Patients First
Quality counts when referring patients to hospitals and physicians, so Cleveland Clinic has created a series of Outcomes books similar to this one for many of its institutes. Designed for a healthcare provider audience, the Outcomes books contain a summary of our surgical and medical trends and approaches, data on patient volume and outcomes, and a review of new technologies and innovations.

Although we are unable to report all outcomes for all treatments provided at Cleveland Clinic — omission of outcomes for a particular treatment does not mean we necessarily do not offer that treatment — our goal is to increase outcomes reporting each year. When outcomes for a specific treatment are unavailable, we often report process measures that have documented relationships with improved outcomes. When process measures are unavailable, we report volume measures; a volume/outcome relationship has been demonstrated for many treatments, particularly those involving surgical technique.

Cleveland Clinic also supports transparent public reporting of healthcare quality data and participates in the following public reporting initiatives:

- Joint Commission Performance Measurement Initiative (www.qualitycheck.org)
- Centers for Medicare and Medicaid (CMS) Hospital Compare (www.hospitalcompare.hhs.gov)
- Leapfrog Group (www.leapfroggroup.org)
- Ohio Department of Health Service Reporting (www.odh.state.oh.us)

Our commitment to providing accurate, timely information about patient care is designed to help patients and referring physicians make informed healthcare decisions. We hope you find these data valuable. To view all our Outcomes books, visit Cleveland Clinic's Quality and Patient Safety website at clevelandclinic.org/quality/outcomes.
Dear Colleague:

I am proud to present the 2007 Cleveland Clinic Outcomes books. These books provide information on results, volumes and innovations related to Cleveland Clinic care. The books are designed to help you and your patients make informed decisions about treatments and referrals.

Over the past year, we enhanced our ability to measure outcomes by reorganizing our clinical services into patient-centered institutes. Each institute combines all the specialties and support services associated with a specific disease or organ system under a single leadership at a single site. Institutes promote collaboration, encourage innovation and improve patient experience. They make it easier to benchmark and collect outcomes, as well as implement data-driven changes.

Measuring and reporting outcomes reinforces our commitment to enhancing care and achieving excellence for our patients and referring physicians. With the institutes model in place, we anticipate greater transparency and more comprehensive outcomes reporting.

Thank you for your interest in Cleveland Clinic's Outcomes books. I hope you will continue to find them useful.

Sincerely,

Delos M. Cosgrove, MD
CEO and President
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chairman’s Letter</td>
<td>04</td>
</tr>
<tr>
<td>Institute Overview</td>
<td>05</td>
</tr>
<tr>
<td>Quality and Outcomes Measures</td>
<td></td>
</tr>
<tr>
<td>Brain Tumor</td>
<td>08</td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td>21</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>25</td>
</tr>
<tr>
<td>Headache</td>
<td>30</td>
</tr>
<tr>
<td>Movement Disorders</td>
<td>34</td>
</tr>
<tr>
<td>Multiple Sclerosis</td>
<td>36</td>
</tr>
<tr>
<td>Neuromuscular Disease</td>
<td>41</td>
</tr>
<tr>
<td>Pediatric Neurology and Neurosurgery</td>
<td>43</td>
</tr>
<tr>
<td>Psychiatric Disorders</td>
<td>48</td>
</tr>
<tr>
<td>Sleep Disorders</td>
<td>52</td>
</tr>
<tr>
<td>Spinal Disorders</td>
<td>56</td>
</tr>
<tr>
<td>Neurological Surgery Anesthesiology</td>
<td>60</td>
</tr>
<tr>
<td>Surgical Quality Improvement</td>
<td>62</td>
</tr>
<tr>
<td>Patient Experience</td>
<td>66</td>
</tr>
<tr>
<td>Innovations</td>
<td>70</td>
</tr>
<tr>
<td>New Knowledge</td>
<td>78</td>
</tr>
<tr>
<td>Staff Listing</td>
<td>86</td>
</tr>
<tr>
<td>Contact Information</td>
<td>90</td>
</tr>
<tr>
<td>Institute Locations</td>
<td>90</td>
</tr>
<tr>
<td>Cleveland Clinic Overview</td>
<td>92</td>
</tr>
<tr>
<td>Online Services</td>
<td>93</td>
</tr>
<tr>
<td>eCleveland Clinic</td>
<td></td>
</tr>
<tr>
<td>DrConnect</td>
<td></td>
</tr>
<tr>
<td>MyConsult</td>
<td></td>
</tr>
</tbody>
</table>
Chairman’s Letter

Dear Colleagues,

I am pleased to present to you this extensive collection of outcomes from Cleveland Clinic’s Neurological Institute. Transparency, quality and outcomes measurement have always been a priority for us. We have enhanced these efforts with major programs to identify, develop, and capture specific quality measures and outcomes in each patient’s electronic medical record. This novel endeavor, led by Irene Katzan, MD, and Jocelyn Bautista, MD, allows us to capture both general and disease-specific outcomes and quality measures with each patient encounter. In this way, our performance and impact can be continuously monitored and refined over time as part of our routine clinical practice.

In this book, we provide you with outcomes for specific conditions and treatments because we understand these play a pivotal role in determining where to turn for specialized care. I invite you to review our outcomes statistics and to compare us with other healthcare providers. I think you will find that our outcomes, as well as our patient satisfaction, are among the best in the nation.

Initiatives in recent years have included upgrading the technology in our Gamma Knife Center, introducing an intensive treatment program for patients with chronic headache, performing the first deep-brain stimulation on a minimally conscious patient, designing and leading clinical trials of the first disease-modifying agent approved for treatment of multiple sclerosis in a decade, expanding our Pediatric Epilepsy Monitoring Unit, adding a thermoregulatory sweat test in our Neuromuscular Center, and expanding our overnight sleep monitoring facilities to hotel-based community locations. We expect these and other advances will further our goal of continual improvement in our outcomes and patient satisfaction.

As always, we look forward to working with you to provide the utmost in neurological care for all patients.

Michael T. Modic, MD, FACS
Chairman, Neurological Institute
Institute Overview

The multidisciplinary Cleveland Clinic Neurological Institute includes more than 200 medical, surgical and research specialists dedicated to the treatment of adult and pediatric patients with neurological and psychiatric disorders. The institute offers a disease-specific, patient-focused approach to care. Our unique, fully integrated model strengthens our current standard of care, allows us to measure quality and outcomes on a continual basis, and enhances our ability to conduct research.

*U.S. News & World Report*’s “America’s Best Hospitals” survey consistently has ranked our neurology and neurosurgery programs among the top 10 in the nation. Our neurology, neurosurgery and psychiatry programs are also ranked best in Ohio.

The institute model allows our patients to better access the care they need through specialized, multidisciplinary, disease-specific centers that integrate the expertise of neurologists, neurosurgeons, psychiatrists, psychologists, neuroradiologists and others into the comprehensive care of a single disease:

- Brain Tumor and Neuro-Oncology Center
- Center for Headache and Pain
- Center for Neurological Restoration
- Center for Pediatric Neurology and Neurosurgery
- Center for Spine Health
- Cerebrovascular Center
- Epilepsy Center
- Mellen Center for Multiple Sclerosis Treatment and Research
- Neuromuscular Center
- Sleep Disorders Center

We provide care across the spectrum of neurological disorders, including primary and metastatic tumors of the brain, spine and nerves; pediatric and adult epilepsy; headache, facial pain syndromes and associated disorders; movement disorders such as Parkinson’s disease, essential tremor and dystonia; cerebral palsy and spasticity; hydrocephalus; metabolic and mitochondrial disease; fetal and neonatal neurological problems; multiple sclerosis; stroke; cerebral aneurysms; brain and spinal vascular malformations; carotid stenosis; intracranial atherosclerosis; nerve and muscle diseases, including amyotrophic lateral sclerosis, peripheral neuropathy, myasthenia gravis and myopathies; sleep disorders; and mental/behavioral health disorders and chemical dependencies.

Expert, Specialized Diagnosis

Our Neurological Institute physicians draw on advanced diagnostic capabilities and experience.

Our imaging services include structural and functional magnetic resonance imaging (MRI), computed tomography (CT), positron emission tomography (PET), myelography, diagnostic cerebral/spinal angiography, interventional neuroradiology, and carotid and transcranial Doppler ultrasound. Our neuroimaging staff subspecialize in specific disease entities, such as epilepsy and cerebrovascular disease, ensuring accurate, in-depth interpretations.

Additional diagnostic tools are found in our Epilepsy Monitoring Units, Sleep Laboratories, Neuropsychological Testing Facilities, Electromyography Laboratory, Autonomic Laboratory and Cutaneous Nerve Laboratory.

The Latest Treatment Modalities

Patients can receive leading-edge treatment options at the Neurological Institute, where we continue to advance such innovations as deep brain stimulation (brain pacemakers), epilepsy surgery, stereotactic spine radiosurgery, blood-brain barrier disruption, endovascular treatment of cerebral aneurysms and vascular malformations, and neuroendoscopy. Distinctive services such as our three-week outpatient program for sufferers of chronic headaches and our Headache Infusion Suite provide intensive therapy when it is needed. The Brain Tumor and Neuro-Oncology Center’s Translational Therapeutics Program is accelerating the process of bringing novel therapeutic agents from the laboratory to the patient, while maintaining the highest standards of efficacy and safety. Joint Commission certification as a Primary Stroke Center and accreditation by the American Academy of Sleep Medicine are just two examples of our commitment to providing the most advanced and highest quality of care to our patients.
Relevant Research
We strive to conduct research directly related to conditions experienced by our patients, including programs in translational research, clinical trials of drug and device interventions, neuroimaging research, epidemiology and health outcomes, behavioral and psychiatric research, and research into better diagnostic methods. Typically, more than 100 clinical research trials are underway at the Neurological Institute. In the area of basic science, a core of internationally recognized scientists with external funding totally $10 million annually conduct investigations at the Cleveland Clinic Lerner Research Institute Department of Neurosciences.

