

Neurosciences

Practice and Outcomes Report

2016







This report represents the first official publication of select clinical outcomes for the Department of Clinical Neurosciences of the Spectrum Health Medical Group. It also reflects the contributions made by our colleagues in other Spectrum Health Medical Group departments—specifically vascular surgery—and contributions made by several associated service lines within the hospitals, including nursing, and the emergency and imaging departments. Spectrum Health tracks, evaluates and reports outcomes data as part of its continuous quality improvement and transparency efforts.

Data reflected in this report represent both 10-year trends as well as volumes and other measures for 2015—the most recent yearly statistics available. This report is not a comprehensive list of all neurosciences programs, services and treatments offered by Spectrum Health. Because of the strong correlation between volume and improved outcomes, outcomes selected for this report primarily represent our high-volume procedures.

We hope the information in this report is valuable to you and we encourage you to contact us with your comments or questions. Contact us on the web at:

- spectrumhealth.org/neuromd
- shmg.org/neuro



Brien Smith, MD, and Kost Elisevich, MD

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Dear Colleagues
and Friends,

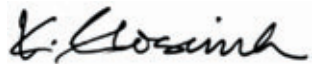
We welcome you to the 2016 Spectrum Health Medical Group Neurosciences Outcomes Report, our inaugural publication of select clinical neurosciences outcomes. We are pleased to provide this information to our colleagues, friends and referring physicians.

About five years ago, we committed to a proactive approach to both clinical and academic excellence. As part of an integrated health system, we are able to offer cutting-edge technology and employ quality improvement principles that help us address issues that positively influence the big picture. We also continue to remain dedicated to high-quality care delivered seamlessly, to translational and clinical research, and to educational development.

As the leading provider of stroke treatment in Michigan, we have much to be proud of, but we also have more to accomplish. This report represents more than a record of our past performance and success—it represents a template for our future vision to realize opportunities for growth and improvement.

Our goal is to use this report as a way to initiate dialogue to help us meet our clinical and academic goals. We invite you to read this report and join the conversation. Together, we can continue to advance care for neurological and craniospinal disorders in our region and beyond.

Sincerely,



Kost V. Elisevich, MD, PhD
Co-chair, Department of Clinical Neurosciences
Chief, Division of Neurosurgery



Brien J. Smith, MD
Co-chair, Department of Clinical Neurosciences
Chief, Division of Neurology

Stroke Care

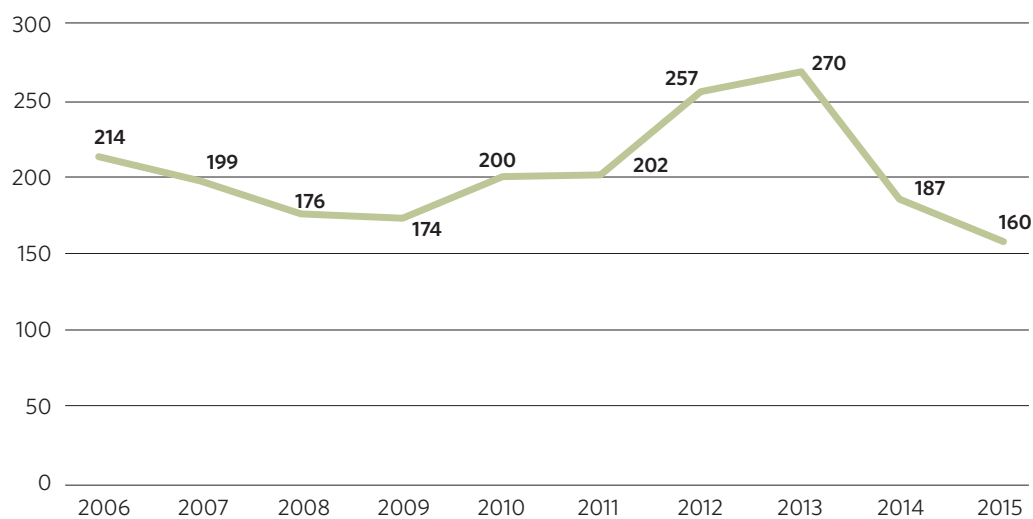
Spectrum Health was certified as West Michigan's first primary stroke center (PSC), and has held the Gold Seal of Approval from The Joint Commission since 2004. The Joint Commission's Certificate of Distinction for Primary Stroke Centers recognizes centers that make exceptional efforts to foster better outcomes for stroke care. The Joint Commission developed the certification program in collaboration with the American Heart Association and the American Stroke Association.

As a PSC, Spectrum Health meets the eight stroke clinical performance measures identified by The Joint Commission to maintain its certification. Spectrum Health also participates in national average benchmarking with Get With The Guidelines®—an in-hospital program aimed to improve acute stroke treatment and prevention of stroke and cardiovascular events. These guidelines focus on quick diagnosis and treatment of stroke patients within PSCs through evidence-based medicine and comparative data for quality improvement.

Structural vascular anomalies, particularly aneurysms, require an interdisciplinary effort with neuroendovascular, neurosurgical and neurocritical care elements. The neurovascular program of Spectrum Health Medical Group (SHMG) is in early development. SHMG hired three new faculty in the past year and already is experiencing a significant growth in its neurovascular caseload. SHMG leadership in the Department of Clinical Neurosciences expects the program to reach maturity by the end of the fiscal year—June 30, 2017.

Transient Ischemic Attack (TIA)

Annual Volumes: 2006 – 2015

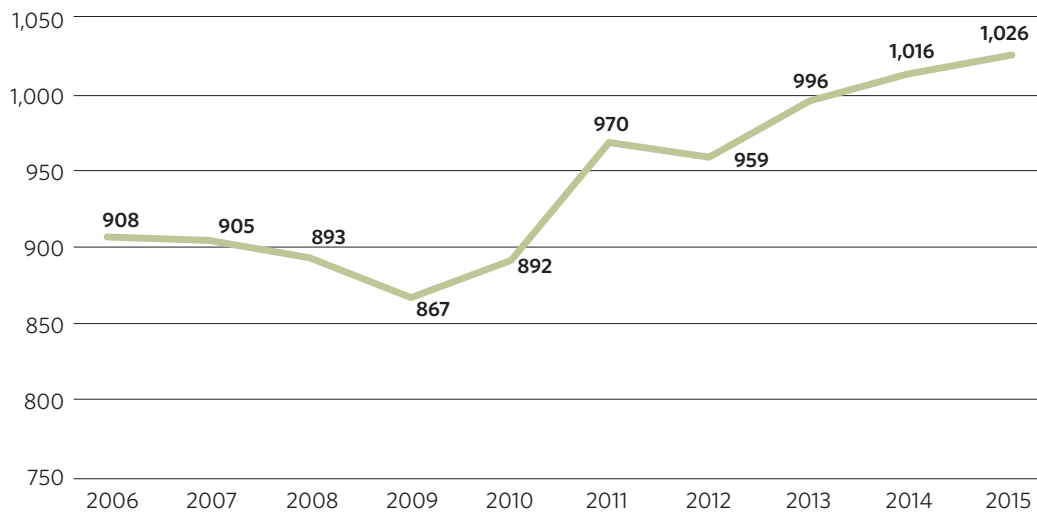


TIA volumes peaked in 2013 with a decline of 25 percent over 10 years. (Introduction of vascular neurology consultations in the emergency department setting began in 2014.)

Stroke Care

Ischemic Stroke

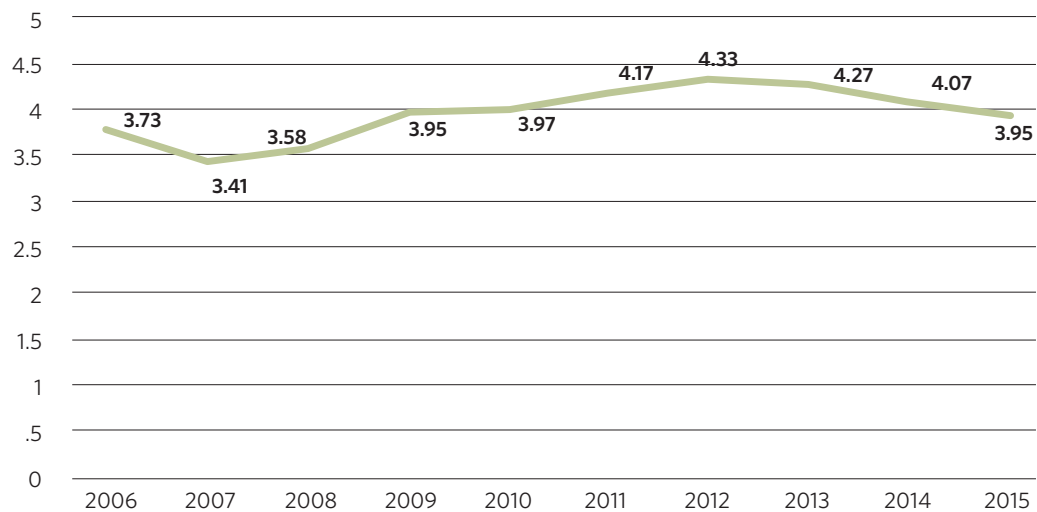
Annual Volumes: 2006 - 2015



Ischemic stroke volumes have increased by 13 percent over 10 years, and by 18 percent since the lowest volume in 2009.

Ischemic Stroke

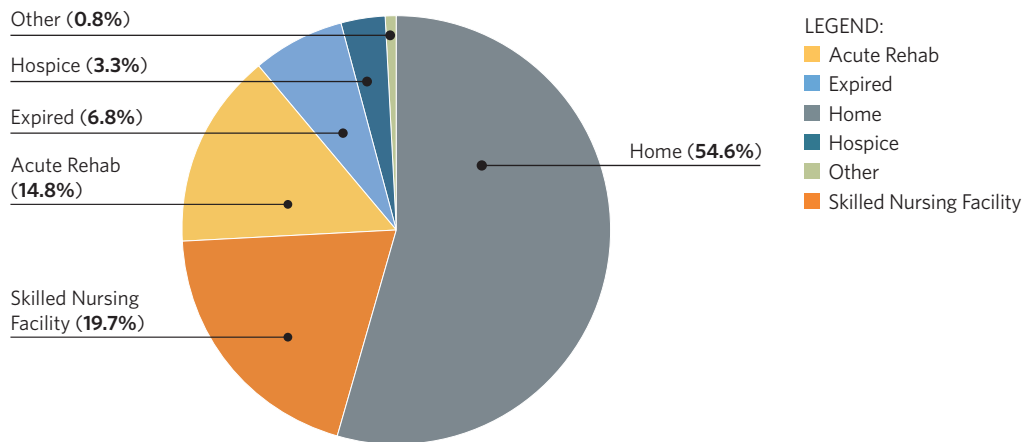
Average Length of Stay (LOS) in Days: 2006 - 2015



Average length of stay peaked in 2012 and has been declining gradually.

Stroke Care

Ischemic Stroke 2015 Discharge Disposition



LEGEND:

Acute Rehab includes transferred to acute care hospital or discharged to inpatient rehab facility.

Expired.

Home includes home or self-care, or home with home health care.

Hospice includes home with hospice care or transferred to hospice facility.

Other includes discharged/transferred to court/law enforcement, discharged/transferred to federal hospital, transferred to swing bed, discharged/transferred to long-term acute care, discharged/transferred to psychiatric hospital or left without being seen.

Skilled Nursing Facility includes transferred to skilled/subacute nursing facility, transferred to basic long-term care or transferred to skilled nursing facility with planned readmission.

Discharge disposition of all ischemic stroke patients for calendar year 2015.

Intracerebral Hemorrhage (ICH) Annual Volumes: 2006 - 2015

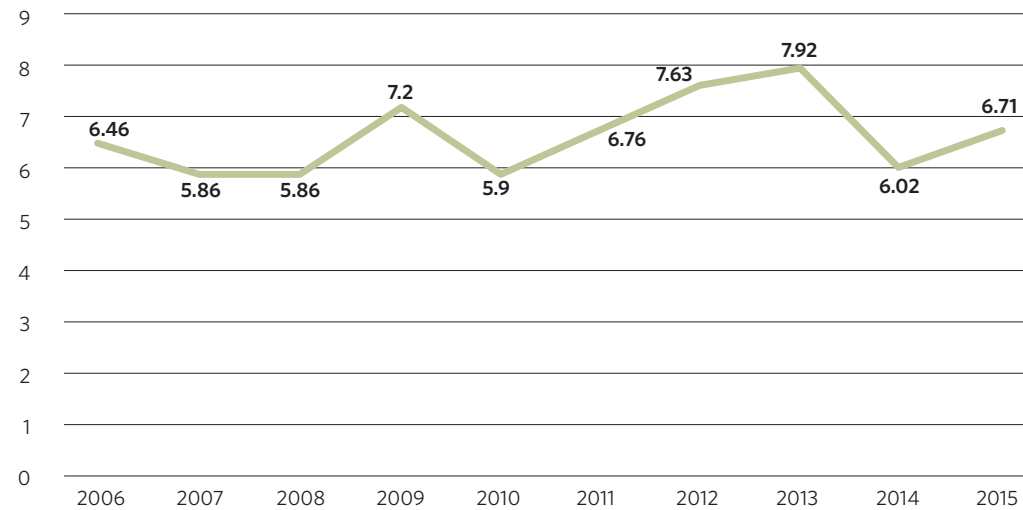


ICH volumes have increased by 26 percent over 10 years.

Stroke Care

Intracerebral Hemorrhage (ICH)

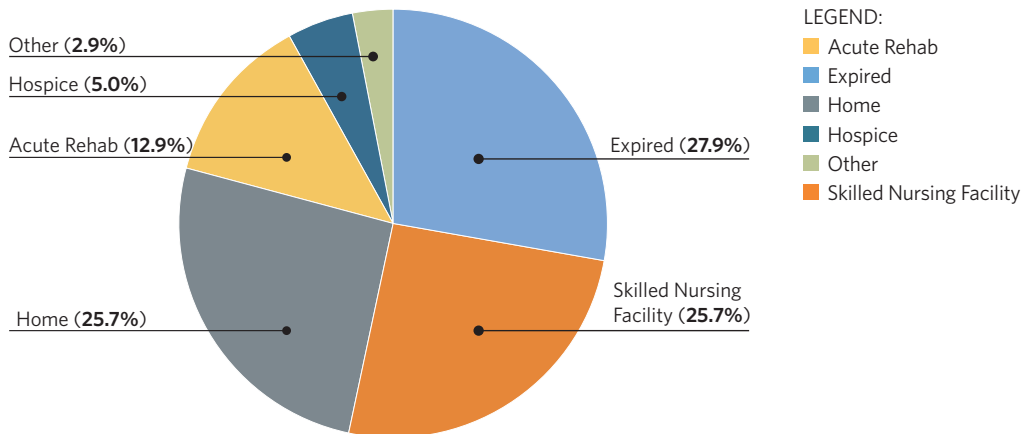
Average Length of Stay (LOS) in Days: 2006 - 2015



LOS has remained relatively flat over 10 years.

Intracerebral Hemorrhage (ICH)

2015 Discharge Disposition



LEGEND:

- Acute Rehab includes transferred to acute care hospital or discharged to inpatient rehab facility.
- Expired.
- Home includes home or self-care, or home with home health care.
- Hospice includes home with hospice care or transferred to hospice facility.

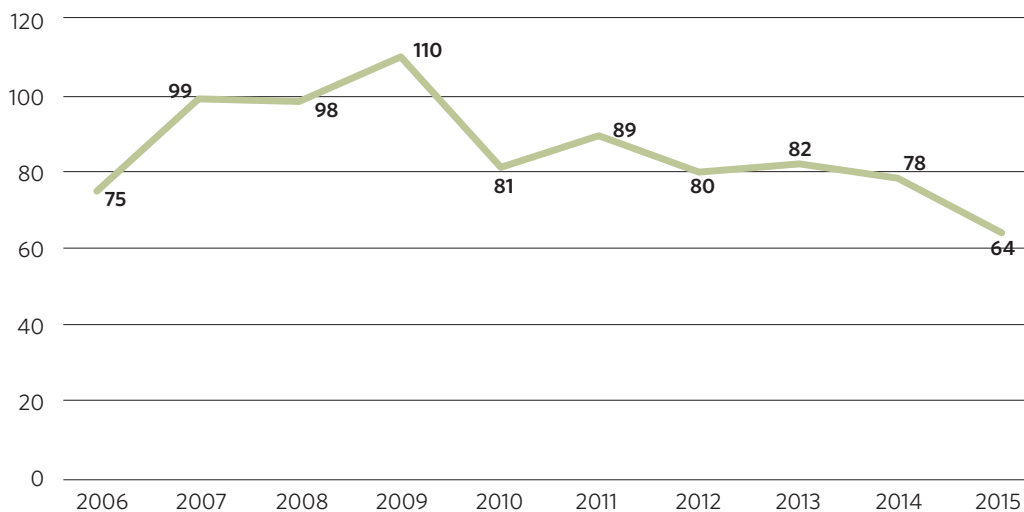
- Other includes discharged/transferred to court/law enforcement, discharged/transferred to federal hospital, transferred to swing bed, discharged/transferred to long-term acute care, discharged/transferred to psychiatric hospital or left without being seen.
- Skilled Nursing Facility includes transferred to skilled/subacute nursing facility, transferred to basic long-term care or transferred to skilled nursing facility with planned readmission.

