MUSC CATALYST news

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*Photo by Sarah Pack*

**Maverick Bily cringes in the arms of his mother, Natalie, as Ciera Reed administers his COVID-19 vaccine.**

# Little kids finally get their shot

By Bryce Donovan

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June 21 was a good day for Natalie Bily. As for her son, Maverick — eh, maybe not so much.

Maverick turns 2 years old later this year, which meant that up until mid-June, he wasn't eligible to get the COVID-19 vaccine. But on June 18, the Centers for Disease Control and Prevention signed off on vaccinations for children under the age of 5, clearing the way for the blue-–boy's date with the needle.

"He usually gets over shots pretty quickly, but I'm sure he won't be happy when it happens," Bily said. "I'm not really worried though ... he's a pretty chill kid."

Maverick was the first child in the newly eligible age range of 6 months to under 5 years old to be vaccinated with Pfizer/BioNTech's COVID-19 vaccine at MUSC. And to be honest, he probably handled it better than most adults.

Ciera Reed, a certified medical assistant, played the unenviable role of the villain, quickly plunging the needle in the boy's leg, unlike the upper arm for anyone over the age of 5. That quick act turned Maverick's smile upside down — but only temporarily. Because, after all, what villain worth her salt doesn't have colorful stickers to give away?

Bily said that she and her husband had been eagerly following the news, wanting to get their son vaccinated as soon as it was deemed safe, since he's about to go off to preschool for the first time.

*See* **Shot** *on page 2*

# Subvariants raise doubts about previously predicted dip in COVID cases

By Helen Adams

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The fast-spreading Omicron subvariants BA.4 and BA.5 could jeopardize a previously predicted decline in COVID cases for the Charleston Tri-county area. Michael Sweat, Ph.D., leads MUSC's COVID-19 Epidemiology Intelligence Project. "We could see some big numbers," he said.

This week's update from his team found that reported COVID cases rose 9% for the Charleston Tri-county area. That's 36 cases per day per 100,000 people. Sweat said the actual number of cases is likely much higher. Many aren't included in the update because people are testing at home, and their results aren't reported to the state.

The increase comes as BA.4 and BA.5 spread across the country, raising the possibility of a sustained surge. "The vast majority of people haven't had a vaccination in over a year and haven't been boosted. The big fear is that we will suddenly go into a massive surge as the months go forward. And there'll be so many cases that it will affect the economy."

That's the big fear — but Sweat said it may not be realized in the immediate future, if at all. "Things often go slower than you expect. You think, 'Oh, we're really primed for something.' But it often kind of goes slowly. It could be we're going to chug along at this rate over summer and even drop. And then all of a sudden, we're going to see some big outbreak happening."

The threat of an outbreak is in part due to how

*See* **Rise** *on page 2*

## Shot

*Continued from Page One*

"We just wanted him to be as protected as possible," she said, as Maverick sucked on an orange Matchbox car, his yellow badge of courage peeking out from just below his shorts. "Plus, this will allow us to do more traveling without feeling like we're putting him at risk."

On June 18, the U.S. Food and Drug Administration expanded the emergency use authorizations for the Pfizer vaccine to include children 6 months through 4 years, having formerly been available for use in individuals 5 years and older, and Moderna's to include children 6 months through 17 years, which previously only had been authorized for use in adults 18 and older.

That's nearly 17 million kids who are now eligible for COVID-19 vaccines.

The vaccine itself is no different than what adults or younger children get — the main difference being that it's a lower dosage, and it's mixed with saline. Children who receive the Pfizer vaccine will get three doses — the second coming 3 to 8 weeks after the first, and the third coming two months after the second. Moderna will include two doses, but, to date, MUSC has not received a shipment.

Ali Worthy, director of administrative operations for MUSC Health's pandemic response team, said the team wasn't sure what to expect right out of the gate as far as patient volume went. Her team received the vaccine the morning of June 21 and was administering it not long after lunch on the same day.

"We're ready no matter what, but we figure the longer we're up and running,

*Photo by Sarah Pack*

**The Pfizer/BioNTech pediatric vaccine comes in a smaller vial and needs to be mixed with saline.**

the more people will hear about it and the more we'll start to see," she said from inside MUSC Health's Lockwood Boulevard vaccination site.

Going forward, the vaccine will be available at both the Lockwood and Rutledge Tower locations, Monday through Saturday from 9 a.m. to 3 p.m. Parents interested in getting their children vaccinated can sign up for a time slot using their MyChart account or, if they don't have one, by simply calling 843-876-7227.

Worthy said appointments are preferred, but they will still take walk-up patients.

"We want to make this as easy as possible on these parents," she said. "Making an informed decision is hard enough, getting the vaccine shouldn't be."

