

# 2013

ANNUAL REPORT



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## INVESTING IN Humanity



# 2013

## ANNUAL REPORT

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### INVESTING IN Humanity

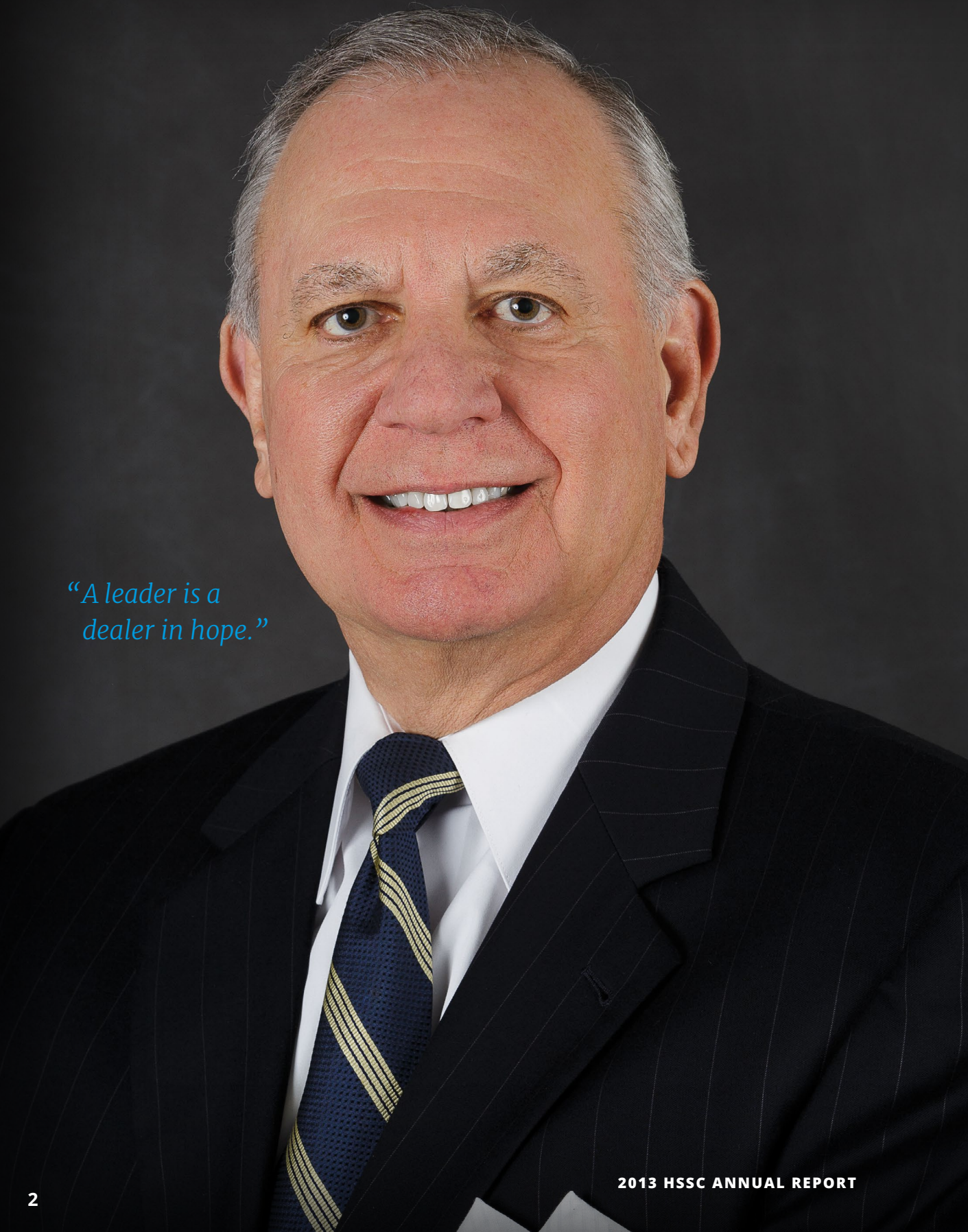
Established in 2004, Health Sciences South Carolina is America's first statewide research collaboration focused entirely on transforming healthcare quality, health information systems, tomorrow's workforce, and ultimately, patient outcomes.

We are a "big idea" organization and always have been. Our members see the value — and the power — of investing in humanity together so that we can transform the health of our state. Together we are committed to this shared mission:

*The mission of Health Sciences South Carolina is to support our members in improving the health of all South Carolinians by collaborating across the state of South Carolina with the goal of enabling evidence-based research.*

**HSSC MEMBERS** ANMED HEALTH // CLEMSON UNIVERSITY // GREENVILLE HEALTH SYSTEM // MCLEOD HEALTH // MEDICAL UNIVERSITY OF SOUTH CAROLINA // MUSC HEALTH // PALMETTO HEALTH // SELF REGIONAL HEALTHCARE // SPARTANBURG REGIONAL HEALTHCARE SYSTEM // UNIVERSITY OF SOUTH CAROLINA // UNIVERSITY OF SOUTH CAROLINA SCHOOL OF MEDICINE GREENVILLE





*“A leader is a dealer in hope.”*

## LETTER FROM THE President & CEO

### DEAR FRIENDS AND STAKEHOLDERS,

I write this letter with a great sense of accomplishment, a deep appreciation for my Health Sciences South Carolina in-house team and supported organization collaborators, and a tinge of sadness. After almost seven years, I am retiring as President and CEO of this amazing collaboration of hospitals and universities, which has proven time and again that diverse and competitive health organizations can work together for the betterment of our state.

When the South Carolina General Assembly recognized the power of research to drive change and created the SmartState Program as the vehicle to do so, the state’s largest research universities and health systems seized the opportunity and established Health Sciences South Carolina (HSSC). That initial leap of faith required a substantial financial and resource commitment by our member institutions, as well as a commitment to work as one in transforming South Carolina’s health. This grand vision and willingness to pursue the greater good of the state are what attracted me to South Carolina. I look back on my decision to work with South Carolina’s healthcare leaders with deep pride.

