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
what’s inside

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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 present the annual Outcomes book for Cleveland Clinic’s Dermatology & Plastic Surgery Institute. This review of 2012 captures the institute’s year in data and treatment trends to share with referring physicians, alumni, potential patients, and other individuals around the nation interested in dermatology and plastic surgery. It is an outgrowth of the work of the institute’s Quality and Compliance Committee, which continues to meet regularly to guide our quality improvement and efficiency efforts.

This past year was one of continued growth. We added five full-time physicians and increased access to our services at locations throughout Northeast Ohio. We expanded our newest collaborative programs, including the Photodynamic Therapy Center, Cosmetic and Plastic Surgery Center, Center for Reconstructive Transplantation, and Multicultural Skin Center. We launched innovative services, such as a clinic for skin cancer in organ transplant patients and a multidisciplinary wound care service, and conducted groundbreaking research, which included our finding that stimulation of the sphenopalatine ganglion can stop cluster migraine headaches 70 percent of the time.
In 2012, there also were many exciting achievements in our institute, including:

- Acquiring a MelaFind® skin imaging device (MELA Sciences, Irvington, N.Y.), which categorizes lesions as being low- or high-risk for dysplasia or melanoma
- Logging three international mission trips totaling 45 vacation days, and more than 400 volunteer hours in Northeast Ohio
- Receiving approval from the Accreditation Council for Graduate Medical Education to increase our number of residents by one resident per year for the next three years
- Authoring 127 publications
- Increasing our research revenue by 26 percent from 2011

On behalf of my colleagues, I hope this edition of the Dermatology & Plastic Surgery Institute Outcomes book proves a valuable resource for detailing our services and the high-quality patient outcomes to which our institute is committed.

Respectfully,

Frank A. Papay, MD, FACS, FAAP
Chairman, Dermatology & Plastic Surgery Institute
As one of the largest academic dermatology and plastic surgery practices in the nation, Cleveland Clinic’s Dermatology & Plastic Surgery Institute offers patients a full range of dermatologic, reconstructive, and aesthetic services.

The institute includes the Department of Dermatology, with 36 dermatologists who offer a full array of subspecialized care for adult and pediatric patients, and the Department of Plastic Surgery, including 17 plastic surgeons with significant expertise in all areas of aesthetic and reconstructive plastic surgery.

The Dermatology & Plastic Surgery Institute continues to benefit from the integration five years ago of its two subspecialties into a single institute. This model of care takes advantage of the collective expertise of the institute’s two component departments, using a collaborative approach that promotes comprehensive, patient-focused care while creating broad new research and educational opportunities. This integration also has allowed continued growth through the acquisition of new regional markets throughout Northeast Ohio.

Following two years of unprecedented growth in clinical staff, the institute continued to add to its ranks in 2012 with five new full-time staff. This resulted in a 6 percent increase in total patient visits and shorter wait times for appointments.
Dermatology

Cleveland Clinic’s Department of Dermatology provides expertise in the diagnosis and management of the full spectrum of dermatologic conditions. It also offers a wide range of services in cosmetic evaluation and surgical procedures.

Last year saw an increased volume of Mohs surgery skin cancer cases. Eight Mohs surgeons performed 3,050 procedures at five sites — making it one of the largest academic Mohs surgery practices in the nation.

The Photodynamic Therapy Clinic continues to grow and is conducting NIH-funded research in two projects for skin cancer and precancers. The volume and demand for photodynamic therapy has increased in recent years, prompting the department to purchase photodynamic therapy units for regional locations.

In 2012, the department also launched a new clinic for skin cancer in organ transplant patients and acquired a MelaFind® diagnostic system (MELA Sciences, Irvington, N.Y.). This device, which will go into clinical use in 2013, takes images of clinically suspicious pigmented lesions using 10 wavelengths of light, compares the images to a bank of 10,000 benign and malignant pigmented lesions, and categorizes the lesions as being low- or high-risk for dysplasia or melanoma.

The Department of Dermatology continues to expand community access to its care with additional clinic hours, including Saturdays, at community healthcare centers. It further served the community through multiple free skin cancer screenings, active participation in National Skin Cancer Week activities, staff presentations at community health talks, and provision of medical missionary assistance in developing nations.

To address the medical, surgical, and cosmetic needs of populations with greater skin pigmentation (skin types IV to VI), the Multicultural Skin Center — one of a few such programs nationally — focuses on improving treatment outcomes for skin conditions that disproportionately affect Asian, black, Arab, and Hispanic patients.
Institute Overview

Plastic Surgery

Cleveland Clinic’s Department of Plastic Surgery is one of the largest plastic surgery programs in the country. The “vertical” organization of its staff, which ensures that each surgeon has a specific area of clinical focus, provides patients with deep expertise in virtually all areas of aesthetic and reconstructive surgery. Surgeons’ close collaboration with their dermatology colleagues within the broader institute yields synergies in the areas of aesthetic facial plastic surgery, oculoplastic surgery, and cosmetic dermatology.

The Center for Reconstructive Transplantation brings together plastic surgeons and other medical and surgical specialists from across Cleveland Clinic to care for patients with deformities resulting from congenital abnormalities, traumatic injury, or cancer surgery. This center is dedicated to restoring function and improving performance for patients who need reconstruction of difficult facial, head and neck, abdominal, breast, laryngeal, or hand deformities and dysfunction as well as providing wound repair.

Specialists in the Cosmetic and Plastic Surgery Center perform facial cosmetic, breast, and body contouring procedures at nine regional locations. In facial cosmetic surgery, the center has a particular focus on minimally invasive techniques and objectively measures and publishes its results.

In the area of reconstructive breast surgery, the Department of Plastic Surgery is one of the few U.S. centers that performs large numbers of deep inferior epigastric perforator flap procedures along with the spectrum of other immediate and delayed reconstructive procedure options.

In 2012, the department continued to expand its practices in the new family health centers and at suburban hospital locations. For the first time, outpatient plastic surgery services are available at Twinsburg Family Health and Surgery Center and Fairview Hospital, and services have been expanded at family health centers in Strongsville and Avon. On the inpatient side, services have been added at Fairview and Hillcrest hospitals.

In addition, patients now have the opportunity to obtain a cosmetic consult without leaving their homes. Through the combined efforts of Plastic Surgery and Dermatology, an eConsult analysis including hospital photography is possible for patients anywhere in the United States and beyond.

Looking Ahead

Given its successful growth in 2012 in patient care, management, finance, education, and research, the Dermatology & Plastic Surgery Institute is well-prepared to further its regional growth and will apply current innovations in treating and managing patients with dermatological and plastic surgery problems in 2013.
Patient Visit Volume
2008 – 2012

Patient Encounters

Mohs Micrographic Surgery
2008 – 2012

Procedures

Phototherapy/Ultraviolet Light Treatments
2008 – 2012

Volume

Dermatology & Plastic Surgery Institute
Institute Overview

Facial Cosmetic Surgeries
2008 – 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Face/Necklift</th>
<th>Browlift</th>
<th>Blepharoplasty</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Primary and Secondary Rhinoplasty
2008 – 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>2009</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Cosmetic Breast Surgery
2008 – 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Breast Reduction</th>
<th>Breast Augmentation</th>
<th>Mastopexy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>400</td>
<td>200</td>
<td>20</td>
</tr>
<tr>
<td>2009</td>
<td>300</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>200</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>100</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Body Contouring
2008 – 2012

Breast Reconstruction
2008 – 2012

Endoscopic and Open Carpal Tunnel Surgery
2009 – 2012

*Transverse rectus abdominis myocutaneous
**Deep inferior epigastric perforator flap
Cleveland Clinic's large population of malignant melanoma patients can receive evaluation and treatment in one location from a multidisciplinary melanoma clinic staff comprising dermatologists, surgeons, oncologists, and radiation oncologists. This approach ensures the best and most efficient care while enhancing patient convenience. Melanoma survival outcomes data from Cleveland Clinic's melanoma registry compare favorably with nationally published data and, in some instances, show a better survival rate than that documented in large studies. The availability of melanoma drugs approved in 2011 is expected to result in even higher survival rates among Dermatology & Plastic Surgery Institute melanoma patients.

