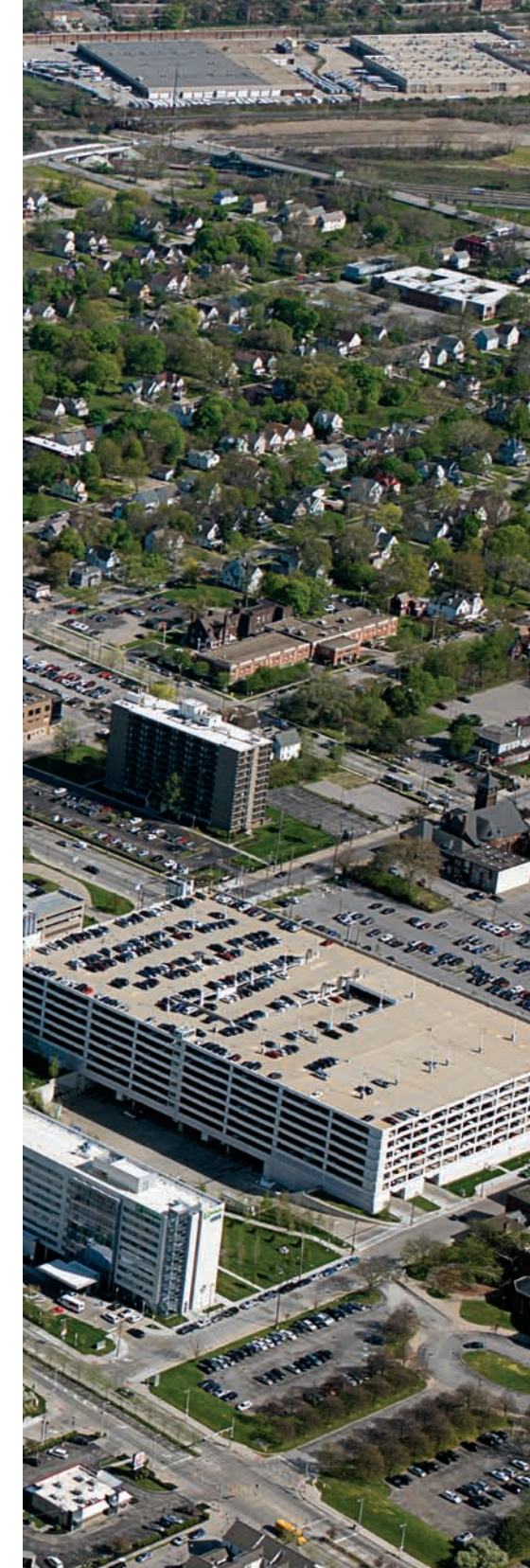


Digestive Disease & Surgery Institute



Measuring Outcomes Promotes Quality Improvement



An aerial photograph showing a large, multi-story hospital building with a flat roof and numerous windows. The building is surrounded by several large parking lots filled with cars. In the background, there is a residential neighborhood with many houses and trees. The image is oriented vertically on the left side of the page.

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 clinical institutes. Designed for a physician audience, the Outcomes books contain a summary of many of our surgical and medical treatments, with a focus on outcomes data 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 and procedural techniques.

In addition to these institute-based books of clinical outcomes, Cleveland Clinic supports transparent public reporting of healthcare quality data. The following reports are available to the public:

- Joint Commission Performance Measurement Initiative (qualitycheck.org)
- Centers for Medicare and Medicaid Services (CMS) Hospital Compare (medicare.gov/hospitalcompare), and Physician Compare (medicare.gov/PhysicianCompare)
- 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.

To view all of our Outcomes books, please visit clevelandclinic.org/outcomes.



Dear Colleague:

Welcome to this 2016 Cleveland Clinic Outcomes book. Every year, we publish Outcomes books for 14 clinical institutes with multiple specialty services. These publications are unique in healthcare. Each one provides an overview of medical or surgical trends, innovations, and clinical data for a particular specialty over the past year. We are pleased to make this information available.

Cleveland Clinic uses data to manage outcomes across the full continuum of care. Our unique organizational structure contributes to our success. Patient services at Cleveland Clinic are delivered through institutes, and each institute is based on a single disease or organ system. Institutes combine medical and surgical services, along with research and education, under unified leadership. Institutes define quality benchmarks for their specialty services and report on longitudinal progress.

All Cleveland Clinic Outcomes books are available in print and online. Additional data are available through our online Quality Performance Reports (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 books has become increasingly relevant as healthcare transforms from a volume-based to a value-based system. We appreciate your interest and hope you find this information useful and informative.

Sincerely,

A handwritten signature in white ink, appearing to read 'DMC', set against a dark background.

Delos M. Cosgrove, MD
CEO and President

what's inside

Chairman's Letter	04
Institute Overview	05
Quality and Outcomes Measures	
Procedure and Outcomes Overview	06
Esophageal and Gastric Disease	08
Small Bowel Disease and Intestinal Transplantation	16
Inflammatory Bowel Disease Center	19
Large Bowel Disease	22
Pancreaticobiliary Disease	33
Liver Disease and Liver Transplantation	36
Obesity and Metabolic Disease	50
Breast Disease	60
Hernia Center	66
Trauma	69
Nutrition	70
Pediatric General Surgery	71
Florida	73
Surgical Quality Improvement	80
Institute Patient Experience	86
Cleveland Clinic – Implementing Value-Based Care	88
Innovations	95
Contact Information	96
About Cleveland Clinic	98
Resources	100

Chairman's Letter

Dear Colleagues,

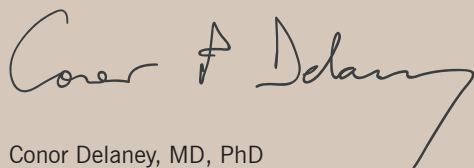
I am pleased to present the 2016 Outcomes book from the Digestive Disease & Surgery Institute. This is the 15th year that we have shared our clinical outcomes and innovations with colleagues, alumni, and other individuals interested in digestive diseases. The Outcomes book reflects our commitment to provide patients with the highest-quality care.

In 2016, the Digestive Disease & Surgery Institute had many exciting achievements, including:

- The nation's first uterus transplant performed by a multidisciplinary surgical team. The procedure was the first in a pioneering US uterine transplant clinical trial enrolling women of reproductive age with uterine factor infertility.
- Cleveland Clinic's Liver Transplant Program, one of the largest in the nation, transplanted 152 livers in 2016 in Ohio, and an additional 40 in Florida. This also represents the highest volume of livers transplanted within the program to date.
- The implementation of an institute-wide Enhanced Recovery After Surgery program, designed to improve patients' postoperative recovery. Research has consistently shown that adoption of enhanced recovery protocols leads to significant improvements in patient satisfaction, outcomes (decreased length of stay and fewer postoperative complications), and reductions in the cost of care.

We welcome your feedback, questions, and ideas for collaboration. Please contact me via email at OutcomesBookFeedback@ccf.org and reference the Digestive Disease & Surgery Institute book in your message.

Sincerely,



Conor Delaney, MD, PhD
Chairman, Digestive Disease & Surgery Institute



Institute Overview

Cleveland Clinic's Digestive Disease & Surgery Institute is regarded as one of the top digestive disease centers in the nation. *U.S. News & World Report's* "Best Hospitals" survey has ranked the institute's digestive disease services as No. 2 in the nation since 2003.

The institute unites all specialists within one unique, fully integrated model of care aimed at optimizing the patient experience. Throughout the years, Digestive Disease & Surgery Institute physicians have pioneered many new technologies and procedures for treating digestive disorders. This rich history of innovation continues today through the development of new surgical techniques, participation in clinical trials, and outcomes research.

The Digestive Disease & Surgery Institute is located on Cleveland Clinic's main campus and at 24 additional locations. The institute includes the departments of Gastroenterology and Hepatology, Colorectal Surgery, and General Surgery (including bariatric, breast, hepato-pancreato-biliary, pediatric, and transplant surgery). There are five major centers within the Digestive Disease & Surgery Institute: the Bariatric and Metabolic Center, the Hernia Center, the Center for Human Nutrition, the Inflammatory Bowel Disease Center, and the Esophageal and Swallowing Center. The institute's 203 staff physicians, 117 residents and clinical fellows, and 369 nurses offer the safest, most proven, and most advanced treatments, performed in the most effective and patient-friendly way.

2016

Statistics

<i>Total new admissions</i>	<i>12,427</i>
<i>Patient days</i>	<i>79,941</i>
<i>Evaluation and management visits</i>	<i>125,755</i>
<i>Endoscopic procedures</i>	<i>84,642</i>
<i>Inpatient surgical visits</i>	<i>11,000</i>
<i>Outpatient surgical visits</i>	<i>28,000</i>

Staffing

<i>Physicians</i>	<i>203</i>
<i>Inpatient nurses</i>	<i>255</i>
<i>Ambulatory nurses</i>	<i>114</i>
<i>Clinical fellows</i>	<i>49</i>
<i>Residents</i>	<i>68</i>

Procedure and Outcomes Overview

Endoscopic and Surgical Procedure Overview

Endoscopic Cases

2013 – 2016

	2013	2014	2015	2016
Digestive Disease & Surgery Institute (total)	63,008	69,842	79,505	84,642
Colonoscopy	29,494	34,324	40,373	41,579
Esophagogastroduodenoscopy/other esophagoscopy	18,065	21,297	23,967	26,710
Endoscopic retrograde cholangiopancreatography (ERCP)	2712	2443	3044	3371
Endoscopic ultrasound (EUS)	1548	1675	1729	1846
Pouchoscopy	1420	1492	1599	1545
Sigmoidoscopy and proctosigmoidoscopy	2745	2722	2851	2882
Upper and lower motility	3825	3077	2998	3174
Peroral endoscopic myotomy	N/A	31	32	51
Other ^a	3199	2781	2876	3484

^aIncludes anoscopy, capsule endoscopy, small bowel endoscopy

Inpatient Surgical Cases by Department/Section

2013 – 2016

	2013	2014	2015	2016
Digestive Disease & Surgery Institute (total)	7594	8030	8718	9004
Bariatric	556	571	609	685
Colorectal	2987	2919	3045	3111
General surgery	4051	4540	5064	5208

Outpatient Surgical Cases by Department/Section

2013 – 2016

	2013	2014	2015	2016
Digestive Disease & Surgery Institute (total)	10,393	10,086	10,294	10,620
Bariatric	335	292	135	139
Breast	1789	1533	1469	1622
Colorectal	1836	1695	1799	1682
General surgery	6433	6566	6891	7177

Minimally Invasive Surgical Cases by Department/Section^a

2013 – 2016

	2013	2014	2015	2016
Digestive Disease & Surgery Institute (total)	6163	6108	6364	6735
Bariatric	811	766	634	701
Colorectal	850	817	933	1087
General surgery	4502	4525	4797	4947

^aIncludes inpatient and outpatient laparoscopic and robot-assisted surgical procedures

Esophageal and Gastric Disease

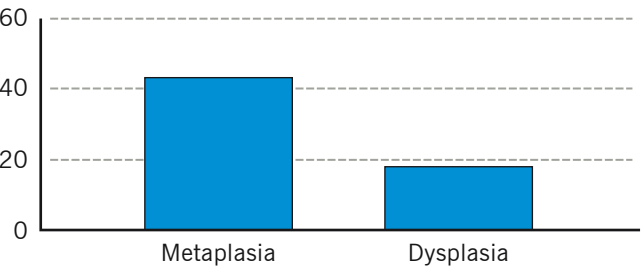
Barrett's Esophagus

The Esophageal Center of Excellence for Barrett's Esophagus provides a multidisciplinary approach for the treatment of complex esophageal disorders. Patients with Barrett's esophagus, dysplasia, and early esophageal cancer are treated with a wide range of techniques such as endoscopic mucosal resection and radiofrequency ablation.

Eradication Rates for Intestinal Metaplasia and Dysplasia (N = 116)

2016

Percent



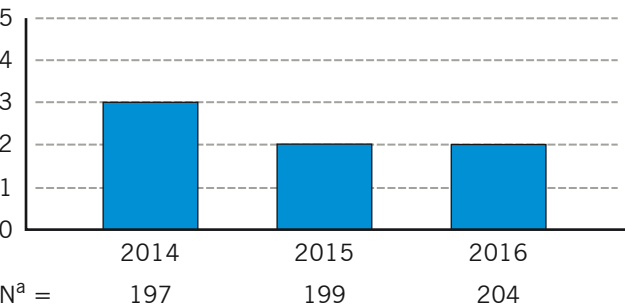
Hiatal Hernia Surgery

Hiatal hernia is often associated with gastroesophageal reflux disease. For patients with severe symptoms, surgery may be indicated. Patients who are offered a minimally invasive approach — the standard of care at Cleveland Clinic — benefit from decreased pain and better overall recovery.

Median Length of Stay, Laparoscopic Hiatal Hernia Repair

2014 – 2016

Days

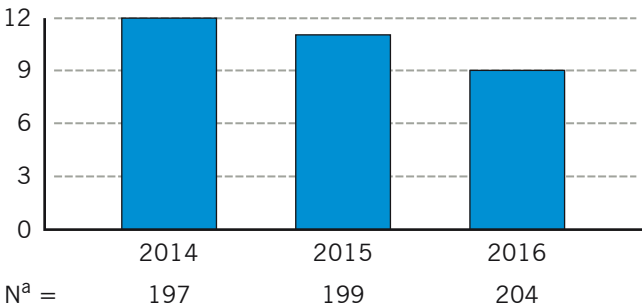


^aIncludes Cleveland Clinic Weston data

Thirty-Day Readmission Rate, Laparoscopic Hiatal Hernia

2014 – 2016

Percent



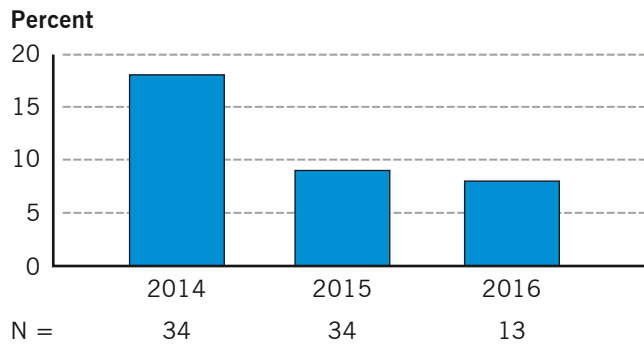
^aIncludes Cleveland Clinic Weston data

Peroral Endoscopic Myotomy

Peroral endoscopic myotomy (POEM) is a procedure used to treat swallowing disorders, most commonly achalasia. This is a relatively new noninvasive endoscopic technology that can effectively relieve symptoms associated with swallowing disorders, including difficulty swallowing, heartburn, weight loss, chronic regurgitation, chest pain, and an overall low quality of life. Currently only a handful of centers in the US offer this approach to treating swallowing disorders.

Complication Rate,^a POEM Procedures

2014 – 2016



^aComplications include dysphagia, hiatal hernia, bleeding, leaks, and perforations.

Esophageal and Gastric Disease

Peroral Pyloromyotomy Procedure

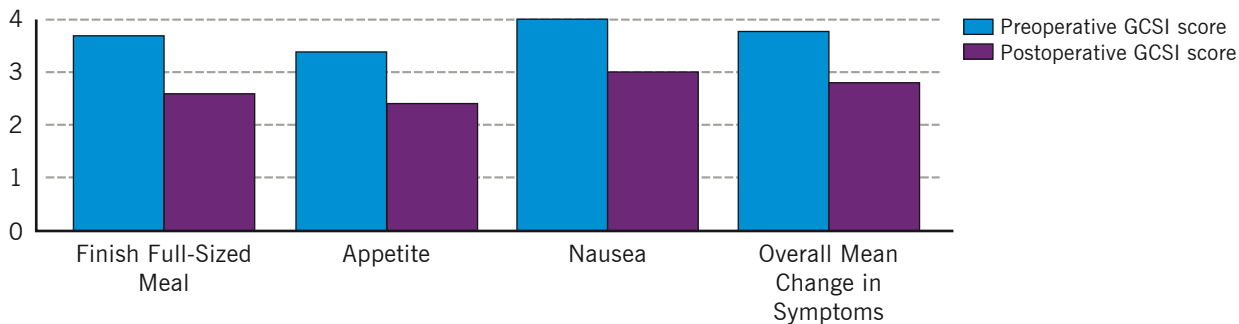
Gastroparesis is a debilitating disease characterized by delayed gastric emptying in the absence of mechanical obstruction. A new intramural technique, peroral endoscopic pyloromyotomy (POP), has been proposed as an alternative to surgical pyloroplasty for the management of medically refractory gastroparesis. POP is performed with a standard upper endoscope and was first performed at Cleveland Clinic in January 2016.

All patients undergoing POP for management of gastroparesis from January through July 2016 were prospectively followed. All patients underwent a 4-hour, nonextrapolated gastric emptying study and were asked to rate their symptoms using the Gastroparesis Cardinal Symptom Index (GCSI) at their preprocedure visit and at 3 months postprocedure. There were no periprocedural complications, and all patients were discharged to home on postprocedure day 1.

Symptom Relief, POP Procedures (N = 20)

January 2016 – July 2016

Mean Symptom Score



GCSI = Gastroparesis Cardinal Symptom Index, POP = peroral endoscopic pyloromyotomy

Source: Revicki DA, Rentz AM, Dubois D, Kahrilas P, Stanghellini V, Talley NJ, Tack J. Gastroparesis Cardinal Symptom Index (GCSI): development and validation of a patient reported assessment of severity of gastroparesis symptoms. *Qual Life Res.* 2004 May;13(4):833-844.

Pre- and postoperative symptom assessments are based on GCSI, which consists of three subscales and an overall improvement score. The lower the GCSI score, the better the patient feels.

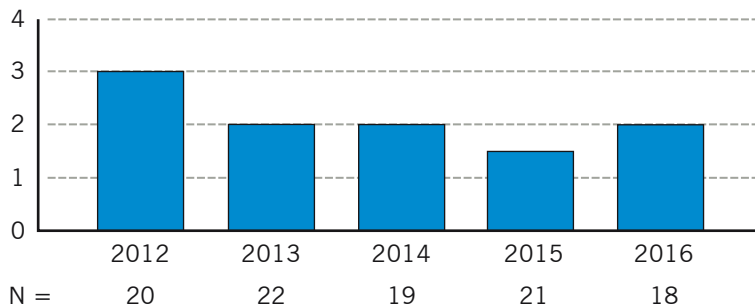
Gastroparesis Surgery

Gastroparesis is a disorder that slows the movement of food from the stomach to the small intestine. Patients often seek hospital treatment for complications of the disease such as malnutrition, dehydration, and pain. Treatment ranges from dietary changes or medications to surgery requiring the removal of most of the stomach and, more recently, the insertion of gastric neurostimulators.

Median Length of Stay, Neurostimulator (Gastroparesis) Surgery

2012 – 2016

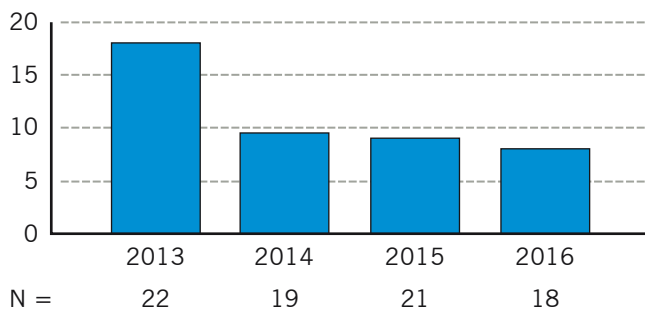
Days



Thirty-Day All Cause Readmission Rate, Neurostimulator (Gastroparesis) Surgery

2013 – 2016

Percent



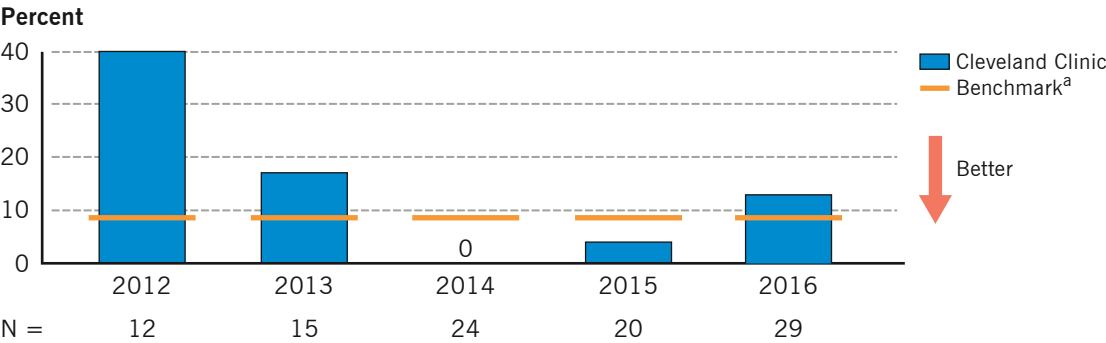
With increased awareness of disease symptoms, the institute's multidisciplinary program has been able to identify and treat patients preemptively and decrease the overall hospital readmission rate.

Esophageal and Gastric Disease

Median Arcuate Ligament Syndrome

Median arcuate ligament (MAL) syndrome, also known as celiac artery compression syndrome, is a rare condition resulting in postprandial abdominal pain and weight loss. Cleveland Clinic has formed a collaborative team of gastroenterologists, minimally invasive surgeons, and vascular surgeons to evaluate and treat MAL syndrome.

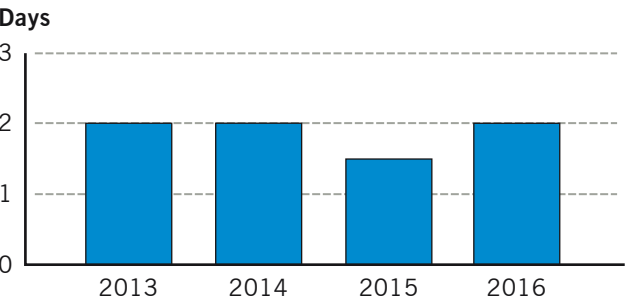
Conversion From Minimally Invasive to Open MAL Release Surgical Procedure 2012 – 2016



MAL = median arcuate ligament

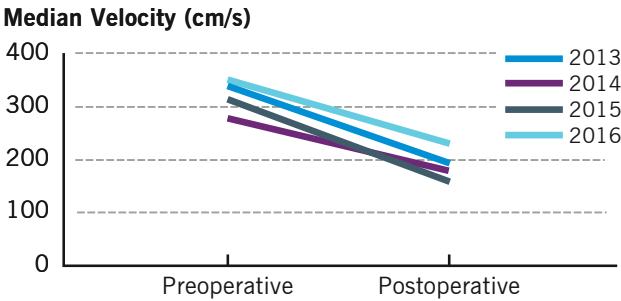
^aJimenez JC, Harlander-Locke M, Dutson EP. Open and laparoscopic treatment of median arcuate ligament syndrome. *J Vasc Surg.* 2012 Sep;56(3):869-873.

Median Length of Stay, MAL Release Surgical Procedure 2013 – 2016



MAL = median arcuate ligament

Celiac Artery Velocity (N = 32) 2013 – 2016

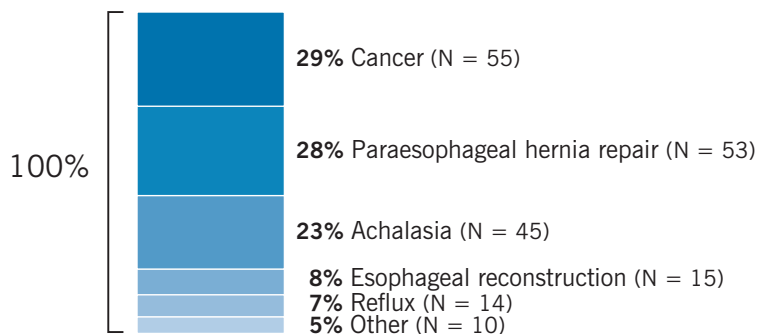


Decreased celiac artery velocity is a marker for successful release of the ligament.

