

Cardiac Care

An Update for Physicians from the Heart, Vascular and Thoracic Institute





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Dear Colleagues,

We are pleased to present you with the inaugural issue of *Cardiac Care*, a compilation of the latest innovations, achievements, and news from the regional Heart, Vascular and Thoracic Institute at Cleveland Clinic Florida.

We are especially proud of this publication as it showcases work from all three locations within the Cleveland Clinic Florida region - Weston, Martin Health and Indian River Hospital. This is the first publication of its kind to represent the regional integration of all three of these locations into the Cleveland Clinic enterprise.

Integration of our staff and resources throughout southeastern Florida has ranked high among the many challenges we have faced in the past year. Out of the challenges, though, have come opportunities for innovation, such as our centrally supported data collection and management system, which is helpful in measuring meaningful clinical outcomes across our Florida locations. More details about this as well as other ongoing initiatives to create a seamless integration of our clinical resources can be found on page 16.

The COVID-19 pandemic has brought its share of challenges to healthcare systems all over the world. Our cover story (page 4) speaks to one of the ways in which our teams of specialists in various disciplines came together and found ways to collaborate to assist our patients with the most severe forms of respiratory failure. Our Acute Mechanical Circulatory Support Program team pioneered use of the mobile ECMO to give an extra fighting chance to the sickest COVID-19 patients as they were transferred to our facility for treatment.

On page 18 we highlight yet another way we have overcome recent challenges and adapted to these unprecedented times. Telemedicine, a helpful tool in patient care in recent years, has been very beneficial to patients and physicians as we have navigated the pandemic. It will continue to offer opportunities to improve care.

The heart transplant program had exponential growth in 2020, positioning it among the top heart transplant programs in the state in terms of volume, and top in the country in terms of outcomes, as reflected in the article on page 8.

As we join Cleveland Clinic's centennial celebration this year, we are proud to continue the institution's legacy here in Florida. Our cardiothoracic program is built off of the solid foundation of Cleveland Clinic's world-renowned and top-ranked program.

I hope you enjoy this first issue of *Cardiac Care*. We look forward to continuing to connect with you through these pages in the coming months and years.

Respectfully,

José L. Navja, MD, FACC



Cardiac Care is produced by Cleveland Clinic Florida's Heart, Vascular and Thoracic Institute.

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Cleveland Clinic Florida in Weston ranked #1 in the Miami-Fort Lauderdale metro area and is a top hospital in Florida, according to *U.S. News & World Report*'s "2020-21 Best Hospitals" rankings.

Overall, Cleveland Clinic Weston Hospital tied for the No. 5 ranking in the state of Florida. Cleveland Clinic Indian River Hospital tied for No. 19, and Cleveland Clinic Martin Health tied for No. 28 as well.

For Patient Appointments

Cleveland Clinic Weston Hospital 877.463.2010

Cleveland Clinic Martin Health 844.630.4968

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To learn more about the articles featured in this issue, to reach a staff member or to inquire about our services, please call the Department of Cardiology at **954.659.5290** or the Department of Cardiac and Thoracic Surgery at **954.659.5320** or visit clevelandclinicflorida.org/heart.

Consolidating a Vital Service Line in the Midst of the Pandemic

By Nicolas Brozzi, MD, Jaime Hernandez-Montfort, MD, and Gaston Cudemus, MD

The year 2020 will be remembered for the profound challenges brought by COVID-19, which affected millions of people worldwide and resulted in more than 550,000 deaths in the United States alone.

While most people affected by COVID-19 developed mild forms of the disease, a proportionally small (5%) but numerically significant number of patients developed severe respiratory failure, leading to a surge of hospital admissions that stressed most health systems around the country. The most severely ill patients required mechanical ventilatory support and eventually an extracorporeal membrane oxygenator (ECMO).

The first patient with COVID-19 to be admitted to the Cleveland Clinic Florida Weston campus came in mid-March 2020. The 62-year-old patient had recently traveled to England and had been admitted to a nearby hospital with progressive shortness of breath, and confirmation of COVID-19. He presented rapid clinical decline over 48 hours, progressing to the most severe form of respiratory failure, not responding to conventional mechanical ventilatory support or attempts at

an increasingly adopted strategy of prone mechanical ventilation. The Acute Mechanical Circulatory Support (AMCS) team at Cleveland Clinic Florida was consulted and deployed to implement ECMO support on-site and transfered the patient to our Weston campus for further care.

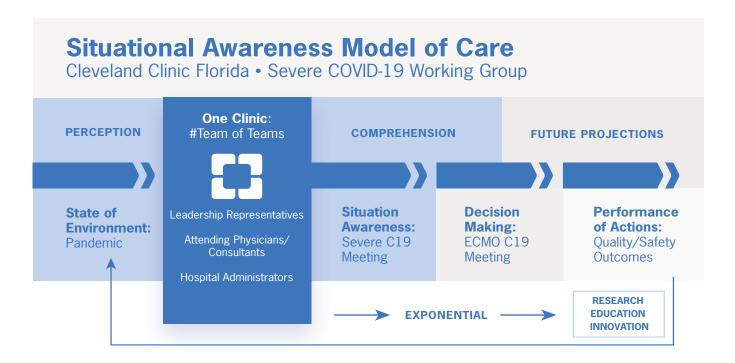
The admission of this patient with the most critical form of lung failure required a strong collaboration among disciplines for a coordinated treatment that resulted in completely satisfactory clinical recovery. The patient was weaned off ECMO support after three weeks, weaned off a mechanical ventilator after 25 days, and discharged home 10 days later. This pioneering experience with mobile ECMO on COVID-19 patients was published in the Journal of Cardiac Surgery and encouraged the adoption of the concept of providing mobile ECMO for patients with COVID-19 around the globe, giving many critically ill patients one more fighting chance for recovery.

The rapid surge of cases sparked a deep interest in collaboration among multiple specialties to facilitate the care of these patients within hospital

systems and across institutions. Communication among caregivers within different locations in the Cleveland Clinic Florida region was enhanced, and critical patients were discussed consistently among multidisciplinary teams. Recurrent virtual educational events were held during early phases of the pandemic as we strived to better understand COVID-19 and the role of potential therapies.



Cleveland Clinic Florida was one of the first centers to offer mobile ECMO. Here it is used to help transport a patient with severe acute respiratory distress syndrome due to COVID-19.



At a state level, we participated in the development of the Florida ECMO Consortium to facilitate communication and share resources and experiences among mechanical circulatory support programs providing ECMO support for patients with COVID-19 in Florida.