**Percentage of Patients With No Local Recurrence One Year After Cutaneous Melanoma Diagnosis and Excision (N = 1,549)**

2003 – 2011

<table>
<thead>
<tr>
<th>T Stage</th>
<th>Percent</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td>610</td>
</tr>
<tr>
<td>I</td>
<td>97.8%</td>
<td>538</td>
</tr>
<tr>
<td>II</td>
<td>99.4%</td>
<td>203</td>
</tr>
<tr>
<td>III</td>
<td>96.8%</td>
<td>109</td>
</tr>
<tr>
<td>IV</td>
<td>96.7%</td>
<td>89</td>
</tr>
</tbody>
</table>

Early-stage melanoma is primarily treated surgically. The incidence of local recurrence after surgery using approaches standardized at Cleveland Clinic reveals excellent outcomes. The T stage is based on depth of invasion. In all groups, the primary tumor was controlled in 95% to 99% of patients after one year.
Survival outcomes for those in the early stages of melanoma show that when nonmelanoma causes of death (disease-free survival) are excluded, survival was between 98% and 100%.
The overall survival rate for Cleveland Clinic patients with stage IIA disease is higher than that reported nationally.\(^1\)

Cleveland Clinic overall survival outcomes among patients with higher stages of malignant melanoma at diagnosis are comparable to those reported in national databases.
A deep, nodular, T4 malignant melanoma before successful treatment (ruler indicates centimeters)

National Quality Measures for Staging of Cutaneous Malignant Melanoma

The seventh edition of the American Joint Committee on Cancer’s Cancer Staging Manual defines and describes the staging of malignant melanomas of the skin. The institute reported the following quality measures for all primary malignant melanoma specimens processed by the Dermatopathology Section at Cleveland Clinic’s main campus in 2012:

- 125/130 (96%) of primary cutaneous melanoma pathology reports listed pT category.
- 126/130 (97%) of primary cutaneous malignant melanoma pathology reports included a statement on thickness.
- 125/130 (96%) of primary cutaneous melanoma pathology report cases included information on ulceration.
- 82/83 (99%) of primary cutaneous melanoma pathology reports for pT1 tumor staging listed mitotic rate.

Reference

Breast Reconstruction

Although current breast reconstruction techniques have advanced, most procedures still require a multistep process. An initial breast reconstruction using implants usually begins with placement of a tissue expander under the pectoralis muscle following mastectomy. The tissue expander creates the space for implant placement during a future reconstructive process.

A single-step breast reconstruction immediately after mastectomy is now possible, eliminating the need for initial tissue expansion. Candidates for this technique are those undergoing skin-sparing or nipple-sparing mastectomies requiring minimal excision. With maximal skin preservation, the breast contour and size can be immediately restored by placing the final implant with a biologic matrix that supports the lower lateral portions of the implant.

This single-stage implant breast reconstruction offers several advantages to Dermatology & Plastic Surgery Institute patients. In addition to obviating the creation of an implant pocket with a separate tissue expansion surgery, this procedure enables better implant positioning, better control of the mastectomy space and inframammary fold, and better overall cosmetic outcomes. Therefore, patients undergo one less surgery, require fewer postoperative office visits, and can recover and return to work sooner.

This 52-year-old patient carries the BRCA gene mutation for breast cancer and underwent prophylactic bilateral mastectomies. Both reconstructions were performed using a single-stage technique with immediate silicone implant placement and a dermal matrix.

A 39-year-old patient had previous bilateral breast augmentation and mastopexy and was later diagnosed with cancer in the right breast. The patient opted to undergo bilateral mastectomies followed by single-stage breast reconstructions with immediate silicone implant placement and dermal matrix support.
Facelift and Chemical Peel

Although a facelift is an effective means of addressing facial aging, it is generally accepted that the procedure has little effect on the wrinkles around the mouth. Combining facelift surgery with a chemical peel is effective for both central tightening and reducing these wrinkles.

Department of Plastic Surgery patients scheduled for facelift surgery are evaluated for the severity of wrinkles around the mouth, and a chemical peel is offered to appropriate candidates. The regional chemical peel is performed at the time of surgery, and typical healing time is seven to 10 days. From 2001 through 2012, 47 patients underwent simultaneous facelift and chemical peel procedures. Between 2006 and 2012, photographic evaluations were done for 20 patients who consented to use of their photographs for research purposes. Results of the combined technique were reviewed using the following measures:

- **Validated patient satisfaction survey**: A patient satisfaction survey was mailed to patients. Overall satisfaction was rated at 6.5 on a 1-to-7 scale, with higher scores indicating greater satisfaction. All individual survey items received a mean score above 5, indicating “satisfied” or “very satisfied.”

- **Apparent age evaluation**: A photo book was created with randomly mixed preoperative and postoperative photographs. The photographs were shown to six independent reviewers who were asked to estimate the ages of the patients. The apparent age (as estimated by reviewers) was then compared with actual patient age. Mean preoperative apparent age assessment was quite accurate, with no significant difference between the real age and the apparent age ($P = 0.133$). However, mean postoperative apparent age estimate was 8.2 years younger than real age ($P = 0.0002$).

- **Wrinkle evaluation**: A second photo book was created with randomly mixed preoperative and postoperative close-up photographs. Improvement in wrinkles around the mouth was evaluated by two independent plastic surgeons using an objective wrinkle classification of 1 to 4, with a higher classification signifying more severe wrinkles. The mean preoperative wrinkle score of 3.3 was reduced to 2.15 postoperatively.

These findings reveal that combining the facelift with chemical peeling around the mouth is a powerful technique. Patient satisfaction is high; there is wrinkle improvement and a significant reduction in apparent age.
Facelift and Chemical Peel

Comparison of Actual and Apparent Age ($N = 20$)

2006 – 2012

Age (Years)

<table>
<thead>
<tr>
<th>Age (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>55</td>
</tr>
<tr>
<td>50</td>
</tr>
</tbody>
</table>

Before Facelift

After Facelift

A 63-year-old patient before (left) and 13 months after (right) undergoing a facelift combined with chemical peel and lipofilling.

Preoperative (left) and 11 months postoperative (right) views of a 64-year-old patient who underwent a facelift combined with chemical peel, endoscopic browlift, and lipofilling.

Outcomes 2012
Graves ophthalmopathy is a chronic, multisystem autoimmune disorder characterized by increased volume of intraorbital fat and hypertrophic extraocular muscles. Clinical findings of proptosis, impaired ocular motility, diplopia, lid retraction, and impaired visual acuity are treated with orbital decompression and fat reduction. Surgeons at the Dermatology & Plastic Surgery Institute also perform skeletal augmentation to further improve periorbital aesthetics in severe cases.

Skeletal augmentation was performed on six Graves ophthalmopathy patients (five females, one male, 12 eyes) from 2010 to 2012. A balanced orbital decompression was executed to remove the medial and lateral walls and medial floor. Intraorbital fat was excised. All patients underwent placement of porous polyethylene infraorbital rim implants followed by midface soft tissue elevation, to increase inferior orbital rim projection and improve globe-cheek relationship.

Outcomes were evaluated for improvement of proptosis, diplopia, dry eye symptoms, and cosmetic satisfaction. Postoperative follow-up ranged from 0.5 to 2.5 years (median 1.5 years). The mean protrusion improvement in Hertel exophthalmometer measurement was 5.2 mm. Diplopia resolved completely in two out of six (33%) cases, and none of the patients experienced worsening diplopia. Five out of six patients (83%) were able to discontinue or greatly decrease the use of eye lubricants postoperatively. All patients reported cosmetic satisfaction. One patient suffered temporary paresthesia of the inferior orbital nerve. There were no infections, hematomas, or ocular complications. Balanced orbital decompression with infraorbital rim implants is reliable, effective, and safe, with good cosmetic results.