Esophageal Surgery

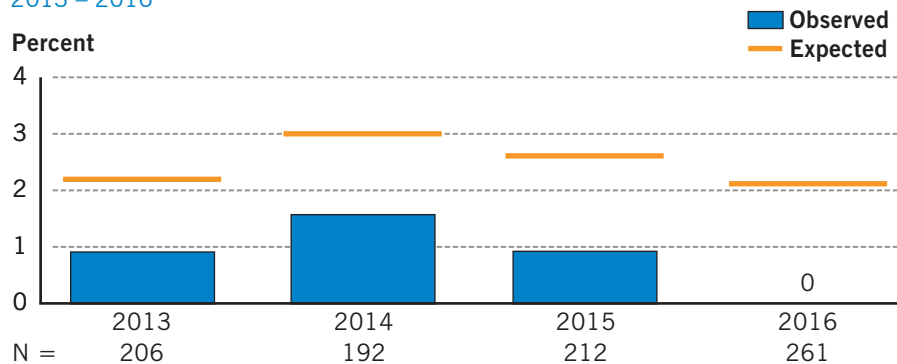
Distribution by Indication (N = 261)

2012 – 2016



In-Hospital Mortality

2013 – 2016



Source: Data from the Vizient Clinical Data Base/Resource Manager™ used by permission of Vizient. All rights reserved.

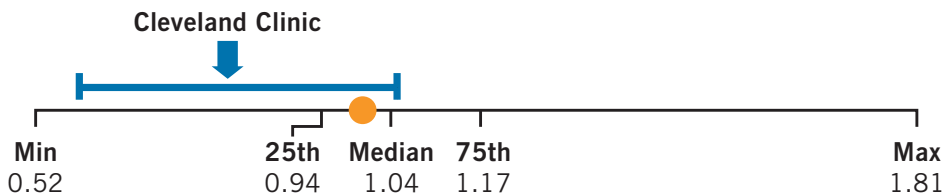
Esophageal and Gastric Disease

Esophagectomy for Esophageal Cancer

Combined Morbidity and 30-Day Mortality (N = 153)

July 2013 – June 2016

Eligible Procedures	Unadjusted Rate	Risk-Adjusted Rate (95% Confidence Interval)	Standardized Incidence Ratio (95% Confidence Interval)
153	14.4%	14.7% (10.1, 19.8)	0.55 (0.38, 0.75)



Source: Society of Thoracic Surgeons (STS) General Thoracic Surgery Database, July 2013 – June 2016

Cleveland Clinic surgeons performed 153 esophagectomy procedures for patients with esophageal cancer from July 2013 through June 2016. The combined morbidity and 30-day mortality risk-adjusted rate was among the best in the country.

Nonoperative Percutaneous Endoscopic Jejunostomy

Direct percutaneous endoscopic jejunostomy (DPEJ) is a nonoperative approach used to deliver postpyloric enteral nutritional support to individuals who cannot tolerate gastric feeding.

A retrospective analysis was conducted to assess complications of patients who had undergone de novo direct PEJ procedures (2003–2015) performed by Cleveland Clinic surgical and advanced endoscopists. Of the 59 patients, six complications (12.5%) in five patients were identified within 30 days of their PEJ procedure. Based on the findings of this study, DPEJ appears to offer a relatively low risk of perioperative complications and may be a preferred alternative to operative jejunostomy tube placement.

Indications for Direct PEJ (N = 59)

2003 – 2015

Indications for PEJ, N (%)	
Dehydration/malnutrition	29 (51)
Gastroparesis	9 (16)
Upper GI cancer	7 (12)
Complications of bariatric surgery (leak, nonhealing marginal ulcer)	4 (7)
Malfunction of prior tube	4 (7)
Other	6 (10)

PEJ = percutaneous endoscopic jejunostomy

Thirty-Day Complication Rate for Direct PEJ (N = 59)

2003 – 2015

30-Day Complications	Rate, N (%)
Total complications	6 (10)
Aspiration	1 (2)
Wound infection	1 (2)
Leakage around tube	1 (2)
Tube blockage	1 (2)
Tube dislodgement	1 (2)
Repeat endoscopy	1 (2)

Source: Strong AT, Sharma G, Davis M2, Mulcahy M, Punchai S, O'Rourke CP2, Brethauer SA, Rodriguez J, Ponsky JL, Kroh MD. Direct Percutaneous Endoscopic Jejunostomy (DPEJ) Tube Placement: A Single Institution Experience and Outcomes to 30 Days and Beyond. *J Gastrointest Surg*. 2017 Mar;21(3):446-452.

Small Bowel Disease and Intestinal Transplantation

Management of Carcinomatosis

Hyperthermic intraoperative peritoneal chemotherapy (HIPEC) is a surgical procedure used to treat cancers that have spread to the lining of the abdominal cavity, such as cancers arising in the appendix, colon, stomach, or ovaries, as well as pseudomyxoma peritonei and peritoneal mesothelioma. This is a 2-step surgical procedure, which includes debulking of visible disease (tumor) followed by HIPEC. HIPEC delivers heated chemotherapy directly into the abdomen; the solution circulates for 90 minutes, treating the microscopic disease that may remain.

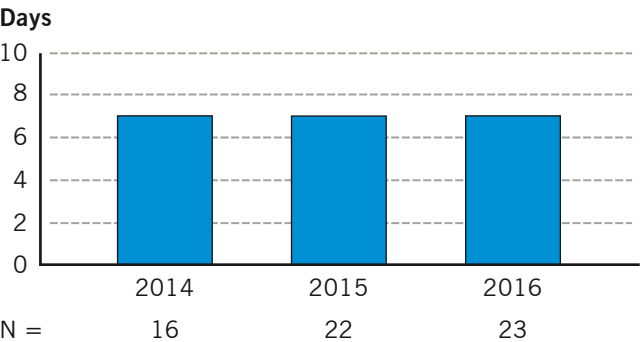
Cancer Type for Patients Undergoing HIPEC Procedure (N = 23)

2016

Cancer Type	Patients	Percent
Pseudomyxoma peritonei	10	43
Colon cancer	5	22
Appendix carcinoma	3	13
Peritoneal mesothelioma	3	13
Peritoneal carcinomatosis	2	9

Median Length of Stay, HIPEC Patients

2014 – 2016



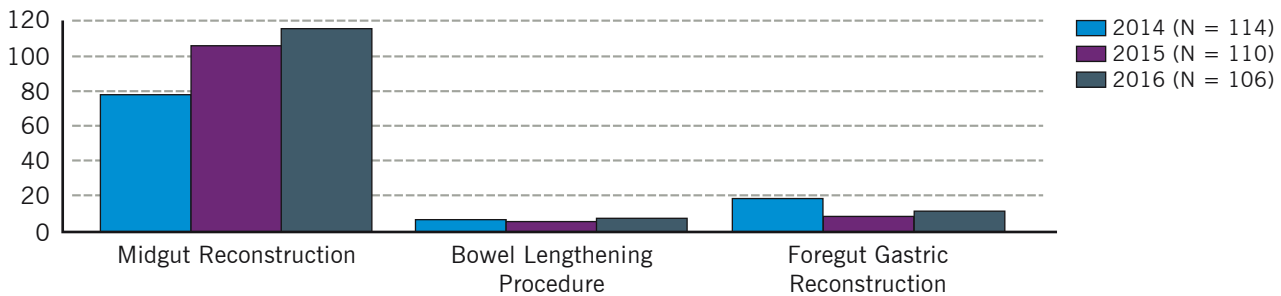
Center for Gut Rehabilitation and Transplantation

The Center for Gut Rehabilitation and Transplantation was established as a continuation of Cleveland Clinic's efforts to enhance the multidisciplinary team approach for the management of patients with acute and chronic gut failure. The center accepts all patients with acute intestinal ischemia, with the intent to restore blood flow to the intestine and other abdominal organs by using combined radiologic and surgical techniques. With chronic gut failure, all efforts are made to restore gut function with medical and surgical modalities including autologous surgical reconstruction and bowel lengthening. Intestinal and multivisceral transplantations continue to be used as rescue therapies for those who fail intravenous nutritional therapy.

Nontransplant Intestinal Reconstruction

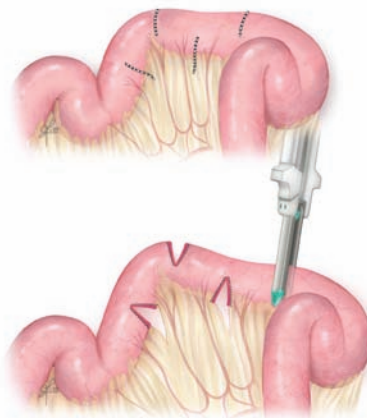
2014 – 2016

Procedures^a



^aPatients may undergo more than 1 procedure

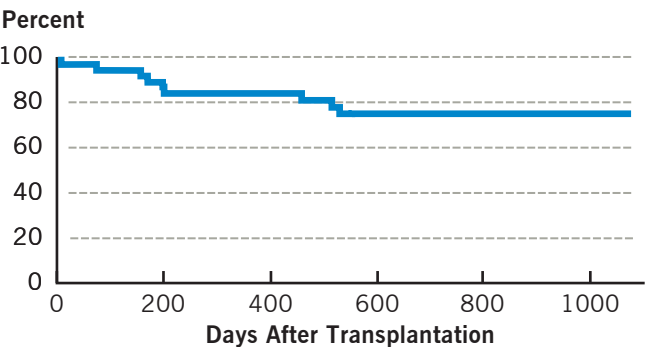
Bowel Lengthening With Serial Transverse Enteroplasty Procedure



Small Bowel Disease and Intestinal Transplantation

Intestinal Transplantation Patient Survival^a (N = 39)

July 2013 – December 2015

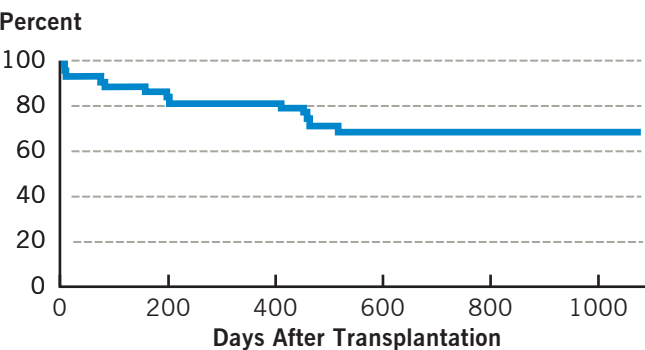


Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

^aSRTR national average for 3-year patient survival = 80.32%

Intestinal Transplantation Graft Survival^{a,b} (N = 43)

July 2013 – December 2015



Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

^aSRTR national average for 3-year graft survival = 74.27%

^bIncludes 4 intestinal retransplants

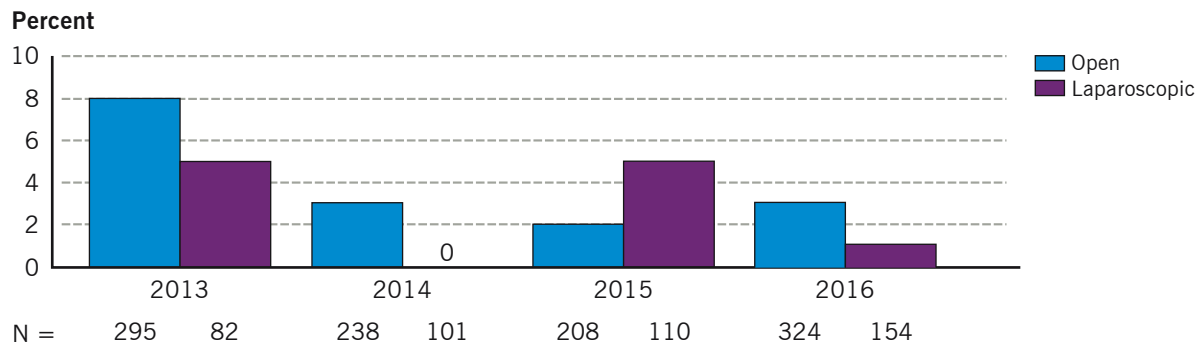
Inflammatory Bowel Disease Center

Crohn's Disease

The surgical volume for Crohn's disease is high, with a particular focus on techniques that conserve the small bowel. The multidisciplinary team that treats patients with Crohn's disease includes surgeons, gastroenterologists, nutritionists, pathologists, and radiologists.

Crohn's Disease Organ Space Surgical Site Infection Rate

2013 – 2016



Crohn's Disease Postoperative Outcomes

2013 – 2016

Postoperative Outcomes	2013		2014		2015		2016	
	Open	Lap	Open	Lap	Open	Lap	Open	Lap
N	295	82	238	101	208	110	324	154
Median length of stay, days	8	7	8	9	8	7	5	5
30-day readmission rate, %	11	19	12	7	14	15	13	8
In-hospital mortality rate, %	0	0	0	0	0	0	0	0
Superficial surgical site infection rate, %	7	5	3	3	6	2	2	1
Urinary tract infection rate, %	2	1	1	1	3	2	1	0
Venous thromboembolism rate, %	4	2	1	3	2	3	1	2

Lap = laparoscopic

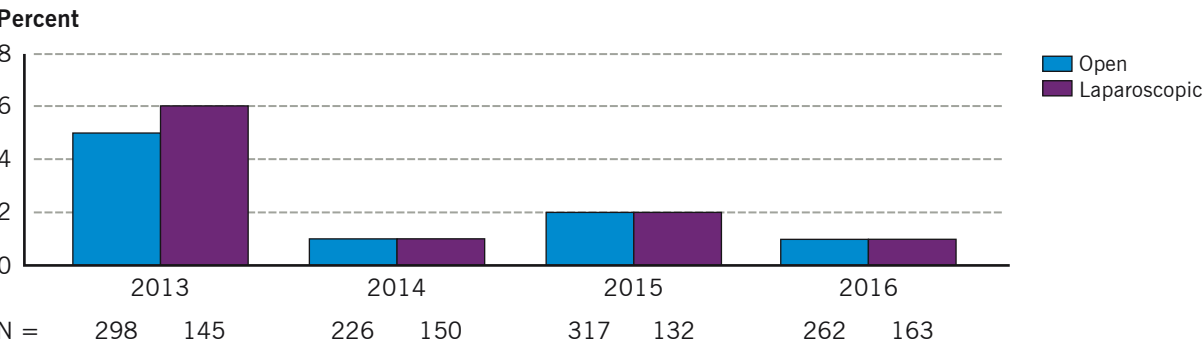
Inflammatory Bowel Disease Center

Ulcerative Colitis

Cleveland Clinic is a referral center for patients diagnosed with ulcerative colitis. Minimally invasive laparoscopic surgical approaches and salvage of problematic pouches are available for those patients requiring surgery.

Ulcerative Colitis Organ Space Surgical Site Infection Rate

2013 – 2016



Ulcerative Colitis Postoperative Outcomes

2013 – 2016

Postoperative Outcomes	2013		2014		2015		2016	
	Open	Lap	Open	Lap	Open	Lap	Open	Lap
N	298	145	226	150	317	132	262	163
Median length of stay, days	5	5	5	4	5	4	4	4
30-day readmission rate, %	13	21	10	13	16	14	18	4
In-hospital mortality rate, %	0	0	0	0	0	0	0	0
Superficial surgical site infection rate, %	4	7	2	1	4	4	2	3
Urinary tract infection rate, %	5	3	4	3	2	1	0	0
Venous thromboembolism rate, %	3	6	3	5	3	5	1	2

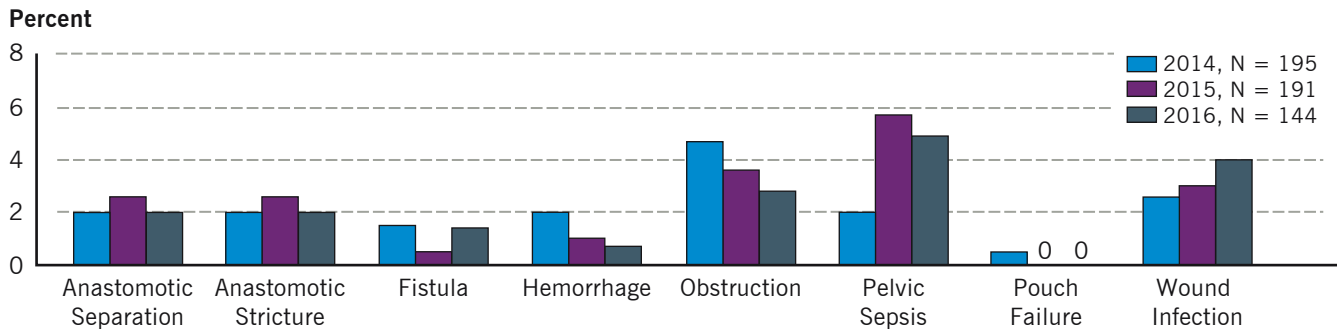
Lap = laparoscopic

Center for Ileal Pouch Disorders

The Center for Ileal Pouch Disorders is the world's first and largest multidisciplinary pouch center and sees more than 1200 patients each year. The center is at the forefront of new approaches to the management of pouch complications, offering restorative proctocolectomy with ileal J pouch surgery as an alternative to a permanent stoma.

Pouch Complication Rate^a

2014 – 2016



^aRepresents data for first, redo and revision pouch procedures

Since 2011, Cleveland Clinic's Department of Colorectal Surgery has performed more than 100 creation and revision continent ileostomies (Kock pouch) and is one of the few sites in the world to perform this procedure.

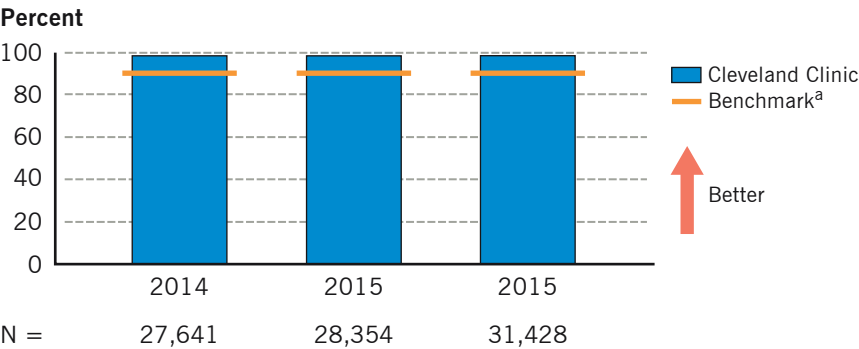
Large Bowel Disease

Colonoscopy

Colonoscopy is a common endoscopic procedure, with more than 3 million examinations performed in the US annually. The efficacy of colonoscopy to prevent colorectal cancer is dependent on the quality of the procedure. National benchmarks have been established as targets to meet or exceed in order to maximize the benefit of the colonoscopy. Three important metrics include the percentage of procedures in which the endoscopist reaches the cecum (cecal intubation rate), the time spent looking at the colon mucosa on withdrawal of the colonoscope (withdrawal time), and adenoma detection rate.

Cecal Intubation Rate for Colonoscopy

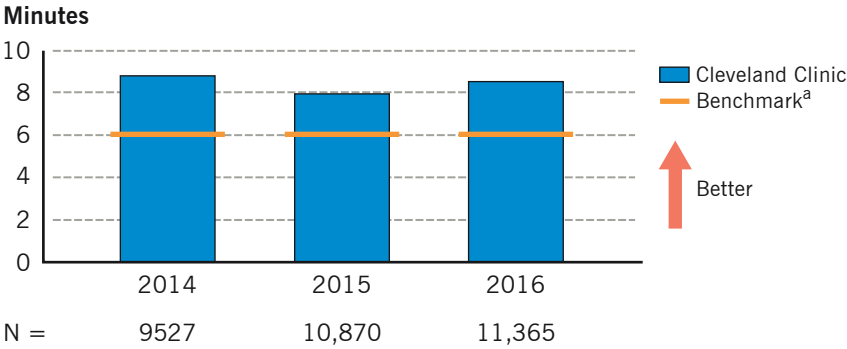
2014 – 2016



^aRex DK, Schoenfeld PS, Cohen J, Pike IM, Adler DG, Fennerty MB, Lieb JG 2nd, Park WG, Rizk MK, Sawhney MS, Shaheen NJ, Wani S, Weinberg DS. Quality indicators for colonoscopy. *Am J Gastroenterol.* 2015 Jan;110(1):72-90.

Mean Scope Withdrawal Time for Colonoscopies Without Maneuvers

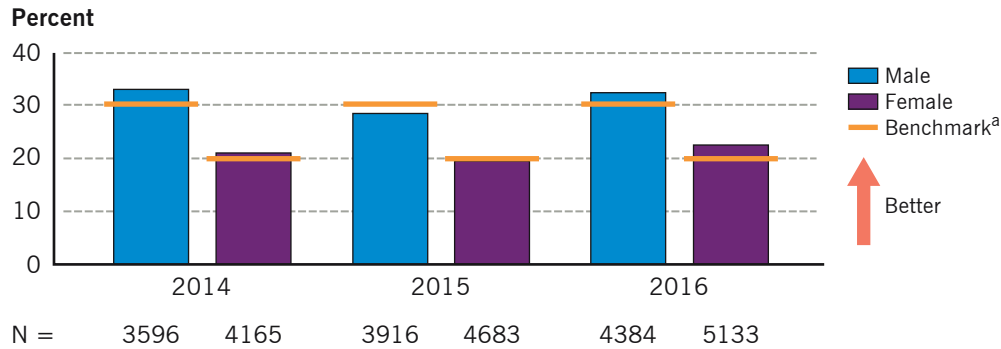
2014 – 2016



^aRex DK, Schoenfeld PS, Cohen J, Pike IM, Adler DG, Fennerty MB, Lieb JG 2nd, Park WG, Rizk MK, Sawhney MS, Shaheen NJ, Wani S, Weinberg DS. Quality indicators for colonoscopy. *Am J Gastroenterol.* 2015 Jan;110(1):72-90.

Adenoma Detection Rate

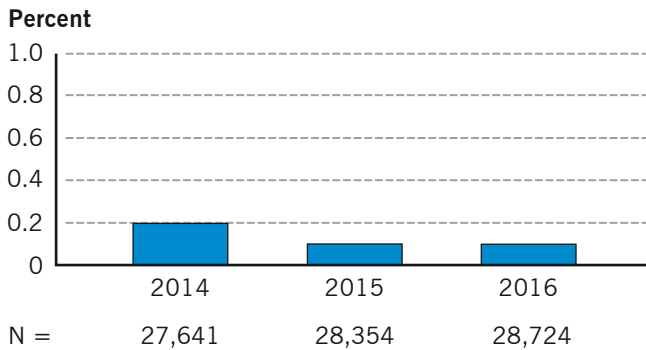
2014 – 2016



^aRex DK, Schoenfeld PS, Cohen J, Pike IM, Adler DG, Fennerty MB, Lieb JG 2nd, Park WG, Rizk MK, Sawhney MS, Shaheen NJ, Wani S, Weinberg DS. Quality indicators for colonoscopy. *Am J Gastroenterol*. 2015 Jan;110(1):72-90.

Thirty-Day Colonoscopy-Related Complications

2014 – 2016



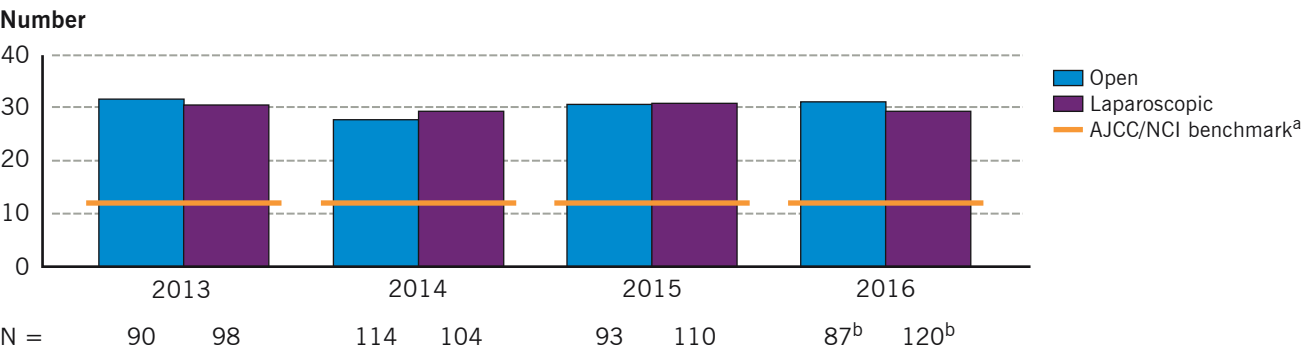
Large Bowel Disease

Colon Cancer

In 2016, approximately 200 patients underwent surgery for tumors of the colon by the Department of Colorectal Surgery. Despite increasing patient acuity (average American Society of Anesthesiologists score 2.9), surgeons in the Department of Colorectal Surgery achieved an in-hospital mortality rate of 0% for patients undergoing laparoscopic resection and 0% for those having an open colectomy.