Situational Awareness Model of Care during the first wave of the pandemic

The Situational Awareness Model of Care for Severe COVID-19 initiative (SA MOC C19) was developed by members of the Cleveland Clinic Florida Heart, Vascular and Thoracic Institute Acute Mechanical Circulatory Support Program (HVTI AMCS) during the first wave of the pandemic (early April to late July of 2020), with the goal of providing interdisciplinary, timely and patientcentered evaluation and management for severe cardiopulmonary failure. SA MOC C19 initiative followed a structured multidisciplinary evaluation of patients admitted to the intensive

care unit with suspected or confirmed COVID-19. Despite the multiple challenges of this unprecedented epidemic, severe COVID-19 is an opportunity for interdisciplinary teams to present their perspectives in a patient-centered fashion and reapply such models to other time-sensitive illnesses such as cardiogenic shock.

SA MOC C19 initiative developed several multidisciplinary educational activities via a virtual educational platform with the goal of improving multidisciplinary perceptions of a new disease entity. This followed a simplified structure of scheduled biweekly and ad hoc video conference calls inclusive of leadership representatives and attending physicians/consultants from multiple disciplines of care including critical care, hospital medicine, emergency medicine, palliative care, bioethics, infectious disease, anesthesiology, cardiology, cardiothoracic surgery, and acute mechanical circulatory support in addition to a hospital administrator for moderating. The electronic medical record was shared with emphasis on critical care detailed flow-sheets, imaging with access to patients' real-time rhythm and hemodynamic monitoring. Review of the patients with possible or confirmed COVID-19 cases admitted to the C19 unit as well as those with potential for deterioration helped us provide a multidisciplinary comprehensive assessment of a novel entity. The review of cases was performed in a structured fashion describing severity of disease to facilitate objective interdisciplinary team discussion, including palliative care and bioethics. In every discussion, our enterprise's goals and mission toward patient-centered care were maintained while assessing the demand for staffing redistribution, personal protection equipment, and availability of mechanical ventilation and ECMO circuits enhancing multidisciplinary future projections based on available predictive models and utilization dashboards.



Integration of AMCS Program across the Cleveland Clinic Florida region: Caregivers from Cleveland Clinic Martin North Hospital transferred a patient on ECMO support for further care at the Weston campus.

Enterprise collaboration, academic and scientific participation

Members of our team participated in the development of enterprise-wide guidelines for the indication of ECMO support in patients affected by COVID-19, the protocols to implement it, the protection of the team of caregivers involved in the process, and the participation in multiple institutional and international clinical trials and registries to better understand the nature of the disease and the value of potential therapies.

Some of the most important registries include Extracorporeal Life Support Organization (ELSO), which has registered ECMO activities around the globe for 30 years; the prospective registry of the Cardiogenic Shock Working Group seeking to establish longitudinal follow-up of patients receiving AMCS; and the ECMOCARD study, which is the most

comprehensive global registry of critically ill patients admitted to intensive care units at 400 collaborating centers from 55 countries.

Additional international collaborative initiatives include our participation in the International Consortium of COVID-19 ECMO, in which collective experience from around the world is being discussed in a virtual forum on a regular basis.

Early reports from COVID-19 registries have revealed that about half of the patients receiving ECMO support for COVID-19 acute respiratory distress syndrome are weaned from ECMO, and 35 to 40 percent of patients are discharged from the hospital either home or to rehabilitation centers. Our program supported eight patients with severe respiratory failure due to COVID-19 in 2020, admitting half of them from other regional hospitals, with similar results to those reported by international registries.

Consolidation of HVTI AMCS program in the year of the pandemic regional collaboration

The commitment of our caregivers, along with strong support from our administration, has been critical to expanding the AMCS program in the midst of the pandemic. While many local hospitals faced challenges to provide intensive therapies for patients developing cardiogenic shock, our program was able to remain active providing a muchneeded service in our region. We were actually able to expand our services and provide support to 170 patients requiring intra-aortic balloon pump, and 60 patients requiring temporary transvalvular pumps (Impella), progressively adopting insertion of temporary devices in the axillary artery to facilitate rehabilitation of these patients.

The application of ECMO support also presented exponential growth during 2020, with 35 ECMO runs performed on 31 patients with cardiogenic shock or severe respiratory failure, including 11 patients who were transferred from other hospitals in South Florida for further clinical management and transition of support.

A SHOCK Line was established and continues today to provide consistent response to consults for mechanical circulatory support 24 hours a day, 7 days a week. By calling 954-48-SHOCK (74625) referring physicians receive immediate response from members of the AMCS team to evaluate the potential application of mechanical circulatory support in these patients. Calls are recorded to allow for concise follow-up.

Regional hospitals in South Florida have become aware of the rapid development of the AMCS program at Cleveland Clinic Florida, recognizing the value of such a dedicated team and our outcomes. This has resulted in an increasing number of referrals for AMCS, which is expected to continue to grow in the near future.

The growing experience and expertise of our team resulted in multiple presentations at virtual international meetings throughout Latin America.

Future directions

The milestones achieved by our AMCS program, with strong collaboration from the SICU team in 2020, represent the foundation to continue consolidating the program in the years to come.

Short-term goals include developing further education and training for caregivers, expanding on the "regionalization of care" concept by the adoption of common protocols within Cleveland Clinic Florida, closer collaboration with EMS teams, and consolidating the Hemodynamic Situational Awareness Model of Care.

Close collaboration with emergency medicine, interventional cardiology, pulmonary medicine, and interventional radiology has been established to facilitate immediate response of patients presenting acute respiratory or cardiogenic shock related to a wide spectrum of pathologies including myocardial infarction, pulmonary embolism, and out-of-hospital cardiac arrest. Standardization of care pathways throughout the region should facilitate optimal care of the most critical patients with cardiovascular and respiratory failure.

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REFERENCES

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Call **954.48.SHOCK** (74625) for an immediate consultation for mechanical circulatory support 24 hours a day, 7 days a week.

Axillary artery access provides opportunity for patients to rehabilitate while awaiting heart transplantation at Cleveland Clinic Florida.



Patient with IABP ambulating



Patient with transvalvular axial pump (Impella 5.5)



As congestive heart failure cases in the United States continue to rise, South Florida remains an epicenter of the disease due to the area's continuing population growth and its status as a retirement haven for the vulnerable population of patients over 65 years old. Despite historically having one of the largest populations of advanced heart failure patients, South Florida also has had the lowest rate of access among major population centers in the country to advanced heart failure therapy. including heart transplant and mechanical circulatory support. To address this issue, Cleveland Clinic Florida organized an expert heart failure team to provide services that include heart transplant, ventricular assist support devices, temporary mechanical circulatory support, advanced diagnostics, and medical and surgical therapy.

We established our heart transplant program in 2014, with the first transplant performed in October of that year. Less than a year after the initial 10 qualifying transplants, the program achieved Medicare certification and has grown consistently since that time. Our heart transplant program utilizes a broad multidisciplinary team with tremendous collective experience and expertise.