Convenient Care in the Community
We are committed to making access to world-class care convenient for all patients — whether coming to us from near or far. Our Neurological Institute Regional Centers are a system-wide effort to extend our services to regional hospitals and at Cleveland Clinic family health centers throughout the community. In addition, Cleveland Clinic neurologists oversee inpatient care at a number of Cleveland Clinic hospitals. Our Sleep Disorders Center is pioneering the idea of hotel-based sleep studies, offering overnight studies at five locations throughout the community for patients' convenience and comfort.

Integrated Nursing Services
Nursing in the institute integrates inpatient and ambulatory nursing, enhancing the continuum of patient care. This unique structure also lends itself to greater information sharing and process improvement opportunities. Through continuing education programs, we are able to broaden nursing educational opportunities from basic nursing instruction to subspecialization in neurological nursing, much like our physician colleagues.

Pioneering the Collection of Data and Outcomes
The Knowledge Program is a joint initiative of the Neurological Institute, the Imaging Institute and the Division of Information Technology, and is designed to harness routinely collected electronic clinical and administrative data to allow us to optimize patient care and outcomes. Data from multiple electronic sources, including imaging results and clinical information collected during patient encounters such as disease-specific measures of patients' health status, will be consolidated into a clinical data warehouse that can be accessed and queried by healthcare personnel. An integral part of this initiative is the standardization of clinical information documented within the electronic medical record. Information gained from the Knowledge Project will inform and guide clinical care, quality improvement and research.

At the Cleveland Clinic Neurological Institute, we are dedicated to maximizing patient care outcomes and the patient experience, and to advancing medical education and research in all areas of neurology, neurosurgery and psychiatry.
### 2007 Statistical Highlights

**Staff Physicians**
220

**Clinical Residents and Fellows**
134

**Research Fellows**
17

**Advanced Practice Nurses**
27

**Physician Assistants**
15

**Initial Outpatient Visits**

<table>
<thead>
<tr>
<th>Specialization</th>
<th>Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain Tumor and Neuro-Oncology</td>
<td>465</td>
</tr>
<tr>
<td>Center for Neurological Restoration</td>
<td>326</td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>515</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>809</td>
</tr>
<tr>
<td>Headache and Pain</td>
<td>862</td>
</tr>
<tr>
<td>Mellen Center</td>
<td>749</td>
</tr>
<tr>
<td>Neurocognitive</td>
<td>304</td>
</tr>
<tr>
<td>Neurology</td>
<td>803</td>
</tr>
<tr>
<td>Neuromuscular</td>
<td>771</td>
</tr>
<tr>
<td>Pediatric Neurology</td>
<td>1,109</td>
</tr>
<tr>
<td>Psychiatry and Psychology</td>
<td>916</td>
</tr>
<tr>
<td>Regional Neurological Institute</td>
<td>360</td>
</tr>
<tr>
<td>Sleep</td>
<td>156</td>
</tr>
<tr>
<td>Spine</td>
<td>2,638</td>
</tr>
</tbody>
</table>

**Total Outpatient Visits**

<table>
<thead>
<tr>
<th>Specialization</th>
<th>Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain Tumor and Neuro-Oncology</td>
<td>8,354</td>
</tr>
<tr>
<td>Center for Neurological Restoration</td>
<td>6,499</td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>4,135</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>9,536</td>
</tr>
<tr>
<td>Headache and Pain</td>
<td>13,315</td>
</tr>
<tr>
<td>Mellen Center</td>
<td>20,301</td>
</tr>
<tr>
<td>Neurocognitive</td>
<td>4,105</td>
</tr>
<tr>
<td>Neurology</td>
<td>4,995</td>
</tr>
<tr>
<td>Neuromuscular</td>
<td>8,121</td>
</tr>
<tr>
<td>Pediatric Neurology</td>
<td>7,623</td>
</tr>
<tr>
<td>Psychiatry and Psychology</td>
<td>47,497</td>
</tr>
<tr>
<td>Regional Neurological Institute</td>
<td>7,706</td>
</tr>
<tr>
<td>Sleep</td>
<td>11,690</td>
</tr>
<tr>
<td>Spine</td>
<td>30,977</td>
</tr>
</tbody>
</table>

**Admissions**

<table>
<thead>
<tr>
<th>Specialization</th>
<th>Admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain Tumor and Neuro-Oncology</td>
<td>906</td>
</tr>
<tr>
<td>Center for Neurological Restoration</td>
<td>333</td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>1,138</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>1,175</td>
</tr>
<tr>
<td>Neurocognitive</td>
<td>411</td>
</tr>
<tr>
<td>Neurology</td>
<td>406</td>
</tr>
<tr>
<td>Pediatric Neurology</td>
<td>220</td>
</tr>
<tr>
<td>Psychiatry and Psychology</td>
<td>759</td>
</tr>
<tr>
<td>Regional Neurological Institute</td>
<td>27</td>
</tr>
<tr>
<td>Spine</td>
<td>1,557</td>
</tr>
</tbody>
</table>

**Inpatient Days**

<table>
<thead>
<tr>
<th>Specialization</th>
<th>Inpatient Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain Tumor and Neuro-Oncology</td>
<td>4,075</td>
</tr>
<tr>
<td>Center for Neurological Restoration</td>
<td>1,475</td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>6,568</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>6,015</td>
</tr>
<tr>
<td>Neurocognitive</td>
<td>1,818</td>
</tr>
<tr>
<td>Neurology</td>
<td>2,242</td>
</tr>
<tr>
<td>Pediatric Neurology</td>
<td>736</td>
</tr>
<tr>
<td>Psychiatry and Psychology</td>
<td>3,843</td>
</tr>
<tr>
<td>Regional Neurological Institute</td>
<td>120</td>
</tr>
<tr>
<td>Spine</td>
<td>8,409</td>
</tr>
</tbody>
</table>

**Surgical Cases**

<table>
<thead>
<tr>
<th>Specialization</th>
<th>Surgical Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain Tumor and Neuro-Oncology</td>
<td>935</td>
</tr>
<tr>
<td>Center for Neurological Restoration</td>
<td>489</td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>1,057</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>370</td>
</tr>
<tr>
<td>Neurocognitive</td>
<td>450</td>
</tr>
<tr>
<td>Regional Neurological Institute</td>
<td>162</td>
</tr>
<tr>
<td>Spine</td>
<td>3,679</td>
</tr>
</tbody>
</table>

**Neuroimaging Studies**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Neuroimaging Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total CT Brain Scans</td>
<td>60,000</td>
</tr>
<tr>
<td>Total MR Brain Procedures</td>
<td>50,000</td>
</tr>
<tr>
<td>Total Cerebral Angio Procedures</td>
<td>3,000</td>
</tr>
</tbody>
</table>

*includes outpatient procedures and diagnostic studies

** studies performed on main campus, Cleveland Clinic satellites and family health centers, estimated
Brain Tumor

Overview

Tumor Diagnosis Distribution

Gliomas remain the most common tumor type.

Procedure Distribution

The majority of patients undergo supratentorial craniotomy or Gamma Knife® radiosurgery.
Surgical Site Infection Rates

Surgical site infections remain stable at three percent. Per CDC guidelines, “Clean Cases” are defined as uninfected operative wounds in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered.

Patient Enrollment

Therapeutic trial enrollment has remained consistent over the past few years, with enrollment in genetic trials over 250 yearly.
Outcomes per Procedure

Brain Biopsy: Inpatient Mortality

Expected deaths are based on APR-DRGs which adjust for the severity of the patient population.

Brain Biopsy: Length of Stay

Mean length of stay (LOS) for brain biopsy admissions was the lowest in five years. Target LOS is calculated based on APR-DRGs which adjust for the severity of the patient population.
KPS Status following Brain Biopsy (N=61)

Change in KPS (Karnovsky Performance Scale) was defined as a change of 20 points or more. Ninety-five percent of patients either improved or remained stable immediately following stereotactic brain biopsy.

Supratentorial Craniotomy: Survival

Supratentorial craniotomy procedural volumes were 16 percent above 2003 values at 272 cases. 180-day survival was a record 92.3 percent.
**Supratentorial Craniotomy: Inpatient Mortality and Length of Stay**

Expected deaths are based on APR-DRGs which adjust for the severity of the patient population.

**KPS Status following Supratentorial Craniotomy (N=248)**

Change in KPS (Karnovsky Performance Scale) was defined as a change of 20 points or more. Performance status was stable or improved in over 90 percent of patients immediately after supratentorial craniotomy.
Supratentorial Craniotomy: Survival by Tumor Type

Glioma

Meningioma

Metastases

Thirty and 180-day survival remained robust in 2007 for supratentorial craniotomy independent of tumor type.
Thirty and 180-day survival remained robust in 2007 for infratentorial craniotomies at 100 and 96.2 percent.
Infratentorial Craniotomy: Survival by Tumor Type (2003-2007)

KPS Status following Infratentorial Craniotomy (N=53)

Change in KPS (Karnovsky Performance Scale) was defined as a change of 20 points or more. Performance status was stable or improved in over 90 percent of patients undergoing infratentorial craniotomy.
Thirty and 180-day survival remained at 100 and 98.8 percent respectively for pituitary tumors in 2007.

KPS Status following Pituitary Surgery (N=90)

Change in KPS (Karnovsky Performance Scale) was defined as a change of 20 points or more. Performance status remained stable or improved in 100 percent of patients immediately after pituitary surgery.
There have been no inpatient deaths following pituitary surgery in the past five years. Target Length of Stay (LOS) is calculated based on APR-DRGs which adjust for the severity of the patient population.
Stereotactic Radiosurgery: Survival

Gamma Knife® and Novalis® radiosurgery deliver high intensity, focused radiation directly to multiple sites within a tumor. Gamma Knife® is used for single treatments of small tumors. Novalis® is used for larger tumors.