Discharge disposition of all ICH patients for calendar year 2015.

Stroke Care

Subarachnoid Hemorrhage (SAH)

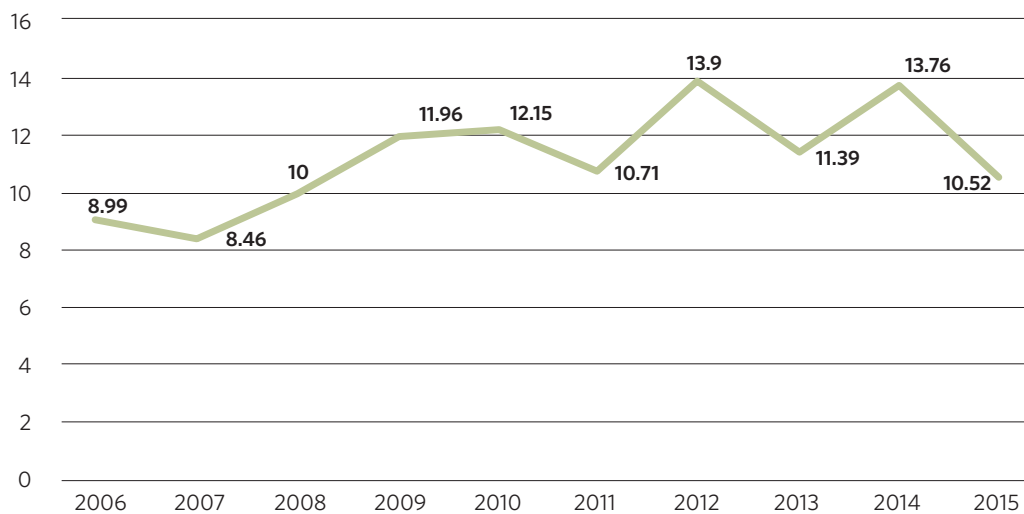
Annual Volumes: 2006 - 2015



SAH volumes peaked in 2009 and have been declining gradually.

Subarachnoid Hemorrhage (SAH)

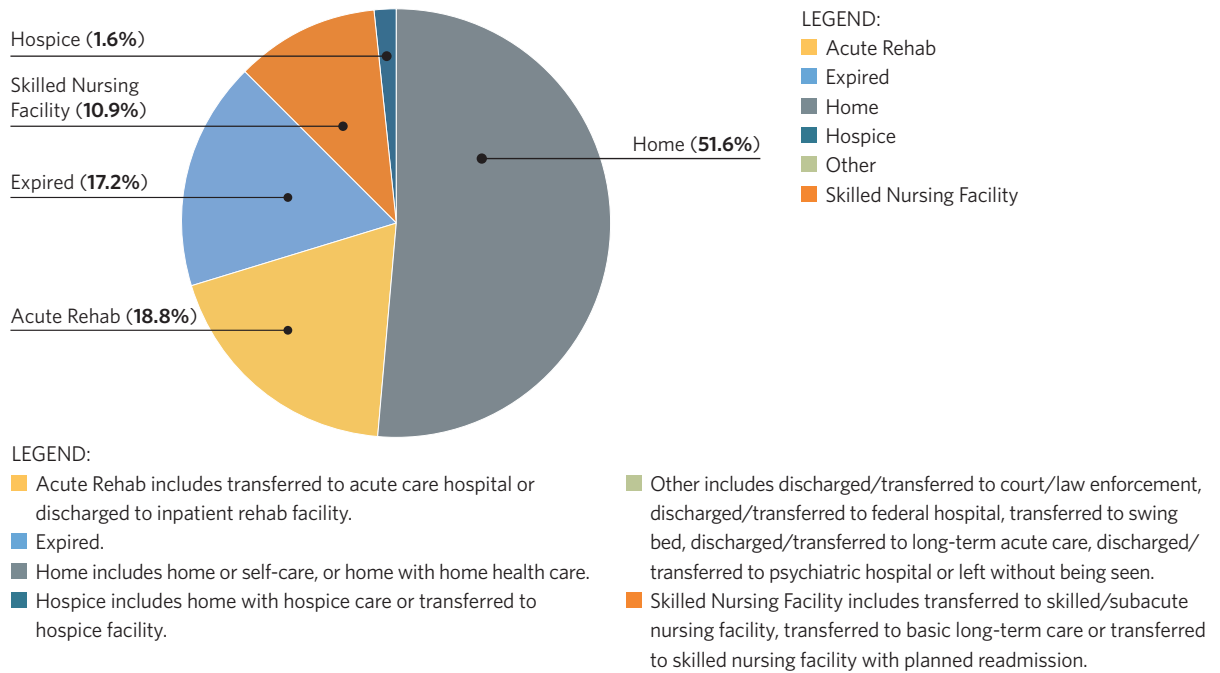
Average Length of Stay (LOS) in Days: 2006 - 2015



Average length of stay peaked in 2012.

Stroke Care

Subarachnoid Hemorrhage (SAH) 2015 Discharge Disposition

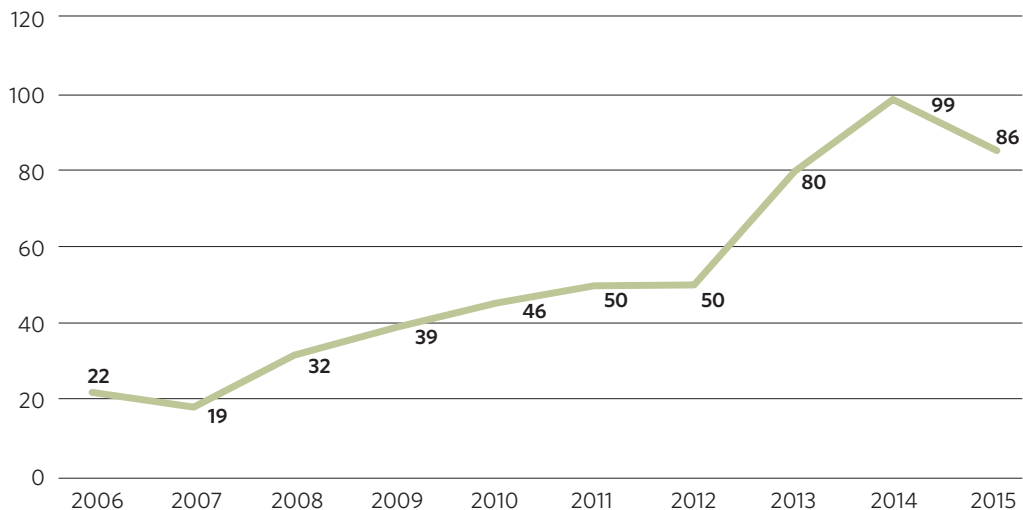


Discharge disposition of all SAH patients for calendar year 2015.

Stroke Care

Intravenous Tissue Plasminogen Activator (IV tPA) Administration

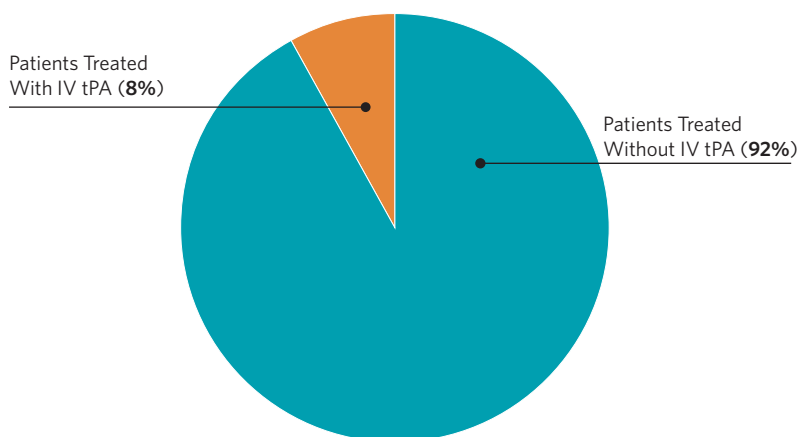
Annual Volumes: 2006 – 2015



Volumes for IV tPA treatment increased nearly fourfold over 10 years without a correlative increase in intracerebral hemorrhage. (See chart on Page 9.)

Intravenous Tissue Plasminogen Activator (IV tPA) Administration

Percentage of Ischemic Stroke Patients Treated in 2015

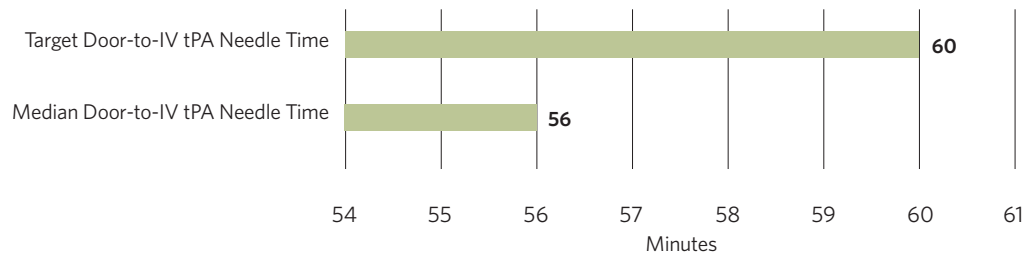


Percentage of patients treated with IV tPA for calendar year 2015.

Stroke Care

Intravenous Tissue Plasminogen Activator (IV tPA) Administration

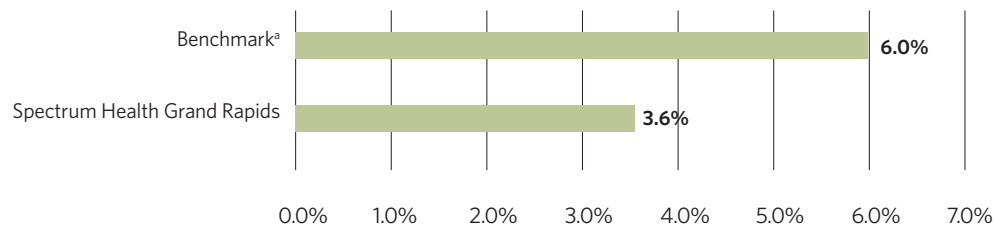
Median Door-to-Needle Time: 2015 (Data shown in minutes)



Median time (in minutes) for patients treated with IV tPA in calendar year 2015. Spectrum Health is under the target time of 60 minutes for hospital arrival to administration of IV tPA, as required for Certified Primary Stroke Center Hospitals and Get With The Guidelines® standards.

Intravenous Tissue Plasminogen Activator (IV tPA) Administration

Symptomatic Intracerebral Hemorrhage: 2015 IV tPA



*NINDS study: Intracerebral hemorrhage after intravenous tPA therapy for ischemic stroke. The NINDS tPA Stroke Study Group Stroke. November 1997;28(11):2109–2118

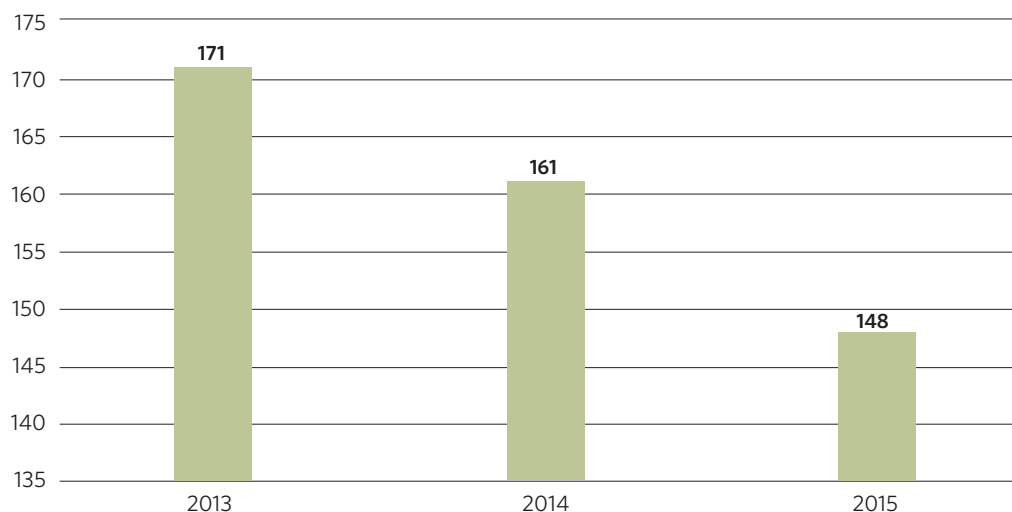
NOTE: The benchmark for this data is from the HERMES collaboration. Symptomatic intracerebral hemorrhage (sICH) is defined as neurological deterioration—marked by an increase of 4 or more points in the score on the NIHSS—and evidence of intracranial hemorrhage on imaging studies.

Stroke Care

NOTE: Data related to carotid endarterectomy shown in this report reflect the Spectrum Health Medical Group Vascular Surgery Department.

Carotid Endarterectomy

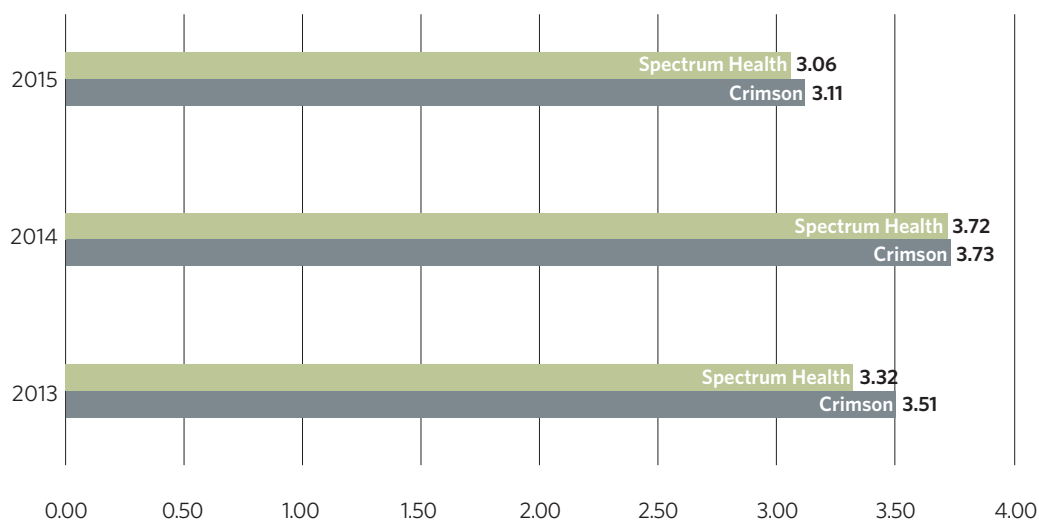
Annual Volumes: 2013 - 2015



Carotid endarterectomy volumes declined by 13 percent over three years with the introduction of stenting.

Carotid Endarterectomy

Average Length of Stay (LOS) in Days: 2013 - 2015

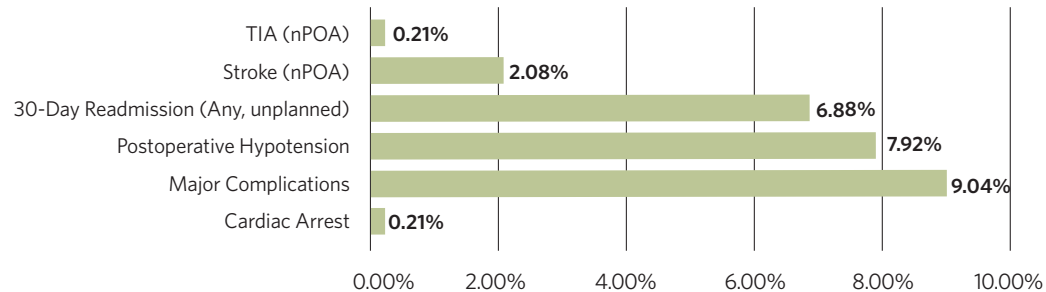


Average annual LOS over three years. Spectrum Health's average annual LOS was below the benchmark average in 2013 and 2014, as well as for the nine months of reporting in 2015. The benchmark comparison is derived from Crimson using large teaching hospitals as a comparison group.

