

# Orthopedics





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## Pursuing Brilliance in Orthopedics

Our mission is to improve health every day. While that may sound altruistic, for orthopedic care, it's true. Each time our orthopedic team members have the opportunity to interact with a patient or their family member, we have the ability to make their lives better. At Sentara we have seen that happen throughout our health facilities. By developing and implementing the most effective clinical protocols, focusing on details, outcomes and supporting collaborative teamwork, we have seen continuous improvement. We saw that in our operating rooms when we celebrated zero wrong events in all of our Sentara Hospitals operating rooms for 2016. That's the type of excellence we hold ourselves to with Sentara orthopedics care.

With the focus on quality, we also believe in creating value for the patients we serve. This approach translates to high quality care that drives costs and inefficiencies out of the system. We strive to align our services across the continuum of care, evaluating and improving the patient experience.

We know that data drives change and that sharing this data through a spirit of transparency is necessary to truly integrate our services.

With that data transparency, our physicians are empowered to help lead our quality initiatives, and we have created a common data repository for our reporting. Our clinical focus is to evaluate and deliver clinical protocols and pathways, with guidelines for safe care oversight, and mechanisms in place to ensure adherence to our evidence-based protocols.

Physician participation is critical to the success of our orthopedic service line. We work with more than 250 orthopedic surgeons and providers and 50 podiatrists across Virginia and northeastern North Carolina. Collectively surgeons performed over 20,000 (all hospitals) inpatient and outpatient orthopedic surgeries throughout Sentara in 2016, a 7% (2015 Epic hospitals) increase over 2015. More than 5,950 of those were elective hip and knee joint replacements, a 15.2 percent increase over 2015.

Caring for our patients doesn't stop when a patient leaves the hospital. With shortened hospital stays, we are arming our patients with more education and resources before any procedure or surgery is performed and it extends to the delivery of more services at home. This is a critical part of creating more value for our patients and keeps their recovery on track.

We also recognize the need for continuing education for surgeons and staff. We partnered with our neurology colleagues to offer the first Sentara conference on managing neuromusculoskeletal disorders. More than 226 surgeons, physicians, advanced health practitioners, nurses and therapists attended this one-day CME conference.

Both 2016 and 2017 have shown growth in orthopedics. Our pursuit of brilliance in orthopedics has created a path of successful orthopedic programs that stretches across Virginia and down into North Carolina. Take a look at the list of orthopedic achievements and then learn the details throughout the pages of this report.

From the patient stories, you will be able to embrace the passion of people who have restored their way of life from the orthopedic care they have received. That is truly our mission.

As we continue implementing our strategic plan, it's important to celebrate and share our accomplishments and commend our superb care teams for their commitment to excellence. Mostly, we thank our patients for trusting us to care for them.



Carole S. Guinane, RN, MBA  
Vice President  
Sentara Orthopedic Services



Jack L. Siegel, MD  
Chairman  
Sentara Orthopedics High  
Performance Team (HPT)

[Online at SentaraOrthoAnnualReport.com.](http://SentaraOrthoAnnualReport.com)

# Sentara Healthcare

## 12 Acute Care Hospitals

- 7 in Hampton Roads
- 1 in Northern Virginia
- 2 in the Blue Ridge Region
- 1 in Halifax
- 1 in Northeastern North Carolina



**Sentara Norfolk General Hospital**  
Norfolk, VA  
525 Beds



**Sentara Albemarle Medical Center**  
Elizabeth City, NC  
182 Beds



**Sentara Heart Hospital**  
Norfolk, VA  
112 Beds (included in Sentara Norfolk General Hospital license)



**Sentara Northern Virginia Medical Center**  
Woodbridge, VA  
183 Beds



**Sentara CarePlex Hospital**  
Hampton, VA  
224 Beds

**Orthopaedic Hospital at Sentara CarePlex**  
Hampton, VA  
18 Beds (included in Sentara CarePlex Hospital license)



**Sentara Leigh Hospital**  
Norfolk, VA  
250 Beds

**Orthopaedic Hospital at Sentara Leigh**  
Norfolk, VA  
48 beds (included in the Sentara Leigh Hospital license)



**Sentara Obici Hospital**  
Suffolk, VA  
176 Beds



**Sentara Halifax Regional Hospital**  
South Boston, VA  
192 Beds



**Sentara Martha Jefferson Hospital**  
Charlottesville, VA  
176 Beds



**Sentara Princess Anne Hospital**  
Virginia Beach, VA  
160 Beds

# SENTARA HEALTHCARE AT A GLANCE

129-Year Not-for-Profit Mission



**28,000+ Members of the Team**



**Four Medical Groups**

With more than 1,000 Physicians and Advanced Practice Clinicians at 222 Locations



**12 Acute Care Hospitals**



**Advanced Imaging and Diagnostic Centers**



**Nursing and Assisted-Living Centers**



**Home Care and Hospice**



**Optima Health Plan**

Serving 450,000 Members



**Sentara College of Health Sciences**



**Sentara Quality Care Network**

A Clinically Integrated Network



**Sentara RMH Medical Center**  
Harrisonburg, VA  
238 Beds



**Sentara Williamsburg Regional Medical Center**  
Williamsburg, VA  
145 Beds



**Sentara Virginia Beach General Hospital**  
Virginia Beach, VA  
276 Beds



# Vision for Unifying Orthopedics

Collaboration and consistent adoption of evidence-based best practices and innovations unifies Orthopedics across all providers affiliated with Sentara. We deliver orthopedic services across the continuum of care and consistently achieve excellent outcomes marked by:



## Some of our 2016 - 2017 orthopedic achievements include:

- Orthopedic and Spine Task Force Teams, with 28 surgeons and 10 service line leaders, provided a systematic approach focused on innovation, standardization, quality and capital acquisitions. The results have been dramatic, saving more than \$1 million through 2017.
- Orthopedic Service Line Teams at each facility continue to implement the orthopedic vision, by monitoring and evaluating care at each Sentara hospital, then coming together as a group to evaluate areas for improvement.
- Orthopedics volumes grew across all regions of Sentara.
- Introduced two new orthopedic programs, Sentara Sports Medicine Center and Sentara Hand Specialty Center, which were developed in 2016 and opened in the first quarter of 2017.

- Three new Sentara Back & Neck Centers opened in 2016 and another opened in early 2017.
- Another Sentara Foot & Ankle Center opened in early 2017 with several facilities planning to open later in 2017/early 2018.
- The Express Track Option was implemented in two additional sites.
- Additional two Sentara OrthoJoint Centers opened in early 2016 and 2017 in our rural markets. An additional center opened in late 2017 to be the 11th center since the initial openings in 2011.
- In May 2017, we designated a second Orthopedic Hospital. The Orthopedic Hospital at Sentara Leigh is the first dedicated orthopedic hospital in South Hampton Roads and it recognizes the facility's decades of excellence in orthopedic care. It joins Sentara CarePlex on the Peninsula as the only two dedicated orthopedic hospitals in the region. Orthopedic hospitals at Sentara provide access to the full complement of orthopedic services from pre-habilitation and surgery to rehabilitation and home care services. Specialized surgical orthopedic care is provided through board-certified and fellowship trained orthopedic physicians known for sub-specialization with expertise in joint replacement, hand and upper extremity

care, shoulder surgery, sports medicine, orthopedic trauma care, orthopedic research, and more.

- Embraced the new norm of bundled orthopedic care and opportunities to further empower patients in caring for their health. Holistic care became even more important to us, with a continued shift for caring for the overall health of the patient and responsible for any readmissions after surgery.



#### PATIENT CONNECTION

+ Sally

“With my hereditary osteoarthritis, I needed to pursue surgical options when pain and stiffness in both shoulders made the simplest daily tasks difficult. Physical therapy has made all the difference in restoring my quality of life. Through hard work, perseverance and staff encouragement, I’m once again playing with my grandchildren. My quality of life has been restored.”

# Differentiated Orthopedic Care at Sentara

At Sentara, our level of patient care is distinctive as we challenge ourselves to be the best with a commitment to constant learning, research and innovation. We strive for excellence, promote teamwork and collaboration, and actively pursue and adopt the latest care techniques and technologies.

## Focus on Patient Outcomes

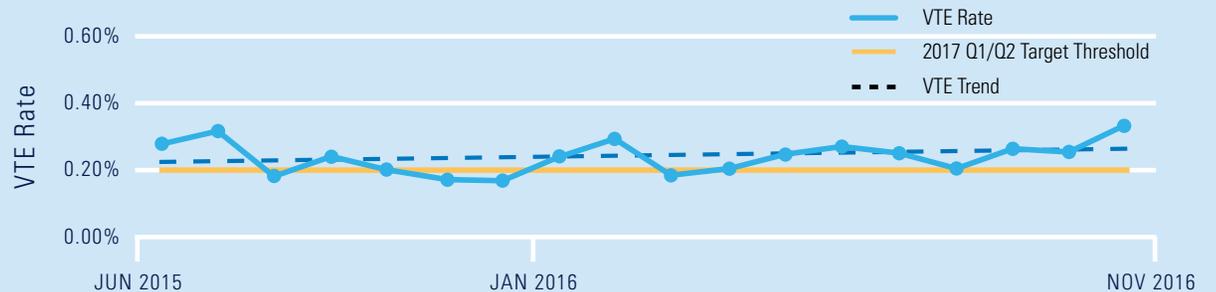
Our mission depends on the care we deliver, so we measure outcomes in as many ways as possible — often beyond what is mandated. We share the resulting data with physicians and other providers across our system, not only to regularly review our performance but also to learn, grow and innovate.

## QUALITY IMPROVEMENT

### System-wide VTE Reduction

Maintained improvement from 2014 with 28% fewer VTEs system-wide

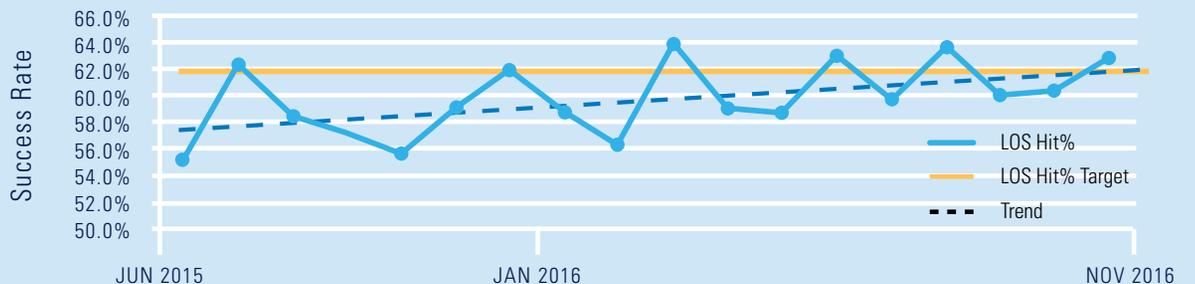
#### VTE Rate 18 Month Trend



### Reduction in Length of Hospital Stay

18% of all Sentara OrthoJoint Center patients went home in 1 day in 2016 compared to under 10% in 2015