**Gamma Knife®**

The number of Gamma Knife® cases peaked in 2007 despite a six-week hiatus for upgrading to the Gamma Knife® Perfexion™. Thirty and 180-day survival for Gamma Knife® were 97.6 and 91.3 percent respectively with the highest 180-day survival in the last five years.

**Novalis®**

A record of 79 patients were treated with Novalis® stereotactic radiosurgery in 2007 representing a 22 percent increase from 2006.
Gamma Knife® Stereotactic Radiosurgery: Survival by Tumor Type

Meningioma

Metastases

Pituitary
Gamma Knife® Stereotactic Radiosurgery: Survival by Tumor Type

Acoustic/Schwannoma

![Graph showing survival and number of procedures]

Spine Radiosurgery for Painful Spinal Metastases (N=54)

![Graph showing BPI scores]

Brief Pain Inventory (BPI) scores following spine radiosurgery in patients presenting with painful spinal metastases. Individual and mean patient scores ± 1 s.e. on the BPI, a brief 10-item self-rating pain scale, are plotted for each time period: baseline, weeks 1-3 (W1-W3), months 1 and 3 (M1, M3) after spine radiosurgery. Spine radiosurgery is a palliative treatment for pain, typically in end-stage cancer patients. A total of 54 patients with painful spinal metastases were treated with single fraction Novalis® spine radiosurgery from 2006 to 2007. As early as week one post treatment there was a statistically significant improvement in patient pain scores. At one month the response rate (the number of patients with improvement in pain) was 85 percent. These results remained stable over time.
## Cerebrovascular Disease

### Stroke Treatment Quality

<table>
<thead>
<tr>
<th>Clinical Measure</th>
<th>Measure Description</th>
<th>National Average Jan-March 2004*</th>
<th>GWTG Performance Award Goal**</th>
<th>2006 Cleveland Clinic</th>
<th>2007 Cleveland Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVT Prophylaxis</td>
<td>The percentage of patients at risk for Deep Venous Thrombosis (DVT) who received DVT Prophylaxis by the second hospital day</td>
<td>77.5% (1513/1953)</td>
<td>85%</td>
<td>91.3%</td>
<td>93.6% (220/235)</td>
</tr>
<tr>
<td>Antithrombotics within 48 hrs</td>
<td>Percent of ischemic stroke or TIA patients who receive antithrombotic medication within 48 hours of hospitalization</td>
<td>95.2% (2592/2724)</td>
<td>85%</td>
<td>96.7%</td>
<td>96.1% (199/207)</td>
</tr>
<tr>
<td>Antithrombotics at Discharge</td>
<td>Percent of ischemic stroke or TIA patients discharged on antithrombotics (e.g., warfarin, aspirin, other antiplatelet drug)</td>
<td>96.9% (2685/2771)</td>
<td>85%</td>
<td>96.2%</td>
<td>98.6% (350/355)</td>
</tr>
<tr>
<td>Anticoagulation for Atrial Fibrillation</td>
<td>Percent of ischemic stroke or TIA patients with atrial fibrillation who are discharged on anticoagulation therapy (warfarin/Coumadin or heparin/heparinoids) unless an absolute or relative contraindication exists</td>
<td>96.5% (167/173)</td>
<td>85%</td>
<td>97.0%</td>
<td>94.6% (35/37)</td>
</tr>
<tr>
<td>IV tPA use (Eligible &lt;2hr arrival)</td>
<td>Percent of acute ischemic stroke patients who arrive at the ED within 120 minutes (two hours) of onset of stroke symptoms who receive IV t-PA within 180 minutes (three hours) of onset of stroke symptoms</td>
<td>40.8% (69/169)</td>
<td>85%</td>
<td>85%</td>
<td>60.0% (3/5)</td>
</tr>
<tr>
<td>Statin at Discharge</td>
<td>Percent of ischemic stroke or TIA patients with LDL ≥ 100 mg/dL OR on cholesterol reducer prior to admission who are discharged on cholesterol reducing drugs</td>
<td>57.1% (1255/2199)</td>
<td>85%</td>
<td>85.2%</td>
<td>90.9% (229/252)</td>
</tr>
<tr>
<td>Smoking Counselling documented</td>
<td>Percent of smokers who are documented of receiving smoking cessation advice or medication (e.g., Nicoderm® or Zyban®) at discharge</td>
<td>54.5% (274/503)</td>
<td>85%</td>
<td>85.0%</td>
<td>100.0% (101/101)</td>
</tr>
</tbody>
</table>

Quality Measure indicators are based upon Get With The Guidelines™ (GWTG) definitions. GWTG is the premier hospital-based quality improvement program for the American Heart Association and the American Stroke Association. It empowers healthcare provider teams to consistently treat heart and stroke patients according to the most up-to-date guidelines and is consistent with quality measures used as part of The Joint Commission’s Primary Stroke Center Certification process.

**Cleveland Clinic exceeds the “Get with the Guidelines” targets of 85 percent compliance in six of the seven core GWTG-Stroke measures**
Cerebrovascular Procedural Volume

Distribution of Major Case Type
Treatment of Unruptured Aneurysms

Treatment of Ruptured Aneurysms

Changes in Treatment Options for Patients with Cerebrovascular Disease
Ruptured Aneurysms: Length of Stay

Unruptured Aneurysms: Length of Stay

Discharge Status

<table>
<thead>
<tr>
<th>2007 Discharge Status</th>
<th>Non-ruptured Aneurysms</th>
<th>Ruptured Aneurysms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>80%</td>
<td>37%</td>
</tr>
<tr>
<td>Home Health</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Acute Rehab</td>
<td>3%</td>
<td>14%</td>
</tr>
<tr>
<td>Skilled Nursing Facility</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Expired</td>
<td>1%</td>
<td>19%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td>18%</td>
</tr>
</tbody>
</table>
Epilepsy


In patients with persistent seizures after surgery, there was a significant drop in seizure frequency down from a mean of 120 seizures/month preoperatively to 20 seizures/month postoperatively.

There are no long-term outcome results published for other centers. Short term rates of seizure freedom in this patient population varied from 13 to 80 percent.
Seizure-freedom following hemispherectomy for epilepsy (N=65 surgeries from 2004-2006)

<table>
<thead>
<tr>
<th>Time Since Surgery</th>
<th>6 months</th>
<th>1 year</th>
<th>2 years</th>
<th>3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Seizure-Free</td>
<td>79%</td>
<td>75%</td>
<td>67%</td>
<td>53%</td>
</tr>
</tbody>
</table>
Seizure-freedom following temporal lobectomy for epilepsy (N=474 surgeries from 1997-2007)

In patients with persistent seizures after surgery, there was a significant improvement in seizure frequency: down from an average of 52 seizures/month preoperatively to 14 seizures/month postoperatively (73 percent reduction in seizure frequency). National seizure-free rates represent a weighted average of recent studies conducted in the United States1-7.

<table>
<thead>
<tr>
<th>Time since surgery</th>
<th>1 year</th>
<th>2 years</th>
<th>5 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>% seizure-free (Cleveland Clinic)</td>
<td>81%</td>
<td>75%</td>
<td>71%</td>
<td>68%</td>
</tr>
<tr>
<td>% seizure-free (national)</td>
<td>72%</td>
<td>54%</td>
<td>59%</td>
<td>51%</td>
</tr>
</tbody>
</table>

Seizure-freedom following posterior quadrant resections for epilepsy (N=60 surgeries from 1997-2007)

- **Time Since Surgery**
  - 1 year
  - 2 year
  - 5 years
  - 10 years

- **% Seizure-Free**
  - 1 year: 69%
  - 2 year: 66%
  - 5 years: 66%
  - 10 years: 55%
Mean depression scores, as measured by the Beck Depression Inventory-II (BDI-II), were decreased six months following temporal lobectomy, indicating an improvement in depressive symptoms.

Individual changes in mood, as measured by the BDI-II, following temporal lobectomy for intractable epilepsy. Change in mood was defined as moving from one severity category to another. Severity categories are BDI-II scores 0-13 for minimal, 14-19 for mild, 20-29 for moderate, and 29-63 for severe depression.
Headache

Pain Outcome Following IMATCH (N=36)

Pain Ratings (0=No Pain; 10=Worst Possible Pain)

![Pain Outcome Bar Chart]

Pain scores (mean + s.d.) decrease following the IMATCH (Interdisciplinary Method for the Assessment and Treatment of Chronic Headache) Program. N=36 patients completing the three-week program in 2007.

Stress, Anxiety and Depression Following IMATCH (N=36)

Emotional Functioning Scores

![Emotional Functioning Bar Chart]

Measures of stress, anxiety, and depression all decrease following IMATCH, indicating improvement. Mean DASS-42 (Depression, Stress, and Anxiety Scale) subscale scores are plotted with their standard deviations.
Functional Status Following IMATCH (N=36)

Disability Scores

Scores on the Treatment Helpfulness Questionnaire indicate high rates of patient satisfaction.
**Infusion Therapy for Headache**

The Headache Center Infusion Suite provides intravenous treatments specifically for headaches under the guidance of a headache staff physician. Same-day care is also available for patients in the Headache Program.

**Headache Infusion Suite**

The number of yearly infusions continues to increase, with headache patients averaging two to three infusions each in 2007.