A 56-year-old female presented with significant Graves ophthalmopathy and epiphora. Preoperative and 18-month postoperative Hertel exophthalmometer measurements were 27 mm (R), 26 mm (L), and 21 mm (R), 21 mm (L), respectively. Preoperative frontal and profile views are shown at left, and 18-month postoperative frontal and profile views are shown at right.
More than 1 million lower extremity total joint replacements are completed annually in the United States, the majority for complications of osteoarthritis. Most implants are metal alloys and some contain nickel, which is the leading cause of metal-associated contact allergies, affecting approximately 19% of patients evaluated with patch testing. Although the prevalence of contact allergy to metals is high, hypersensitivity complications associated with metal implants have been reported to be less than 0.1%. Potential allergic complications after implantation of orthopaedic metal devices are cutaneous eruptions, chronic joint pain, edema, joint loosening, and joint failure.

Dermatology & Plastic Surgery Institute specialists and others have proposed objective criteria supporting a causative association between metal release from an orthopaedic implant, metal allergy, and dermatitis in the area overlying an implant. However, the clinical decision-making process remains difficult.

Patients are frequently referred to the Department of Dermatology when implant problems develop, to rule out metal-related hypersensitivity reactions. Dermatologists commonly rely on patch testing to evaluate these patients.

Institute dermatologists aimed to determine the effect of patch testing on surgical decision-making and outcomes in patients evaluated for suspected metal allergy related to implants in bones or joints. Surgeons’ preoperative choice of metal implant alloy was compared with patch testing results and the presence of postsurgical hypersensitivity complications related to the metal implant at follow-up.

Patients with potential metal hypersensitivity from implanted devices (N = 72) were divided into two groups depending on the timing of their patch testing. In the preimplantation group (N = 31), 21 patients had positive patch test results that influenced the referring surgeon’s decision-making. In the postimplantation group (N = 41), the referring surgeons recommended patch testing after excluding periprosthetic complications such as infection and mechanical failure. The most common reason for patch testing in this group was chronic pain at the implant site. Ten of these patients had at least one relevant positive patch test for a metal that was a component of their implant, and in six patients removal of the device was followed by resolution of the associated symptoms.

These data support a role for patch testing in patients with putative allergy to metal implants. A decision on whether to remove an implanted device after positive patch test results should be made on a case-by-case basis following discussions with the patient, surgeon, and dermatologist.

## Effects of Positive Metal Patch Tests on Orthopaedic Surgeons’ Preoperative Implant Choice and Postimplant Complications

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N = 21 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Allergen Avoided</td>
<td>21 (100)</td>
</tr>
<tr>
<td>Alternative Implant Chosen</td>
<td>13 (62)</td>
</tr>
<tr>
<td>Implant Alloy Used</td>
<td></td>
</tr>
<tr>
<td>Titanium</td>
<td>11 (52)</td>
</tr>
<tr>
<td>Zirconium</td>
<td>10 (48)</td>
</tr>
<tr>
<td>Complications Postimplantation</td>
<td></td>
</tr>
<tr>
<td>Suture Reaction</td>
<td>2 (10)</td>
</tr>
<tr>
<td>Nonspecific Joint Pain</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Arthrofibrosis</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Scar Contracture</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Dermatitis</td>
<td>0</td>
</tr>
<tr>
<td>Early Joint Loosening</td>
<td>0</td>
</tr>
<tr>
<td>Median Postoperative Follow-up, Months (range)</td>
<td>12 (1.5–71)</td>
</tr>
</tbody>
</table>
### Postimplantation Details on Patients With Clinically Relevant Patch Tests Indicating Metal Sensitivity

<table>
<thead>
<tr>
<th>Implant Type (Material)</th>
<th>Symptoms/Signs</th>
<th>Relevant Metal</th>
<th>Implant Removal/Revision</th>
<th>Outcome (Months After Revision)</th>
<th>Total Follow-up After First Operation, Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibular Plate (Stainless Steel)</td>
<td>Dermatitis, edema</td>
<td>Nickel</td>
<td>Device removed</td>
<td>Dermatitis and edema resolved (54)</td>
<td>62</td>
</tr>
<tr>
<td>Nuss Bar (Stainless Steel)</td>
<td>Dermatitis</td>
<td>Nickel</td>
<td>Device removed</td>
<td>Dermatitis resolved (1)</td>
<td>23</td>
</tr>
<tr>
<td>Spinal Fusion Rod (Stainless Steel)</td>
<td>Dermatitis, impaired wound healing</td>
<td>Nickel</td>
<td>Device removed</td>
<td>Dermatitis resolved, wound healed (46)</td>
<td>58</td>
</tr>
<tr>
<td>Total Knee Arthroplasty (Fem/Tib: Co-Cr-Mo)</td>
<td>Joint pain, joint loosening</td>
<td>Chromium</td>
<td>Revision with oxidized zirconium-niobium</td>
<td>Joint pain, joint loosening resolved (14)</td>
<td>38</td>
</tr>
<tr>
<td>Shoulder Arthroplasty (Metaglene/Screw: Ti-6 Al-4V; Hum/Glen: Stainless Steel)</td>
<td>Joint pain, joint loosening</td>
<td>Nickel</td>
<td>Revision with nickel-free titanium</td>
<td>Joint pain, joint loosening resolved (12)</td>
<td>36</td>
</tr>
<tr>
<td>Total Hip Arthroplasty (Acet: Ti-6 Al-4V; Fem: Co-Cr-Mo; Insert: Polyethylene)</td>
<td>Joint pain, joint loosening</td>
<td>Nickel</td>
<td>Revision with oxidized zirconium-niobium</td>
<td>Joint pain, joint loosening resolved (1.5)</td>
<td>38</td>
</tr>
</tbody>
</table>

**Key:** Acet = acetabular component; Al = aluminum; Co = cobalt; Cr = chromium; Fem = femoral component; Glen = glenosphere; Hum = humeral component; Mo = molybdenum; Ti = titanium; Tib = tibial component; V = vanadium
Onabotulinum Toxin A Treatment of Primary Focal Hyperhidrosis

Primary focal hyperhidrosis (PFH) is defined as focal, visible, excessive sweating of at least six months’ duration plus at least two of the following six criteria:

- Bilateral and relatively symmetrical distribution
- Impairment of daily activities
- Frequency of at least one episode per week
- Age of onset < 25
- Positive family history
- Cessation of focal sweating during sleep

PFH affects close to 3% of the U.S. population and occurs equally in both sexes, though women more commonly seek treatment. The age of onset can vary anywhere from childhood to early adolescence, and the condition tends to progress toward spontaneous regression. A strong family history of PFH predisposes affected individuals to earlier onset of symptoms.

The axilla is the most commonly affected site, followed by the soles, palms, face, and other areas (trunk, genitals, and lower extremities). Among patients with axillary hyperhidrosis (HH), 81% also note HH in other areas. Typically, presentation is symmetrical but may be unilateral.

PFH unduly burdens those affected. Symptoms such as bacterial or fungal overgrowth, eczematous dermatitis, and muscle cramps in affected areas may complicate the condition, which already affects quality of life and psychosocial well-being.

