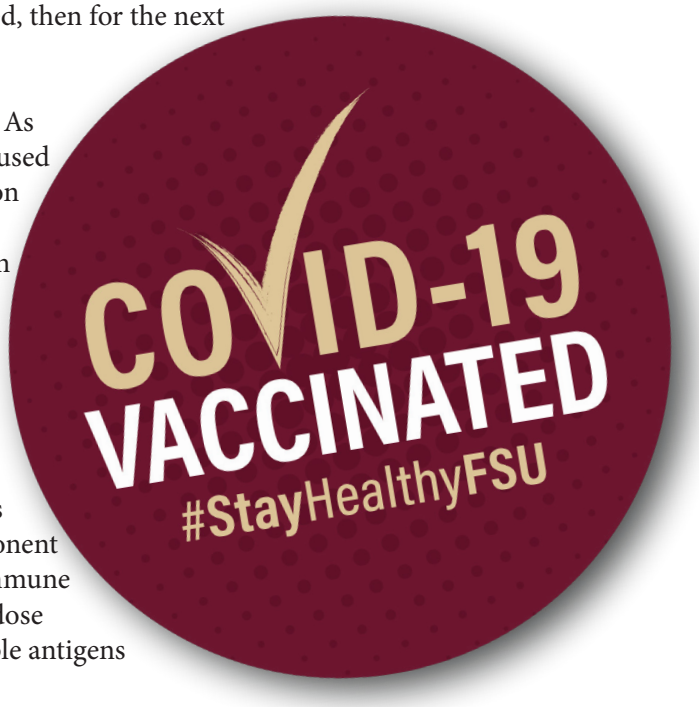
NEWSLETTER
INSTITUTE FOR SUCCESSFUL LONGEVITY

So, You've Gotten Your Shot: Now What?

You've gotten the vaccine ... can life now return to normal? First, there is a lot to consider

By Neil Charness, Ph.D.
Director
Institute for Successful Longevity

More and more people 65 and older are fortunate to be receiving their first doses of Covid-19 vaccine with more doses hopefully released soon for the rest of the population. If you are one of the lucky pioneers with the first approved vaccines, congratulations on getting a dose, or doses, as this is the first step down a long road toward rolling back the pandemic. You should be maximally protected a few weeks after getting vaccinated, then for the next few months at the very least.



Having received your vaccine, can you now go back to "normal"? As much as I would like to say yes, go out and enjoy life the way you used to, I think the data are still uncertain about the degree of protection — your risk of becoming infected if you breathe in novel coronavirus particles (SARS-Cov2) — and the length of protection — how long your ability to fight off SARS-Cov2 will last.

The two-dosage Pfizer-BioNTech and Moderna shots are messenger RNA (mRNA) vaccines. They deliver instructions (messenger RNA) into your cells, ordering them to make a spike protein from the SARS-Cov2 virus. By getting you to produce a harmless part of the virus, not the whole virus, the vaccine primes your immune system to produce antibodies specific to that component of the virus particle, so that when the real virus shows up, your immune system recognizes and neutralizes it. Johnson & Johnson's single-dose vaccine is an adenovirus-based vaccine that delivers non-replicable antigens from coronavirus into cells via the virus.

First, let me address the degree of immediate protection. Recall that the Food and Drug Administration (FDA) provided emergency use authorization for these vaccines, and as a result we do not have the typical lengthy clinical trials to assess the duration of protection after dosing someone (once or twice). These trials are continuing, so we may eventually have more information. Current efficacy estimates extend out to a few months following the second dose/shot.

Although the immediate efficacy figures sound terrific, such as 93 percent protection for Moderna https://www.nejm.org/doi/full/10.1056/NEJMoa2035389 and 95 percent protection for Pfizer-BioNTech https://www.nejm.org/doi/full/10.1056/NEJMoa2034577, they vary across subgroups. For instance, I received a dose of Moderna, and if you look up efficacy for just those who were age 65+, it is estimated to be 86 percent, less than the 93 percent cited for the clinical trial sample as a whole. To put it another way, if 100 vaccinated seniors were exposed to a sufficient dose of the virus, 14 might be expected to contract the disease. The silver lining, based on the data about severe cases, is that vaccinated seniors would most likely develop a much less severe case, avoiding hospitalization or death. The same appears to be true for the Johnson & Johnson vaccine, with 67 percent efficacy for contracting the disease and 85 percent protective against severe disease.

Now, interpreting the data from the trial is complicated by the extent to which participants were exposed and, most importantly, the intensity of the viral dose they encountered. For instance, walking through a Covid-19 ward in a hospital is likely to expose you to a greater concentration of virus than walking in a park with only a few people around. We can assume that because this was a large randomized controlled trial that lifestyle differences in exposure following inoculation were not different between the placebo and the vaccine groups. However, a careful examination of the published data indicates that seniors in the placebo group were much more careful than their younger placebo group counterparts, contracting the disease

at much lower rates.