Since inception we have performed more than 160 heart transplants and have become one of the largest programs in Florida and one of the fastest growing programs in the nation, with a current year-over-year growth of 175 percent. According to the Scientific Registry of Transplant Recipients quality criteria, Cleveland Clinic Florida's cardiac transplantation program leads the state in quality and ranks 4th in the nation in combined

Positioned at the forefront of medical advancement for the last 100 years, Cleveland Clinic continues to advance its practice in South Florida by offering world-class care. As part of these efforts Cleveland Clinic Florida has taken the lead in providing care options for patients with end-stage organ failure, which include cardiac transplantation.

measures of transplant rate, survival on the waiting list, and posttransplant survival after only the 6th year of the program's existence.

Cleveland Clinic Florida has spurred growth in transplantation throughout Florida with the number of transplants in the state increasing by more than 100 percent since our program began. This has markedly improved access to the lifesaving therapy throughout the region and state. Our heart transplant team provides expert collaborative care in association with referring providers and hospitals using a "team of teams" approach for a seamless high-quality patient experience.

Cleveland Clinic Florida's aggressive comprehensive multidisciplinary approach, which allows us to be involved in all areas of our patients' care, is one of the keys to achieving great outcomes. We frequently care for patients who have been turned down by other programs. Working with their referring providers, we evaluate each patient individually and deliver a treatment that is best suited for each patient's condition. We are available for inpatient and outpatient referrals as well as consultations 24 hours a day and encourage early referral.

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Members of the Heart Transplant Team. From left to right: Janice Bonilal, Jaime Hernandez-Montfort, MD, Cedric Sheffield, MD, Debra Rossignol, Viviana Navas, MD, Nicolas Brozzi, MD, Mauricio Velez, MD, Victoria Ambrosio-Slade, Maryann Zamora.

Multidisciplinary team approach helps chemotoxicity patient return to normal life

A patient with cancer was referred to our hospital after she recently was treated with resection and chemotherapy and developed chemotoxicity-induced cardiomyopathy and shock. Following transfer to Cleveland Clinic Florida in Weston, she received medical optimization involving our advanced heart failure cardiologists and cardio-oncology specialists. The patient then received durable mechanical support with an implanted left ventricular assist device (LVAD), which supported her circulation and allowed her to return home in great functional condition with a return to normal activity (Figure 1A). When she was ultimately deemed cancer-free, she was evaluated for heart transplant, listed, and underwent successful transplant and LVAD explant with return to her previous very active lifestyle (Figure 1B).

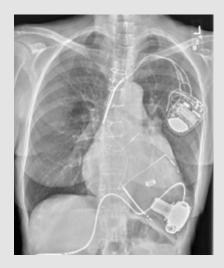
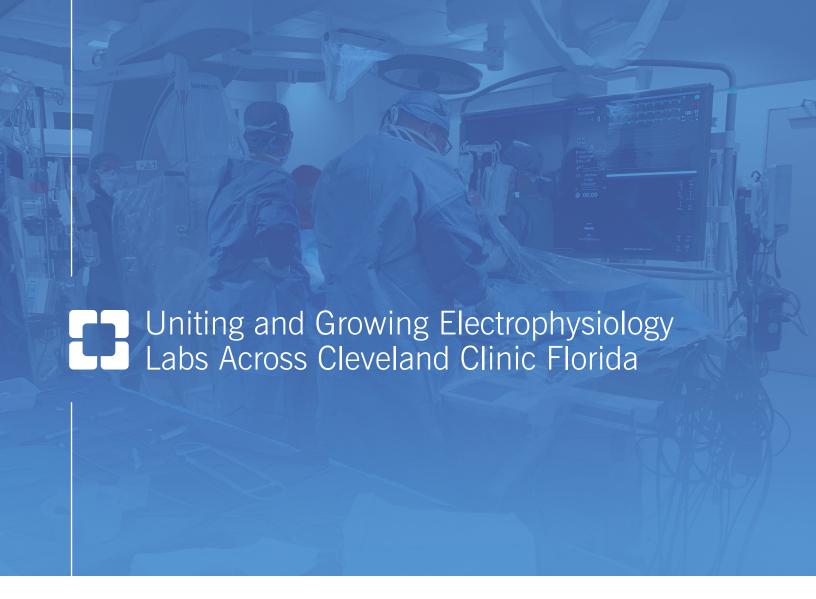


Figure 1A: CXR after LVAD implantation



Figure 1B: CXR of the same patient after receiving heart transplantation





A large part of Cleveland Clinic Florida's expansion along Florida's eastern coast is the integration of similar services among different locations and collaboration among clinical providers. Evidence of this shows strongly in the collaboration that has been fostered among our electrophysiology labs.

When the Martin Health System and Indian River Medical Center became part of Cleveland Clinic in 2019, the electrophysiology lab at Indian River Medical Center (now Cleveland Clinic Indian River Hospital) became part of the Cleveland Clinic Florida region as well. The lab had been increasing in size and scope over the previous years in order to meet increasing patient demand.

Brett Faulknier, DO, had established the service at the hospital and into the area in 2016. Prior to his arrival patients needing such services had no choice but to travel a good distance elsewhere.

"Our ability to serve our local population on a day-to-day basis in which lots of people can see us sooner has been critical to our growth," Dr. Faulknier says.

The population profile of the area increases the prevalence of atrial fibrillation, Dr. Faulknier points out, as many people of retirement age move to Florida and want to stay active.

In its first year (August 2016 through October 2017), 276 patients received care at the Indian River Medical Center electrophysiology lab. The following year (2018) brought 354 patients for a mix of device and ablation procedures. In 2019 there were 440 patients. And in 2020, 500 patients received care. Of those, 275 were device cases and 225 were ablation cases.

Ablation procedures are done on an almost daily basis at the lab and many of them are performed using the cryoballoon method. According to Dr. Faulknier, among various centers, "there is greater consistency with outcomes and shorter procedure times" using the cryoballoon method.

In order to maximize lab space and continue to provide care for the growing volume of patients in the

community, a new staff member joined the team. Fahad Ali, MD, who performs all standard electrophysiology procedures, joined in August and "brings additional expertise to all that we do," Dr. Faulknier says. Together, Dr. Faulknier and Dr. Ali are prepared to provide contemporary therapy for the wide array of cardiac arrhythmias and device therapy that are associated with a state-of-the-art, modern electrophysiology lab.