Mean Lymph Nodes Harvested, Colon Cancer

2013 – 2016



AJCC = American Joint Committee on Cancer, NCI = National Cancer Institute

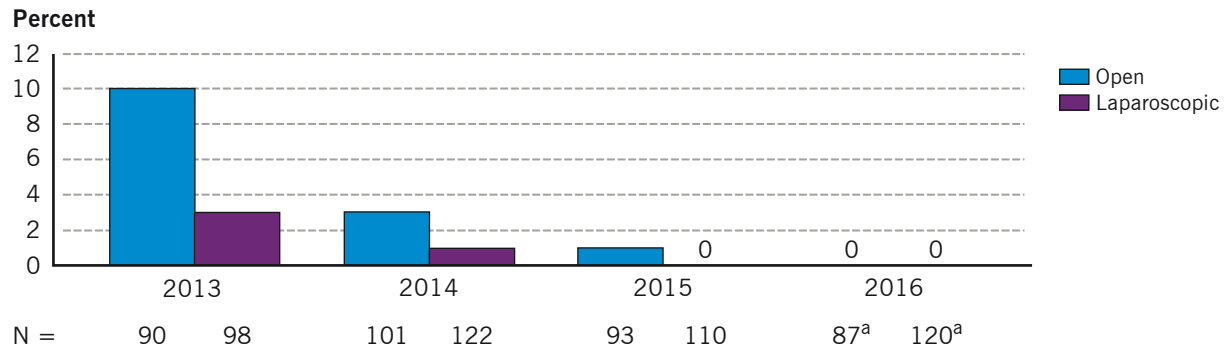
^aThe American Joint Committee on Cancer (AJCC) and National Cancer Institute (NCI) recommend harvesting for examination at least 12 lymph nodes in patients with colon cancer to confirm the absence of nodal involvement by tumor.

^b2016 volume annualized

The average lymph node harvest remained almost 3 times higher than the 12-node minimum that has become a national benchmark for quality of surgery and pathology assessment.

Colon Cancer Organ Space Infection Rate

2013 – 2016



^a2016 volume annualized

Large Bowel Disease

Colon Cancer Postoperative Outcomes

2013 – 2016

Postoperative Outcomes	2013		2014		2015		2016	
	Open	Lap	Open	Lap	Open	Lap	Open	Lap
N	90	98	114	104	93	110	87 ^b	120 ^b
ASA score ^a , mean	2.9	2.8	3.1	2.8	3.1	2.8	2.9	3.0
Median length of stay, days	9	8	11	6	9	7	9	5
30-day readmission rate, %	13	16	12	7	5	3	9	12
In-hospital mortality rate, %	1	0	1	0	2	1	0	2
Superficial surgical site infection rate, %	6	8	3	3	2	1	0	0
Urinary tract infection rate, %	6	8	3	0	0	3	4	2
Venous thromboembolism rate, %	4	3	5	3	2	4	0	3

ASA = American Society of Anesthesiologists, Lap = laparoscopic

^aASA score is a subjective assessment of a patient's severity of illness based on 5 classes (1–5), where 1 represents a completely healthy/fit patient and 5 represents a moribund patient not expected to live more than 24 hours.

^b2016 volume annualized

Multidisciplinary Tumor Conference

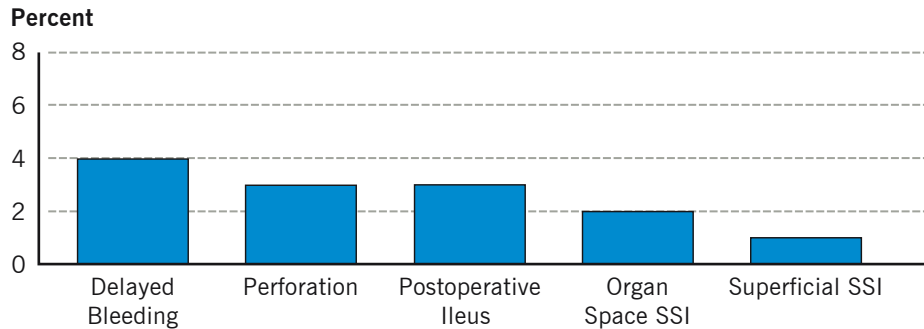
Patients with colon and rectal cancer are reviewed by a multidisciplinary tumor board consisting of caregivers from anatomic pathology, colorectal surgery, medical oncology, radiation oncology, gastroenterology, genomic medicine, hepatobiliary surgery, and radiology.

During tumor board conferences, patients' pathology and radiologic images are reviewed for diagnosis and clinical staging, and an individualized treatment plan is formulated. Cleveland Clinic's colorectal cancer multidisciplinary tumor board strives to discuss 100% of patients with a new diagnosis of colorectal cancer.

Advanced endoscopic resection techniques provide treatment of difficult colonic lesions and avoid the need for surgery in certain cases. A retrospective study was conducted to evaluate complications associated with advanced endoscopic resection in patients with complex colorectal lesions.

Advanced Endoscopic Resection–Related Complications, Colorectal Cancer

2011 – 2016



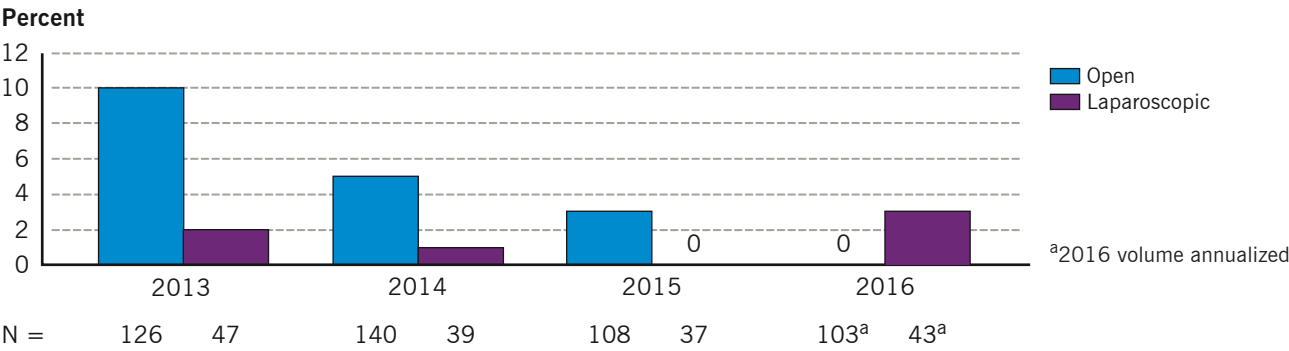
SSI = surgical site infection

Large Bowel Disease

Rectal Cancer

Rectal Cancer Organ Space Infection Rate

2013 – 2016



Rectal Cancer Postoperative Outcomes

2013 – 2016

Postoperative Outcomes	2013		2014		2015		2016	
	Open	Lap	Open	Lap	Open	Lap	Open	Lap
N	126	47	140	39	108	37	103 ^b	43 ^b
ASA score ^a , mean	2.8	2.7	3.0	2.7	2.8	2.9	2.9	2.9
Median length of stay, days	9	8	9	6	9	8	7	5
30-day readmission rate, %	19	14	17	4	11	5	10	16
In-hospital mortality rate, %	0	0	1	0	2	0	3	0
Superficial surgical site infection rate, %	6	1	3	2	2	1	3	0
Urinary tract infection rate, %	7	1	2	2	2	2	0	3
Venous thromboembolism rate, %	4	1	6	2	1	1	0	3

ASA = American Society of Anesthesiologists, Lap = laparoscopic

^aASA score is a subjective assessment of a patient's severity of illness based on 5 classes (1–5), where 1 represents a completely healthy/fit patient and 5 represents a moribund patient not expected to live more than 24 hours.

^b2016 volume annualized

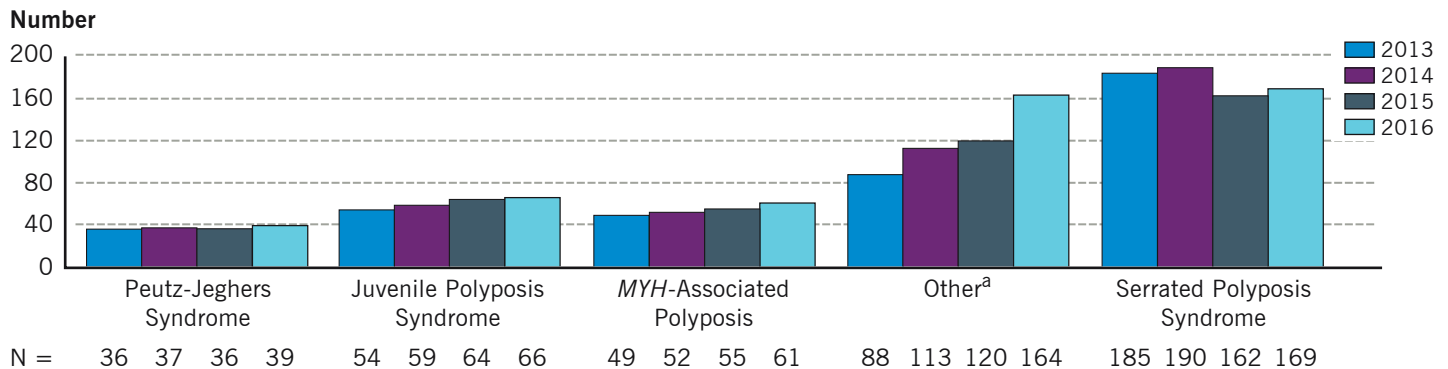
Hereditary Colon Cancer

The Sanford R. Weiss, MD, Center for Hereditary Colorectal Neoplasia was established in 2008. It is staffed by a multidisciplinary team dedicated to the care of patients affected by hereditary colorectal cancer syndromes. The center houses the David G. Jagelman Inherited Colorectal Cancer Registries, which were established in 1979. The mission of the Jagelman Registries and the Weiss Center is to prevent death from cancer and maintain quality of life through excellent patient care, effective education, and clinically relevant research.

In addition to treating patients with hereditary nonpolyposis colorectal cancer and familial adenomatous polyposis syndromes, the Weiss Center cares for patients and families with other less common hereditary syndromes associated with a high risk for colorectal and other cancers. These include Peutz-Jeghers syndrome, juvenile polyposis syndrome, *MYH*-associated polyposis, and serrated polyposis syndrome.

Families Treated by the Weiss Center for Less Common Polyposis Syndromes

2013 – 2016



^aIncludes Cowden syndrome, Cronkhite-Canada syndrome, and oligopolyposis

Weiss Center

Each year approximately **200** families are enrolled in the Weiss Center Familial Adenomatous Polyposis and Hereditary Nonpolyposis Colorectal Cancer Registry.

Large Bowel Disease

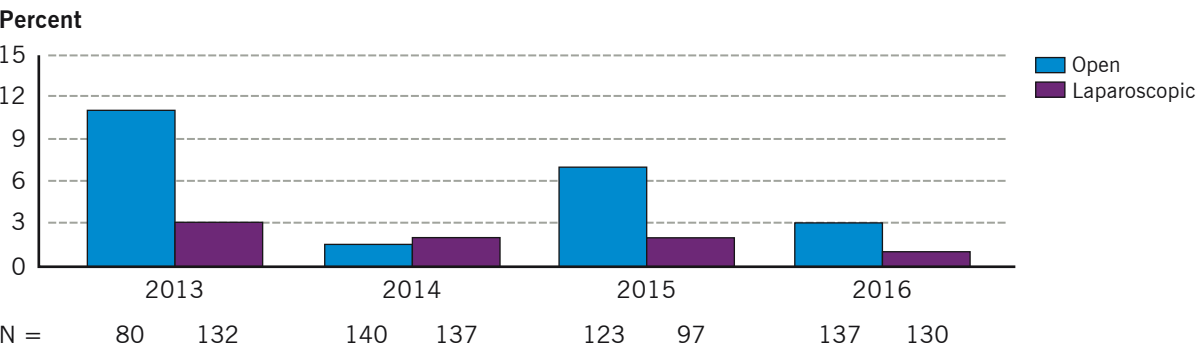
Diverticulitis

Diverticulitis is a condition resulting from inflammation and infection in 1 or more diverticula. Surgery becomes necessary when antibiotics fail to eradicate the infection and when a large abscess, perforation, peritonitis, or continued rectal bleeding is present.

The percentage of diverticulitis surgical cases completed via a minimally invasive laparoscopic approach has increased over the past 3 years. The colorectal department has a national and international referral base for highly complex cases.

Diverticulitis Organ Space Site Infection Rate

2013 – 2016



Diverticulitis Postoperative Outcomes

2013 – 2016

Postoperative Outcomes	2013		2014		2015		2016	
	Open	Lap	Open	Lap	Open	Lap	Open	Lap
N	80	132	140	137	123	97	137	130
Median length of stay, days	7	5	8	4	8	6	6	4
30-day readmission rate, %	11	13	15	8	12	12	14	7
In-hospital mortality rate, %	0	0	3	0	2	0	1	1
Superficial surgical site infection rate, %	7	4	16	5	3	2	3	2
Urinary tract infection rate, %	7	1	6	2	3	4	1	2
Venous thromboembolism rate, %	3	3	1	1	6	1	1	0

Lap = laparoscopic

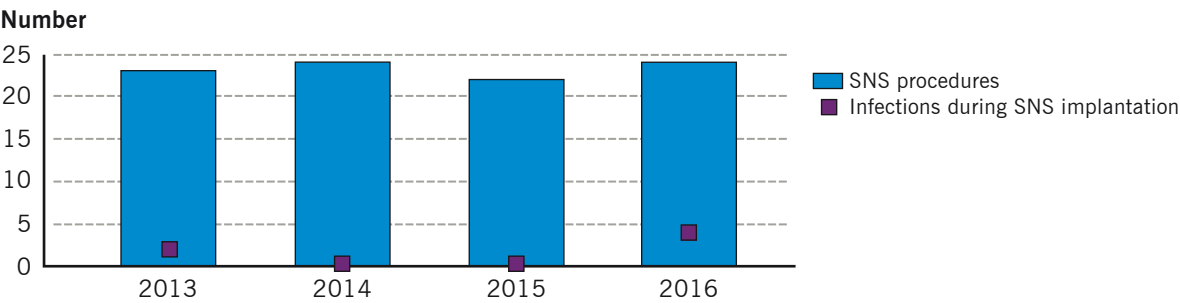
Pelvic Floor Disorders

The pelvic floor team is a multidisciplinary group of physicians that focuses on pelvic floor disorders and is one of the most experienced groups of such specialists in the region. Specialists treat the entire spectrum of bowel disorders, including fecal incontinence, chronic constipation, prolapse, and other disorders. They also treat anal pain, hemorrhoids, fissures, anal and rectovaginal fistulas, and pelvic pain. The National Association for Continence has designated the Section of Female Pelvic Medicine and Reconstructive Surgery in Cleveland Clinic's Ob/Gyn & Women's Health and Digestive Disease & Surgery Institutes as a Center of Excellence for Continence Care in Women.

Sacral nerve stimulation (SNS) is an FDA-approved treatment for fecal incontinence. The graph below depicts the number of procedures performed yearly and the number of yearly infections during SNS implantation, which has stayed consistently low over the past few years.

Sacral Nerve Stimulation for Fecal Incontinence (N = 93)

2013 – 2016

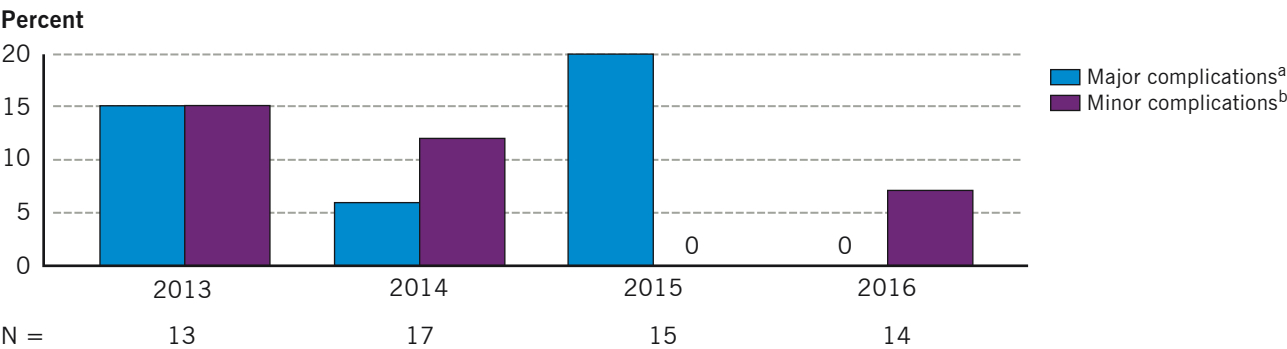


Large Bowel Disease

Ventral rectopexy is a procedure to correct internal and external rectal prolapse. The procedure is technically challenging, and even in expert hands, it is not without complications.

Complications After Ventral Rectopexy

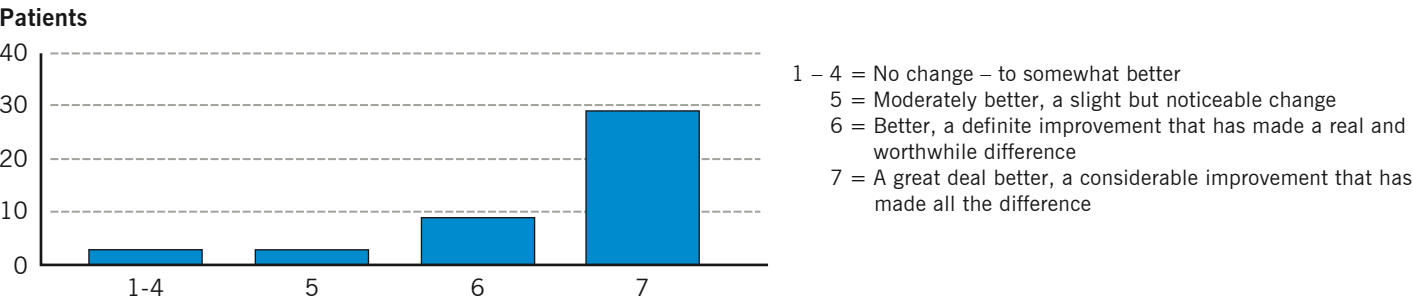
2013 – 2016



The Patient Global Impression of Change (PGIC) scale assesses quality of life (QOL) after surgery related to baseline conditions. During follow-up after ventral rectopexy, patients' QOL was assessed using the PGIC. A score of 5–7 represents a favorable change in QOL, whereas a score of 1–4 represents no significant change in QOL.

Patient Global Impression of Change Scores After Ventral Rectopexy (N = 44)

2013 – 2016



Pancreaticobiliary Disease

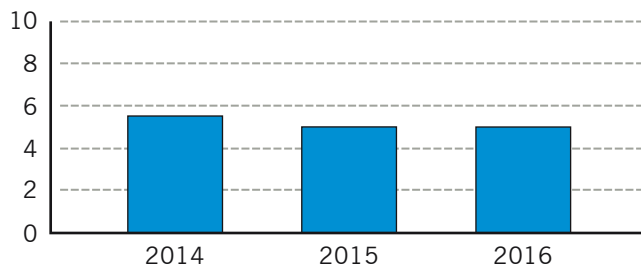
Endoscopic Retrograde Cholangiopancreatography

Endoscopic retrograde cholangiopancreatography (ERCP) is a procedure used to diagnose and treat disorders of the bile and pancreatic ducts.

Post-ERCP Acute Pancreatitis, Adult and Pediatric

2014 – 2016

Percent



N^a = 1563 1714 1565

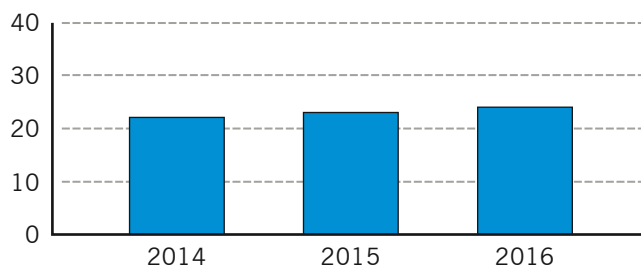
ERCP = endoscopic retrograde cholangiopancreatography

^aIncludes Cleveland Clinic Weston data

Pancreatic Stent Placement and/or Use of Indomethacin, Adult and Pediatric

2014 – 2016

Percent



N^a = 1563 1714 1565

^aIncludes Cleveland Clinic Weston data

Placement of a pancreatic duct stent and/or rectal indomethacin has been shown to reduce the risk for pancreatitis following ERCP.

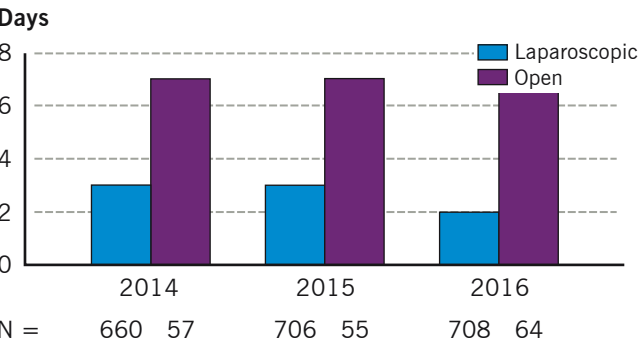
Pancreaticobiliary Disease

Management of Gallbladder Disease

Cholecystectomy is one of the most common general surgical procedures for the treatment of symptomatic gallstones and other gallbladder conditions. The majority of these operations are performed laparoscopically.

Median Length of Stay, Inpatient Laparoscopic and Open Cholecystectomies^a

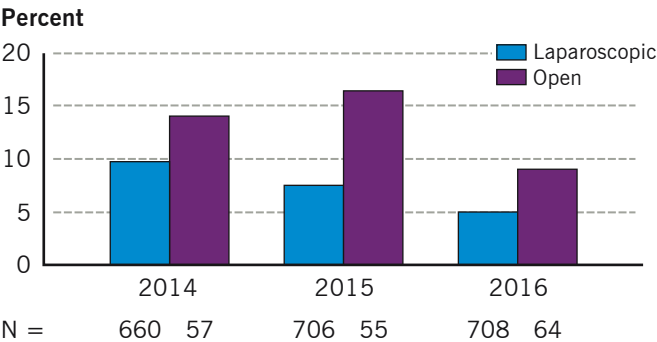
2014 – 2016



^aIncludes Cleveland Clinic Weston data

Thirty-Day Readmission Rate, Inpatient Laparoscopic and Open Cholecystectomies^a

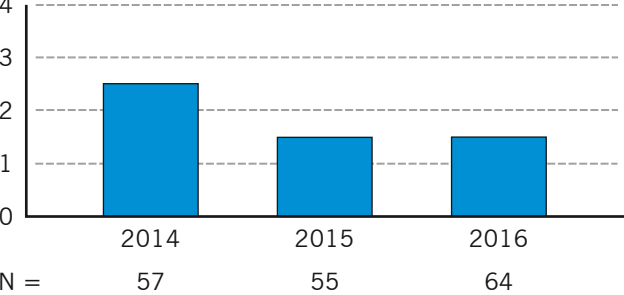
2014 – 2016



^aIncludes Cleveland Clinic Weston data

Thirty-Day Mortality Rate, Inpatient Open Cholecystectomies^a

2014 – 2016



The 30-day mortality rate for laparoscopic cases was 0% in all 3 years.