NOTE: The 2015 comparison of Spectrum Health length of stay with Crimson ONLY includes the first three quarters of the year due to the transition to ICD-10 reporting.

Stroke Care

Carotid Endarterectomy Complications: 2013 – 2015



nPOA = not present on admission

Complications among carotid endarterectomy patients over three years.

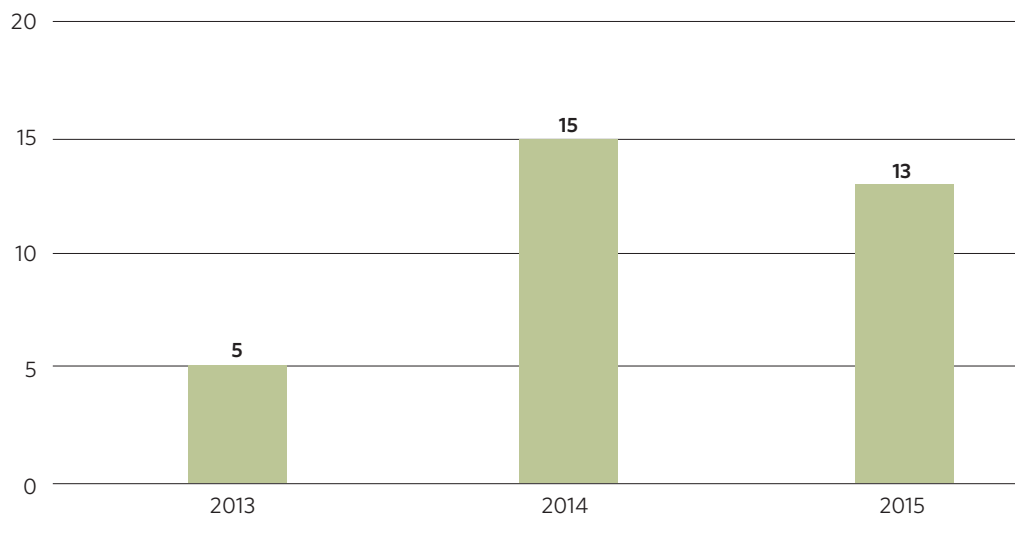
Major complications carotid surgery is defined by Health Grades Major Complications – Carotid.

Health Grades Major Complications – Carotid includes Methicillin-resistant *Staphylococcus aureus* (MRSA) Septicemia, anterior myocardial infarction (AMI), Septic Embolism, Cardiac Arrest, Pneumonia, Respiratory Failure, Coma, Nerve Damage, Iatrogenic cerebrovascular accident (CVA), Accidental Puncture or Laceration, Hemorrhage, Postoperative Shock, Hypertension, Postoperative Infection, Wound Disruption, and various miscellaneous complications of the central nervous system (CNS), Heart, Respiratory, Digestive and genitourinary (GU) systems. Health Grades has not yet released the ICD-10 (International Classification of Diseases - 10th Revision) definition for major complications carotid surgery; subsequently, 2015 data for this complication includes those up through the end of September 2015.

Stroke Care

Aneurysm Clipping

Annual Volumes: 2013 - 2015



Aneurysm clipping volumes increased nearly threefold over three years.

Stroke Care

Stroke Performance Measures

Performance Measure	Description	Certified TJC/AHA PSC Hospitals ^a	Spectrum Health Grand Rapids ^b
Venous Thromboembolism (VTE) Prophylaxis (STK-1)	Ischemic and hemorrhagic stroke patients who received VTE prophylaxis or have documentation why no VTE prophylaxis was given the day of or the day after hospital admission.	97.9%	95.3%
Discharged on Antithrombotic Therapy (STK-2)	Ischemic stroke patients prescribed antithrombotic therapy at hospital discharge.	99.4%	100%
Anticoagulation Therapy for Atrial Fibrillation/Flutter (STK-3)	Ischemic stroke patients with atrial fibrillation/flutter who are prescribed anticoagulation therapy at hospital discharge.	97.4%	94.1%
Thrombolytic Therapy (STK-4)	Acute ischemic stroke patients who arrive at this hospital within 2 hours of time last known well and for whom IV tPA was initiated at this hospital within 3 hours of time last known well.	89.0%	94.0%
Antithrombotic Therapy by End of Hospital Day 2 (STK-5)	Ischemic stroke patients administered antithrombotic therapy by the end of hospital day 2.	98.2%	97.3%
Discharged on Statin Medication (STK-6)	Ischemic stroke patients who are prescribed statin medication at hospital discharge.	97.8%	99.4%
Stroke Education (STK-8)	Ischemic or hemorrhagic stroke patients or their caregivers who were given educational materials during the hospital stay addressing all of the following: activation of emergency medical system, need for follow-up after discharge, medications prescribed at discharge, risk factors for stroke, and warning signs and symptoms of stroke.	96.4%	94.5%
Assessed for Rehabilitation (STK-10)	Ischemic or hemorrhagic stroke patients who were assessed for rehabilitation services.	99.0%	98.8%

^a This Get With The Guidelines® Aggregate Data report was generated using the Quintiles PMT® system. Copy or distribution of the Get With The Guidelines Aggregate Data® is prohibited without the prior written consent of the American Heart Association and Quintiles.

^b In 2015, Spectrum Health abstracted a 20 percent sampling of patients plus an oversample of five patients for the first quarter, and 100 percent during the second, third and fourth quarters for Primary Stroke Center Certification performance measures.

Data show that Spectrum Health Grand Rapids exceeds performance measures in three of the eight measures shown—dramatically exceeding performance measures in two of the measures shown and slightly exceeding performance measures in one of the measures shown.

Spectrum Health Grand Rapids is below performance measures in five of the eight measures shown—less than 1 percent below performance measures in two of the measures shown and less than 2 percent below performance measures in one of the measures shown.

LEGEND

TJC: The Joint Commission

AHA: American Heart Association

PSC: Primary Stroke Center

STK: Stroke

PMT: Patient Management Tool

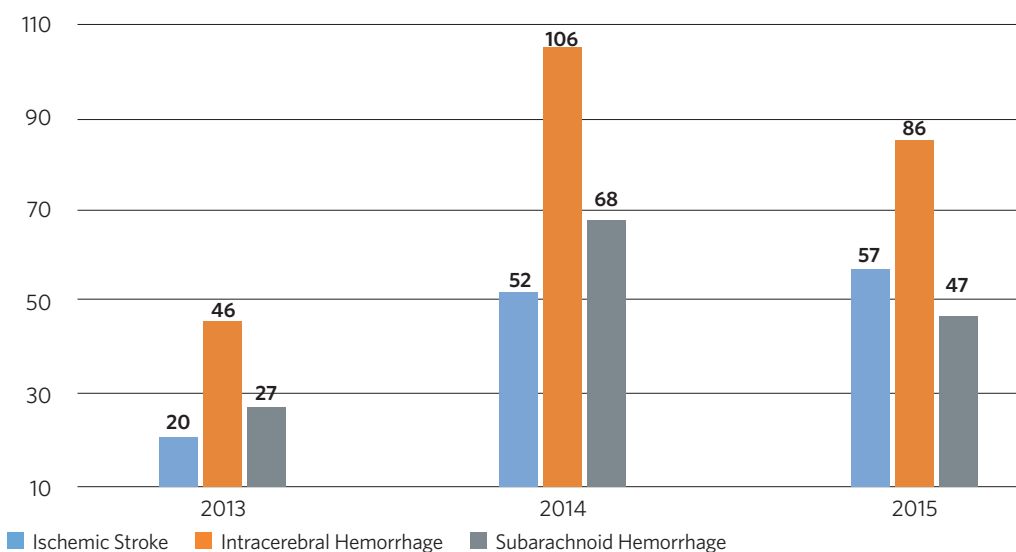
Neurocritical Care

The physicians of Spectrum Health Medical Group care for critically ill neurosurgical and neurological patients in the Spectrum Health Neurocritical Care Unit, which opened in August 2013. The charts in this section reflect volumes, length of stay, discharge disposition and Glasgow Coma Scale for six patient populations:

1. Intracerebral Hemorrhage (ICH)
2. Subarachnoid Hemorrhage (SAH)
3. Ischemic Stroke
4. Traumatic Brain Injury
5. Seizures
6. Tumors (Neuro)

Neurocritical Care Stroke Volumes

Annual Volumes: 2013 - 2015

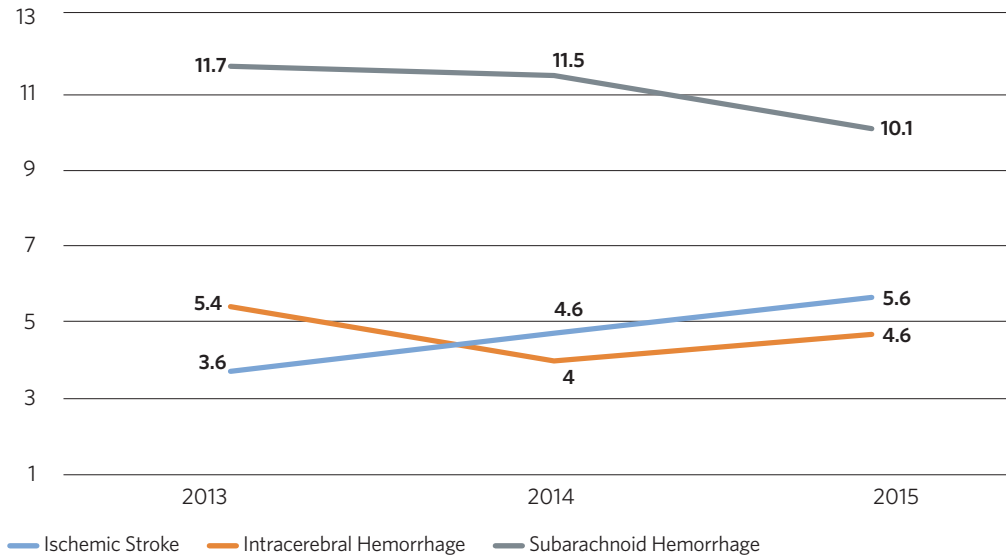


NOTE: The Spectrum Health Neurocritical Care Unit opened in August 2013—rates for 2013 represent the latter portion of the year. In the 2014 and 2015 metrics, ischemic stroke volumes remained flat; intracerebral and subarachnoid hemorrhage volumes decreased by 19 percent and 30 percent, respectively.

Neurocritical Care

Neurocritical Care Stroke Length of Stay (LOS)

Average Length of Stay (LOS) in Days: 2013 – 2015

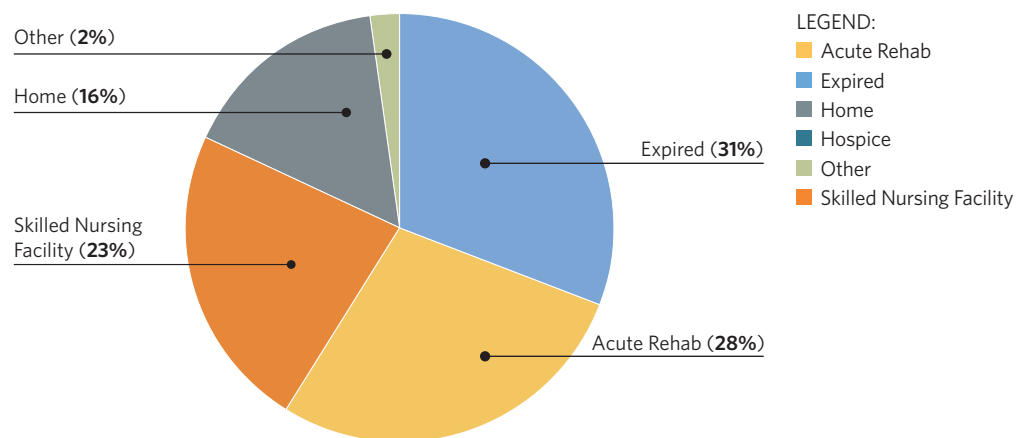


Average length of stay has remained relatively stable for each of the three patient populations, with a slight increase in LOS for ischemic stroke and a slight decrease for both intracerebral hemorrhage and subarachnoid hemorrhage from 2013 to 2015.

NOTE: The Spectrum Health Neurocritical Care Unit opened in August 2013—rates for 2013 represent the latter portion of the year.

Discharge Disposition of Neurocritical Care Ischemic Stroke Patients

2015 Discharge Disposition



LEGEND:

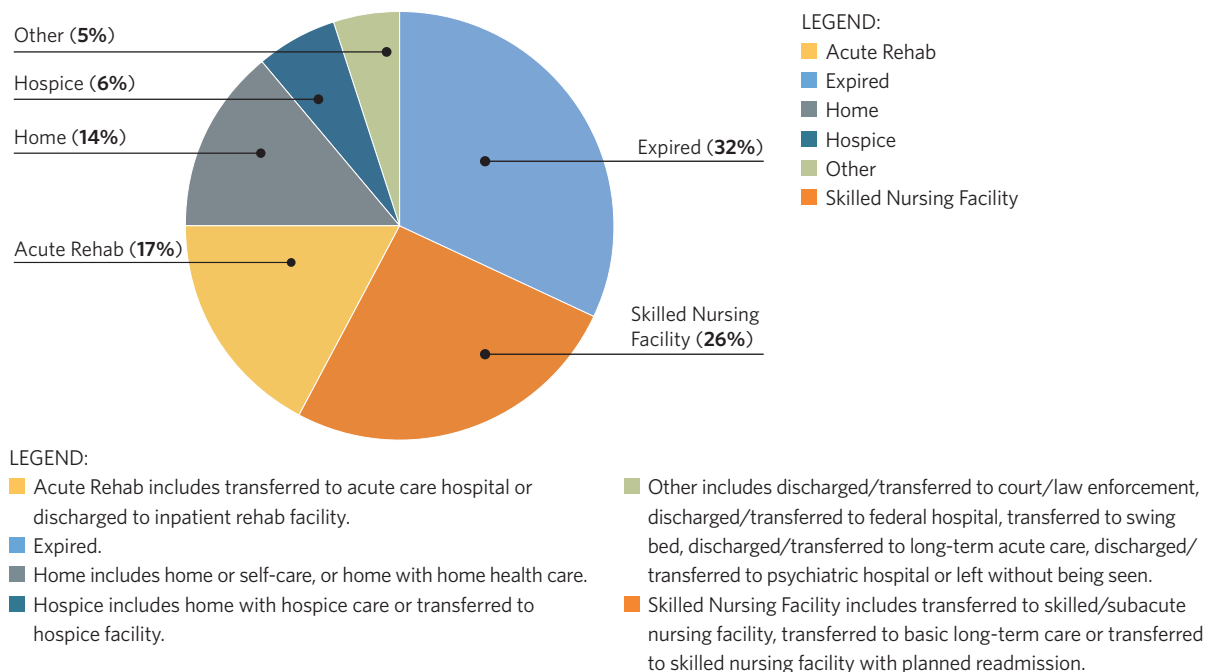
■ Acute Rehab includes transferred to acute care hospital or discharged to inpatient rehab facility.
 ■ Expired.
 ■ Home includes home or self-care, or home with home health care.
 ■ Hospice includes home with hospice care or transferred to hospice facility.

■ Other includes discharged/transferred to court/law enforcement, discharged/transferred to federal hospital, transferred to swing bed, discharged/transferred to long-term acute care, discharged/transferred to psychiatric hospital or left without being seen.
 ■ Skilled Nursing Facility includes transferred to skilled/subacute nursing facility, transferred to basic long-term care or transferred to skilled nursing facility with planned readmission.

Discharge disposition of all ischemic stroke patients in 2015.