### Hyperhidrosis Disease Severity Scale

<table>
<thead>
<tr>
<th>Hyperhidrosis Disease Severity Scale</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>My sweating is never noticeable and never interferes with my daily activities.</td>
<td>1 (mild)</td>
</tr>
<tr>
<td>My sweating is tolerable but sometimes interferes with my daily activities.</td>
<td>2 (moderate)</td>
</tr>
<tr>
<td>My sweating is barely tolerable and frequently interferes with my daily activities.</td>
<td>3 (severe)</td>
</tr>
<tr>
<td>My sweating is intolerable and always interferes with my daily activities.</td>
<td>4 (severe)</td>
</tr>
</tbody>
</table>

The Hyperhidrosis Disease Severity Scale (HDSS) is a quick and practical way of measuring interference with daily activities and may be used for diagnosis and follow-up. The HDSS may also be used to assess treatment success. A one- or two-point drop in score from a baseline severe score (HDSS 3 or 4) or a one-point reduction from a baseline mild or moderate score (HDSS 1 or 2) indicates successful treatment. Treatment failure is defined as no change in the HDSS score.
Positive Minor starch-iodine test before onabotulinum toxin A injections

Negative Minor starch-iodine test one week after treatment with onabotulinum toxin A

Treatment options for PFH include topical antiperspirants, over-the-counter and prescription-strength preparations containing aluminum chloride or formaldehyde, oral glycopyrrolate, and iontophoresis. Surgical options include tissue excision, liposuction, or curettage of the eccrine glands, and endoscopic thoracic sympathectomy.

Onabotulinum toxin A injection is FDA-approved for the treatment of severe focal axillary HH. No serious adverse events have been reported, but pain and bleeding at the injection site are to be expected. A perceived increase in compensatory sweating from nonaxillary regions after treatment has been reported.

Onabotulinum toxin A injections may also be used to treat PFH of the palms, soles, and craniofacial and inguinal regions. Injection site pain is the biggest challenge when treating the palms and soles; a combination of topical anesthesia, ice, and pressure helps to alleviate it. In addition to pain and bleeding at the injection site, self-limited and reversible muscle weakness resulting from toxin diffusion to the underlying musculature (e.g., lumbricals, frontalis) has been reported.

Treatment response can be seen within a week of an injection session and lasts anywhere from three to 12 months or more before an unacceptable level of sweating recurs. Onabotulinum toxin A injections for PFH have been very successful and life-altering for almost all patients, with the resulting anhidrosis far outweighing the minimal side effects associated with injections.

The Minor starch-iodine test is a colorimetric reaction that occurs between the iodine/starch combination and eccrine sweat. It is useful in delineating areas of PFH involvement and also provides a qualitative measure for evaluating treatment response.
Hyperhidrosis

This graph shows the total number of Dermatology & Plastic Surgery Institute patients treated annually with onabotulinum toxin A for PFH.

**Onabotulinum Toxin A for Primary Focal Hyperhidrosis (N = 347)**

2006 – 2012

**Number of Patients**

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
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<tr>
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<td>0</td>
<td>10</td>
<td>20</td>
<td>40</td>
<td>80</td>
<td>90</td>
<td>120</td>
</tr>
</tbody>
</table>
The following graph shows the number of onabotulinum toxin A injections administered each year by body area. The axilla is the most commonly treated site. The number of treatments is more than the number of patients, reflecting additional injections administered after HH returned.

**Onabotulinum Toxin A for Primary Focal Hyperhidrosis (N = 594)**

2006 – 2012

Number of Treatments

<table>
<thead>
<tr>
<th>Year</th>
<th>Inguinal Region</th>
<th>Craniofacial</th>
<th>Soles</th>
<th>Palms</th>
<th>Axilla</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2</td>
<td>11</td>
<td>33</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2008</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>123</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>165</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2011</td>
<td>194</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References


Psoriasis is a chronic skin disorder characterized by erythematous papules and plaques with a silver scale that may affect children and adolescents but occurs primarily in adults. The exact cause has not been identified, but the disorder may be due to a combination of immunologic, genetic, and environmental factors.

Between September 2011 and September 2012, 585 psoriasis patients presented to the institute's Department of Dermatology; of these, 204 met the outcomes inclusion criteria of being new psoriasis patients with at least one follow-up. The female-to-male ratio was 1.5-to-1 — higher than the expected 1-to-1 ratio — which may reflect an increased desire among women to seek treatment for a cosmetically bothersome problem. The mean age at presentation was 43 years and ranged from 5 months to 89 years. Pediatric patients ages 0 to 18 years accounted for 17% of this new patient population.

Plaque psoriasis was the most common subtype (56%) seen in Cleveland Clinic patients, followed by scalp, guttate, and inverse psoriasis. This distribution is similar to that reported in the literature.
All newly diagnosed Cleveland Clinic patients were classified by disease severity, as presented in the following table:

<table>
<thead>
<tr>
<th>Severity</th>
<th>Body Surface Area Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>&lt; 3%</td>
</tr>
<tr>
<td>Moderate</td>
<td>3%–10%</td>
</tr>
<tr>
<td>Severe</td>
<td>&gt; 10%</td>
</tr>
</tbody>
</table>

Source: National Psoriasis Foundation
Psoriasis

This graph illustrates the percentage of newly diagnosed Cleveland Clinic patients who were classified in each severity category.

Psoriasis Severity (N = 204)
September 2011 – September 2012

Up to one-third of psoriasis patients also have psoriatic arthritis, a condition that causes joint pain and swelling. Cutaneous signs usually develop first, and only about 15% of patients develop arthritis before skin symptoms. Among Cleveland Clinic psoriasis patients, 22% had documented psoriatic arthritis.

Recent studies have found an association between psoriasis and metabolic syndrome. Statistics have varied, with some studies showing that up to 40% of psoriasis patients have metabolic syndrome and, consequently, a higher risk of developing cardiovascular disease. Similar data specific to the Northeast Ohio population do not exist; staff aimed to identify the percentage of psoriasis patients seen at the institute who suffer from this comorbid condition. Only adult patients were included in this analysis.

A chart review of 127 psoriasis patients who had Cleveland Clinic laboratory investigations was conducted to evaluate patients for metabolic syndrome according to the International Diabetes Federation definition. Patients with central obesity, defined as a body mass index > 30 kg/m² or a waist circumference exceeding ethnicity-specific values, were classified as having metabolic syndrome if two or more of the following were also present:

- Triglycerides ≥ 150 mg/dL, or taking a specific treatment for this lipid abnormality
- HDL cholesterol < 40 mg/dL in males or < 50 mg/dL in females, or taking a specific treatment for this lipid abnormality
- Elevated blood pressure of 130 mm Hg systolic or ≥ 85 mm Hg diastolic, or current treatment of previously diagnosed hypertension
- Fasting plasma glucose ≥ 100 mg/dL, or previously diagnosed Type 2 diabetes

A 53-year-old female patient with psoriasis and psoriatic arthritis
The analysis demonstrated that 54% of newly diagnosed psoriasis patients also suffered from metabolic syndrome, which is a higher percentage than documented in most studies. Because psoriasis may serve as a marker for increased risk of cardiovascular morbidity and mortality, it is important to evaluate patients for this essential comorbidity.

Psoriasis Patients Aged > 18 Years With Metabolic Syndrome (N = 127)
September 2011 – September 2012

Psoriasis Treatment
Psoriasis is not curable, but available treatments can reduce the bothersome symptoms and appearance of the disease. Treatment selection depends on disease severity, cost and convenience, and a patient's response. A combination of therapies is often recommended. The chart below shows the different psoriasis treatments used by Cleveland Clinic dermatologists and the percentage of patients receiving each type of treatment.

Psoriasis Patients Aged > 18 Years With Metabolic Syndrome (N = 127)
September 2011 – September 2012

**KEY**

**Topicals:** topical corticosteroids, topical vitamin D3 preparations (calcipotriene and calcitriol), coal tar, anthralin, topical retinoids (tazarotene), salicylic acid, calcineurin inhibitors

**Systemic:** methotrexate, cyclosporin, acitretin, mycophenolate mofetil, prednisone, hydroxyurea, azathioprine

**Biologics:** infliximab (Remicade®), adalimumab (Humira®), etanercept (Enbrel®), ustekinumab (Stelara®), alefacept (Amevive®)

**Phototherapy:** narrowband ultraviolet B light, psoralen plus ultraviolet A radiation

*Patients given a combination of topical and systemic therapy were included in the systemic therapy group.*
The graphs below illustrate the percentage improvement associated with each type of treatment for each level of psoriasis severity. Improvement was based on a composite of physician and patient global assessment of disease activity and severity.