Collaboration unites locations

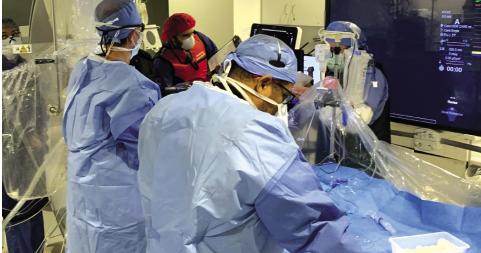
Cleveland Clinic Florida Weston Hospital has an established electrophysiology lab staffed by four physicians and led by Jose Baez-Escudero, MD. In August, Cleveland Clinic Martin Health opened a state-of-the-art electrophysiology lab that is a hybrid operating room and has the specialty equipment to accommodate other cardiac procedures as well.

Staff at Cleveland Clinic Indian River Hospital, Cleveland Clinic Martin Health and Cleveland Clinic Weston Hospital meet through a virtual platform on a monthly basis to share experiences and discuss difficult cases and best practices. This collaboration is important to foster a sense of community between the locations and is one example of the virtual integration taking place throughout Cleveland Clinic Florida.

"It is good to know that you have other physicians in your organization that you can discuss difficult cases with or obtain second, or even third opinions, on optimal treatment strategies," Dr. Faulknier says. "Overall, this enhances patient care and helps to provide better continuity of care throughout each of our Cleveland Clinic Florida facilities."

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Robotic Approach to Lung Cancer Resections on the Rise Due to Improved Access, Benefits

Lung cancer is by far the leading cause of cancer death among both men and women, according to the American Cancer Society. Each year, more people die of lung cancer than from colon, breast, and prostate cancers combined. Minimally invasive lung cancer resection – as opposed to an open procedure – has been very clearly established as the standard of care at the present time.

The use of robotic technology for lung cancer resection is on the rise due to the increasing awareness of the benefits of a minimally invasive approach over thoracotomy. Most patients with early-stage lung cancers are now treated with either robotic or video-assisted thoracic surgery (VATS). The robotic approach allows for a more precise lymph node dissection over the VATS approach.

Offering these minimally invasive procedures at each of our hospitals in Florida provides more access to patients who are unable or unwilling to travel to a larger center. Cleveland Clinic Martin Health, which

integrated with Cleveland Clinic Florida in 2019, started offering robotic-assisted lung cancer surgery in March 2020. Brett Beecher, MD, and Edward Savage, MD, have seen an "exponential growth in lung cancer resection cases" since they began offering this approach. Both surgeons have performed 61 robotic lung cancer resections in less than a year.

Benefits of roboticassisted lung surgery

In general, recovery from roboticassisted operations is faster, requires a shorter hospital stay, and allows for a faster return to normal activities.

Results of a study by Reddy et al., published in the Annals of Thoracic Surgery in 2018, showed that atelectasis and pulmonary embolism events occurred significantly less often in the robotic lobectomy cohort than in the VATS cohort. There were fewer atrial fibrillation events and wound complications in the robotic lobectomy cohort as well.

Another study, published in 2017 in the Annals of Thoracic Surgery, states that physicians who are proponents of robotic-assisted lung resections cite some of the many benefits as having improved range of motion in smaller spaces and improved visualization of relevant anatomy, which also allows for more ease in teaching cases.

"The two main goals for any lung cancer resection are to perform the best cancer operation for the patient and to perform it safely," Dr. Beecher says. "Our goal here at Cleveland Clinic Martin Health is for discharge on postoperative day one after lobectomy. Robotic-assisted surgery helps us to accomplish that goal."

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REFERENCES

For a complete list of references in this article, email garciac15@ccf.org.

News from the Institute

Publications and Editorial Achievements

José L. Navia, MD's longitudinal work on the Commando procedure for infective endocarditis was the cover story in the Annals of Thoracic Surgery (2019).

The article by Robert Cubeddu, MD, and Craig Asher, MD, on TAVR and CKD in the Journal of the American College of Cardiology was one of the most noticed papers of 2020 according to the Altmetric Attention scores.

Nicolas Brozzi, MD, Cedric Sheffield, MD, and Jaime Hernandez-Montfort, MD, et al. reported the first mobile VV ECMO transport for severe COVID-19 in the United States.

Sergio Pinski, MD, serves on the editorial board of JACC Clinical Electrophysiology.

The physicians and specialists at Cleveland Clinic Florida's Heart, Vascular and Thoracic Institute, including cardiovascular disease fellows and interdisciplinary teams. published in more than 50 peer-reviewed publications.

Clinical Trials

Robert Cubeddu, MD, completed enrollment of Reduce LAP-HF II and serves as Co-PI in these ongoing structural trials: Early TAVR, TAVR-Unload, SUMMIT, REDUCE PAS.

Craig Asher, MD, is serving as PI in phase 3 trial of mavacamten for adults with symptomatic hypertrophic cardiomyopathy.

Jaime Hernandez-Montfort, MD, served as Co-PI in the Three-C study to prevent COVID-19 myocardial injury. The study was successfully completed and presented in 2020 AHA Scientific Sessions.

Jaime Hernandez-Montfort, MD, served as Co-PI in BEAT-COVID using a remote monitor device to evaluate and monitor caregivers cardiovascular well-being during the pandemic.

Jaime Hernandez-Montfort, MD, serves as PI in the following remote monitoring trials in heart failure: HATS-OFF and PROACTIVE HF.

Scientific Achievements

Bernardo Perez-Villa, MD, and Jaime Hernandez-Montfort, MD, launched the Patient Reported Outcomes Measures for Cleveland Clinic Florida's Heart, Vascular and Thoracic Institute, using the OME platform in cardiac transplantation.

Sophia Wilson, APP, Jaime Hernandez-Montfort, MD, and Bernardo Perez Villa, MD, submitted ISHLT Grant Application for Patient Centered durable LVAD care.

Jaime Hernandez-Montfort, MD, helped with the creation of The Cardiogenic Shock Working group and presented original research in Circulation Heart Failure and JACC Heart Failure.

Nicolas Brozzi, MD, and Jaime Hernandez-Montfort, MD, had ongoing participation on global and national registries related to ECMO in COVID (ECMOCARD, ELSO).

Nicolas Brozzi, MD, participated in the first ELSO guidelines for ECMO in COVID-19.

Mauricio Velez, MD, and Nicolas Brozzi, MD, have ongoing participation on national registry related to LVAD (Intermacs).

Cedric Sheffield, MD, and Viviana Navas, MD, have ongoing participation on national registry related to heart transplantation (UNOS).

Diego Sadler, MD, helped with the creation of national to global registry related to cardio-oncology.

Diego Sadler, MD, Bernardo Perez-Villa, MD, and Jaime Hernandez-Montfort, MD, submitted Velosano Grant Applications for Patient Reported Outcomes in Cardio-Oncology.

Diego Sadler, MD, Bernardo Perez-Villa, MD, and Jaime Hernandez-Montfort, MD, have been tasked to produce the population health and disparities in cardio-oncology for an enterprise AHA grant submission.