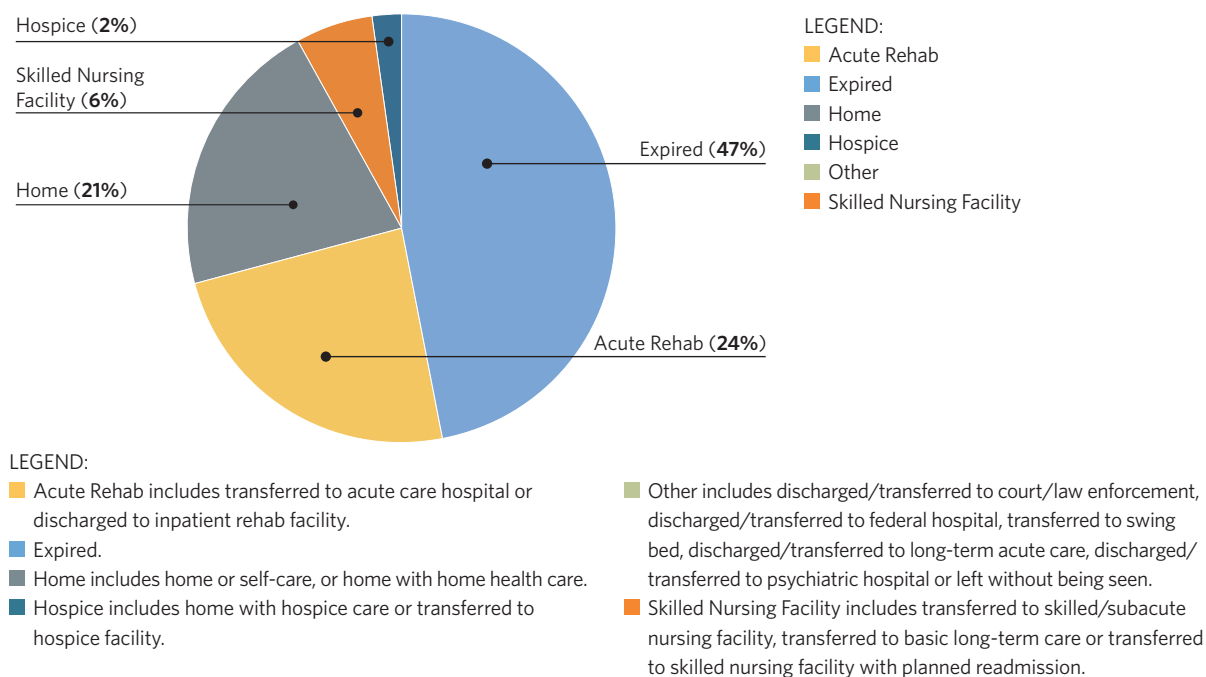
Neurocritical Care

Discharge Disposition of Neurocritical Care Intracerebral Hemorrhage Patients 2015 Discharge Disposition



Discharge disposition of all intracerebral hemorrhage (ICH) patients in 2015.

Discharge Disposition of Neurocritical Care Subarachnoid Hemorrhage Patients 2015 Discharge Disposition

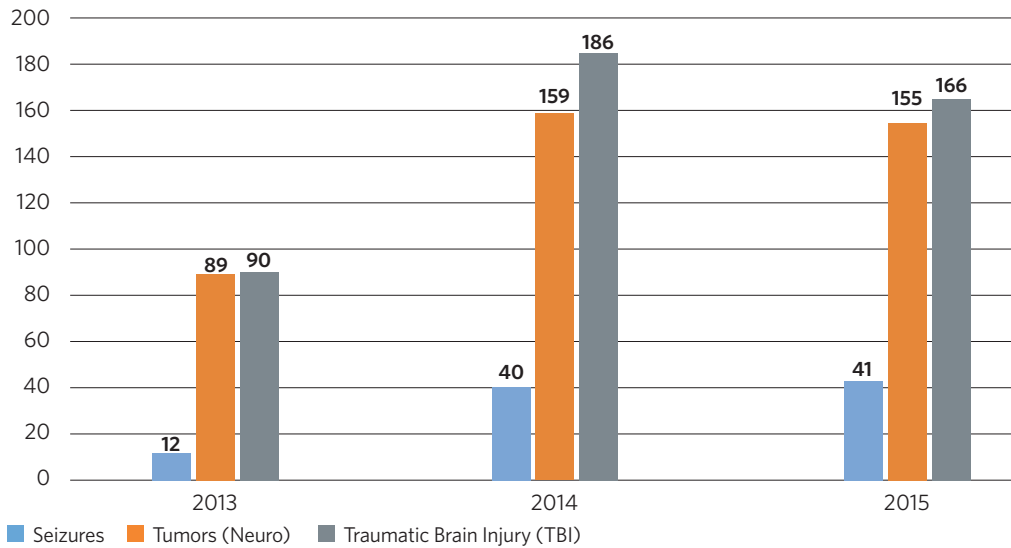


Discharge disposition of all subarachnoid hemorrhage (SAH) patients in 2015.

Neurocritical Care

Neurocritical Care Volumes: Seizures, Tumors (Neuro) and Traumatic Brain Injury

Annual Volumes: 2013 – 2015

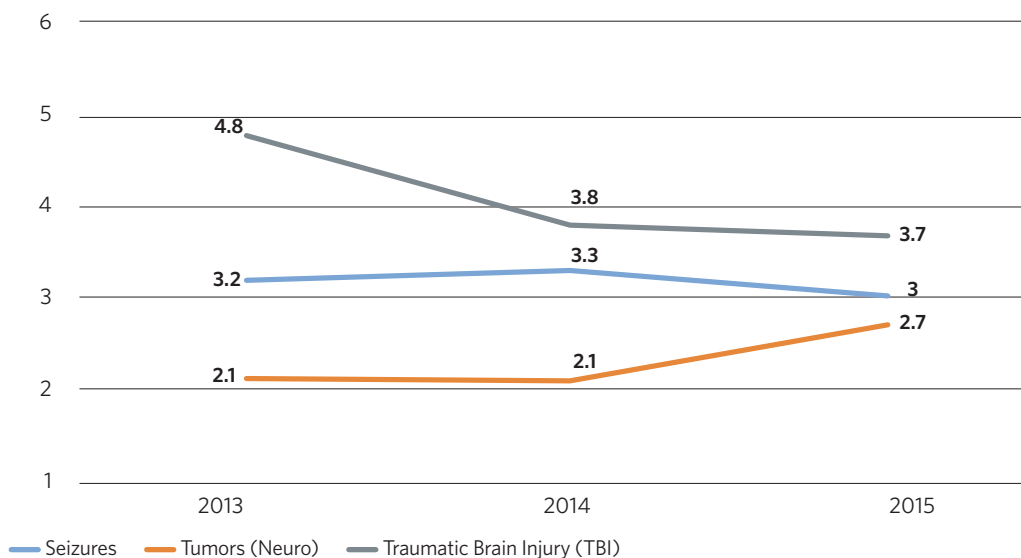


Volumes for seizures and tumors (neuro) remained relatively flat from 2014 to 2015 and decreased slightly for traumatic brain injury (TBI) from 2014 to 2015.

NOTE: The Spectrum Health Neurocritical Care Unit opened in August 2013—rates for 2013 represent the latter portion of the year.

Neurocritical Care Length of Stay (LOS)

Average Length of Stay (LOS) in Days: 2013 – 2015

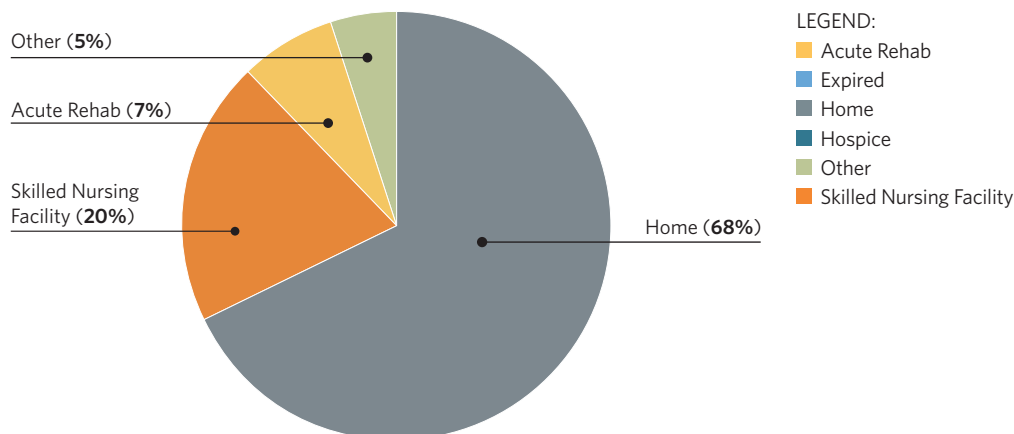


Average length of stay has decreased slightly for seizures and traumatic brain injury (TBI), with a slight increase in LOS for tumors (neuro).

NOTE: The Spectrum Health Neurocritical Care Unit opened in August 2013—rates for 2013 represent the latter portion of the year.

Neurocritical Care

Discharge Disposition of Neurocritical Care Seizure Patients 2015 Discharge Disposition



LEGEND:

Acute Rehab includes transferred to acute care hospital or discharged to inpatient rehab facility.

Expired.

Home includes home or self-care, or home with home health care.

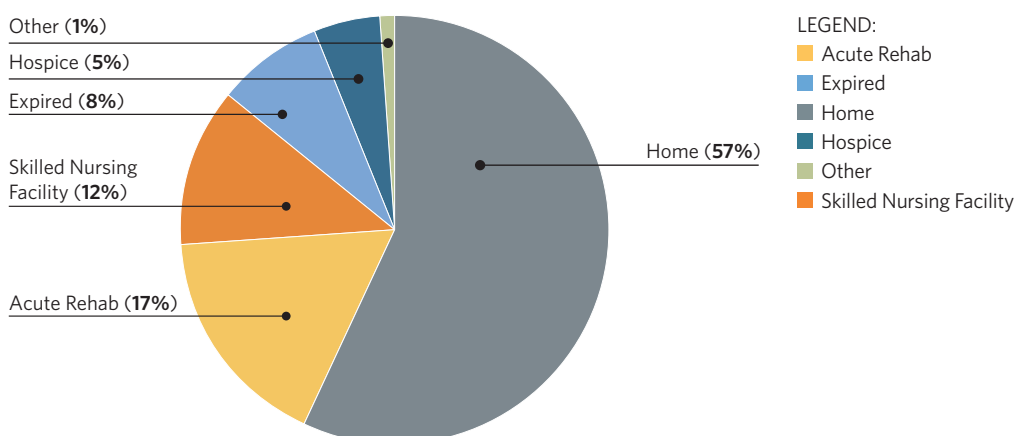
Hospice includes home with hospice care or transferred to hospice facility.

Other includes discharged/transferred to court/law enforcement, discharged/transferred to federal hospital, transferred to swing bed, discharged/transferred to long-term acute care, discharged/transferred to psychiatric hospital or left without being seen.

Skilled Nursing Facility includes transferred to skilled/subacute nursing facility, transferred to basic long-term care or transferred to skilled nursing facility with planned readmission.

Discharge disposition of all seizure patients in 2015.

Discharge Disposition of Neurocritical Care Tumor (Neuro) Patients 2015 Discharge Disposition



LEGEND:

Acute Rehab includes transferred to acute care hospital or discharged to inpatient rehab facility.

Expired.

Home includes home or self-care, or home with home health care.

Hospice includes home with hospice care or transferred to hospice facility.

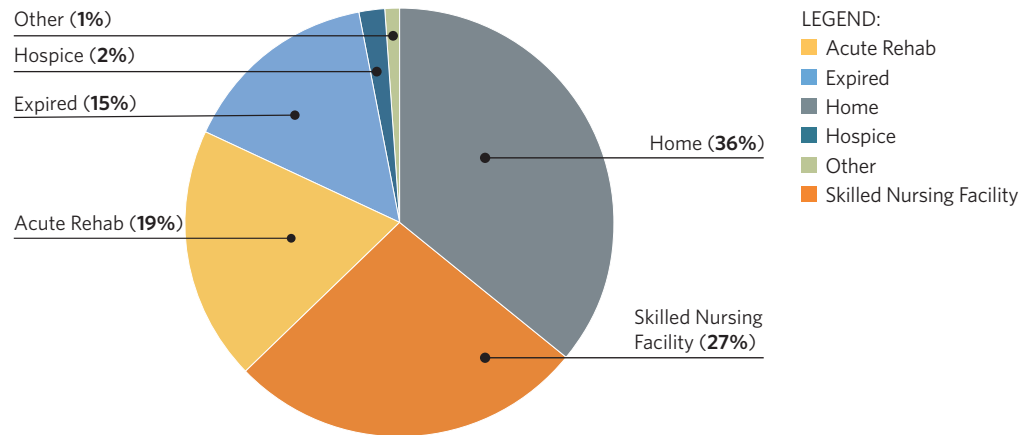
Other includes discharged/transferred to court/law enforcement, discharged/transferred to federal hospital, transferred to swing bed, discharged/transferred to long-term acute care, discharged/transferred to psychiatric hospital or left without being seen.

Skilled Nursing Facility includes transferred to skilled/subacute nursing facility, transferred to basic long-term care or transferred to skilled nursing facility with planned readmission.

Discharge disposition of all tumor (neuro) patients in 2015.

Neurocritical Care

Discharge Disposition of Neurocritical Care Traumatic Brain Injury Patients 2015 Discharge Disposition



LEGEND:

Acute Rehab includes transferred to acute care hospital or discharged to inpatient rehab facility.

Expired.

Home includes home or self-care, or home with home health care.

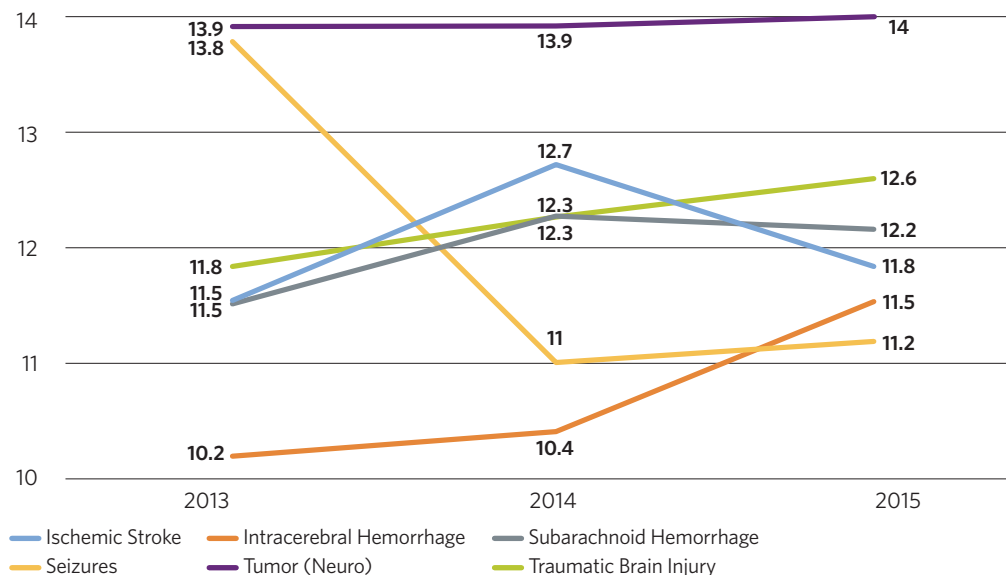
Hospice includes home with hospice care or transferred to hospice facility.

Other includes discharged/transferred to court/law enforcement, discharged/transferred to federal hospital, transferred to swing bed, discharged/transferred to long-term acute care, discharged/transferred to psychiatric hospital or left without being seen.

Skilled Nursing Facility includes transferred to skilled/subacute nursing facility, transferred to basic long-term care or transferred to skilled nursing facility with planned readmission.

Discharge disposition of all traumatic brain injury (TBI) patients in 2015.

Average Initial Glasgow Coma Scale (GCS) Annual Averages: 2013 – 2015



Average initial Glasgow Coma Scale (GCS) has decreased slightly for ischemic stroke, increased slightly for intracerebral hemorrhage (ICH) and remained relatively stable for all other patient populations shown from 2014 to 2015.

NOTE: The Spectrum Health Neurocritical Care Unit opened in August 2013—rates for 2013 represent the latter portion of the year.

