Measuring Outcomes Promotes Quality Improvement
Measuring and understanding outcomes of medical treatments promotes quality improvement. Cleveland Clinic has created a series of Outcomes books similar to this one for its disease-based institutes. Designed for a physician audience, the Outcomes books contain a summary of many of our surgical and medical treatments, with data on patient volumes and outcomes and a review of new technologies and innovations.

The Outcomes books are not a comprehensive analysis of all treatments provided at Cleveland Clinic, and omission of a particular treatment does not necessarily mean we do not offer that treatment. When there are no recognized clinical outcome measures for a specific treatment, we may report process measures associated with improved outcomes. When process measures are unavailable, we may report volume measures; a relationship has been demonstrated between volume and improved outcomes for many treatments, particularly those involving surgical techniques.

In addition to these institute-based books of clinical outcomes, Cleveland Clinic supports transparent public reporting of healthcare quality data and participates in the following public reporting initiatives:

- Joint Commission Performance Measurement Initiative (qualitycheck.org)
- Centers for Medicare & Medicaid Services (CMS) Hospital Compare (hospitalcompare.hhs.gov)
- Ohio Department of Health (ohiohospitalcompare.ohio.gov)
- Cleveland Clinic Quality Performance Report (clevelandclinic.org/QPR)

Our commitment to transparent reporting of accurate, timely information about patient care reflects Cleveland Clinic’s culture of continuous improvement and may help referring physicians make informed decisions.

We hope you find these data valuable, and we invite your feedback. Please send your comments and questions via email to:

OutcomesBooksFeedback@ccf.org or scan here.

To view all our Outcomes books, please visit Cleveland Clinic’s Quality and Patient Safety website at clevelandclinic.org/outcomes.
Dear Colleague:

Welcome to this 2012 Cleveland Clinic Outcomes book. We distribute Outcomes books for more than 14 specialties. These publications are unique in healthcare. Each one provides a summary overview of medical or surgical trends, innovations, and clinical data for a Cleveland Clinic specialty over the past year.

Cleveland Clinic uses data to manage outcomes across the full continuum of care. Clinical services are delivered through patient-centered institutes, each based around a single disease or organ system. Institutes combine medical and surgical services, along with research and education, under unified leadership. The individual institute defines quality benchmarks for its specialty services and reports longitudinal progress.

All Cleveland Clinic Outcomes books are available in print and online. Additional data are available through our online Quality Performance Report (clevelandclinic.org/QPR). The site offers process measure, outcome measure, and patient experience data in advance of national and state public reporting sites.

Our practice of releasing annual outcomes reports has received favorable notice from colleagues, media, and healthcare observers. We appreciate your interest and hope you find this information useful and informative.

Sincerely,

Delos M. Cosgrove, MD
CEO and President
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Visit clevelandclinic.org/OutcomesOnline, and we’ll remove you from the hard copy mailing list and email you when next year’s books are online.
Dear Colleagues,

I am pleased to share the 2012 Outcomes from Cleveland Clinic Cole Eye Institute with referring physicians, alumni, and potential patients across the country.

The future of electronic health records (EHR) is now. Cole Eye Institute continues to be a national leader in EMR implementation, and current versions offer physicians and patients robust access to ophthalmic imaging and clinical data. In 2012, we began to use our EMR to report integrated outcomes data. Our goals for the EMR are to optimize clinical efficiency and to use it as a tool to implement quality measures and best practices systemwide. Our world-class EMR system is further proof of our commitment to innovation, discovery, and the best in patient care.

Our staff and services continued to grow last year. We welcomed a new retina specialist and a pediatric ophthalmologist to our practice, and 2012 saw an increased migration of our retina and other subspecialists in to our community locations. This geographic expansion of our ophthalmology practice increases patient access to our services — another example of Cleveland Clinic’s dedication to putting patients first.

In 2012, we had our most productive year ever. Across Cleveland Clinic in Northeast Ohio, we conducted 241,264 physician visits and performed 12,742 surgeries. In reporting our outcomes data, we relied on two key assessment measures: visual acuity, using Early Treatment of Diabetic Retinopathy Study protocol refraction, and surgical complication rates.

On behalf of my colleagues, I hope that you find this edition of the Cole Eye Institute Outcomes book informative and useful.

Daniel F. Martin, MD
Chairman, Cole Eye Institute
Institute Overview

Cleveland Clinic Cole Eye Institute is a center of excellence for highly specialized ophthalmologic care and research, with a reputation for innovation and superior outcomes. Its patient volume is among the highest of any eye program in the United States. Cleveland Clinic’s ophthalmology program is rated No. 9 in the U.S. News & World Report “America’s Best Hospitals” survey.

Spearheading Research, Innovation

Cole Eye Institute staff members aggressively pursue research to bridge the gap between laboratory and patient care. The institute’s ophthalmologists are national leaders in clinical trials for age-related macular degeneration and have pioneered comparative effectiveness research in heading the Comparison of Age-Related Macular Degeneration Treatments Trials (CATT).

Cole Eye Institute is among the first academic centers to customize an electronic medical record for ophthalmic use. The two-year project allowed Cole Eye Institute staff across the system to share this type of record by the end of 2012. The electronic medical record integrates ophthalmic imaging and provides full access to patient histories for maximal clinical efficiency. It also streamlines data collection and allows quality measures to be adopted systemwide.

Cornea and External Diseases

The Cornea and External Diseases staff performs more than 1,800 cataract surgeries each year. They also offer advanced procedures such as Descemet’s stripping automated endothelial keratoplasty, deep anterior lamellar keratoplasty, and highly specialized transplant procedures.

Vitreoretinal Conditions

Surgical procedures developed by the institute’s vitreoretinal faculty are used worldwide for the treatment of retinal detachments, diabetic macular edema, diabetic traction detachments, macular holes, and pediatric retinal surgery. Cole Eye Institute experts are also helping develop the next generation of vitreoretinal surgical devices. They utilize advanced retinal imaging devices such as next-generation spectral domain optical coherence tomography. Cole Eye Institute retina specialists provide access to the latest clinical trials for patients who are in the early stages of age-related macular degeneration, those who have failed standard medical therapy, and those with macular edema from diabetes or vein occlusion.

Glaucoma

Cole Eye Institute glaucoma specialists employ automated visual field testing, retinal nerve fiber layer photography, stereoscopic disc photography, and computerized optic disc analysis in the diagnosis of primary, secondary, or complicated glaucoma. They offer patients of all ages access to the latest treatments: topical medications, glaucoma implants, mitomycin C, glaucoma filtration surgery, cataract surgery, combined glaucoma/cataract surgery, and laser surgery (argon, Nd:YAG, and pulsed-dye).