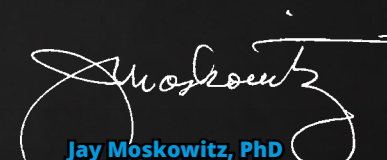
I extend my sincerest gratitude to the Board as well as to the staff of The Duke Endowment, which from the very beginning saw the possibilities of statewide collaboration to transform the health of South Carolina. For this act of faith by The Duke Endowment, and for its investment of more than \$32 million in HSSC, the people of South Carolina, and humanity, I am forever grateful.

HSSC’s vision and open arms approach have attracted a wealth of partners: the South

Carolina Hospital Association, South Carolina Primary Healthcare Association, South Carolina Office of Rural Health, BlueCross BlueShield of South Carolina, PHTS Risk Management Services, the Carolinas Center for Medical Excellence, South Carolina Department of Health and Environmental Control, South Carolina Department of Health and Human Services, and many more.

HSSC has had numerous accomplishments, the biggest of which in 2013 was the debut of the Clinical Data Warehouse (CDW). Like HSSC itself, the CDW is a “first in the nation” informatics tool that researchers and medical professionals across our state can use to advance patient-focused research and to improve patient care and outcomes. Presently, the CDW enables us to collect and aggregate de-identified patient data from the major health systems in our state—Greenville Health System, MUSC Health, and Palmetto Health—which may then be used as the basis of important research initiatives.

Once again, I would like to thank everyone who welcomed me as chief executive of this incredible organization and made the journey so very rewarding. I cannot thank enough our member organizations that made the commitment to work together to achieve the best possible results. Also, I am grateful to the HSSC staff, who work tirelessly to advance our mission, as well as to the South Carolina General Assembly for its leadership and to our many other partners for their enthusiasm and efforts. Together we can “Make Good Health Possible™” for all South Carolinians.

  
**Jay Moskowitz, PhD**  
President & CEO, Health Sciences South Carolina





# LETTER FROM THE Chairman of the Board

**DEAR FELLOW SOUTH CAROLINIANS,**

Nearly a decade ago, when Health Sciences South Carolina (HSSC) was founded, we offered South Carolinians a fresh, forward thinking concept that promised to improve the health of South Carolinians while also improving the state's economy.

Today, as America's healthcare system undergoes a major transformation, HSSC is poised to be a leader in this new frontier. The Affordable Care Act as well as today's market forces demand that providers deliver higher quality care in the most efficient manner possible. As we slowly emerge from the Great Recession, we must acknowledge the reality that the incidence of many preventable diseases is worsening at the same time that our financial ability to combat them is tightening.

As a health researcher, I am a practical person. It is abundantly clear to me that while we should never sacrifice patient care for cost-effectiveness, these two things are not mutually exclusive. Through investments in HSSC, we are uniquely positioned to meet the challenge of giving providers the tools they need to make evidence-based decisions that eliminate inefficiencies in the healthcare system.

At HSSC, a powerful coalition of academi-

cians, researchers, healthcare executives and front-line clinicians are working together to find answers that will make care more patient-centered, more effective and more safe than it is today. This is how we will begin to turn the tide against the chronic diseases that have affected generations of South Carolinians, exacting an enormous human and economic toll.

The recently launched statewide Clinical Data Warehouse is a prime example of how HSSC puts South Carolina on the leading edge. The Clinical Data Warehouse will allow researchers to conduct comparative effectiveness studies across a much broader patient population base than ever before, while making South Carolina a destination for the development of next-generation pharmaceuticals and medical devices.

We owe great thanks and appreciation to Jay Moskowitz, who captured the vision of HSSC and moved mountains to deliver its mission to the people of South Carolina. His dedication to improving the lives of ordinary South Carolinians will not be forgotten and we wish him Godspeed as he retires. We will continue to carry the mission forward, investing in humanity by creating a better state and nation.

*Harris Pastides*

**Harris Pastides, PhD**

President, University of South Carolina  
Chair, HSSC Board of Directors



INVESTING IN HUMANITY





# BOARD OF Directors

There is tremendous power when an organization has a clear vision and solid support from its members. Such is the case with Health Sciences South Carolina. We are fortunate to have the following leaders serve

on our Board of Directors. Each individual brings knowledge and insight from around the state to a single table to work together to make good health possible through innovative and forward-thinking initiatives.



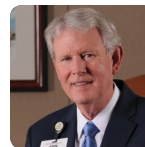
**Harris Pastides, PhD**  
President  
University of South Carolina

*“A great person attracts  
great people and knows how  
to hold them together.”*

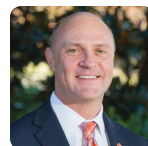
GOETHE



**Charles D. Beaman, Jr.**  
CEO  
Palmetto Health



**John A. Miller, Jr. FACHE**  
CEO  
AnMed Health



**James P. Clements, PhD**  
President  
Clemson University



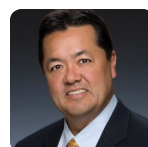
**Jim Pfeiffer**  
President & CEO  
Self Regional Healthcare



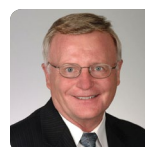
**Rob Colones**  
President & CEO  
McLeod Health



**Michael C. Riordan**  
President & CEO  
Greenville Health System



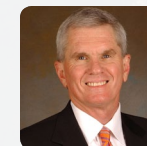
**Bruce Holstien**  
President & CEO  
Spartanburg Regional Healthcare System



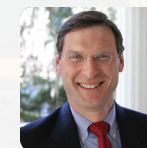
**Mark S. Sothmann, PhD**  
Interim President  
Medical University of South Carolina

## A Special Thanks

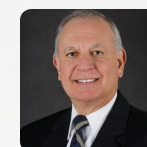
In 2013, three distinguished HSSC Board members and leaders retired or moved on to other opportunities. Join us in thanking them for their numerous contributions to our organization and state.