**Pain Reduction with Infusion Therapy (N=198)**

Percent of patients reporting various levels of pain reduction following infusion therapy. Over 60 percent of patients reported a 50 percent or greater reduction in pain immediately after treatment.
Botox Therapy for Headache

Botox continues to be a popular treatment for headache, with patients averaging two treatments per year.
Improvement in motor functioning in Parkinson’s disease with deep brain stimulation. Motor functioning is measured with the Unified Parkinson’s Disease Rating Scale, Part III (Motor Subscale). Motor scores are shown with the stimulator in the on and off states.
Percent improvement on Unified Parkinson’s Disease Rating Scale (UPDRS), Part III (Motor Subscale) following deep brain stimulation treatment for Parkinson’s Disease.
Multiple Sclerosis

Intrathecal Baclofen Therapy

Intrathecal baclofen (ITB) therapy is approved by the FDA for the treatment of severe spasticity of spinal or cerebral origin refractory to other treatment modalities. The Mellen Center has been using this therapeutic modality since its approval, with over 250 patients treated since 1990. The intrathecal infusion device (baclofen pump) is implanted by neurosurgeons at the Center for Neurological Restoration at Cleveland Clinic. Patient selection, testing, and postoperative management are performed in the Mellen Center Spasticity Clinic.

From January to December 2007, 19 patients underwent the implantation of a baclofen pump.

<table>
<thead>
<tr>
<th>Diagnosis/Indication for ITB</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Sclerosis</td>
<td>10</td>
</tr>
<tr>
<td>ALS (Amyotrophic Lateral Sclerosis)</td>
<td>2</td>
</tr>
<tr>
<td>Cerebral Palsy</td>
<td>2</td>
</tr>
<tr>
<td>Stroke</td>
<td>1</td>
</tr>
<tr>
<td>Spinal Cord Injury</td>
<td>1</td>
</tr>
<tr>
<td>Myelopathy</td>
<td>2</td>
</tr>
<tr>
<td>Adrenomyeloneuropathy</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

Three patients had complications leading to treatment discontinuation in two patients.

<table>
<thead>
<tr>
<th>Postoperative Outcome</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection leading to removal of the device and treatment discontinuation</td>
<td>2</td>
</tr>
<tr>
<td>Device malfunction requiring surgical revision; patient continued treatment</td>
<td>1</td>
</tr>
<tr>
<td>No complications</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>
Spasticity scores on the Modified Ashworth Scale (0=no increase in tone, 4=severe increase in tone) at baseline and after ITB therapy. There was a statistically significant (p<0.001, paired t-test) reduction in spasticity after treatment. Average follow-up for the 17 patients was 167 days.

Spasm Frequency Scale scores (0=no spasms, 4=more than 10 spasms/hour) at baseline and most recent follow-up visit. There was a statistically significant (p<0.001, paired t-test) reduction in spasm frequency after treatment. Average follow-up for the 17 patients was 167 days.
Ambulating Following ITB

The Mellen Center has developed expertise in the use of ITB therapy in ambulatory patients. ITB therapy in this population has the same potential benefits in terms of reduction of bothersome spasticity which may interfere with activities of daily living, sleep, and quality of life in general. However, a common concern about ITB is that it may cause increased weakness with loss of function. Ten of our ITB patients (59 percent) were ambulatory at baseline. Only one patient became nonambulatory at follow-up. This patient had a diagnosis of amyotrophic lateral sclerosis (ALS) and the loss of ambulation was attributed to rapid disease progression.

Gait Speed (Timed 25-Foot Walk)

There was no significant change in gait speed, as measured with the Timed 25-Foot Walk Test, following ITB, supporting the conclusion that ITB can be used in carefully selected ambulatory patients without loss of function.
Natalizumab (Tysabri®) Therapy

Natalizumab (Tysabri®) is the newest approved disease-modifying therapy for multiple sclerosis. Because of safety concerns (two cases of PML: Progressive Multifocal Leukoencephalopathy), there are restrictions imposed by the FDA on the administration of the medication. The Mellen Center is one of the centers approved to administer natalizumab. Between Aug. 29, 2006, and Jan. 2, 2008, 108 patients were started on natalizumab at the Mellen Center. The average treatment duration to date is 242 days, for an average number of seven infusions. Eighteen patients (16.7 percent) discontinued therapy. The reasons for treatment discontinuation are presented below. There were no cases of PML. The treatment was judged to be effective in 83.3 percent of patients, defined as clinical and/or MRI stability at follow-up visits. Significant improvement of neurologic status was noted in 11 percent of the total number of patients treated. The usual goal of disease-modifying therapies in MS is to achieve relative stability; an actual improvement in neurological function is unusual.

Time to Tysabri® Treatment Discontinuation

Kaplan-Meier curve of time to treatment discontinuation. Approximately 80 percent of patients continue on treatment at 15 months.

<table>
<thead>
<tr>
<th>Reasons for Discontinuation</th>
<th>Number of Patients</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy</td>
<td>4</td>
<td>One of the four patients developed neutralizing antibodies against natalizumab.</td>
</tr>
<tr>
<td>Lack of efficacy</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>Three patients transferred care closer to home; it is not known if they continued treatment with natalizumab.</td>
</tr>
<tr>
<td>Complications</td>
<td>1</td>
<td>One patient developed multiple infections.</td>
</tr>
<tr>
<td>Side effects</td>
<td>1</td>
<td>One patient developed headache, nausea.</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>One patient became pregnant and one patient decided to discontinue treatment due to potential adverse effects.</td>
</tr>
</tbody>
</table>
Botulinum Toxin Therapy

Botulinum toxin (BT) is used off-label in the United States for the treatment of focal spasticity.

Diagnoses of patients treated with BT in 2007

<table>
<thead>
<tr>
<th>Diagnosis/Indication for BT</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Sclerosis</td>
<td>25</td>
</tr>
<tr>
<td>Traumatic Brain Injury</td>
<td>2</td>
</tr>
<tr>
<td>Cerebral Palsy</td>
<td>5</td>
</tr>
<tr>
<td>Stroke</td>
<td>9</td>
</tr>
<tr>
<td>Myelopathy</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>49</strong></td>
</tr>
</tbody>
</table>

Between January and December 2007, 49 patients initiated BT therapy at the Mellen Center. A majority of these patients have multiple sclerosis (MS). No patients developed complications. Two patients (4 percent) reported transient side effects after the injections. Two patients (4 percent) decided to discontinue BT therapy (not related to side effects).

Botox Treatment Effectiveness (N=47)

Percent of patients reporting treatment effectiveness following botox therapy for focal spasticity. Patients were assessed at first follow-up visit (three months after initial treatment) and subsequently every three months. Average last follow-up was six months, with a range up to 12 months. The average follow-up period for the 47 patients who continued treatment is 170 days. The average dose injected at the most recent session was 360 units of botulinum toxin A. Most patients reported benefit with treatment both on symptoms and function, and the results were stable over time.
Neurological Institute

Neuromuscular Disease

Skin Biopsy for Small Fiber Sensory Neuropathy

Cleveland Clinic is one of a few medical centers with a cutaneous nerve laboratory to facilitate evaluation of small fiber sensory neuropathy (SFSN). In 2007, we performed skin biopsies with intraepidermal nerve fiber density evaluation for 233 patients. One hundred and seventy eight patients (76 percent) were diagnosed with SFSN based on the biopsy results. In 79 patients (44 percent) the diagnosis was made exclusively by skin biopsy. Our data are consistent with reports by other medical centers that skin biopsy is a valuable diagnostic tool and is more sensitive than electrophysiological studies for diagnosing SFSN.

Of 42 patients with painful peripheral polyneuropathy followed for up to one year, 60 percent showed improvement in visual-analog pain scores (VAS) with various treatment modalities.

Patients showed an average improvement (reduction in pain scores) of 25 percent. This compares to an average improvement of 12 to 42 percent in published studies of treatment of neuropathic pain

Pediatric Neurology and Neurosurgery

Pediatric Neurosurgery (< 18 years)

Congenital Malformation

Chiari Malformation
### Spasticity

![Spasticity Graph]

### Tumors

![Tumors Graph]

### Hydrocephalus

![Hydrocephalus Graph]
Endoscopic Third Ventriculostomy (ETV)

Time to Treatment Failure Following Endoscopic Third Ventriculostomy

Time to treatment failure following endoscopic third ventriculostomy (ETV). Treatment failure is defined as recurrence of symptoms and/or need for repeat surgery. Approximately 85 percent of patients continue to be symptom-free after one year, 76 percent after two years, and 70 percent after three years.
Pediatric Headache (N=18)

Pediatric patients treated for headache showed an improvement in PedsMIDAS (Migraine Disability Assessment Score), headache frequency, and number of rescue medications needed. The number of school days missed is one of the questions included in the PedsMIDAS interview. N=18 pediatric patients with two PedsMIDAS scores an average of three months apart.

Pediatric EMG

There are very few medical centers in the country that provide high-quality electromyography (EMG) for the pediatric population with the option of EMG under sedation, resulting in a more comprehensive examination and less discomfort for the patient.
**Pediatric Neurometabolic Clinic**

The term idiopathic developmental delay is used to define some 3 percent of the population that has unexplained neurologic and developmental symptoms including autism and epilepsy. Until very recently, this population of children and adults, some with progression of their symptoms for unexplained reasons, remained largely without a diagnosis. With advances in technology and improving diagnostic skills the ability to reach a conclusive diagnosis in this population has steadily improved. While there is no national standard, tertiary care centers such as ours have the potential to reach a diagnosis 30 to 50 percent of the time.

**Neurometabolic Clinic Diagnostic Yield**

In 2007 our Neurometabolic Clinic evaluated over 300 patients presenting with unexplained neurologic and/or developmental symptoms, and we were able to establish a diagnosis in 125 patients, or 40 percent.

Psychiatric Disorders

Psychiatric Admissions

Chronic Pain Rehabilitation Program

The Chronic Pain Rehabilitation Program is a comprehensive, interdisciplinary team approach to the treatment of patients with chronic pain. These patients typically have pain that is not amenable to usual medical, surgical or interventional approaches. Most have substantial pain-related functional impairment and many have substantial psychological distress as well.

