Welcome

The mission of CentraCare Neurosciences Stroke Center at the St. Cloud Hospital is to provide the best possible stroke care to patients in Central Minnesota. To achieve this mission, we continue to seek opportunities to improve the overall care for stroke patients at St. Cloud Hospital and other Central Minnesota hospitals. In this year’s report, we are happy to present the summary of our initiatives and how they have helped us to achieve our goal.

Two years ago, overwhelming evidence demonstrated a clear benefit of emergent intra-arterial thrombectomy for patients with large vessel occlusions. Since then, stroke centers nationwide have been struggling to reduce the time it takes from arrival of the patient to the emergency room to the start of the thrombectomy procedure. As there is still no national benchmark regarding this parameter, we took multiple initiatives to push for our best. We are excited to share with you a new telestroke initiative for patients coming directly to St. Cloud Hospital Emergency Room. A second initiative expedites patients transferred from other hospitals by taking them directly from helicopter or ambulance to our operating room.

Additionally, as our telestroke network has continued to grow, we realized that sometimes it requires extensive and tedious arrangements for caregivers of our patients to bring them for follow-up visits. We initiated “telestroke/vascular neurology clinic” to help these patients have their follow-up visits in a local clinic via telestroke network. The progress we have made with this program has been overwhelmingly positive and we are excited to share our findings with you.

As our telestroke network has become more robust, we feel proud how our collaborating sites are improving their benchmarks and stroke care in the whole region.

As we continue to grow and improve the care of stroke together with our collaborating sites, we would like to share all important outcomes of stroke patients at St. Cloud Hospital.

Sincerely,

M. Fareed Suri, MBBS
Stroke Center Medical Director
Our Mission

CentraCare Neurosciences Stroke Center at St. Cloud Hospital offers comprehensive, interdisciplinary, patient and family-centered stroke care that encompasses public awareness and prevention education, rapid triage, diagnosis, treatment and rehabilitation.

Our patients benefit from:
- Nationally recognized care
- Certified nurses, fellowship-trained doctors and excellent support staff
- Quality indicators which meet or exceed national benchmarks
- Multidisciplinary team
- State-of-the-art technology and surgical approaches
- High-volume center

Cerebrovascular team
Our cerebrovascular team includes stroke neurologists, interventional neurologists, cerebrovascular neurosurgeons and advanced practice providers. We are dedicated to delivering the best treatment, care and outcomes for patients with a wide range of cerebrovascular disorders. When developing treatment plans for our patients, we focus on a collaborative and multidisciplinary approach. The cerebrovascular team seeks to serve both the urgent patient who has suffered an acute stroke or cerebral hemorrhage, as well as the elective patient who is stable and needs counseling and management for conditions such as unruptured cerebral aneurysms.
Jeff Birch of Melrose was fortunate that his daughters Avery, 9, and Kyja, 12 (shown on cover) at the time, realized he needed help when he had a stroke at their home in February 2016 at the age of 45.

Jeff was diagnosed at CentraCare Health – Melrose by a neurologist via telestroke. CentraCare Neurosciences Stroke Center provides telestroke services in the region to help patients experiencing a stroke receive treatment as quickly as possible and reduce the effects of stroke. A stroke is a stop in blood flow to the brain. It could be caused by a blocked blood vessel or bleeding in the brain.

Jeff was flown to St. Cloud Hospital, where Interventional Neurologist Fareed M. Suri, MBBS, performed surgery to remove a blockage of a blood vessel in the brain. Dr. Suri said Jeff was lucky because he got to the operating room well within the timeframe where the treatment is effective. This is why it is important for people of all ages to know the signs and symptoms of stroke.

Outpatient occupational and speech therapies have helped Jeff’s recovery. He continues to enjoy golfing, fishing and spending time with his family.

Today, Jeff enjoys golfing, fishing and spending time with family, including their dogs.
Telestroke in the Region

The CentraCare Neurosciences Stroke Center at St. Cloud Hospital provides regional telestroke services to help patients receive stroke treatment as quickly as possible and reduce the effects of stroke. Patients who access a facility that has telestroke are able to connect, in real time, with an interventional stroke neurologist from the Stroke Center. Telestroke accelerates treatment decisions which improves patient outcomes. This partnership allows accurate and prompt diagnosis of stroke so that important treatment can begin quickly and patients can be transferred to St. Cloud for advanced stroke interventions, such as thrombectomies, if needed.