**James F. Barker, FAIA**  
Former President  
Clemson University



**Raymond S. Greenberg, MD, PhD**  
Former President  
Medical University of South Carolina



**Jay Moskowitz, PhD**  
President & CEO  
Health Sciences South Carolina



# Investing in RESEARCH Leads to BETTER CARE

John A. Miller, Jr. serves as the CEO of AnMed Health System. AnMed Health is one of South Carolina's largest independent not-for-profit hospital systems, with more than 3,600 employees and nearly 50 service delivery sites in the Upstate and northeast Georgia. After serving in the U.S. Navy and completing a Masters of Health Administration from Duke University, Miller began his career at AnMed Health in 1973.

**HSSC:** AnMed has a history of being innovative and a leader rather than a follower. Can you explain why this has been a priority and what it means to your community?

**JM:** We've been an innovator from the very beginning. When Jeannie Gilmer decided to start a hospital in tiny Anderson more than a century ago, small towns didn't have hospitals. In fact, Charleston had the only other hospital in the state when we opened our doors in 1908. We've been a leader ever since. One of our most recent investments is the TrueBeam STx system, the most advanced radiosurgery technology available anywhere in the state. It's just one example of how we're always adjusting to deliver the very best healthcare to the communities we serve.

**HSSC:** What are some of the challenges facing South Carolina's hospitals today?

**JM:** The transition from a system of volume-based to value-based reimbursements, developing a clinical integration strategy across a continuum of care, and accelerating our efforts to become a Highly Reliable Organization. These are just a few and they are ongoing, life-long challenges as we set our sights on the kind of excellence we aspire to reach.

**HSSC:** Why is it important that AnMed Health and other South Carolina hospitals like Self Regional Healthcare System and McLeod Health be affiliated with Health Sciences South Carolina?

**JM:** There are a number of reasons why it would be attractive, but to name one: everyone should want to get in on the ground floor of our statewide collaborative effort to establish the Clinical Data Warehouse. There is a reason people outside South Carolina wish to be a part of it. We're establishing a rich database of patient data that will be a tremendous resource for researchers and clinicians in South Carolina. This collaboration is something that no one else has done and will be a tremendous contributor to improving the health status of our state's population.



John Miller, CEO, AnMed Health System

**HSSC:** HSSC leads a number of statewide collaborations, including one with the South Carolina Hospital Association, that bring diverse partners to the table. Why are these collaborations important to our state, health systems and people?

**JM:** We have a national reputation for sometimes getting a little feisty in South Carolina, but the truth is that most of the time we work really well together, including the healthcare industry and our lawmakers. HSSC is a big idea and we're a state accustomed to forming collaborations to make big ideas work. It's paid off with better patient safety, quality care, and research that improves patient outcomes.

**HSSC:** Any other comments you would like to add about the Clinical Data Warehouse or HSSC?

**JM:** HSSC's Clinical Data Warehouse is a very progressive idea and I'm proud to see it launched in South Carolina. It promises to be a significant boost to patient safety, quality care and quality outcomes. In the end, the best patient care is what we are all about. ■

# 2013: THE YEAR IN REVIEW

## Investing in Humanity Yields Results

### CITIA-SC HELPS MORE THAN 1,200 PHYSICIANS IMPLEMENT ELECTRONIC HEALTH RECORDS SYSTEMS

As part of the 2009 HITECH Act, the Centers for Medicare and Medicaid Services (CMS) provides financial incentives to healthcare providers for the “meaningful use” of certified electronic health records (EHR) systems. To receive the incentives, physicians and hospitals must demonstrate they are meeting certain requirements of use, ranging from recording patient information as structured data to exchanging care records with other providers.

Sounds simple, right? If only it were. Implementing EHR systems can be very challenging

for medical practices. EHR systems are costly and complicated to deploy. Staff must be trained on the new processes. And all this needs to happen while medical practices are busy caring for patients.

Health Sciences South Carolina (HSSC) saw an opportunity to lead this important effort.

In 2009, HSSC secured a \$4.8 million federal grant to help South Carolina’s primary care physicians to implement EHR technology and qualify for CMS financial incentives. To support the statewide initiative, HSSC established the Center for IT Implementation Assistance (CITIA-SC) to operate a CMS Regional Extension Center.

The effort has been hugely successful. CITIA-SC was the second Regional Extension Center in the nation to sign up 1,000 physicians to implement certified EHR systems. To date, more than 1,200 South Carolina physicians have enrolled. And, more than 500 physicians have met the standards for meaningful use, qualifying for CMS financial incentives.

Additionally, CITIA-SC has helped participating physicians receive more than \$15 million in Medicaid EHR adoptions. CITIA-SC has also played a vital leadership role in getting EHR vendors to assist physicians with the process of connecting to the South Carolina Health

*“We knew we had to implement the Medicare Incentive Program’s requirements for Meaningful Use to ensure full reimbursement for services provided to our patients, but it’s very complicated, particularly for a busy medical practice like ours. We used CITIA-SC as a consultant to help us. Our CITIA-SC representative understood all of Medicare’s requirements and had an excellent, highly professional rapport with our office. CITIA-SC fulfilled our expectations.”*

**Beth Gold, Practice Manager**

Dr. Jonathan Sack Family Medicine  
Hilton Head Island



Information Exchange (SCHIE), a statewide information system specifically for sharing health information between healthcare providers and state and federal agencies.

As an added bonus, the statewide network of physicians using EHR systems can assist HSSC in securing future federally funded healthcare reform research projects.

### PREVENTING HOSPITAL READMISSIONS

A 2013 study conducted by The Dartmouth Institute found that one in six Medicare patients is readmitted to the hospital within 30 days of discharge. Costs associated with avoidable readmissions are estimated in one study to exceed \$17 billion a year nationally. In 2012, the Center for Medicare and Medicaid Services began imposing financial penalties on hospitals with excessive readmission rates, to encourage hospitals to improve their systems of care and reduce avoidable readmissions.