Epilepsy

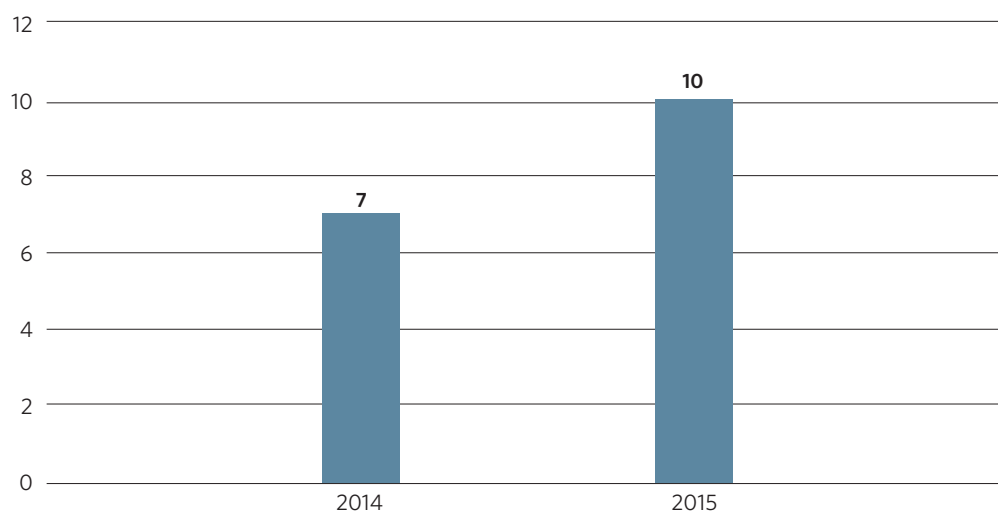
The epilepsy program at Spectrum Health is staffed by seven board-certified neurologists with fellowship training, two neurosurgeons specializing in epilepsy surgery, seven dedicated neuropsychologists and more than 60 electroencephalogram (EEG) technologists.

Spectrum Health has a Level 4 Epilepsy Center as designated by the National Association of Epilepsy Centers (NAEC). This designation recognizes the expertise, state-of-the-art facilities, and superior medical and surgical care provided for complex epilepsy, particularly uncontrolled seizures (i.e., intractable or refractory epilepsy).

This interdisciplinary team uses all known medical, surgical, alternative and experimental therapies to treat patients. Additionally, this team is on the forefront of epilepsy care through research into new treatments.

Epilepsy Surgery: Responsive Neurostimulator (NeuroPace RNS® System)

Annual Volumes: 2014 - 2015

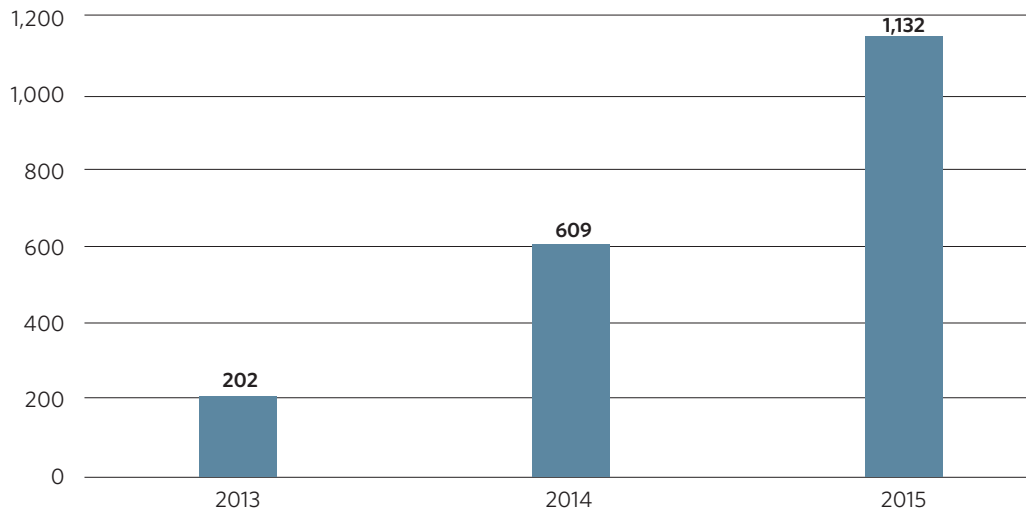


NeuroPace RNS System volumes increased from 2014 to 2015 and are expected to continue increasing with program growth. No cerebral-spinal fluid leakages, infections or hemorrhages were reported following intracranial recordings or subsequent NeuroPace RNS System implantation.

Epilepsy

Epilepsy Clinic - Adult

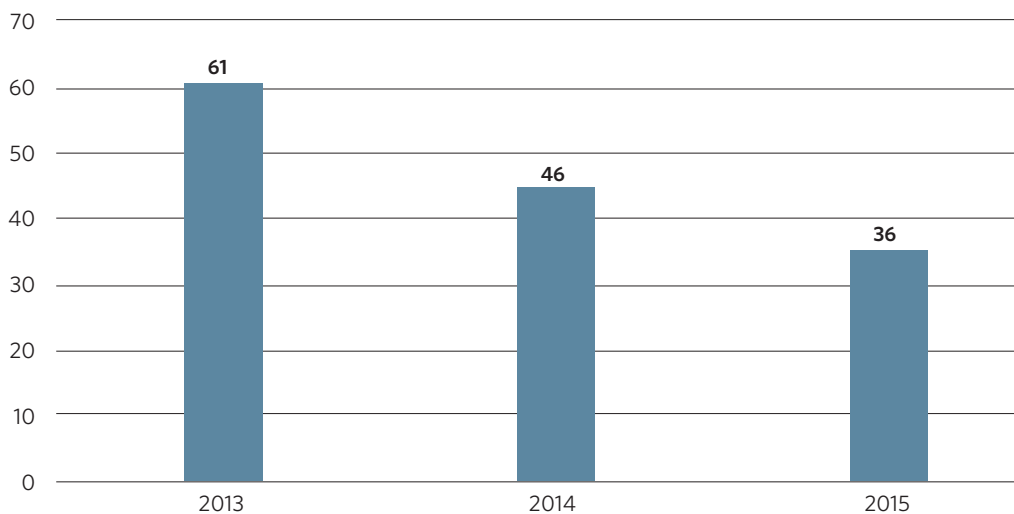
Annual Epilepsy Clinic New Patient Referral Volumes: 2013 - 2015



A fivefold volume increase over three years marks the initiation of a comprehensive program; an evolving pediatric epilepsy program will be added.

Epilepsy Clinic

Annual Epilepsy Clinic Appointment Wait Time From Referral to Initial Visit: 2013 - 2015

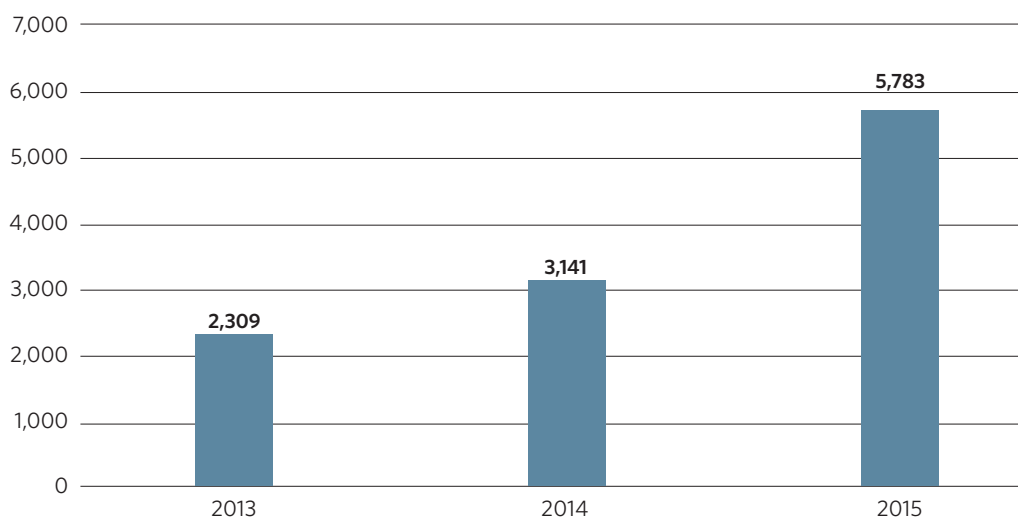


Time from referral to initial visit to the epilepsy clinic decreased dramatically over three years, even as referrals increased over the same three years. Nine epileptologists are involved in the program.

Epilepsy

Epilepsy Clinic

Annual Appointment Volumes: 2013 - 2015



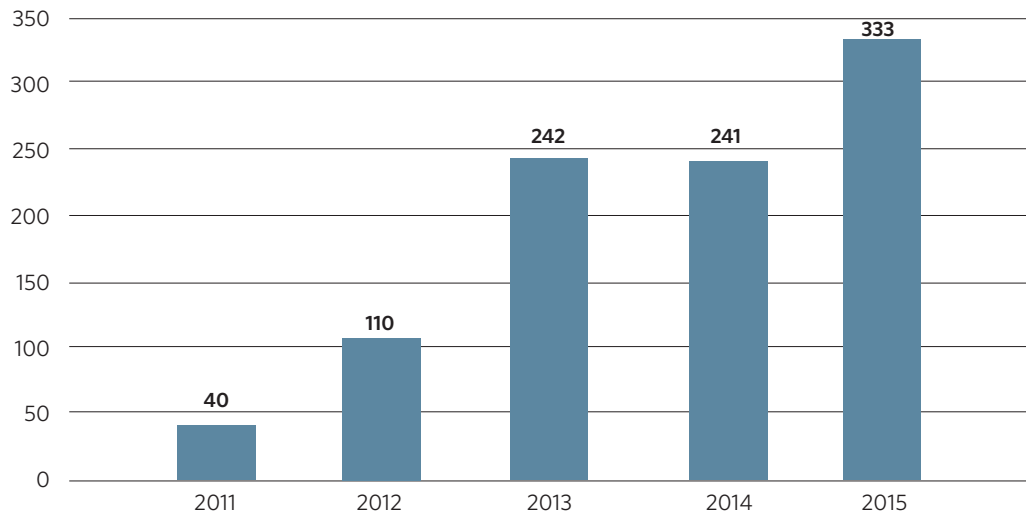
Appointment volumes for the epilepsy clinic also increased dramatically over three years—an increase of 150 percent.

Epilepsy

Epilepsy Monitoring Unit (EMU) - Adult

The EMU undertakes an intensive electroencephalographic (EEG) investigation of those patients failing control using antiepileptic medication. A variety of surgical options remain that may offer more significant relief of the epilepsy.

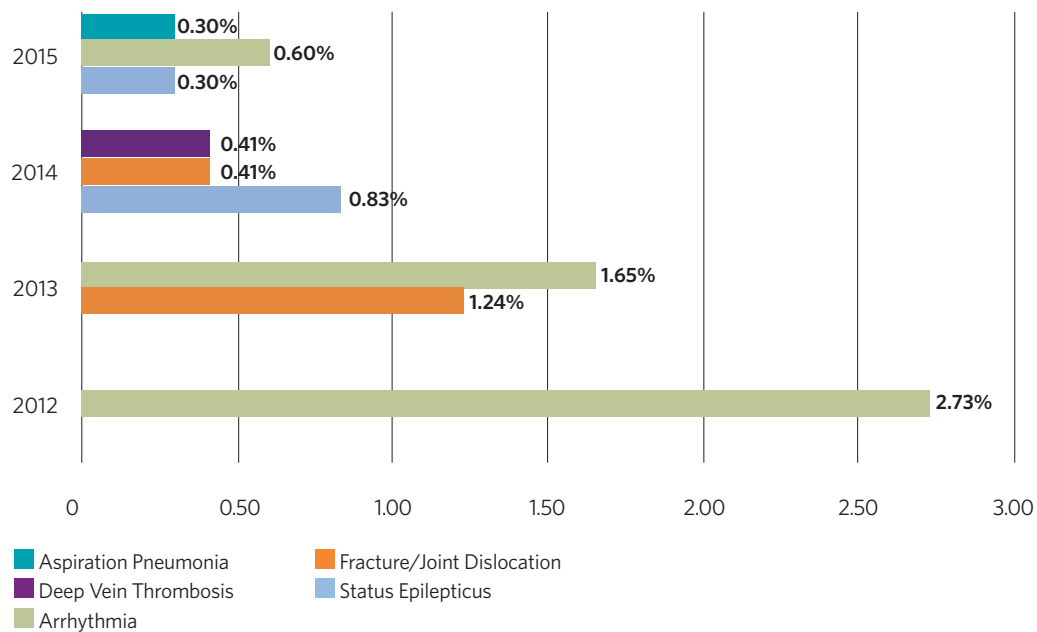
Annual Admission Volumes: 2011 – 2015



EMU volumes increased by more than eightfold over five years.

Epilepsy Monitoring Unit (EMU)

Annual Complications: 2011 – 2015

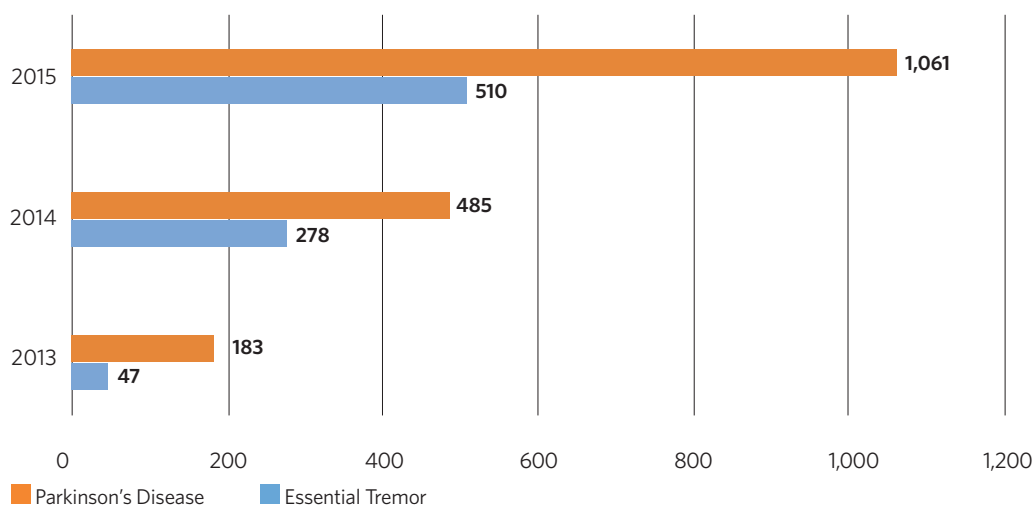


EMU complication rates for specific events have remained low. (There were no complications in 2011.)

Movement Disorders

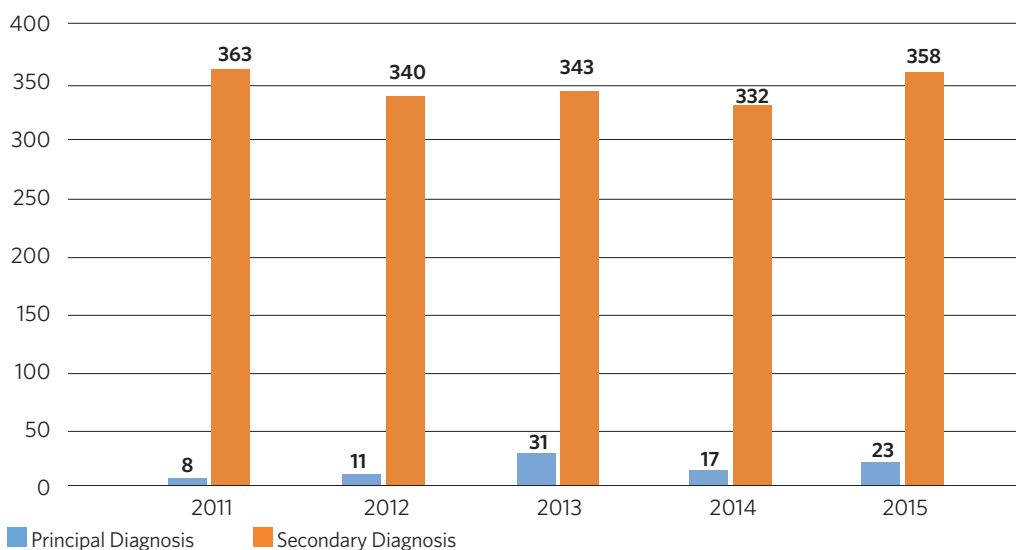
Spectrum Health Medical Group provides an interdisciplinary approach for the treatment of movement disorders. Fellowship-trained neurologists, functional neurosurgeons, psychiatrists, neuropsychologists, as well as physical, occupational and speech therapists work together toward optimal outcomes and improved quality of life for each patient.

Ambulatory Appointments: Parkinson's Disease and Essential Tremor Annual Volumes: 2013 - 2015



Ambulatory volumes for Parkinson's disease and essential tremor increased dramatically beginning in 2014—an increase of more than fivefold in three years.