The second issue these trials could not address was length of effectiveness for the vaccine because of the short duration of each trial before emergency approval was granted. We will have more definitive data about the duration of protection over the coming months. If we quickly achieve herd immunity, the holy grail for ending the pandemic, we may have difficulty knowing how effective the vaccines are and for how long. It stands to reason that when the positivity rate in the community is very low, a wonderful problem we would all love to have happen, no one in either the placebo or the vaccine condition will contract the disease.

Many vaccines seem to confer near lifetime protection, for instance, measles vaccine. That is, lifetime immunity means that once your immune system is trained to recognize the virus it always will manufacture sufficient antibodies to stop a new infection in its tracks. A caveat is that the immune response suffers from diminished efficiency in old age, a reason why seniors are sometimes given stronger doses of vaccine than other age groups. Other vaccines, like our annual influenza shots, may work for the current season only, partly because the rate of mutation is so high in flu viruses.

Neil Charness, director of the Institute for Successful Longevity, gets his first Moderna shot at Florida State University.

Another unknown is whether you could still become contagious after inoculation when being exposed to the virus. That is, would you manufacture sufficient Covid-19 virus particles to infect someone else before your own immune system could snuff out the infection? The other risk for those vaccinated with these early vaccines is that one or more mutant variants will begin to replace the original SARS-Cov 2 virus and potentially escape from the clutches of the current vaccines as some fear may be happening with the so-called South African variant. This form of "hide and seek" between viruses and our immune systems has been going on for millennia, and we are fortunate that our immune system has multiple weapons to fight viruses, bacteria, fungi, and other invaders.

So, what should we do a few weeks after getting our vaccinations?

Be cautious and do not drop the current good habits you have already adopted, such as masking, social distancing, avoiding crowds, and frequent hand washing. (Here's what the CDC recommends: https://www.cdc.gov/coronavirus/2019-ncov/your-health/need-to-know.html.) But, you may consider resuming activities that you dropped, such as shopping in non-crowded stores, eating in restaurants either outside with patio seating or inside with adequately spaced tables.

Each of us has different risk thresholds, and you probably know your tolerance for risk. I'm a cautious type myself. Resumption of normal activities and a mask-less approach to living seems to be some time away, likely by 2022, following achievement of herd immunity associated with widespread vaccination rates and the resulting decline to low infection rates in the community.

In the interim, encourage your friends, family, and neighbors to get their vaccinations, assuming that they are good candidates based on CDC guidelines. The sooner we can reach herd immunity, the sooner we can return to a pre-Covid 19 lifestyle. ■

Judy Delp of College of Medicine develops splint to aid older adults with peripheral arterial disease

A Faculty Affiliate of the Institute for Successful Longevity is developing a device to provide an easy to use home treatment for older adults suffering from peripheral arterial disease, a debilitating condition that limits mobility and can lead to amputation of limbs.

Judy Delp, Ph.D., professor of Biomedical Sciences in Florida State University's College of Medicine, is leading a team that includes Faculty Affiliates Emily Pritchard, Ph.D., also in the Department of Biomedical Sciences, and Lynn Panton, Ph.D., professor of Nutrition, Food and Exercise Sciences in the College of Human Sciences.

Delp's work is supported in part by a grant from the Institute for Successful Longevity. She also has received support from the FSU Office of Research's GAP Commercialization Investment Program.

"Peripheral arterial disease is very difficult to treat," Delp said, "and there really are not any great pharmacological treatments." The prototype she has under development, a therapeutic splint, has potential to fill this treatment gap and help patients restore some use of their legs.

Judy Delp, Ph.D., is professor of Biomedical Sciences in FSU's College of Medicine and a Faculty Affiliate of the Institute for Successful Longevity.

Patients with peripheral arterial disease have serious atherosclerosis in the large blood vessels of their legs, caused by a buildup of fatty plaque in the arteries. This restricts blood flow to the lower legs, especially when they are walking. This lack of adequate blood flow causes pain in the legs, and so many patients choose to limit walking. This sedentary behavior makes the affliction worse.

Delp's goal is to provide physicians with a way to treat patients who have the worst conditions, those who can walk only short distances due to the pain. "What we hopefully are trying to do is give these patients something that we think might effectively start to help improve the function of their leg muscles and the function of the vasculature with their leg muscles and that they can do at home," she said.

The device under development is a modified splint for the foot. The modifications allow patients to use a hand pump to have the splint bend their foot, which stretches the muscles in the patient's lower leg. This stretching is critically important. "When the muscle is stretched," Delp said, "it actually creates a little bit of a further decrease in blood flow to that muscle, but that's actually a very strong signal to the muscle to adapt."

This happens normally in muscles when someone exercises, she said. "When you first start moving a muscle and contacting a muscle, the blood flow first goes down a little bit and then that sends sort of a signal to say, 'Hey, I'm not getting quite as much oxygen as I need here,'" she explained. "So then, in response, the blood vessels dilate, and you increase the blood flow in that area."

Her device is designed to replicate these conditions so that the leg muscles send out a "need more oxygen" alert to trigger greater flow through the blood vessels. "We are creating a signal of reduced blood flow, also called ischemia," Delp said.