For mild disease, the use of topical medications is often enough. The success rate for all treatments used in patients with mild psoriasis is high.

**Mild Psoriasis Patients Improved by Treatment Type (N = 103)**
September 2011 – September 2012

*Patients given a combination of topical and systemic therapy were included in the systemic therapy group.*

For patients with moderate psoriasis, a combination of topical treatments and systemic therapy is most often given. Treatment outcomes for this class of patients are shown on page 31.
Moderate Psoriasis Patients Improved by Treatment Type (N = 65)
September 2011 – September 2012

Biologic therapies are usually reserved for patients who fail other systemic therapy or for those with severe disease. The success rates for these drugs in patients with severe psoriasis are shown below.

Severe Psoriasis Patients Improved by Treatment Type (N = 36)
September 2011 – September 2012

*Patients given a combination of topical and systemic therapy were included in the systemic therapy group.

Reference
Acne vulgaris is the most common skin condition in the United States, with approximately 40 million to 50 million Americans affected. More than 85% of adolescents in North America report having acne or a history of acne. Acne is a disorder of the pilosebaceous follicles, characterized by follicular hyperkeratinization, sebum production, inflammation, and bacterial overgrowth, specifically with *Propionobacterium acnes*. Risk factors for acne include hormonal fluctuations during adolescence, polycystic ovary syndrome, the use of oil-based cosmetics, and genetic predisposition. Psychological stress has been shown to worsen acne. Postadolescent acne predominantly affects females, in contrast to adolescent acne, which largely affects males.

Between September 2011 and September 2012, 1,504 patients presented to the Dermatology & Plastic Surgery Institute for an initial acne evaluation. Of those, 470 had at least one follow-up visit after their initial visit, and demographic data, disease severity, treatment regimens, and complications reported for these patients were reviewed in order to determine treatment outcomes. Among the 470 acne patients, the female-to-male ratio was 2.5-to-1, and the mean age was 25.2 years with a range of 8 to 75 years. Postadolescent females ages 25 to 45 years made up 31% of this population.

Although there is no universal classification system for acne, patients treated at the institute were classified as having mild, moderate, or severe disease and the presence of comedonal, papulopustular, or nodulocystic acne. Whether patients had scarring and/or postinflammatory hyperpigmentation (PIH) was also specified. Analysis of the data shows that the majority of patients presented with mild or moderate acne, and the majority did not suffer from acne complications.
**Analysis of Complications**

PIH can be a significant problem for acne patients, especially those with darker complexions. In many cases, patients are more distressed by the dark spots that take several months or more to resolve than they are by the more quickly resolving active acne lesions. The racial differences among patients presenting to the Dermatology & Plastic Surgery Institute with acne vulgaris help determine the rate of PIH and other complications seen in these patient subgroups.

*PIH = postinflammatory hyperpigmentation*
Acne complications occurred in 63% of black patients, with the majority experiencing PIH. In contrast, 34% of Caucasians developed acne complications, predominantly scarring.

**Acne Complications in Black Patients (N = 58)**
September 2011 – September 2012

- 5% Scarring
- 5% PIH* + Scarring
- 5% Keloids
- 38% None
- 47% PIH*

*PIH = postinflammatory hyperpigmentation

**Treatment Outcomes**
The graph below shows the types of acne treatment most frequently used by the institute’s dermatologists.

**Types of Acne Treatment (N = 470)**
September 2011 – September 2012

<table>
<thead>
<tr>
<th>Type</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topical Only</td>
<td>50%</td>
</tr>
<tr>
<td>Systemic Antibiotics</td>
<td>40%</td>
</tr>
<tr>
<td>Hormonal Treatment</td>
<td>10%</td>
</tr>
<tr>
<td>Isotretinoin</td>
<td>5%</td>
</tr>
<tr>
<td>Photodynamic Therapy</td>
<td>5%</td>
</tr>
</tbody>
</table>
Improvement associated with the acne therapies used was based on a composite of physician and patient global assessment of disease activity and severity. Improvement was most frequent in the photodynamic therapy group (100%), the isotretinoin group (96%), and the hormonal treatment group (95%).

**Acne Treatment Outcomes (N = 470)**
September 2011 – September 2012

**Percent**

- **Topical Only**: 100%
- **Systemic Antibiotics**: 75%
- **Hormonal Treatment**: 50%
- **Isotretinoin**: 25%
- **Photodynamic Therapy**: 0%

**PIH* Treatments Used (N = 30)**
September 2011 – September 2012

- **20%** Chemical Peel
- **30%** No Treatment
- **50%** Hydroquinone

*PIH = postinflammatory hyperpigmentation

PIH treatment can be challenging and is usually prolonged. Both topical retinoids and azelaic acid can accelerate the resolution of PIH. Topical hydroquinone is a depigmenting agent that inhibits melanin production and is considered the gold standard for treating PIH; it is available in 2% or 4% concentrations and is applied twice daily. Additionally, patients may benefit from superficial chemical peels with glycolic acid or salicylic acid, which can diminish skin discoloration and help with mild scarring, although care must be taken to avoid chemical-peel-induced PIH. Half of the black patients seen at the institute were treated with hydroquinone, 20% underwent chemical peels, and 30% received no specific PIH treatment.
Acne Vulgaris

Improvement was based on a composite of physician and patient global assessment of disease activity and severity. The results demonstrated remarkable improvement with hydroquinone and chemical peels with concomitant sunscreen application several times daily. Noticeable improvement in PIH usually required three to six months of treatment.

PIH* Improvement (N = 21)
September 2011 – September 2012

*PIH = postinflammatory hyperpigmentation

A 20-year-old male who responded to a five-month course of isotretinoin 40 mg daily.

This PIH patient responded to a combination of salicylic acid (20% to 30%), chemical peels, and 4% hydroquinone cream used twice daily for three months.
Sarcoidosis is a multisystem granulomatous disease of unknown etiology. Its development has been associated with many genetic and environmental factors. The most frequently affected organs are the lungs (90%), lymph nodes (90%), eyes (40%), and skin (25%). The most frequent clinical morphology of cutaneous lesions is macules and papules, but plaques, nodules, lupus pernio, subcutaneous infiltrates, and infiltration of pre-existing scars are also commonly identified.

A 53-year-old female patient with cutaneous and systemic sarcoidosis present since 28 years of age. Note the sarcoidal papules and plaques over the entire nose and left cheek (lupus pernio) as well as involvement of the left eye.

Dermatology & Plastic Surgery Institute dermatologists aimed to evaluate treatment outcomes of this skin condition as it occurs in the Northeast Ohio population. A total of 153 patients with sarcoidosis presented to Cleveland Clinic’s main campus from Jan. 1, 2006, to Sept. 30, 2012, and of those, 83 met the inclusion criteria for being newly diagnosed during that time frame with biopsy-proven cutaneous sarcoidosis.

The female-to-male ratio in the sample was 1.9-to-1, similar to that seen in other studies. The mean age at diagnosis was 47 years, with a range of 28 to 69 years. Sarcoidosis disproportionately affects blacks, and blacks made up the majority of this Northeast Ohio sample (57%), followed by Caucasians (19%). The chart below illustrates sarcoidosis frequency by race.

**Sarcoidosis Race Distribution (N = 83)**

<table>
<thead>
<tr>
<th>Race</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1% South Asian</td>
<td></td>
</tr>
<tr>
<td>1% Hispanic</td>
<td></td>
</tr>
<tr>
<td>19% Caucasian</td>
<td></td>
</tr>
<tr>
<td>22% Not Recorded</td>
<td></td>
</tr>
<tr>
<td>57% Black</td>
<td></td>
</tr>
</tbody>
</table>

100%
Sarcoidosis

The cutaneous clinical presentations are summarized in the following chart.