Inpatient: Parkinson's Disease Annual Volumes: 2011 - 2015



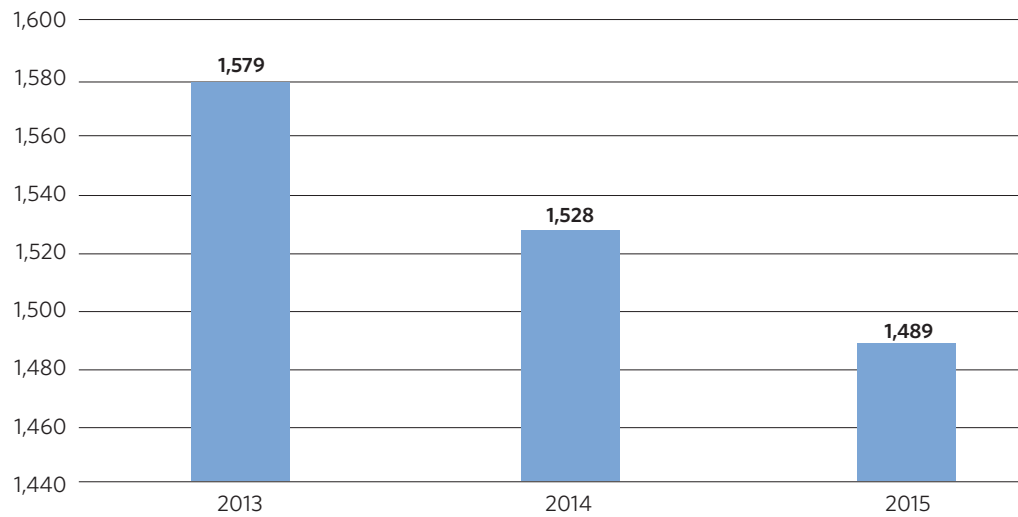
Parkinson's disease inpatient volumes for both principal and secondary diagnosis have remained relatively flat over five years.

Neuromuscular

The neuromuscular group of Spectrum Health Medical Group diagnoses and treats diseases of the muscles and nerves, including progressive diseases such as amyotrophic lateral sclerosis (ALS) and autoimmune diseases such as myasthenia gravis. Diagnostic procedures include electromyography to assess muscle and nerve cell health as well as muscle and nerve biopsies, helping to determine best treatments.

Electromyography (EMG)

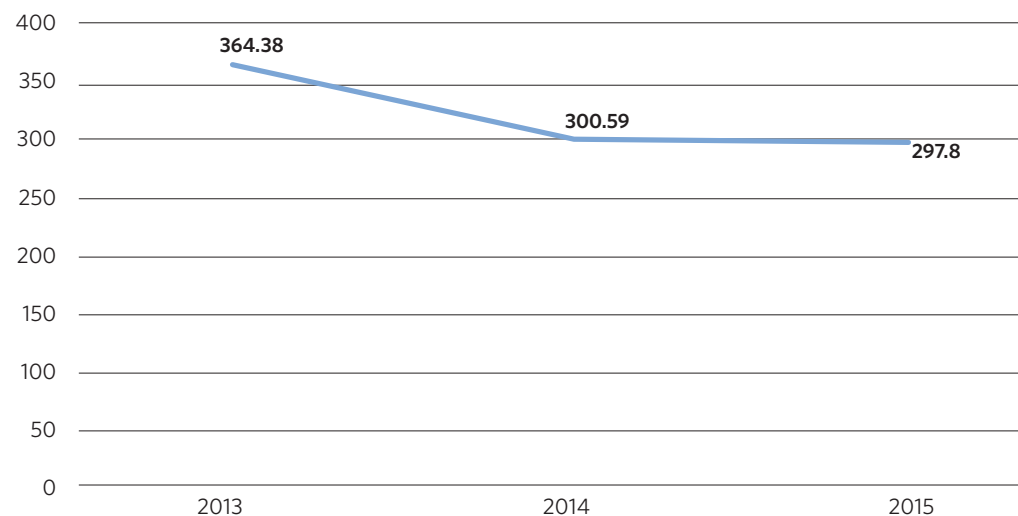
Annual Volumes: 2013 - 2015



EMG volumes have declined by 6 percent over three years.

Electromyography (EMG)

Annual Average EMGs Per Provider: 2013 - 2015

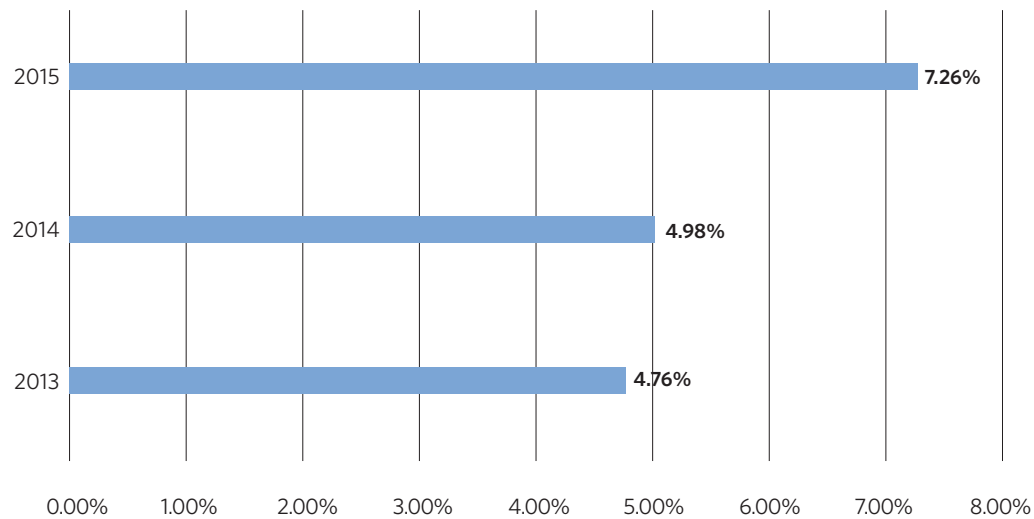


EMGs per provider have declined gradually over three years as volumes declined over the same period.

Neuromuscular

Myasthenia Gravis

Annual Inpatient Admissions Within 30 Days of Ambulatory Appointment: 2013 – 2015

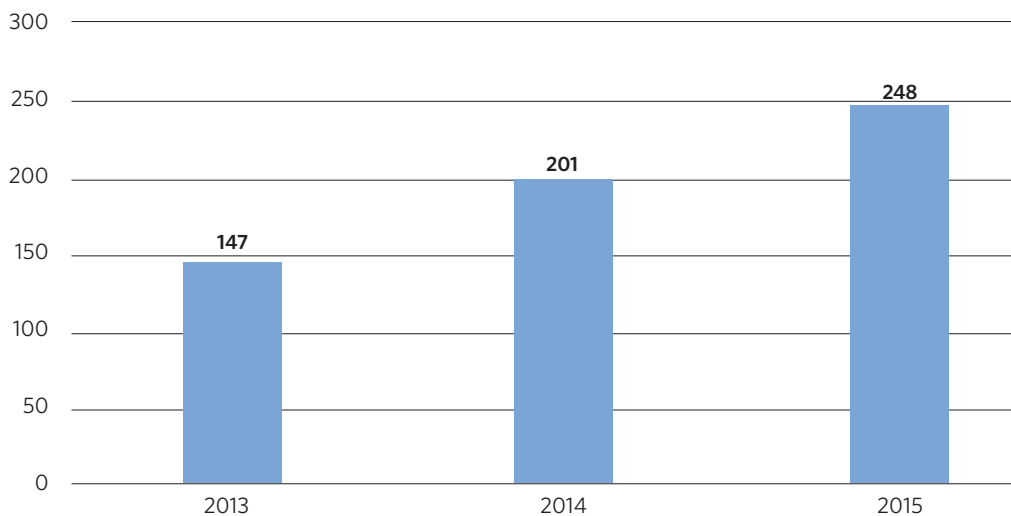


Inpatient admissions for myasthenia gravis within 30 days of an ambulatory visit have increased by 2.5 percent over three years.

NOTE: The percentages shown include patient status of inpatient or observation.

Myasthenia Gravis

Annual Ambulatory Visits: 2013 – 2015

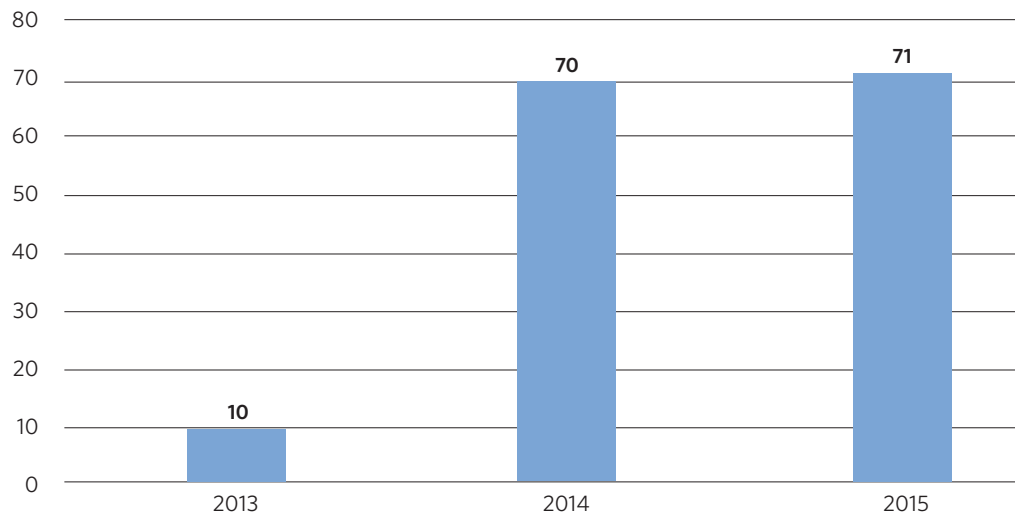


Ambulatory visits for myasthenia gravis have increased by 69 percent over three years.

Neuromuscular

Amyotrophic Lateral Sclerosis

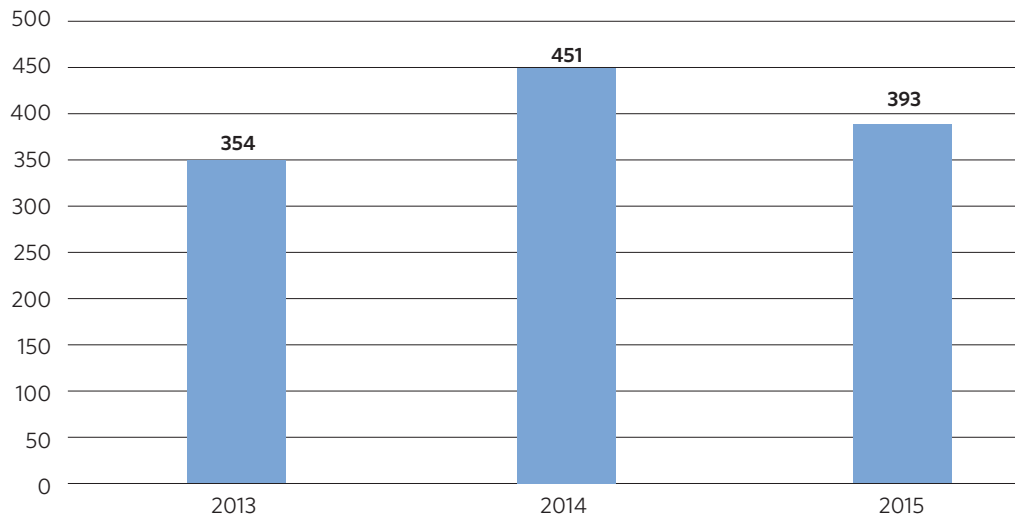
Annual Appointment Volumes: 2013 - 2015



Appointment volumes for ALS increased sevenfold since the initiation of an ALS Clinic in 2013.

Peripheral Neuropathy

Annual Ambulatory Visits: 2013 - 2015



Ambulatory visits for peripheral neuropathy increased 28 percent between 2013 and 2014 and then declined by 13 percent between 2014 and 2015.

Neuro-Oncology

The Spectrum Health Brain & Spine Tumor Center is part of the Spectrum Health Cancer Center and is located in Grand Rapids. Neurosurgery outpatient clinics are located in four additional Spectrum Health locations regionally.

The center's interdisciplinary team uses the most advanced and innovative treatment options, including new, emerging and experimental therapies, to care for patients with primary and metastatic tumors of the brain and spine. The center offers expert clinical care through its physicians, neuro-oncologists, surgeons and neuro-oncology nurses. These nurses serve as a patient navigator to coordinate all care and services for the patient.

Additionally, based on individual needs, patients also have access to endocrinologists, genetic counselors, neuropathologists, neuropsychologists, neuroradiologists, oncology-certified registered dietitians, research nurses and medical social workers.

Other supportive care services help patients minimize the side effects of treatment and develop strategies for pain control. These may include light-touch massage, acupuncture, cancer rehabilitation and supportive care services, such as pastoral and spiritual care, and hospice and palliative care.

The Brain & Spine Tumor Clinic evaluates and follows patients and is staffed by an interdisciplinary team, including a neurosurgeon and the only fellowship-trained neuro-oncologist in West Michigan.

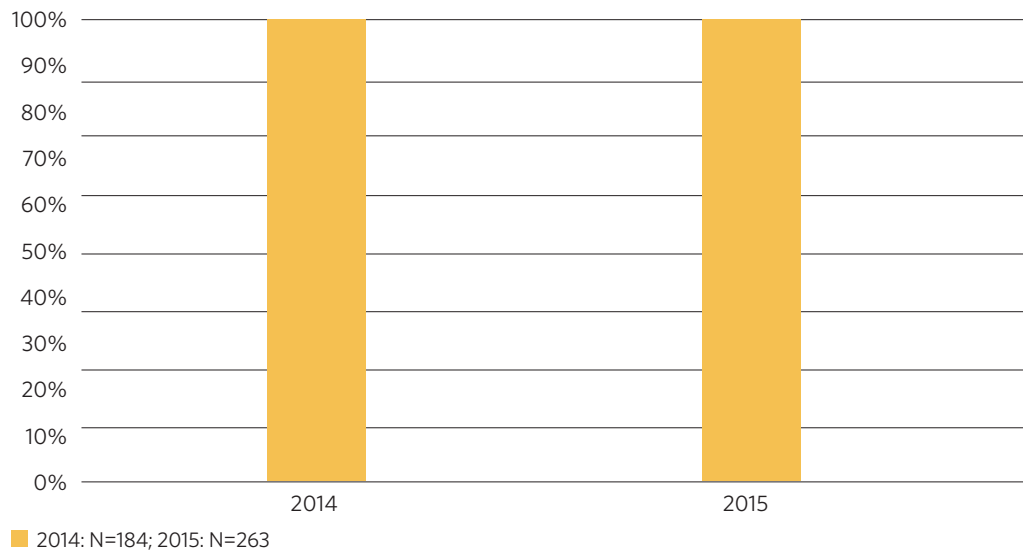
The Spectrum Health Neuro-Oncology Tumor Board is a multidisciplinary team that reviews each patient case to establish accurate diagnosis and provide optimal patient-specific treatments.

The neurosurgical program is supported by several technical assets—intraoperative magnetic resonance imaging (iMRI), laser-mediated thermoablation and robotic stereotactic delivery.

Neuro-Oncology

Multidisciplinary Conference (MDC): Tumor Board

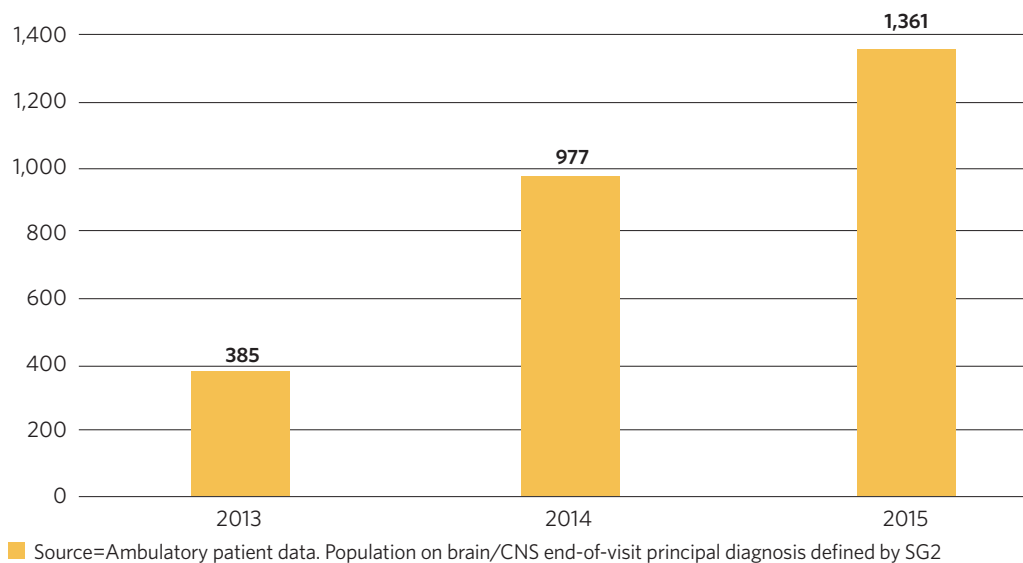
Annual Percentages: 2014 - 2015



The Neuro-Oncology Tumor Board reviewed 100 percent of patients in both 2014 and 2015.