In 2012, HSSC joined BlueCross BlueShield of South Carolina and the South Carolina Hospital Association to establish the Partnership for Health leadership collaboration.

The initial project of this organization is the Preventing Avoidable Readmissions Together (PART) Program. The goal of this statewide program is to reduce avoidable readmissions and to improve communication between patients and providers.

“Often patients are released from the hospital with limitations in their ability to manage their medical condition,” explained Dr. Chris Turley, the HSSC Chief Medical Officer. “Establishing an effective, proven system of communication by hospitals at the time of discharge will give patients more confidence as they transition to settings outside of the hospital. These enhancements to communication have been shown to help avoid preventable readmissions.”



## HEALTHCARE SIMULATION SC TRANSFORM EDUCATION, ADVANCES STARTUP COMPANIES

HealthCare Simulation South Carolina, which is supported in part by HSSC, has helped establish a network of simulation training centers across the state, and in the process, has transformed how future doctors, nurses, allied health and EMS workers are trained. Under the direction of Dr. John Schaeffer (pictured right), HealthCare Simulation South Carolina has increased the number of training simulations from about 1,000 to more than 25,000 per year statewide, and developed more than 400 simulation scenarios and 25 courses that have brought some \$2 million in research

funding to South Carolina. Additionally, HealthCare Simulation South Carolina partners have provided over 115,000 student encounters.

Working with HealthCare Simulation South Carolina, HSSC has been instrumental in a successful spinoff company and commercial development relationships, working with SimTunes, LLC, and Laerdal Corporation to deliver course content for distribution in the online SimStore®. The Simulation Center is working closely with B-Line Medical to develop and distribute SimCapture and SimBridge, patient simulation related software.

## CAROLINAS TO COLLABORATE ON RESEARCH

The Carolinas is a region of historically poorer health and greater disparities compared to other regions and states in the U.S. In an effort to improve the region's health status, HSSC has facilitated the creation of a unique research collaboration called the Carolinas Patient-Centered Outcomes Network (CP-CON) composed of Clemson University, Duke University, Medical University of South Carolina, University of North Carolina, University of South Carolina, and Wake Forest

University, along with Palmetto Health and Greenville Health System.

During summer 2013, leaders from each institution established an organizational structure and plan of action for improving health and reducing disparities in the Carolinas. Plans include building a comprehensive infrastructure that supports patient-centered outcomes research and allows CP-CON to successfully compete for federal research grants.



CP-CON FORMATION MEETING PARTICIPANTS



JOHN J. SCHAEFER, III, MD, DIRECTOR, HEALTHCARE SIMULATION SOUTH CAROLINA; SMARTSTATE LEWIS BLACKMAN ENDOWED CHAIR FOR PATIENT SIMULATION AND RESEARCH

## EFFORTS TO REDUCE HOSPITAL-ACQUIRED INFECTIONS LEADS TO NEW TECHNOLOGY

Hospital-acquired infections (HAIs) are the most common complication of hospital care, occurring in approximately one in every 20 patients. Treating HAIs costs U.S. hospitals as much as \$45 billion annually. HSSC has been working for several years to develop novel products that enable prevention or avoidance of infectious disease. Since later 2012, this effort, led by HSSC Chief Economic Development Officer Michael Randall, has resulted in six idea disclosures, five provisional patent applications, one utility patent application, and one technology license agreement.

HSSC has developed technologies to address potential sources of contamination in healthcare facilities. The first invention addresses contamination transference via privacy curtains. "Clean Shield" dispenses sanitary sheets and acts as a

sterile handle at the edge of the privacy curtain. This invention has U.S. and International patent pending status. The second invention, "Sani-Switch," addresses contamination transference via light switches, elevator buttons and the like, using germicidal ultraviolet illumination (GUVI) to ensure a disinfected switch contact surface. The third invention addresses the need for local sanitization of devices such as blood pressure cuffs, stethoscopes and examination lights. This invention has U.S. and International patent pending status. The fourth invention, "Sani-Sock," addresses contamination of handheld devices with user interfaces, such as remote controls. It uses antimicrobial treated fabric to physically and chemically separate people from contamination that is resident on most handheld electronic devices. ■

MICHAEL RANDALL, PHD, MBA  
CHIEF ECONOMIC DEVELOPMENT OFFICER





# ACTIONABLE *Information is* INTEGRATED *Information*

An international expert in bioinformatics, medical informatics and predictive analytics, Dr. Les Lenert is a pioneer in developing web-based systems for patient use and online research studies. He was the founding director of the National Center for Public Health Informatics at the Centers for Disease Control and Prevention (CDC). He recently served as associate chair of Quality and Innovation in the Department of Internal Medicine and professor of Bioinformatics at the University of Utah. Dr. Lenert joined Health Sciences South Carolina (HSSC) in December 2013 as Chief Medical Information Officer. Given the shortage of high-level bioinformatics experts at U.S. medical institutions, South Carolina is fortunate to have Dr. Lenert.

**HSSC:** What brought you to South Carolina?

**LL:** The short answer is opportunity. A former U.S. Secretary of Health said that our country has a healthcare sector, not a system, which is why we're facing challenges today. HSSC has a vision of creating an effective healthcare system for South Carolina. Informatics and predictive analytics, my area of expertise, play a major role in that. No one else in the country has the informatics infrastructure South Carolina has for advancing healthcare research and improving public health.

**HSSC:** You also hold major positions at HSSC member the Medical University of South Carolina (MUSC).

**LL:** I was appointed the first Chief Research Information Officer at MUSC and the SmartState Endowed Chair in Medical Bioinformatics. MUSC's interim president, Dr. Mark Sothmann, is a visionary; he sees the merit of integrating informatics into the MUSC research infrastructure and leveraging it into HSSC's assets. By taking a global view of the flow and sharing of information, we can make clinical information more useful to research efforts, and in turn, research more useful for clinicians.