Pain Intensity following Treatment

(0 = No Pain, 10 = Worst Possible Pain)

Mean pain scores decrease following enrollment in the Chronic Pain Rehabilitation Program. Two hundred fifty-nine patients were admitted to the program in 2006 and 233 in 2007. Approximately 80 percent of patients completed the program. Typical treatment duration is 3.5 weeks.
Depression scores, as measured with the DASS (Depression, Anxiety and Stress Scale) depression subscale, show improvement following treatment.

Anxiety scores, as measured with the DASS, show improvement with treatment.

Pain Disability following Treatment
(0=No Disability, 70=Total Disability)

Functional status, as measured with the Pain Disability Index (PDI), shows improvement following treatment.
**Patient Satisfaction with Chronic Pain Rehab Program**

Fifty-three percent of patients rated the Chronic Pain Rehabilitation Program as Excellent at 6-month follow-up. Ninety percent of patients would recommend the program to a friend. \( N=47 \) in 2006 and \( N=43 \) in 2007 (number of patients completing the survey).

**Depressive symptom improvement with deep brain stimulation (DBS) in highly refractory depression**

Change in Montgomery-Asberg Depression Rating Scale (MADRS) and Hamilton-24 Depression Rating Scale (HDRS) over time for the subject population.
**Binge Eating Group**

The Binge Eating Group is a cognitive behavioral group therapy conducted by the Section of General and Health Psychology and Bariatric and Metabolic Institute, designed for bariatric surgery patients who reported behaviors consistent with Binge Eating Disorder (BED). BED has been associated with poorer surgery outcomes including weight regain, and is thus an important factor to assess and treat for bariatric surgery patients.\(^1,\(^2\)

Patients are routinely given the Binge Eating Scale (BES) at their initial assessment by Psychology.\(^3\) Patients with elevated scores, those who meet criteria for BED, or those who demonstrate other binge eating behaviors as determined by the interview are referred to the Binge Eating Group. The BES and number of binges per week are then routinely assessed at the end of the four-week group to determine treatment progress along with a satisfaction questionnaire.

The Binge Eating Group is a cognitive behavioral treatment including elements of self-monitoring, stimulus control, cognitive restructuring, body image processing, stress management and relaxation training, and group support. The sample consisted of 81 patients who completed all four sessions of the group, 86 percent of whom were female.

**Outcomes following Binge Eating Therapy (N=81)**

The patient average on the BES showed a significant reduction following group treatment (p<.001). The average number of binge eating episodes also showed a significant reduction following group treatment (p < .001). Average patient satisfaction was 4.52 (Very Satisfied to Extremely Satisfied) on a scale of 1 (Extremely Dissatisfied) to 5 (Extremely Satisfied).

---

The Sleep Disorders Center performed 4490 total sleep studies in 2007. Several quality indicators are tracked each quarter for each of its accredited sleep laboratories. Out of 4256 overnight studies performed in 2007, only three sentinel events occurred related to comorbid cardiovascular disease. PAP=positive airway pressure.
Types of Sleep Studies Performed in 2007

<table>
<thead>
<tr>
<th>Type of Study</th>
<th>Number of Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSG</td>
<td>2,500</td>
</tr>
<tr>
<td>Split study</td>
<td>2,000</td>
</tr>
<tr>
<td>PAP titration</td>
<td>1,500</td>
</tr>
<tr>
<td>PSG-EEG</td>
<td>1,000</td>
</tr>
<tr>
<td>MSLT/MWT</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,500</strong></td>
</tr>
</tbody>
</table>

PSG=polysomnography, Split study=combination PSG and PAP (positive airway pressure) titration, PSG-EEG=combination PSG and standard electroencephalography, MSLT=multiple sleep latency test, MWT=multiple wake test.

Interscorer Reliability

Sleep study quality rests largely on the expertise of the recording technologists and interpreting physicians. Interscorer reliability is tracked each quarter for all technologists. The American Academy of Sleep Medicine requires technologists to achieve a score of at least 85 percent compared to the sleep staging and event scoring of a board-certified sleep medicine physician. For 2007, interscorer reliability for all Cleveland Clinic Sleep Disorders Center locations surpassed the national standard.
Sleep Apnea

Improvement in Sleepiness (N=60)

Sleepiness as measured with the Epworth Sleepiness Scale (ESS) in sleep apnea patients seen from June to December 2007, before and after PAP (positive airway pressure) treatment. Higher scores indicate more severe daytime sleepiness; PAP treatment reduced sleepiness into the normal range (<10). Average duration of treatment was 86 days.

Improvement in Fatigue (N=60)

Fatigue as measured with the Fatigue Severity Scale (FSS) in sleep apnea patients seen from June to December 2007, before and after PAP treatment. Higher scores indicate more severe fatigue. Patients showed a 9 percent improvement in fatigue after PAP treatment.
Improvement in Depressive Symptoms (N=60)

Depressive symptoms as measured with the Patient Health Questionnaire (PHQ-9), in sleep apnea patients seen from June to December 2007, also improved after PAP treatment. PHQ-9 scores of 5-9 suggest mild depression, <5 suggests minimal depression.

Insomnia

Sleep Skills Group

The Sleep Skills Group is a novel treatment for insomnia started in 2007, one of the first of its kind in Northeast Ohio. After a five-week session, 69 percent of participants had a significant improvement in insomnia, and 22 percent of participants no longer had insomnia, as measured with the Insomnia Severity Index.
Spinal Disorders

Selected Spinal Procedures

Spinal decompression remains the most frequently performed procedure for spine disease.

Mean Length of Stay (LOS) in Spinal Disorders

Target LOS is calculated based on APR-DRGs which adjust for the severity of the patient population.
Surgical Site Infections following Spinal Surgery

Infections by Procedure Type (N=2026)
Complications following Spinal Surgery (N=2026)

Complications were defined as follows: Dural = related to hemorrhage, hematoma, postoperative fistula, or wound disruptions; Mechanical = related to device, implant, or graft; Systemic = related to organ system involvement, central nervous system or otherwise.

Complications by Procedure Type (N=2026)
Spinal Surgery Complications and Mortality
The Section of Anesthesia for Neurological Surgery continues its emphasis on the management of perioperative normothermia (≥36.0°C). Achieving perioperative normothermia has been shown to reduce surgical wound infection rates. Performance increased substantially in 2007. The addition of this measure in early 2008 to the Anesthesiologist Dashboard clinical practice reporting tool for staff anesthesiologists will provide data for continuous improvement.

Patient Satisfaction with Management of Postoperative Nausea & Vomiting

The department of General Anesthesiology visits spine, craniotomy and other neurological surgery inpatients on their second postoperative day in the hospital to evaluate the early postoperative period and to obtain patients’ responses to a standardized anesthesia experience survey. Favorable responses to the question “I threw up or felt like throwing up” are “Disagree very much” or “Disagree moderately”. Results for 2006 and 2007 for neurological surgery inpatients are shown.
A question in the postoperative patient satisfaction survey obtained during postoperative rounds asks for the response to the statement “I was satisfied with my anesthesia care”. Favorable responses include “Agree very much” or “Agree moderately”. Results for 2006 and 2007 for spine, craniotomy and other neurological surgery patients are shown.
Surgical Care Improvement Program (SCIP)

SCIP is a national campaign aimed at reducing surgical complications by 25 percent by the year 2010. SCIP is sponsored by the Centers for Medicare and Medicaid Services (CMS) in collaboration with a number of other national partners serving on the steering committee, including the American Hospital Association (AHA), Centers for Disease Control and Prevention (CDC), Institute for Healthcare Improvement (IHI), The Joint Commission and others. Cleveland Clinic is committed to improving the care of surgical patients and participates in SCIP. A multidisciplinary team including the Surgery Institute, Anesthesiology Institute, Infectious Disease Department, Nursing Institute, and Quality and Patient Safety Institute works together to ensure that our surgical patients receive appropriate care.

Appropriate Preoperative Prophylactic Antibiotic Timing 2007

* Source: United States Department of Health and Human Services, Hospital Compare
   Most current reported discharges July 2006 to June 2007.
   “Top Hospitals” represent the top 10 percent of reporting hospitals nationwide.
   National average of all reporting hospitals in the United States.
Appropriate Prophylactic Antibiotic Selection 2007

Prophylactic Antibiotics Discontinued within 24 Hours After Surgery 2007

* Source: United States Department of Health and Human Services, Hospital Compare
Most current reported discharges July 2006 to June 2007.
“Top Hospitals” represent the top 10 percent of reporting hospitals nationwide.
National average of all reporting hospitals in the United States.
Recommended Venous Thromboembolism Prophylaxis Received by Patient 2007

* Source: United States Department of Health and Human Services, Hospital Compare
Most current reported discharges January 2007 to June 2007.
“Top Hospitals” represent the top 10 percent of reporting hospitals nationwide.
National average of all reporting hospitals in the United States.

Recommended Venous Thromboembolism Prophylaxis Ordered 2007

* Source: United States Department of Health and Human Services, Hospital Compare
Most current reported discharges January 2007 to June 2007.
“Top Hospitals” represent the top 10 percent of reporting hospitals nationwide.
National average of all reporting hospitals in the United States.
Surgery Patients Who Received their Beta Blocker Perioperatively 2007

* No national benchmark data available at this time
Patient Experience

Outpatient - Neurological Institute

We ask our patients about their experiences and satisfaction with the services provided by our staff. Although our patients are already indicating we provide excellent care, we are committed to continuous improvement.

Overall Rating of Care 2007

![Bar chart showing the distribution of patient ratings from Excellent to Poor with N=5,565 patients.]