With stroke, every second matters. Interventions such as intravenous (IV) alteplase can quickly be administered to break up clots. IV alteplase is the only U.S. Food and Drug Administration-approved drug for the treatment of acute ischemic strokes. Numerous studies have demonstrated the clinical effectiveness of telestroke care. In a large controlled trial, stroke patient outcomes were better at hospitals with telestroke support than in hospitals without telestroke support. This program is making a positive difference in how stroke care is provided to our local communities.

### St. Cloud Hospital Telestroke Data Rollup

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of requests for telestroke consult</td>
<td>260</td>
<td>178</td>
</tr>
<tr>
<td>Number of successful connections</td>
<td>250</td>
<td>159</td>
</tr>
<tr>
<td>Average response time (minutes)</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Number of transfers to St. Cloud Hospital</td>
<td>152 (61%)</td>
<td>114 (72%)</td>
</tr>
<tr>
<td>Number of patients kept locally</td>
<td>98 (39%)</td>
<td>45 (28%)</td>
</tr>
</tbody>
</table>

### Telestroke Go-Live Dates

- Alexandria
- Appleton
- Benson
- Glenwood
- Hutchinson
- Long Prairie
- Melrose
- Monticello
- Olivia
- Paynesville
- Sauk Centre
- Staples
- Wadena
- Willmar
Beginning in early October 2015, regional post-stroke and TIA (transient ischemic attack) patients gained access to a telestroke/vascular neurology clinic patient navigator program. The program was made possible by a $540,000, three-year grant from the Department of Health and Human Services’ Rural Health Care Services Outreach Grant Program.

The primary goal of the program is to provide better access to care and improve health outcomes for patients recovering from stroke or TIA who reside in Chippewa, Pope, Swift, Todd, Wadena and parts of Stearns counties in Central Minnesota. The program went live in four CentraCare Health (CCH) regional sites in December 2015: Long Prairie, Melrose, Paynesville and Sauk Centre. Glacial Ridge Health System in Glenwood was added in December 2016. Tri-County Health Care in Wadena was added in February 2017. Two more sites, Lakewood Health System in Staples and Swift County – Benson Health Services in Benson, were added at the end of April 2017.

As of November 2016, 39 individuals were enrolled in the program. Of those, 79 percent had their follow-up visit completed within 30 days of hospital discharge. Eighty percent (24) completed their visit via telehealth. Thirty-eight individuals had been enrolled for more than 30 days as of November 2016. Of these, six (16 percent) were readmitted within 30 days. Three (8 percent) had a stroke within 90 days.

Surveys were administered to the patients upon completion of their telehealth appointment. As of November 2016, 15 surveys had been received. Only two out of the 15 indicated they would have preferred to drive to St. Cloud for a face-to-face appointment in lieu of telemedicine. All patients responded they felt comfortable with the telemedicine equipment and most (77 percent) agreed the quality of care via telemedicine is as good as a face-to-face visit.

The goals of this program include improvement of the patient’s quality of life by 30 percent from enrollment to six months later, and a decrease in the degree of disability by 50 percent from enrollment to six months later. As of November 2016, the quality-of-life scores have improved by 41 percent and the degree of disability has been reduced by 56 percent.
Time is Brain — Improving Outcomes

Time is brain. Every minute a stroke goes untreated, 2 million brain cells are lost. CentraCare Neurosciences Stroke Center at the St. Cloud Hospital continually strives to improve the stroke care provided to our patients. Our goal is to provide time-sensitive treatments as quickly and as safely as possible.

Telestroke at St. Cloud Hospital Emergency Department

In 2015, we saw an increase in the time it took to administer alteplase. A group of stakeholders examined our process beginning from when the patient arrives in the emergency department (ED) with acute stroke symptoms to the time the medication was administered, which is known as the door-to-needle time (DTN). From January-June of 2015 our median DTN was 53 minutes.