Keratorefractive Surgery

Cole Eye Institute surgeons use a leading-edge excimer laser system for customized treatment of myopia, hyperopia, and astigmatism. The institute’s keratorefractive surgeons rely on advanced laser technologies that offer increased accuracy and faster healing, including all-laser or “bladeless” LASIK and photorefractive keratectomy.
Neuro-Ophthalmology
The institute’s neuro-ophthalmologists are experts in optic nerve disorders, visual field loss, unexplained or transient vision loss, diplopia, nystagmus, thyroid eye disease, ocular myasthenia gravis, unequal pupil size, and eyelid abnormalities. They collaborate with Cleveland Clinic Neurological Institute specialists on patient care when needed.

Pediatric Ophthalmology/Strabismus
Cole Eye Institute pediatric specialists offer expert treatment for strabismus, retinopathy of prematurity, and congenital cataracts. They perform about 200 surgical procedures annually for esotropia, exotropia, thyroid eye disease, cranial nerve palsies, dissociated deviations, hypertropia and hypotropia, Duane and Brown syndromes, nystagmus, and related conditions.

Oculoplastics
Cole Eye Institute oculoplastic specialists perform more than 900 eyelid, lacrimal (tear duct), and orbital surgery procedures annually. Complex procedures performed include repairs of orbital fractures, ptosis, and lacrimal obstruction.

Ophthalmic Oncology
Cole Eye Institute oncologists treat uveal melanoma and other ocular tumors using advanced techniques such as radioactive plaque therapy to preserve vision. A technique they have developed for resecting circumscribed iris tumors utilizes gentle aspiration through a small corneal incision to reduce morbidity. Ophthalmic oncologists collaborate with Taussig Cancer Institute and other Cleveland Clinic specialists on research projects to improve the outlook for these diseases.

Uveitis
Cole Eye Institute specialists are international leaders in the diagnosis and management of uveitis. They collaborate with rheumatologists and other Cleveland Clinic specialists when uveitis signals a systemic immune disorder, offering topical therapy, antibiotics, or other medications along with careful follow-up to prevent/ manage relapses and to minimize vision damage.

Genetic Eye Diseases
Cole Eye Institute’s Center for Genetic Eye Diseases is an international referral center for multidisciplinary diagnosis, treatment, and research. Specialists care for patients with inherited corneal and retinal dystrophies and microphthalmia, as well as patients with inherited systemic disorders that involve the eye such as neurofibromatosis, albinism, neurodegenerative disorders, and Marfan syndrome.
Serving the Northeast Ohio Community

Cole Eye Institute offers comprehensive specialty ophthalmic care in a modern building equipped with advanced technology and designed for patient comfort. High-quality ophthalmic care is also offered at five Cleveland Clinic community locations. Comprehensive general ophthalmology and retina services are provided at Hillcrest Hospital in Mayfield Heights and at Twinsburg Family Health and Surgery Center. Ophthalmologists are on call 24/7 for emergency care across the system. Cole Eye Institute specialists also provide all retina services for MetroHealth Medical Center in Cleveland.

Research

Cole Eye Institute is heavily engaged in research, with an aggregate annual grant level of $10,617,150 for 2011–2012, including $5,843,450 from federal sources for basic research and $1,650,000 annually for clinical research. This funding helps both basic and clinical researchers better understand ophthalmic conditions and pioneer new treatments and techniques that will improve visual outcomes. Major research initiatives underway include those in the areas of age-related macular degeneration, diabetic retinopathy, retinal degeneration, and retinopathy of prematurity.

In 2012, Cole Eye Institute researcher Brian Perkins, PhD, received the prestigious Jules and Doris Stein Professorship for the study of the genetics of retinal ciliopathies. The award, bestowed by Research to Prevent Blindness, helps attract exceptionally talented basic scientists to careers devoted to eye research.

2012 Cole Eye Institute Key Statistics

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Clinic Visits</td>
<td>182,663</td>
</tr>
<tr>
<td>Total Surgeries</td>
<td>8,054</td>
</tr>
<tr>
<td>Total Surgical Procedures</td>
<td>10,020</td>
</tr>
<tr>
<td>(surgeries in operating rooms and all outpatient procedures)</td>
<td></td>
</tr>
<tr>
<td>Total Laser Procedures</td>
<td>1,807</td>
</tr>
</tbody>
</table>
Cataract surgery is the most commonly performed surgical procedure in ophthalmology and thus represents a significant proportion of the surgical caseload at Cleveland Clinic’s Cole Eye Institute. From October 2011 through September 2012, a total of 1,882 cataract extraction procedures were performed.

The goal of cataract surgery is improvement of visual acuity, which is accomplished for the vast majority of patients at Cole Eye Institute. There was a 94% improvement with ≥ 15 letter improvement in ETDRS (Early Treatment Diabetic Retinopathy Study) protocol refraction visual acuity in 42% of patients at their one-month follow-up, and 52% of patients had a 1 to 14 letter improvement. The remaining 5.7% had no change or a decrease from baseline status.

The overall improvement in vision was seen in patients with a cataract condition; some also may have had other disorders of the eye, such as glaucoma, retina disease, or anterior segment disease. A significant number of the institute’s cataract patients have multiple clinical morbidities. In patients without other eye disease, the mean visual acuity score with best glasses correction following surgery was 79 ETDRS letters, corresponding to nearly 20/20 vision.
Intraoperative complications during cataract surgery were uncommon, occurring in only 1.87% of patients. The most common complication was a capsular tear, reported in 0.64% of patients, most of whom ended up with excellent vision.

Postoperative complications also were rare, occurring in less than 1% of patients. The most common complication was cystoid macular edema.
Most patients achieved a refractive outcome following cataract surgery that was near the anticipated refractive error. Despite the large number of patients with other conditions that can influence refractive outcome, or the accuracy in measuring the final refractive error, 88% of patients achieved a final spherical equivalent refractive error within 1 diopter of the expected result.

*Early Treatment Diabetic Retinopathy Study
ETDRS Vision Improvement
October 2009 – September 2010
October 2010 – September 2011
October 2011 – September 2012

<table>
<thead>
<tr>
<th>Vision Improvement</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Change or Worse</td>
<td>35</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>1–14 Letters Improvement</td>
<td>395</td>
<td>379</td>
<td>332</td>
</tr>
<tr>
<td>≥ 15 Letters Improvement</td>
<td>342</td>
<td>301</td>
<td>265</td>
</tr>
</tbody>
</table>

N = 35 27 36
Corneal transplant surgeons at Cleveland Clinic's Cole Eye Institute perform state-of-the-art procedures for numerous conditions that distort or cloud the normally transparent cornea. Traditional full-thickness procedures, also known as penetrating keratoplasties (PK), make up the majority of the grafts performed in recent years. From October 2011 to September 2012, 65 PKs were performed, and 89% of these grafts remained clear at three to six months.