**HSSC:** Mention "informatics" and most people's eyes glaze over. Why is it important?

**LL:** (Laughs) Thank goodness for guys like me who love data and structuring it so people can use it. For example, after the terrorist attacks of 9/11, I led a team of engineers and computer scientists that developed the first wireless location-aware EHR system for first responders. At the CDC, I managed the development of key national biodefense computer systems. Here in South Carolina, we are using informatics, and more specifically HSSC's Clinical Data Warehouse, to create a "Rapid Learning Healthcare Delivery System," where we use de-identified data generated by doctors, hospitals, and their patients to improve public health and healthcare services. It's exciting work!



Les Lenert, MD, MS, FACMI

**HSSC:** South Carolina was ranked 47th in the country in health status. We're now ranked 43rd. How can we continue improving?

**LL:** The answer to that lies in data from health systems across the state and how we use it, and changing what's possible. By determining where we standardize care for overall population health (evidence-based medicine), and where we individualize care to the patient, we can create new models of healthcare delivery that lead to the best health system possible for South Carolina.

**HSSC:** It sounds complicated.

**LL:** It is, which is why no state is doing it except for South Carolina. Our state is fortunate to have HSSC and university and health system organizations working together and investing in a statewide Clinical Data Warehouse. The warehouse contains data from 70 percent of South Carolina's hospital beds. We're also merging databases from public health departments and insurance companies. The end result is a powerful confluence of information that can then be used to improve healthcare and public health in South Carolina.

**HSSC:** At the end of the day, what makes your job worthwhile?

**LL:** HSSC is an extraordinary convening place for collaboration and true healthcare transformation in South Carolina. It's great to be part of it. ■



# CLINICAL DATA WAREHOUSE LIVE!

## Advancing the Rapid Learning Healthcare Delivery System

What if we could link the data systems of South Carolina's largest hospitals and communicate that information to the state's largest research universities, thus creating a comprehensive, statewide patient database for research?

This question was posed to Health Sciences South Carolina (HSSC) member organizations in 2008. The rationale for creating the Clinical Data Warehouse was compelling. Clinical researchers need vast quantities of patient information to develop and test ideas behind the next generation of treatments and technology. The ability to study statewide patient populations in real time and to retrieve detailed healthcare data beyond their own patient databases would greatly amplify researchers' efforts and results.

The Clinical Data Warehouse excited HSSC's health system members because such a statewide tool could lead to better treatments for the chronic diseases that plague South Carolinians and reduce healthcare costs. The

tool could also foster partnerships with the biomedical industry, leading to new medical technologies and job creation.

HSSC leaders agreed to make the Clinical Data Warehouse a priority initiative. With its launch in September 2013, the Clinical Data Warehouse has become the cornerstone of the South Carolina Rapid Learning Health System, a powerful tool HSSC and its member organizations are now using to change the course of research, healthcare and public health in the state, and potentially the nation.

HSSC has initiated three pilot projects that utilize the Clinical Data Warehouse to address chronic illness and disease in South Carolina. The projects will also demonstrate how this powerful tool uses de-identified patient data from across the state to support research, which in turn supports a better healthcare system and ultimately better public health. HSSC's Chief Medical Officer, Dr. Christine Turley, is overseeing the three projects.



**Christine Turley, MD**  
HSSC Chief Medical Officer

*"The Clinical Data Warehouse was five years in the making, the work of hundreds of people committed to making this first-in-the-nation research tool happen. Now that the CDW is live, we're wasting no time in addressing the pressing health issues of our state."*



RON TEUFEL, MD, MUSC CHILDREN'S HOSPITAL

### CDW PROJECT 1: CHILDHOOD PNEUMONIA

The United Nations Children's Fund estimates that pediatric pneumonia kills 3 million children worldwide each year. Pneumonia remains a significant cause of childhood death in the United States. Pediatric pneumonia is the second leading cause of hospitalization among children in South Carolina.

In 2011, the Pediatric Infectious Diseases Society and Infectious Diseases Society of America introduced evidence-based clinical practice guidelines for managing Community-Acquired Pneumonia in children. These guidelines recommend the use of narrow spectrum antibiotics as the first line of treatment in inpatient hospital settings. The guidelines also include recommendations about the site of care, testing and prevention.

South Carolina's Children's Hospital Collaborative is now working together with the help of HSSC and our Clinical Data Warehouse to improve care of children hospitalized with pneumonia across the state, as well as to develop a statewide model for a Rapid Learning Health System for children.

The project is coordinated by Dr. Matt Garber, Palmetto Health Children's Hospital;

Dr. Ronald Teufel, MUSC Children's Hospital; and Dr. Elizabeth Tyson, Greenville Health System Children's Hospital. The project will evaluate how the state's children's hospitals are adhering to the new clinical care guidelines, how they are treating their patients and what approaches are yielding the best results for patients.

It will look at decreasing the overuse of broad-spectrum antibiotics and decrease incidence of multi-drug resistant organisms. Finally, the project will look at hospital utilization such as length of time a child was hospitalized, complications of hospitalization, re-hospitalization, along with utilization of outpatient services and emergency departments.

The ability to analyze data from children's hospitals from across the state is powerful, said Dr. Turley. "We are excited about this first project because it will allow researchers and clinicians in South Carolina to fully realize what the Clinical Data Warehouse can do in terms of supporting and accelerating research, but it's also exciting to know this tool will allow us to achieve a new evidence-based standard of care for pediatric pneumonia patients capable of getting better results."



## CDW PROJECT 2: OUT-OF-HOSPITAL CARDIAC ARREST

According to the Centers for Disease Control and Prevention, half of heart- and stroke-related deaths occur before a patient arrives at a hospital. This is very troubling news for South Carolinians as heart disease is the second leading cause of death in the Palmetto State. Creating a more effective out-of-hospital system of care for cardiac arrest patients could potentially lead to dramatic improvements in survival rates.