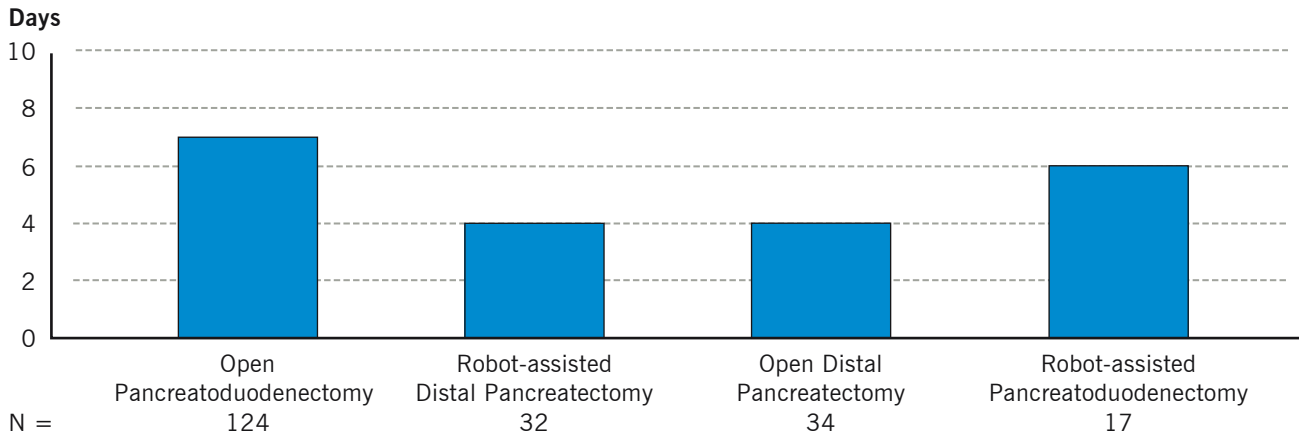
^aIncludes Cleveland Clinic Weston data

Management of Pancreatic Disease

Cleveland Clinic's Pancreas Disorder Clinic cares for patients across the spectrum of pancreatic diseases, both benign and malignant, and offers multidisciplinary care teams for pancreatic cancer and chronic pancreatitis.

Median Length of Stay, Pancreatectomy Procedures^a (N = 207)

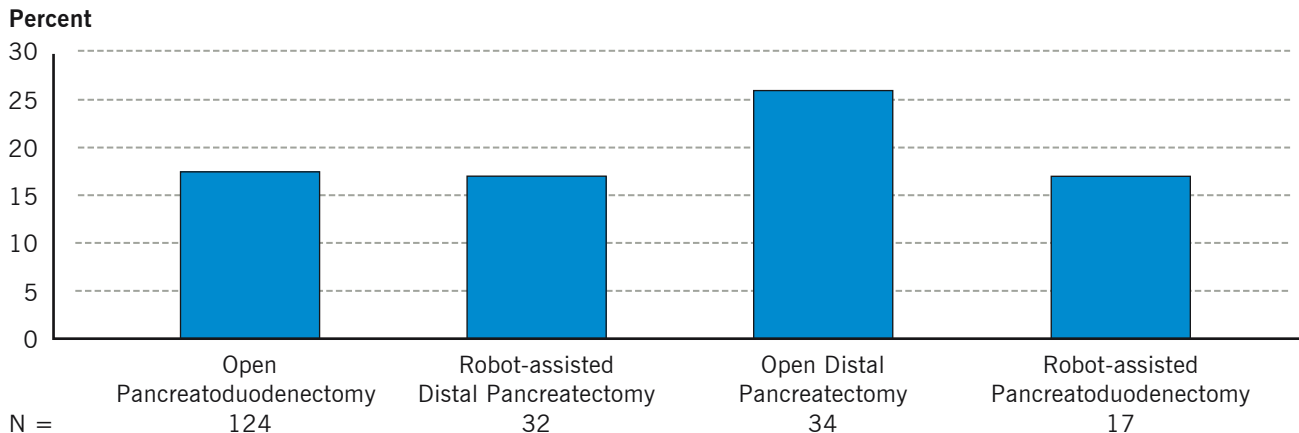
2016



^aIncludes Cleveland Clinic Weston data

Thirty-Day Readmission Rate, Pancreatectomy Procedures^a (N = 207)

2016



^aIncludes Cleveland Clinic Weston data

Liver Disease and Liver Transplantation

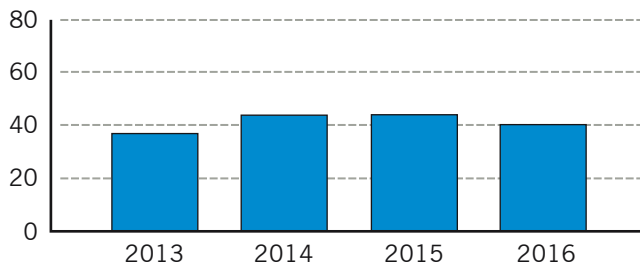
Paracentesis

Paracentesis is a diagnostic and therapeutic procedure. Large volume paracentesis is the first-line treatment for cirrhotic patients with tense and/or refractory ascites.

Thirty-Day Readmission Rate, Large Volume Paracentesis

2013 – 2016

Percent

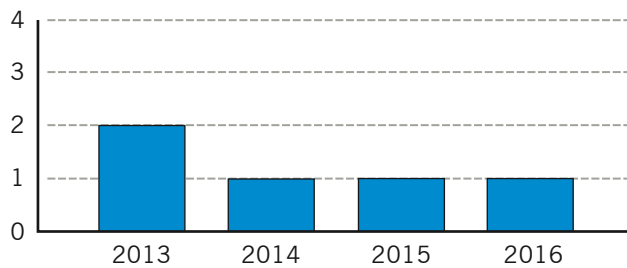


N = 238 290 332 330

Severe Adverse Events^a Following Paracentesis

2013 – 2016

Percent



N = 1290 1548 1872 1869

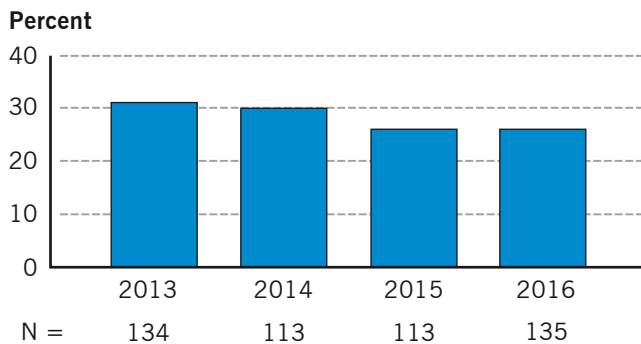
^aDefined as death within 72 hours or hemoperitoneum

Transjugular Intrahepatic Portosystemic Shunt

Transjugular intrahepatic portosystemic shunt (TIPS) is used to treat portal hypertension-related complications, such as bleeding esophageal or gastric varices, refractory ascites, and hepatic hydrothorax. Cleveland Clinic is among the top institutions in the nation in the number of TIPS procedures it performs. A multidisciplinary approach, which involves hepatologists and radiologists, is employed in the selection of candidates best suited for TIPS procedures.

Admission or Readmission^a Within 30 Days of TIPS

2013 – 2016

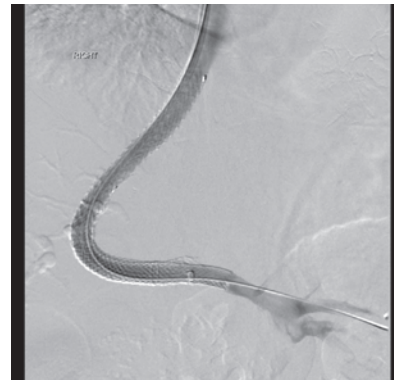


TIPS = transjugular intrahepatic portosystemic shunt

^aReadmissions include need for management of all complications related to severity of underlying liver disease.



Coronal multiplanar reconstruction of CT of the abdomen with contrast, demonstrating contrast opacification of the existing left portal vein to middle hepatic vein shunt corresponding to patent TIPS. The stent extends inferiorly in the main portal vein.



Portogram: Direct portogram obtained through transjugular approach that demonstrates contrast opacification of the main portal vein and patent TIPS.

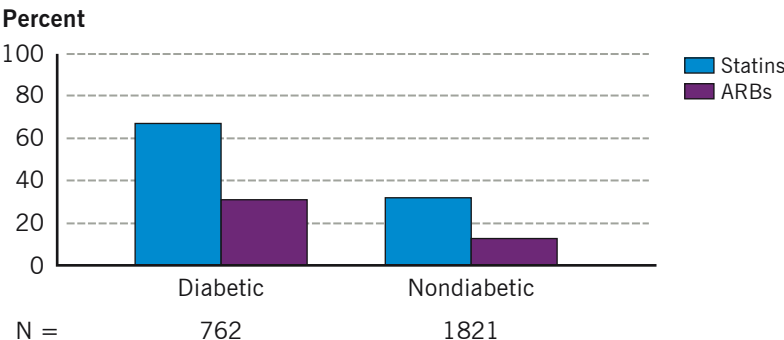
Liver Disease and Liver Transplantation

Nonalcoholic Steatohepatitis

Cardiovascular disease is the main cause of death in patients with nonalcoholic steatohepatitis (NASH). Statin therapy has proved safe in NASH patients and improves cardiovascular outcomes. Renal-angiotensin system blockade with angiotensin receptor blockers has an antihypertensive effect, and current evidence suggests it has a role in inhibiting liver fibrosis.

Nonalcoholic Steatohepatitis Patients Receiving Drug Therapy

2014 – 2016



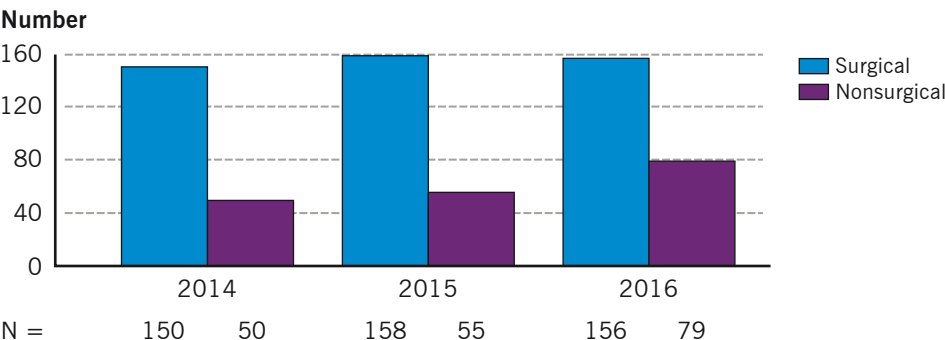
ARBs = angiotensin receptor blockers

Liver Tumor Clinic

Cleveland Clinic’s Liver Tumor Clinic uses a multidisciplinary approach to treat benign and malignant liver tumors. Treatment options include surgical resection (open, laparoscopic, robot-assisted) and nonsurgical treatment (chemoembolization, radioembolization, external beam radiation, radiofrequency ablation). The team includes medical and radiation oncologists, interventional radiologists, hepatologists, and transplant/hepatobiliary surgeons.

Interventions for New Patients^a

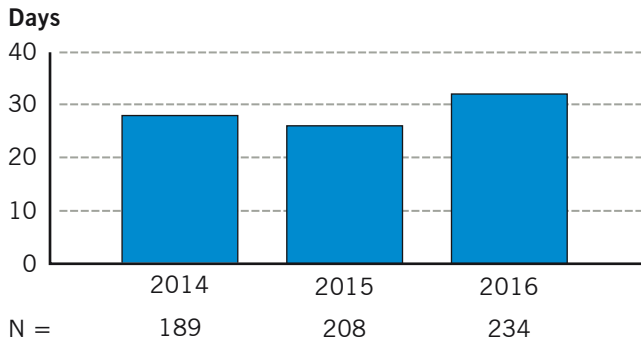
2014 – 2016



^aNot all patients met the criteria for treatment.

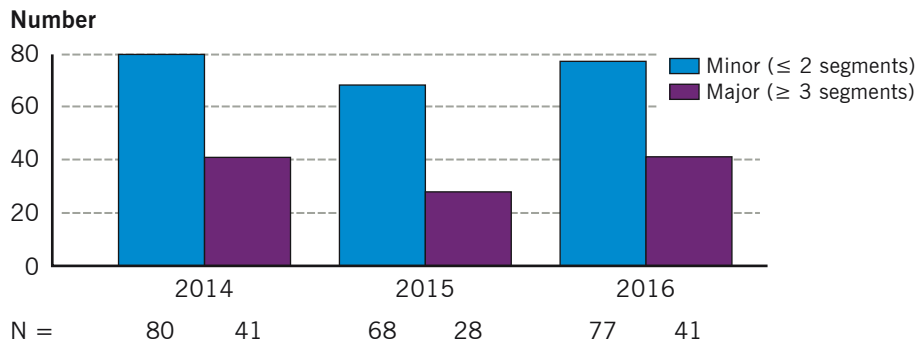
Median Number of Days From Initial Visit to Intervention

2014 – 2016



Type of Liver Resections

2014 – 2016



Since **2006**

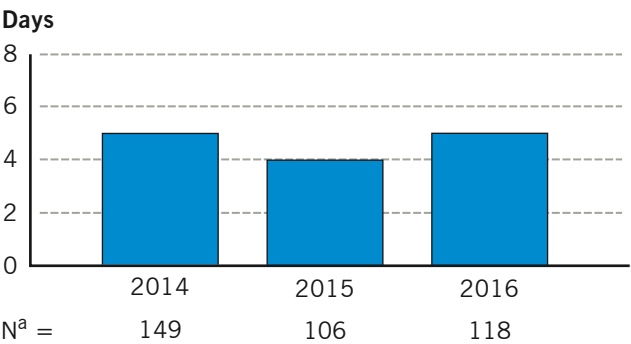
The Liver Tumor Clinic has performed more than **250** minimally invasive liver surgery resections via laparoscopic and robot-assisted technology.

Liver Tumor Clinic

The Liver Tumor Clinic has developed a tissue, serum, and breath biorepository for samples from patients with liver malignancies. Currently the clinic has **152** tissue and **82** blood/plasma stored samples, and **43** breath samples, which are utilized as substrates for translational research.

Median Length of Stay, Liver Resection

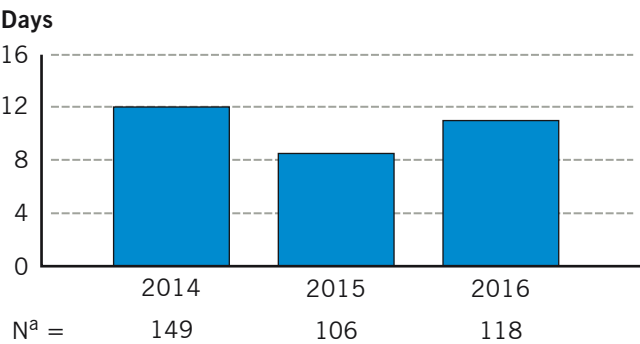
2014 – 2016



^aData not available for all patients who underwent liver resection.

Thirty-Day Readmission Rate, Liver Resection

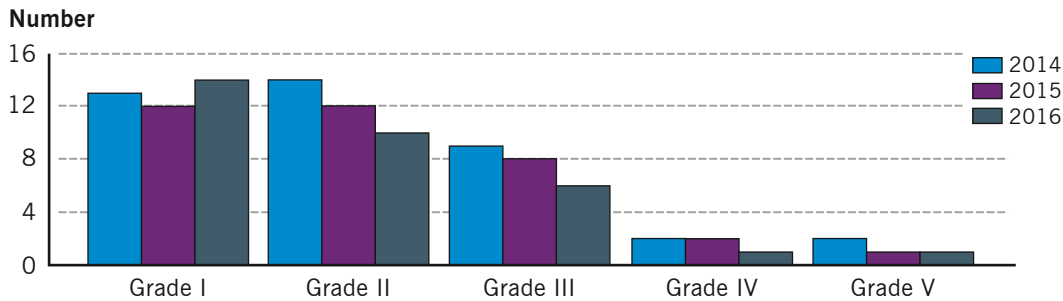
2014 – 2016



^aData not available for all patients who underwent liver resection.

Postoperative Complications,^a Liver Resection (N = 107)

2014 – 2016



^aBased on Clavien-Dindo classification, grades indicate increasingly severe complications (Grade I = least severe to Grade V = death).

*A **liver malignancy mouse xenograft** platform has been initiated to study liver tumors from individual patients and to foster personalized medicine in the field of liver oncology.*

Liver Disease and Liver Transplantation

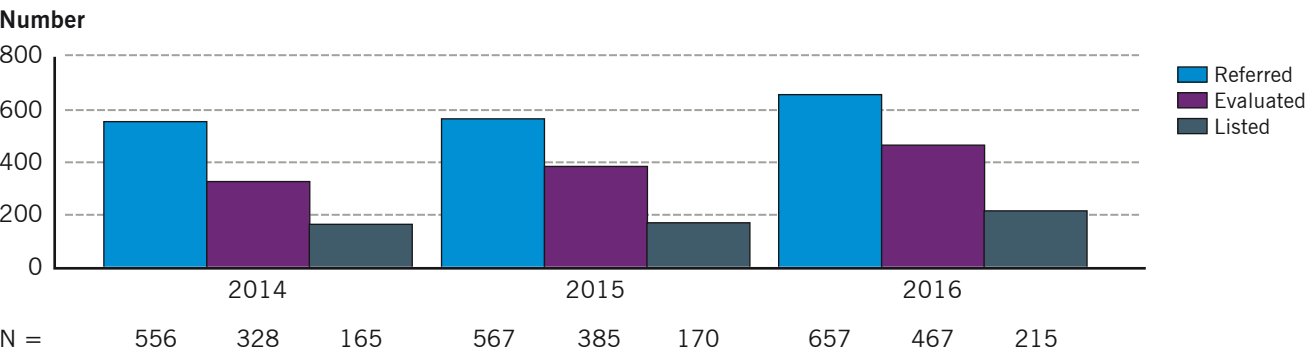
Liver Transplantation

Cleveland Clinic performed its first adult liver transplantation on Nov. 8, 1984, and had completed 2392 liver transplantations as of the end of 2016, including 2261 liver only transplantations and 131 multiorgan transplantations (100 liver/kidney, 5 liver/heart, 8 liver/lung, 4 liver/pancreas, 12 liver/intestine/pancreas, and 2 liver/intestine/pancreas/kidney).

Liver Transplant Patients and Short-Term Outcomes

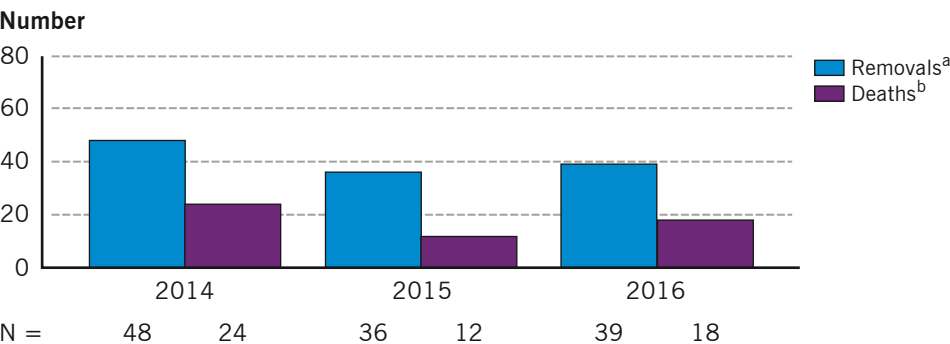
Patients Referred, Evaluated, and Listed

2014 – 2016



Patient Removals From the Wait-List

2014 – 2016



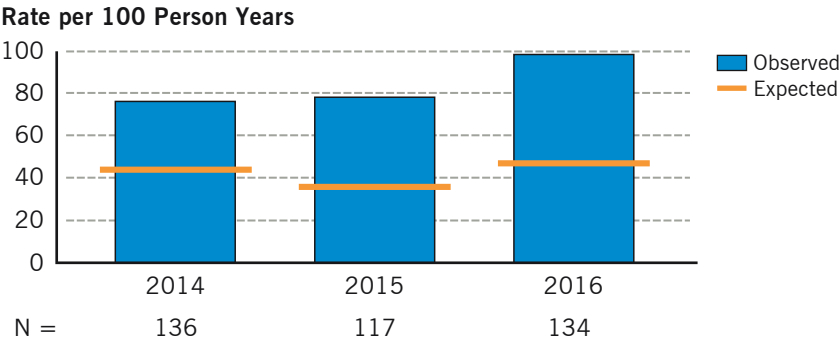
^aIncludes all removals for reasons other than death and transplantation

^bPatient deaths while on the liver transplant wait-list

Transplant rate is calculated in person-years (days converted to fractional years): the number of days from Jan. 1 or from the date of first wait-listing until death, transplantation, 60 days after recovery, transfer, or Dec. 31. The expected transplant rate is adjusted for age, blood type, medical urgency status, time on wait-list, and previous transplantation.

Transplant Rate for Patients Waiting for Liver Transplantation

2014 – 2016

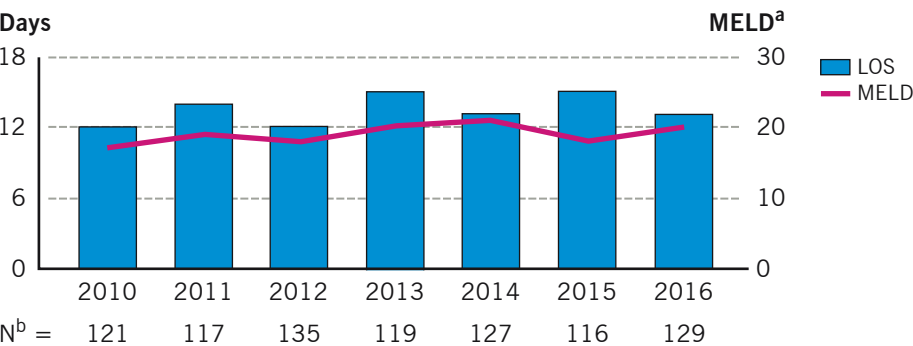


Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

Liver Disease and Liver Transplantation

Median Length of Stay, Liver Transplantation

2010 – 2016



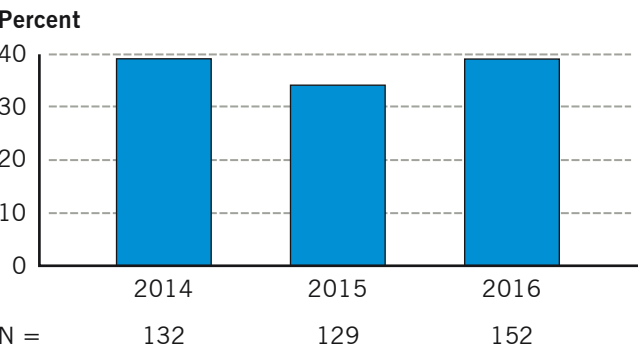
LOS = length of stay, MELD = Model for End-Stage Liver Disease

^aCalculated MELD score does not reflect exception MELD points.

^bData not available for all liver transplant patients.

Thirty-Day Readmission Rate, Liver Transplantation

2014 – 2016

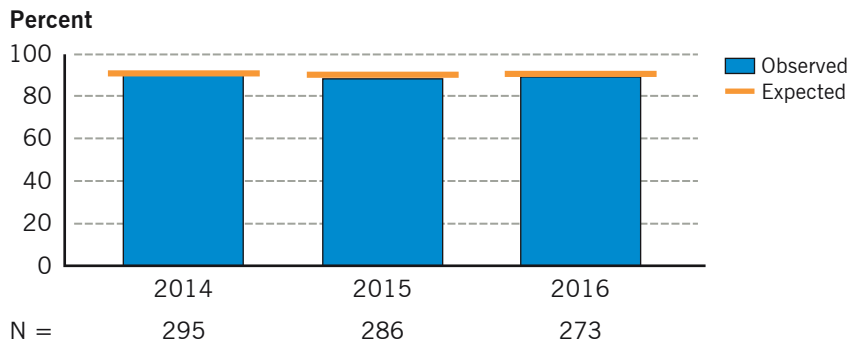


Cleveland Clinic's liver transplant team started a project in 2010 to streamline the postoperative clinical care pathways, which resulted in an immediate reduction in length of stay.

Patient and Graft Survival, All Donor Types

One-Year Adult Patient Survival

2014 – 2016

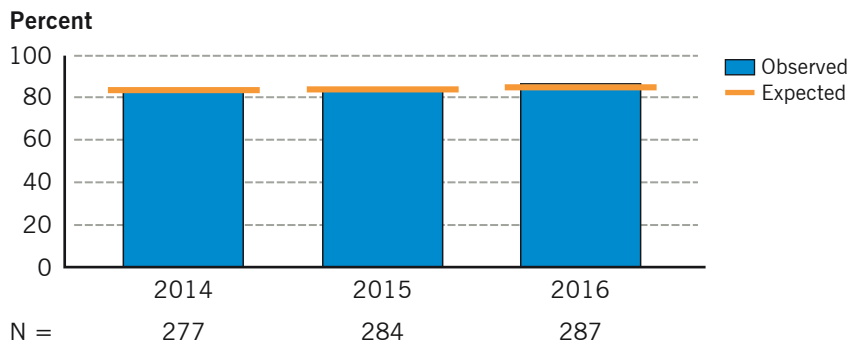


Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

Each reporting year reflects transplants performed over a 2.5-year period.