Cole Eye Institute surgeons also are contributing to the development of cutting-edge lamellar corneal transplant procedures in which only the diseased portion of the cornea is replaced. Using a procedure called Descemet's stripping automated endothelial keratoplasty (DSAEK), surgeons selectively transplant the endothelium for conditions such as pseudophakic bullous keratopathy and Fuchs endothelial dystrophy. These patients experience faster visual recovery and more stable and predictable refractive outcomes than those who undergo traditional PK. During the interval described above, 114 DSAEKs were performed at Cole Eye Institute, and 99% of these grafts remained clear at three to six months. In deep anterior lamellar keratoplasty for corneal scars and keratoconus, the recipient’s anterior cornea is replaced but the patient’s healthy endothelium is retained, eliminating the risk of endothelial rejection. In 2008 to 2009, equivalent numbers of PKs and DSAEKs were performed. In the past year, DSAEK cases outnumbered PKs, reflecting an international trend toward less invasive corneal transplant procedures for endothelial disease.

Highly specialized transplants are performed in smaller numbers for uncommon sight-threatening corneal conditions. For patients with end-stage corneal disease who are not candidates for other forms of transplantation, synthetic corneas (Boston keratoprostheses) are implanted to allow them to regain their visual function.

A total of 190 corneal procedures were performed last year, and most patients had no complications. Of the 176 who were tracked for outcomes, the intraoperative complication rate was 1.2% and included one case each of capsular rupture and vitreous prolapse. After three to 12 months of follow-up, the postoperative complication rate was 5.7% and included seven episodes of graft rejection and three patients with corneal ulcers.

Corneal transplant surgeons at Cole Eye Institute have integrated intraoperative optical coherence tomography into their approach to lamellar transplant surgeries such as DSAEK and deep anterior lamellar keratoplasty to better identify surgical endpoints in real time and to study the effect of enhanced intraoperative visualization on postoperative outcomes. Eye surgeons across the institute are participating in a comprehensive prospective study of this technology in a variety of applications.
Intraoperative Complications (N = 176)
October 2011 – September 2012

1.2% Complications:
- 0.6% Capsular Rupture
- 0.6% Vitreous Prolapse

98.8% None

Postoperative Complications (N = 176)
October 2011 – September 2012

5.7% Complications:
- 4.0% Graft Rejection Episode
- 1.7% Corneal Ulcer

94.3% None
Changes in visual acuity by the type of corneal transplant procedure are shown in the graph. For patients who completed a three- to 12-month follow-up, the mean improvement in ETDRS visual acuity score in DSAEK patients was 28.49 letters, corresponding to an improvement of about five lines of visual acuity. PK patients had worse preoperative vision than DSAEK patients and gained 38 letters, equivalent to seven lines of vision.
Glucoma is the second most common cause of irreversible blindness in the United States, after age-related macular degeneration. While visual loss from glaucoma cannot be reversed, adequate control of eye pressure can halt the progressive loss of vision. The keys to preserving vision in glaucoma are early detection and good intraocular pressure (IOP) control. Glaucoma can be managed with eyedrops, laser treatment, or surgery. Medication can help patients avoid the need for laser treatment or surgery to control glaucoma, but medication, usually in the form of eyedrops, entails long-term cost and some potential for local and systemic side effects. Laser surgery for glaucoma is generally quick, safe, and convenient but has only a relatively small effect in reducing eye pressure in many patients, and the effect may wear off over time. For some patients, surgery to control glaucoma is the best option.

Trabeculectomy is the most frequently performed glaucoma surgical procedure in the United States. For some patients with more difficult-to-control glaucoma or who have had previous other eye surgery or trauma, a glaucoma implant (glaucoma drainage device) is used instead. From January 2006 through September 2012, 1,895 glaucoma surgeries were performed at Cleveland Clinic's Cole Eye Institute. These included 973 trabeculectomies, 694 glaucoma implants, and 141 revisions of other glaucoma surgeries.

Volume of Glaucoma Surgeries
October 2009 – September 2010
October 2010 – September 2011
October 2011 – September 2012

Surgeries (%)

<table>
<thead>
<tr>
<th>Type of Surgery</th>
<th>2009-10 (N = 313)</th>
<th>2010-11 (N = 313)</th>
<th>2011-12 (N = 276)</th>
</tr>
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<tr>
<td>Trabeculectomy</td>
<td></td>
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<tr>
<td>Glaucoma Implant</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Revision of Trabeculectomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revision of Glaucoma Implant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Intraoperative trabeculectomy complications were low (0.4%). The total postoperative complication rate was 3.6%, which included hypotony (IOP < 5 mm Hg), bleb leak, choroidal effusion, and shallow flat anterior chamber.
In procedures performed at Cole Eye Institute in the 12-month period from Oct. 1, 2011, to Sept. 30, 2012, trabeculectomies reduced IOP in patients from a mean of 21.0 mm Hg to 15.5 mm Hg, and glaucoma implant surgery reduced IOP from 25.8 mm Hg to 16.1 mm Hg. A normal range of eye pressure is approximately 10 to 21 mm Hg.

The goal of glaucoma surgery is to preserve the current level of vision. Glaucoma surgery usually does not improve visual acuity unless combined with cataract surgery. In surgeries at Cole Eye Institute, the mean level of visual acuity, as measured on ETDRS (Early Treatment Diabetic Retinopathy Study) protocol visual acuity charts, improved slightly after trabeculectomy surgery.
Oculoplastic surgery outcomes were divided into three categories: eyelid surgery, lacrimal surgery, and orbital surgery. There were 954 oculoplastic surgeries performed at Cleveland Clinic Cole Eye Institute from October 2011 through September 2012. Eyelid surgery outcome measures included intraoperative complications and postoperative eyelid symmetry.

There were 157 lacrimal and 66 orbital procedures performed during this period, none of which resulted in any intraoperative or postoperative complications.

### Distribution of Oculoplastic Surgeries (N = 954)
October 2011 – September 2012

- 6.9% Orbital
- 16.5% Lacrimal
- 76.6% Eyelid

100%
A total of 731 eyelid surgeries were performed during this period. In the 630 patients who returned for their follow-ups, postoperative complications included the need for reoperation in 1.4%, worsened dry eye in 0.8%, a failed dacrocystorhinostomy in 0.3%, and bleeding/infection in 0.3% of cases.

Postoperative eyelid symmetry was excellent in 70% of cases and good in the remaining 30%. Excellent and good eyelid symmetry was defined by a marginal reflex distance within 0.5 mm and 1.0 mm of the desired position, respectively.
Uveal melanoma is the most common primary intraocular malignancy in adults and accounts for approximately 85% of all ocular melanomas. With current clinical examination techniques, the accuracy of clinical diagnosis of uveal melanoma exceeds 99%. A variety of imaging techniques have been used for differentiating uveal melanoma from other tumors or simulating conditions. The primary diagnostic modalities include slit-lamp examination, transillumination, digital photography, A-scan and B-scan ultrasonography, ultrasound biomicroscopy, angiography, and optical coherence tomography.

**Fine Needle Aspiration Biopsy**

In certain situations, such as atypical presentation or dense media opacity, or for diagnostic confirmation prior to the initiation of therapy, biopsy may be warranted. Fine needle aspiration biopsy may be performed for diagnostic or prognostic purposes.