David Wolinsky, MD, has ongoing participation on enterprise registry for cardiac amyloidosis.

David Wolinsky, MD, serves as the PI in phase 3 trial for TTR related cardiac amyloidosis.

Emad Hakemi, MD, has ongoing participation on national registry related to chronic total occlusions (PROGRESS-CTO).



Cardiovascular disease management is critical to improve outcomes and reduce overall mortality for cancer survivors. Cancer patients have a two to six times higher risk for cardiovascular mortality than the general population, and such risk is evident throughout the continuum of cancer care.

The Cardio-Oncology program at Cleveland Clinic Florida was created to detect, monitor and treat cardiovascular risks and conditions throughout cancer treatment. Our team evaluates and treats patients with cancer and cardiovascular disease, assesses potential adverse cardiovascular effects (from chemotherapy, targeted therapies, immunotherapy and radiation) before, during and after treatment, and assists in the surveillance and treatment of long-term cardiovascular effects from prior cancer treatments. We use advanced imaging modalities, biomarkers, clinical evaluation and implementation of cardio-protective strategies when indicated to allow continuation of cancer treatment in a safer context.

Addressing the barriers to cardiooncology programs across the country

With an estimated 17 million cancer survivors alone in the United States there is a need to improve access to this type of care at the local, state and national level. The American College of Cardiology's (ACC) National Cardio-Oncology Survey identified specific barriers which might limit the implementation of cardio-oncology programs. These include lack of funding, limited interest, lack of infrastructure, and lack of educational opportunities.

At Cleveland Clinic Florida, we recently reported a practical model to start and maintain a successful cardio-oncology program that can be reproduced in a variety of different practice settings to improve access to care.

We created an innovative new model for inter-specialty collaboration providing cardiac services via a clinic at our main oncology facility. The

presence of a cardiologist on-site facilitates referrals, interactions and rapid consultations, and streamlines decision-making in complex cases where cancer risk versus cardiovascular risk has to be considered for treatment decision-making.

Promoting collaboration between cardiologists and oncologists

We developed a collaborative program between the Florida Chapter of the ACC and the Florida American Society of Clinical Oncology to assess the educational needs of both cardiologists and oncologists, and subsequently developed educational materials to help bridge the identified knowledge gaps. To further expand our access-to-care platform, we established a large, multistate network - the Cardio-Oncology International Collaborative Network – with members from state chapters from the ACC, American Society of Clinical Oncology (ASCO), and regional chapters from the International Cardio-Oncology Society (ICOS). It currently has members

from 19 ACC state chapters, six ASCO chapters, and nine countries with ICOS affiliated chapters. This network is a platform for multiple current and future collaborations.

In our first project, we conducted an international survey to assess the impact of the COVID-19 pandemic during its initial phase in March and April 2020 on the practices of cardiologists and oncologists and its effects on the reallocation of resources for elective procedures, testing, scheduling, access to telemedicine services, the early utilization of new COVID-19 therapies, and providers' opinions on national healthcare policies. We received responses

from 1,415 providers from 43 countries that provided new data on the similarities and differences experienced by physicians in different geographic locations and the impact of this pandemic on different practice settings.

Ongoing collaboration will improve outcomes

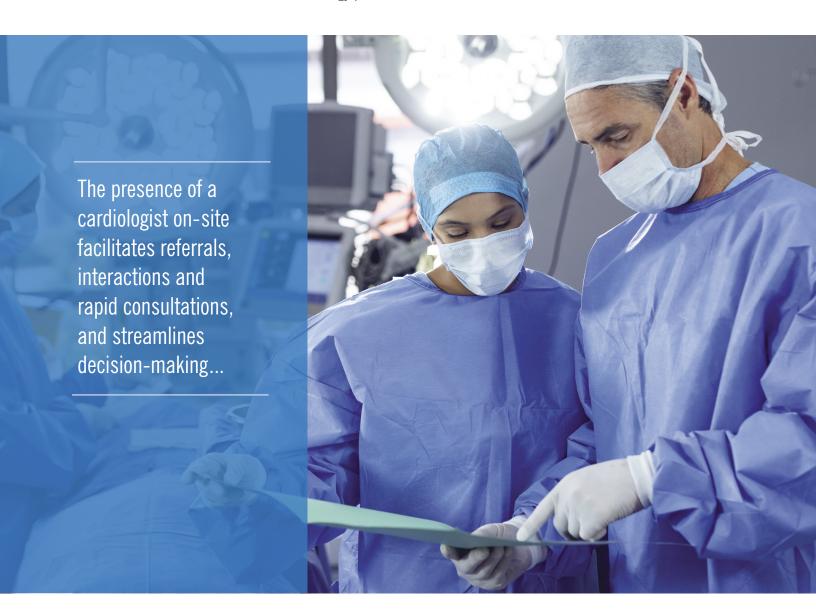
Our Cardio-Oncology program continues to grow and looks forward to expanding its clinical imprint with new clinical protocols and collaborations with referring physicians and institutions in order to facilitate the treatment of cardiooncology patients. We also look

forward to increasing research collaborations, establishment of registries, and increased participation in improving access-to-care for patients through active participation and leadership in professional societies at local, state and national levels and the continuous development of collaborative networks that can facilitate health outcomes in this population.

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REFERENCES

For a complete list of references in this article, email garciac15@ccf.org.



Cleveland Clinic Meets the Challenges to Integrate and Deliver World-Class Care in the Florida Region

By Joseph P. lannotti, MD, PhD



Joseph P. lannotti, MD. PhD

On Jan. 1, 2019, Cleveland Clinic Florida expanded sevenfold and became a fivehospital health system with many other associated outpatient facilities over

120 miles of geography along the southeast coast of Florida. Cleveland Clinic Weston Hospital has always been integrated with the much larger Cleveland Clinic main campus in Cleveland. Both are closed-staff models, with 1,300 beds in Cleveland and a 255-bed hospital in Weston along with more than 300 employed physician staff members in Weston.

The four hospitals in Martin, St. Lucie and Indian River counties along the Treasure Coast are mixedstaff models. The Lou Ruvo Center for Brain Health in Las Vegas completes the United States footprint of Cleveland Clinic. Our Executive Health Center in Toronto, and the hospitals in Abu Dhabi and London are integrated as well into the Cleveland Clinic enterprise.

Achieving success as an organization of patientcentered institutes

Cleveland Clinic has achieved excellence through the integration of physician-led teams that work together to achieve a well-defined set of goals using common tools and processes. One of the tools is the organizational structure of clinical institutes to deliver care. The institutes are structured around the patient's health conditions (e.g., heart and vascular) rather than around the provider's discipline (e.g., heart surgery vs. cardiology). For example, the Heart, Vascular and Thoracic Institute (HVTI) brings together into a single physician-led institute all of the clinicians and supportive infrastructure to treat all heart-related issues. The Cleveland Clinic Florida HVTI is led by José L. Navia, MD, a world-renowned heart surgeon who spent many years in a leadership role within the HVTI in Ohio.