Overall Rating of Provider Care 2007

![Bar chart showing the distribution of provider care ratings from Excellent to Poor with N=5,595 patients.]

Outcomes 2007
Would Recommend Provider 2007

N=5,431
**Inpatient - Cleveland Clinic**

With the support of the Center for Medicare and Medicaid Services (CMS) and its partner organizations, the first national standard patient experience survey was implemented in late 2006. Adult medical, surgical, and obstetrics and gynecology patients treated at acute care hospitals across the country are included in the survey. Results collected for initial public reporting, published on www.hospitalcompare.gov in March 2008, are shown here.

**Overall Rating of Care (0 worst - 10 best scale)**
October 2006 - June 2007

![Bar chart showing Percent “9” or “10” for Cleveland Clinic and HCAHPS National Average.]

Total Cleveland Clinic Survey Respondents = 4,725

---

**Would Recommend Facility**
October 2006 - June 2007

![Bar chart showing Percent “Yes, definitely” for Cleveland Clinic and HCAHPS National Average.]

Total Cleveland Clinic Survey Respondents = 4,725
Going Mobile and Pain-Free

David Marshall Jr., OD, PhD, is no stranger to Cleveland Clinic. With a range of health problems, including reflex sympathetic dystrophy (RSD), Dr. Marshall had become very familiar with 9500 Euclid Ave. over the course of four years.

He had previously undergone surgery to receive a spinal cord stimulator to ward off the pain from RSD. But when a new pain from spinal stenosis left him immobile, he turned to Cleveland Clinic’s Center for Spine Health.

The pain, he says, radiated from his sternum to his shoulder and prevented him from doing so much as lifting his chin from his chest. “There wasn’t much I could do,” he says. “I could lift my head for a second, but the pain would drop it back down again.”

Dr. Marshall underwent a C3-4 discectomy and revision spine surgery, and the results were noticeable immediately.

“The next day I felt the best I had in four years,” he says, noting that the surgery relieved him of much of the pain associated with RSD as well.

Leading up to the procedure, Dr. Marshall says his spinal cord stimulator had been on “24 hours a day, seven days a week.” Since that day, however, he says the device is only on about 50 percent of the time, and, with his physician’s blessing, he is currently working to wean himself off the device completely.
Innovations

Brain Tumor and Neuro-oncology Center

- Installed the Gamma Knife® Perfexion™ Radiosurgery Unit, the second unit of this type in the United States. The Gamma Knife® Perfexion™ Unit allows for treatment in a wider range of anatomical structures, offers enhanced planning, uses all imaging modalities, increases patient comfort and reduces treatment time.

- Further refined the first program in Ohio for the treatment of spinal tumors using high precision, noninvasive stereotactic radiosurgery (with Novalis® shaped-beam surgery) to encompass the Novalis® use for spine pain.

Image shows a metastasis to the spine with the target area defined (red outline). A very conformal desired dose is delivered with stereotactic radiosurgery (blue). The spine cord (green) does not receive significant radiation, as can be clearly seen.

- Demonstrated impact of STAT3 inactivation on GBM tumor formation.

![Graph showing percent survival over time for different treatments.](image)

Tumors N709 and N714 contain inactivated STAT3 and show improved survival in animal studies.

Ranking that Discover magazine gave Cleveland Clinic’s work with deep brain stimulation for minimally conscious patients in its list of top scientific discoveries in 2007.
• Initiated a collaboration with industry to develop laser interstitial thermal therapy for brain tumors – moving initial research from the preclinical phase to a first-in-man trial.

• Showed IL-8 to be a key mediator of NF-kB induced glioma cell invasion.

• Demonstrated that methoxyamine can sensitize established GBM tumors to the effects of chemotherapy.

---

**Center for Headache and Pain**

• Established IMATCH (Interdisciplinary Method for the Assessment and Treatment of Chronic Headache) program for adults with chronic headaches. One of only a few in the country, IMATCH is an intensive, multidisciplinary outpatient program for patients who have exhausted other treatment options.

---

**Center for Neurological Restoration**

• Implanted the first Deep Brain Stimulator (DBS) in a patient with severe traumatic brain injury, demonstrating behavioral improvement from a minimally conscious state.

• Investigated stimulation of spheno-palatine ganglia for treatment of severe cluster and migraine headaches.

• Performed ongoing investigations exploring the utilization of DBS for treating Obsessive Compulsive Disorder and Depression.
Center for Pediatric Neurology and Neurosurgery

- Established a dedicated Pediatric Syncope and Autonomic Clinic in collaboration with the Neuromuscular Center and Pediatric Cardiology.
- Recognized by the Children's Tumor Foundation as one of 29 multidisciplinary NF (neurofibromatosis) clinics in the country. Awarded funding by the American Tumor Foundation.
- Developed the first Pediatric Multiple Sclerosis (MS) and White Matter Disorders Clinic in Ohio in collaboration with the Mellen Center.

Center for Spine Health

- Established The Neurological Institute Collaborative Community of Innovation (NICCI). NICCI is a new initiative designed to create, promote and nurture a culture of creativity, innovation and teamwork in the Neurological Institute.
- OrthoMEMS (microelectromechanical system), a Cleveland Clinic spin-off company, is moving rapidly toward clinical trials with its micro-pressure sensor, the OrthoChip. The first clinical application of this battery-less, telemetric micro-sensor will be for the assessment of intervertebral disc function and the more accurate determination of the indications for and contraindications to spine fusion surgery.
• Opened a state-of-the-art angiography room that allows for endovascular and open craniotomy treatment of a patient with cerebrovascular disease.
• Developed Temporary Endovascular Bypass technology for stroke treatment.
• Successfully formed Cleveland Clinic spin-off company, ReVasc Inc, which focuses on the development of a new technology for the treatment of ischemic stroke.
• Completed 160-patient, five-center U.S. Multicenter Wingspan Registry.
• First in Ohio to use Enterprise stent to treat wide-necked aneurysms.
• First in Ohio to use Enzo deflectable tip micro catheter to treat aneurysms.
Department of Psychiatry and Psychology

- Developed and implemented an Outcome Scale which measures target symptoms, housing and social support needs on admission and at discharge. This will allow quantitative measurement of improvement during a patient’s inpatient stay.
- Developed and implemented an SBAR modified for psychiatry. The SBAR (Situation, Background, Assessment and Recommendation) is a tool that is used to report to the next shift, improving communication between providers.
- Implemented a suicide-assessment protocol for the medical floors.
- Established routine screening for metabolic syndrome in all psychiatric patients on the Cleveland Clinic unit. Developed programs to promote healthy lifestyles.
- Implemented programs to train trainers in a new crisis intervention model, Non Abusive Psychological and Physical Intervention. This is the first step in a move toward a trauma-informed model of care in our hospital.

Epilepsy Center

- Launched installation of the first clinical MEG (magnetoencephalogram) system in Ohio. The MEG will improve non-invasive localization of the seizure focus in patients who suffer from intractable epilepsies.
- Opened an expanded eight-bed Pediatric Epilepsy Monitoring Unit which has been renovated with state-of-the-art video-EEG monitoring equipment.
- Participated in a multi-center clinical trial to test the efficacy of NeuroPace in the treatment of non-surgical pharmacoresistant epilepsy. NeuroPace is an implantable neurostimulator designed to deliver electrical stimulation in response to detected EEG seizure activity, to suppress clinical seizures.
Mellen Center for Multiple Sclerosis

- Utilized Diffusion Tensor Imaging as a non-invasive MRI-based technique to measure remyelination.

Diffusion tensor images from a patient with MS. Left: mean diffusivity (MD), indicating the overall amount of water diffusion; Middle: fractional anisotropy (FA), indicating the amount of anisotropy (or “elongatedness”) of diffusion; Right: colorized primary eigenvector maps, illustrating different directions of the primary fiber tract. Red is left-right; green is up-down; blue is in-out of the page. The arrows indicate the effect of an MS lesion disrupting water diffusion: overall diffusion is increased (bright on MD map), anisotropy is decreased (dark on FA map), and the primary fiber direction is disrupted (loss of color on the eigenvector map).

- Developed a protocol that improved the safety of Tysabri®, an FDA-approved disease-modifying therapy for MS.
- Developed a transmigration assay laboratory test to monitor brain inflammation.
- Developed the first Pediatric MS and White Matter Disorders Clinic in Ohio in collaboration with the Center for Pediatric Neurology.
- Assisted in the development and evaluation of a new Hip Flexion Assist Orthosis (HFAO) in ambulatory MS patients with hip flexor weakness. The HFAO is safe, cost-effective and had a high level of patient satisfaction with use as well as facilitating significant improvement in walking speed and endurance.
**Neuroanesthesiology**

- Developed a central line catheter prototype incorporating jugular bulb sampling which allows placement of a single catheter for assessing global oxygen delivery/oxygen use ratios in the brain during cranial surgery, as well as central venous pressure monitoring and fluid delivery. The catheter prototype is being developed for market by the Interplex company.

---

**Neuromuscular Center**

- Implemented thermoregulatory sweat testing as an added tool in our battery of autonomic and quantitative sensory testing, allowing more sophisticated diagnosis of autonomic and small fiber neuropathic disorders.
- Provided skin biopsy histopathology and interpretation for the diagnosis of small fiber neuropathy as a national referral service.
- Established a neuromuscular ultrasound service for the diagnosis of focal peripheral neuropathies, such as entrapment neuropathies.

Ultrasound of the superficial peroneal nerve revealing a cystic mass.
Sleep Disorders Center

• Expanded our pediatric sleep program.
• Established a comprehensive Cognitive Behavioral Program incorporating individual and group therapy for the treatment of insomnia.
• Collaborated with University Hospitals Case Medical Center to explore ambulatory polysomnography.
• Collaborated with Cleveland Clinic Cardiovascular Surgery to study the perioperative morbidity of sleep apnea.