For iris tumors, entry into the anterior chamber can be accomplished using a 26- to 30-gauge needle under direct visualization with an operating room microscope. The needle is inserted bevel up and is swept gently over the surface of the tumor while approximately 0.5 ml of aqueous fluid is aspirated. Posterior-segment tumors can be biopsied via a trans-scleral or a transvitreal approach. The trans-scleral approach, by far the most common technique employed, is often preferred for tumors located within the ciliary body or the anterior choroid. Posteriorly located tumors are often more easily accessible through a transvitreal approach.

**Fundus photograph depicting a completely amelanotic tumor.**

**Fine needle aspiration biopsy revealed spindle cells lacking melanin, consistent with the clinical impression of amelanotic choroidal melanoma.**

**A localized preretinal hemorrhage is seen overlying the needle biopsy site, which generally clears in several weeks.**
Methods of Treatment for Uveal Melanoma (N = 87)

2012

- 27% Enucleation
- 73% Plaque

Uveal Melanoma Surgeries (N = 421)

2007 – 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Enucleation</th>
<th>Plaque Brachytherapy</th>
</tr>
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<tbody>
<tr>
<td>2007</td>
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</tr>
<tr>
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<td>2011</td>
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<tr>
<td>2012</td>
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</table>
Although Cole Eye Institute has two laser platforms and several surgeons, the outcomes of laser vision correction are summarized here for a single surgeon and single combined laser platform (WaveLight® Refractive Suite: Allegretto Wave® Eye-Q Laser and FS200 Femtosecond Laser). This is the first year the institute is reporting the combination of these two lasers as a single platform for the whole cohort, and the results are improved over last year. They are subdivided based on the type of surgery (defined below) and the patient’s preoperative refractive status (low/moderate myopia (0 to -7.00 diopters), high myopia (> -7.00 diopters), and hyperopia (0 to +4.00 diopters)). Both the type and magnitude of refractive error can affect the likelihood that uncorrected visual acuity (UCVA) of 20/20 or better will be achieved. Another important metric in assessing laser vision correction outcomes is the proportion of patients whose final refractive error falls within ± 0.5 diopter of the intended result.

This section documents the outcomes for laser-assisted in situ keratomileusis (LASIK) with a femtosecond laser (FS200) flap (FemtoLASIK) and photorefractive keratectomy (PRK) (i.e., surface ablation) using the wavefront optimized ablation profile of the WaveLight Allegretto Wave Eye-Q excimer laser. The outcomes are reported as percentages of eyes with UCVA of 20/20 or 20/25, eyes with an exceptional outcome (UCVA of 20/16 or better), and eyes with UCVA meeting the requirements for driving without glasses (20/40 or better). This analysis includes the outcomes of 331 eyes treated in 2012.
Distance Only LASIK for Low to Moderate Myopia (0 to -7 Diopters Sphere With Cylinder < 3 Diopters) (N = 221 at ≥ Three Months) 2012

Following FemtoLASIK to treat mild/moderate myopia, 94% of eyes achieved UCVA of 20/20 or better and 100% achieved 20/25 or better. The refractive accuracy in achieving these excellent visual outcomes is 97% within ± 0.5 diopter of the desired target. Overall, 75% of eyes had an exceptional visual outcome of 20/16 or better.

Distance Only LASIK for High Myopia (> -7 Diopters Sphere With Cylinder < 3 Diopters) (N = 35 at ≥ Three Months) 2012

Following FemtoLASIK to treat high myopia, 86% of eyes achieved UCVA of 20/20 or better and 95% achieved 20/25 or better. The refractive accuracy in achieving these excellent visual outcomes is 82% within ± 0.5 diopter of the desired target. All eyes achieved UCVA of 20/40 or better (legal driving vision), and 63% had an exceptional visual result of 20/16 or better.
Following PRK to treat both low and high myopia, 97% of eyes achieved UCVA of 20/20 or better and the same number achieved 20/25 or better. The refractive accuracy in achieving these excellent visual outcomes is 97% within ± 0.5 diopter of the desired target. All eyes achieved UCVA of 20/40 or better (legal driving vision), and 66% had an exceptional visual result of 20/16 or better.
Distance Only LASIK for Hyperopia (N = 14 at ≥ Three Months) 2012

For FemtoLASIK in hyperopic eyes, where a precise refractive outcome is known to be more difficult to achieve, 86% of eyes still achieved UCVA of at least 20/20 and 93% achieved 20/25. The refractive accuracy in achieving these visual outcomes is 86% within ± 0.5 diopter of the target outcome. Again, 100% had UCVA of 20/40 or better (legal driving vision), and 43% of eyes achieved an exceptional result with an uncorrected visual acuity of 20/16 or better.
The Vitreoretinal Department at Cleveland Clinic Cole Eye Institute has assembled a dedicated surgical team of surgeons, nurses, and skilled technicians to deliver world-class care for its patients. This team has developed several surgical procedures that are now used worldwide for treatment of retinal detachment, diabetic macular edema, diabetic traction retinal detachments, and myopic macular holes, and for microincision surgery and pediatric retinal surgery. Members of the team have also helped develop the next generation of vitreoretinal surgical devices including microincision surgical instruments and techniques. Finally, the Ophthalmic Imaging Center at Cole Eye Institute is a leader in the new field of intraoperative optical coherence tomography, developing new uses for this pioneering technology.

In 2012, the team performed 635 surgical procedures. As in previous years, the following were excluded from the analysis: (1) emergency cases, (2) situations in which ETDRS (Early Treatment Diabetic Retinopathy Study) protocol visual acuity measurement could not be performed at baseline, and (3) cases in which patients received postoperative care at another facility.

Detailed efficacy outcomes were available for 58 surgeries performed by the vitreoretinal team to close a macular hole. Anatomic closure of the macular hole was achieved in 100% of cases. Vision improved ≥ 3 ETDRS lines in 53% of cases, with an average improvement in vision of 17.4 ETDRS letters, or ≥ 3 lines.

Another commonly performed macular procedure was epiretinal membrane removal, with detailed efficacy outcomes available in 111 cases. The mean visual acuity improvement after membrane peeling surgery was +11.2 ETDRS letters, with 22% of patients having a ≥ 3 line gain in vision.

Primary rhegmatogenous retinal detachments are common, and primary retinal detachment repair was performed in 38 patients in 2012. In 89.4% of cases, the retina was reattached with one surgery. The mean change in vision after primary retinal detachment repair was an improvement of +14.8 ETDRS letters, with an improvement in vision of ≥ 3 lines in 40% of cases.