Over the course of several months, we implemented practices that we anticipated would help improve our times. While we did see some improvement with our times, we wanted to see more of an improvement. The group began exploring other options and learned from our telestroke sites that having a stroke provider available as soon as the patient arrives, improves DTN times.

In August 2016, we fully implemented the use of telestroke in the St. Cloud Hospital ED. As soon as a patient arrives at the hospital, the stroke provider is notified and the patient is examined via telestroke. The stroke provider is then able to immediately initiate treatment decisions. Since this implementation, we have successfully decreased our DTN to 40.5 minutes.
Our goal is to provide time-sensitive treatments as quickly and safely as possible.
In 2012, a new stroke treatment, known as mechanical clot retrieval or mechanical thrombectomy, became available, expanding the treatment window for ischemic strokes. Carefully selected patients may benefit from this treatment in which an interventional neurologist makes a small incision in the groin and threads a very small catheter through an artery to the site of the clot. The clot is then removed which improves blood flow to the brain. In 2015, several pivotal clinical trials were published that proved patients have improved outcomes with these newer mechanical clot retrieval treatments, and stroke providers were encouraged to start the procedure as quickly as possible.

From October to December 2015, the time the patient arrived to the St. Cloud Hospital ED from an outside hospital to the time the groin incision was made for this procedure was 38.1 minutes. There were identified delays in the process of getting the patient to the operating room (OR) from when the patient was admitted to the ED. A process was developed in which the patient could bypass the ED admission process and go directly to the OR. In February 2016, the process was fully implemented and patients that needed a mechanical thrombectomy from an outside hospital were brought directly to the OR without going first to the ED. Through this change in process we reduced the door to incision time to a median time of 18 minutes.

**Apollo Device**

Hemorrhagic stroke occurs whenever a blood vessel in the brain bursts and bleeds into the surrounding area. The excess blood puts pressure on the brain and causes dangerous swelling and injury to the surrounding brain structures.

The Apollo System is a minimally invasive surgical device that allows neurosurgeons to remove brain hemorrhages while causing much less stress for the patient. This device consists of a surgical wand that combines vacuum, irrigation and vibrational energy to gently and rapidly remove brain hemorrhages through the smallest possible channel.

When using the Apollo System, the surgeon inserts an endoscope through a small hole in a patient’s skull. The surgeon then uses stereotactic navigation to guide it to the site of the hemorrhage. The tiny Apollo wand passes through the endoscope and suctions out the hemorrhage thus relieving the pressure and swelling. In 2016, six patients were treated using this minimally invasive procedure.

**Teach-Back Patient Technique**

Improving patients’ understanding of their stroke discharge instructions is a priority for our nursing staff. All stroke patients receive education on their personal risk factors and the signs of a stroke. Patients that go home receive a follow-up phone call and are asked if they can recall their personal risk factors and the signs of a stroke. In September 2015, only 46 percent of patients could recall the signs of a stroke and only 18 percent of patients could identify their personal risk factors.

A work group convened and reviewed the current evidence for improving health literacy and decided to implement the teach-back method. Teach-back methodology encourages nursing staff to refrain from using medical jargon and assess patients’ understanding of discharge teaching by having the patients “teach back” to the nurse what the nurse has taught them regarding their discharge instructions and stroke education. All registered and licensed nurses on the Neuroscience/Spine Unit received simulation training on how to use the teach-back method and it was implemented in February 2016.

After implementation, there was a significant improvement in patients’ recall of their signs of stroke and identifying their personal stroke risk factors. In September 2016, 76 percent patients could identify the signs of a stroke and 76 percent of patients could state their personal risk factors.
Stroke Quality Measures

Get With The Guidelines-Stroke Gold Plus Quality Achievement Award with Target: Stroke Honor Roll

To receive the Gold Plus Quality Achievement Award, hospitals must achieve 85 percent or higher adherence to all Get With The Guidelines-Stroke achievement indicators for two or more consecutive 12-month periods and achieve 75 percent or higher compliance with five of eight Get With The Guidelines-Stroke quality measures. This is the third year in a row that the CentraCare Neurosciences Stroke Center at St. Cloud Hospital has achieved this award.