Brain & Spine Tumor Visits

Annual Volumes: 2013 - 2015

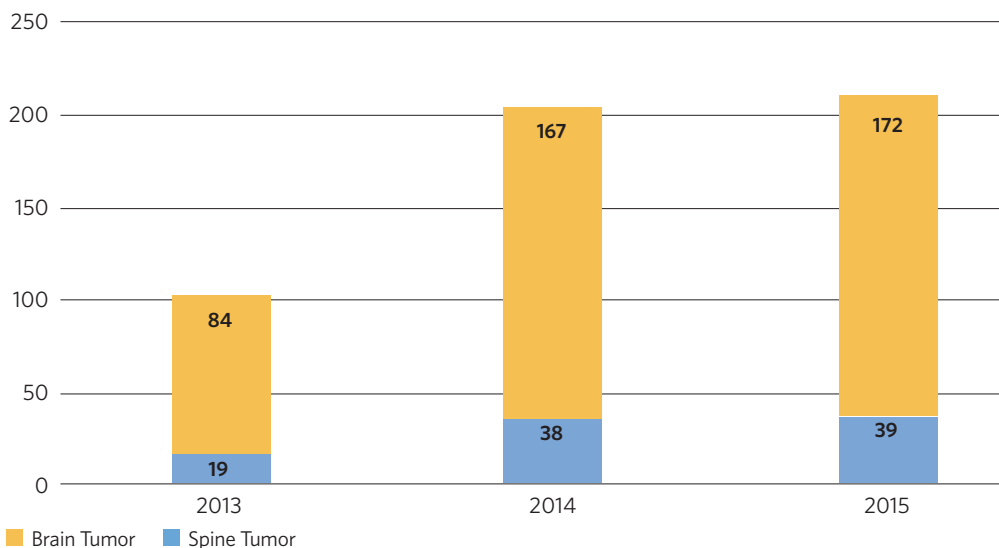


Ambulatory visits at the Brain & Spine Tumor Center increased more than threefold in three years.

Neuro-Oncology

Brain & Spine Tumor Visits

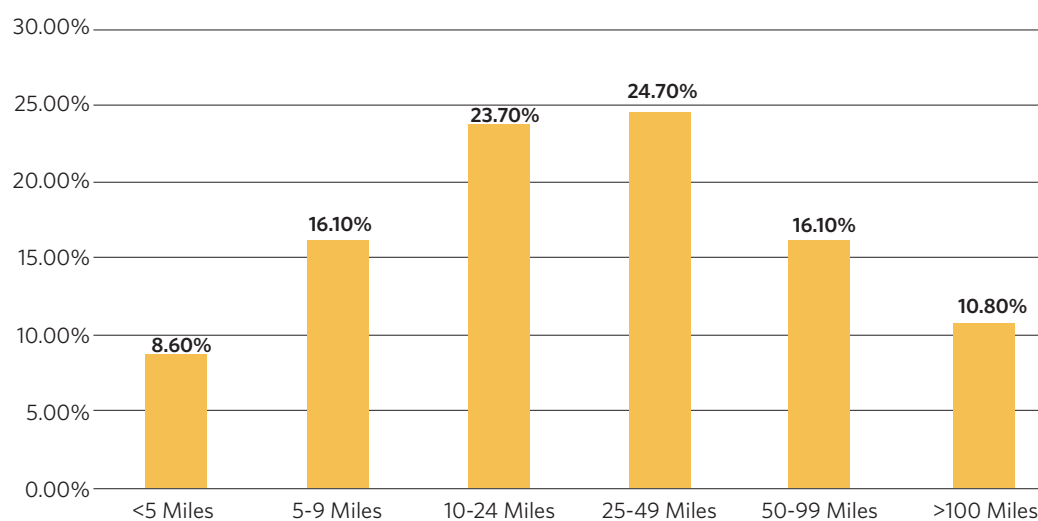
Annual Neuro-Oncology Surgical Volumes: 2013 - 2015



Neuro-oncology surgical volumes doubled from 2013 to 2015.

Brain & Spine Tumor Visits

Distance Traveled/Brain Cancers: 2015



Distance traveled by patients to visit the center in 2015. A total of 73.1 percent of patients seen were able to receive care by traveling fewer than 50 miles.

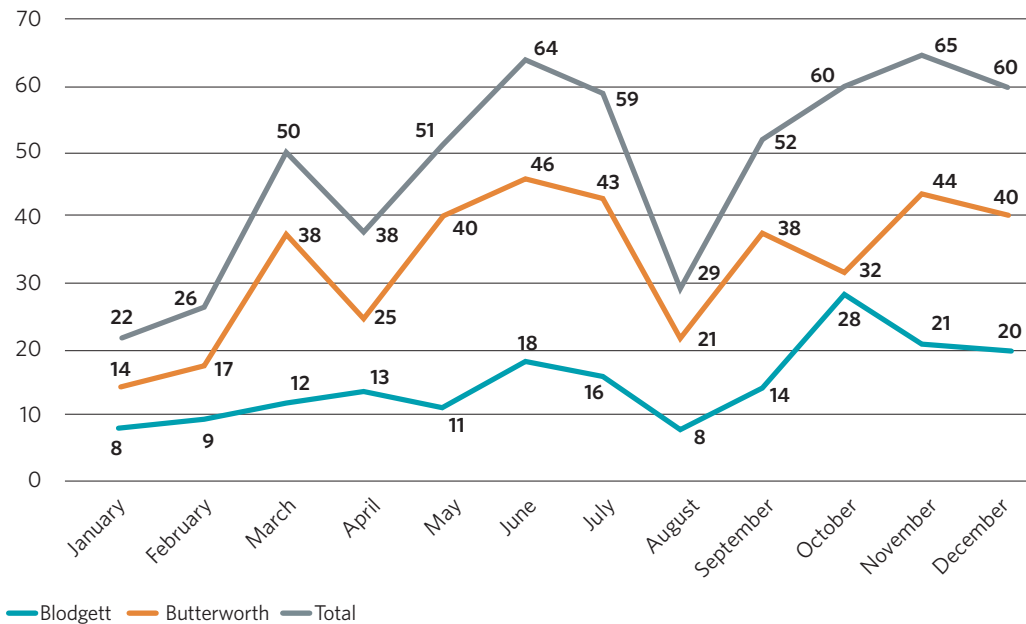
Inpatient Neuropsychology

At Spectrum Health Medical Group, neuropsychologists have a presence in the inpatient setting where they conduct cognitive assessments to assist with the diagnosis and treatment of neurological, medical and emotional conditions that affect the structure and function of the brain. These specialists conduct inpatient evaluations on neurologically compromised individuals and assist in treatment recommendations and discharge planning. Primary referral sources include neurology and neurosurgery, as well as hospitalists, neurointensivists and trauma physicians.

Neuropsychologists also work in collaboration with our Memory Disorders Clinic and the Sports Concussion Clinic.

Neuropsychology: Inpatient Volumes

Inpatient Neuropsychology Initial Consult Volumes: 2015



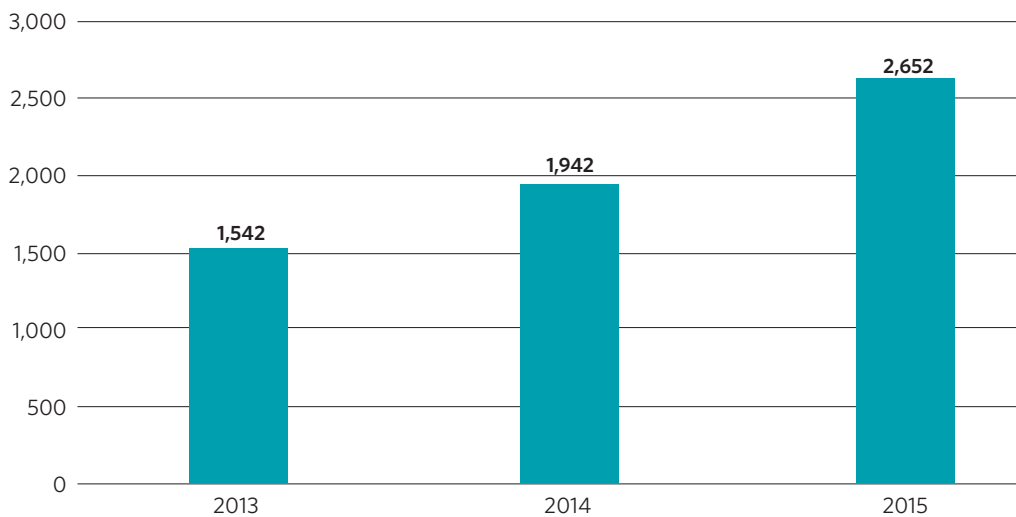
Inpatient neuropsychology initial consults at both Butterworth and Blodgett hospitals have increased since the beginning of the year—an increase of threefold. (Early growth has been subject to fluctuation in referrals and subsequently reflected in patient volumes.)

NOTE: Data for January are for part of the month only—data collection began midmonth.

Neuropsychology

Neuropsychology Ambulatory Appointment Volumes

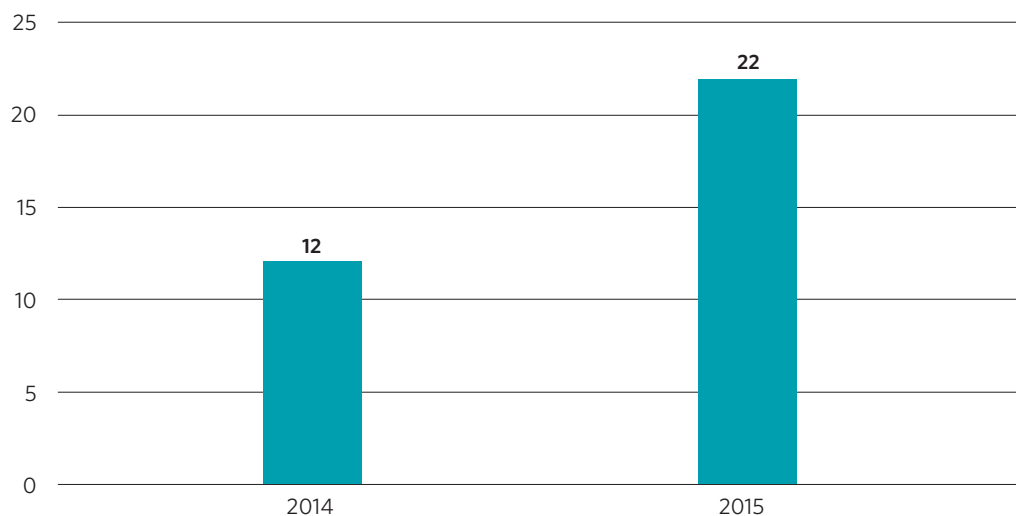
Annual Volumes: 2013 - 2015



Neuropsychology appointment volumes have increased 72 percent over three years.

Neuropsychology: Wada Testing Patient Volumes

Annual Volumes: 2014 - 2015



Wada testing for neuropsychology inpatients nearly doubled from 2014 to 2015.

NOTE: Inpatient status; limited to neuropsychologist provider.

Neuropsychology

Neuropsychology: Patient Satisfaction

Below are 14 questions from patient satisfaction surveys and the average response rate, based on the three neuropsychologists surveyed.

Question	% Yes Responses
During this visit, did you see this provider within 15 minutes of your appointment time?	88.18%
During your most recent visit, did clerks and receptionists at this provider's office treat you with courtesy and respect?	94.03%
During your most recent visit, did this provider explain things in a way that was easy to understand?	95.67%
During your most recent visit, did this provider give you easy-to-understand instructions about taking care of these health problems or concerns?	90.04%
During your most recent visit, did this provider listen carefully to you?	98.24%
During your most recent visit, did this provider seem to know the important information about your medical history?	86.91%
During your most recent visit, did this provider show respect for what you had to say?	99.44%
During your most recent visit, did this provider spend enough time with you?	95.44%
During your most recent visit, were clerks and receptionists at this provider's office as helpful as you thought they should be?	91.20%
In the last 12 months, when you made an appointment for a checkup or routine care with this provider, how often did you get an appointment as soon as you thought you should?	71.05%
In the last 3 months, how often did you or anyone on your health care team talk about all the prescription medications you were taking?	45.29%
Using any number from 0 to 10, where 0 is the worst provider possible and 10 is the best provider possible, what number would you use to rate this provider?	87.08% *
Wait time includes time spent in the waiting room and exam room. In the last 12 months, how often did you see this provider within 15 minutes of your appointment time?	74.71%
Would you recommend this provider's office to your family and friends?	95.72%

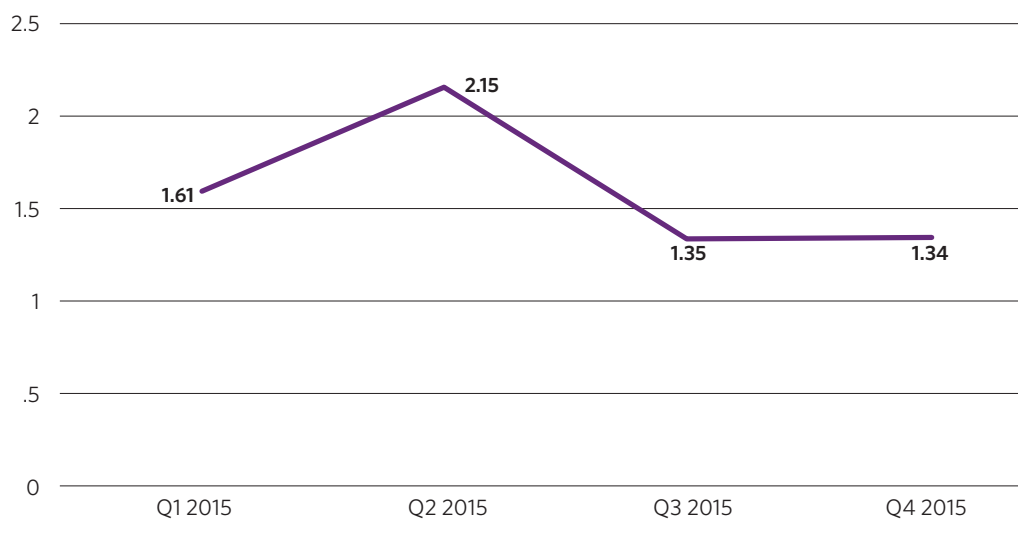
* Percentage of patient respondents who gave a rating of 9 or 10.

Spine

Spine management is conducted in the interdisciplinary Spine & Pain Management Center (SPMC). The group consists of pain management and neuro-rehabilitative staff, spine surgeons and clinical psychologists who interact daily and during weekly conferences to address individual concerns. After interdisciplinary assessment, surgeons initiate appropriate corrective surgeries in the more complex circumstances.

Spine Surgery

Surgical Site Infection Rates Per 100 Patients: 2015



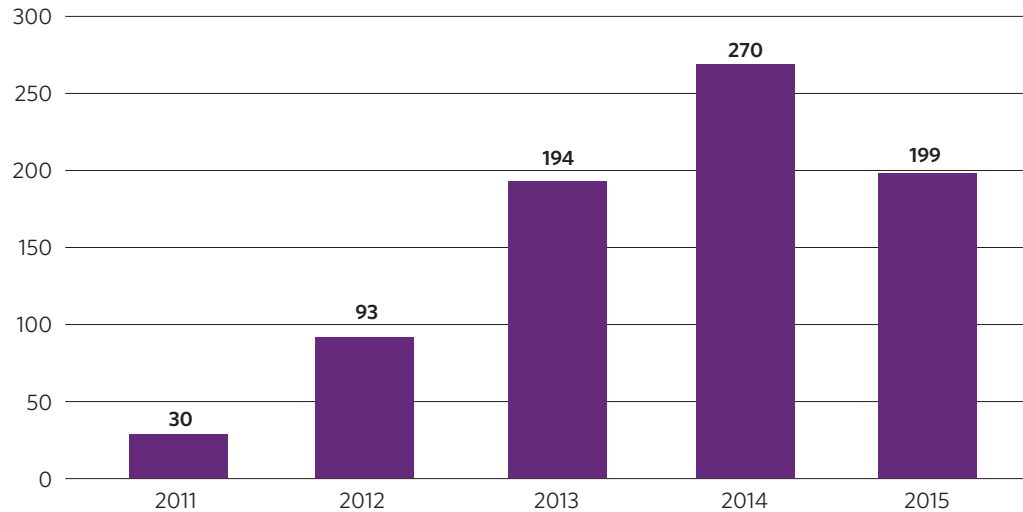
Surgical infection rates increased in the second quarter of 2015 and then decreased and leveled off for the third and fourth quarters of 2015.