Within the institute are physician center directors and the structure is supported by service-line-specific regional hospital administrative

support. All institute functions are reported monthly at each hospital and quarterly across the Florida region and Ohio. The meetings report performance to targets and opportunities along with the needed resources to achieve or exceed institute and enterprise goals.

The physician and administrative leadership collaborate with Cleveland Clinic-employed and independent physicians across the region to define and consistently execute on providing evidence-based best practices to achieve the best clinical outcomes safely with an excellent care experience. Florida's HVTI is one of the best examples of an organizational structure that has a good working relationship between both employed and independent physicians.

Innovating ways to integrate clinical care and collect outcomes data among specialties in the region

To achieve integration of our clinical care across the Florida region we



require an integrated single inpatient and outpatient electronic medical record across all Florida locations with all care facilities in the United States. This is a complex process that we anticipate will be completed by 2022.

We also have identified and answered the need to define, measure, report and manage provider- and site-specific patient safety and experience metrics using a common dashboard. These processes have been created during the last two years and have been in use through our office of Patient Quality, Safety and Experience, led by Sonya Pease, MD, who has developed an effective multidisciplinary, hospital-based team to integrate our efforts across Cleveland Clinic Florida. This year we have a focused effort to link the hospital-based teams with the physician leadership within each clinical institute.

In mid-2020 we began building our capabilities to measure patientreported outcome measures (PROM) before and after procedural care within five Florida clinical institutes.

Kurt Spindler, MD, an orthopaedic surgeon at Cleveland Clinic in Ohio, developed a data management system called OME (Outcomes, Measurement and Evaluation) in 2014 for his department. It was implemented for orthopaedic surgical care at Cleveland Clinic Weston Hospital three years ago and we recently started collecting data from OME from Martin Health and

Indian River orthopaedic surgeons. In 2020 we implemented (PROM) for all spine procedures in Florida and started a heart failure OME module.

OME, which is now licensed and commercially available, provides centrally supported data collection from all sites of care. It is embedded in the normal workflow at the site of care with minimal effect on the efficiencies of practice. The centralized OME resources collect. analyze and report PROMs at a meaningful period of time after the procedure.

clinical outcome at one year with patient, disease, surgeon, implant and facility factors from thousands of procedures performed at a single large health system. This data has changed clinical practice at Cleveland Clinic Florida as well as other health systems as noted through many peer-reviewed publications and presentations. We will now use this data to help with creating value-based contracting. Every provider wants to be compensated for both quality and cost. Without measurement of true clinical outcomes, we generally compete for contracting by the cost of our care.

Throughout its 100-year history Cleveland Clinic has been a physician-led organization with a mission to provide outstanding, compassionate patientcentered healthcare, to conduct cutting-edge basic and clinical research and to train those that serve. We continue to strive to be the best healthcare system in the world, and we are proud of the recognition we receive from many organizations as being one of the best health systems worldwide.

- Joseph P. Iannotti, MD, PhD

For orthopaedic surgical care the PROMs are collected at one year after surgery. Data collected from Weston and Ohio including 50,000 surgical cases, representing 95 percent of all patients having procedures performed at these sites.

Orthopaedic OME data has been used to measure clinical outcomes that are meaningful to the patient, provider and payer. We have analyzed the correlation between

OME is funded through operating revenue, donor support and grant support for specific clinical research projects. We anticipate the same use and success of this OME program within the HVTI in Florida.

Dr. Iannotti iannoti@ccf.org

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Telemedicine Fills Need, Gets Big Lift from Pandemic

By Darryl Miller, MD



Today, our very survival depends on our ability to stay awake, to adjust to new ideas, to remain vigilant and to face the challenge of change.

- Martin Luther King, Jr.

In order to cope with the disruption in normal healthcare delivery brought on by the COVID-19 pandemic, we have accelerated innovation, particularly in the area of virtual patient consultations. Telemedicine has gained significant traction out of necessity and filled a noticeable void that would have otherwise significantly impacted healthcare both from patient care and physician practice sustainability perspectives.

Biometric sensors and remote monitoring devices are further bridging diagnostic gaps between video and in-person observation and expanding the scope of virtual care. Blood pressure monitoring, telemetry monitoring, and implanted devices such as cardiac resynchronization defibrillators and pulmonary artery pressure monitors provide the objective biometric data needed to effectively manage patient care and reduce the likelihood of hospitalizations in ever more complex medical scenarios.

Long before COVID-19, Cleveland Clinic embraced telemedicine, providing virtual visits for minor health issues, postoperative visits, and chronic disease management

outside the healthcare setting. Telemedicine consults provide an extra layer of inpatient care for intensive care patients, while our cardiologists use a mobile app to monitor telemetry data for hospitalized patients.

Removal of economic and bureaucratic barriers in the past year has accelerated real world application of telemedicine services across the industry with success. Homebased cardiac rehabilitation has been tested and safety established in low-moderate risk individuals. Studies have shown that smartphone technology assessment of surgical wounds, a significant aspect of postoperative care, is comparable to that of in-person wound examination.

With more providers and health systems incorporating telemedicine, new patient management strategies are sure to follow, along with potential advancements in care. Telemedicine services for heart failure patients, for example, are mainly focused on predicting acute decompensation episodes. But randomized clinical trials to date have yielded conflicting results. There is now more opportunity than ever to use

and compare the effects of different telemonitoring strategies on improving clinical outcomes.

While full physical examinations are not meant to be conducted over a digital platform, telemedicine is just as effective as face-to-face consultations when it comes to patient satisfaction and clinical effectiveness for triaging, diagnoses of lower complexity, and postoperative rehabilitation. The next challenge is to improve access to these innovative programs for those who are not technologically proficient, have limited health literacy, or have visual or hearing impairment.

Changes in healthcare regulations and reimbursement have facilitated implementation of telemedicine during the COVID-19 pandemic. This need-based amplification of the innovative technology has created an opportunity for improved care beyond the pandemic.

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REFERENCES

For a complete list of references in this article, email garciac15@ccf.org.

New Staff

Cleveland Clinic Florida Heart, Vascular and Thoracic Institute Welcomes New Staff Members



John Bibawy, MD

Dr. Bibawy is a clinical cardiac electrophysiologist. He specializes in advanced cardiac arrhythmias and device-based therapy. His skills include advanced left- and rightsided cardiac ablations, which

include supraventricular tachycardias, ventricular tachycardia and atrial fibrillation. Dr. Bibawy is an expert in the management and implantation of pacemakers, defibrillators and cardiac resynchronization devices. He also performs novel procedures such as Medtronic's Micra pacemaker and Boston Scientific's subcutaneous ICD.