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## Rise

*Continued from Page One*

good the subvariants are at getting around antibodies from previous infections. "If you had Omicron when most people did, you could get BA.4 or BA.5. It will not protect you from getting infected."

Neither will the way a lot of us are living right now, Sweat said. "We're now at a point where the majority of people, by far, don't take any precautions. They just live their life like they did before COVID."

But Sweat said there's a key factor in our favor, at least for now. The numbers of hospitalizations and deaths as a proportion of the number of cases are at record lows for the pandemic. "That's a byproduct of so many people having been infected, and then the fact that a lot of people got vaccinated. But there's a continued worry about sort of waning immunity."

**Sweat**

MUSC Health had about 80 people hospitalized with COVID systemwide in the most recent update, a number that's rising but manageable, Sweat said.

But Sweat, a professor in the College of Medicine at MUSC, an adjunct professor at the Johns Hopkins Bloomberg School of Medicine and a former research scientist with the Centers for Disease Control and Prevention, is also tracking another concern that he wants people to be aware of. It was the focus of a big study by the Department of Veterans Affairs.

VA researchers followed about 5 million people who have had COVID. "They're looking at repeated infections and what happens to people as you get repeatedly infected. And the takeaway was the more you get infected, the worse the outcomes start to become," Sweat said.

"A lot of people think, 'Oh, if I get it twice, I'm even more protected.' But there's a cumulative impact. Your chances of ending up in the hospital go up five to seven times with a third infection. The risk of a cardiovascular side effect goes up three or four five times. It's not good to think that COVID is always just a minor thing. The risk gets amplified over and over."

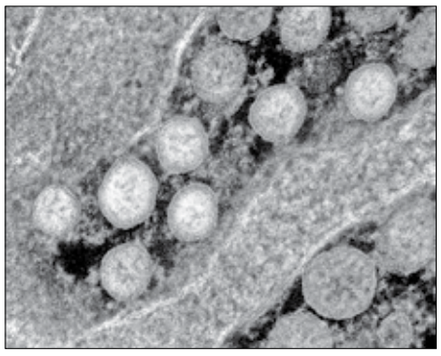

*Photo by National Institute of Allergy & Infectious Diseases*

**SARS-CoV-2 virus particles (center) isolated from a patient.**

Despite that risk, Sweat said living with the threat of COVID as the virus continues to mutate doesn't have to mean all or nothing when it comes to taking precautions. "I do think the mindset is that it's binary. Either you're living in a cave or you're just living your life. But I think it's really not. It's a continuum. If you're thoughtful, you can still live a pretty normal life. You may give up a few things. Like maybe for me, it's eating in restaurants," Sweat said.

"Thinking that you're either kind of a nut and always wearing a mask and never touching anybody and never doing anything, or you're just not, that's not how it has to be. There is the potential for mitigating it and still living a normal life. And I feel like that message doesn't get out to people."

It's a message that may maintain its importance as the virus continues to mutate. "Every time these variants come along, we get another wave. It does appear to me that they're coming more frequently, by the way - the variants. The time from Alpha to Delta was almost a year. Then Delta to Omicron was nine months. Now we've got this whole Omicron lineage. It's coming faster. We're going to see another wave of infections. How quickly that'll happen, I don't know."

# Preventing skin cancer: Advice for before, and after, sun damage occurs

By Josh Birch

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It's estimated that 20% of the U.S. population will develop skin cancer at least once in their lifetimes. What if there were a way to prevent certain skin cancers even after sun damage had occurred?

Specialists at MUSC Hollings Cancer Center want to educate patients about the options available to them.

Joni Mazza, M.D., an MUSC Health dermatologist and skin cancer specialist, said catching skin cancers early, or before they form, is important. "We are seeing more and more people being diagnosed with skin cancer at a young age," she said. "We don't know if that is because of tanning bed use or increased exposure to sunlight, but it is definitely a concern."

The best ways to prevent skin cancer are to use the correct sunscreen, wear protective layers like a hat and to limit your exposure to sunlight. Living in the Lowcountry, Mazza understands outdoor activities are a way of life. Even after sun damage has occurred, she said there are nonsurgical options available to patients to help to prevent certain types of skin cancer from forming.

"One of the treatments that a lot of people don't know much about is called photodynamic therapy," she said. "It involves the use of a topical solution that is activated by light, which causes it to target and kill precancerous cells."

Photodynamic therapy (PDT) can be an especially important tool for patients at a high risk for skin cancer or those with a direct or family history of having skin cancer. The treatment is approved by the Food and Drug Administration for use on the face and scalp. Patients have a liquid treatment applied to the area of concern and then wait between 20 minutes and up to two hours before going under a blue light machine.

"Precancerous cells lose some of the properties that a normal skin cell has," Mazza said. "The mixture used during PDT targets these abnormal cells and gets absorbed. Once the liquid is exposed to light, it is activated and the precancerous cells that have absorbed it are killed."