Cole Eye Institute is a tertiary care facility, and the vitreoretinal team is called on to assist in difficult cases such as giant retinal tears and complicated retinal detachments that have proliferative vitreoretinopathy. Many of these patients are referred to this facility after having had vitreoretinal surgeries at other hospitals. Detailed efficacy outcomes for these types of surgery were available for 217 patients in 2012. Although most patients had a previous retinal surgery, the reattachment rate in these complicated cases was 97%. Seven patients had to return to the operating room after complicated retinal repair. Of these, five were referred from outside Cleveland Clinic and two were clinic patients who had undergone multiple previous surgeries. After the additional surgery, retinal reattachment was successful in all seven patients. The average improvement in vision after proliferative vitreoretinopathy retinal detachment repair was +15.2 ETDRS letters. A ≥ 3 line improvement in vision occurred in 35% of cases, while a ≥ 3 line loss in vision occurred in 8.8% of cases.

Diabetic vitrectomy surgery is among the most complex surgeries performed by a vitreoretinal surgeon. The vitreoretinal team has developed new techniques for diabetic surgery, including pioneering the use of small-gauge surgery. In 2012, detailed efficacy outcomes analysis was available in 90 cases. In patients with traction retinal detachment, the mean improvement in visual acuity was +11.9 ETDRS letters, with 36% having a ≥ 3 line gain in vision and none having a ≥ 3 line loss in vision. In diabetic patients, with just a vitreous hemorrhage, the mean change in vision was +37.4 ETDRS letters or 7 lines, with 55% having a ≥ 3 line gain in vision and one patient having a ≥ 3 line loss in vision.
**Category Definitions**

**DR 1**  
- Diabetic Macular Edema (DME)  
  - Macular edema due to posterior hyaloidal traction

**DR 2**  
- Complicated Diabetic Retinopathy  
  - Anterior hyaloidal fibrovascular proliferation  
  - Traction retinal detachment (TRD)  
  - Combined TRD and rhegmatogenous retinal detachment (RRD)

**RRD 1**  
- Rhegmatogenous Retinal Detachment (RRD)

**RRD 2**  
- Complicated Rhegmatogenous Retinal Detachment (RRD)  
  - Recurrent Retinal Detachment  
  - Proliferative Vitreoretinopathy

**Vitreous Hemorrhage (VH)**

**Giant Retinal Tear (GRT)**

**Macular Hole (MH)**

**Epiretinal Membrane (EM)**

**Groupings for Graphs**

**Group 1:** Diabetic Retinopathy (DR1 and Diabetic VH)

**Group 2:** Complicated Diabetic Retinopathy

**Group 3:** Primary Rhegmatogenous Retinal Detachment

**Group 4:** Complicated Rhegmatogenous Retinal Detachment and GRT

**Group 5:** Macular Hole

**Group 6:** Epiretinal Membrane

Note: For most emergency cases, especially RRD1, preoperative baseline ETDRS visual acuity cannot be performed and therefore the outcome results are not included in this analysis.

**Vision Improvement by Indication for Surgery (N = 215)**

**October 2011 – September 2012**

**Percentage**

![Graph showing vision improvement by indication for surgery](image-url)
An analysis of intraoperative complications for all surgical procedures revealed no complications in 97.8% of cases. Iatrogenic retinal breaks were the most common intraoperative complication, recorded in 1.3% of cases.
Postoperative Complications  
October 2011 – September 2012

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (N = 36)</th>
<th>Group 2 (N = 64)</th>
<th>Group 3 (N = 124)</th>
<th>Group 4 (N = 85)</th>
<th>Group 5 (N = 30)</th>
<th>Group 6 (N = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOP spike &gt; 30 mm Hg</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New retinal breaks</td>
<td></td>
<td>1%</td>
<td>1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypotony</td>
<td></td>
<td></td>
<td></td>
<td>4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visually significant cataract</td>
<td>3%</td>
<td></td>
<td>2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitreous hemorrhage</td>
<td>2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An analysis of patients who had at least three months of follow-up revealed that 97% of cases did not have any postoperative complications. The most prevalent postoperative complications were intraocular pressure (IOP) spike > 30 mm Hg (1.1%), hypotony (0.3%), and new retinal breaks (0.6%).
Strabismus Surgery

Cole Eye Institute considers the outcome of surgery for strabismus in adults to be good if there is: (1) disappearance of diplopia and/or anomalous head position in primary position of gaze or (2) in the absence of diplopia or anomalous head position, a constant deviation of less than 10 prism diopters. In children, a good outcome is defined as: (1) a constant deviation of less than 10 prism diopters in primary position or (2) the disappearance of anomalous head position in those in whom the surgery was done for that purpose, such as patients with a fourth nerve palsy, Brown syndrome, or Duane syndrome. The results here reflect reviews of follow-up visits during the period between October 2011 and September 2012. Hence, the follow-up data for some patients is not included here, nor are long-term outcomes.

For the above-mentioned period, 212 strabismus procedures were performed by three surgeons; 127 procedures were performed on children and 85 on adults (defined as age 16 years or older).
Adult Strabismus Cases (N = 85)  
October 2011 – September 2012

Surgeries (%)

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Surgeries (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esotropia</td>
<td>27%</td>
</tr>
<tr>
<td>Exotropia</td>
<td>73%</td>
</tr>
<tr>
<td>4th Nerve Palsy</td>
<td>6%</td>
</tr>
<tr>
<td>6th Nerve Palsy</td>
<td>4%</td>
</tr>
<tr>
<td>Hypertropia</td>
<td>5%</td>
</tr>
<tr>
<td>Thyroid Eye Disease</td>
<td>1%</td>
</tr>
<tr>
<td>Duane Syndrome</td>
<td>1%</td>
</tr>
<tr>
<td>Slipped Muscle</td>
<td>1%</td>
</tr>
</tbody>
</table>

Note: This graph excludes six patients for whom follow-up was not available.

Adult Outcomes (N = 79)  
October 2011 – September 2012

27% Poor – Over- or undercorrected

73% Good – Ocular alignment within 10 prism diopters of orthotropia if no diplopia, and/or diplopia disappeared and/or anomalous head position resolved


Pediatric Strabismus Cases (N = 127)
October 2011 – September 2012

Pediatric Outcomes (N = 110)
October 2011 – September 2012

Note: This graph excludes 17 patients for whom follow-up was not available.
Cleveland Clinic is dedicated to delivering excellent clinical outcomes and the best possible experience for our patients and their families. Patient feedback is critical in driving priorities and assessing results. Based on this feedback, Cleveland Clinic’s Office of Patient Experience implements training programs to improve service and communication as well as educational initiatives to help patients understand what to expect when they are in our care.

Outpatient Office Survey — Cole Eye Institute

2011 – 2012

Percent Best Response*

*Response options: Very Good, Good, Fair, Poor, Very Poor
Each bar represents a composite score based on responses to multiple survey questions.
Source: Press Ganey, a national hospital survey vendor
Overview
Cleveland Clinic health system uses a scorecard approach to measure and monitor quality, safety, and patient experience. Real-time dashboard data are leveraged in each location to drive performance improvement. Although not an exact match to publicly reported data, more timely internal data create transparency at all organizational levels and support improved care in all clinical locations. The following measures are examples of health system 2012 quality and safety focus areas. Throughout this section, “Cleveland Clinic” refers to the academic medical center or “main campus,” and those results are shown.