Three-Year Adult Patient Survival

2014 – 2016



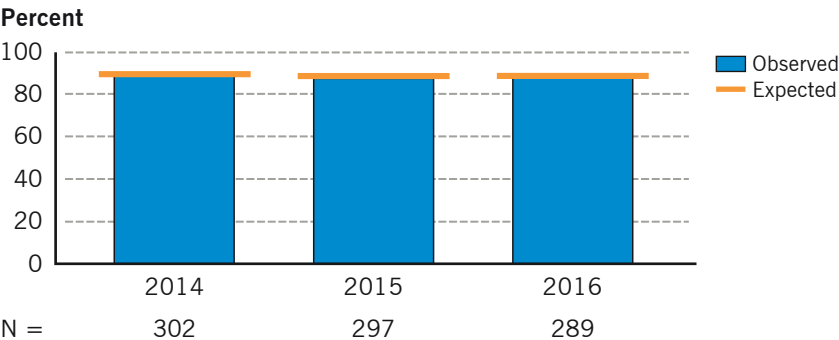
Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

Each reporting year reflects transplants performed over a 2.5-year period.

Liver Disease and Liver Transplantation

One-Year Adult Graft Survival

2014 – 2016

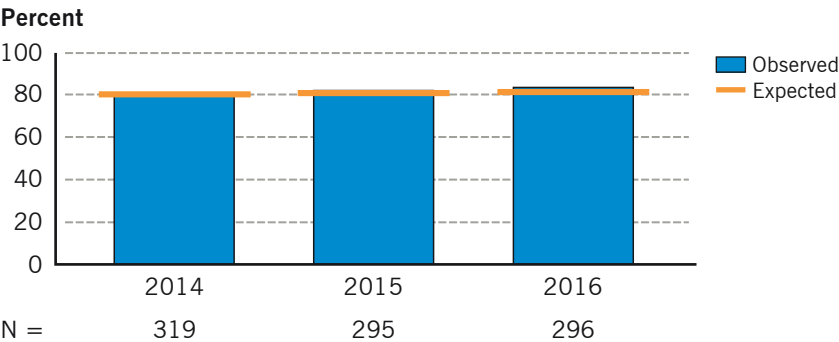


Source: Scientific Registry of Transplant Recipients (SRTR) srr.org

Each reporting year reflects transplants performed over a 2.5-year period.

Three-Year Adult Graft Survival

2014 – 2016



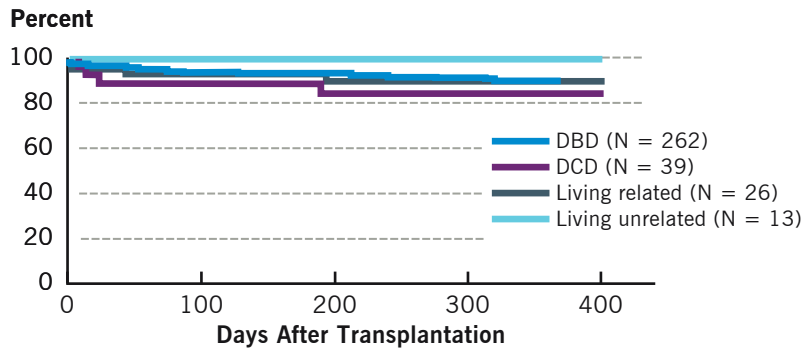
Source: Scientific Registry of Transplant Recipients (SRTR) srr.org

Each reporting year reflects transplants performed over a 2.5-year period.

Patient and Graft Survival by Donor Types

One-Year Patient Survival: Adult Primary Liver Transplantation Only^a

2014 – 2016



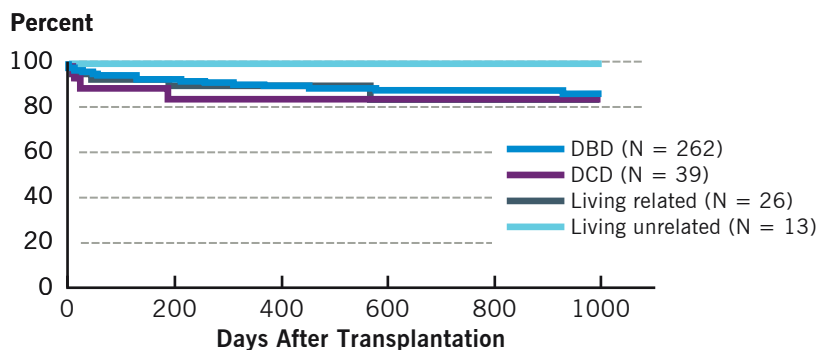
DBD = donation after brain death, DCD = donation after cardiac death

Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

^aSRTR national average for 1-year patient survival = 91.57%

Three-Year Patient Survival: Adult Primary Liver Transplantation Only^a

2014 – 2016



DBD = donation after brain death, DCD = donation after cardiac death

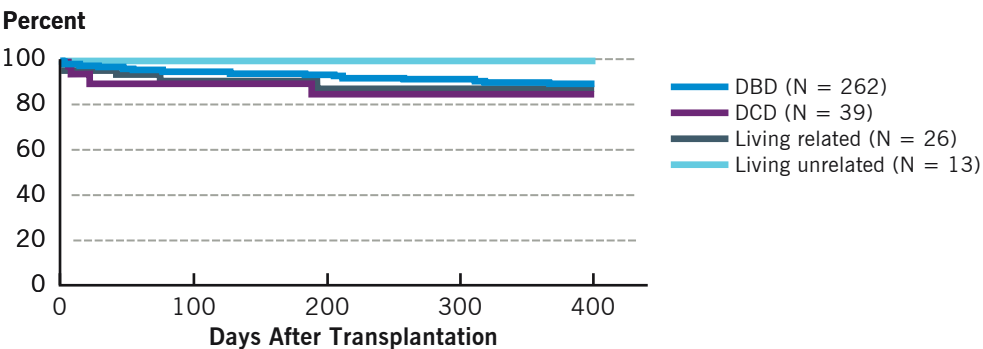
Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

^aSRTR national average for 3-year patient survival = 83.43%

Liver Disease and Liver Transplantation

One-Year Graft Survival: Adult Primary Liver Transplantation Only^a

2014 – 2016



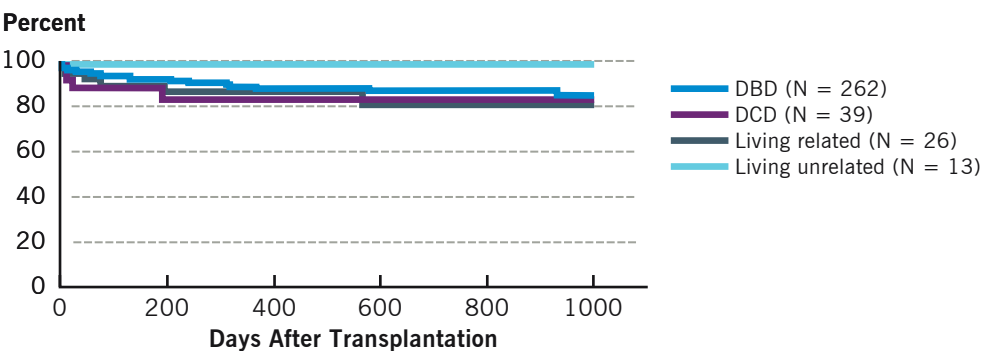
DBD = donation after brain death, DCD = donation after cardiac death

Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

^aSRTR national average for 1-Year Graft Survival = 88.26%.

Three-Year Graft Survival: Adult Primary Liver Transplantation Only^a

2014 – 2016



DBD = donation after brain death, DCD = donation after cardiac death

Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

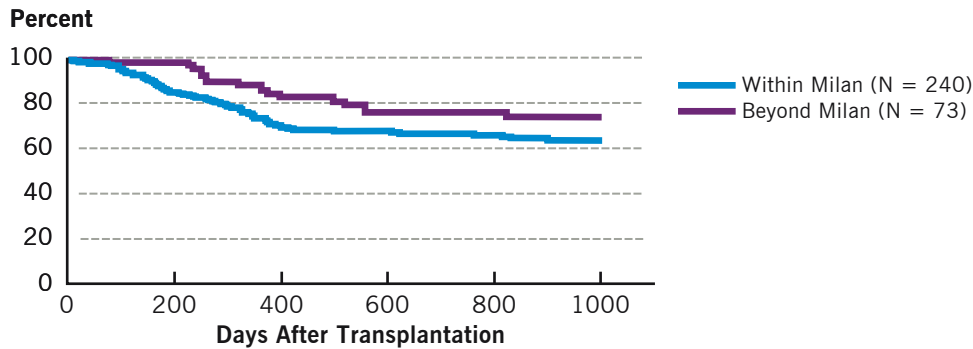
^aSRTR national average for 3-Year Graft Survival = 77.97%.

Liver Transplantation for Hepatocellular Carcinoma

Hepatocellular carcinoma (HCC) is the fifth most common cancer in men and the seventh most common cancer in women. Liver transplantation is the standard of care for patients with HCC complicated by cirrhosis and portal hypertension. Candidates for liver transplantation must have HCC lesions within the Milan criteria. Locoregional therapy has been used to downstage HCC in selected patients who fall outside the Milan criteria in order to proceed to liver transplantation.

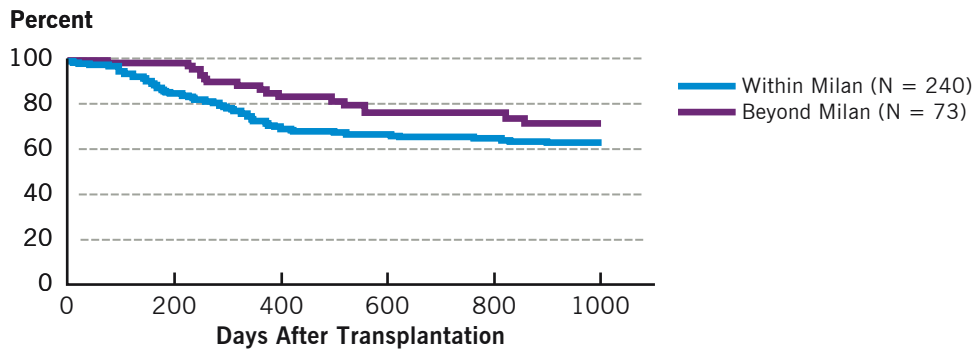
Three-Year Patient Survival: Within and Beyond Milan Criteria

2009 – 2016



Three-Year Graft Survival: Within and Beyond Milan Criteria

2009 – 2016



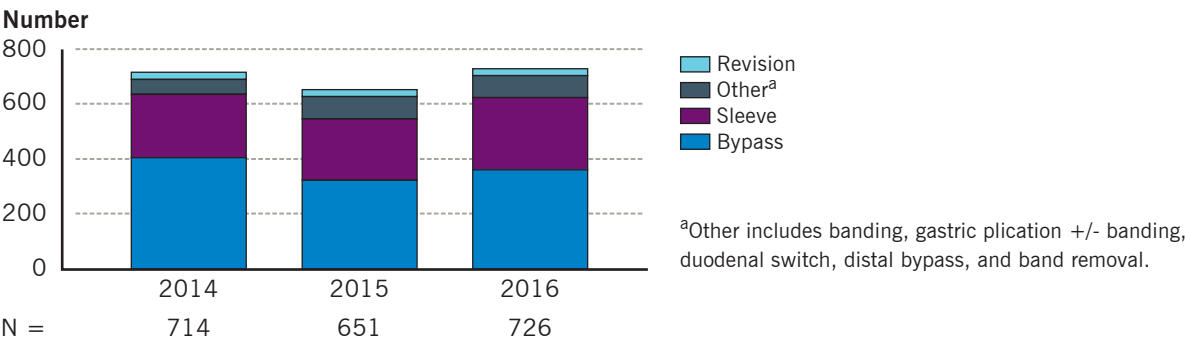
Obesity and Metabolic Disease

Bariatric Surgery

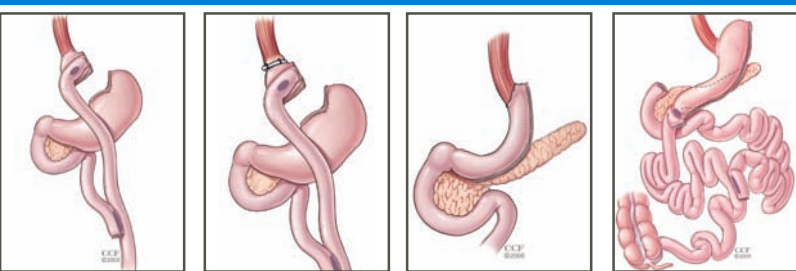
In 2015, Cleveland Clinic's Bariatric and Metabolic Institute marked its 10th anniversary and continues to be accredited as a designated Bariatric Surgery Center of Excellence by the American Society for Metabolic & Bariatric Surgery and the American College of Surgeons. This designation is awarded to programs that meet high quality standards and perform a minimum of 125 procedures annually.

Bariatric Surgery Cases

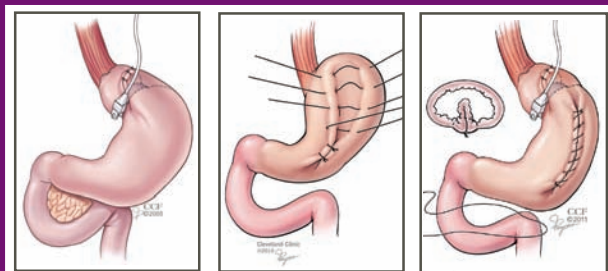
2014 – 2016



More Common Procedures



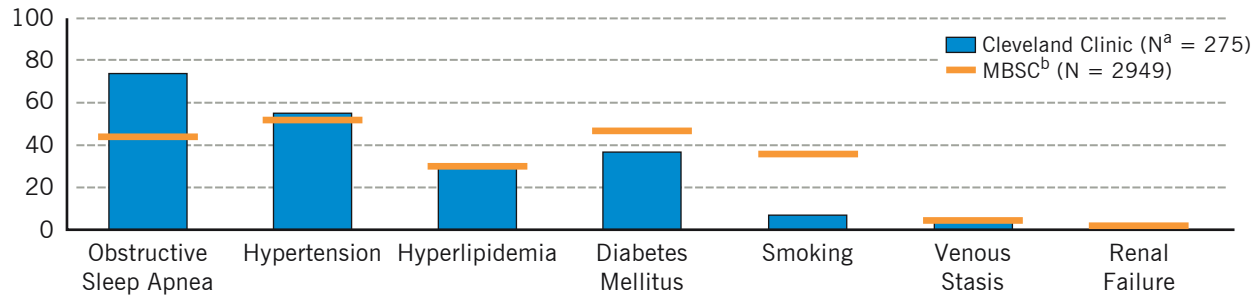
Less Common Procedures



Baseline Comorbidities, Laparoscopic Roux-en-Y Gastric Bypass

2016

Percent



MBSC = Michigan Bariatric Surgery Collaborative

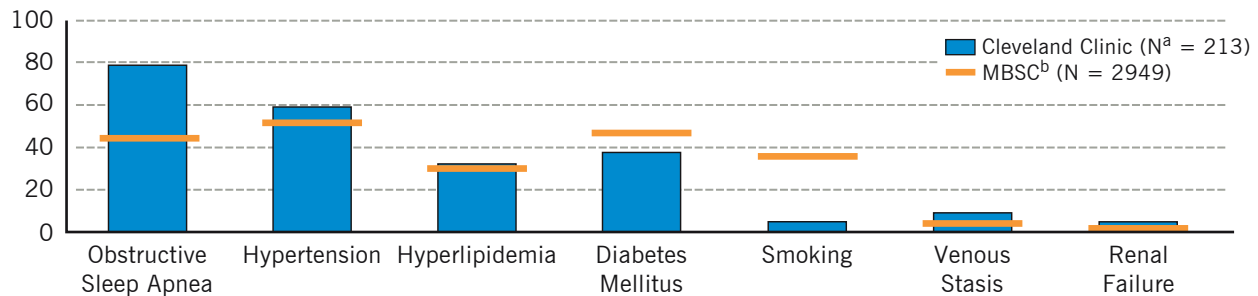
^aRepresents primary procedures only

^bBenchmark: MBSC michiganbsc.org

Baseline Comorbidities, Laparoscopic Sleeve Gastrectomy

2016

Percent



MBSC = Michigan Bariatric Surgery Collaborative

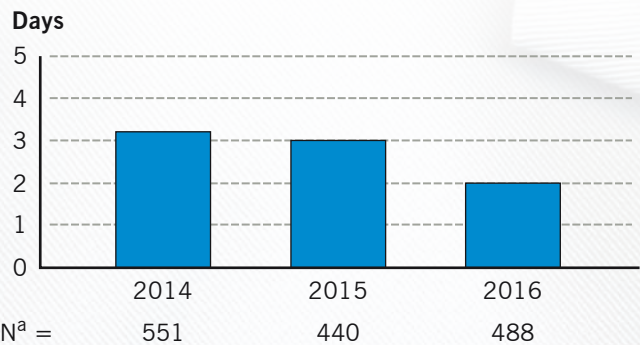
^aRepresents primary procedures only

^bBenchmark: MBSC michiganbsc.org

Obesity and Metabolic Disease

Median Length of Stay, Laparoscopic Roux-en-Y Gastric Bypass and Laparoscopic Sleeve Gastrectomy

2014 – 2016



^aRepresents primary procedures only



Thirty-Day Complication Rate, Bariatric Surgery (N^a = 488)

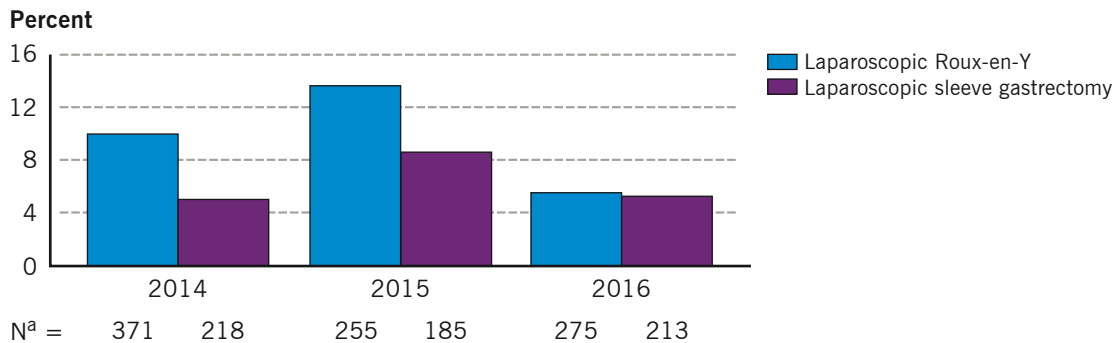
2016

Complications	Rate (%)
Respiratory failure	0.21
Deep vein thrombosis	0.0
Bleeding	0.62
Intestinal obstruction	0.0
Wound infection/evisceration	0.21
Anastomotic leak	0.0

^aRepresents primary procedures only

Thirty-Day Readmission Rate, Laparoscopic Roux-en-Y Gastric Bypass and Laparoscopic Sleeve Gastrectomy

2014 – 2016

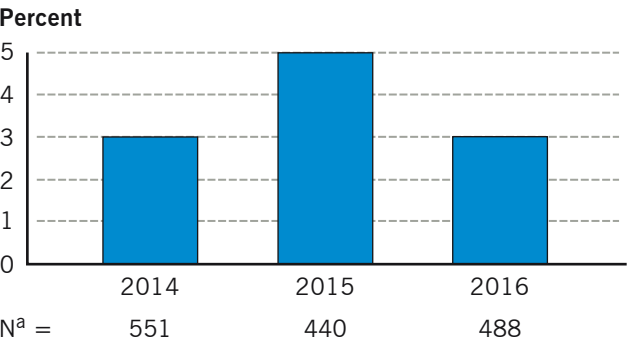


^aRepresents primary procedures only

Obesity and Metabolic Disease

Intensive Care Unit Admission, Laparoscopic Roux-en-Y Gastric Bypass and Laparoscopic Sleeve Gastrectomy

2014 – 2016



^aRepresents primary procedures only

Thirty-Day Mortality Rates, Bariatric Surgery

2016

Surgery Type, % (N ^a)	Cleveland Clinic	BOLD ^b
All bariatric surgeries	0.41 (488)	0.1 (186,567)
Laparoscopic Roux-en-Y gastric bypass	0.36 (275)	0.14 (136,036)
Laparoscopic sleeve gastrectomy	0.47 (213)	0.08 (15,964)

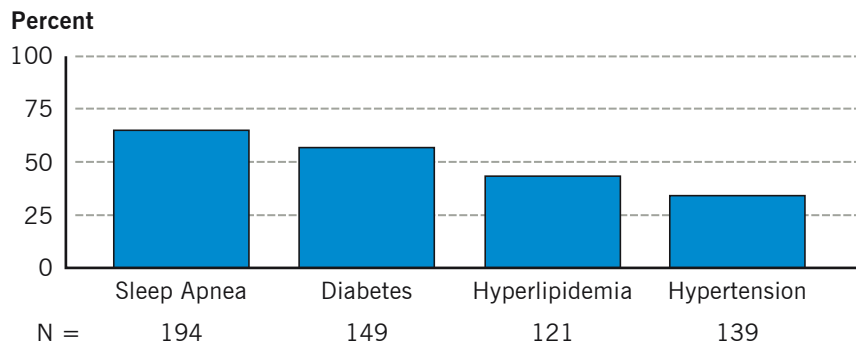
BOLD = Bariatric Outcomes Longitudinal Database

^aRepresents primary procedures only

^bBenchmark: BOLD asmbs.org

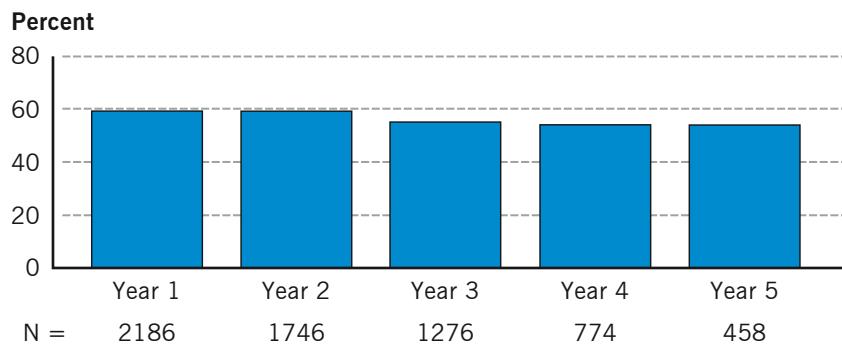
Comorbidity Resolution at 3-Year Follow-Up, Bariatric Surgery

2008 – 2016



Mean Percent Weight Loss^a Toward Ideal Body Mass Index at Follow-Up, Bariatric Surgery

2008 – 2016



^aWeight loss formula: (baseline BMI – follow-up BMI) / (baseline BMI – ideal BMI [25]) x 100

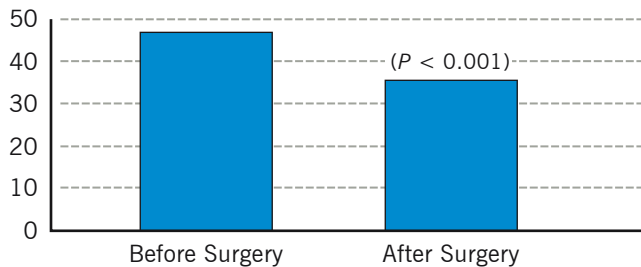
Obesity and Metabolic Disease

Bariatric Surgery for Diabetes

Mean Body Mass Index Before and After Bariatric Surgery for Obese Diabetic Patients With Baseline HbA_{1c} Values > 6.5% (N = 458)

2004 – 2016

BMI (kg/m²)

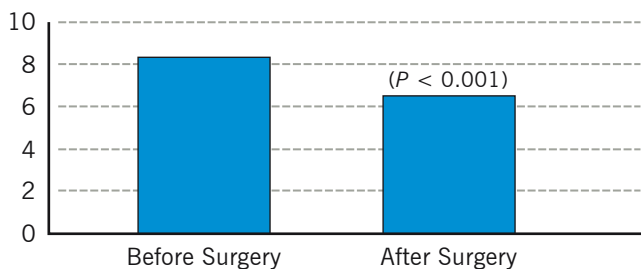


The mean body mass index (BMI) difference before and after surgery was significant, with baseline BMI at 46.5 and follow-up at 35.5. The mean follow-up duration was 3.5 years.