Cleveland Clinic Neurological Institute Regional Centers

• Established a community neurosurgery team approach.
• Established a strategic plan to place neurologists in Cleveland Clinic family health centers and surrounding hospitals.

Cleveland Clinic Knowledge Program

• Developed methods of integrating data from Epic and multiple electronic sources into a discrete clinical data repository for Neurological and Imaging Institute patients.
• Established the routine collection of patient health status measures as discrete data fields within the outpatient encounter.
• Implemented the use of kiosks and tablets for the electronic collection of patient-reported health status measures.
The Neurological Institute staff authored more than 400 publications in 2007. For a complete list go to www.clevelandclinic.org/quality/outcomes.


13,835,686

External funding in dollars for Cleveland Clinic neuroscience-based research in 2007
NEUROLOGICAL INSTITUTE TEAM INVESTIGATES BRAIN PATHOLOGY IN MULTIPLE SCLEROSIS

A team of investigators in the Neurological Institute and Lerner Research Institute is studying changes in the brains and spinal cords of patients with multiple sclerosis (MS). One goal of the study is to develop more informative imaging tools that can be used to monitor and treat MS patients. In this study, regions of the brain were selected from postmortem magnetic resonance images (MRI) of 10 MS patients, and classified into MRI-defined categories. One of the categories identified swollen axons and axonal loss, pathologies that are associated with neurological disability in MS. Studies to characterize cellular and molecular changes in brain tissue are continuing. We expect to gain improved understanding of mechanisms leading to brain damage in MS patients, and improve methods to monitor treatments for individual patients using noninvasive MRI methods. Studies supported by the NIH (NINDS P01 NS38667).

Axonal Measurements By MRI Region Type

Plot of percentage axonal area, axonal count, and swelling index in each MRI group (gray bars denote T2-weighted imaging only; black bars denote T2-weighted, T1-weighted, and magnetization transfer ratio abnormal [T2T1MTR]) relative to the means for normal-appearing white matter (NAWM; hatched bars) regions. Fisher E, et al. Ann Neurol. 2007;62:219–228.
NEUROLOGICAL INSTITUTE TEAM DETECTS CHANGES IN BRAIN ACTIVATION PATTERNS IN EARLY ALZHEIMER’S DISEASE

A team of investigators in the Neurological Institute is studying changes in brain activation of healthy older individuals (ages 65-85) who are genetically at risk for developing Alzheimer’s disease (AD) and individuals who have Mild Cognitive Impairment (MCI), a condition that typically precedes the diagnosis of AD. One goal of the study is to develop an imaging biomarker that can detect the earliest brain changes associated with AD. Nineteen MCI patients, 19 genetically at-risk but healthy older adults and 19 healthy older adults not at-risk for AD (control) were administered a memory task while undergoing functional magnetic resonance imaging (fMRI). Results indicate that fMRI is sensitive to detecting the earliest changes in AD, even before patients become symptomatic. The goal is to use this imaging technology to assess the efficacy of drugs designed to delay the onset of AD. Studies supported by the NIH (NIA R01 AG022304).

Three groups of older participants, MCI patients, individuals at-risk for developing AD and healthy not-at-risk control subjects, were asked to discriminate names of famous individuals from those of unfamiliar persons. The difference in brain activation (Famous > Unfamiliar) is shown in blue. MCI and at-risk participants exhibited greater brain activity than Controls. Results suggest that early AD-related changes require the brain to “work harder” to achieve similar levels of task performance. Rao SM, et al. Submitted.

NEUROLOGICAL INSTITUTE AND IMAGING INSTITUTE EVALUATE DEEP BRAIN STIMULATION WITH FMRI

Investigators from the Neurological Institute and the Imaging Institute have collaborated to study the effect of deep brain stimulation (DBS) in patients with Parkinson’s disease using functional MRI. The investigators are determining how the brain is activated during DBS for Parkinson’s disease. Early results demonstrated a consistent pattern of brain activation produced by stimulation within the ipsilateral thalamus and globus pallidus. These studies will lead to better understanding of the relationship between brain activation and DBS in Parkinson’s disease, and will provide the necessary information to maximize therapeutic benefits of this treatment. Studies supported by the NIH (NINDS R01 NS052566-01A1).

Brain Activation Patterns with DBS

Staff Listing

**Chairman**
Michael T. Modic, MD, FACR

**Vice Chairman, Clinical Areas**
William Bingaman, MD

**Vice Chairman, Research and Development**
Richard Rudick, MD

**Quality Review Officer**
Jocelyn Bautista, MD

**Department of Neurological Surgery**
Edward Benzel, MD
Chairman, Department of Neurological Surgery

**Department of Neurology**
Kerry Levin, MD
Chairman, Department of Neurology

**Department of Psychiatry and Psychology**
George Tesar, MD
Chairman, Department of Psychiatry and Psychology
Susan Albers-Bowling, PsyD
Kathleen Ashton, PhD
Scott Bea, PsyD
Dana Brendza, PsyD
Karen Broer, PhD
Kumar Budur, MD
Kathy Coffman, MD
Gregory Collins, MD
Edward Covington, MD
Roman Dale, MD
Beth Dixon, PsyD
Judy Dodds, PhD
Kristen Eastman, PsyD
Darlene Floden, PhD
Catherine Gaw, PhD
John Glazer, MD
Lilian Gonsalves, MD
Shannon Griffith, PhD
Jennifer Haut, PhD
Leslie Heinberg, PhD, MA
Karen Jacobs, DO
Joseph Janesz, PhD, LICDC
Regina Josell, PsyD
Eileen Kennedy, PhD
Patricia Klaas, PhD
Steven Krause, PhD, MBA
Cynthia Kubu, PhD
Kathleen Laing, PhD
Amy Lee, PhD
Donald Malone, Jr., MD
Beth Ann Martin, PhD
Michael McKee, PhD
Scott Meit, PsyD, MBA
Gene Morris, PhD
David Muzina, MD
Richard Naugle, PhD
Shannon Perkins, PhD
Leopoldo Pozuelo, MD
Kathleen Quinn, MD
Ted Raddell, PhD
Judith Scheman, PhD
Isabel Schuermeyer, MD
Jean Simmons, PhD
Barry Simon, DO
Catherine Stenroos, PhD
David Streem, MD
Adele Viguera, MD
John Vitkus, PhD
Cynthia White, PsyD
Amy Windover, PhD
**Center for Regional Neurology**
Stephen Samples, MD  
Director, Center for Regional Neurology  
A. Romeo Craciun, MD  
Sheila Rubin, MD  
Joseph Zayat, MD

**Center for Regional Neurological Surgery**
Michael Mervart, MD  
Director, Center for Regional Neurological Surgery  
Samuel Borselino, MD  
Samuel Tobias, MD

**Brain Tumor and Neuro-Oncology Center**
Gene Barnett, MD, FACS  
Director, Brain Tumor and Neuro-Oncology Center  
Lilyana Angelov, MD  
Samuel Chao, MD  
Bruce Cohen, MD  
Heinrich Elinzano, MD  
Joung Lee, MD  
David Peereboom, MD  
Burak Sade, MD  
John Suh, MD  
Glen Stevens, DO, PhD  
Tanya Tekautz, MD  
Michael Vogelbaum, MD, PhD  
Robert Weil, MD

**Center for Neurological Restoration**
Ali Rezai, MD  
Director, Center for Neurological Restoration  
Anwar Ahmed, MD  
Scott Cooper, MD, PhD  
Milind Deogaonkar, MD  
Darlene Floden, PhD  
Ilia Itin, MD  
Cynthia Kubu, PhD  
Richard Lederman, MD, PhD  
Andre Machado, MD, PhD  
Donald Malone, Jr., MD  
Mayur Pandya, DO  
Patrick Sweeney, MD

**Center for Neuroimaging**
Thomas Masaryk, MD  
Director, Center for Neuroimaging  
Stephen E. Jones, MD, PhD  
Mark Lowe, PhD  
Doksu Moon, MD  
Micheal Phillips, MD  
Paul Ruggieri, MD  
Alison Smith, MD  
Todd Stultz, DDS, MD  
Andrew Tievsky, MD

**Center for Pediatric Neurology and Neurosurgery**
Elaine Wyllie, MD  
Director, Center for Pediatric Neurology  
Mark Luciano, MD, PhD  
Director, Center for Pediatric Neurosurgery  
Bruce Cohen, MD  
Xiao Di, MD, PhD  
Stephen Dombrowski, PhD  
Gerald Erenberg, MD  
Neil Friedman, MBChB  
Debabrata Ghosh, MD, DM  
Gary Hsich, MD  
Irwin Jacobs, MD  
Manikum Moodley, MD  
Sumit Parikh, MD  
A. David Rothner, MD
Center for Spine Health
Edward Benzel, MD
Director, Center for Spine Health
Gordon Bell, MD
William Bingaman, MD
Edwin Capulong, MD
Russell DeMicco, DO
Lars Gilbertson, PhD
Augusto Hsia Jr., MD
Serkan Inceoglu, PhD
Iain Kalfas, MD
Gaurav Kapur, MD
Tagreed Khalaf, MD
Ajit Krishnaney, MD
Paula Lestri, MD
Daniel Mazanec, MD
Robert McLain, MD
Thomas Mroz, MD
R. Douglas Orr, MD
Richard Schlenk, MD
Michael Steinmetz, MD
Santhosh Thomas, DO
Fredrick Wilson, DO
Adrian Zachary, DO, MPH

Cerebrovascular Center
Peter Rasmussen, MD
Director, Cerebrovascular Center
David Fiorella, MD, PhD
Rishi Gupta, MD
Irene Katz, MD
Gwendolyn Lynch, MD
J. Javier Provencio, MD, FCCM
Vivek Sabharwal, MD