Mazza said the precancerous cells targeted in the treatment could turn into squamous cell carcinoma if left untreated. Squamous cell skin cancers can appear as a firm, red bump or a flat sore that feels scaly. Mazza said these, unlike typical sores, will not go away on their own.

Squamous cell and basal cell are the two most common types of cancer. The deadliest form of cancer is melanoma, which is the third most common type of skin cancer diagnosed.

"Basal and squamous cell skin cancers tend to be less aggressive than melanoma, but they can still cause a lot of local tissue damage that can cause disfiguration," she said. "Just because they are less aggressive doesn't mean they are less serious."

In addition to PDT, patients at high risk of skin cancer can use topical chemotherapy agents like fluorouracil cream or imiquimod creams, which also are absorbed by abnormal skin cells and kill them.

### Multidisciplinary approach to skin cancer

Mazza said Hollings and MUSC Health offer patients what few others in the state can – a team consisting of every specialist needed to diagnose and treat skin cancer in a single location. "We have dermatologists to check patients for skin cancers. We also have surgeons and specialists to treat skin cancer no matter the type or stage."

Mohs surgery can be used to treat basal and squamous cell and

*See* **Skin** *on page 9*

*President's Blog* **Cut to the Chase**

# Unsung heroes

By David J. Cole

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On a recent walk through campus after a case in the OR, I had the opportunity to stop and talk with a few of our MUSC Engineering and Facilities team members working on campus. One of these individuals said something that stuck with me: 'Dr. Cole, I enjoy reading your emails and newsletters and learning about all that is going on – we are very proud to be a part of MUSC. Nothing against our awesome care providers, researchers and educators, but there's a lot of people whose work is just as important that never get recognized. Without our work, there is no awesome. Could you shine the light on us occasionally?'

In the days following that conversation, I started thinking about what he had said, how that connected to OneMUSC, who those people are within our MUSC family and what I could personally do to shine the light on them. So, here goes.

First, to those team members I chatted with that day, a heartfelt 'thank you' for your work (and candor).

That conversation reminded me of a story that was recounted to me by a senior staff member when I was a fellow at the NIH learning the fundamentals of research. As the story went, there apparently was a very well-known and senior research scientist who had a very large and productive research team doing groundbreaking research. One day a group visited his laboratory to interview him about his work. Once at the lab, they saw a lot of activity and ongoing work by many technicians, post-docs and students, but the research professor was nowhere to be found. Eventually, he was located in a remote corner of the lab, busy cleaning lab glassware at the sink. The reporter was astounded that this luminary would be 'hiding' in the corner of the lab doing work that could have been assigned to any number of students or support personnel. When asked why he was wasting his time washing glassware rather than directing the experiments, he replied, 'I know from too many years of experience that if the glassware is dirty, the whole experiment and results will be worthless. I have taught my team well and am now focusing on assuring success with the most critical remaining part of the experiment – clean glassware.' Oftentimes, the most important dimensions of a task are the not the most obvious (or glamorous).

We talk a lot about teams and patient focus at MUSC – and rightly so. But

*See* **Chase** *on page 7*

# Restoring vision by recharging cells' batteries

By Kimberly McGhee

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*Photo Provided*

**Team members include Charles Holjencin, left to right, Dr. Andrew Jakymiw, Dr. Barb Rohrer and Kyrie Wilson join Drs. Jesse Goodwin, Lori McMahon and Lisa Saladin.**

In May, an interdisciplinary MUSC research team won an inaugural Blue Sky Award, which provided $100,000 in funding for its project to restore vision in patients with age-related macular degeneration (AMD) by recharging the eye cells' batteries. The Blue Sky Award was created to encourage high–risk, high–reward research that has the potential to make a profound impact on patient care but is unlikely to attract traditional funding due to the difficulties of the projects.

The team is led by Baerbel Rohrer, Ph.D., of the College of Medicine, and Andrew Jakymiw, Ph.D., of the College of Dental Medicine, and included their graduate students Kyrie Wilson and Charles Holjencin. Rohrer is the Endowed Chair of Gene and Pharmaceutical Treatment of Retinal Degenerative Disease. Jakymiw is an expert in developing cell–penetrating peptides for drug delivery.

Together, they intend to tackle a disease that affects more than 10 million Americans: AMD. The disease causes vision to worsen slowly and eventually leads to blindness. Current therapies are inadequate, as they can only lessen the symptoms and aim, at best, to postpone the loss of vision. Existing therapies also require patients to return again and again for treatment.

Team members weren't satisfied with just slowing down the disease. They wanted to develop a curative therapy that could protect and even restore vision.

"We knew that if we could treat the disease at the root cause, and not just the symptoms, that would be a huge step forward in regenerative medicine," said Wilson.