Mean HbA_{1c} Values Before and After Bariatric Surgery for Diabetic Patients With Baseline A_{1c} Values > 6.5% (N = 458)

2004 – 2016

Percent

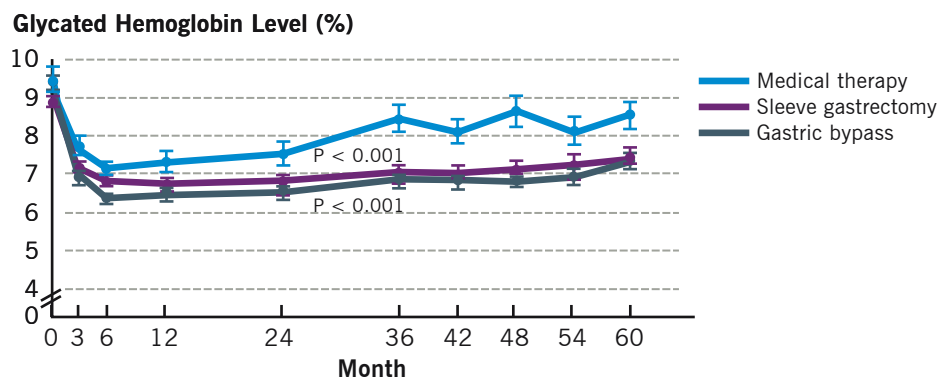


The mean hemoglobin difference before and after surgery was significant, with a mean A_{1c} baseline of 8.2% before surgery and a most recently available A_{1c} of 6.5% after surgery. The average time between pre- and postoperative HbA_{1c} values was 15 months.

Long-term (5-year) follow-up analyses from the Surgical Treatment and Medications Potentially Eradicate Diabetes Efficiently (STAMPEDE) trial found that bariatric surgery plus intensive medical therapy is more effective than intensive medical therapy alone in decreasing, or in some cases resolving, hyperglycemia.¹

Outcomes were assessed in 150 Cleveland Clinic patients with type 2 diabetes and a body mass index of 27 to 43. Patients were randomly assigned to receive intensive medical therapy alone or intensive medical therapy plus Roux-en-Y gastric bypass or sleeve gastrectomy. The primary outcome was a glycated hemoglobin level of $\leq 6.0\%$ with or without the use of diabetes medications.¹

Mean Glycated Hemoglobin by Intervention (N = 150)



Mean (median) Value at Visit

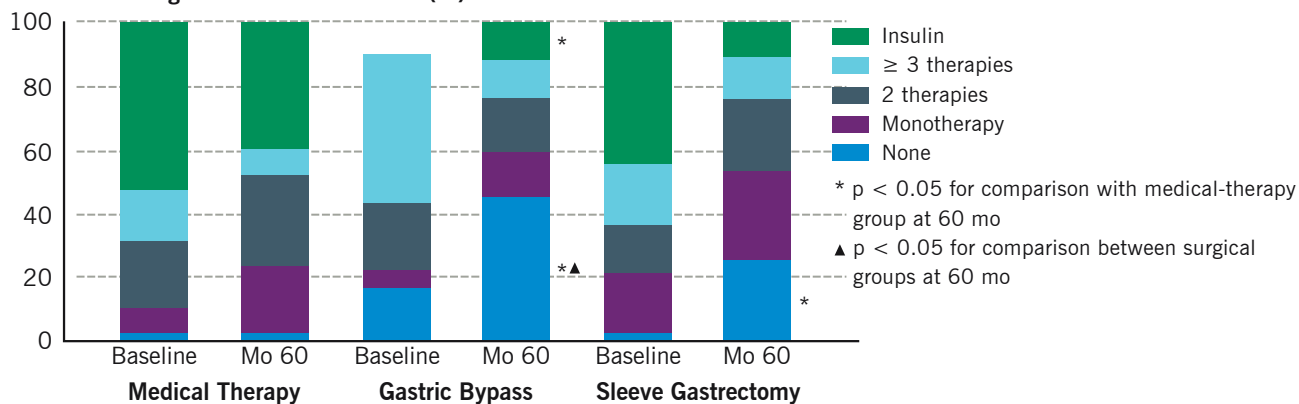
Medical therapy 8.8 (8.6) 7.3 (6.8) 7.5 (7.2) 8.4 (7.7) 8.6 (8.2) 8.5 (8.0)

Gastric bypass 9.3 (9.4) 6.4 (6.2) 6.5 (6.4) 6.8 (6.6) 6.8 (6.8) 7.3 (6.9)

Sleeve gastrectomy 9.5 (8.9) 6.7 (6.4) 6.8 (6.8) 7.0 (6.7) 7.1 (6.6) 7.4 (7.2)

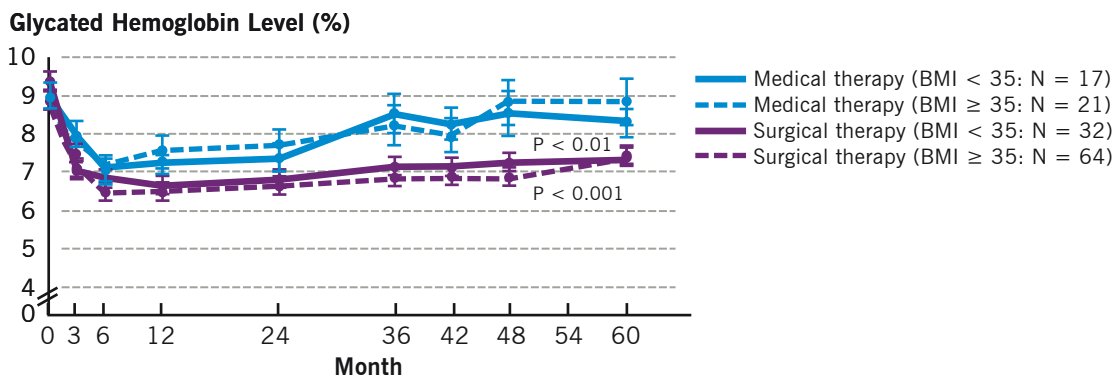
Change in Patients' Diabetes Medications 5 Years Postintervention (N = 150)

Patients Taking Diabetes Medications (%)



Obesity and Metabolic Disease

Mean Glycated Hemoglobin Levels According to Body Mass Index and Intervention



Mean (median)							
Value at Visit							
Medical < 35	8.8 (8.9)	7.5 (6.9)	7.7 (7.4)	8.2 (7.9)	8.8 (8.6)	8.8 (8.0)	
Medical ≥ 35	8.9 (8.5)	7.2 (6.5)	7.3 (6.8)	8.5 (7.1)	8.5 (8.2)	8.3 (8.0)	
Surgical < 35	9.5 (9.1)	6.6 (6.7)	6.8 (6.8)	7.1 (6.7)	7.2 (6.8)	7.3 (7.1)	
Surgical ≥ 35	9.4 (9.2)	6.5 (6.2)	6.6 (6.4)	6.8 (6.6)	6.8 (6.5)	7.3 (7.1)	

Reference

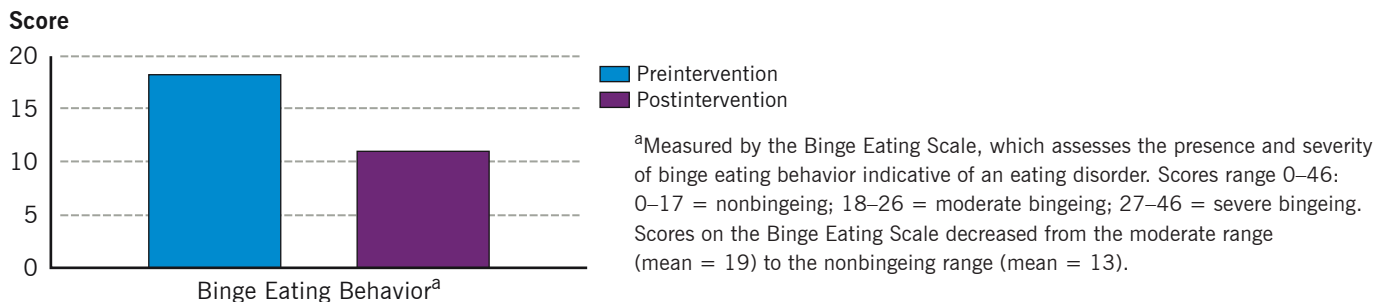
¹Schauer PR, Bhatt DL, Kirwan JP, Wolski K, Aminian A, Brethauer SA, Navaneethan SD, Singh RP, Pothier CE, Nissen SE, Kashyap SR; STAMPEDE Investigators. Bariatric Surgery versus Intensive Medical Therapy for Diabetes — 5-Year Outcomes. *N Engl J Med*. 2017 Feb 16;376(7):641-651.

Bariatric Behavioral Health

Cleveland Clinic provides a 4-session cognitive behavioral group intervention for patients with binge eating disorder undergoing weight loss surgery, with the goal of reducing binge eating episodes and anxiety and depression associated with binge eating behaviors.

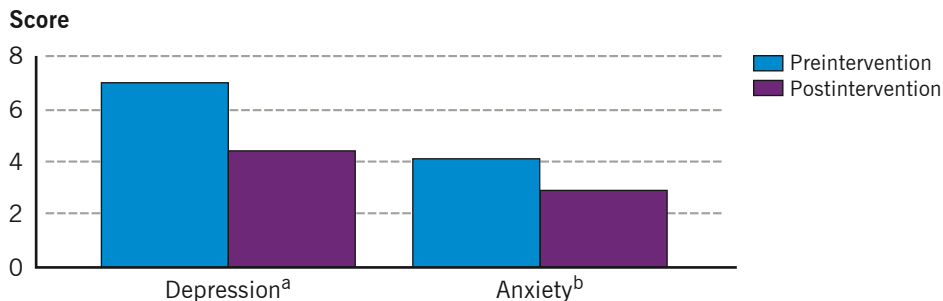
Mean Binge Eating Behavior Scores Before and After Cognitive Behavioral Group Intervention, Bariatric Surgery Patients (N = 176)

2015 – 2016



Mean Depression and Anxiety Scores Before and After Cognitive Behavioral Group Intervention, Bariatric Surgery Patients (N = 176)

2015 – 2016



^aMeasured by the Patient Health Questionnaire-9, used to screen, diagnose, monitor, and measure severity of depression. Scores range 0–27: 0–4 = minimal depression; 5–9 = mild depression; 10–14 = moderate depression; 15–19 = moderately severe depression; 20–27 = severe depression.

^bMeasured by the Generalized Anxiety Disorder 7-item scale used to screen and assess the severity of generalized anxiety disorder. Scores range 0–21: 0–4 = minimal anxiety; 5–9 = mild anxiety; 10–14 = moderate anxiety; 15–21 = severe anxiety.

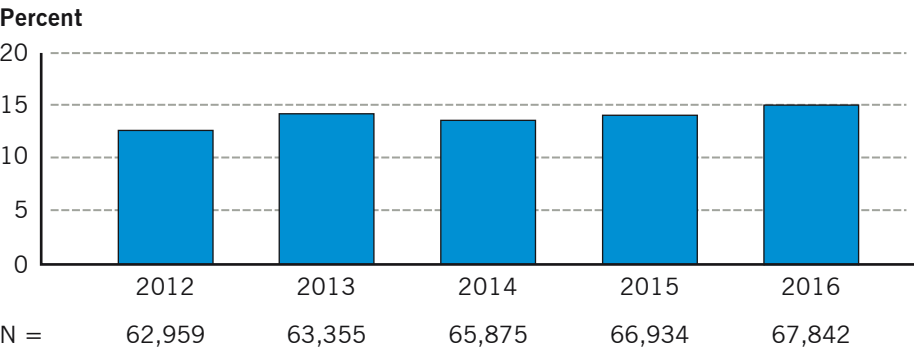
Patients also showed statistically significant improvements in depression scores ($P < 0.001$) and in anxiety scores ($P < 0.001$), suggesting that the cognitive behavioral intervention was effective in reducing mood symptoms.

Breast Disease

Cleveland Clinic’s Comprehensive Breast Cancer Program offers a multidisciplinary team of highly skilled specialists who provide comprehensive care to patients with breast cancer. A full array of services ranges from initial screening and diagnosis to high-risk genetic counseling to innovative breast cancer treatment and supportive therapies. Cleveland Clinic has 5 multidisciplinary comprehensive breast center locations: Fairview Hospital, Hillcrest Hospital, Beachwood Family Health Center, Strongsville Family Health Center, and Cleveland Clinic main campus. The Breast Centers at Cleveland Clinic’s main campus, Fairview Hospital, Beachwood Family Health Center, and Strongsville Family Health Center have been accredited by the American College of Surgeons’ National Accreditation Program for Breast Centers.

Percentage of Screening Mammograms Resulting in Callback

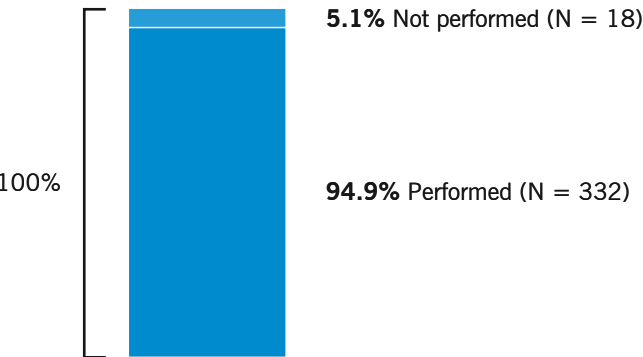
2012 – 2016



Cleveland Clinic offers a diagnostic callback program for patients with abnormal screening mammograms.

Needle Core or Fine Needle Aspirate Biopsy Prior to Surgical Treatment of Breast Cancer (N = 350)

2015

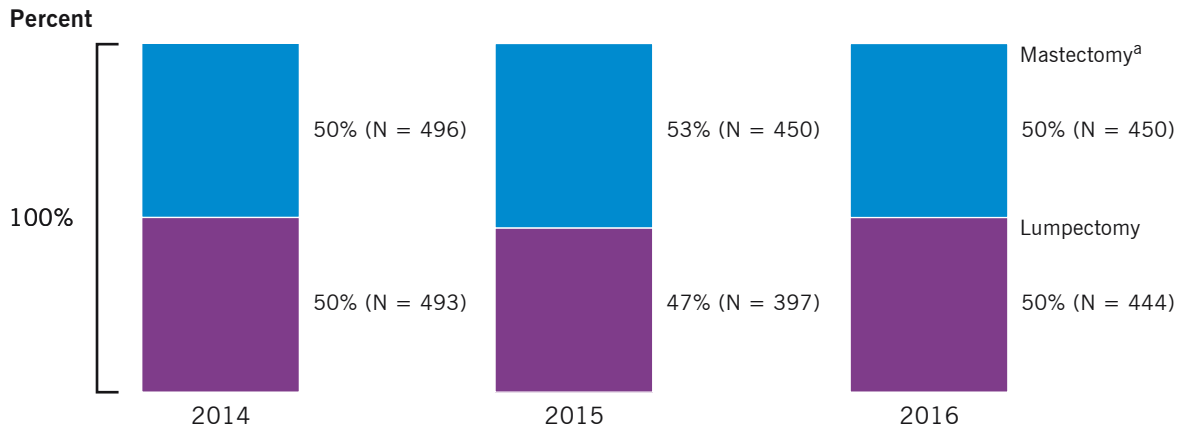


Cleveland Clinic’s performance was 94.9% (332 of 350 patients) in 2015 for this Commission on Cancer standard of care quality measure (95% confidence interval [CI], 92.5-97.2). Cleveland Clinic performs within the acceptable range for biopsy prior to surgical treatment of breast cancer.

Source: Data from Cleveland Clinic tumor registry for main campus and family health center locations

Breast Cancer Surgery

2014 – 2016



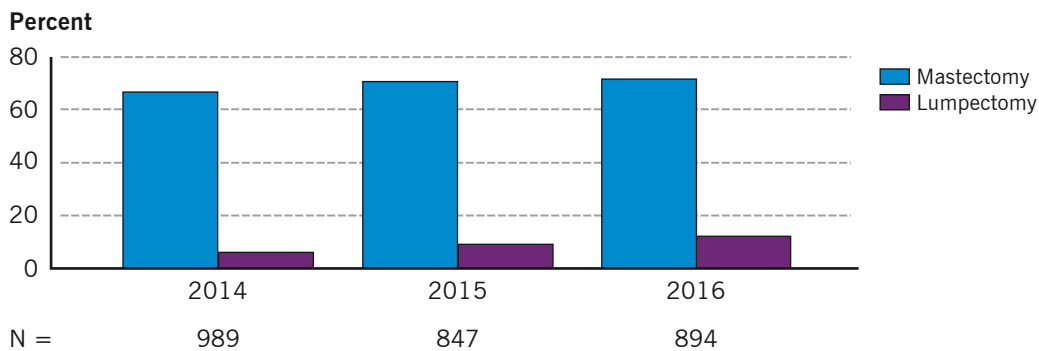
Data are from Digestive Disease & Surgery Institute only

All patients undergoing mastectomy are offered preoperative referral to plastic surgery.

^aIncludes all breast cancers plus prophylactic mastectomy with breast reconstruction

Immediate Breast Reconstruction

2014 – 2016

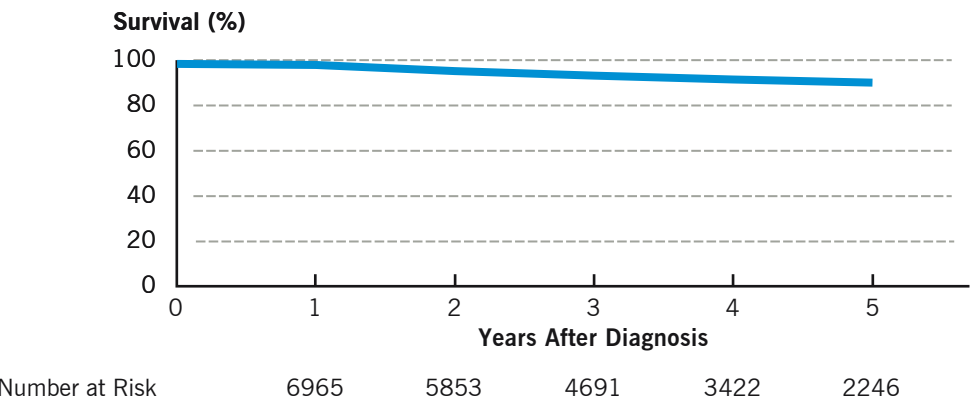


Digestive Disease & Surgery Institute data only

Breast Disease

Five-Year Overall Survival of Female Patients With All Stages^a of Breast Cancer (N = 7632)

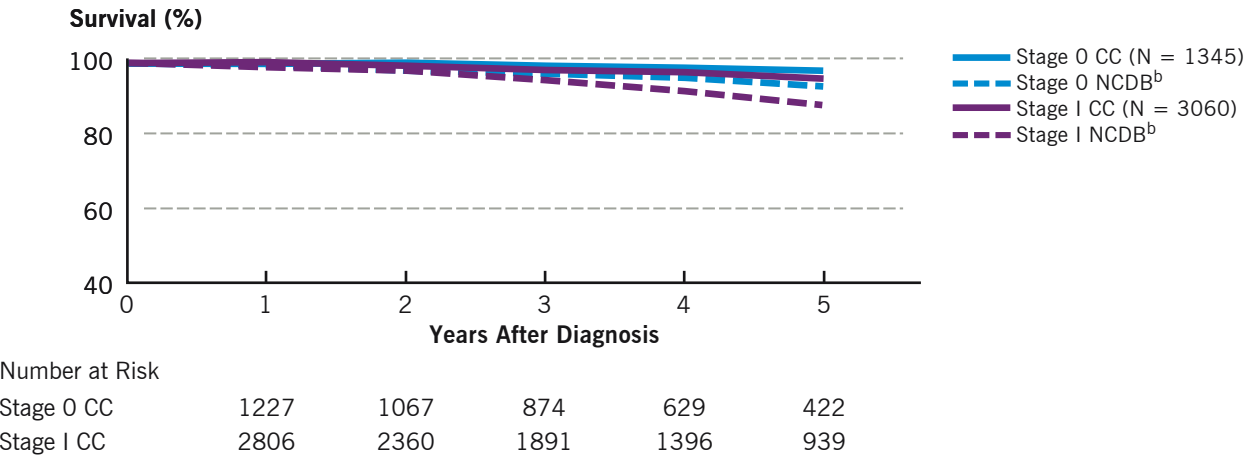
2007 – 2015



^aAJCC stage I–IV breast cancer

Five-Year Overall Survival of Female Patients With Stage^a 0 and I Breast Cancer (N = 4405)

2007 – 2015



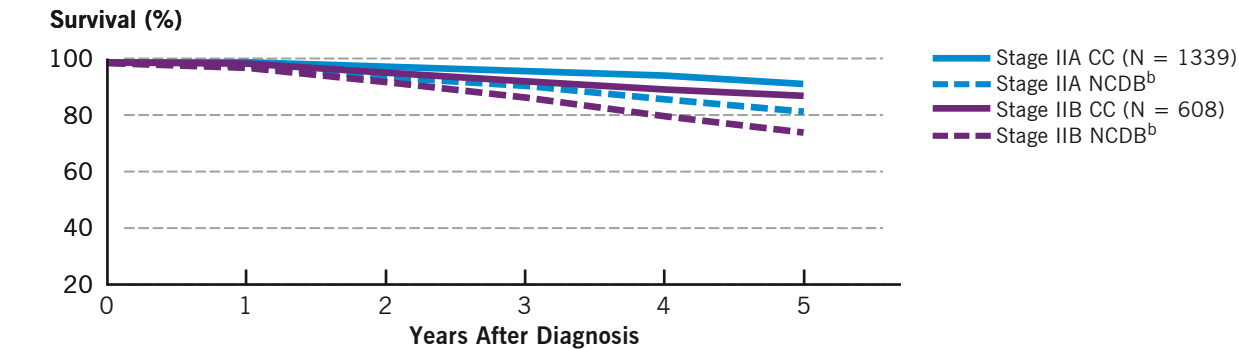
CC = Cleveland Clinic, NCDB = National Cancer Database

^aAJCC stage I–IV breast cancer

^bReference group data from the National Cancer Database (Commission on Cancer of the American College of Surgeons and the American Cancer Society) 2000–2002, as reported in: Edge SB, Byrd DR, Compton CC, Fritz AG, Greene FL, Trotti A. *AJCC Cancer Staging Manual*. 7th ed. New York, NY: Springer Science & Business Media; 2010.

Five-Year Overall Survival of Female Patients With Stage^a IIA and IIB Breast Cancer (N = 1947)

2007 – 2015



Number at Risk

Stage IIA	1254	1075	868	627	420
Stage IIB	560	478	384	268	152

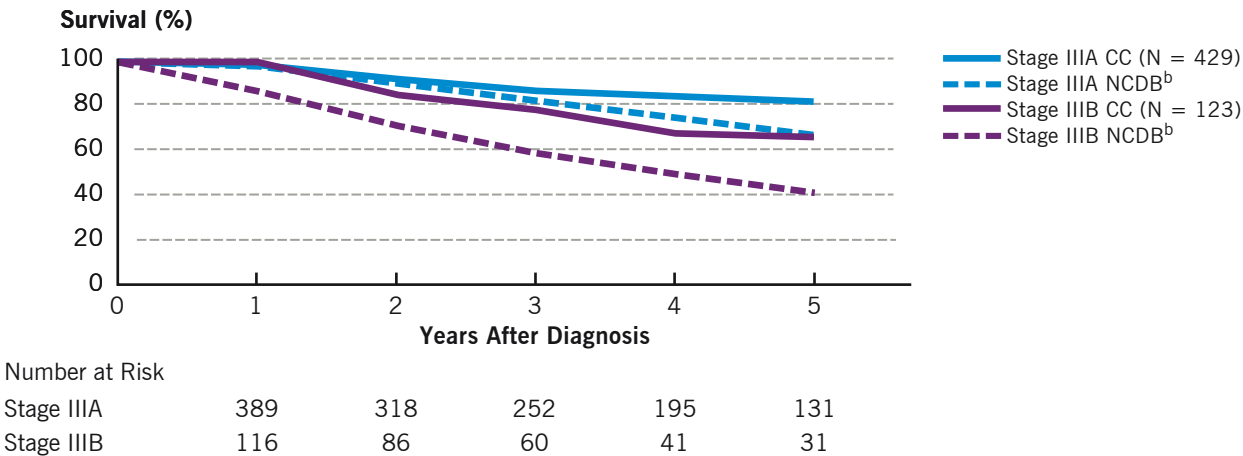
CC = Cleveland Clinic, NCDB = National Cancer Database

^aAJCC stage I–IV breast cancer

^bReference group data from the National Cancer Database (Commission on Cancer of the American College of Surgeons and the American Cancer Society) 2000–2002, as reported in: Edge SB, Byrd DR, Compton CC, Fritz AG, Greene FL, Trotti A. *AJCC Cancer Staging Manual*. 7th ed. New York, NY: Springer Science & Business Media; 2010.