Dr. Bibawy graduated from Ross University School of Medicine in 2010. He completed his internal medicine residency and cardiovascular disease fellowship at Northwell Health's Hofstra School of Medicine in Staten Island in 2018. He then completed two additional years of advanced training in clinical cardiac electrophysiology at University of Rochester's Strong Memorial Hospital in 2020.

To reach Dr. Bibawy, call 954.659.5290



Emad U. Hakemi, MD, MSc

Dr. Hakemi joined the Structural Heart Disease team at the Robert and Suzanne Tomsich Department of Cardiology at Cleveland Clinic Florida. He completed his fellowship in interventional cardiology at Columbia

University Medical Center (New York), along with advanced training in complex coronary artery disease interventions, mechanical cardiac support, and structural heart disease interventions.

Dr. Hakemi underwent training in internal medicine at John. H. Stroger Hospital of Cook County (Chicago) where he also completed his cardiovascular disease fellowship and served as chief cardiology fellow. He obtained his master's degree in clinical research at Rush University (Chicago) and is actively participating in outcome-based clinical research focused on coronary artery disease and structural heart disease. Dr. Hakemi is American board-certified in internal medicine, cardiovascular disease, interventional cardiology, adult echocardiography, and nuclear cardiology. His procedural focus includes transcatheter aortic valve replacement (TAVR), transcatheter mitral valve interventions, left atrial appendage closure using WATCHMAN device, paravalvular leak and ASD/PFO transcatheter closure, mechanical cardiac support, and chronic total occlusion percutaneous coronary interventions.

To reach Dr. Hakemi, call 954.659.6877



Alberto Lopez, MD

Dr. Lopez is the vice chairman of the Vascular Surgery Department at Cleveland Clinic Florida in Weston. He has been in practice for 12 years. Prior to joining Cleveland Clinic Florida he served for 7 years as Assistant

Professor of Surgery at the University of Miami/Jackson Health System.

Dr. Lopez has written multiple articles in scientific journals. He completed his vascular surgery fellowship at Cleveland Clinic in Cleveland, Ohio in 2013. He attended Boston College for undergraduate studies and Ponce School of Medicine in Puerto Rico for his medical degree. Dr. Lopez completed his general surgery residency at the Wright State University Boonshoft School of Medicine in Dayton, Ohio. He was board certified in general surgery in 2013 and in vascular surgery in 2015. He is experienced in peripheral vascular disease, thoracic aortic aneurysm, abdominal aortic aneurysm, dialysis access, varicose veins and vagal nerve stimulation for seizure disorder.

To reach Dr. Lopez, call 954.659.5230

To refer a patient to one of the Heart, Vascular and Thoracic Institute specialists, please call **877.463.2010**

Dedicated Cleveland Clinic Dedicated Cleveland Climic Vascular Surgeon and Leader Terry King, MD, Retires

By Mark K. Grove, MD



Terry King, MD, of Cleveland Clinic Florida's Department of Vascular Surgery, retired from a 37-year career in vascular surgery on December 1. Dr. King, a native of Pittsburgh, grew up in a family with five children and parents who had met during flight school in the early 1940s. In high school his interests varied from sports to music. He became a varsity wrestler and was an early devotee of rock 'n' roll. In addition to these activities and his academic pursuits, he delivered newspapers and groceries from a local grocery store.

The early years of education

After graduating from high school, Dr. King matriculated at the University of Pittsburgh, triple-majoring in biophysics, microbiology and economics. Notwithstanding the rigorous academic demands, he had time to "play" while at Pitt, as a guitarist in several bands.

Following graduation, Dr. King stayed in Pittsburgh to attend Pitt's School of Medicine. There, he was inspired by Henry "Hank" Bahnson, MD, a pioneer in cardiothoracic surgery. Dr. Bahnson later recruited Tom Starzl, MD, PhD, who developed the world-renowned liver transplant program at Pittsburgh. It is noteworthy that a number of Cleveland Clinic's transplant surgeons have had their training at the University of Pittsburgh.

A career in medicine takes shape

After receiving his medical degree from University of Pittsburgh School of Medicine in 1977, the newly minted doctor moved a few hours west and started his surgical training at University Hospitals (UH) of Cleveland. As a general surgery resident at UH, Dr. King was influenced by Jerry Shuck, MD, who later became chairman of the American Board of Surgery. Just a few months into internship at UH he met a young nurse named Diane Conner and, by the third year of his residency, Diane and Dr. King were married.

After completing his year as chief resident in general surgery, Dr. King started a coveted fellowship at Northwestern University, one of the bastions of the developing field of vascular surgery. The late John Bergan, MD, and "Jimmy" Yao, MD, were at the forefront of academic vascular surgery in this era and among the literati in the field, authoring a number of the authoritative and popular texts in the 1980s. Dr. King co-authored a number of book chapters in these textbooks and gained tremendous experience in management of all aspects of vascular disease in this busy vascular center, under the tutelage of these experts. One of his co-fellows was Linda Graham, MD,

also now a staff member in the Department of Vascular Surgery at Cleveland Clinic's main campus in Cleveland.

After finishing his fellowship in Chicago in 1983, Dr. King moved his growing family to Washington, DC, where he became an attending surgeon on the teaching service at George Washington Medical Center and the DC Veterans Affairs Medical Center.

Dr. King was then recruited by Jeffrey Ponsky, MD, to join the Department of Surgery at Mt. Sinai Hospital in Cleveland, where he served as Head of the Section of Peripheral Vascular Surgery.

In 2000, Dr. King began his affiliation with Cleveland Clinic when he was recruited to the Department of Vascular Surgery. This happened during a period of tremendous expansion of Cleveland Clinic in Cleveland and the surrounding areas, spearheaded by CEO Floyd Loop, MD. In addition to Cleveland Clinic's main campus, Dr. King operated at Hillcrest Medical Center, Marymount Medical Center and Euclid Medical Center. He also saw patients and performed outpatient procedures at the Beachwood and Strongsville family health centers.

Four years later, Dr. King was given the opportunity to join the staff at the nascent Cleveland Clinic in

Naples, Fla. The last of Dr. King's children had gone off to college, and Dr. and Mrs. King were prepared to move once again. Dr. King built the endovascular and vascular surgical practice at Cleveland Clinic Naples. When a decision was made to close the Naples clinic and hospital a few years later, Dr. King elected to stay with the group that assumed control of the hospital, as did a number of the former Cleveland Clinic staff. He practiced at Physicians Regional Medical Center from 2006 to 2009.