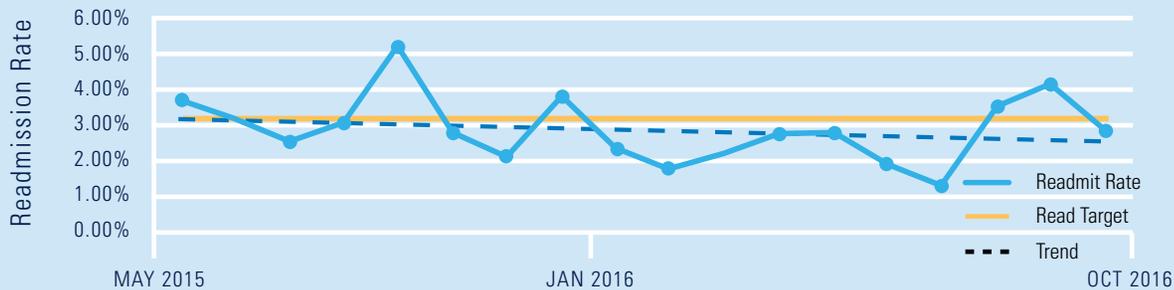
#### System LOS Success Rate



## Reduction in Readmissions

16% fewer SOJC readmissions in 2016 — 2.77% — vs 2015 at 3.29% (30 fewer cases)

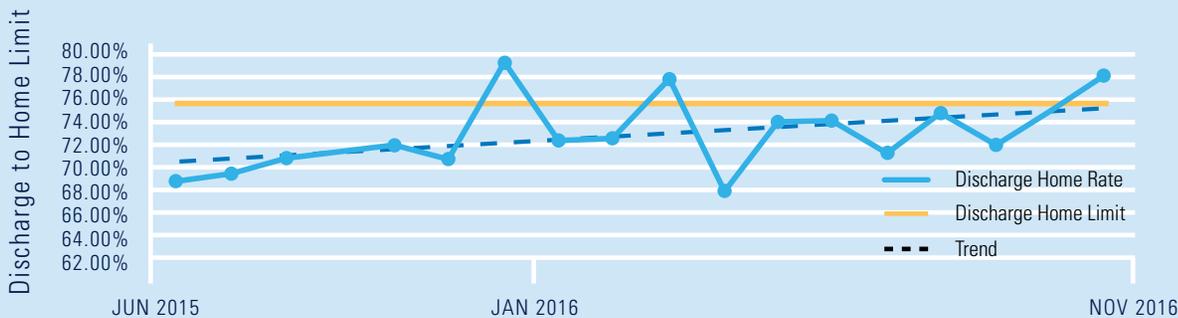
### System Readmission Rate 18-Month Trend



## Discharge Home/Home Care for TJA

5% increase in discharging patients to home, nearly 300 more patients

### System Discharge to Home Rate 18-Month Trend



## Commitment to the Best Pathways for Care

Local physicians work with clinical and operational leaders at Sentara to identify and evaluate the best protocols. With an eye toward consistency across the system, they implement those improvements that are backed by data and meet or exceed national standards and show an improvement for patient outcomes.

## Dedication of the Orthopedic High Performance Team (HPT)

The HPT tracks goals and measurements across our system, to improve quality in a consistent and coordinated manner. We share information with the orthopedic providers in our communities, so they can compare their performance to their peers. A shared goal of helping patients heal faster with better protocols and discharging them home when ready has already led to fewer hospital readmissions. It also celebrates the surgeons and team members each month for their excellent work in the local and national field of orthopedics.

# Awards & National Recognition

The dedication of our staff and community physicians has helped Sentara in earning a national reputation for exceptional patient outcomes and innovative care. Sentara is continually recognized as one of the most progressive and integrated healthcare organizations in the nation. We have earned a multitude of awards and accolades for our orthopedic care.



## 2016 Anthem Blue Cross and Blue Shield, Blue Distinction Center Award for Hip and Knee Replacement

Recognition was awarded to eight Sentara hospitals across the system:

- Sentara CarePlex Hospital
- Sentara Leigh Hospital
- Sentara Martha Jefferson Hospital
- Sentara Northern Virginia Medical Center
- Sentara Obici Hospital
- Sentara RMH Medical Center
- Sentara Virginia Beach General Hospital
- Sentara Williamsburg Regional Medical Center



## U.S. News & World Report 2016-2017 included Sentara hospitals:

**Sentara Norfolk General Hospital, #1 hospital in Hampton Roads; tied for #2 in Virginia.**

**Sentara Leigh Hospital as a regional high performing hospital in Orthopedics, and #2 hospital in Hampton Roads; #9 in Virginia.**

**Sentara RMH Medical Center and Sentara Martha Jefferson Hospital in a 3-way tie for #12 hospital in Virginia.**

### In 2016 Hospital Compare

recognized

Sentara Leigh Hospital as the **only hospital in Virginia** to be recognized as both **“Better than the National Rate for Hip and Knee Complications and Better than the National Rate for Readmissions.”**

Hospital Compare has information on the quality of care at over 4,000 Medicare-certified hospitals. This can be used to compare the quality of healthcare across the country. (Medicare.gov)

### 2016 Anthem Blue Cross and Blue Shield

**designation for Spine Surgery was awarded to five Sentara hospitals:**

- Sentara CarePlex Hospital
- Sentara Leigh Hospital
- Sentara Norfolk General Hospital
- Sentara Princess Anne Hospital
- Sentara Virginia Beach General Hospital

## Truven

Sentara Leigh Hospital was recognized among the 100 top Truven hospitals by Truven Health Analytics in 2017. These hospitals demonstrated major improvements in the areas of inpatient mortality and complication rates, 30-day readmissions and lengths of stay, according to the study.

## Becker's Hospital Review: National Recognition

Becker's Healthcare recognized Orthopedic Hospital at Sentara Leigh as one of the top 100 Great Orthopedic Programs in the nation for 2016 and among the top 100 Hospital and Health Systems Orthopedic Programs for 2017.

Our Express Track program made Becker's 2016 Top 10 List, **"How 10 Hospitals took their Joint Replacement Programs to the Next Level."**



## Healthgrades Names Top Hospitals for Patient Safety and Patient Experience

Healthgrades is an organization that covers the people, policy and technology driving next-generation healthcare in the U.S. Each year they release a list of more than 400 hospitals as part of their annual Patient Safety Excellence Award that, by their analysis, perform above their peers when it comes to limiting deadly medical errors and other preventable patient harm incidents.

### Patient Safety:

- Sentara CarePlex Hospital
- Sentara RMH Medical Center
- Sentara Williamsburg Regional Medical Center

- Healthgrades also publishes a Patient Experience Award list that it also says represents the top 15% of facilities when it comes to patient experience based on the facility's Hospital Consumer Assessment of Healthcare Providers and Systems surveys to gauge how highly patients rank them. According to Healthgrades, the awarded hospitals represent the top 15% in the nation.
- **Patient Experience:**
  - Sentara CarePlex Hospital
  - Sentara Leigh Hospital
  - Sentara Martha Jefferson Hospital
  - Sentara Princess Anne Hospital
  - Sentara Williamsburg Regional Medical Center

The full list of winners can be found at [www.healthcareitnews.com/node/537874](http://www.healthcareitnews.com/node/537874)

## Nursing Magnet® Accreditation is held by seven Sentara hospitals

- Sentara CarePlex Hospital
- Sentara Leigh Hospital
- Sentara Martha Jefferson Hospital
- Sentara Norfolk General Hospital
- Sentara Princess Anne Hospital
- Sentara RMH Medical Center
- Sentara Williamsburg Regional Medical Center



All of these hospitals have earned this recognition for quality patient care, nursing excellence and innovations in professional nursing practice.

# It Takes A Team

The spectrum of orthopedic care is wide and highly specialized. While the navigators, nurses, orthopedic surgeons and therapists are the most visible components of orthopedic treatments, it takes the expertise of many additional clinical providers to offer the comprehensive care that we as a system demand and patients deserve. We have taken the opportunity to recognize some additional members of the team that contribute throughout the clinical experience to make our excellent patient outcomes a priority.



## “Well” Before Surgery

Across the board, a patient’s general health is a concern both before and after surgery. For elective/scheduled surgeries, a designated Pre-Anesthesia Surgical Screening (PASS) can identify potential health issues and create a plan to manage the health issue that could affect, or even delay surgery. For elective surgeries, patients are advised to expect a call from the PASS Nurse for a health interview. In some areas a primary care physician or nurse practitioner may provide this screening. This pre-screening done before anesthesia provides an additional layer of safety, and another opportunity to help patients to be at their most optimal health before anesthesia and surgery.

## Anesthesia and Medications

Both anesthesiologists and pharmacists focus on the goal of providing optimal pain control in a manner that keeps orthopedic patients comfortable and safe. Their open and innovative approaches to patient care have directly reduced the time a patient needs to be hospitalized.

- Advances in long-lasting local anesthetics have provided newer anesthesia options that can dramatically decrease postoperative pain and recovery time after hip or knee replacement.
- The focus on perioperative pain control and multi-modal analgesia allows the use of multiple agents to treat pain before it starts and continues through all phases of surgery. This can help to avoid narcotics and the unwanted side effects they can cause.
- Sentara is moving toward surgeries that use regional anesthesia instead of general anesthesia. Regional anesthesia results in less grogginess and nausea, and patients can be up and moving the same day as their surgery. The results are showing in our patients’ decreased length of stays.

## Financially Responsible Care

Bundled Payments for Care Involvement (BPCI) is a partnership program with Sentara and Remedy Partners™ to better manage and improve the health of hospitalized Medicare patients. Patients are provided services at no additional cost that help to coordinate their care and control their health care costs. This covers care while the patient is in the hospital and extends through the recovery after the patient is discharged from the hospital. Participating patients continue to have the right to choose their health care provider.

A total joint replacement BPCI (program) was launched in 2016 with impressive results:

- Readmissions declined to 5.7% from a baseline of 10.8%
- Referral to Skilled Nursing Facility reduced to 35.2% as compared to baseline of 55.5%
- Referral to Home/Home Care was 53.6% as compared to a baseline of 40.7%
- Skilled Nursing Facility days 18.4, compared to baseline of 24 days



## Rehab

With the skilled inpatient therapy team, an overwhelming majority of joint replacement patients are up and walking the day of surgery, hastening recovery and allowing discharge directly to home. However, for patients who require short-term skilled rehabilitation therapy, Sentara offers the full continuum of care, including the new Sentara Rehabilitation & Care Residence. This newly constructed 120-bed facility features an innovative “household” design with 20 residents each, and a resident-centered approach to care currently in use at just 3 percent of skilled nursing facilities nationwide. It is also the first facility of its

kind in Virginia to move beyond a trial phase to full implementation.

## Hospitalists: Specialists in Managing Care for Patients During Hospitalization

Throughout Sentara facilities, surgeons have the resources to include a full-time hospitalist or other primary care physician to consult with any orthopedic patient in need of additional medical attention while hospitalized for an orthopedic procedure. Whether a medical issue develops following a procedure or it is a previously known comorbidity, the team rallies to manage the patient’s care. It’s part of the emphasis to keep

SYSTEM-WIDE INITIATIVE:

**Lower the incidence of clots to less than 1% of patients at the majority of Sentara hospitals**

(The target is 0.49% at Sentara Norfolk General Hospital because of its trauma designation.)

patients at their optimal health to promote recovery as well as prevent readmission for a medical issue that can be addressed while the patient is in our facility.