"There's good evidence in the literature that shows that if you create brief ischemia you stimulate a lot of things that improve muscle and blood flow function if you do that for a brief period of time. So that's the premise behind what we're trying to do."

The design by Delp's team is built on a splint available now to patients. That version, however, can be difficult to operate, as it requires patients to put on the splint, lie flat and then connect and tighten some straps to bend the foot. For many older adults with peripheral arterial disease, all this is hard to do. Delp and her researchers redesigned the splint to use an inflation device instead of straps. The modifications make it much easier to use.

The protype therapeutic splint under development by Dr. Judy Delp and her research team.

"They can pump this and it causes the rest of the movement by pumping, rather than by adjusting the straps, so it makes it very easy for them," Delp said. "It's a very clever solution. It's really easy for people to do this by themselves, so they don't need any help from a caregiver."

Delp and her team are pursuing a utility patent on their use of the modified splint. "That's moving forward pretty well," she said. Once a patent is in hand, she said, their design could become commercially available.

"The big thing we are trying to do now, with the work we're doing with the Institute for Successful Longevity, is to gather more preliminary data," Delp said. "I'm hoping to eventually get a much larger clinical trial funded by the National Institutes of Health so that we can do this in much larger numbers and so that hopefully we can eventually attract attention from investors."

The goal of the research now is to see whether use of their modified splint by patients leads to their walking more. "Hopefully we're going to show that quality of life is improved and maybe even trips to the emergency room and hospitalization events are reduced by people using this," Delp said.

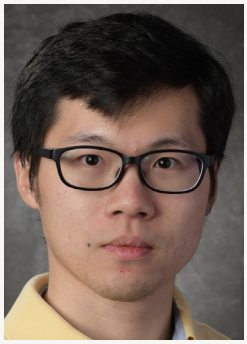
Delp is hopeful that her research and her team's design modifications to the therapeutic splint can have important health effects for patients. "What I know about advanced peripheral arterial disease is it reduces your lifespan — in many cases, people die," Delp said. "So, this could conceivably not only improve the quality of their lives but actually extend their lives as well.... If we can prevent the progression of this disease and some of the negative effects of this disease by having patients do this and also promoting a little bit more walking and a little bit more physical activity, then I think it could have some really significant health benefits for these folks." ■

Watch Dr. Delp on 'FSU Headlines' and catch her ISL Brown Bag talk

Dr. Delp and her work on a prototype therapeutic splint was featured in an edition of "FSU Headlines." You can watch the clip at https://youtu.be/3cdTgNAvHIY.

In February, Dr. Delp spoke on "The Impact of Muscle Stretch Training on Mobility in Older Adults" as part of ISL's Brown Bag Series. You can catch her presentation at https://youtu.be/y8A3ni-YtiQ.



From left: Dr. Ravinder Nagpal, Dr. Laurie Abbott, Dr. Michael Duncan, Dr. Shenghao Zhang

Four FSU researchers join Institute for Successful Longevity

Four researchers have recently joined the Institute for Successful Longevity as Faculty Affiliates.

Dr. Ravinder Nagpal is an assistant professor of Nutrition, Food & Exercise Sciences in the College of Human Sciences. He received his Ph.D. in Food & Dairy Microbiology from National Dairy Research Institute in Haryana, India, and undertook postdoctoral trainings in gut microbiology from Juntendo School of Medicine in Tokyo and Wake Forest School of Medicine in Winston-Salem, N.C. His research spans around understanding the host-associated microbiome and the dynamics of diet-gut-brain interface at the extremes of aging and in aging-associated metabolic and cognitive health.

Dr. Nagpal's lab aims to discover novel signatures of gut dysbiosis in host metabolic diseases including obesity and Type-2 diabetes and neuropsychiatric disorders including stress, anxiety and depression, with an aim to explore how microbiome modulation with specific nutritional interventions including dietary elements, micronutrients, probiotics and prebiotics could ameliorate the pathology of these aging-associated disorders.

Dr. Laurie Abbott is an assistant professor in the College of Nursing. She earned her Ph.D. from Florida Atlantic University, and her research program involves health promotion and prevention of chronic disease presentation, progression, and exacerbation.

As a board-certified advanced public health nurse, Dr. Abbott has conducted two cluster randomized trials that tested culturally relevant evidence-based health promotion and disease risk reduction interventions in rural community settings. She has also explored protective and contributory factors of disease including acute and chronic stress, social support, and resilience.

Dr. Michael Duncan is an associate professor in the Department of Urban and Regional Planning in the College of Social Sciences & Public Policy.

He received his Ph.D. from the University of California, Berkeley. His research and teaching focus on sustainable transportation planning that mitigates environmental impacts and improves social equity. This includes research that focuses on providing better transportation options for older adults.

Dr. Shenghao Zhang is a postdoctoral researcher in the Department of Psychology. Zhang, who received his Ph.D. from North Carolina State University in 2020, is interested in how older adults maintain high performance on cognitively complex tasks in everyday life. His research focuses on individual difference factors that influence these performances and interventions that help to maintain those performances.

The Institute for Successful Longevity has more than 80 Faculty Affiliates conducting research in varied fields across the Florida State University campus. ■