A pioneer and leader at Cleveland Clinic Florida

Dr. King was recruited to join Cleveland Clinic Florida in 2009 to expand the endovascular surgery practice here in Weston. He performed the first endovascular repair of a thoracic aortic aneurysm at Cleveland Clinic Florida. Dr. King's experience and administrative talents were quickly recognized, and he became Chairman of the Division of Surgery at Cleveland Clinic Florida, until the organization morphed into the institute model in 2014.

Dr. King's tenure at Cleveland Clinic Florida over the past 12 years has

been the culmination of a career characterized by superb patient care and the deft application of surgical skills honed over four decades. He delighted in mentoring surgical residents and imparting his vast knowledge of vascular disease to medical students. He was recognized by the surgical residents as Teacher of the Year. Dr. King was also particularly mindful and supportive of the efforts of all caregivers and support staff and stressed the importance of teamwork in providing the world-class care which has become the standard of Cleveland Clinic.

Dr. King's dedication to patient care and to training the next generation of surgeons is underscored by his wife's observation that he "never once called in sick from medical school, through residency, fellowship or as an attending. That included over 8,000 days on call!"

Dedication to his field and his family

Mrs. King also recently retired from her position as Senior Director of Quality and Safety at Cleveland Clinic Florida. She and Dr. King plan to remain very busy in their newfound retirement. In addition to spending

quality time with their grandchildren, they plan to travel. Dr. King hopes to rekindle his prior interest in music and to pursue his passion for woodworking. We, in the Department of Vascular Surgery, are also hopeful that Dr. King will continue to remain involved in clinical care and teaching on a part-time basis.

Dr. King recently reflected on his decision to become a surgeon, noting "...it is all I ever wanted to do, to become a doctor, to make a difference, to use my mind and my hands to help people. I think I have made some lives better, less burdensome, bought some time for some, cured some, and had a lot of fun and satisfaction along the way. I would not change a thing."

Dr. King's retirement was commemorated by a tribute in November with limited in-person attendance comprised of his immediate family, closest colleagues, caregivers, and surgical trainees. The event was also live-streamed, bringing forth a "virtual" outpouring of congratulations from those who have been an important part of Dr. King's career from across the United States.





Dr. King's wife. Diane. was a familiar face at Cleveland Clinic Florida where she served as Senior Director of Quality and Safety prior to retiring in early 2020.

Thirty Years of Service to Patients – Howard Bush, MD, Reflects on a Long, Successful Career



Howard Bush, MD

Howard Bush. MD, recently hit a milestone of 30 years of service at Cleveland Clinic Florida. Although it is a great personal accomplishment

for him, he credits his patients with keeping him passionate about his work all these years.

training was done at Baylor College of Medicine, and he completed fellowships in cardiovascular disease and interventional cardiology at the Texas Heart Institute.

Dr. Bush was recruited by Floyd Loop, MD, CEO of Cleveland Clinic at the time, and Carl Gill, MD, the first CEO of Cleveland Clinic Florida. He admits that when he left Texas for South Florida in 1989 he wasn't sure he

15 physicians when he started to more than 250 "located on a magnificent and ever-expanding integrated medical campus."

"A lot of people believed in Cleveland Clinic Florida and stayed the course," Dr. Bush says. "We're just at the tip of the iceberg with where we're going. It's gratifying to see how far we've come. It motivates me for training future generations."

Dr. Bush, affectionately referred to as "The Legend" by his colleagues, takes a very individualistic approach to patients – spending time to get to know them as people. He enjoys sharing what he's learned about that with younger doctors.

"I'm tremendously proud of my work with patients," he says. "I've learned how to talk and communicate and listen to people. That's as rewarding as it gets."

[Patients] put lots of faith in you and I find that very motivating. It's the energy that drives me. That passion has never changed.

"I work for the patient," he says. "They put lots of faith in you and I find that very motivating. It's the energy that drives me. That passion has never changed."

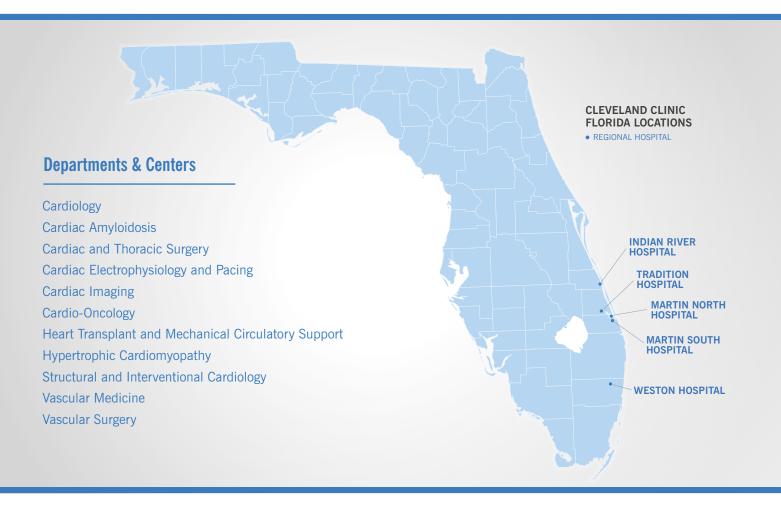
Dr. Bush received his undergraduate degree from Syracuse University and his medical degree from New York Medical College. His postgraduate

wanted to stay. It turns out, he says, that it was his best decision. In 30 years, Cleveland Clinic Florida has become a leading healthcare provider and "the talent pool is mind boggling."

Dr. Bush has said the most rewarding accomplishment has been the growth and development of Cleveland Clinic Florida's programs. It has grown from

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Cleveland Clinic Tradition Hospital

10000 SW Innovation Way Port St. Lucie, Florida 34987 844.630.4968

Cleveland Clinic Indian River Hospital

1000 36th Street Vero Beach, Florida 32960 877.463.2010



About Cleveland Clinic Florida

Cleveland Clinic Florida is a nonprofit, multi-specialty healthcare provider that integrates clinical and hospital care with research and education. The Florida region now includes Cleveland Clinic Indian River Hospital, Cleveland Clinic Martin Health, and Cleveland Clinic Weston Hospital, with five hospitals and numerous outpatient centers in Broward, Palm Beach, Martin, St. Lucie and Indian River counties. Cleveland Clinic Florida ranked #1 in the Miami-Fort Lauderdale metro area and is a top hospital in Florida, according to U.S. News & World Report's "2020-21 Best Hospitals" rankings. The Florida region is an integral part of Cleveland Clinic in Ohio, where providing outstanding patient care is based upon the principles of cooperation, compassion and innovation. Physicians at Cleveland Clinic are experts in the treatment of complex conditions that are difficult to diagnose.

For more information about Cleveland Clinic Florida, visit www.clevelandclinicflorida.org.

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