HSSC is working with South Carolina DHEC, the state's EMS system, South Carolina Hospital Association and MUSC to improve out-of-hospital cardiac arrest care in South Carolina. The program will include a statewide cardiac arrest registry to establish benchmarks, assess current standards of care, and improve in the overall system of care.

HSSC's plan is to model the cardiac arrest system of care after the highly successful South Carolina ST Elevation MI (STEMI) network. The 19 existing primary STEMI

centers will be designated as Cardiac Arrest Centers and work at a regional level with local EMS agencies and referring hospitals to implement processes such as field-induced hypothermia as well as to establish bypass and transfer protocols to Cardiac Arrest Centers. Key background information will be gathered through HSSC's Clinical Data Warehouse to evaluate current care across the state for diagnoses, outcomes and interventions, as well as to evaluate patient characteristics to identify patterns of decision making post-cardiac arrest.

The project is in its early stages. MUSC is collecting and analyzing two years of cardiac arrest-related data. The effort will expand to include Greenville Health System, Palmetto Health and other HSSC member hospitals. The ultimate goal is a more effective system of out-of-hospital cardiac arrest care used by all of South Carolina hospitals and EMS will to save lives.

*"We have collected the data on MUSC patients who experienced heart attacks over the last two years and are now analyzing it to determine how effective our care is in saving lives and returning patients to healthful lives, how we can use our findings to help hospitals across South Carolina improve their care to heart attack patients, and finally, how we can create a statewide network that works together to constantly improve out-of-hospital care for heart attack patients. The Clinical Data Warehouse is making this possible."*

**Thomas Todoran, MD, MSc**

Interventional Cardiologist  
MUSC Heart & Vascular Center



ELIZABETH TYSON, MD, GREENVILLE HEALTH SYSTEM CHILDREN'S HOSPITAL

## CDW PROJECT 3: SAFE SURGERY

Safe Surgery 2015, a partnership between the Harvard School of Public Health and the South Carolina Hospital Association, was initiated in 2010. Its purpose was to establish a statewide Surgical Safety Checklist that prevents rare and "never" events, as well as decreases the incidence of surgical complications. HSSC member health systems were early adopters of the surgical safety checklist.

"Never" events are preventable surgical complications like leaving an instrument in a patient, performing surgery on the wrong place, using the wrong procedure, or even operating on the wrong patient. More than 4,000 "never" events occur annually in the United States.

HSSC's goal is to understand whether using the Surgical Safety Checklist results in a decrease in serious surgical events. HSSC will work with the Harvard School of Public Health team to create a model for pattern recognition within the CDW data to identify

non-coded complications, work with computer science teams to evaluate Natural Language Processing and Machine Learning tools to identify outcomes, and evaluate the change in surgical outcomes across HSSC-supported organizations. The project will assess the impact of Safe Surgery 2015 complications on participating health systems pre- and post-implementation, develop a model of impact based on the Surgical Safety Checklist implementation, and estimate the impact of statewide implementation on preventable surgical complications across the state. ■



# UNLEASHING THE POWER

## Taking the Clinical Data Warehouse to Users

Katherine Reilly, a lead analyst for HSSC who is involved in the rollout of the Clinical Data Warehouse to researchers across South Carolina, has heard it all. “After a demonstration of the Clinical Data Warehouse in Charleston, a researcher was so impressed with the system that he told Dr. Turley that he loved it.”

What’s not to love about HSSC’s Clinical Data Warehouse? Authorized researchers at Clemson University, Greenville Health System, Medical University of South Carolina, (MUSC), Palmetto Health, and the University of South Carolina can now tap into one of the country’s best biomedical databases to support patient-centered research.

What makes the Clinical Data Warehouse even more attractive is its usability. The warehouse contains robust demographic data, everything from age, location, race, and religion to diagnoses and procedures. (Diagnostics, medications, and labs will be added in 2014.)

*“We developed the Clinical Data Warehouse thoughtfully and with input from our partners and experts like Oracle so that from day one it was workable for researchers and clinical users and scalable so that we can easily add other South Carolina hospitals.”*

**Jihad Obeid, MD, Co-Director**  
MUSC Biomedical Informatics Center  
SmartState Chair in Biomedical Informatics

Researchers can drill down as deeply as they desire and review data from the entire state or from their own institution. They can “drag and drop” data sets and download charts, all with just a few clicks.

According to Reilly, the ease of use is greatly appreciated, as researchers don’t have to invest time in learning a complicated system. After signing in through a secure login, researchers have immediate access to patient population data that has been de-identified to protect patients’ privacy. Training sessions on how to use the warehouse are underway at HSSC-supported organizations across the state.

The Clinical Data Warehouse can be expanded



MARVELLA FORD, PHD, MUSC HOLLINGS CANCER CENTER & KATHERINE REILLY, HSSC LEAD ANALYST

in a myriad of ways to improve the health outcomes and economy of South Carolina. Marvella Ford, PhD, a researcher at the MUSC Hollings Cancer Center, believes it will make South Carolina more competitive for federal research grants. These grants have the potential to pump millions of dollars into the state’s economy, create jobs and position the state as a leader.

“Currently, the process of preparing research grant applications is very tedious and time consuming. We have to hunt for information, often going to different sources for supporting data. The Clinical Data Warehouse will make it faster and easier to get the preliminary data required for grant applications. It will also support applications for multi-site studies, and encourage even greater collaboration between Clemson, MUSC and USC researchers,” Dr. Ford said.

What’s next for HSSC’s Clinical Data Warehouse? Currently, the warehouse contains data from Greenville Health System, Palmetto Health and MUSC. In 2014, HSSC will bring Spartanburg Regional Healthcare online, followed

by the other three HSSC member health systems, AnMed Health, McLeod Health and Self Regional Healthcare. The datasets will soon be expanded to include information on medications and laboratory tests. The Clinical Data Warehouse could also be utilized by the biomedical industry in order to conduct research to advance new drugs, devices or treatments. Such partnerships could bring investment and new jobs to South Carolina.