## Setting the Standard: Improving the Patient Experience

The success and expansion of Sentara Orthopedics is a direct result of our dedication to improving the patient experience. We've implemented countless measures to improve both overall care and treatment — from the initial consultation to postoperative care and beyond. We don't just follow the crowd; instead, we constantly set the standard for excellence in our regions and beyond. Right now, our patients are benefiting from game-changing advances that include:

- **Sentara Fracture Care:** Committing to operations for hip fracture patients within 24 hours: This approach significantly lowers mortality rates and blood clots (DVTs), with most patients up the day of surgery.
- **Standardizing nationally proven best practices at the 11 Sentara OrthoJoint Center® locations:** This effort began in 2011 and continues to evolve and show excellent patient outcomes fueled in part from the patient interaction and education. For example, blood transfusions were reduced from 21.9% in 2011 to 3.4% in 2016. This resulted in nearly 1 million in cost savings over 5 years. (917k)
- **Limiting the use of narcotics with the adoption of pain management protocols:** Our focus is on perioperative pain control (starting prior to surgery and continuing through discharge) and multi-modal analgesia (treating pain before it starts). This approach includes the use of medicines that work on pain receptors everywhere in the body, resulting in less nausea, less confusion and a significant decrease in patient recovery time.
- **Implementing a comprehensive protocol for infection prevention and MRSA screening:** Coupled with pre-surgery screenings for anemia and malnutrition, this protocol has significantly improved patient outcomes by lowering infection rates.
- **Establishing and adopting DVT (deep vein thrombosis) prophylaxis protocol within each Sentara OrthoJoint Center® and system-wide:** This protocol has been associated with significant reductions in the postoperative formation of clots in blood vessels (thrombosis) that can lead to severe complications and even death.

### PATIENT CONNECTION

+ Thomas

"I was worried about having surgery, because after an earlier one, I woke up experiencing post-traumatic stress disorder. I shared my concern with the staff, and the anesthesiologist took every precaution, allowing my wife and my daughter into the recovery room to comfort me and instruct the nurses on how to approach me so I wouldn't become alarmed. It was the best care I ever had."



# Innovations SURGICAL & PROCEDURAL

The care teams at Sentara strive to improve patient care by developing, adopting and implementing the most sophisticated and proven techniques, technologies and protocols. Our commitment to advancement in orthopedic care ensures a distinguished patient experience. Our innovative approach is multifaceted.

## Rapid Recovery Protocols

Sentara orthopedic care teams continue to evaluate methods of care that help patients to recover more quickly. Along with the surgical precision and innovation, there are numerous practices that are effective in helping our patients' progress through recovery and back to enjoying everyday activities:

- Preoperative education to prepare patients and their caregivers to set expectations and goals for recovering from surgery.
- Encouraging patients to be at their best physical health prior to any elective surgery by stopping smoking, starting pre-surgery exercises to strengthen muscles for recovery

after surgery, and preparing the home as a clean, healthy place to recover.

- Exchanging addictive opioids for multi-modal pain management, including non-addictive pain medications, day of surgery physical therapy that gets patients up and moving, and an attentive care team that helps patients to keep ahead of post-surgical pain. When pain is at a tolerable level, patients are more able to move, participate in therapy and reduce the risk of developing a blood clot.
- Something as simple as having elective surgery patients to wear their own clothes in the hospital gives patients the sense of normalcy that motivates them to get up and moving.

## Robotic-Assisted Surgeries

Over the past years the development of robotic-assisted technologies has focused on increasing the precision of certain types of orthopedic and neurological surgeries. Some of the technologies combine the use of CT scans to help prepare the individualized plans for surgery.

For orthopedic and spine surgeries, Sentara currently has robotic-assisted surgical equipment systems that are available for surgeons to implement for spinal surgeries, total hip replacements, partial knee replacements, and in 2017, the added capability for robotic-assisted total knee replacements.

## Muscle-Sparing Procedures:

- Subscapularis total shoulder replacement technique: This muscle-sparing approach for total shoulder replacement preserves the subscapularis muscle, reduces the risk of tendon failure, provides fewer postoperative restrictions and potentially shortens rehabilitation time.
- Mini-stem and stemless shoulder replacements that do not violate the bone canal.
- Direct anterior approach hip replacement (also known as Jiffy Hip\* in some markets) continues to grow, with 39.5% growth from 2016 to 2017 third quarter, with 926 direct anterior approach hip replacements. This

minimally invasive advancement in hip replacement surgery uses a direct anterior (frontal) approach and does not require muscle or tendon detachment. It is available at most Sentara OrthoJoint Center® locations.

- Subvastius knee replacement: This minimally invasive total knee arthroplasty reconstructs or replaces the joint while sparing the quadriceps muscle, leading to a quicker recovery.

\*Registered trademark of Mitsuho Orthopedic Systems Inc.

## Specialized Surgical Procedures

Surgeons practicing at Sentara facilities have adopted cutting-edge, minimally invasive surgeries for total joint replacement surgery, fracture care and arthroscopic surgery. Smaller incisions preserve the patient's natural soft tissue blood supply, result in less postoperative pain and lead to quicker healing. These surgeries include:

- Bone-preserving implants for shoulder replacement surgery
- Less invasive implants for fracture care
- External fixator to correct complex lower extremity deformity (see Natasha's story)

### PATIENT CONNECTION

## + Natasha

"I've been working with doctors for 30 years. My vitamin D-resistant rickets gave me bowed legs and kept me from growing over 4'-5". My last two surgeries used the Orthofix TrueLok Hexapod external fixator to change the length and shape of my legs. Now I'm 4'-8"."

# Clinical Research

Throughout Sentara, we continually embrace the value of good clinical research and the difference it can make in patient care. Orthopedic surgeons who practice at Sentara facilities continue to pursue clinical improvements through clinical trials and research, both at the local and national levels. Across the regions, these surgeons are presenting their findings at national association meetings and being published in specialty trade journals.

## System-wide Clinical Trials

### Cupron: World's largest clinical trial on copper a success at Sentara

A 10-month clinical trial at Sentara Leigh Hospital in Norfolk, Virginia, determined that hard surfaces and linens infused with copper oxide compounds contributed to an 83 percent reduction in C-difficile and a 78 percent overall reduction in multi-drug resistant organisms (MDROs) including C-diff, MRSA and VRE in a real-world clinical environment. These results occurred in a hospital with a robust protocol for managing infection risk certified by the health care accrediting body DNV-GL Healthcare.

Patient data was analyzed from the highest-touch surfaces in patient rooms including rolling bedside tables and hand rails on the sides of patient beds, plus bed linens, gowns and washcloths that came into direct contact with patients.

Sentara Healthcare partnered with Richmond, Virginia-based Cupron Inc., which invented the proprietary copper oxide technology used in the surfaces and textiles, and Norfolk, Virginia-based EOS Surfaces LLC, which developed the unique copper oxide-impregnated hard surfaces. EOS Surfaces manufactured custom-made countertops, bathroom sinks, bedside tables and bedrails that were installed in 124 patient rooms

in the newly-built East Tower at Sentara Leigh Hospital, plus copper-infused work surfaces at nursing and charting stations, in soil rooms and other common areas.

We owe it to our patients to try new approaches and this clinical trial indicates that copper-infused products are an effective addition to a robust infection prevention program. Sentara is in the process of incorporating Cupron materials in all of our 12 hospitals in Virginia and North Carolina.

The results of the trial were published in the peer-reviewed American Journal of Infection Control on Sept. 28, 2016, and were presented at the annual conference of the Infectious Disease Society of America in New Orleans on Oct. 27, 2016.



## Clinical Research

Our facilities feature orthopedic surgeons who are actively involved in research and clinical trials to helping to advance patient care. Institutional Review Boards in each region review, approve and govern clinical trials at our facilities. This policy ensures patients are safe and informed when participating.

*Review Academic Publications on page 40 or online at [SentaraOrthoAnnualReport.com](http://SentaraOrthoAnnualReport.com).*

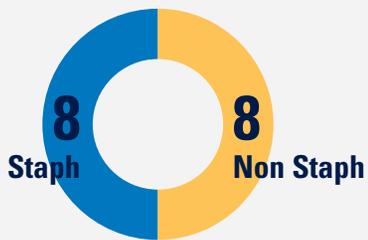
## Nose to Toes: Infection Prevention Pilot

### Reducing Surgical Site Infections

For our Sentara Back & Neck Center program, presurgery patient education involves time spent with the Spine Patient Navigator where patients learn not only how to prepare for surgery but also to learn what steps patients can take to reduce infections along with reducing the risk of a blood clot (VTE).

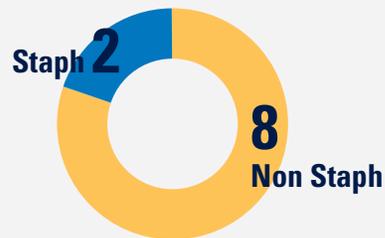
From March 2016 to March 2017, Sentara Norfolk General Hospital focused on reducing the surgical site infection rate with the introduction of a protocol that had patients bathing the night before and morning of surgery with a soap packet and instructions that were provided, changed the wipe down in pre-op from site specific to total body and implemented an intranasal swabbing with povidone-iodine.

### SENTARA NORFOLK GENERAL HOSPITAL RESULTS



Pre-implementation:  
**644 patients**

Surgical Site Infections:  
**16 Total**



Post-implementation:  
**951 patients**

Surgical Site Infections:  
**10 Total**

#### Impressive Results

Even with a 47.7% increase in surgical case volume (from 644 to 951), there was a 58% reduction in Surgical Site Infections.

The increased cost of the supplies from \$1,452 to \$18,545 was significantly recovered by savings of \$496,795 in the reduced number of infections to treat.



### PATIENT CONNECTION

## + Christine

“Before my surgery, I was in a wheelchair and could not take care of my 8-month-old son. Now, two months post-surgery and with the help of your loved one’s tissue, I am fully mobile, working out five times a week, and chasing my almost year-old son around the house. I would not have been able to recover as quickly or as well without the gift your family gave me.”

## LifeNet Health

An extensive amount of research has led to amazing work with donor bio-implant technologies and cellular therapy materials that are changing people’s lives. This is especially true for regenerative care in orthopedics where injured or diseased bones, tendons and muscles can directly affect the quality of a person’s life. Our surgeons have access to these new technologies that honor donors and their families while allowing healing for patients with orthopedic concerns.

PATIENT CONNECTION

+ William

"I injured my knee years ago playing football, and I put off any operations. I finally had the knee replacement surgery because I wanted to walk my daughter down the aisle and dance at her wedding. Since then, I've continued to be pain-free and can chase around my grandson and ride my bike."



# Sentara OrthoJoint Center®

Each Sentara OrthoJoint Center® has a singular focus: the needs of orthopedic surgical patients undergoing hip or knee replacement. These 11 centers concentrate their efforts on a dedicated team approach involving nurses, anesthesiologists, surgeons, physical therapists and home care. This centered approach improves both patient care and outcomes and has helped us provide surgical options for patients.

## Highlights:

- Two new locations for a new Sentara OrthoJoint Center were established: at Sentara Halifax Regional Hospital in early 2016 and another site at Sentara Albemarle Medical Center in early 2017.
- In late 2016, Sentara RMH Medical Center branded its existing joint replacement program to become a Sentara OrthoJoint Center®.
- In late 2017, Sentara Martha Jefferson Hospital was designated the eleventh Sentara OrthoJoint Center®.
  - To better serve our diverse populations, a Spanish version of the Sentara OrthoJoint Center® Patient Guidebook was made available in 2016.