Five-Year Overall Survival of Female Patients With Stage^a IIIA and IIIB Breast Cancer (N = 552)

2007 – 2015



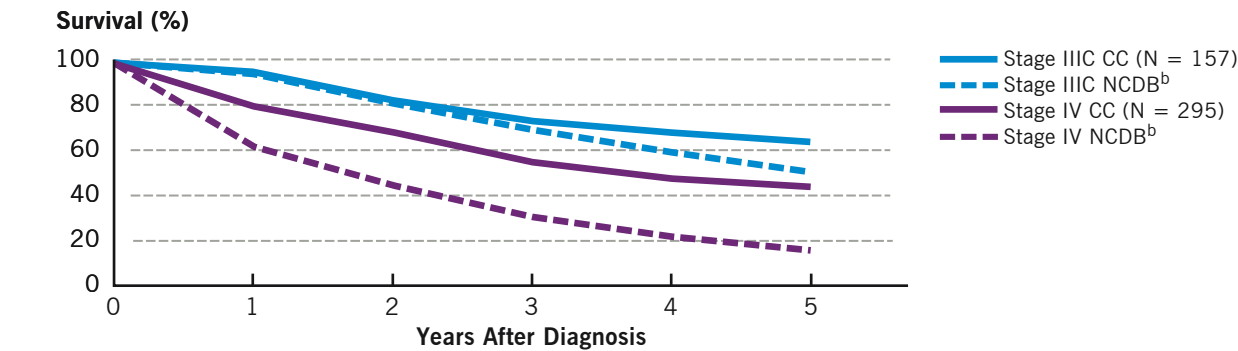
CC = Cleveland Clinic, NCDB = National Cancer Database

^aAJCC stage I–IV breast cancer

^bReference group data from the National Cancer Database (Commission on Cancer of the American College of Surgeons and the American Cancer Society) 2000–2002, as reported in: Edge SB, Byrd DR, Compton CC, Fritz AG, Greene FL, Trotti A. *AJCC Cancer Staging Manual*. 7th ed. New York, NY: Springer Science & Business Media; 2010.

Five-Year Overall Survival of Female Patients With Late Stage^a Breast Cancer (N = 452)

2007 – 2015



Number at Risk

Stage IIIC	142	106	82	59	38
Stage IV	217	155	97	62	37

CC = Cleveland Clinic, NCDB = National Cancer Database

^aAJCC stage I–IV breast cancer

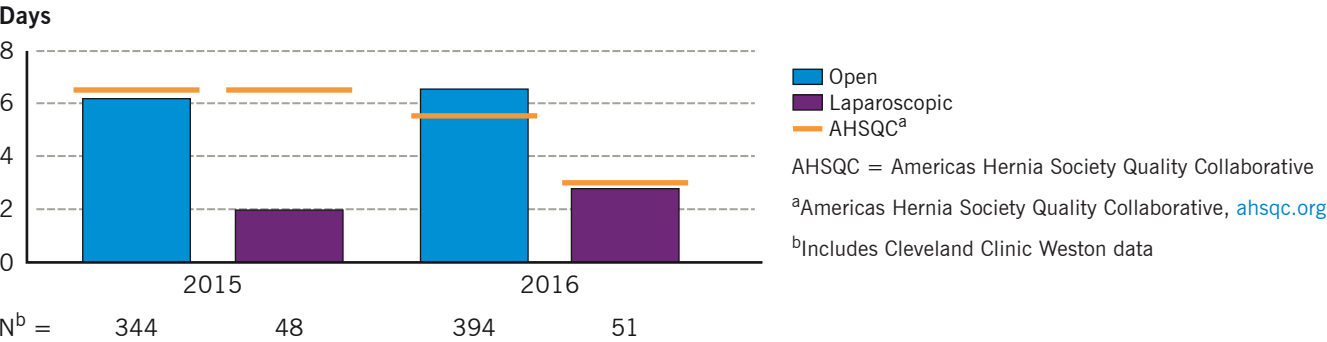
^bReference group data from the National Cancer Database (Commission on Cancer of the American College of Surgeons and the American Cancer Society) 2000–2002, as reported in: Edge SB, Byrd DR, Compton CC, Fritz AG, Greene FL, Trotti A. *AJCC Cancer Staging Manual*. 7th ed. New York, NY: Springer Science & Business Media; 2010.

Hernia Center

Surgeons from Cleveland Clinic’s Hernia Center perform more than 1700 hernia repairs each year, from the routine to the most complex cases. The center is designed so that patients receive individualized care, undergoing a comprehensive evaluation to determine the best surgical procedure for their specific type of hernia.

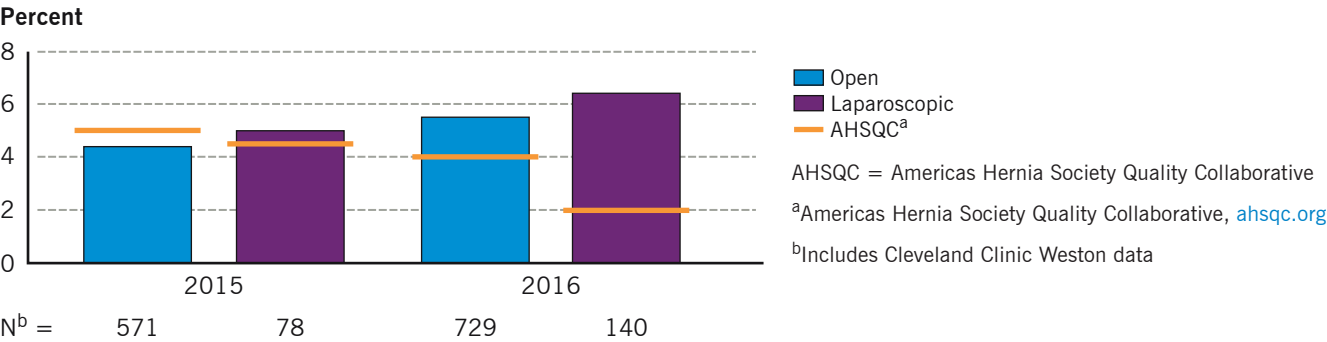
Median Length of Stay, Ventral Hernia Repair

2015 – 2016



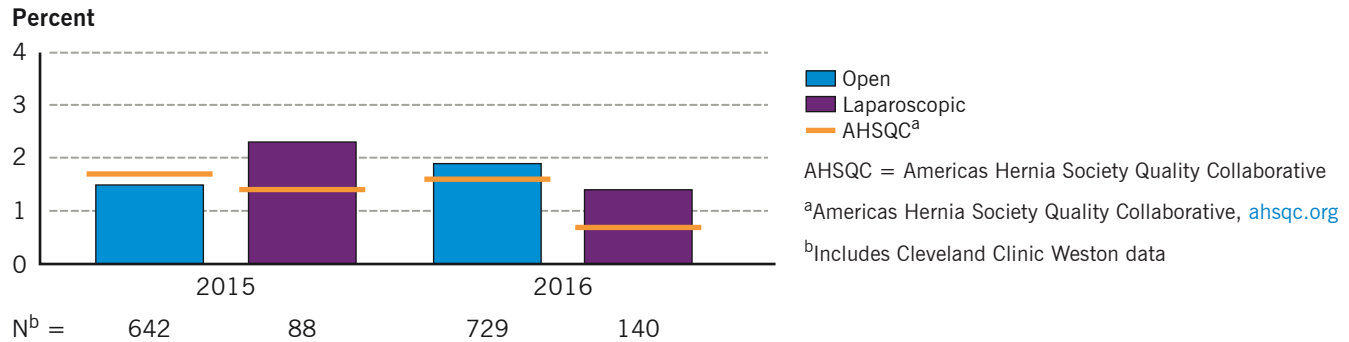
Thirty-Day Unplanned Hospital Readmission,^a Ventral Hernia Repair

2015 – 2016



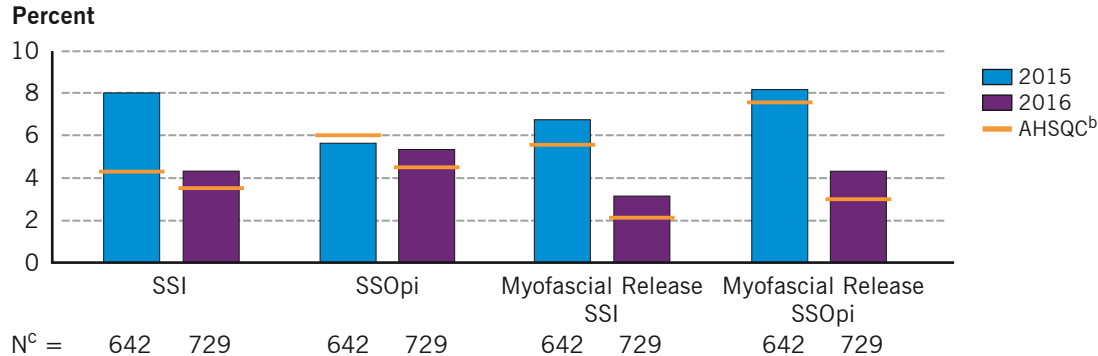
Thirty-Day Unplanned Reoperation Rate, Ventral Hernia Repair

2015 – 2016



Thirty-Day Surgical Site Status, Open Ventral Hernia Repair^a

2015 – 2016



AHSQC = Americas Hernia Society Quality Collaborative; SSI = surgical site infection;

SSOp = surgical site occurrence requiring procedural intervention

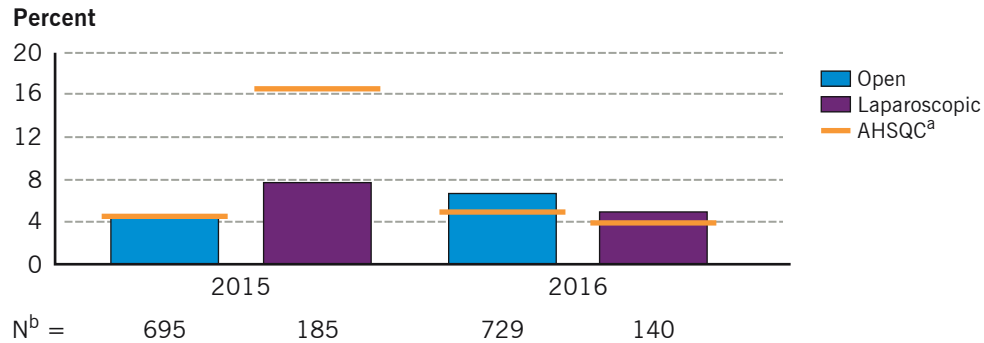
^aNo surgical site infections or occurrences were reported for laparoscopic cases.

^bAmericas Hernia Society Quality Collaborative, ahsqc.org

^cIncludes Cleveland Clinic Weston data

Thirty-Day Postoperative Emergency Department Visit, Ventral Hernia Repair

2015 – 2016



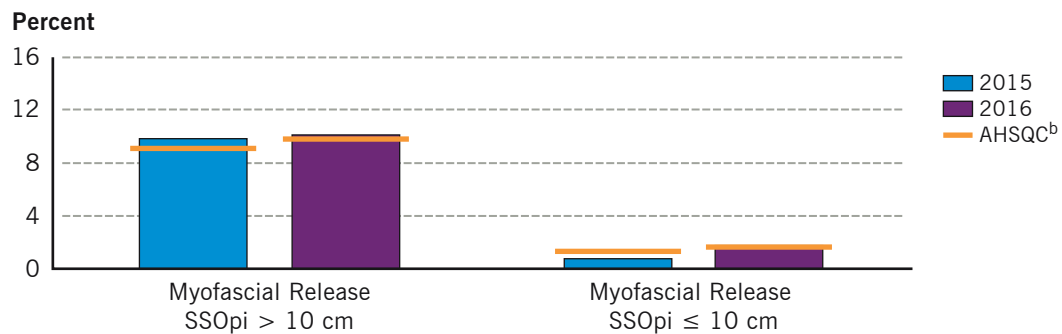
AHSQC = Americas Hernia Society Quality Collaborative

^aAmericas Hernia Society Quality Collaborative, ahsqc.org

^bIncludes Cleveland Clinic Weston data

Thirty-Day Ventral Hernia Repair With Myofascial Release With Surgical Site Occurrence Requiring Procedural Intervention by Hernia Width

2015 – 2016



AHSQC = Americas Hernia Society Quality Collaborative; SSOp = surgical site occurrence requiring procedural intervention

^aAmericas Hernia Society Quality Collaborative, ahsqc.org

^bIncludes Cleveland Clinic Weston data

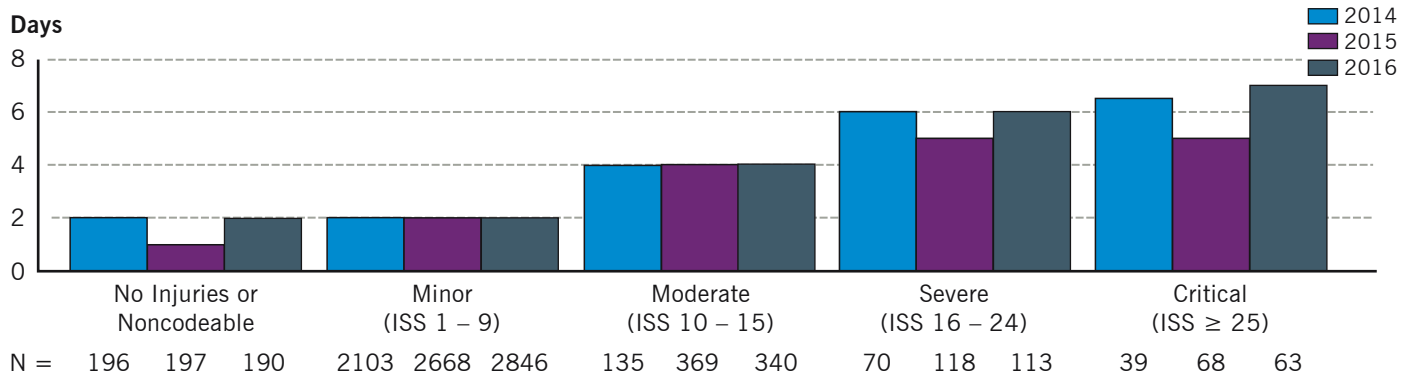
Trauma

Trauma

The Department of General Surgery provides coverage for trauma care. The Northeast Ohio Trauma System, created in 2010, is a partnership between the Cleveland Clinic health system and MetroHealth Medical Center. Together they provide integrated trauma care to the citizens of northeast Ohio. Since its inception, the collaboration has proved successful in controlling length of stay and mortality rates.

Mean Length of Stay, Trauma Cases^a

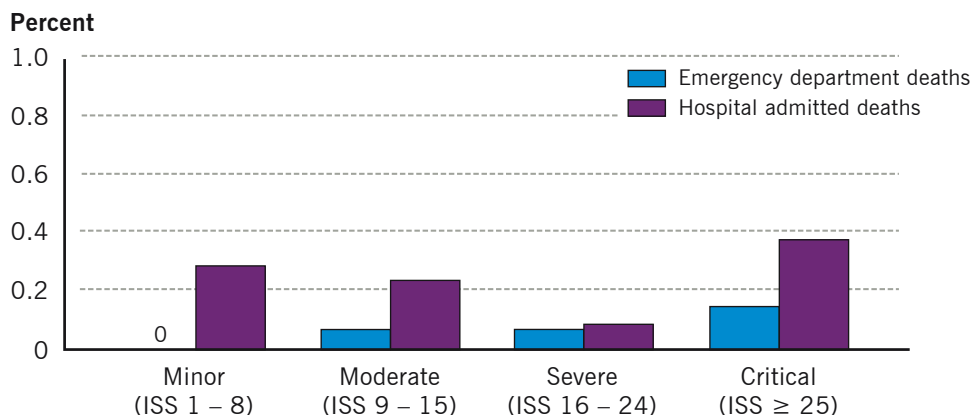
2014 – 2016



^aData from Fairview Hospital and Hillcrest Hospital, both Cleveland Clinic regional hospitals and level II trauma centers

Thirty-Day Mortality^a (N = 3552)

2016



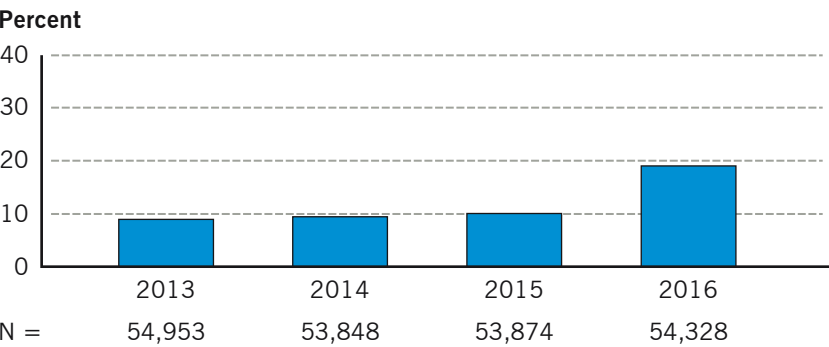
ISS = Injury Severity Score

^aData from Fairview Hospital and Hillcrest Hospital, both Cleveland Clinic regional hospitals and level II trauma centers

The Center for Human Nutrition (CHN) provides evaluation, education, and treatment for disease-related nutrition problems, as well as preventive, sports, and wellness counseling. Specialty focus nutrition teams work closely with healthcare providers using an interdisciplinary approach. CHN dietitians, nurses, and physicians are integral to providing nutrition support for all solid organ transplant teams, critically ill patients, and patients with severe gastrointestinal failure. As part of overall care, the center offers intensive diet therapy, enteral and parenteral nutrition, oral rehydration techniques, medication and growth factor therapy, and restorative surgery.

Malnutrition can lead to complications such as increased infections, decreased wound healing, and increased hospital length of stay and readmission. In 2012, a multidisciplinary program commenced that included intense training of registered dietitian nutritionists to assess and diagnose malnutrition and communicate results to the physician. As a result of this project, capture rates of malnourished patients continue to increase each year.

Capture Rate, Percent of Hospitalized Patients Identified As Malnourished
2013 – 2016



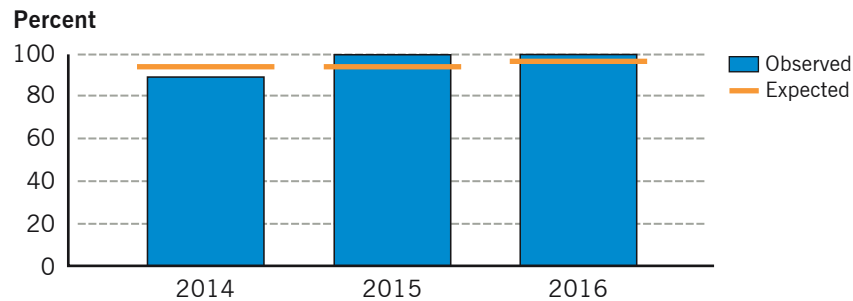
Pediatric General Surgery

Cleveland Clinic's pediatric liver transplant team offers a full range of pediatric liver transplant procedures, including partial grafts from living donors, whole-organ and split-liver transplants from deceased donors, and liver transplant as part of multivisceral transplantation.

Pediatric Liver Transplantation

One-Year Pediatric Patient Survival

2014 – 2016



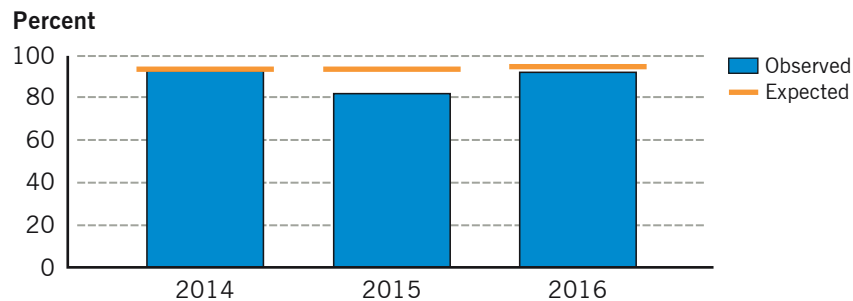
N = 9 9 11

Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

Each reporting year reflects transplants performed over a 2.5-year period.

Three-Year Pediatric Patient Survival

2014 – 2016



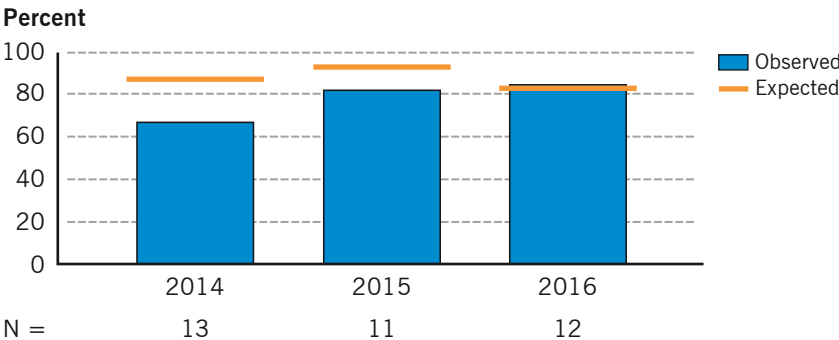
N = 13 11 12

Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

Each reporting year reflects transplants performed over a 2.5-year period.

One-Year Pediatric Graft Survival

2014 – 2016

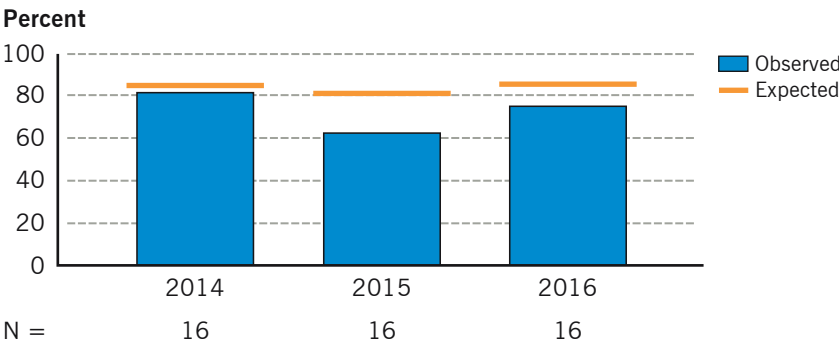


Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

Each reporting year reflects transplants performed over a 2.5-year period.

Three-Year Pediatric Graft Survival

2014 – 2016



Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

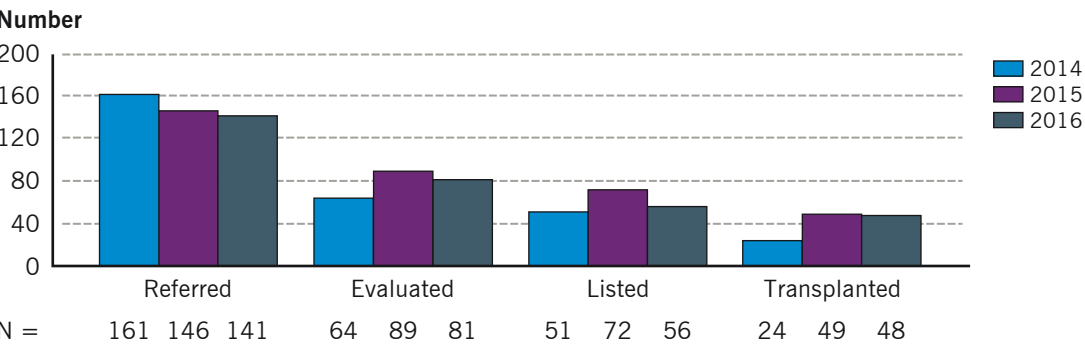
Each reporting year reflects transplants performed over a 2.5-year period.