“This will create the ultimate statewide healthcare learning system where data leads to better care for all South Carolinians and a healthier population. It’s very humbling,” said Dr. Chris Turley, HSSC, CMO, “and we’re all proud to be part of it.” ■

*“This is amazing! Not only will the Clinical Data Warehouse save us hours of time, it will make us much more competitive in securing national research grants.”*

**Marvella Ford, PhD, Researcher**  
MUSC Hollings Cancer Center



## GENERATION NEXT: Greenville Medical School Challenges Students to Be Critical Thinkers

Stewart Lee came to the University of South Carolina School of Medicine Greenville with no interest in research; his dream was to become a doctor. However, now that he and fellow medical student Geevan George have just completed and published their first research project in a scientific journal, ISRN Biomaterials, Lee looks at research differently.

"I had no clue how powerful and practical research can be for physicians and their patients. It turns out I like research," said Lee.

South Carolina's newest medical school, the USC School of Medicine Greenville, requires all of its students to complete a patient-focused research project as part of their education. The prerequisite is an important part of the School of Medicine mission to create a new generation of physicians who don't accept the status quo and instead rely on research and evidence-based medicine to determine the best care for patients and society.

Lee and George turned to Dr. Thomas Pace, a medical school faculty member and Greenville Health System orthopedic surgeon,

for direction on their research project. He suggested they compare the performance of two knee joint devices, a traditional implant made of cobalt chrome, and another made of an advanced material, oxidized zirconium.

Dr. Pace explained his rationale for suggesting the study. "It gets down to doing what's truly best for the patient and economics. In 2013, 450,000 total knee joint replacement surgeries were performed. By 2030, that number is expected to be 3.5 million. There's a huge variation in the cost of knee joint devices; newer devices can cost as much as 50 percent more than traditional devices. Do outcomes justify the cost? That's something we need to determine."

Dr. Pace has performed total knee joint replacement surgeries for 20 years and maintains a database on his patients. He gave



*"We teach our medical students to look beyond the status quo and use research-backed, evidence-based medicine to continually stay current with what is best for patients."*

**Jerry Youkey, MD, Dean**  
USC School of Medicine Greenville



USC SCHOOL OF MEDICINE GREENVILLE STUDENTS GEEVAN GEORGE AND STEWART LEE, WITH FACULTY MENTOR DR. THOMAS PACE

Lee and George access to data on 120 knee replacements using the two knee devices. Dr. Pace also enlisted Nicole Durig, then a Master's candidate in Bioengineering at Clemson University, to assist Lee and George with their study based on her research, engineering and metallurgy experience.

"We didn't have a clue at first," said Lee. "With Nicole's help, we learned the nomenclature and process of research."

Laboratory simulations conducted by the manufacturer showed the more costly oxidized zirconium knee joint device performed better than the cheaper device. How something works in a controlled lab setting can be very different than the real world. As part of their analysis, Lee and George reviewed patient outcome data with the two devices, including patients' range of motion, flexion, pain, and overall movement. They also compared radiographic studies. What they learned about the devices' performance surprised them.

"The lower cost device yielded the same results as the costly device," reported Lee.

What they learned from the process of thoroughly analyzing both devices was perhaps even more important.

Lee explained. "The science behind the more expensive joint device is stout; you assume it's better based on the metal and design. But when you put the device in a human, the difference in outcomes between it and the other device was negligible. It showed me that physicians have to do their homework."

Added George, "As physicians, we can't keep spending healthcare dollars like we did in the past. We have to identify products and procedures that are clinically effective and cost efficient."

Dr. Pace is satisfied with the project's results. "These young men learned they have to question, investigate, and become critical thinkers. It was a lesson well learned." ■

**NICOLE DURIG,**  
MASTER OF BIOENGINEERING, CLEMSON; MEDICAL STUDENT, MUSC





## MEMBER ORGANIZATIONS:

# Partnering to Make Good Health Possible

**H**ealth Sciences South Carolina members include the largest research-intensive universities and health systems across the state, which equates to a powerful agent for change.

**AnMed Health** is South Carolina's largest independent, not-for-profit health system and includes three licensed hospitals: AnMed Health Medical Center, AnMed Health Rehabilitation Hospital and AnMed Health Women's and Children's Hospital. It also operates a cancer center, Level II trauma center, cardiac and orthopedic centers, three outpatient surgery centers, a family medicine residency program, and physician practices throughout the Upstate and northeast Georgia.



**Clemson University** Ranked 21st among national public universities, Clemson University is a land grant, science- and engineering-oriented research university with a strong commitment to student success. Located in the Blue Ridge foothills, Clemson is characterized by high academic standards, a culture of collaboration and relentless school spirit. Clemson is highly ranked for quality, value, return on investment and efficiency by Princeton Review, Kiplinger's and U.S. News & World Report.



[CLEMSON.EDU](http://CLEMSON.EDU)

**Greenville Health System** is committed to medical excellence through patient care, research and education. GHS offers patients a comprehensive network of expertise and technologies through its six medical campuses, tertiary medical center, research and education facilities, community hospitals, physician practices and numerous specialty services throughout South Carolina's Upstate. It also is home to one of the nation's newest medical schools, University of South Carolina School of Medicine Greenville.



**McLeod Health** Recognized nationally for its quality initiatives and methodology, McLeod Health has a leading regional presence in northeastern South Carolina and southeastern North Carolina. McLeod is constantly seeking to improve its patient care with efforts that are physician-led, data-driven and evidence-based. Founded in 1906, McLeod Health is a locally owned and managed, non-profit organization.