### Expansion Continues for the Sentara OrthoJoint Center®

Patients having joint replacement at Sentara grew

# 17.2%

in 2016 (over 2015 volume)



## PROGRAM LOCATIONS

- **Orthopaedic Hospital at Sentara CarePlex** | Hampton, VA
- **Orthopedic Hospital at Sentara Leigh** | Norfolk, VA
- **Sentara Albemarle Medical Center** | Elizabeth City, NC
- **Sentara Halifax Regional Hospital** | Halifax, VA
- **Sentara Martha Jefferson Hospital** | Charlottesville, VA
- **Sentara Northern Virginia Medical Center** | Woodbridge, VA
- **Sentara Obici Hospital** | Suffolk, VA
- **Sentara Princess Anne Hospital** | Virginia Beach, VA
- **Sentara RMH Medical Center** | Harrisonburg, VA
- **Sentara Virginia Beach General Hospital** | Virginia Beach, VA
- **Sentara Williamsburg Regional Medical Center** | Williamsburg, VA



A Dedicated Orthopedic Patient Navigator at each facility continues to offer to patients the extra benefit of an informed and individualized joint replacement experience.

The Patient Navigator helps foster open lines of communication among the patient, the patient's family and the care team before, during and after surgery. With education being such an active component for joint replacement patients, the navigators continuously look for additional ways to keep their patients and the coaches informed on the latest information. This has resulted in the team of navigators developing and implementing several innovative patient-focused materials:

- **Ten Ways to Recover at Home.** A two-sided document developed to help patients and their surgeons appreciate the advantages of being able to be discharged from the hospital directly to the comforts of home for a continued recovery. This document has since been adapted for other patients outside of orthopedic care.
- **Patient Commitment.** Choosing to have elective orthopedic surgery does come with a commitment from the commitment from the patient — and a coach — to do their best to learn what they can do to have the very best outcomes. This three-copy

document bullets out the simple things that can optimize the experience and recovery.

- **Stop Light Discharge Poster.** With hospital stays after surgery becoming shorter, when patients are discharged to home, they need to know the guidelines for what is normal, what symptoms need to be discussed with a health care provider and what needs immediate attention.
- **Online educational video** developed to offer 24/7 online access to patients and their families about the Sentara OrthoJoint Center® joint replacement experience. It is available at [SentaraOrthoJointCenter.com/video](http://SentaraOrthoJointCenter.com/video).

*View these patient education documents online at [SentaraOrthoAnnualReport.com](http://SentaraOrthoAnnualReport.com).*



**1-855-2ORTHOJT**

**This dedicated phone line assists people with joint pain to get connected with an orthopedic specialist.**

# COMMITMENT TO THE PATIENT EXPERIENCE: Patient Navigators

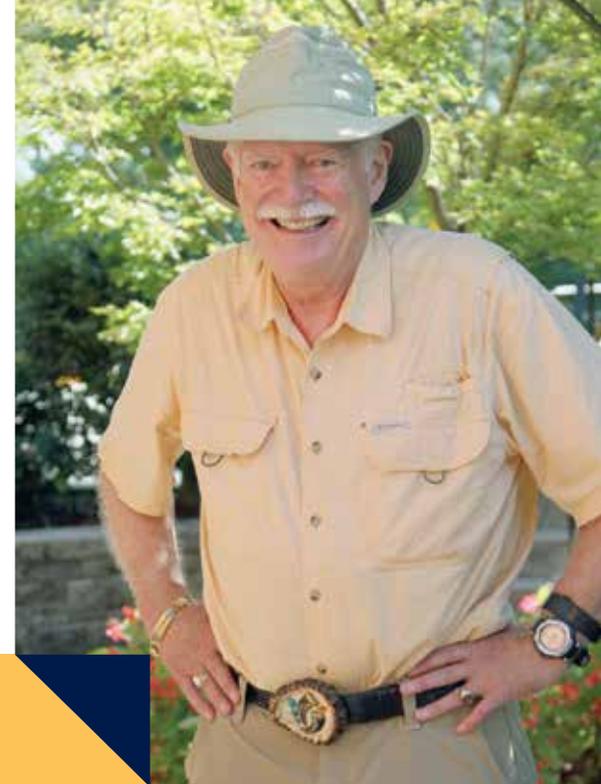


Sentara Patient Navigators are nurses with specialized training in orthopedics, helping them provide an extraordinary level of patient care in their role as liaisons between the patient, the physician and the hospital. The Patient Navigator assesses patient needs and provides personal, individualized care for each and every patient in the Sentara OrthoJoint Center® and the Sentara Back & Neck Center. Orthopedic Patient Navigators are available at all nine Sentara OrthoJoint Center® locations.

**There are Orthopedic/Spine Patient Navigators at each Sentara OrthoJoint Center® and Sentara Back & Neck Center.**

Sentara Patient Navigators see patients multiple times and serve as a touch point for the patient and the patient's family. They help ensure that patients are properly prepared to undergo surgery. Their assistance may include:

- Preparing patients for surgery at a preoperative class. Patients learn about preoperative cleansing to minimize bacteria on the skin and lessen the chance of infection.
- Understanding each patient's medical history and risk factors (making sure, for example, that a patient's diabetes is being properly managed).
- Coordinating all aspects of a patient's care while in the hospital and after they leave. Responsibilities include arranging group physical therapy, providing discharge instructions and following up after the hospital stay.
- Collaborating with the surgeons and other team members to continuously improve the patient experience.
- Evaluating patient care and looking for ways to improve patient outcomes.
- Conducting studies to see if simple changes can offer advantages for patients or their families.



## PATIENT CONNECTION

+ William

"I worked for many years as an orthopedic surgeon, and then, unfortunately, I experienced knee pain of my own. I decided to ask the people I worked with to do the surgery. The replacement went wonderfully. I got up and walked 600 feet only two hours after the surgery."

# Sentara OrthoJoint Center®

## EXPRESS TRACK OPTION

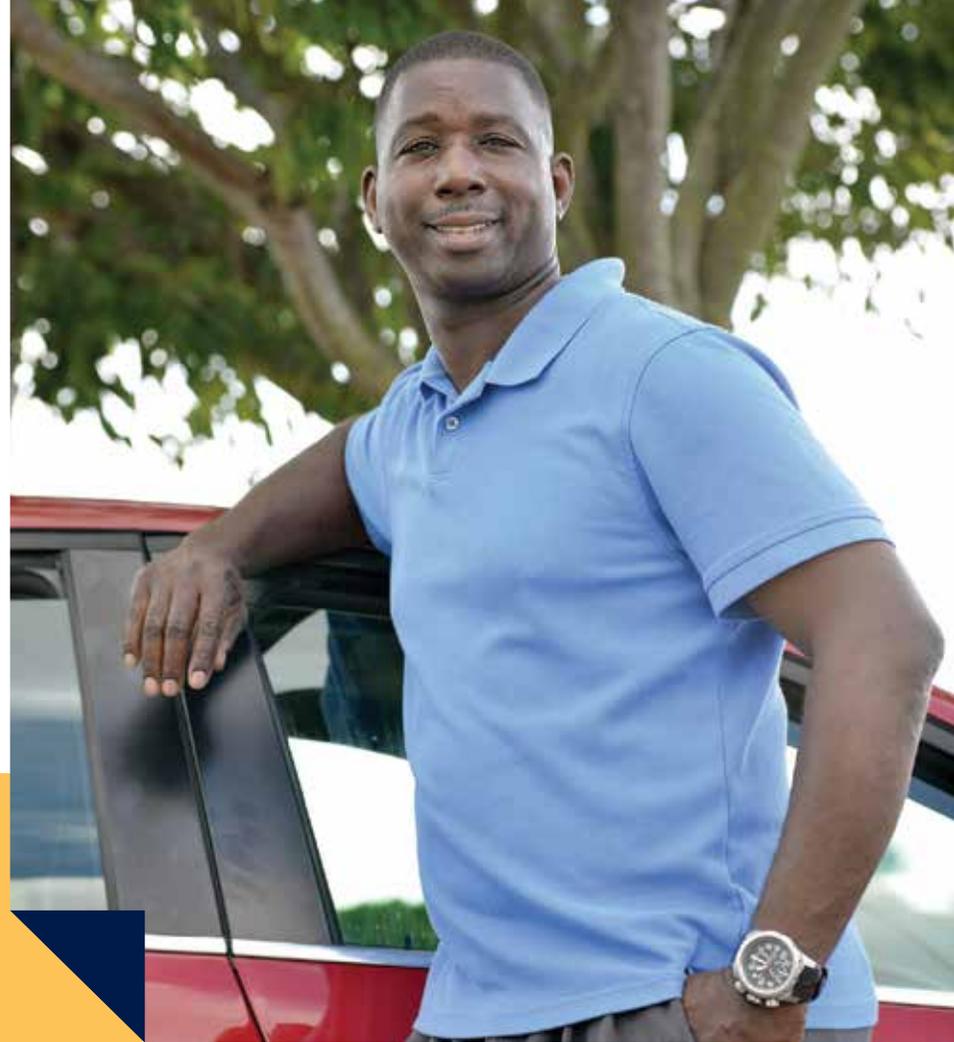
Joint Replacement in the morning — home the next or even the same day

The trend of shorter length of stays fueled the increased expansion of patients electing to have a one-night length of stay in the hospital following joint replacement surgery. This option was initially offered at two locations in 2014, grew to four sites in 2015 and, in 2016, expanded to two additional locations: Sentara Princess Anne Hospital and Sentara Virginia Beach General Hospital. In late 2017, the Express Track option started being offered at Sentara Martha Jefferson Hospital where some patients are already returning home the day of surgery to continue their recovery.

### PATIENT CONNECTION

+ Dwan

"I had a hip replacement on my right side years ago, and over time, it seemed like everything shifted, and I began to feel deep pain in my left hip. I was glad I chose to have my second surgery. The Express Track Option included classes that explained everything to me, and it provided the chance to stay only one night in the hospital. I was up and around the next day. Now I'm able to walk around without a limp and pain-free."



### Highlights of the Express Track:

- Healthy patients interested in a shorter hospital stay are pre-screened by the surgeon before surgery.
- Selected patients agree to prepare themselves and their coaches for an expedited recovery.
- Pre-surgery education is imperative in setting expectations.
- Strengthening exercises are recommended before surgery.

Express Track helps healthy patients recover more quickly after joint replacement. Getting patients up and walking the same day of surgery and aggressive physical therapy are key components to the success of the Express Track program.

It combines the high quality care of the Sentara OrthoJoint Center® with a shortened hospital stay. Patients leave the hospital the day after or even the day of their joint replacement surgery and continue recovering in the comfort of their own home. They have the option to be visited there by our expert team of home care providers.