To qualify for the Target: Stroke Honor Roll, hospitals must meet quality measures developed to reduce the time between the patient’s arrival at the hospital and treatment with the clot-busting medication alteplase which is the only drug approved by the U.S. Food and Drug Administration to treat ischemic stroke.

About Get With The Guidelines®

Get With The Guidelines® is the American Heart Association/American Stroke Association’s hospital-based quality improvement program that provides hospitals with the latest research-based guidelines. Developed with the goal of saving lives and hastening recovery, Get With The Guidelines has touched the lives of more than 5 million patients since 2001.

<table>
<thead>
<tr>
<th>Get With The Guidelines (GWTG)- Stroke Gold Achievement Metrics</th>
<th>GWTG Gold Achievement Goal</th>
<th>2016 National Average</th>
<th>2016 St. Cloud Hospital</th>
<th>2015 St. Cloud Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic or hemorrhagic stroke patients who receive VTE prophylaxis by the end of hospital day 2</td>
<td>85%</td>
<td>97.3%</td>
<td>98.8%</td>
<td>98.3%</td>
</tr>
<tr>
<td>Ischemic stroke or TIA patients prescribed antithrombotics on DC</td>
<td>85%</td>
<td>98.6%</td>
<td>100%</td>
<td>99.7%</td>
</tr>
<tr>
<td>Ischemic stroke or TIA patients with atrial fibrillation/flutter discharged on anticoagulation therapy</td>
<td>85%</td>
<td>96.3%</td>
<td>96.9%</td>
<td>96.2%</td>
</tr>
<tr>
<td>Acute ischemic stroke patients who arrive at the hospital within 2 hours of last time known well, receive IV tPA within 3 hours of last time known well</td>
<td>85%</td>
<td>88.1%</td>
<td>88.2%</td>
<td>92.6%</td>
</tr>
<tr>
<td>Ischemic stroke or TIA patients who receive antithrombotic by end of hospital day 2</td>
<td>85%</td>
<td>97.3%</td>
<td>98.9%</td>
<td>98.7%</td>
</tr>
<tr>
<td>Ischemic stroke and TIA patients with LDL &gt;100, LDL not measured, or on cholesterollower- reducing prior to admission are prescribed statin therapy on DC</td>
<td>85%</td>
<td>96.8%</td>
<td>99%</td>
<td>98%</td>
</tr>
<tr>
<td>Ischemic or hemorrhagic stroke, or TIA with a history of smoking cigarettes, who are, or whose caregivers are, given smoking cessation advice or counseling during hospital stay</td>
<td>85%</td>
<td>97.6%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Additional Quality Metrics for GOLD PLUS</td>
<td>GWTG Quality Award Goal</td>
<td>2016 National Average</td>
<td>2016 St. Cloud Hospital</td>
<td>2015 St. Cloud Hospital</td>
</tr>
<tr>
<td>Stroke or TIA patients or their caregivers who were given education and/or educational materials during the hospital stay</td>
<td>75%</td>
<td>95.1%</td>
<td>92.4%</td>
<td>96.3%</td>
</tr>
<tr>
<td>Patients with Stroke who were assessed for rehabilitation services</td>
<td>75%</td>
<td>98.6%</td>
<td>99.7%</td>
<td>99.6%</td>
</tr>
<tr>
<td>Ischemic stroke or TIA patients with a documented Lipid profile</td>
<td>75%</td>
<td>92.5%</td>
<td>98%</td>
<td>98.2%</td>
</tr>
<tr>
<td>Ischemic stroke and stroke not otherwise specified patients with a score reported for NIH Stroke Scale (Initial)</td>
<td>75%</td>
<td>88.5%</td>
<td>95%</td>
<td>94.8%</td>
</tr>
<tr>
<td>Stroke patients who undergo screening for dysphagia with an evidence-based bedside testing protocol approved by the hospital before being given any food, fluids or medication by mouth</td>
<td>75%</td>
<td>84.9%</td>
<td>97.2%</td>
<td>92.7%</td>
</tr>
</tbody>
</table>
Length of Stay

Graph 4 depicts the mean length of stay (LOS) for the various types of strokes in 2016. St. Cloud Hospital LOS is below national benchmarks for all stroke types.