At its root, AMD is caused by an insufficient supply of energy to eye cells.

"Every single activity of a cell requires energy," said Rohrer. "Once you lose that energy, you will lose proper function of the cells. That will eventually lead to disease and vision loss."

Mitochondria are the batteries that supply energy to cells, and they have their own DNA — mitochondrial DNA or mtDNA — to help them to do that. When their DNA becomes damaged, mitochondria cease to function properly and cannot provide cells with the energy they need.

Over time or because of stress, errors can be introduced into mtDNA as it copies itself. Rohrer likens the process to the game of "telephone." In the game, a person whispers a word into the ear of another person. That person then whispers the word into the ear of the next person and so on down the line.

"Whatever ends up after five people is probably not the word that you picked to start with," said Rohrer. "And it's pretty much the same thing with copying mtDNA."

Instead of trying to target and fix many copy errors, Rohrer and Wilson wondered whether a better approach would be to prevent the mistakes in the first place. They could do so by providing the mitochondria a new blueprint, or template, for copying their DNA, essentially "resetting" the word in the telephone game.

"You need a new template," said Wilson. "You need to go back and have the perfect words again and know what you're trying to say."

Rohrer and Wilson realized that they would need a vehicle to deliver the template to the mitochondria. It would have to be able to dodge the body's immune system and be accepted by the mitochondria. They reached out to Jakymiw, who had expertise with small nucleic acid-based drug delivery.

"We had actually never delivered anything that large to that point," said Jakymiw. "I mean we're talking about like 16 kilobases, which is a pretty big molecule."

Although the two laboratories had had initial discussions, it was the announcement of the Blue Sky Award that solidified the collaboration and jump started the project.

"Some outcomes of the preliminary work that has evolved over the last few months suggest that we can potentially deliver this large amount of DNA and target it efficiently enough to restore vision for individuals affected by AMD," continued Jakymiw.

Jakymiw and Holjencin decorate the surface of the mtDNA with small proteins that carry instructions for the cells and mitochondria on how to take up this newly formed nanoparticle.

"Essentially, we have a delivery mechanism that carries its own instructions for cell delivery," said Holjencin, who is creating the nanoparticles being used in the project.

"You can also design the small proteins so that they can recognize a particular 'zip code' and deliver the cargo to that particular site within the cell," said Jakymiw.

These small proteins also provide a potential "invisibility cloak" to protect the nanoparticles from the body's immune system.

To date, the team has shown that the small proteins can package the mtDNA within nanoparticles and deploy it to the struggling mitochondria. They have also shown that it persists there for at least four weeks. In previous studies, mtDNA disappeared after just 48 hours.

"We will eventually end up looking for the presence of mtDNA at probably eight weeks, maybe even out to 16 weeks," said Wilson.

"And obviously what we would want for humans is that that this translates into many years as opposed to having to repeat these treatments on a regular basis," said Rohrer.

## Meet Mary

**Mary Louise Deas**

**Department; Years at MUSC** *MUSC Environmental Services; 6.4 years*

**Family** *Daughters, Monica Deas-Lee, Marshitta Deas and Jacquetta Deas; son, Malcolm Deas; and grandkids, Demaire, Jalen, Dallas and Micah*

**Best thing about living in Charleston**
*Living by the beautiful water and the Charleston houses*

**Favorite food** *Snow crab legs*

**Favorite movie** *"Annie"*

**Favorite football team** *Dallas Cowboys*

**Favorite restaurant** *California Dreaming*

**How would I spend $1 million**
*By helping people in need and the elderly —I'd do things to help them have a better life.*

**Greatest moment in my life**
*Spending time with my great-grandmother during summers.*

**Words of advice** *Be the best in whatever you do. It's your life — be proud of what you do!*

# Getting a boost, predicting the future and other things you need to know about COVID vaccine

By Bryce Donovan

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To borrow from one of the great literary minds of our time, the Fresh Prince, it's summertime. And in order to maximize your and your family's ability to have fun while school is out ("and it's sort of a buzz"), we're here to help you to untangle and make sense of all the different guidance floating around when it comes to COVID vaccines. That way you can take time to sit back and unwind – safely.

But first, just to point out how maddeningly confusing it can be as to who should be getting boosted — and when — this week we'll start things off with a little quiz.

HYPOTHETICAL QUESTION: You are 48 years old. Your spouse, who just turned 46, has an underlying health condition that necessitated her getting a second COVID vaccine booster. Your kids, one of whom is 12 and the other, who is 16 and suffers with asthma, have both been vaccinated — and boosted. The older one recently contracted the virus and was prescribed Paxlovid by the family doctor. Your mother, who lives in Canada and you plan on visiting in two weeks, is currently going through chemotherapy, but she's been vaccinated and boosted as well. Are you eligible for a second booster? Solve for x.

Right. So, it's a tad complicated.