**Sarcoidosis Race Distribution (N = 83)**

2006 – 2012

- 1% Löffgren Syndrome
- 2% Erythema Nodosum
- 10% Nodular
- 11% Macular/Papular
- 16% Lupus Pernio
- 60% Plaque

Only 24% of the patients had isolated cutaneous sarcoidosis, whereas the majority (76%) had systemic sarcoidosis in addition to their skin disease. The incidence of extracutaneous disease in this population was notably higher than the 29% to 50% reported in most other sarcoidosis studies. This finding serves to emphasize the importance of referring all cutaneous sarcoidosis patients to a specialist for thorough investigation and appropriate screening.

**Treatment and Outcomes**

Systemic therapy was the most common treatment approach (65%) used by institute dermatologists, followed by topical treatment alone (11%). The graph below shows the various treatments used in this population.

**Types of Sarcoidosis Treatment (N = 83)**

2006 – 2012

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topical Only</td>
<td>10%</td>
</tr>
<tr>
<td>Systemic*</td>
<td>60%</td>
</tr>
<tr>
<td>Biologics*</td>
<td>10%</td>
</tr>
<tr>
<td>Biologic and Phototherapy</td>
<td>2%</td>
</tr>
<tr>
<td>IVIG*</td>
<td>1%</td>
</tr>
<tr>
<td>Excision</td>
<td>1%</td>
</tr>
<tr>
<td>Treatment Deferred</td>
<td>1%</td>
</tr>
<tr>
<td>No Follow-up</td>
<td>1%</td>
</tr>
</tbody>
</table>

*See key on page 39
Improvement was based on a composite of physician and patient global assessment of disease activity and severity. The sarcoidosis treatments used in this patient population were highly successful, as can be seen in the graph below. Systemic therapies such as intravenous immunoglobulin and biologics were very effective, as was surgical excision.

**Sarcoidosis Treatment Outcomes (N = 83)**

*2006 – 2012*

**Key:** Topical Only = topical corticosteroids, calcineurin inhibitors; Systemic = prednisone, methotrexate, chloroquine, hydroxychloroquine, doxycycline, minocycline, leflunomide, dapsone; Biologics = adalimumab (Humira®), infliximab (Remicade®); IVIG = intravenous immunoglobulin
Photodynamic therapy (PDT) is a nonsurgical treatment modality requiring the use of a topical photosensitizer in combination with visible light in the presence of oxygen to selectively induce apoptosis in proliferating tumors. The procedure results in the destruction of abnormally proliferating cells. The photosensitizing agents 5-aminolevulinic acid and methyl aminolevulinate are used in PDT for actinic keratoses (AK). PDT is currently FDA-approved only for the treatment of nonhyperkeratotic AK. However, in most European countries, PDT is approved for the treatment of superficial squamous cell carcinoma (SCC) and nodular basal cell carcinoma (BCC). The Department of Dermatology’s Photodynamic Therapy Center has been offering PDT for the treatment of AK since 1999.

A 70-year-old male with numerous facial actinic keratoses before PDT (left) and one month after (right) receiving one treatment with long-incubation red light PDT.

Another standard of care for AK is topical 5-fluorouracil (5-FU), a chemotherapy that must be applied twice daily for many weeks and causes significant erythema and pain during therapy. To compare efficacy, the Department of Dermatology reviewed the charts of 100 AK patients treated with blue light 5-aminolevulinic acid PDT and 100 AK patients treated with topical 5-FU from January 2006 to December 2009. The endpoint was the development of a skin cancer in a three-year follow-up period.

Charts of patients in both groups were also screened for documented skin cancers occurring in PDT- or 5-FU-treated areas during the three-year follow-up. Documented skin cancers were categorized as BCC, SCC, squamous cell carcinoma in situ (SCCIS), or melanoma. Patients were excluded if they had had any AK treatment other than cryotherapy in the year prior to PDT or 5-FU treatment.

The two treatment groups were not different in terms of age and gender. A comparison of the characteristics of the two groups is summarized on page 41.

A 59-year-old-female with nevoid basal cell carcinoma syndrome (Gorlin syndrome) of the chest, before (left) and after (right) three monthly sessions of red light PDT.
PDT vs. 5-FU Baseline Patient Characteristics
January 2006 – December 2009

<table>
<thead>
<tr>
<th></th>
<th>PDT Group (N = 100)</th>
<th>5-FU Group (N = 100)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean), Years</td>
<td>66</td>
<td>68</td>
<td>0.273</td>
</tr>
<tr>
<td>Gender</td>
<td>M = 72, F = 28</td>
<td>M = 70, F = 30</td>
<td>0.755</td>
</tr>
<tr>
<td>History of NMSK*</td>
<td>86</td>
<td>79</td>
<td>0.226</td>
</tr>
<tr>
<td>History of Melanoma</td>
<td>4</td>
<td>3</td>
<td>0.874</td>
</tr>
<tr>
<td>Solid Organ Transplant</td>
<td>2</td>
<td>5</td>
<td>0.772</td>
</tr>
</tbody>
</table>

*NMSK = nonmelanoma skin cancer

The three-year risk of developing a skin cancer in the PDT group vs. the 5-FU group is summarized in the following graph.

Patients Who Developed Cancer vs. Those Who Did Not in PDT (N = 100) vs. 5-FU Group (N = 100)
2006 – 2009

Number of Patients

![Bar graph showing the number of patients who developed cancer vs. those who did not in PDT (N = 100) vs. 5-FU Group (N = 100) 2006 – 2009.](image)
The relative risk reduction for developing skin cancer in the PDT group vs. the 5-FU group was 0.36. PDT offered a 36% risk reduction for cutaneous malignancy compared with 5-FU therapy and may be a promising treatment for AK patients at increased risk of developing skin cancer.

A recent randomized, placebo-controlled study of immunocompetent patients with diffuse AK and a history of nonmelanoma skin cancer (NMSC) demonstrated both delayed appearance of and fewer new NMSC lesions with PDT treatment compared with placebo. The rate of new NMSC remained low for six months after PDT and then increased to eventually parallel the rate seen with placebo. These results indicate that repeated interventions with PDT at regular intervals could result in adequate AK prevention. Among the 200 patients in the Dermatology & Plastic Surgery Institute cohort, 32 required a second PDT session for AK recurrence and/or skin cancer development. In the 5-FU group, 30 patients needed a second course of treatment. This demonstrates that these high-risk patients with extensive photodamage require close follow-up and more than one treatment, whether with PDT or topical chemotherapy.

The graph below shows the frequency of different types of skin cancer for each treatment group.
All three types of cancers were less common in patients treated with PDT vs. 5-FU. The most common cancer in the PDT group was SCCIS, while BCC was the most common malignancy in patients treated with 5-FU.

As for development of cutaneous malignancies in areas outside the treated zone, 35 PDT patients developed a skin cancer elsewhere on their body during the three-year follow-up, as did 43 patients in the 5-FU group. This further indicates that AK patients have an increased risk of developing these malignancies and should be closely followed and treated.

Several studies have already illustrated the impressive AK clearance rate and excellent cosmetic outcomes associated with PDT, making it an attractive treatment option for areas with high AK density. Institute dermatologists have further demonstrated the efficiency of PDT over 5-FU for preventing skin cancers. Because PDT also has a much milder side effect profile and higher compliance rate than 5-FU, it has become a more appealing treatment choice. Taken together, these variables illustrate that PDT is a promising treatment option for the prevention of NMSC in high-risk patients with field mutagenesis.

Reference
Skin cancer is the most common malignancy among organ transplant recipients and accounts for substantial morbidity and mortality. These patients tend to develop multiple skin cancers and tend to have more aggressive skin cancers with higher recurrence rates and increased risk for metastasis than those seen in the general population. Skin cancer lesions in organ transplant recipients more often grow rapidly to a large size with invasion of deeper structures and present with a more aggressive histologic growth pattern as well as increased perineural invasion. Since 1971, it has been recognized that solid organ transplant recipients are at an increased risk of developing skin cancer as a result of ongoing immunosuppressive therapy.