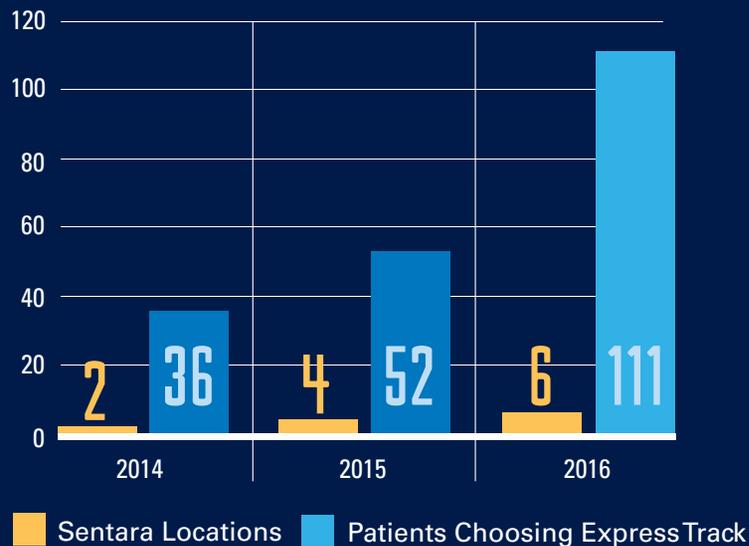
Express Track is an optional program that requires a commitment on the part of the patient. To prepare for Express Track, patients receive preoperative education and information, including a best practices guidebook that lets them know what to expect. The guidebook also provides patients with both preoperative and postoperative exercises and manages their expectations regarding recovery.



## PROGRAM LOCATIONS

- **Orthopaedic Hospital at Sentara CarePlex** | Hampton, VA
- **Orthopedic Hospital at Sentara Leigh** | Norfolk, VA
- **Sentara Martha Jefferson Hospital** | Charlottesville, VA
- **Sentara Obici Hospital** | Suffolk, VA
- **Sentara Princess Anne Hospital** | Virginia Beach, VA
- **Sentara Virginia Beach General Hospital** | Virginia Beach, VA
- **Sentara Williamsburg Regional Medical Center** | Williamsburg, VA

## Express Track Option Growth



*Number of patients choosing the Express Track option doubled.*



# Sentara Back & Neck Center

## Expanded the Sentara Back & Neck Center to four new locations across the regions

The Sentara Back & Neck Center provides seamless, coordinated back and neck care. In 2016 Sentara Back & Neck Centers opened at Sentara Norfolk General Hospital and the Orthopaedic Hospital at Sentara CarePlex; and the existing spine care at Sentara RMH Medical Center was added. In late 2017, Sentara Northern Virginia Medical Center opened its center. This care is now available at seven Sentara hospitals.

This specialized center brings together an experienced team of expert surgeons, as well as nurses and therapists with special training in orthopedics and spine care. This approach results in better communication and better patient care. The Sentara Back & Neck Center continues to distinguish itself by providing exceptional care:

### PATIENT CONNECTION

## + Elizabeth

"I was in profound pain, so I decided to have back surgery. All the staff wanted was for me to be comfortable. Once I was back home, I was able to do little things again, such as make my bed. I've even worked in my garden."

- Dedicated Spine Patient Navigators provide seamless, personalized care before and after surgery.
- Staff focus and special training: the nursing staff and physical therapists have a unified focus on back and neck care, and many are specially credentialed in orthopedics. This focus and expertise results in higher patient satisfaction and better patient care and outcomes.
- Preoperative classes set patient expectations and increase patient

ambulation rates (return to walking) after surgery.

- Developed the Spanish version of the Sentara Back & Neck Center Patient Guidebook.
- Patient Commitment. Choosing to have elective back or neck surgery does come with a commitment from the patient and a coach to do their best to learn what they can do to have the very best outcomes. This three-copy document bullets out the simple things that can optimize the experience and recovery.

People choosing Sentara for Spine Care grew **13.5%** in 2016

- StopLight Discharge Poster. With hospital stays after surgery becoming shorter, when patients are discharged home, they need to know the guidelines for what is normal, what symptoms need to be discussed with a health care provider and what needs immediate attention.

View these patient education documents online at [SentaraOrthoAnnualReport.com](http://SentaraOrthoAnnualReport.com).



Online educational video developed to offer 24/7 online access to patients and their families about the Sentara Back & Neck Center experience.

[SentaraBackNeckCenter.com/video](http://SentaraBackNeckCenter.com/video)

**1-855-267-8465**  
Direct line gives patients help in finding a local spine physician.



## PROGRAM LOCATIONS

- **Orthopaedic Hospital at Sentara CarePlex** | Hampton, VA
- **Sentara Norfolk General Hospital** | Norfolk, VA
- **Sentara Northern Virginia Medical Center** | Woodbridge, VA (late 2017)
- **Sentara Obici Hospital** | Suffolk, VA
- **Sentara Princess Anne Hospital** | Virginia Beach, VA
- **Sentara RMH Medical Center** | Harrisonburg, VA
- **Sentara Virginia Beach General Hospital** | Virginia Beach, VA

# Sentara Foot & Ankle Center

In early 2017 Sentara Obici Hospital joined Sentara Williamsburg Regional Medical Center as the second Sentara hospital with a dedicated Sentara Foot & Ankle Center. These centers provide both inpatient and outpatient foot and ankle services, including procedures that allow immediate or early weight bearing. The Sentara Foot & Ankle Centers are dedicated exclusively to foot and ankle health, including education, diagnosis, therapy and surgery.

Although the Sentara Foot & Ankle Center only grew 1.2 percent in 2016, as the sites expand across the regions in early 2018, including the addition of the Orthopedic Hospital at Sentara Leigh, Sentara Princess Anne Hospital, and Sentara Virginia Beach General Hospital, there will be an expected increased volume. Community seminars continue to draw large crowds of people interested in improving the health of their feet and ankles.



## PROGRAM LOCATIONS

- **Orthopedic Hospital at Sentara Leigh** | VA (early 2018)
- **Sentara Williamsburg Regional Medical Center** | Williamsburg, VA
- **Sentara Obici Hospital** | Suffolk, VA
- **Sentara Princess Anne Hospital** | Virginia Beach, VA (early 2018)
- **Sentara Virginia General Beach Hospital** | Virginia Beach, VA (early 2018)

1-855-704-FOOT

Patients looking for foot care can connect with our call line.



## PATIENT CONNECTION

+ Jennifer

"An old soccer injury to my ankle had gotten so bad that I couldn't do everything I wanted to as a Boy Scout leader. Plus, my job as a nurse, where my feet are my life, was so painful. I finally had a total ankle replacement. Now I'm virtually pain-free and comfortable standing on my feet all day and camping again with the Boy Scouts."

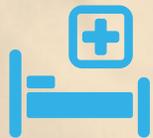
# Sentara Fracture Care

Sentara Fracture Care is the first and only program of its kind in the region. It provides high quality, subspecialty care from a specialized team of orthopedic surgeons. Sentara Fracture Care was pioneered at the Orthopedic Hospital at Sentara Leigh in 2015 and implemented at Sentara Princess Anne Hospital in 2016. Collectively these programs have offered this specialty care to over 858\* patients.

Non-surgical methods for patient care, including injections and physical therapy, are evaluated prior to exploring surgical options.

If surgery is required, Sentara Fracture Care provides completely integrated care emphasizing the patient and family perspective, from the emergency room through discharge. Sentara Fracture Care has developed specific treatment protocols for fractures, ensuring patients receive prompt and effective care. It has also shortened hospital stays and made for a better overall hospital experience for patients and their families. A comprehensive patient guidebook is provided to Sentara Fracture Care patients and families to share helpful information about caring for their fracture as well as information for staying safe once the patient returns home for recovery. For patients who require extended rehabilitation therapy, Sentara Life Care provides the short-term, skilled care continuum that completes recovery allowing patients to return home.

\*2015-2016 data



**Reduced Length of Stay  
for all fracture patients by  
half a day.**

**16%** fewer complications than  
the national average (Truven Expected)

## PROGRAM LOCATIONS

- **Orthopedic Hospital at Sentara Leigh** | Norfolk, VA
- **Sentara Princess Anne Hospital** | Virginia Beach, VA

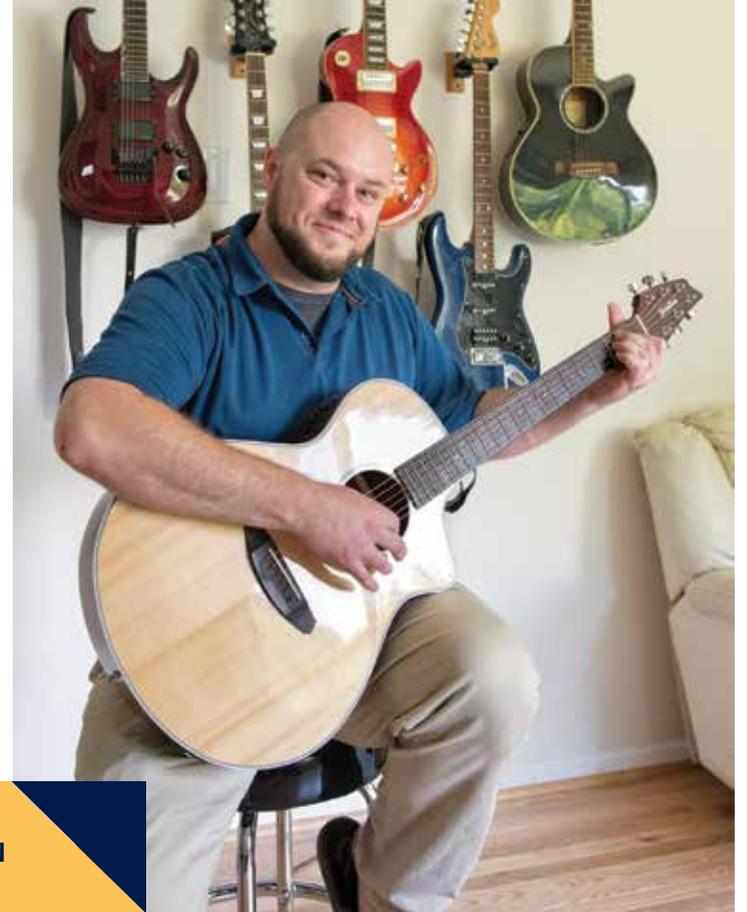
Sentara Leigh Hospital  
Sentara Princess  
Anne Hospital

# Sentara Hand Specialty Center

## From the Finger Tips to the Elbow

Throughout the regions, orthopedic surgeons who specialize in hand extremities offer patients exceptional care for injuries, deformities, sports injuries, fractures, osteoarthritis and other conditions.

From diagnosis to recovery, the first of its kind Sentara Hand Specialty Center opened at the Orthopedic Hospital at Sentara Leigh in early 2017 after years of planning. Patients in the Hampton Roads region now have a one-stop array of services including surgeon office visits, X-rays, diagnostics, outpatient surgery and procedures onsite, and hand speciality physical therapy. Emergency care from hand speciality orthopedic surgeons is available 24/7 through the adjacent Emergency Center at Sentara Leigh Hospital. 757-261-HAND is the dedicated call line for the Sentara Hand Specialty Center.



### PATIENT CONNECTION

## + David

"I accidentally cut my right hand and the staff quickly saw me and scheduled my surgery the next day. The surgical care, post-op recovery and my follow-up physical therapy made all the difference. In less than three months, I made progress equivalent to six months and can play the guitar again."