To answer tough questions like these — and plenty of others — we chatted with Danielle Scheurer, M.D., MUSC Health System chief quality officer, who oversees all things COVID for the hospital system.

*Photo Courtesy iStock*

**Time has not been kind to D.J. Jazzy Jeff.**

**Q. If you're under 50 and it's been more than five months since your first booster, should you be getting another one, even if the Centers for Disease Control and Prevention is only recommending it for those 50 and older? I ask because I imagine there aren't lines out the door these days.**

A. It's a good question, and you make a fair point. As far as "should you," the CDC has released no new guidance for those age 49 and younger. And you're right; a lot of those folks are hitting their six-, seven-, eight-month windows, so they're wondering what they should do. To be honest, we always ask people if they're eligible for the booster, but if they come in seeking a vaccine, we don't pester them or over-screen. We never turn away people wanting to get a vaccine. It's an honor system.

**Q. Same scenario, but let's turn the question on its head: are the boosters even that effective against the latest strains of COVID anyway?**

A. For the most part the mindset has changed quite a bit on vaccines and boosters – it's less about can we prevent you from altogether getting COVID, and it's shifted more to a focus on reducing how sick you get if you happen to get COVID. The boosters are still very good, but there's a lot we just don't know. The bottom line is – and this gets back to some of the old boring and tiresome public health messaging – if you want to prevent getting COVID, you need to social distance, wash hands frequently, wear a mask. That sort of thing.

**Q. I keep reading about how the Food and Drug Administration says the next round of boosters should focus on the Omicron subvariants. How are scientists supposed to make a vaccine for variations that haven't even**

*See* **Q&A** *on page 11*

## Chase *Continued from Page Three*

it is important to consider and realize that the team extends way beyond the obvious –– our individual group or domain. Our Engineering and Facilities team member was on target with his comments — there are so many individuals working each and every day 'cleaning glassware,' whose work is vital to the mission and success of the enterprise and, ultimately, our patients and students. Without them, there is no awesome. To mention just a few of the innumerable examples of excellence across MUSC:

- The ORs will grind to a stop without a high-performing sterile processing unit — thank you!
- Hospitals, clinics, classrooms and labs will not work without dedicated facilities professionals and engineers working 24/7 to keep the trains capable of running — thank you!
- Our Public Safety, Hospital Security and Guest and Patient Services teams enable a safe and inviting place for all of us to thrive — thank you!
- Our food service staff members prepare and make available high–quality food that enables our patients, providers, students and families to function properly on a day-to-day basis — thank you!
- Our Admissions and Enrollment Services help to bring us the best and brightest students — thank you!
- Our Environmental Services team works every day to make sure that a clean and safe environment is a given — thank you!
- Our communications and marketing teams make sure that our story is being told every day — thank you!
- Our information solutions (IT) team keeps our digital transformation on track and enables forward-thinking capabilities for all things computer–related — thank you!

So, this is all about taking a moment to say 'thank you' to all members of the MUSC family who represent our unsung heroes. And I would encourage every team member of this very special place called the Medical University of South Carolina, no matter our roles or responsibilities, to take the opportunity to look around and embrace all of the members of our MUSC family — from Mail Services, Transportation and Parking Management to Finance and Operations; Library, Educational and Technology Services; and our phone and scheduling operators (again, just to name some — I know there are more!) Let's all remember to reach out and acknowledge the work of others, show everyone respect and communicate and support each other.

Bottom line? In a high–stress academic health sciences environment that has very high expectations, we can't reach our full potential in taking care of those we serve across our mission if we don't take care of ourselves and each other.

# CAR-T therapy is like science fiction made real, patient says

By Leslie Cantu

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"I'm now a GMO. I'm a genetically modified organism," jokes Marty Perlmutter, Ph.D.

The retired professor of philosophy and director emeritus of the Yaschik/Arnold Jewish Studies Program at the College of Charleston has had the unfortunate opportunity to watch up close as medical science has progressed – he's dealt with different cancers for more than a decade now. But he's also been able to receive the newest treatments, including CAR-T-cell therapy at MUSC Hollings Cancer Center for his lymphoma.

"In some ways, I don't have my own blood anymore," he explained of the treatment. "I have blood that's modified to fight the blood cancer."

It's like science fiction become reality, he said.

CAR-T therapy is a treatment that is as simple in concept as it is nuanced in execution: Retrofit existing immune cells to better recognize and fight cancer. Brian Hess, M.D., an oncologist who focuses on lymphoma, oversaw Perlmutter's treatment.

"I think it really makes us feel lucky that we have this type of therapy that we can offer patients," he said. "If we go back just to a few years ago when these therapies were in clinical trial and they weren't approved, these patients had very little to no options otherwise in terms of treating their cancer, and they really didn't have much hope."