NOTE: Rates are per 100 patients. Surgical site infections include superficial and complex infections for laminectomies, fusions and other spine procedures.

Spine

Lumbar Laminectomy

Annual Volumes: 2011 – 2015

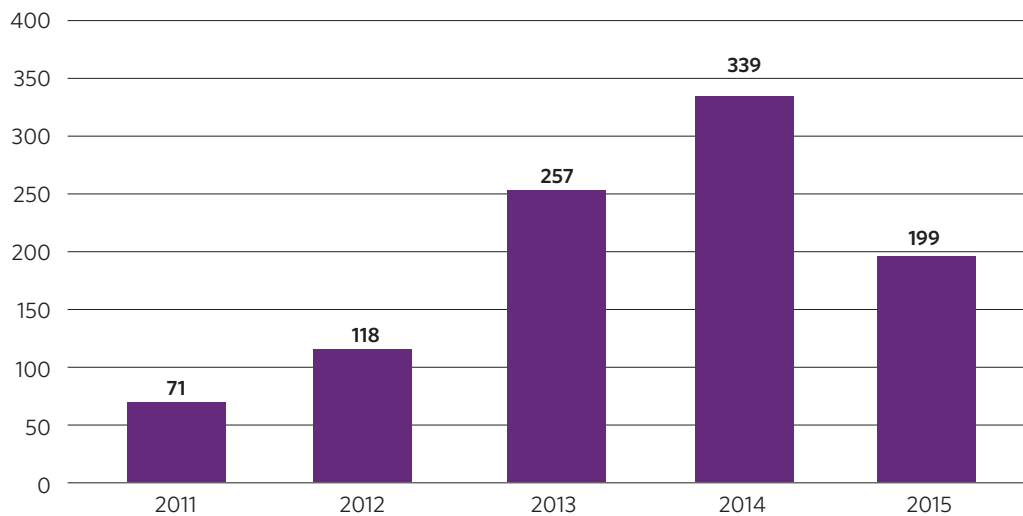


Lumbar laminectomy volumes increased ninefold since 2012 and decreased by 26 percent in 2015.

NOTE: Patient types include inpatient, observation and outpatient.

Lumbar Discectomy

Annual Volumes: 2011 – 2015



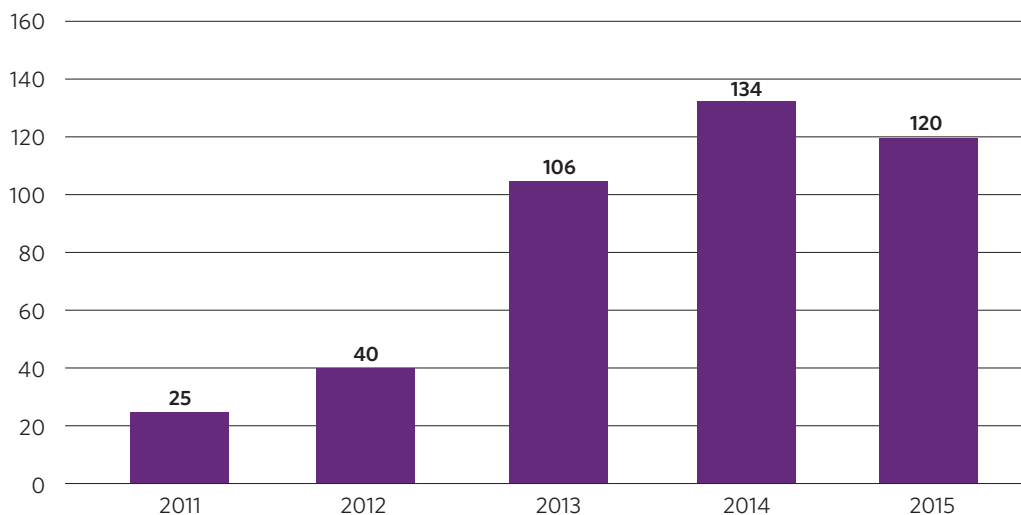
Lumbar discectomy volumes increased almost fivefold since 2012 with a decrease of 41 percent in 2015.

NOTE: Patient types include inpatient, observation and outpatient.

Spine

Anterior Surgical Fusion

Annual Volumes: 2011 – 2015

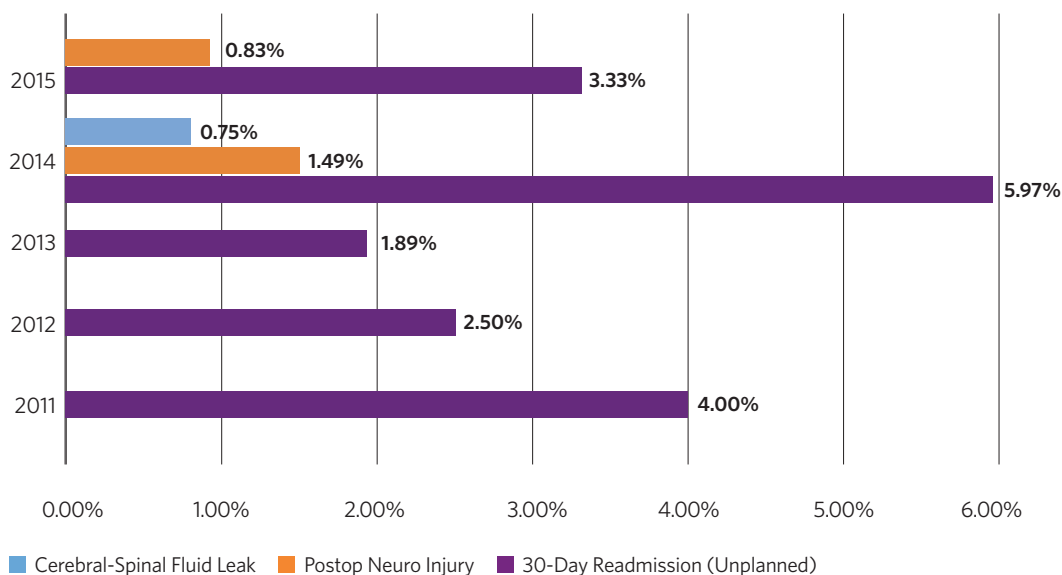


Anterior surgical fusion volumes increased 26 percent between 2013 and 2014 with a slight decrease between 2014 and 2015.

NOTE: Patient types include inpatient, observation and outpatient.

Anterior Surgical Fusion

Annual Complication Rates: 2011 – 2015



Complication rates for anterior surgical fusions from 2011 to 2015.

30-day unplanned readmission rates decreased from 2011 to 2012 and again in 2013. These rates increased in 2014 and then decreased again in 2015.

There were no postop neural injury complications from 2011 to 2013. Complications decreased between 2014 and 2015.

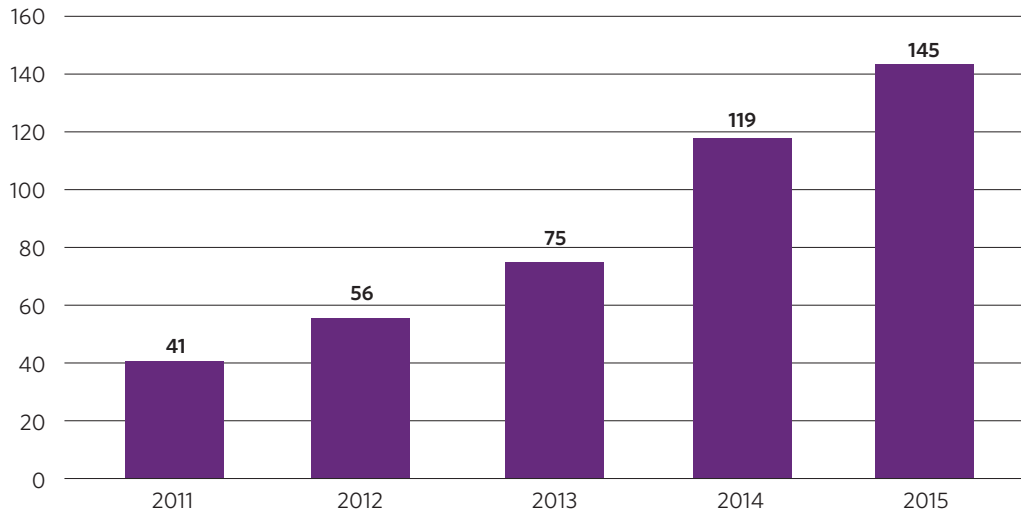
There were no cerebral-spinal fluid leaks except in 2014.

NOTE: Patient types include inpatient, observation and outpatient. Fusions are for all levels.

Spine

Lumbar Fusion

Annual Volumes: 2011 – 2015

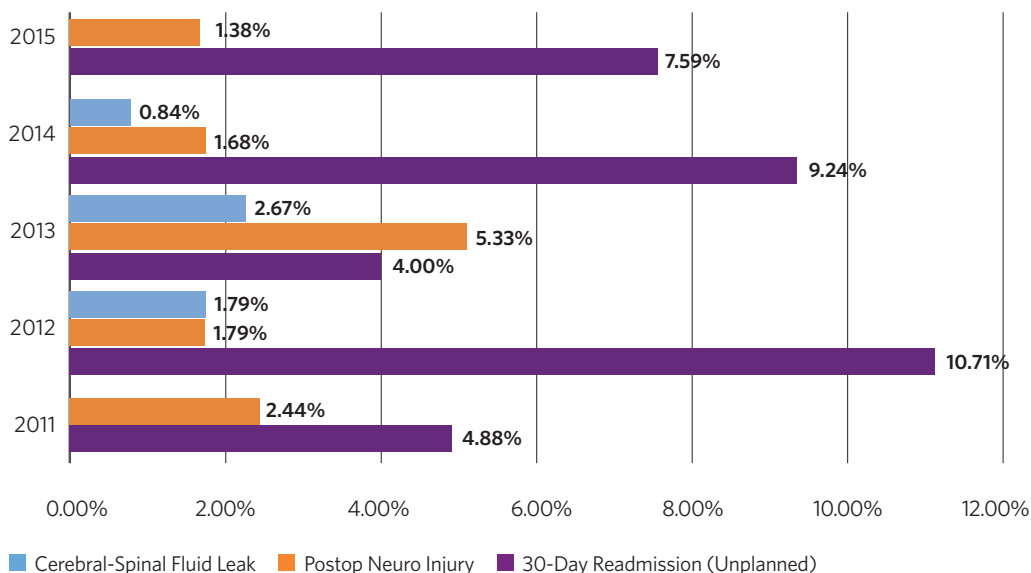


Lumbar fusion volumes increased more than threefold since 2011.

NOTE: Patient types include inpatient, observation and outpatient. Fusions are for all levels.

Lumbar Fusion

Annual Complication Rates: 2011 – 2015



Complication rates for lumbar fusions from 2011 to 2015.

30-day unplanned readmission rates increased from 2011 to 2012 and again from 2013 to 2014. These rates decreased slightly from 2014 to 2015.

Postop neural injury complications decreased from 2011 to 2012 and again from 2013 to 2014. These rates decreased in 2015 to its lowest five-year rate.

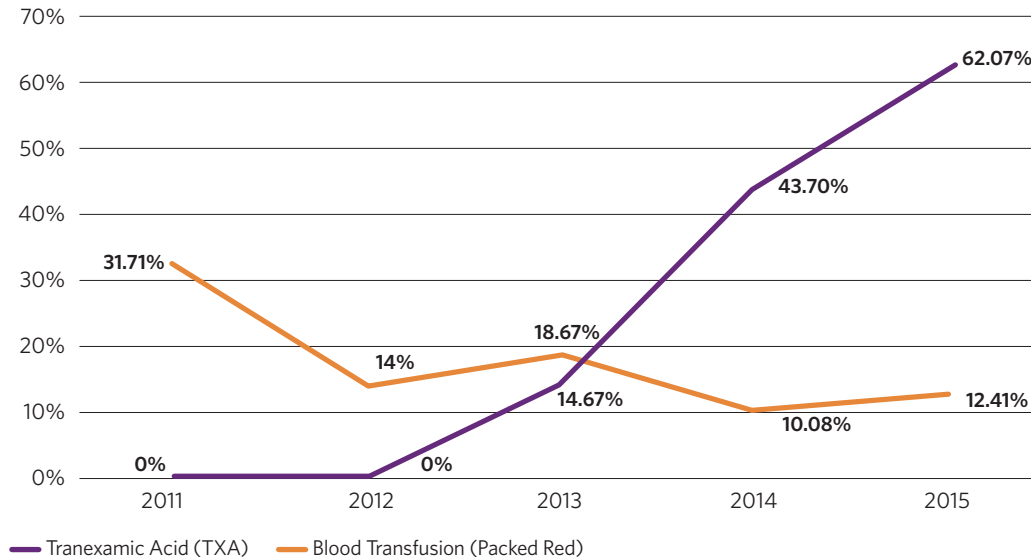
There were no cerebral-spinal fluid leaks in 2011 or in 2015. Cerebral-spinal fluid leaks increased slightly from 2012 to 2013 and then decreased in 2015 to the lowest five-year rate.

NOTE: Patient types include inpatient, observation and outpatient.

Spine

Lumbar Fusion—Tranexamic Acid Utilization and Blood Transfusion (Packed Red)

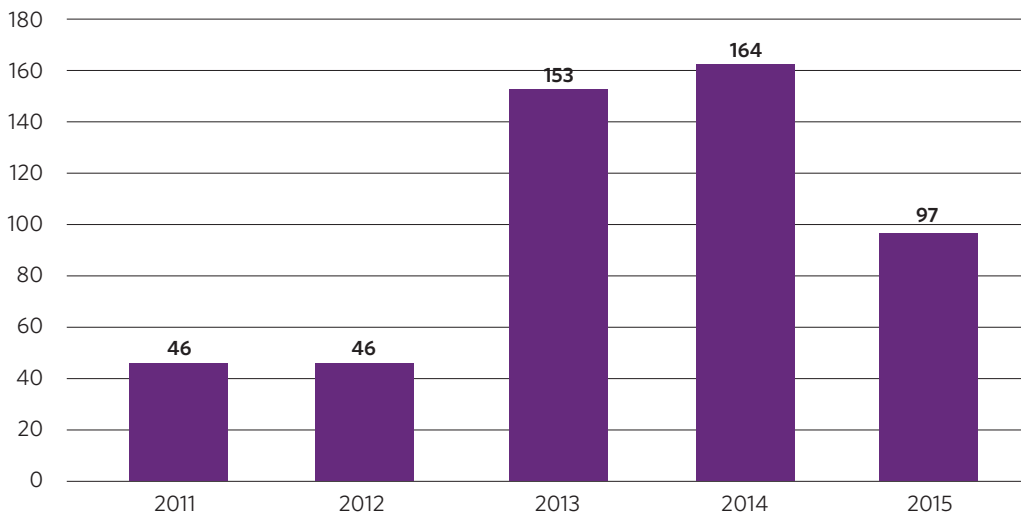
Annual Administration Rates: 2011 - 2015



Tranexamic acid utilization increased more than fourfold between 2013 and 2015. Blood transfusion decreased by 61 percent over five years.

Pain Modulation Surgery

Annual Volumes: 2011 - 2015



Pain modulation surgery volumes increased almost fourfold since 2012 with a decrease of 40 percent in 2015.

NOTE: Only outpatient and observation patient types included.



Spectrum Health complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex.
[81 FR 31465, May 16, 2016; 81 FR 46613, July 18, 2016]

ATENCIÓN: Si usted habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al 1.844.359.1607 (TTY: 711).

(711) مكالمة او مصل فته مقرر: 1.844.359.1607. مقرر لصفت. ناملاب كل رفاهت فيوغلل قدعاسملا تامدخ ناف، ءغلل ركذا شحت تنك اذا: فطوالم