**MUSC** has served the citizens of South Carolina since 1824, expanding from a small private medical college to a state university with a medical center and six colleges for the education of health professionals, biomedical scientists and other health-related



personnel. MUSC is a top research university, conducting federal and private-funded investigations across a full spectrum of health concerns, from bioengineering and tissue generation to cancer and heart disease to drug discovery and healthcare disparities.

[MUSC.EDU](http://MUSC.EDU)

**MUSC Health** is among the state's largest health systems with a main campus in downtown Charleston and primary care and specialty medical practices throughout the Lowcountry. MUSC Medical Center is ranked by U.S. News & World Report as the #1 hospital in South Carolina and nationally ranked in three adult subspecialties and three pediatric specialties.



[MUSCHEALTH.COM](http://MUSCHEALTH.COM)

**Palmetto Health** is the largest healthcare system in the Midlands. The system includes Palmetto Health Baptist, Palmetto Health Children's Hospital, Palmetto Health Heart Hospital and Palmetto Health Parkridge, scheduled to open spring 2014. The system trains future physicians through 23 residency and fellowship programs affiliated with the USC School of Medicine Columbia.



[PALMETTOHEALTH.ORG](http://PALMETTOHEALTH.ORG)

**Self Regional Healthcare** is a not-for-profit regional referral center and tertiary care facility located in Greenwood that serves a seven-county region known as the Lakelands. In 2010, Self Regional received the South Carolina Governor's Quality Award and for four straight years has earned the Gallup Great Workplace Award as one of the top 25 places to work in the world. Self Regional is a teaching hospital, graduating 10 family medicine physicians annually.



[SELFREGIONAL.ORG](http://SELFREGIONAL.ORG)

**Spartanburg Regional Healthcare System** is an integrated healthcare delivery system in the Upstate. Spartanburg Regional is nationally recognized for excellence in nursing and is among the fewer than three percent of hospitals nationwide to achieve Magnet designation, nursing's top honor. In 1983, the National Cancer Institute named Spartanburg Regional one of 50 sites for a Community Clinical Oncology Program. Today, the program at the Gibbs Cancer Center provides patients all the benefits of a major research hospital.



[SRHS.ORG](http://SRHS.ORG)

**University of South Carolina** is the only South Carolina institution that has received the highest ranking by the Carnegie Foundation as an institution with "very high research activity." USC's sponsored research awards have totaled more than \$200 million per year each of the last six years. USC's faculty and students engage in a diverse array of research and scholarly activities that promote innovation across multiple disciplines, including health sciences, advanced materials, energy, environment and sustainability.



[SC.EDU](http://SC.EDU)

**University of South Carolina School of Medicine Greenville** is South Carolina's newest medical school, located at the heart of the Greenville Health System and backed by two decades of partnership in providing comprehensive medical education to students from the University of South Carolina. Medical students develop the leadership, clinical, and interpersonal skills essential to delivering the next generation of patient-focused healthcare with confidence and compassion.



[GREENVILLEMED.SC.EDU](http://GREENVILLEMED.SC.EDU)



# HSSC Leadership and Staff

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Interim President & CEO

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Academic Program Manager

**R. Maynard Cain, MBA, PMP**  
Program Manager

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Program Coordinator-CITIA-SC

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**Ranina Outing**  
Assistant to the Chief Medical Officer

**Genevieve Ray Lyons, MSPH**  
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**Lori Ritter**  
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Executive Assistant to the President

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**Andrew Cates**  
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**John Clark**  
IT Operations Manager

**Spencer Clark**  
DDSL Program Analyst (SCTR)

**Jean Craig**  
Systems Architect & Database Developer

**Tami Crawford**  
Senior Applications Analyst

**Rick Larsen**  
Clinical and Informatics Program Director

HSSC'S OFFICES  
ON THE MUSC  
CAMPUS IN  
CHARLESTON



HSSC'S OFFICES IN THE MERIDIAN BUILDING IN DOWNTOWN COLUMBIA



HSSC'S OFFICES IN THE GREENVILLE HEALTH SYSTEM PATEWOOD MEDICAL CAMPUS IN GREENVILLE







# A Clear Path FORWARD

## DEAR FRIENDS,

**H**ealth Sciences South Carolina is a results organization. This can be attributed to two things: a clear mission and strong leadership. Which is why it makes it easy to serve this visionary organization, its members, and our state as the interim president and CEO. To say that I am honored is an understatement.

Jay Moskowitz left big shoes to fill, but fortunately he also left a clear path forward. HSSC will continue to conduct collaborative health sciences research to improve the health status, education, workforce development, and economic wellbeing of all South Carolinians.

Consider our results. By working within our organization and with other associations, government entities and health systems across the Palmetto State, we have helped improve South Carolina's national health status ranking from 46th in the nation to 43rd. The fact that we have jumped three positions is huge considering other states are also trying to improve. We improved more.

Now that the statewide Clinical Data Warehouse is operational, HSSC will have the data and analytics necessary to advance South Carolina's health systems and health status even further. We will continue to engage partners like the South Carolina Hospital Association and BlueCross BlueShield of South Carolina. And we will continue to seek large grants that will fund our efforts and turn dreams of a healthier state into reality.

Health Sciences South Carolina is making good health possible by investing in humanity. You can be confident this will remain our clear path forward.



**J. Todd Thornburg, PhD**  
Interim President & CEO  
Health Sciences South Carolina

*"Leadership is defined by results not attributes."*

PETER DRUCKER

*"I extend my sincerest gratitude to the Board as well as to the staff of The Duke Endowment, which from the very beginning saw the possibilities of statewide collaboration to transform the health of South Carolina. For this act of faith by The Duke Endowment, and for its investment of more than \$32 million in HSSC, the people of South Carolina, and humanity, I am forever grateful."*

**Dr. Jay Moskowitz, HSSC President & CEO**



**WE WELCOME YOUR INTEREST IN  
HEALTH SCIENCES SOUTH CAROLINA  
AND OUR MEMBER ORGANIZATIONS.**

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