### PROGRAM LOCATION

- Orthopedic Hospital at Sentara Leigh | Norfolk, VA



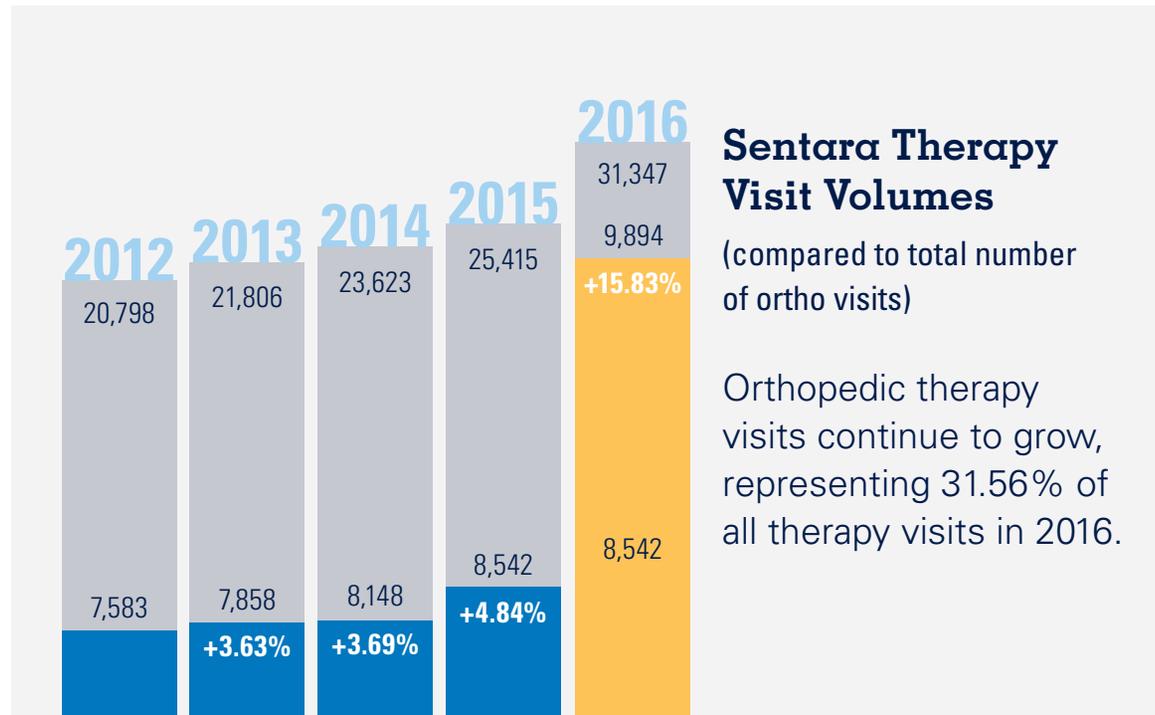
# Sentara Therapy Center

## Direct Access to Physical Therapy Services

Sentara strives to help patients achieve their personal goals for rehabilitation. Patients recovering from surgery, injury or illness can count on over 44 conveniently located Sentara Therapy Centers to provide high quality therapy care, including spine therapy, lymphedema (therapy to reduce fluid retention and tissue swelling), sports medicine, manual therapy, aquatics, comprehensive rehabilitation programs with physical, speech and occupational therapies, and other subspecialty clinical disciplines.

Located throughout Virginia and northeastern North Carolina, Sentara Therapy Centers partner with YMCAs to offer services inside of these facilities to improve the health of our local communities. In 2017 Sentara Therapy Center - Edinborough opened in Chesapeake. The center is located in an outpatient campus that also offers a combined family and pediatric practice.

The Virginia law now allows direct access, where patients can begin therapy services without a physician referral. This new access is empowering people to connect with a physical therapist for guidance in restoring and maintaining a healthy body.



### Sentara Therapy Visit Volumes

(compared to total number of ortho visits)

Orthopedic therapy visits continue to grow, representing 31.56% of all therapy visits in 2016.

Evaluations scheduled through therapy central number grew from 6,115 in 2015 to

**10,216** in 2016



More than 45  
Convenient  
Neighborhood  
Centers

VIRGINIA

NORTH CAROLINA

1-855-852-9066

A dedicated phone number allows patients to easily schedule therapy sessions at any of the Sentara Therapy Center locations.

# Sentara Sports Medicine



## PATIENT CONNECTION

### + Rebekah

"In the same year, I had a hand fracture and a concussion from cheerleading. The sports medicine care I received helped me feel like myself again. I had been tired and dizzy for a long time; now I'm fine and have energy to enjoy my new puppy."

When you hear the term sports medicine, you may think that it's medical care for professional athletes or younger people in competitive sports. While that is often true, sports medicine is really for everyone. Physical activity can increase your chances of living longer. Throughout the regions, teams of sports medicine

specialists are helping people of all ages to be active and able to do the everyday activities of life — whether it's running a marathon or just walking the dog.

Sports medicine representatives from across the regions evaluated successful sports medicine programs across the country as well as consumer research to create criteria for a comprehensive sports medicine program that includes both non-surgical and surgical orthopedic physicians, physical therapists, athletic trainers and other sports injury prevention and treatment professionals.

### **Three New Sentara Sports Medicine Centers Opened in 2017**

In early 2017, Sentara Albemarle Medical Center became the first to meet the established criteria for a Sentara Sports Medicine Center. Sentara RMH Medical Center quickly followed to establish the next Sentara Sports Medicine Center. Sentara Martha Jefferson Hospital will complete construction on their new Sentara Sports Medicine Center in late 2017.



## Highlights

Sentara Albemarle Medical Center received approval for a \$1 million expansion and renovation of an Orthopedic Center that opened in 2017 on the hospital campus, bringing together in one site the orthopedic, sports medicine and athletic trainers.

In June of 2016, Sentara RMH Orthopedic Center opened a 58,000+ square foot facility that cost \$20 million to complete. The center includes:

- An Orthopedic Clinic with 38 exam rooms and 2 X-ray units in the clinic. Provides services for joint and general orthopedics, sports medicine, and hand services.
- A Spine Clinic with 16 exam rooms, with an additional EMG room. Provides services for spine and pain management.
- Advanced Imaging Center that includes: 2 CT units, 2 ultrasound machines, MRI machine, interventional room for image-guided procedures, and 2 X-ray rooms.
- 5 semi-private treatment rooms and 2 private treatment rooms for up to 12 therapists including a hand specialist. This space also includes a rehab/sports performance gym.
- 15 orthopedic providers and 4 radiologists practice out of this facility.

Sentara Martha Jefferson Hospital completed new construction that brings together the orthopedic practices and sports medicine providers along with therapy services to create a complete center for orthopedics and sports medicine services.



## PROGRAM LOCATIONS

- **Sentara RMH Medical Center** | Harrisonburg, VA
- **Sentara Martha Jefferson Hospital** | Charlottesville, VA
- **Sentara Albemarle Medical Center** | Elizabeth City, NC



Whether through early adoption of surgical techniques, a commitment to minimally invasive surgeries or providing a point of contact for local athletic trainers, Sentara is proud of its reputation as a regional presence in orthopedics and sports medicine:

### Unique Procedures:

- The first DeNovo® NT (natural tissue) graft surgery for articular cartilage repair in the world was performed at Sentara Leigh Hospital: This cutting-edge procedure to spur regeneration of cartilage was written about in the Journal of Knee Surgery.
- Sentara Martha Jefferson Hospital offers ACL autograft reconstruction, using just one hamstring tendon instead of two. This “all inside” technique does not go through the femur or tibia (bones in the leg), resulting in less pain and quicker healing.

### Community Programs

- **The athletic trainers throughout the regions provide a link between the athletic community and surgeons.** Sentara is a leading presence within the Blue Ridge, Hampton Roads and northeastern North Carolina communities, connecting orthopedic physicians and surgeons, orthopedic physical therapists and local athletic trainers.
- **The Concussion Clinic provides rapid evaluation** to monitor any concerning symptoms associated with concussions. Sentara doctors perform cognitive testing and help prescribe post-concussion care, including vestibular (balance) rehabilitation.
- **Sentara RMH Medical Center sponsors an annual sports medicine two-day conference** that is designed for physical therapists and athletic trainers. As Sentara is committed to specialized care and continuing education, this conference will be expanded to other regions.

- **Sentara Colonial Half Marathon and 5K with William & Mary.** More than 1,200 runners participated on this course through the streets and neighborhoods of historic Williamsburg. This annual race celebrated its 38th annual running in the late winter of 2016. All proceeds from this event benefit the College of William & Mary track and field and cross-country programs.



- **Sentara OrthoJoint Center® 2K Walk.** For the second year we added the Sentara OrthoJoint Center 2K Walk. More than 120 walkers participated in the 2017 walk. Participation increased by 37.5 percent from 2016.



Orthopedic surgeons who practice at Sentara facilities also share their time and talents throughout the regions, serving as team physicians for local schools, colleges and sports teams.

#### Professional

Admirals Hockey  
Tides Baseball

#### College

Bridgewater College  
James Madison University  
Virginia Wesleyan College  
Hampton University  
Elizabeth City State University  
Newport News Shipbuilding  
Apprentice School  
Eastern Mennonite University  
Old Dominion University

#### School

Harrisonburg City High School  
Hampton Public Schools  
Page County High Schools  
Rockingham County Public Schools  
Augusta County High Schools  
Pasquotank Public Schools  
Norfolk Public Schools  
Norfolk Collegiate School

## Athletic Trainer and Sports Medicine

In addition to the new Sentara Sports Medicine Centers opening across the regions, new athletic trainer and sports medicine contracts and services continued to grow in the Hampton Roads region:

- Southhampton High School
- Gates County High School
- Extended an agreement with Mathews County High School
- Booker T. Washington High School in Norfolk



## Innovative Shoulder Treatment

Across the country, shoulder reconstruction is growing in the treatment of arthritis and fractures of the shoulder. Innovative shoulder care is offered throughout Sentara facilities. Subspecialty trained orthopedic surgeons offer personalized patient care with a commitment to using the most minimally invasive interventions possible, including the latest arthroscopic techniques.

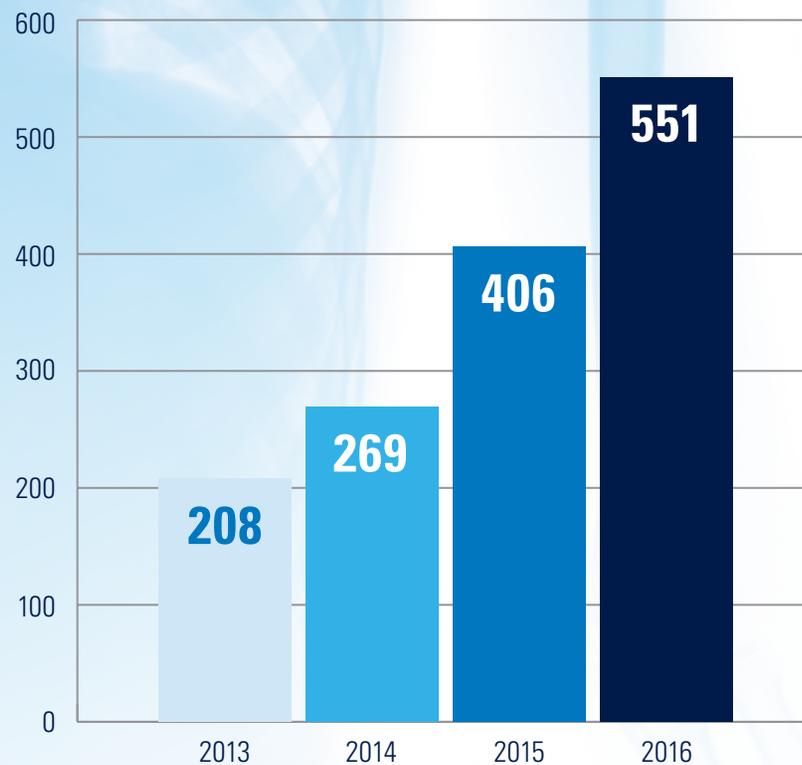
- The Orthopedic Hospital at Sentara Leigh was among the first facilities in Virginia to offer the subscapularis total shoulder replacement. This innovative, muscle-sparing approach for total shoulder replacement preserves the subscapularis (rotator cuff muscle at the front of the shoulder), reduces the risk of tendon failure, provides fewer postoperative restrictions and potentially shortens rehabilitation time.
- Several facilities use minimally invasive, arthroscopic reconstruction for certain (glenoid) bone defects. This muscle-sparing approach leaves the subscapularis largely intact.
- Shoulder replacement using mini stem and stemless continues to be a new option for patients.
- Orthopedic surgeons practicing at Sentara are among a handful trained in the use of the intramedullary small incision technique for clavicle fracture. This technique requires less stripping of the periosteum (a specialized connective tissue that covers all bones), resulting in less pain and quicker recovery times.