Discharge Disposition

In 2016, more of our patients went home compared to national benchmarks, as shown in Graph 5.

Inpatient Satisfaction

Random inpatient satisfaction surveys are sent to patients discharged from St. Cloud Hospital by the health care industry’s leading independent vendor of satisfaction. In July 2016, the method to measure satisfaction was changed to Top Box percentage. The Top Box score reflects the percentage of patients that scored “very good” or “always” on their survey questions. St. Cloud Hospital is at or above national benchmarks as shown in Graph 3.
Inpatient Rehabilitation Stroke Patients

St. Cloud Hospital Inpatient Rehabilitation Unit has been a Commission on Accreditation of Rehabilitation Facilities (CARF) accredited program since 2009. We were honored to be the first facility in Central Minnesota to achieve this accreditation and distinction. Stroke patients are the largest demographic of patients served in our facility. In 2015, 36 percent of our patients were stroke survivors for a total of 152 patients. In 2016, this number increased to 41 percent.

FIM (Functional Independence Measure) is a nationally recognized tool used by inpatient rehabilitation units to measure patients’ abilities to care for themselves. Areas measured include eating, grooming, bathing, toileting, communicating, ambulation, speaking and thinking skills. We are able to measure a patient’s improvement through these scores. The higher the FIM score, the more independently a patient can function. We look at patients’ admission FIM scores as well as their discharge scores. We also measure their improvement through the FIM change score. The FIM change score is the difference in a patient’s admission and discharge scores compared to a patient’s length of stay. During 2015, the average stroke patient had a length of stay of 14 days. Upon admission, the average FIM score was 62 and discharge was 93 which indicated a FIM change score of 31.

We also measure our patients CMI (Case Mix Index) which takes their admission FIM scores, age, diagnosis and preexisting conditions in account. Our stroke patients in 2015 had a CMI of 1.42, this is higher than the regional and national scores which are closer to 1.31. A higher CMI reflects the more clinically complex needs of the patient. Even though we had slightly above average CMI scores for our patients, we were able to discharge 71 percent of them back into the community setting.

In 2016, the average stroke patient had a length of stay of 15 days. We saw an increase in the number of stroke patients, as well as their CMI scores. According to the admission FIM scores, the stroke patients were admitted doing less for themselves, with admission FIM scores averaging 57. Despite having lower FIM scores on admission and at discharge, we were able to discharge 73 percent of the stroke patients back to the community.

<table>
<thead>
<tr>
<th>Inpatient Rehabilitation Stroke Patients</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total patients</td>
<td>165</td>
<td>152</td>
</tr>
<tr>
<td>Length of stay</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Discharge to community</td>
<td>73%</td>
<td>71%</td>
</tr>
<tr>
<td>Admission FIM</td>
<td>57</td>
<td>62</td>
</tr>
<tr>
<td>Discharge FIM</td>
<td>88</td>
<td>93</td>
</tr>
<tr>
<td>FIM change</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>CMI</td>
<td>1.47</td>
<td>1.42</td>
</tr>
<tr>
<td>Average age</td>
<td>69 years</td>
<td>69 years</td>
</tr>
<tr>
<td>Male</td>
<td>65%</td>
<td>62%</td>
</tr>
<tr>
<td>Female</td>
<td>35%</td>
<td>38%</td>
</tr>
<tr>
<td>Non-caucasian</td>
<td>3%</td>
<td>5%</td>
</tr>
</tbody>
</table>
In-Hospital Stroke Mortality

St. Cloud Hospital's 2016 in-hospital mortality reports (graph 6) were obtained through Get With The Guidelines-Stroke. Acute ischemic stroke calculations include adjustments using the National Institutes of Health Stroke Scale (NIHSS). Risk-adjusted mortality takes into account co-morbidities that would increase mortality and is considered the expected mortality. St. Cloud Hospital's acute ischemic, intracerebral and subarachnoid hemorrhages observed mortality is less than the expected mortality. When compared to national benchmarks, the observed mortality is higher for acute ischemic and subarachnoid hemorrhagic strokes, however the risk adjusted mortality is significantly higher indicating that the St. Cloud Hospital cares for sicker patients with higher expected mortality rates.