### CAR-T-Cell therapy

CAR-T stands for chimeric antigen receptor T-cell therapy. The therapy is Food and Drug Administration approved for several types of lymphoma, B-cell acute lymphoblastic leukemia and multiple myeloma – but only for patients who have already gone through standard chemotherapy and relapsed.

That was the case for Perlmutter who, after a diagnosis of chronic lymphocytic leukemia, had previously participated in a National Institutes of Health clinical trial of ibrutinib, a drug that's now commonly used.

*Photo by Kristin Lee*

**Marty and Jeri Perlmutter in their garden. Supportive friends and family have helped them through his cancer journey of the past decade, they said.**

*See* **Therapy** *on page 10*

# Hollings takes the helm: Cancer Center to host sailing regatta

By Leslie Cantu

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Grab your deck shoes and some sunscreen — MUSC Hollings Cancer Center is going sailing.

This September, Hollings, along with the Charleston Ocean Racing Association, will host the MUSC Hollings Cup Regatta in Charleston Harbor to raise funds for lifesaving cancer research happening here at MUSC, benefiting cancer patients throughout South Carolina.

Although the event is new to Hollings, it is not new to local sailors. In fact, 2021 marked the 25th anniversary of the Leukemia Cup Regatta in Charleston. In that quarter century, the local sailing community raised more than $3 million for cancer research and patient care, said Ben Hagood, a sailor who is both a patient and a board member at Hollings.

"I think it's been important to the sailing community because a lot of people are affected by cancer, whether sailors, crew members, family members or sponsors," he said. "They have a direct connection with cancer and realize the importance of funding research and patient care."

The race in Charleston was part of a national network of boating races under the umbrella of the Leukemia and Lymphoma Society, which all together raised more than $73 million since launching the event in 1988. The society used the money to provide financial assistance to families and to fund research at cancer centers across the nation.

When the national society made the difficult decision to discontinue staff support for the local races this year, the Charleston sailing community decided to keep the regatta going but with Hollings as the recipient of the funds raised. The more that the local leadership team has learned about Hollings, Hagood said, the more that enthusiasm for the idea grew.

**What: MUSC Hollings Cancer Center Hollings Cup Regatta**
**When: Sept. 10, 2022 @ 1 p.m.**
**Where: Charleston Harbor**
**Information and registration: hollingscancercenter.musc/regatta**

Hollings director Raymond N. Dubois, M.D., Ph.D., is excited about the new event as well.

**Dubois**

"Hollings Cancer Center has accepted the honor of hosting this regatta that was previously presented by the Leukemia and Lymphoma Society," he said. "We are humbled that local sailors, who are dedicated to the cause of ending cancer, are entrusting us to further research in this area."

Hagood has seen firsthand the patient care at Hollings. He received a bone marrow transplant at Hollings in 2017 for B-cell acute lymphoblastic leukemia after being in remission for six years from multiple myeloma, and he continues to receive follow-up care here.

He appreciates the high standard of care at Hollings and the collaborative spirit between clinicians and researchers.

"Having dealt with two different blood cancers and referred a lot of friends to Hollings and having done treatments out of state before I found Hollings, I really appreciate what Hollings brings to the people of South Carolina and to people right here in Charleston," he said.

An avid sailor, Hagood is ready to get out on the water for a cause he believes in.

*Photo by Josh Birch*

**Dr. Joni Mazza offers photodynamic therapy, which can kill precancerous cells.**

## Skin

*Continued from Page Three*

layers of skin affected by cancer, ensuring that surrounding tissue is spared, until only cancer-free tissue remains. If reconstruction is needed after Mohs surgery, the internationally recognized reconstructive team at MUSC Health can often complete it the same day as surgery.

For patients with melanoma, Hollings' Jenny Sullivan Sanford Melanoma & Skin Cancer Program offers hope for a life in remission. The center has been designated a Melanoma Center of Excellence by the Melanoma Hope Network – one of the first 14 programs in the nation to receive the designation.

Hollings specialists were the first in South Carolina to administer T-VEC treatment for melanoma. During the treatment, medication is injected into melanoma spots that are on or beneath the skin or in lymph nodes. The targeted and precise treatment then multiplies quickly inside the tumor, causing the tumor to burst. This triggers the body's immune system to recognize the tumor cells and kill them.

Mazza said advancements in skin cancer research have led to a number of ways that doctors can treat skin cancer. She said it is important for patients to know about their options and to be aware of any suspicious spots on their bodies. She encourages patients to reach out to trained specialists if they have a spot on their skin that they are worried about. Patients are encouraged to be screened annually. Patients deemed high risk should be screened every six months.

"It's important for patients to know that you can get skin cancer anywhere on your body, whether that area has been exposed to direct sunlight or not," she said. "We have had patients that were diagnosed with melanoma in their mouths or eyes. We've had skin cancer cases on the buttocks and the bottom of the foot. The most important thing someone can do is to monitor changes to their skin and seek medical attention if they are concerned."