Cleveland Clinic Core Measures
Appropriateness of Care
2011 – 2012

Percent of Patients

<table>
<thead>
<tr>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cleveland Clinic monitors 30-day readmission rates for any reason to any of its system hospitals. Unplanned readmissions are actively reviewed for improvement opportunities. Strategies associated with communication, education, and follow-up have been implemented for several high-risk conditions, including heart failure and pneumonia. These practices are being expanded and enhanced to reduce overall avoidable readmissions.
Cleveland Clinic Overall In-Hospital Mortality Observed/Expected Ratio

2011 – 2012

Cleveland Clinic’s observed/expected (O/E) mortality ratio outperformed the University HealthSystem Consortium (UHC) academic medical center 50th percentile throughout 2012 based on the UHC 2012 risk model. Ratios less than 1.0 indicate mortality performance “better than” expected in UHC’s risk adjustment model.

*These data are prepared using the University HealthSystem Consortium (UHC) Clinical Database. uhc.edu

Cleveland Clinic Deaths Among Surgical Patients With Serious Treatable Complications (PSI 4) Rate per 1,000 Eligible Patients

2011 – 2012

The Agency for Healthcare Research and Quality’s Patient Safety Indicator 4 (AHRQ PSI 4) reports deaths among patients with serious treatable complications. Cleveland Clinic performs in the top third of UHC’s academic medical centers for this measure.
Cleveland Clinic continues to improve its performance with respect to postoperative blood clots (AHRQ Patient Safety Indicator 12). Improved screening and prevention strategies have led to a 45% reduction in these events over the past two years.

Cleveland Clinic has implemented several strategies to reduce central line-associated bloodstream infections (CLABSI), including a central-line bundle of insertion, maintenance, and removal best practices. In 2012, Cleveland Clinic initiated focused reviews of every CLABSI occurrence and is introducing equipment and technology to support reductions in CLABSI rates in its high-risk critical care population.

*These data are prepared using the University HealthSystem Consortium (UHC) Clinical Database. uhc.edu
A pressure ulcer is an injury to the skin that can be caused by pressure, moisture, or friction. These sometimes occur when patients have difficulty changing positions on their own. Cleveland Clinic caregivers have been trained to provide appropriate skin care and regular repositioning help while taking advantage of special devices and mattresses to reduce pressure for high-risk patients. In addition, they actively look for hospital-acquired pressure ulcers and treat them quickly if they occur.

Nationally, falls are a leading cause of hospital patient injury. Cleveland Clinic fall prevention efforts include identifying patients who are at risk for falls, checking on them frequently, assisting them to the bathroom, and providing nonskid footwear. Caregivers make sure patients have all necessary items, including a call light, within easy reach.

*The National Database of Nursing Quality Indicators® (NDNQI®) is owned by the American Nurses Association. The database collects and evaluates unit-specific nurse-sensitive data from hospitals domestically and globally, with > 1900 hospitals participating. The comparison data represented here are based on a third of all hospitals in the U.S. participating. © 2012, American Nurses Association, All Rights Reserved. [www.nursingquality.org](http://www.nursingquality.org)
Patient Experience

The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey is a standardized national tool used to measure patients’ perspectives of hospital care. Results collected for public reporting are available at medicare.gov/hospitalcompare.

Cleveland Clinic HCAHPS Overall Assessment
2011 – 2012

Percent Best Response*

<table>
<thead>
<tr>
<th>Recommend Hospital (% Definitely Yes)*</th>
<th>Hospital Rating (% 9 or 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>84.0</td>
<td>80.0</td>
</tr>
<tr>
<td>84.9</td>
<td>80.8</td>
</tr>
</tbody>
</table>

2011 (N = 10,378)
2012 (N = 11,190)
National Average
July 1, 2011 – June 30, 2012

*Response options: Definitely Yes, Probably Yes, Probably No, Definitely No
Source: Centers for Medicare & Medicaid Services and Press Ganey, a national hospital survey vendor
The guiding principle of Cleveland Clinic is “Patients First,” and improving the patient experience is a major strategic organizational goal. The Office of Patient Experience collaborates with physician and nursing leadership to establish best practices and implement standardized protocols that ensure delivery of patient-centered care.

Cleveland Clinic HCAHPS Domains of Care
2011 – 2012

Percent Best Response*

(Options: Always, Usually, Sometimes, Never)

*Except for “Room Clean” and “Quiet at Night,” each bar represents a composite score based on responses to multiple survey questions.

Source: Centers for Medicare & Medicaid Services and Press Ganey, a national hospital survey vendor

The guiding principle of Cleveland Clinic is “Patients First,” and improving the patient experience is a major strategic organizational goal. The Office of Patient Experience collaborates with physician and nursing leadership to establish best practices and implement standardized protocols that ensure delivery of patient-centered care.

Cleveland Clinic HCAHPS Domains of Care
2011 – 2012

Percent Best Response*

(Options: Always, Usually, Sometimes, Never)

*Except for “Room Clean” and “Quiet at Night,” each bar represents a composite score based on responses to multiple survey questions.

Source: Centers for Medicare & Medicaid Services and Press Ganey, a national hospital survey vendor

The guiding principle of Cleveland Clinic is “Patients First,” and improving the patient experience is a major strategic organizational goal. The Office of Patient Experience collaborates with physician and nursing leadership to establish best practices and implement standardized protocols that ensure delivery of patient-centered care.
Creating Next-Generation Electronic Health Record Tools to Care for Patients

In 2012, Cleveland Clinic’s Cole Eye Institute completed a total migration to an electronic health records (EHR) system. This project took more than three years and $3 million in support to complete. Substantial modifications to clinic and billing workflows, hardware, image storage, and Epic content were required to optimize the system and ensure successful deployment.

Now that the migration is complete, Cole Eye Institute has started reaping some of the rewards of customization, data collection, and streamlined workflow. There was little economic change from year-to-date values, whereas other ophthalmology peers showed significant declines. “EHR has allowed us to examine every aspect of patient care,” explains Rishi Singh, MD, who has served as physician leader for the project’s scope, design, development, and implementation. “We can track improvements following procedures, display summary reports that help physicians follow trends, and aggregate our collective experiences to assess our practice.”

With the EHR, cross-communication among doctors who manage complex patients can occur with ease. For example, a patient who has both rheumatologic disease and eye disease and who requires care from multiple specialists now has the opportunity to take advantage of joint clinics, which allow him or her to see all providers in one day, at one location. Aside from being convenient for patients, joint clinics allow ophthalmologists and other physicians to provide coordinated multidisciplinary care.

Cole Eye Institute has begun leveraging its experiences through an EHR Optimization Services Program. As part of this program, the team from Cole Eye Institute has been traveling to leading ophthalmic programs across the country and sharing best practices and advice on EHR system implementation. This program has been extremely well received, and multiple institutions have entered into agreements with Cole Eye Institute to provide EHR services from workflow optimization through complete implementation of the EHR system.