Among those with a history of skin cancer prior to transplantation, more than 75% develop additional skin cancers in the posttransplantation setting, with an average of 17 tumors per patient. The increased incidence of nonmelanoma skin cancers in organ transplant recipients is alarming, with a 10-fold increase in basal cell carcinoma and a 65- to 250-fold increase in squamous cell carcinoma compared with the general population. There is also a 3.4-fold increase in melanoma and an 84-fold increase in Kaposi sarcoma in the posttransplant population.

According to United Network for Organ Sharing organ procurement and transplantation data, 561,367 solid organ transplants have been performed in the United States since 1988, with 25,787 performed in 2012 alone. As the number of solid organ transplants and long-term posttransplant survival continue to increase every year, the burden of cutaneous malignancies in this group is an increasing concern.

In July 2011, Cleveland Clinic established a multidisciplinary Transplant Dermatology Clinic to serve this high-risk skin cancer population. Patients are offered education and risk assessments with individually determined follow-up intervals. To date, 640 pretransplant and 217 posttransplant skin evaluations have been performed. Between July 2011 and February 2013, 80 skin cancers were diagnosed and treated in pretransplant patients, and 334 skin cancers were diagnosed and treated in posttransplant patients.

The management of patients affected by numerous aggressive skin cancers associated with high rates of morbidity and mortality presents a challenge to dermatologists. In this patient population, frequent surgical interventions such as Mohs micrographic surgery, wide local excision, electrodesiccation and curettage, and cryosurgery are used as well as systemic and topical chemoprevention and photodynamic therapy. For patients with metastatic disease, adjuvant chemotherapy, radiation, and reduction of immunosuppression are also indicated. Pre- and posttransplant skin screening, early detection and management, and a multidisciplinary care approach are critical to minimize morbidity and mortality in transplant patients.
A 63-year-old male kidney transplant patient developed a poorly differentiated squamous cell carcinoma with perineural invasion on the right frontal scalp eight months after transplant. The photograph on the left shows recurrence of the lesion two months after an initial Mohs surgery and a large metastatic squamous cell carcinoma that developed on his vertex scalp. The photograph on the right shows the bone erosion identified after two stages of Mohs surgery. This patient subsequently underwent a craniectomy, craniotomy, and cranioplasty and was also treated with postoperative radiotherapy to the surgical site.

Pretransplant and Posttransplant Evaluations Performed and Skin Cancers Diagnosed and Treated

July 2011 – February 2013

<table>
<thead>
<tr>
<th></th>
<th>Pretransplant</th>
<th>Posttransplant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluations Performed</td>
<td>640</td>
<td>217</td>
</tr>
<tr>
<td>Squamous Cell Carcinomas</td>
<td>44</td>
<td>275</td>
</tr>
<tr>
<td>Basal Cell Carcinomas</td>
<td>32</td>
<td>54</td>
</tr>
<tr>
<td>Melanomas</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Other Skin Cancers</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>(Merkel Cell Carcinomas)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Number of Skin Cancers</td>
<td>80</td>
<td>334</td>
</tr>
</tbody>
</table>

Perineural invasion is illustrated by this squamous cell carcinoma tightly wrapped around the nerve bundle.
Standardized Clinical Assessment and Management Plan

Since the utility of propranolol for treatment of infantile hemangiomas (IH) was discovered serendipitously in 2008, this medication has gained increasing acceptance as first-line therapy for this condition. Cleveland Clinic’s Vascular Anomalies Committee developed a Standardized Clinical Assessment and Management Plan (SCAMP) for administration of propranolol to infants and children to treat IH (see page 61 in the Innovations section for further discussion of the SCAMP paradigm).

Between October 2009 and November 2012, the institute treated 47 patients with IH in the outpatient setting using the SCAMP. A pediatric cardiologist evaluated all patients prior to therapy and prescribed the medication. The SCAMP allows customization of the dosage based on individual responses to treatment. Results were positive, with 100% improvement and no significant adverse events.

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</thead>
<tbody>
<tr>
<td><strong>Number of Patients</strong></td>
<td>47</td>
</tr>
<tr>
<td><strong>Age at Initiation</strong></td>
<td>1–14 months (mean 5.2 months, median 3 months)</td>
</tr>
<tr>
<td><strong>Weight at Initiation</strong></td>
<td>2.3–11.1 kg (mean 6.4 kg, median 5.9 kg)</td>
</tr>
<tr>
<td><strong>Male/Female</strong></td>
<td>9 (19%)/38 (81%)</td>
</tr>
<tr>
<td><strong>Solitary/Multiple IH</strong></td>
<td>41 (87%)/6 (13%)</td>
</tr>
<tr>
<td><strong>Success in Shrinking IH</strong></td>
<td>47/47 (100%)</td>
</tr>
<tr>
<td><strong>Significant Adverse Events</strong></td>
<td>0/47 (0%)</td>
</tr>
</tbody>
</table>
A solitary nasal IH presenting at age 4 months and after four months of therapy

A solitary periocular IH presenting at 3 months of age and after eight months of therapy

An ulcerated labial IH presenting at age 2 months and after one year of treatment
Infantile Hemangiomas

A solitary IH on lip presenting at age 5 months and after four months of treatment

A solitary periocular lesion in a 3-month-old, causing astigmatism, before and after 10 months of therapy

An ulcerated scrotal IH at age 3 months and after three months of treatment
A solitary forehead IH presenting in a 2-month-old and after four and nine months of therapy

An upper-extremity IH presenting at 2 months of age and after two months of therapy
Infantile Hemangiomas

A facial IH presenting at age 10 months, after three months of treatment, and after completion of treatment at age 19 months

A large segmental IH presenting in a 5-month-old boy before and after three months of treatment
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 — Dermatology & Plastic Surgery Institute

#### 2011 – 2012

<table>
<thead>
<tr>
<th>Percent Best Response*</th>
<th>2011 (N = 2,736)</th>
<th>2012 (N = 3,120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appt Access/Check-In</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic Wait Times and Comfort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse and Assistant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concern for Needs and Privacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Assessment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*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
National Surgical Quality Improvement Program

The American College of Surgeons’ National Surgical Quality Improvement Program (NSQIP) objectively measures and reports risk-adjusted surgical outcomes based on a defined sampling and abstraction methodology. These outcomes data reflect Cleveland Clinic’s NSQIP performance benchmarked against more than 350 participating hospitals.

Cleveland Clinic
Overall Multispecialty 30-Day Mortality (N = 4,988)
July 2011 – June 2012

Percent

<table>
<thead>
<tr>
<th></th>
<th>Expected</th>
<th>Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Overall mortality was significantly lower than expected, and overall morbidity was significantly higher than expected.

Plastic Surgery 30-Day Morbidity (N = 129)
July 2011 – June 2012

In addition to overall surgical performance, NSQIP data specific to plastic surgery are provided. There was no significant difference between plastic surgery observed and expected morbidity rates.
Surgical Care Improvement Program (SCIP) — Appropriateness of Care

This composite metric, based on 10 hospital surgical quality process measures developed by the Centers for Medicare & Medicaid Services, shows the percentage of patients who received all the recommended care for which they were eligible.

Cleveland Clinic Surgical Appropriateness of Care
2011 – 2012

<table>
<thead>
<tr>
<th>Percent</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>92.3</td>
<td>93.0</td>
</tr>
</tbody>
</table>

UHC 90th Percentile, 2012*

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

Cleveland Clinic has set a target of UHC’s 90th percentile, and results are trending positively.
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

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.