## Therapy

*Continued from Page Eight*

Though Perlmutter initially had good results, the cancer eventually went through a Richter's transformation, a rare complication in which chronic lymphocytic leukemia transforms into an aggressive lymphoma. An initial course of chemotherapy didn't work. Hess said it was unlikely that continued chemotherapy would have accomplished anything other than introducing more toxicity, so it was on to CAR-T.

The treatment requires several steps over about a month's time. First, a patient's T-cells, which are part of the immune system, are removed in a process called apheresis, which is somewhat similar to a blood donation. The difference is that as the blood is collected, the fraction with T-cells are separated, and the rest of the blood is returned to the patient. From there, the T-cells are sent to the lab to be modified so that they express the chimeric antigen receptor, or CAR.

"Programming a T-cell to express a CAR receptor causes that T-cell to be directed against a specific protein on the surface of the cancer cell. In the case of lymphoma, that is CD19," Hess explained. "In other words, adding a CAR onto a T-cell gives that T-cell a specific job, which is to attack the cancer cell that expresses that protein."

The T-cells must come from the individual patient who is going to be treated. That eliminates the chance that the T-cells will start attacking organs in addition to the cancer.

There's still the possibility of serious side effects, though. Because the CAR-T-cells continue to multiply inside the body, they can sometimes cause things like fever and confusion, Hess said. Some patients need to be admitted, and that was the case for Perlmutter, who was briefly hospitalized. Nonetheless, the side effects can be managed and reversed, Hess said, and Perlmutter noted that he was quickly back to normal life.

### 'Purified' CAR-T

Two important questions in the field of CAR-T right now are how to make CAR-T safer and how to make it more effective. Reducing side effects and improving the efficacy of CAR-T is the focus of a small clinical trial that will get underway later this summer at Hollings.

Building upon the work of Michael Nishimura, Ph.D., of Loyola University Chicago and his colleagues there, the Center for Cellular Therapy at MUSC, under the direction of Shikhar Mehrotra, Ph.D., will manufacture "purified" CAR-T-cells.

The idea, Hess said, is that currently, there are other products of the immune system that are infused into patients along with the CAR-T-cells – such as T-cells in which the CAR didn't take, for example, as well as other cellular components — which may increase the risk of side effects. By adding an additional tracker protein onto the CAR-T, the lab will be better able to grab only the CAR-T-cells and infuse only those cells into the patient, which should reduce side effects.

In addition, Mehrotra is taking the blueprint from Loyola and altering the way the CAR-T-cells are activated in a way that the team expects will help the CAR-T-cells to persist longer and to be more effective. Hess lauded Mehrotra's work, noting that the trial wouldn't be possible without his contribution.

Across the nation, researchers are working to see if CAR-T can be used on solid tumors or can be manufactured in an off–the–shelf fashion.

These goals are challenging. With solid tumors, the challenge is finding a target that is unique to the cancer so that the CAR-T-cells won't also cause severe toxicity, Hess said.

"You have to find the appropriate target, which is really like the holy grail for all of these other types of cancers," he said.

And it's not clear yet if mass-produced CAR-T-cells could be as effective as ones derived from the patient's own body.

Perlmutter is eager to see where the science goes next.

"I've said for a number of years that I want to be one step behind the science. The treatments have changed so rapidly over the last 10 years," he said. "CAR-T is an absolute game changer. Hopefully they will navigate a way to treat solid cancers."

Perlmutter's lymphoma went into remission after the CAR-T therapy. In fact, his adult children organized a one–year CAR-T anniversary party on May 4 to celebrate the remission. Hess was there, as were other Hollings providers and staff members.

Hess said Perlmutter's personality is infectious. CAR-T-cell therapy necessitates an entire team to provide the care, and the team members who took care of Perlmutter universally loved taking care of him. They were all rooting for him.

"He has such a wonderful family as well," Hess said, especially pointing to Perlmutter's wife, Jeri, whose caregiving was essential after the CAR-T treatment. Perlmutter called his wife a "caregiver extraordinaire, understanding the challenges that I was facing, while living through her own uncertainties about the future, all the while encouraging me to continue enjoying life to the fullest."