**Total Shoulder  
Replacement  
Increased**

**35.7%**

in 2015-2016  
(over 2014-2015 volume)

## Total Shoulder Replacement Volume



### PATIENT CONNECTION

## + Charles

"After years of wear and tear on my shoulder, a stemless shoulder replacement provided me with the relief I needed. I began therapy two weeks after the procedure and within four months, my range of motion was already back to 75% - 80%. Through continued physical therapy and daily exercises, I was able to throw around the football with my grandson again."

# Orthopedic TRAUMA

In Virginia, the process of trauma designation is entirely voluntary. It is meant to identify those hospitals that make a commitment to providing a higher level of care for injured patients and who welcome public acknowledgment of that capability. The Virginia standards are reviewed and updated based on changes in the national standards, as well as the evolving needs of the Trauma System in Virginia.

## Orthopedic Traumatology

No one can predict when an accident may happen. Similarly orthopedic trauma surgeons (traumatologists) cannot predict the types of injuries their patients may have sustained in an accident or the types of care that will be needed. Orthopedic traumatology is much more than just surgical intervention. While the initial focus is on fracture care, it extends to soft tissue infections, ruptured tendons, and multiple system involvement. Each trauma patient has a unique plan of treatment, starting with the most urgent issues and continuing a more long-term relationship with their orthopedic traumatologist with follow-up care sometimes lasting 12-18 months after the initial trauma intervention.

For patients with multiple trauma injuries, pain management is critical for healing. Multi-modal pain control options, beginning at the initial trauma assessment, work to help patients reduce the use and side effects of opioids and narcotics.



Sentara Norfolk General Hospital is designated a Level I Trauma Center, the highest level of trauma care.



Sentara Virginia Beach General Hospital is designated a Level III Trauma Center.

**Sentara Virginia Beach General Hospital**

Trauma patients don't choose their orthopedic surgeon as you would for an elective orthopedic procedure. The good news for orthopedic trauma patients is the assurance that Sentara has already recruited the most skilled and experienced orthopedic traumatologists that are on call 24/7 at the two trauma centers, Level I Sentara Norfolk General Hospital and Level III Sentara Virginia Beach General Hospital. These surgeons also provide consultation for complicated orthopedic cases and some elective orthopedic procedures.

The goal is to restore the health of a traumatized patient, to make it possible to return to work or other activities of life.



#### Highlights of our emergency care include:

- Trauma patients in Hampton Roads and northeastern North Carolina may have their orthopedic care provided at either trauma center, with trauma surgeons coming from Eastern Virginia Medical School, Sentara Medical Group and private practice.
- As a dedicated Level 1 Trauma Center, Sentara Norfolk General Hospital focuses mainly on trauma and serves as a referral center for complicated orthopedic cases.

#### PATIENT CONNECTION

### + Curtis

“My motorcycle crash left me in the hospital for three weeks, and I needed six surgeries. We thought at first that it would take more than 18 months for me to walk again – my right leg was that bad – but I was back playing softball three times a week in less than 10 months.”

# Orthopedic and Podiatry Groups Practicing at Sentara Hospitals/Facilities



## Albemarle Region North Carolina

- Coastal Albemarle Orthopedics
- Sentara Orthopedic & Sports Medicine Specialists, Division of Albemarle Physician Services

## Blue Ridge Region Virginia

### Charlottesville

- Albemarle Orthopaedics
- Central Virginia Foot and Ankle Laser Center
- Charlottesville Hand Surgery
- Charlottesville Orthopaedic Center
- Christopher B. Stewart, DPM, PC
- Foot & Ankle Specialists of the Mid-Atlantic, LLC
- Michael Goldman, DPM
- Sentara Martha Jefferson Orthopedics
- The Podiatry Group
- Thomas L. Schildwachter, MD
- Virginia Foot & Ankle Surgical Associates

### Harrisonburg

- Harrisonburg Foot and Ankle Clinic
- Hess Orthopedics & Sports Medicine
- Sentara RMH Orthopedics and Sports Medicine
- Sentara RMH Back & Neck
- Valley Plastic Surgery

## Halifax Region Virginia

- Sentara Southern Virginia Orthopedics
- The Foot and Ankle Clinic

## Hampton Roads Region Virginia

### Southside

- 1 Foot 2 Foot Center
- Atlantic Foot & Ankle Center
- Atlantic Orthopaedic Specialists
- Bayview Physicians Group
- Coastal Podiatry
- Dr. William Grant Foot & Ankle
- Family Foot & Ankle Care
- Glasson Sports Medicine
- Jordan-Young Institute
- Neurosurgical Specialists
- Oceana Sports Medicine & Orthopaedic Center
- Persons Orthopaedics
- Robert W. Sullivan, DPM
- Sports Medicine and Orthopaedic Center
- Sentara Hand Surgery Specialists
- Sentara Orthopaedic Trauma Specialists
- Sentara Podiatry Specialists
- Virginia Institute for Sports Medicine

## Peninsula

- Affiliated Podiatrists
- Ambulatory Foot & Ankle Center
- Hampton Roads Orthopaedics and Sports Medicine
- Tidewater Foot and Ankle
- Tidewater Orthopaedics Associates
- Tidewater Physicians Multispecialty Group
- Williamsburg Podiatry

## Northern Virginia Region Virginia

- Bull Run Foot Clinic
- Dynamic Foot & Ankle Center
- Family Orthopedics & Sports Medicine
- Ghassem Nejad, MD
- Medstar Georgetown Orthopaedic Institute
- NoVa Orthopedic & Spine Care
- Potomac Podiatry Group
- Washington Orthopedic & Spine Institute
- Woodbridge Foot & Ankle

# 2016-2017 Academic Publications

**Kevin Bonner, M.D.** Boniello M, Robinson SP, **Bonner KF**. Osteochondral Allograft Transplantation. Chapter 31: Insall and Scott Surgery of the Knee Textbook. 6th ed. Edited by W. Norman Scott; Elsevier, Churchill, & Livingstone. Philadelphia, PA. 2017: 442-453.

**Kevin Bonner, M.D.** Nelson CG, **Bonner KF**. Meniscal Transplant. Chapter 35: Operative Techniques in Orthopaedic Surgery. 2nd Edition. Edited by Sam W. Wiesel and Mark D. Miller, Lippincott, Williams & Wilkins, Published 2016.

**Kevin Bonner, M.D.** Mistry JB, **Bonner KF**, Gwam CU, Thomas M, Etcheson JI, Delanois RE. Management of Injuries to the Medial Patellofemoral Ligament: A Review. J of Knee Surgery 2017: DOI <https://doi.org/10.1055/s-0037-1604142>

**Kevin Bonner, M.D.** **Myers R**, Kim H, Hsieh AH, O\_Toole RV, Sciadini MF. When Should We Change Drill Bits? A Mechanical Comparison of New, Reprocessed, and Damaged Bits. J Orthop Trauma. 2017.

**Kevin Bonner, M.D.** **Bonner KF**, Mannino A. An Alternative Technique to Avoid Injury to the Medial Femoral Condyle when Reaming the Femoral Tunnel during ACL Reconstruction: Arthroscopy Techniques. 2017 Feb 6;6(1):e1+B8B3:B6+B+B3:B6

**Megan Swanson, M.D.** **M. Swanson**. "3D Printing in Total Knee Replacement Surgery." Grand Rounds Speaker at the Chairman's Seminar Series at the UVA School of Engineering & Applied Science, Department of Mechanical & Aerospace Engineering. Spring 2016.

**William P. Grant, DPM** Lias M. Grant-McDonald, DPM, **William P. Grant, DPM, FACFAS**, Jeffrey Yates, BS. Emerging Concepts in Beaming for Charcot. Podiatry Today 2017 March 23; Vol 30, Issue 3.

**Sophia Leung, M.D.** **Leung S**, Paryavi E, Herman MJ, Sponseller PD, Abzug JM. Does the Modified Gartland Classification Clarify Decision Making? J Pediatr Orthop. 2016 Mar 11. (Epub ahead of print)

**Richard J. Myers, M.D.** **Myers R**, Kim H, Hsieh AH, O\_Toole RV, Sciadini MF. When Should We Change Drill Bits? A Mechanical Comparison of New, Reprocessed, and Damaged Bits. J Orthop Trauma. 2017. May; 31(5):281-286. DOI: 10.1097/BOT.0000000000000812.

**Blake E. Moore, M.D.** Umur Aydogan, Evan P. Roush, **Blake E. Moore**, Seth H. Andrews, Gregory S. Lewis Biomechanical Consequences of Adding Plantar Fascia Release to Metatarsal Osteotomies: Changes in Forefoot Plantar Pressures. Journal of Orthopaedic Research. Accepted 7 June 2016; Published online 22 June 2016 ([wileyonlinelibrary.com](http://wileyonlinelibrary.com)). DOI 10.1002/jor.23331.

**Justin W. Griffin, M.D.** Mahkni E, Hamamoto, JT, Higgins, JD, Patterson T, **Griffin JW**, Romeo, AA, Verma, NN. How Comprehensive and Efficient are Patient Reported Outcomes for Rotator Cuff Tears? The Orthopaedic Journal of Sports Medicine 5(3). March 2017. DOI: 10.1177/2325967117693223

**Justin W. Griffin, M.D.** Erickson BJ, Basques BA, **Griffin JW**, Taylor SA, O'Brien SJ, Verma NN, Romeo AA. The Effect of Concomitant Biceps Tenodesis on Reoperation Rates After Rotator Cuff Repair: A Review of a Large Private-Payer Database From 2007 to 2014. Arthroscopy. 2017

Mar 20. pii: S0749-8063(17)30104-4. doi: 10.1016/j.arthro.2017.01.030. PMID: 28336230

**Justin W. Griffin, M.D.** Saltzman BM, Collins MJ, Leroux TS, Arns, TA, **Griffin JW**, Romeo AA, Verma NN, Forsythe B, Arthroscopic Repair of Isolated Subscapularis Tears: A Systematic Review of Technique-Specific Outcomes. Journal of Arthroscopic and Related Surgery. 2017 Apr;33(4):849-860. doi: 10.1016/j.arthro.2016.10.020. Epub 2017 Jan 9. Review. PMID: 28082063

**Justin W. Griffin, M.D.** **Griffin JW**, Leroux TS, Romeo AA. Management of Proximal Biceps Injuries in Overhead Athletes: What is the Role of Biceps Tenodesis? American Journal of Orthopaedics. 2017 Jan/Feb;46(1):E71-E78

**Justin W. Griffin, M.D.** Leroux TS, Basques B, Frank RM, **Griffin JW**, Nicholson GP, Cole BJ, Romeo AA, Verma NN. Outpatient Total Shoulder Arthroplasty: A Population-Based Study Comparing Adverse Event and Readmission Rates to Inpatient Total Shoulder Arthroplasty. Journal of Shoulder and Elbow Surgery. 2016 Jun 6. pii: S1058-2746(16)30059-3. doi: 10.1016/j.jse.2016.04.006

**Cyrus M. Press, M.D.** Kilian CM, **Press CM**, Smith KM, O'Connor DP, Morris BJ, Elkousy HA, Gartsman GM, Edwards TB. Radiographic and clinical comparison of pegged and keeled glenoid components using modern cementing techniques: midterm results of a prospective randomized study. Kilian J Shoulder Elbow Surg. 2017 Sep 13. pii: S1058-2746(17)30437-8. doi: 10.1016/j.jse.2017.07.016. (Epub ahead of print)

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# Community Outreach

## Sentara Northern Virginia Medical Center

encouraged community members to “Get Back in the Game” during their Sentara OrthoJoint Center® Night with the Potomac Nationals minor-league baseball team.