The EHR system will be rolled out to Cole Eye Institute physicians throughout the year, and the next phase of EHR will offer decision-support tools for physicians, create a data repository or data mart for ongoing clinical research, and provide dashboards that will display the ongoing clinical, administrative, quality, and safety metrics at the institute. “Our work on EHR is giving Cole Eye Institute a monumental opportunity to contribute knowledge to and lead in the field of ophthalmology.”
Refractive Laser Assisted Cataract Surgery

Cataract surgery today has changed from what it used to be. It essentially began as a therapeutic procedure for older patients, but is now used on patients of all ages and expectations. Patients today not only want their cataracts removed but also want it to be done in a faster, better, and more technologically refined manner.

With the introduction of refractive laser assisted cataract surgery (ReLACS), standard cataract procedure (which focuses on the removal of a cloudy lens for replacement with a synthetic lens implant) is now moving beyond the best lens implant calculation and aspheric, toric, or multifocal shape to refractive laser precision. ReLACS is changing modern-day cataract surgery into a refractive procedure, striving to achieve the same kind of refractive precision with cataract surgery as is experienced with LASIK.

A growing number of “baby boomers” are reaching the age for cataract development and surgery, and this generation has high expectations for vision correction derived from their knowledge of LASIK. Thus, ReLACS represents the next big wave of refractive cataract surgery within a population wishing for not just cataract removal, but vision correction.

Ronald R. Krueger, MD, as an early innovator and co-founder of one of the four commercial companies offering ReLACS, serves as the lead editor of and contributor to a textbook on the procedure.¹ This first textbook on ReLACS summarizes the historical, technological, commercial, and early clinical aspects of laser assisted cataract surgery and how it can be used to enhance the visual outcomes and meet the expectations of patients seeking cataract surgery and a glasses-free result.

For a complete list of 2012 publications go to clevelandclinic.org/outcomes.


Kaiser PK. Choroidal imaging offers a new window on disease management: The technology is already in use for diagnosis and management of some conditions. Retina Today. 2012 Apr;60-63.


Selected Publications


Selected Publications


**Ophthalmology Research**


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

Institute Chairman
Daniel F. Martin, MD

Vice Chairman
Quality Review Officer
Andrew P. Schachat, MD

Vice Chairman, Education
Elias I. Traboulsi, MD

Surgical Outcomes Team
Peter K. Kaiser, MD
Monica Jain, MBBS, MHA

Comprehensive Ophthalmology
Richard E. Gans, MD
Philip N. Goldberg, MD
Martin A. Markowitz, MD
Shari Martyn, MD
Michael E. Millstein, MD
Sheldon M. Oberfeld, MD
Allen S. Roth, MD
David B. Sholiton, MD
Scott A. Wagenberg, MD

Cornea and External Disease
William J. Dupps Jr., MD, PhD
Jeffrey M. Goshe, MD
Roger H.S. Langston, MD
Martin A. Markowitz, MD
David M. Meisler, MD
Sheldon M. Oberfeld, MD
Allen S. Roth, MD
Scott A. Wagenberg, MD
Steven E. Wilson, MD

Glaucoma
Jonathan A. Eisengart, MD
Edward J. Rockwood, MD
Shalini Sood-Mendiratta, MD

Keratorefractive Surgery
William J. Dupps Jr., MD, PhD
Ronald R. Krueger, MD
Michael E. Millstein, MD
Allen S. Roth, MD
Steven E. Wilson, MD

Neuro-Ophthalmology
Gregory S. Kosmorsky, DO
Lisa D. Lystad, MD

Oculoplastics and Orbital Surgery
Julian D. Perry, MD
Ophthalmic Oncology
Arun D. Singh, MD

Pediatric Ophthalmology and Adult Strabismus
Fatema Ghasia, MD
Andreas Marcotty, MD
Paul Rychwalski, MD
Elias I. Traboulsi, MD

Vitreoretinal
Justis P. Ehlers, MD
Peter K. Kaiser, MD
Daniel F. Martin, MD
Andrew P. Schachat, MD
Jonathan E. Sears, MD
Rishi P. Singh, MD
Sunil K. Srivastava, MD
Alex Yuan, MD

Uveitis
Careen Y. Lowder, MD, PhD
Sunil K. Srivastava, MD

Optometry
David Barnhart, OD
Anita Chitluri, OD
Heather L. Cimino, OD
Robert Engel, OD
Reecha Kampani, OD
Rosemary Perl, OD
William E. Sax, OD
Mary Jo Stiegemeier, OD
Diane Tucker, OD

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Minzhong Yu, PhD

Ophthalmic Anesthesia
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Section Head
J. Victor Ryckman, MD
Sara Spagnuolo, MD
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General Patient Referral
24/7 hospital transfers or physician consults
800.553.5056

Cole Eye Institute Appointments
216.444.2020 or 800.223.2273, ext. 42020

Cole Eye Institute Referrals
216.444.2030 or 800.223.2273, ext. 42030

On the Web at clevelandclinic.org/eye

Additional Contact Information

General Information
216.444.2200

Hospital Patient Information
216.444.2000

General Patient Appointments
216.444.2273 or 800.223.2273

Referring Physician Center and Hotline
24/7 hotline to streamline access to our array of medical services and schedule patient appointments
855.REFER.123 (855.733.3712)

Or email refdr@ccf.org or visit clevelandclinic.org/refer123

Request for Medical Records
216.444.2640 or 800.223.2273, ext. 42640

Same-Day Appointments
216.444.CARE (2273)

Global Patient Services/International Center
Complimentary assistance for international patients and families
001.216.444.8184 or visit clevelandclinic.org/gps

Medical Concierge
Complimentary assistance for out-of-state patients and families
800.223.2273, ext. 55580, or email medicalconcierge@ccf.org

Cleveland Clinic Abu Dhabi
clevelandclinicabudhabi.ae

Cleveland Clinic Canada
888.507.6885

Cleveland Clinic Florida
866.293.7866

Cleveland Clinic Nevada
702.483.6000

For address corrections or changes, please call 800.890.2467
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216.444.2020

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25101 Chagrin Blvd.
Beachwood, OH 44122
216.831.0120

Cole Eye Institute,
Hillcrest Hospital
Atrium Medical Building
6770 Mayfield Road,
Suite 326
Mayfield Heights, OH
44124
440.461.4733

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

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

Twinsburg Family Health
and Surgery Center
8701 Darrow Road
Twinsburg, OH 44087
330.888.4000
Overview

Cleveland Clinic is an academic medical center offering patient care services supported by research and education in a nonprofit group practice setting. More than 3,000 Cleveland Clinic staff physicians and scientists in 120 medical specialties care for more than 5 million patients across the system, performing more than 200,000 surgeries and conducting 450,000 Emergency Department visits. Patients come to Cleveland Clinic from all 50 states and more than 132 nations around the world.