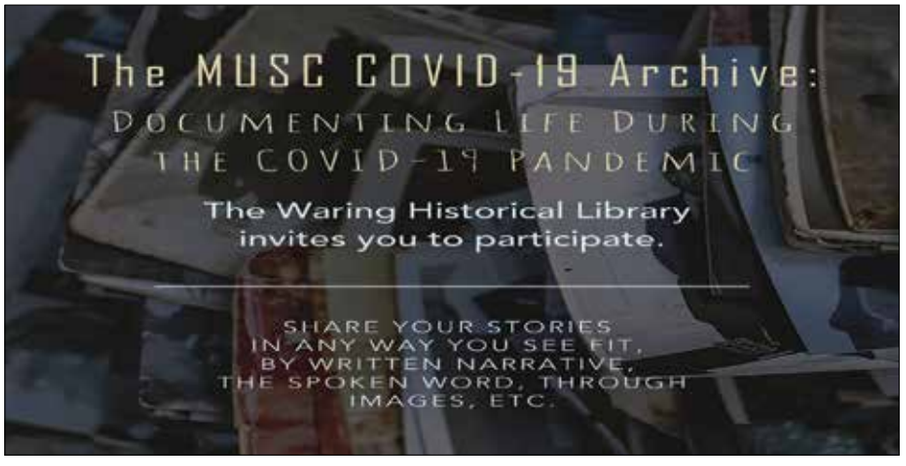
As a professor, Perlmutter studied medical ethics. He even served on the MUSC ethics committee. But living through a cancer diagnosis and treatment has given him new insights.

"It has taught me that my students were somewhat smarter than I was in some ways because they, when you'd ask them a question, they'd say, 'Well, you have to be there.' And I think there are some things about cancer where you just have to be there. It has been an education," he said.

Perlmutter is grateful for the gift of ordinary days with his wife, four children and 11 grandchildren. Over the past decade, supportive friends have helped just by showing up — for coffee, walks or games of bridge. Buttressed by family and friends, he's been able to live a full life despite cancer, he said.

"Life is good," he said. Waking up to work in the garden, check out what's flowering and which fruits are ready to pick, and watch the birds that are attracted to the bird feeders provides a quiet joy. So does a morning cup of coffee and the company of his family.

"Having been retired for the last three or four years, I just enjoy having the time and feeling well, and I'm very thankful for that."



## Q&A

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A. You're right. There is some work being done – and I don't know how far they've gotten with it – to produce an Omicron-specific booster with some projection of what may happen based on the pattern of behavior. Just like with the flu, COVID is constantly changing. How flu vaccines are made from season to season is based on historical data and projections. Basically, it's our best scientific guess, for lack of a better way of putting it. Some years we nail it, and flu numbers are low. Sometimes we don't, and it's maybe 30% effective, and a lot more people get sick. So yes, it is possible for the vaccine makers to get a future COVID booster right, but it's still based on their best guess, which is usually pretty good. My only concern is that this new round of boosters is only going to be good if the variants quit mutating. And the more time the virus has the luxury of hanging around, the more likely it is to keep mutating and varying. Every iteration of these variants, the vaccine becomes less and less of a shield against transmission. But it's still very good at preventing hospitalization and death.

**Q. Kids age 5 and younger were recently approved to get the vaccine. What kind of numbers are we seeing at MUSC Health's vaccine sites for kids in that age range?**

A. The turnout has been pretty low for little kids. Maybe some of it has to do with it being so early in the approval process. Maybe parents are just overly cautious. Either way, there's not a high uptake yet.

**Q. Basic question, but one that I know most people still care about: Regardless of age, does getting a COVID vaccine/booster at any of the MUSC Health sites cost anything?**

A. We have chosen not to charge people for the vaccine. And that applies to everybody.

**Q. Why does my pediatrician's office charge for it?**

A. I'm not 100% sure, but my guess is they're not charging you for the vaccine but rather an administration fee, like a payment for their time.

**Q. Why isn't everybody who gets a positive COVID test prescribed Paxlovid?**

A. The CDC has guidelines for prescribers, and just like with the vaccine, it's all about the risk-benefit ratio. In other words, it comes down to the patient's age, health history and timing: it needs to be started within five days of coming down with the virus. But that doesn't mean there's a hard and fast rule as to who can get it and who can't. Just like any prescription, it boils down to the expertise of the prescriber as to whether it's a good fit for the patient. That said, getting Paxlovid is much easier than ever. More drugstores have it, and now pharmacists themselves are able to prescribe it, saving the patient the headache of having to scramble to find a prescriber and then a location that actually has the pills.

**Q. Last one. We're in a weird time where we're in a spike, but nobody really seems to be behaving like we have in the past: i.e., social distancing, masking, etc. To what do you attribute infection numbers being medium to high but hospitalizations and deaths so low? Is it because the strains are less severe or maybe we're approaching some sort of herd immunity?**

A. I think it might be both. There is pretty good evidence that we're pretty close to, if not already at, herd immunity. Most Americans have evidence of antibodies in their systems, whether it's from vaccine or natural antibodies. So, combine that with the fact that Omicron seems to be a little less severe, and that's my best guess as to why things haven't spiraled out of control.

***Got a vaccine question you'd like answered? Email it to donovanb@musc.edu with subject line "Vaccine Q."*