Sentara Orthopedic & Sports Medicine Specialists at **Sentara RMH Medical Center** provide sports physicals to their local high school athletes. They do not charge anything for this service; all funds are collected by the schools and support the athletic programs.

**Sentara Princess Anne Hospital** offers an assortment of complementary therapies to help patients heal. A team of 14 volunteers who offer healing touch, energy therapy, aromatherapy and reflexology to patients recovering from surgery. These services can be ordered by a provider or requested by the patient and can help a patient to relax or reduce their pain.



**Sentara Halifax Regional Hospital** attended Clarksville LakeFest on July 22, 2017, where more than 3,000 people passed through the Sentara booths and displays.



A couple of months after joint replacement surgery, **Sentara Virginia Beach General Hospital** invites its Sentara OrthoJoint Center® patients to bring their “coach” and join the orthopedic staff for a fun reunion luncheon to celebrate their successful joint replacement journey.

**Sentara Obici Hospital** celebrated the opening of its new Sentara Foot & Ankle Center with a community lecture where Dr. Jeremy Walters answered questions about foot and ankle concerns to a packed room.





Team physician Dr. Matthew Panzarella, an orthopedic surgeon at **Sentara Martha Jefferson Hospital**, poses with Team USA during the UCI Track Cycling World Championships in London, where athletes from 45 nations competed in early March 2017. The U.S. women's team won the Team Pursuit event, a competition that no U.S. team had ever won a medal for previously.

At **Sentara Albemarle Medical Center**, Dr. Jared Miller, Dr. Dan Elliott and the athletic training team from Sentara Orthopedics and Sports Medicine Specialists hosted a training session on Northeastern High School's football field with local EMS members from Perquimans, Pasquotank, Camden and Gates counties. The training enhances both EMS and Sentara athletic trainers' readiness in the event a player is injured on the field.



The **Orthopedic Hospital at Sentara Leigh** hosted the second annual Sentara OrthoJoint Center® 1 Mile Stroll with over 110 community members joining the celebration as patients were able to show off their new joints.



Nightingale nurses from **Sentara Norfolk General Hospital** provide education to the community. Nightingale often provides emergency transportation and care for trauma orthopedic and spine patients.

**Sentara Williamsburg Regional Medical Center** orthopedic team members came out to support their joint replacement patients in the Sentara OrthoJoint Center® 1K in 2016 (2K in 2017) that is now an annual part of the Sentara Colonial Half Marathon in Williamsburg.



Pedal the Parkway, with over 1,000 community members biking the scenic roadway, was just one of the many community events the Orthopedic Navigator Cathy Garcia and the **Orthopaedic Hospital at Sentara CarePlex** team supported to encourage an active and healthy lifestyle.

# Special Thanks

## Physician Leaders on the Sentara Healthcare Orthopedic High Performance Team

Daniel Cavazos, MD	Sentara Williamsburg Regional Medical Center
Michael Chung, MD	Sentara Medical Group
Frank Cuce, MD	Sentara RMH Medical Center
Gregory Degnan, MD	Sentara Martha Jefferson Hospital
AJ Disatsio, MD	Sentara Norfolk General Hospital
Jim Dowd, MD	Orthopedic Hospital at Sentara Leigh
Jacqueline Fogarty, MD	Sentara Halifax Regional Hospital
Bryan Fox, MD	Sentara Obici Hospital
Michael Higgins, MD	Orthopaedic Hospital at Sentara CarePlex
Michael Holtz, DPM	Sentara Medical Group
Jonathan Mason, MD	Orthopaedic Hospital at Sentara CarePlex
Dang Vo, MD	Sentara Albemarle Medical Center
Blake Moore, MD	Sentara Princess Anne Hospital
Patrick O'Connell, MD	Sentara Virginia Beach General Hospital
Raymond Payne, MD	Sentara Princess Anne Hospital
Tina Rodrigue, MD	Sentara Norfolk General Hospital
Jack Siegel, MD, Chairman	Orthopedic Hospital at Sentara Leigh
Megan Swanson, MD	Sentara Martha Jefferson Hospital
Wylie Zhu, MD	Sentara Norfolk General Hospital

## Service Line Leaders

Julie Billingsley	Sentara Northern Virginia Medical Center
Arina Boldt	Sentara Albemarle Medical Center
Dianne Boone	Sentara Obici Hospital
Michele Carroll	Orthopedic Hospital at Sentara Leigh
Amanda Colley	Sentara Virginia Beach General Hospital
Lori Crowder	Orthopaedic Hospital at Sentara CarePlex
Beth Davis	Sentara Williamsburg Regional Medical Center
Abby Denby	Sentara Martha Jefferson Hospital
Joni Henderson	Sentara Halifax Regional Hospital
Judy Jenkins	Sentara RMH Medical Center
Samantha Kern	Sentara Princess Anne Hospital
Kelly Lamping	Sentara Norfolk General Hospital
Jennifer Smiley	Sentara Martha Jefferson Hospital

### Service Line Support Professionals

Charity Anderson	Process Improvement
Brian Boland	Clinical Effectiveness and Regulatory
Jacqueline Butler	Infection Prevention
Judy Cole	Materials Management
Robin Crane	Marketing/Customer Development
Alyssa Fisher	Sports Medicine and Outpatient Rehab
Meg Fraim	Strategic Planning
Victoria Gray	Administrative Support
Jessica Grippo	Finance
Christine Hall-Reichert	IT Support
Kathleen Hardesty	Acute and Post-Acute Rehabilitation
Angie Honeycutt	Sentara Martha Jefferson Hospital
Julie Lineberger	Performance Improvement
Jamie Marsh	Sports Medicine and Outpatient Rehab
Blair Miles	Materials Management
Marley Nacey	Finance
Michelle Packer	Sentara Medical Group
Maureen Ryu	Sentara Enterprises
Kelly Shaner	1-800-Sentara
Andrew Sharp	Decision Support
Chris Tagliente	Pharmacy
Bernadette Varnes	Sentara Life Care
Alan Wilson	Sports Medicine and Outpatient Rehab

### Orthopedic and Spine Patient Navigators

Shannon Brown	Sentara Halifax Regional Hospital
Ada Vega-Diamantis	Sentara Northern Virginia Medical Center
Anna Donahoe-Mick	Orthopedic Hospital at Sentara Leigh
Cathy Garcia	Orthopaedic Hospital at Sentara CarePlex
Shannon Johnson	Sentara Norfolk General Hospital
Grace Miller	Sentara Princess Anne Hospital
Ann Phillips	Orthopedic Hospital at Sentara Leigh
Leslie Scott	Sentara Albemarle Medical Center
Tracey Stallard	Sentara Obici Hospital
Connie Summy	Sentara Martha Jefferson Hospital
Tonya Turner	Sentara RMH Medical Center
Rita Wade	Sentara Williamsburg Regional Medical Center
Ann Kay Walters	Sentara Virginia Beach General Hospital

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### Special Recognition To:

Howard Kern	Chief Executive Officer
Michael V. Gentry	Chief Operating Officer
Mary Blunt	Senior Vice President
Terrie Edwards	Corporate Vice President
Carole Guinane	Vice President, Sentara Orthopedic Services
Michele Carroll	Director, Sentara Orthopedic Services

# GLOSSARY OF TERMS

We have provided this glossary for those readers who may not be familiar with some of the medical terms used in this annual report.

**ACL (anterior cruciate ligament):** The ligament in the knee that joins the upper leg bone and the lower leg bone

**Anterior:** Refers to the front

**Anterior approach hip replacement (also see Jiffy Hip\*):** Minimally invasive hip replacement surgery using a frontal (anterior) approach

**Arthroplasty:** A surgical procedure that restores joint function

**Arthroscopic (surgery):** A minimally invasive surgical procedure used to diagnose and treat joint problems

**Cupron antimicrobial technology:** Copper-infused patient linens, thought to reduce infections and the need for antibiotics

**DVT (deep vein thrombosis):** A clot that lodges in a blood vessel

**Embolism:** Blood clot that becomes lodged in a blood vessel and blocks it

**Fellowship:** Advanced medical training

**Glenoid:** The part of the shoulder where the shoulder blade (scapula) connects to the upper arm bone (humerus)

**Holistic care:** An approach to wellness that accounts for the physical, emotional and psychological needs of a patient

**Hypotension:** Low blood pressure

**Incision:** A cut made in order to perform surgery

**Intramedullary:** Referring to the inside of a bone

**Jiffy Hip\* (also see anterior approach hip replacement):** Minimally invasive hip replacement surgery using a frontal (anterior) approach

**MAKOplasty®:** Robot-assisted technology for partial knee, total knee replacement, and total hip replacement surgeries

**Minimally invasive:** Refers to a surgical procedure that only requires a small incision

**MRSA (methicillin-resistant staphylococcus aureus):** A strain of antibiotic-resistant bacteria that is difficult to treat and can affect many parts of the body

**Multi-modal analgesia:** Incorporating different pain control techniques to more effectively manage pain, with fewer side effects

**Musculoskeletal (MSK) radiologist:** A doctor who specializes in the imaging and diagnosis of problems relating to muscles, bones and joints

**NAVIO®:** Robot-assisted tool for partial knee replacement

**Orthopedics:** The branch of medicine dealing with the skeletal system

**Osteoarthritis:** Joint stiffness and joint pain caused by loss of cartilage over time

**Patient Navigator:** Specially trained orthopedic nurse that provides guidance and education for orthopedic patients and their families

**PE:** Pulmonary embolism, when a blood clot breaks loose and travels to the lungs

**Perioperative pain control:** Pain management before, during and after surgery

**Periosteum:** Specialized connective tissue that covers all bones

**Posterior:** Refers to the rear

**Prophylaxis:** A preventive treatment

**Quadriceps:** The four muscles that cover the front of the thigh

**Regional anesthesia:** A type of anesthesia administered to only part of the body

**RN:** Registered nurse

**Subchondroplasty:** A joint-preserving surgical procedure for chronic knee pain

**Subscapularis:** The triangular muscle that extends from the shoulder to the upper arm

**Subspecialty:** A highly specific area of expertise

**VTE:** Venous thromboembolism is the formation of blood clots in the vein including DVT and PE





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