Epilepsy Center
Imad Najm, MD
Director, Epilepsy Center
Andreas Alexopoulos, MD
Jocelyn Bautista, MD
William Bingaman, MD
Richard Burgess, MD, PhD

Center for Headache and Pain
Mark Stillman, MD
Director, Center for Headache and Pain
Cynthia Bamford, MD
Neil Cherian, MD
Thomas Gretter, MD
Steven Krause, PhD, MBA
Jennifer Kriegl, MD
Robert Kunkel, MD
MaryAnn Mays, MD
Roderick Spears, MD
Deborah Tepper, MD
Stewart Tepper, MD

Mellen Center for Multiple Sclerosis Treatment and Research
Richard Rudick, MD
Director, Mellen Center for Multiple Sclerosis Treatment and Research
Francois Bethoux, MD
Jeffrey Cohen, MD
Robert Fox, MD
Keith McKee, MD
Deborah Miller, PhD
Alexander Rae-Grant, MD
Mary Rensel, MD
Lael Stone, MD
Neurocognitive Center
Richard Rudick, MD
Interim Director, Neurocognitive Center
Michael Parsons, PhD
Stephen Rao, PhD
Janice Zimbelman, PhD

Neuromuscular Center
Kerry Levin, MD
Director, Neuromuscular Center
Kamal Chemali, MD
Rebecca Kuenzler, MD
Erik Pioro, MD, PhD
David Polston, MD
Robert Shields Jr., MD
Steven Shook, MD
Jinny Tavee, MD
Deborah Venesy, MD
Lan Zhou, MD, PhD

Sleep Disorders Center
Nancy Foldvary-Schaefer, DO
Director, Sleep Disorders Center
Charles Bae, MD
Kumar Budur, MD
Michelle Drerup, PsyD
Prakash Kotagal, MD
Jyoti Krishna, MD
William Novak, MD
Carlos Rodriguez, MD

Department of Neurosciences, Lerner Research Institute
Bruce Trapp, PhD
Chairman, Department of Neurosciences, Lerner Research Institute
Cornelio Bergmann, PhD
Hitoshi Komuro, PhD
Bruce Lamb, PhD
Wendy Macklin, PhD
Sanjay Pimplikar, PhD
Richard Ransohoff, MD
Susan Staugaitis, MD, PhD
Stephen Stohlman, PhD
Jerrold Vitek, MD, PhD
Riqiang Yan, PhD

Biomedical Engineering, Lerner Research Institute
Jay Alberts, PhD
Elizabeth Fisher, PhD
Aaron Fleischman, PhD
Cameron McIntyre, PhD
Shuvo Roy, PhD

Cell Biology, Lerner Research Institute
Luca Cucullo, PhD
Damir Janigro, PhD
Nicola Marchi, PhD

Anatomic Pathology, Lerner Research Institute
Richard Prayson, MD

Neuroanesthesiology
Michelle Lotto, MD
Head, Section of Neurosurgical Anesthesia
Zeyd Ebrahim, MD
Interim Chair, Institute of Anesthesiology and Critical Care
Armin Schubert, MD
Chairman, Department of General Anesthesiology
Rafi Avitsian, MD
Ehab Farag, MD
Mariel Manlapaz, MD
Marco Maurtua, MD
Vivek Sabharwal, MD
Gloria Walters, MD

Some physicians may practice in multiple locations. For a detailed list including staff photos, please visit clevelandclinic.org/staff.
Contact Information

General Patient Referral
24/7 hospital transfers or physician consults
800.553.5056

Neurological Institute Appointments/Referrals
Toll-free 866.588.2264
On the Web at clevelandclinic.org/neuroscience

Additional Contact Information

General Information
216.444.2200

Hospital Patient Information
216.444.2000

Patient Appointments
216.444.2273 or 800.223.2273

Special Assistance for Out-of-State Patients
Complimentary assistance for out-of-state patients and families
800.223.2273, ext. 55580, or email medicalconcierge@ccf.org

International Center
Complimentary assistance for international patients and families
800.884.9551 or 001.631.439.1578 or visit clevelandclinic.org/ic

Cleveland Clinic in Florida
866.293.7866

For address corrections or changes, please call 800.890.2467
clevelandclinic.org

Institute Locations

Cleveland Clinic Neurological Institute physicians see patients at the locations below. Please inquire about availability of specific services at each location when calling.

Main Campus
9500 Euclid Ave.
Cleveland, OH 44195
866.588.2264

Neurological Institute Regional Centers

Euclid Hospital
18901 Lake Shore Blvd.
Euclid, OH 44119
216.531.9000

Fairview Hospital
18101 Lorain Ave.
Cleveland, OH 44111
216.476.7000

Hillcrest Hospital
6780 Mayfield Road
Mayfield Heights, OH 44124
440.312.4500

Huron Hospital
13951 Terrace Road
East Cleveland, OH 44112
216.761.3300

Lakewood Hospital
14519 Detroit Ave.
Lakewood, OH 44107
216.521.4200
Lutheran Hospital
1730 West 25th St.
Cleveland, OH 44113
216.696.4300

Marymount Hospital
12300 McCracken Road
Garfield Heights, OH 44125
216.581.0500

Cleveland Clinic Children’s Hospital Shaker Campus
2801 Martin Luther King Jr. Drive
Cleveland, OH 44104
216.721.5400

Cleveland Clinic Family Health Centers

Beachwood Family Health and Surgery Center
26900 Cedar Road
Beachwood, OH 44122
216.839.3000

Chagrin Falls Family Health Center
551 E. Washington St.
Chagrin Falls, OH 44022
440.893.9393

Independence Family Health Center
5001 Rockside Road
Crown Center II
Independence, OH 44131
216.986.4000

Lorain Family Health and Surgery Center
5700 Cooper Foster Park Road
Lorain, OH 44053
440.204.7400

Strongsville Family Health and Surgery Center
16761 SouthPark Center
Strongsville, OH 44136
440.878.2500

Solon Family Health Center
29800 Bainbridge Road
Solon, OH 44139
440.519.6800

Westlake Family Health Center
30033 Clemens Road
Westlake, OH 44145
440.899.5555

Willoughby Hills Family Health Center
2570 SOM Center Road
Willoughby Hills, OH 44094
440.943.2500

Cleveland Clinic Wooster
1739 Cleveland Road
Wooster, OH 44691
330.287.4500
Cleveland Clinic Overview

Cleveland Clinic, founded in 1921, is a nonprofit multispecialty academic medical center that integrates clinical and hospital care with research and education. Today, 1,800 Cleveland Clinic physicians and scientists practice in 120 medical specialties and subspecialties, annually recording more than 3 million patient visits and more than 70,000 surgeries.

In 2007, Cleveland Clinic restructured its practice, bundling all clinical specialties into integrated practice units called institutes. An institute combines all the specialties surrounding a specific organ or disease system under a single roof. Each institute has a single leader and focuses the energies of multiple professionals onto the patient. From access and communication to point-of-care service, institutes will improve the patient experience at Cleveland Clinic.

Cleveland Clinic’s main campus, with 37 buildings on 140 acres in Cleveland, Ohio, includes a 1,000-bed hospital, outpatient clinic, specialty institutes and supporting labs and facilities. Cleveland Clinic also operates 14 family health centers; eight community hospitals; two affiliate hospitals; a 150-bed hospital and clinic in Weston, Fla.; and health and wellness centers in Palm Beach, Fla., and Toronto, Canada. Cleveland Clinic Abu Dhabi (United Arab Emirates), a multispecialty care hospital and clinic, is scheduled to open in 2011.

At the Cleveland Clinic Lerner Research Institute, hundreds of principal investigators, project scientists, research associates and postdoctoral fellows are involved in laboratory-based research. Total annual research expenditures exceed $150 million from federal agencies, non-federal societies and associations, and endowment funds. In an effort to bring research from bench to bedside, Cleveland Clinic physicians are involved in more than 2,400 clinical studies at any given time.

In September 2004, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University opened and will graduate its first 32 students as physician-scientists in 2009.

Cleveland Clinic is consistently ranked among the top hospitals in America by *U.S. News & World Report*, and our heart and heart surgery program has been ranked No. 1 since 1995.

For more information about Cleveland Clinic, visit clevelandclinic.org.
Online Services

eCleveland Clinic

eCleveland Clinic uses state-of-the-art digital information systems to offer several services, including remote second medical opinions to patients around the world; personalized medical record access for patients; patient treatment progress for referring physicians (see below); and imaging interpretations by our subspecialty trained radiologists. For more information, please visit eclevelandclinic.org.

DrConnect

Online Access to Your Patient’s Treatment Progress

Whether you are referring from near or far, DrConnect can streamline communication from Cleveland Clinic physicians to your office. This online tool offers you secure access to your patient’s treatment progress at Cleveland Clinic. With one-click convenience, you can track your patient’s care using the secure DrConnect website. To establish a DrConnect account, visit eclevelandclinic.org or email drconnect@ccf.org.

MyConsult

MyConsult Remote Second Medical Opinion is a secure online service providing specialist consultations and remote second opinions for more than 600 life-threatening and life-altering diagnoses. The MyConsult service is particularly valuable for people who wish to avoid the time and expense of travel. For more information, visit eclevelandclinic.org/myconsult, email eclevelandclinic@ccf.org or call 800.223.2273, ext 43223.
Cleveland Clinic

9500 Euclid Avenue, Cleveland, OH, 44195

Cleveland Clinic is a nonprofit multispecialty academic medical center. Founded in 1921, it is dedicated to providing quality specialized care and includes an outpatient clinic, a hospital with more than 1,000 staffed beds, an education institute and a research institute.

© The Cleveland Clinic Foundation 2008