All-Cause 30-Day Readmission Rate to Any Cleveland Clinic Hospital

2011 – 2012

Cleveland Clinic's goal is for all patients to receive all the recommended care for their condition. An aggregated “all or nothing” measurement approach to monitoring multiple publicly reported process-of-care measures for heart failure, acute myocardial infarction, pneumonia, and surgery patients yields results consistently above 94%.
Cleveland Clinic Overall In-Hospital Mortality Observed/Expected Ratio

2011 – 2012

O/E Ratio

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.

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.

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

<table>
<thead>
<tr>
<th>Percent Best Response*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommend Hospital (% Definitely Yes)*</td>
</tr>
<tr>
<td>Hospital Rating (% 9 or 10) 0–10 Scale</td>
</tr>
<tr>
<td>2011 (N = 10,378)</td>
</tr>
<tr>
<td>84.0</td>
</tr>
</tbody>
</table>

*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.
Transoral Posterior Maxillary Craniofacial Surgery to Place a Neurostimulator for Chronic Cluster Headache Treatment

The pain and autonomic symptoms of chronic cluster headache may result from activation of the trigeminal parasympathetic reflex, mediated through the sphenopalatine ganglion (SPG). The Dermatology & Plastic Surgery Institute assisted in the surgical and clinical design of the multicenter Pathway CH-1 study to evaluate the surgical safety of SPG stimulation for the treatment of acute chronic cluster headache.

A minimally invasive transoral technique was used to implant an experimental miniaturized neurostimulator, consisting of a stimulating electrode and fixation plate, proximally to the SPG. This technique involves placing the body of the neurostimulator on the lateral posterior maxilla and using the fixation plate to anchor the neurostimulator on the superior lateral zygomaticomaxillary buttress. The procedure is performed using fluoroscopic guidance with general anesthesia and takes 30 to 60 minutes.

Since the study began in June 2012, 43 patients in six European centers have been implanted with the ATI Neurostimulation System™. In one subject (2%) the procedure was not completed due to anatomical limitations. Three subjects (7%) were explanted due to early lead migrations or misplacement of the neurostimulator, and another three patients (7%) underwent a revision procedure due to lack of efficacious SPG stimulation and nonoptimal electrode locations. Within the first 30 postoperative days, 20 subjects (47%) reported numbness in the second division of the trigeminal nerve, which resolved within an average of 90 days from onset in 12 patients (62%). As of June 2013, numbness was unresolved in eight patients (38%) and had persisted an average of 163 days, with a maximum duration of 356 days. Reported adverse events include pain (25%), swelling (20%), and paresthesias (19%). The majority of reported adverse events were classified as mild to moderate, and there have been no infections requiring explantation. Additionally, 81% of subjects have achieved acute headache pain relief of > 50% and/or a > 50% reduction in headache frequency with SPG stimulation.

The initial experience using the minimally invasive implantation procedure for the neurostimulator shows an acceptable safety profile that is comparable with that observed in standard oral maxillofacial surgeries. Advancements in surgical instruments and gains in surgeon experience have reduced both the number and severity of adverse events reported.
Standardized Clinical Assessment and Management Plan for Propranolol Treatment of Infantile Hemangiomas

The multidisciplinary Cleveland Clinic Vascular Anomalies Committee developed a Standardized Clinical Assessment and Management Plan (SCAMP) for administration of propranolol to infants and children for treatment of infantile hemangiomas. The SCAMP paradigm was developed in other areas of medicine, with the heterogeneous patient population in mind, as a method for rapid development and evaluation of a clinical management protocol. Intrinsic to this approach is continuous revision of a treatment plan while preserving the ability to carefully measure and assess outcomes. As far as can be determined, this is the first application of the SCAMP methodology in academic dermatologic practice.

The high degree of diversity of presentation in infantile hemangiomas, the range of subspecialties involved in the care of these patients, and the challenge of assessment for cardiac risk were important considerations when the institute began to use propranolol as a treatment. The importance of systematizing the approach in order to allow an organized assessment of outcomes and any adverse events led to adoption of the SCAMP paradigm.

The SCAMP was established with the following goals:

- To ensure patient safety with a comprehensive cardiovascular evaluation performed prior to treatment and initiation of treatment under the supervision of an experienced pediatric cardiologist
- To facilitate multidisciplinary involvement in patient care
- To achieve careful documentation of methods and results to facilitate quality improvement

Between October 2009 and November 2012, the institute successfully treated 47 children with infantile hemangiomas using this SCAMP. (See page 46 of the Outcomes section for a description and photographs of the results.)

Reference

Selected Publications

Dermatology & Plastic Surgery Institute staff authored more than 80 publications in peer-reviewed journals in 2012.

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

**Dermatology**


Plastic Surgery


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Vice Chairman

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Ralph Tuthill, MD

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Cutaneous Care Center
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Chairman

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Section Head, Craniomaxillofacial Surgery

Maria Siemionow, MD, PhD
Section Head, Plastic Surgery Research

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Graham Schwarz, MD
Randall Yetman, MD

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Dawn Schell, MD
Peter Schoenwald, MD
Sara Spagnuolo, MD
Karen Steckner, MD

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Director

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Shahpour Esfandiari, MD
Faith Factora, MD
Samuel Irefin, MD
Ali Jahan, MD
Joti Juneja-Mucci, MD
Piyush Mathur, MD
Douglas Naylor Jr., MD
James Phillips, MD
Nadeem Rahman, MD
Nicholas Russo, MD
Anand Satyapriya, MD
Ellie Wurm, MD

Some physicians may practice in multiple locations. For a detailed list including staff photos, please visit clevelandclinic.org/staff.
General Patient Referral
24/7 hospital transfers or physician consults
216.444.8302 or 800.553.5056

General Dermatology
Appointments/Referrals
216.444.5725 or 800.223.2273, ext. 45725

Surgical Dermatology
Appointments/Referrals
216.444.5724 or 800.223.2273, ext. 45724

Cutaneous Care Center
216.444.2649 or 800.223.2273, ext. 42649

Dermatology Clinical Research
216.445.8454 or 800.223.2273, ext. 58454

Dermatology Financial Counselor
216.445.8662 or 800.223.2273, ext. 58662

Plastic Surgery Appointments/Referrals
216.444.6900 or 800.223.2273, ext. 46900

Plastic Surgery Financial Counselor
216.445.1331 or 800.223.2273, ext. 51331
On the Web at clevelandclinic.org/dermatology and clevelandclinic.org/plastics

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

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clevelandclinicaidabudhabi.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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**Cleveland Clinic Main Campus**
9500 Euclid Ave.
Cleveland, OH 44195

**General Dermatology**
216.444.5725 or 800.223.2273, ext. 45725

**Surgical Dermatology**
216.444.5724 or 800.223.2273, ext. 45724

**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

**Elyria Family Health and Surgery Center**
303 Chestnut Commons Drive
Elyria, OH 44035
440.366.9444

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

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

**Richard E. Jacobs Health Center**
33100 Cleveland Clinic Blvd.
Avon, OH 44011
440.695.4000

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

**Twinsburg Family Health and Surgery Center**
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Twinsburg, OH 44087
330.888.4000

**Willoughby Hills Family Health Center**
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Willoughby Hills, OH 44094
440.943.2500

**Wooster Family Health Center**
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Wooster, OH 44691
330.287.4500
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Cleveland Clinic Main Campus
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800.223.2273, ext. 46900

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

Cleveland Clinic Florida
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Weston, FL 33331
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440.366.9444

Lorain Family Health and Surgery Center
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Solon Family Health Center
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440.519.6800

Strongsville Family Health and Surgery Center
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Strongsville, OH 44136
440.878.2500

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

Westlake Medical Campus: Building A
850 Columbia Road
Westlake, OH 44145
440.899.9993
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.
**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 James Taylor, MD, and Darlene Lyons.

Photography by Patricia Shoda, Janine Sot, and Rachel Schweizer. Graphic design and additional photography were provided by Cleveland Clinic’s Center for Medical Art and Photography.
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