Cleveland Clinic is an integrated healthcare delivery system with local, national, and international reach. The main campus in midtown Cleveland, Ohio, has a 1,450-bed hospital, outpatient clinic, specialty institutes, labs, classrooms, and research facilities in 46 buildings on 167 acres. Cleveland Clinic patients represent the highest CMS case-mix index in the nation. Cleveland Clinic encompasses 75 northern Ohio outpatient locations, including 16 full-service family health centers, eight community hospitals, an affiliate hospital, and a rehabilitation hospital for children. Cleveland Clinic also includes Cleveland Clinic Florida, Cleveland Clinic Lou Ruvo Center for Brain Health in Las Vegas, Cleveland Clinic Canada, and Sheikh Khalifa Medical City (management contract). Cleveland Clinic Abu Dhabi is a full-service hospital and outpatient center in the United Arab Emirates scheduled to begin offering services in 2014. Cleveland Clinic is the second-largest employer in Ohio with nearly 44,000 employees. It generates $10.5 billion of economic activity a year.

The Cleveland Clinic Model

Cleveland Clinic was founded in 1921 by four physicians who had served in World War I and hoped to replicate the organizational efficiency of military medicine. The organization has grown through the years by adhering to the model set forth by the founders. All Cleveland Clinic staff physicians receive a straight salary with no bonuses or other financial incentives. The hospital and physicians share a financial interest in controlling costs, and profits are reinvested in research and education.

The Cleveland Clinic system began to grow in 1987 with the founding of Cleveland Clinic Florida and expanded in the 1990s with the development of 16 family health centers across Northeast Ohio. Fairview Hospital, Hillcrest Hospital, and six other community hospitals joined Cleveland Clinic over the past decade and a half, offering Cleveland Clinic institute services in heart and neurological care, physical rehabilitation, and more. Clinical and support services were reorganized into 27 patient-centered institutes beginning in 2007. Institutes combine medical and surgical specialists around specific diseases or body systems under single leadership and in a shared location to provide optimal team care for every patient. Institutes work with the Office of Patient Experience to give every patient the best outcome and experience.
**Cleveland Clinic Lerner Research Institute**

At the Lerner Research Institute, hundreds of principal investigators, project scientists, research associates, and postdoctoral fellows are involved in laboratory-based translational and clinical research. Total research expenditures from external and internal sources exceeded $265 million in 2012. Research programs include cardiovascular, oncology, neurology, musculoskeletal, allergy and immunology, ophthalmology, metabolism, and infectious diseases.

**Cleveland Clinic Lerner College of Medicine**

Lerner College of Medicine of Case Western Reserve University, which celebrated its 10th anniversary in 2012, is known for its small class size, unique curriculum, and full-tuition scholarships for all students. The program is open to 32 students who are preparing to be physician investigators.

**Graduate Medical Education**

In 2012, nearly 1,800 residents and fellows trained at Cleveland Clinic and Cleveland Clinic Florida, which is part of a continuing upward trend.

**U.S. News & World Report Ranking**

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 in the nation since 1995. In 2012, Cleveland Clinic’s urology and nephrology programs were both ranked No. 1 in the nation.

For more information about Cleveland Clinic, please visit [clevelandclinic.org](http://clevelandclinic.org).
Referring Physician Center and Hotline
24/7 hotline to streamline access to our array of medical services and schedule patient appointments, call 855.REFER.123 (855.733.3712), email refdr@ccf.org, or visit clevelandclinic.org/refer123

Remote Consults
Online medical second opinions from Cleveland Clinic's MyConsult® are particularly valuable for patients who wish to avoid the time and expense of travel. Cleveland Clinic offers online medical second opinions for more than 1,200 life-threatening and life-altering diagnoses. For more information, visit clevelandclinic.org/myconsult, email eclevelandclinic@ccf.org, or call 800.223.2273, ext. 43223.

Request Medical Records
216.444.2640 or 800.223.2273, ext. 42640

Track Your Patients' Care Online
DrConnect® offers referring physicians secure access to their patients' treatment progress while at Cleveland Clinic. To establish a DrConnect account, visit clevelandclinic.org/drconnect or email drconnect@ccf.org.

Medical Records Online
Cleveland Clinic continues to expand and improve electronic medical records (EMRs) to provide faster, more efficient, and more accurate care by sharing patient data through a highly secure network. Patients using MyChart® can renew prescriptions and review test results and medications from their personal computers. MyChart provides a link to Microsoft HealthVault, a free online service that helps patients securely gather and store health information. It connects to Cleveland Clinic's social media and Internet site, currently the most visited hospital website in America. For more information, visit clevelandclinic.org/mychart.

Critical Care Transport Worldwide
Cleveland Clinic's critical care transport team and fleet of mobile ICU vehicles, helicopters, and fixed-wing aircraft serve critically ill and highly complex patients across the globe.

To arrange a transfer for STEMI (ST elevated myocardial infarction), acute stroke, ICH (intracerebral hemorrhage), SAH (subarachnoid hemorrhage), or aortic syndrome, call 877.379.CODE (2633).

For all other critical care transfers, call 216.444.8302 or 800.553.5056.

CME Opportunities: Live and Online
Cleveland Clinic's Center for Continuing Education operates one of the largest and most successful CME programs in the country. The center's website (ccfcme.org) is an educational resource for healthcare providers and the public. Available 24/7, it houses programs that cover topics in 30 areas.

Among other resources, the website contains a virtual textbook of medicine (Disease Management Project) and myCME, a system for physicians to manage their CME portfolios. Live courses, however, remain the backbone of the center's CME operation. Most live courses are held in Cleveland, but outreach plans are underway.
Clinical Trials

Since its establishment in 1921, Cleveland Clinic has been an innovator in medical breakthroughs, with a mission of unlocking basic science and pursuing clinical research. Today, Cleveland Clinic is running more than 2,000 clinical trials of various types. Our researchers are focusing on an array of conditions, including breast and liver cancer, coronary artery disease, heart failure, epilepsy, Parkinson disease, chronic obstructive pulmonary disease, asthma, high blood pressure, diabetes, depression, and eating disorders. To learn more, go to clevelandclinic.org/research.

Healthcare Executive Education

Cleveland Clinic's dynamic executive education program provides real-world insights into the highly competitive business of healthcare. The Executive Visitors' Program is an intensive three-day program that provides a behind-the-scenes view of our organization for the busy executive. The Samson Global Leadership Academy is a two-week immersion into the challenges of leadership, management, and innovation. The curriculum includes coaching and a personalized three-year leadership development plan. Learn more at clevelandclinic.org/execed.
This project would not have been possible without the commitment and expertise of a team led by Peter K. Kaiser, MD, and Monica Jain, MBBS, MHA.

Graphic design and photography were provided by Cleveland Clinic’s Center for Medical Art and Photography.
Cleveland Clinic

Every life deserves world class care.