All Cause 30-Day Readmissions

Centers for Medicare and Medicaid Service (CMS) reporting period from third quarter 2012 through second quarter 2015 listed St. Cloud Hospital's All-Cause 30-Day readmission rate at 12.4 percent, which is reported as "no different than" the national rate.

Stroke Treatment

• **IV Alteplase and Mechanical Thrombectomy**

This graph compares the IV alteplase and mechanical thrombectomy 2016 usage rate for Stroke Center patients to national benchmarks. The graph indicates that our overall treatment rates are above national benchmarks. We have a developed telestroke system where the stroke providers consult with ED providers on IV alteplase administration and our rates of administration at outside facilities are higher than national benchmarks.
• Door-to-Needle Time
Graph 8 compares the 2016 median door-to-needle time for St. Cloud Hospital patients to national benchmarks. Graph 9 indicates the percentage of patients that received IV alteplase within 60 minutes compared to national benchmarks. Both graphs indicate that St. Cloud Hospital is at a comparable rate to hospitals nationwide.

Graph 10 shows St. Cloud Hospital has comparable 2016 thrombolytic complication rates compared to national benchmarks. Thrombolytic therapy refers to IV alteplase or mechanical thrombectomy. Thrombolytic complications are defined as life threatening serious systemic hemorrhages or symptomatic brain hemorrhages within 36 hours of IV alteplase or other serious complications that require additional medical interventions or a prolonged hospital stay.

• Thrombolytic Therapy Complications

Functional Outcome (NIHSS)
The National Institutes of Health Stroke Scale (NIHSS) is validated clinical assessment that provides a quantitative measure of stroke severity. The scale ranges from 0, being no deficits to 42, being a severe stroke. Graphs 11 and 12 illustrate greater improvements in 2016 stroke severity upon discharge for patients that receive IV alteplase and/or mechanical thrombectomy.
Improving Community Health

Research
St. Cloud Hospital is involved in clinical and academic research to support best practices and evidence-based care for stroke. Members of our cerebrovascular team have published several research articles in medical journals and presented at national conferences.

• ARAMIS
CentraCare Neurosciences Stroke Center enrolls patients in Addressing Real-world Anticoagulant Management Issues in Stroke (ARAMIS). This study is sponsored by Duke University and by invitation only. The study is designed to provide important and timely insight into the management of acute stroke patients who are on novel oral anticoagulants in community practice. The study is estimated to enroll 10,000 patients by study completion date of August 2019.

• StrokeNet
St. Cloud Hospital has joined the National Institute of Health’s StrokeNet, which was created to conduct small and large clinical trials and research studies to advance acute stroke treatment, stroke prevention, and recovery and rehabilitation following a stroke. The network consists of 25 regional centers across the United States which involves more than 200 hospitals. St. Cloud Hospital is part of the University of Minnesota Regional Coordinating Center.

TIA Clinic
The CentraCare Neurosciences Transient Ischemic Attack (TIA) Clinic helps patients diagnosed with TIAs, minor subacute strokes, dissections, aneurysms, atrial venous malformations or who are at risk for stroke. Several studies have demonstrated TIA clinics affiliated with stroke centers provide management resources that decrease overall risk for recurrent TIA or stroke.

Instead of being admitted to the hospital or making several trips to multiple locations for a full work-up, cerebrovascular patients benefit from the one-stop location at CentraCare Clinic – River Campus. In addition to seeing TIA patients, we have urgent appointments available within 48 hours for patients experiencing any critical cerebrovascular issues.
Community Education

Prevention of stroke begins with education. Our community education is aimed at increasing awareness of stroke risk factors, stroke warning signs and responses needed when stroke warning signs occur. CentraCare Neurosciences Stroke Center strives to educate the community by being involved in numerous events. Two of our largest events are Strides for Stroke and Strike Out Stroke.