Liver Transplantation

In August 2012, the Agency for Health Care Administration approved Cleveland Clinic Florida's Certificate of Need to provide liver and kidney transplant services. In March 2013, the United Network for Organ Sharing granted approval to Cleveland Clinic Florida's liver transplant program. The program was launched in April 2013 and received CMS (Medicare) approval in June 2014. A multidisciplinary team participates in the evaluation, management, treatment, and follow-up of the transplant patients.

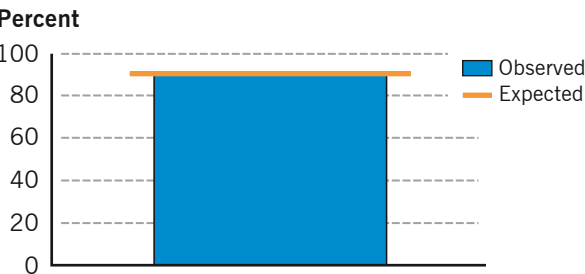
Patients Referred, Evaluated, Listed, and Transplanted

2014 – 2016



One-Year Patient Survival (N = 64)

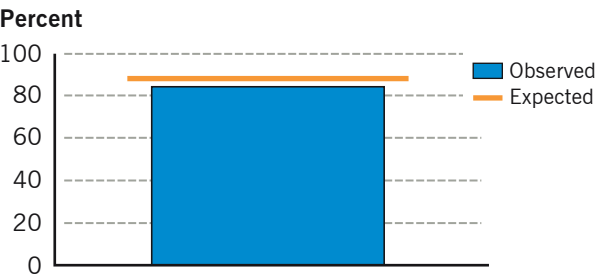
July 2013 – December 2015



Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

One-Year Graft Survival (N = 69)

July 2013 – December 2015



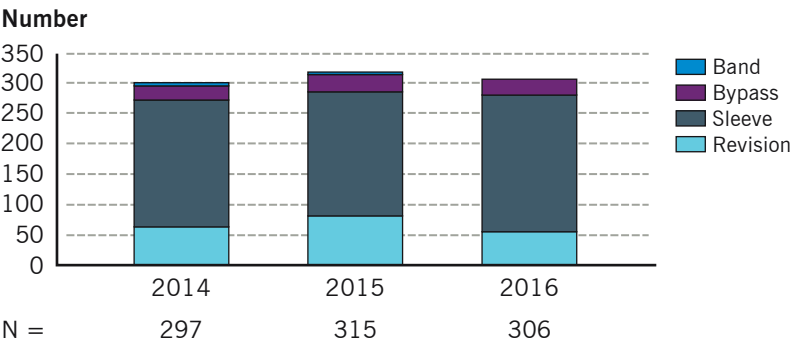
Source: Scientific Registry of Transplant Recipients (SRTR) srtr.org

Obesity and Metabolic Disease

The Bariatric and Metabolic Center (BMC) at Cleveland Clinic Florida is dedicated to the care and well-being of surgical and morbidly obese patients. The American Society for Metabolic and Bariatric Surgeons, the American College of Surgeons, and the Fellowship Council have named BMC and the Section of Minimally Invasive Surgery a Center of Excellence. For the past 16 years, BMC at Cleveland Clinic Florida has delivered high-quality care and research in bariatric surgery.

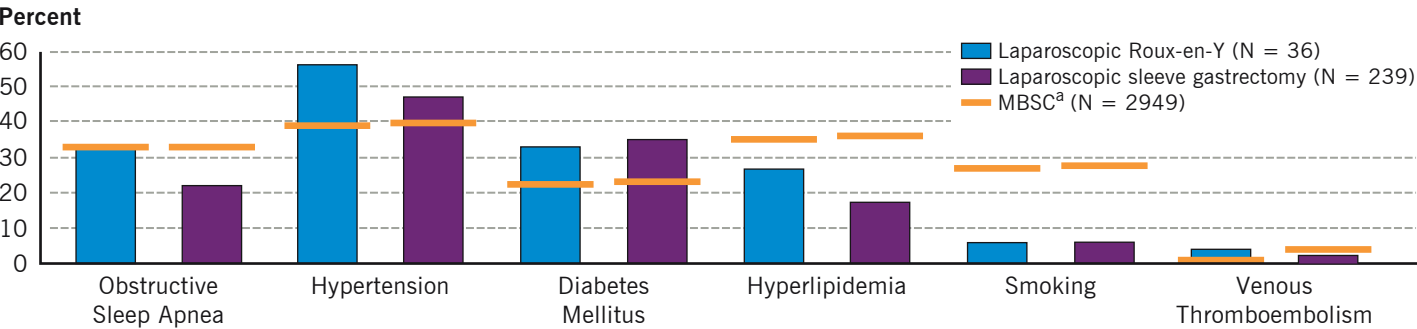
Bariatric Surgery Cases

2014 – 2016



Baseline Comorbidities, Laparoscopic Roux-en-Y Gastric Bypass and Laparoscopic Sleeve Gastrectomy

2016



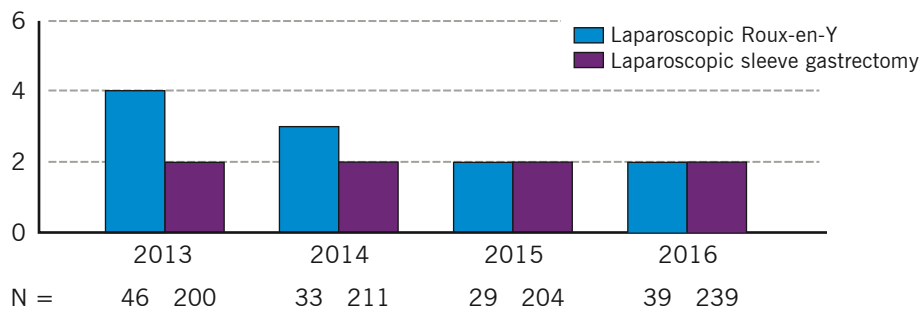
MBSC = Michigan Bariatric Surgery Collaborative

^aBenchmark: MBSC michiganbsc.org

Median Length of Stay, Laparoscopic Roux-en-Y Gastric Bypass and Laparoscopic Sleeve Gastrectomy

2013 – 2016

Days



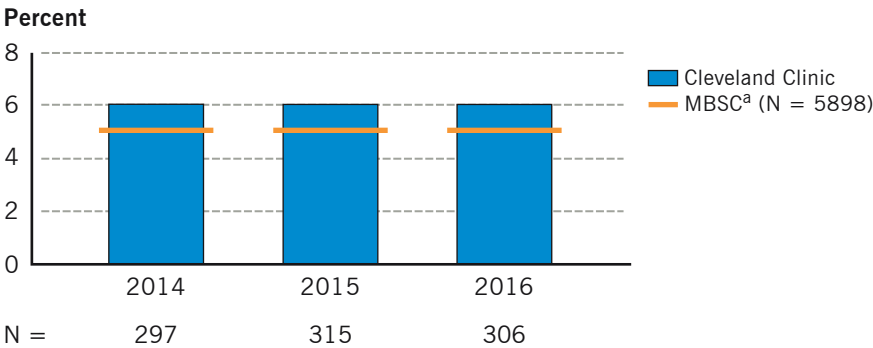
Thirty-Day Complication Rate, Bariatric Surgery (N = 918)

2016

Complications	Rate (%)
Respiratory failure	1
Deep vein thrombosis	1
Bleeding	2
Intestinal obstruction	0
Wound infection/evisceration	0
Anastomotic leak	1

Thirty-Day Readmission Rate, Bariatric Surgery

2014 – 2016

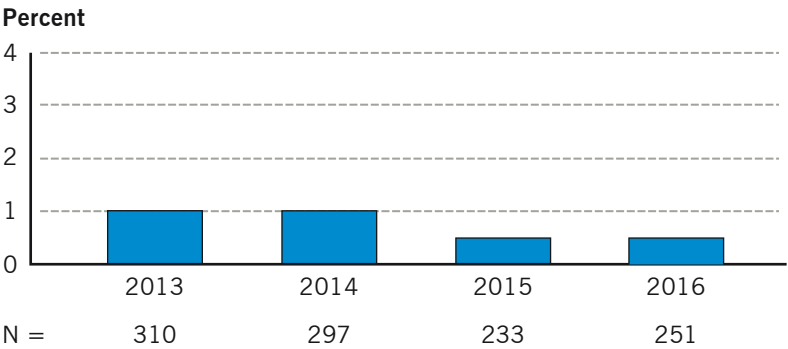


MBSC = Michigan Bariatric Surgery Collaborative

^aBenchmark: MBSC michiganbsc.org

Intensive Care Unit Admission Rate, Bariatric Surgery

2013 – 2016



Thirty-Day Mortality Rates, Bariatric Surgery

2016

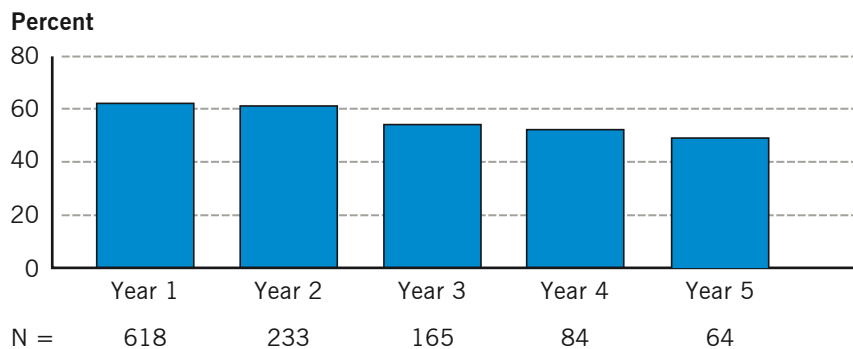
Surgery Type	Cleveland Clinic Florida % (N)	BOLD ^a % (N)
All bariatric surgeries	0.6 (306)	0.1 (186,567)
Laparoscopic Roux-en-Y gastric bypass	0 (36)	0.14 (136,036)
Laparoscopic sleeve gastrectomy	0.8 (239)	0.08 (15,964)

BOLD = Bariatric Outcomes Longitudinal Database

^aBenchmark: BOLD asmbs.org

Mean Percent Weight Loss^a Toward Ideal Body Mass Index at Follow-Up, Bariatric Surgery

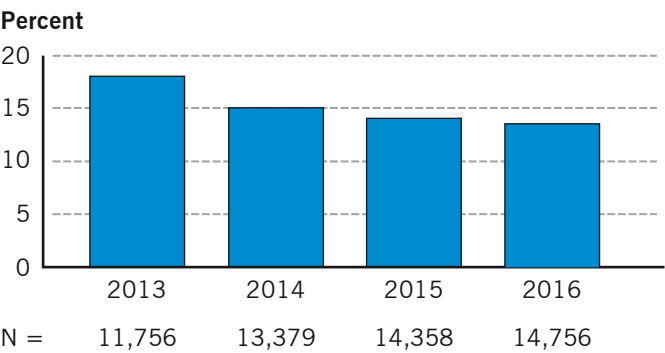
2010 – 2016



^aWeight loss formula: $(\text{baseline BMI} - \text{follow-up BMI}) / (\text{baseline BMI} - \text{ideal BMI [25]}) \times 100$

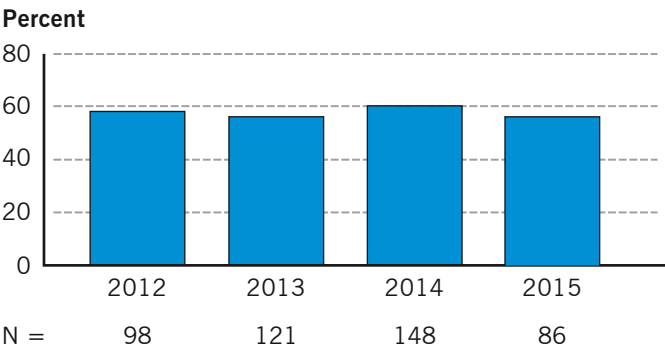
Breast Disease

Screening Mammograms Resulting in Callback

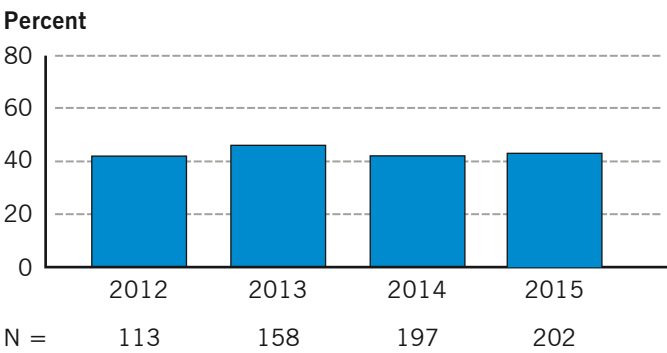


Cleveland Clinic Florida offers a diagnostic callback program for patients with abnormal screening mammograms.

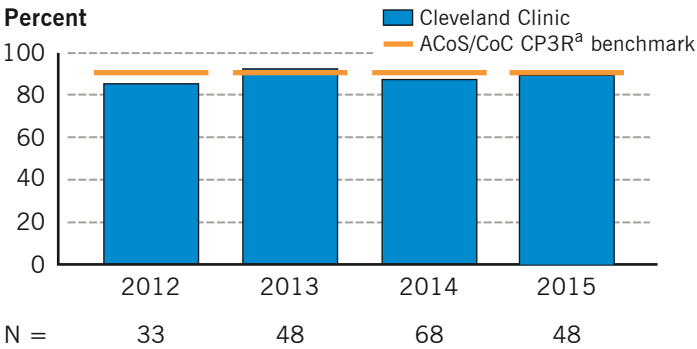
Breast Conservation Surgery for Breast Cancer (Lumpectomy)
2012 – 2015



Breast Surgery for Breast Cancer (Mastectomy)
2012 – 2015



Radiation Therapy After Lumpectomy
2012 – 2015

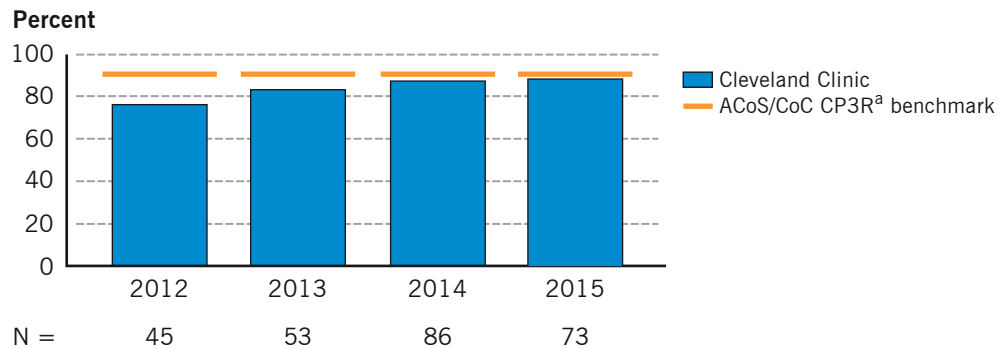


^aThe American College of Surgeons Commission on Cancer's Cancer Program Practice Profile Report (ACoS/CoC CP3R) benchmark is 90%.

Radiation is administered within 1 year of diagnosis for women < 70 years of age receiving breast conservation surgery for breast cancer.

Tamoxifen or Third Generation Aromatase Inhibitor Within 1 Year of Diagnosis

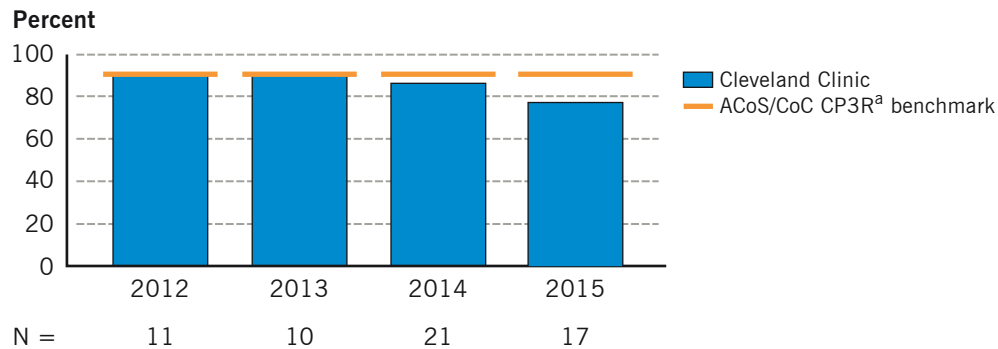
2012 – 2015



^aThe American College of Surgeons Commission on Cancer's Cancer Program Practice Profile Report (ACoS/CoC CP3R) benchmark is 90%.

Combination Chemotherapy Within 4 Months of Diagnosis

2012 – 2015



^aThe American College of Surgeons Commission on Cancer's Cancer Program Practice Profile Report (ACoS/CoC CP3R) benchmark is 90%.

Surgical Quality Improvement

The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP®) objectively measures and reports risk-adjusted surgical outcomes based on a defined sampling and abstraction methodology. These outcomes data reflect Cleveland Clinic's overall general surgery ACS NSQIP performance benchmarked against 662 participating sites and overall colorectal surgery benchmarked against 648 participating sites.

General Surgery Outcomes

July 2015 – June 2016

Outcome	N	Observed Rate (%)	Expected Rate (%)
30-day mortality	1078	0.65 ^a	1.63
30-day morbidity	1078	11.41 ^a	13.81
Cardiac event	1078	0.74	0.99
Pneumonia	1076	0.56 ^a	2.02
Unplanned intubation	1078	1.39	1.48
Ventilator > 48 hours	1073	1.49	1.52
Deep vein thrombosis/pulmonary embolism	1078	3.34 ^b	1.67
Renal failure	1078	1.21	1.05
Urinary tract infection	1078	0.74	1.52
Surgical site infection	1064	6.02 ^a	7.84
Sepsis	1060	5.75 ^b	3.59
Return to operating room	1078	3.34	4.25
Readmission	1078	10.76	10.76

^aIdentified as a statistical outlier (lower than expected) by the ACS NSQIP hierarchical model

^bIdentified as a statistical outlier (higher than expected) by the ACS NSQIP hierarchical model

Colorectal Surgery Outcomes

July 2015 – June 2016

Outcome	N	Observed Rate (%)	Expected Rate (%)
30-day mortality	452	1.11	1.83
30-day morbidity	452	12.17 ^a	16.17
Length of stay	383	35.25 ^b	24.13
Pneumonia	452	0.66	1.74
Unplanned intubation	452	1.99	1.41
Ventilator > 48 hours	449	2.00	1.68
Deep vein thrombosis/pulmonary embolism	452	3.76 ^b	1.88
Renal failure	452	1.77	1.33
Urinary tract infection	452	0.88	1.92
Surgical site infection	447	4.25 ^a	9.56
Sepsis	441	5.90	4.11
<i>C. difficile</i> colitis	452	2.21	1.16
Return to operating room	452	3.54	5.23
Readmission	452	12.17	13.79

^aIdentified as a statistical outlier (lower than expected) by the ACS NSQIP hierarchical model

^bIdentified as a statistical outlier (higher than expected) by the ACS NSQIP hierarchical model

Surgical Quality Improvement

In addition to overall general surgery and colorectal surgery ACS NSQIP outcomes data, data specific to the following procedures are provided (with number of sites participating in benchmarking outcomes shown in parentheses): hepatectomy (113), pancreatectomy (133), colectomy (234), and proctectomy (512).

Hepatectomy Outcomes

July 2015 – June 2016

Outcome	N	Observed Rate (%)	Expected Rate (%)
30-day mortality	96	1.04	1.15
30-day morbidity	96	16.67 ^a	19.17
Cardiac event	96	1.04	2.13
Pneumonia	96	3.13 ^a	2.36
Ventilator > 48 hours	96	1.04	1.77
Deep vein thrombosis/pulmonary embolism	96	12.63	10.42
Renal failure	96	10.42	6.21
<i>C. difficile</i> colitis	96	2.08	1.57
Return to operating room	96	3.13	2.76
Readmission	96	9.38	9.93
Invasive intervention	96	9.38 ^a	9.53
Bile leakage	96	7.29	11.10
Liver failure	96	2.08	3.49

^aIdentified as a statistical outlier (lower than expected) by the ACS NSQIP hierarchical model

Pancreatectomy Outcomes

July 2015 – June 2016

Outcome	N	Observed Rate (%)	Expected Rate (%)
Distal pancreatectomy 30-day morbidity	35	0.00	0.41
Distal pancreatectomy pneumonia	35	0.00	2.22
Distal pancreatectomy unplanned intubation	35	0.00	1.62
Distal pancreatectomy ventilator > 48 hours	35	0.00	0.86
Distal pancreatectomy sepsis	35	11.43 ^a	3.93
Distal pancreatectomy <i>C. difficile</i> colitis	35	2.86	1.02
Distal pancreatectomy fistula	35	25.71	18.90
Distal pancreatectomy delayed gastric emptying	35	14.29	3.96
Whipple pancreatectomy 30-day mortality	74	0.00	1.32
Whipple pancreatectomy 30-day morbidity	74	27.03 ^a	22.79
Whipple pancreatectomy cardiac	74	0.00 ^a	1.37
Whipple pancreatectomy pneumonia	74	1.35	2.79
Whipple pancreatectomy unplanned intubation	74	1.35	2.98
Whipple pancreatectomy ventilator > 48 hours	74	1.35	2.16
Whipple pancreatectomy deep vein thrombosis/pulmonary embolism	74	6.76	4.27
Whipple pancreatectomy renal failure	74	1.35	1.34
Whipple pancreatectomy urinary tract infection	74	2.70	2.30
Whipple pancreatectomy surgical site infection	74	21.13 ^a	18.71
Whipple pancreatectomy sepsis	74	14.86 ^a	9.84
Whipple pancreatectomy <i>C. difficile</i> colitis	74	2.70	1.85
Whipple pancreatectomy readmission	74	6.76	5.99
Whipple pancreatectomy fistula	74	29.73 ^a	19.74
Whipple pancreatectomy delayed gastric emptying	74	8.11	17.20

^aIdentified as a statistical outlier (higher than expected) by the ACS NSQIP hierarchical model

Surgical Quality Improvement

Colectomy Outcomes

July 2015 – June 2016

Outcome	N	Observed Rate (%)	Expected Rate (%)
30-day mortality	312	1.60	2.25
30-day morbidity	312	13.78 ^a	14.93
Cardiac event	312	1.92	1.27
Pneumonia	312	0.96 ^a	1.89
Unplanned intubation	312	2.56	1.54
Ventilator > 48 hours	309	2.91	2.05
Deep vein thrombosis/pulmonary embolism	312	4.17 ^b	2.25
Renal failure	312	2.56	1.30
Urinary tract infection	312	0.96	1.61
Surgical site infection	308	4.87 ^a	8.51
Sepsis	301	5.98	3.61
<i>C. difficile</i> colitis	312	1.92	1.31
Return to operating room	312	4.49 ^a	4.79
Readmission	312	11.22	11.66
Anastomotic leak	312	1.60	3.06
Prolonged NPO/nasogastric tube use	312	20.51	15.66

^aIdentified as a statistical outlier (lower than expected) by the ACS NSQIP hierarchical model

^bIdentified as a statistical outlier (higher than expected) by the ACS NSQIP hierarchical model

Source: facs.org/quality-programs/acs-nsqip

Proctectomy Outcomes

July 2015 – June 2016

Outcome	N	Observed Rate (%)	Expected Rate (%)
30-day morbidity	140	8.57	17.47
Cardiac event	140	0.00	0.62
Pneumonia	140	0.00	1.27
Renal failure	140	0.00	1.57
Urinary tract infection	140	0.71	2.38
Surgical site infection	139	2.88	10.42
Sepsis	140	5.71	4.31
<i>C. difficile</i> colitis	140	2.86	0.63
Return to operating room	140	1.43	5.72
Readmission	140	14.29	17.91

Patient Experience — Digestive Disease & Surgery Institute

Keeping patients at the center of all that Cleveland Clinic does is critical. Patients First is the guiding principle at Cleveland Clinic. Patients First is safe care, high-quality care, in the context of patient satisfaction, and high value. Ultimately, caregivers have the power to impact every touch point of a patient's journey, including their clinical, physical, and emotional experience.

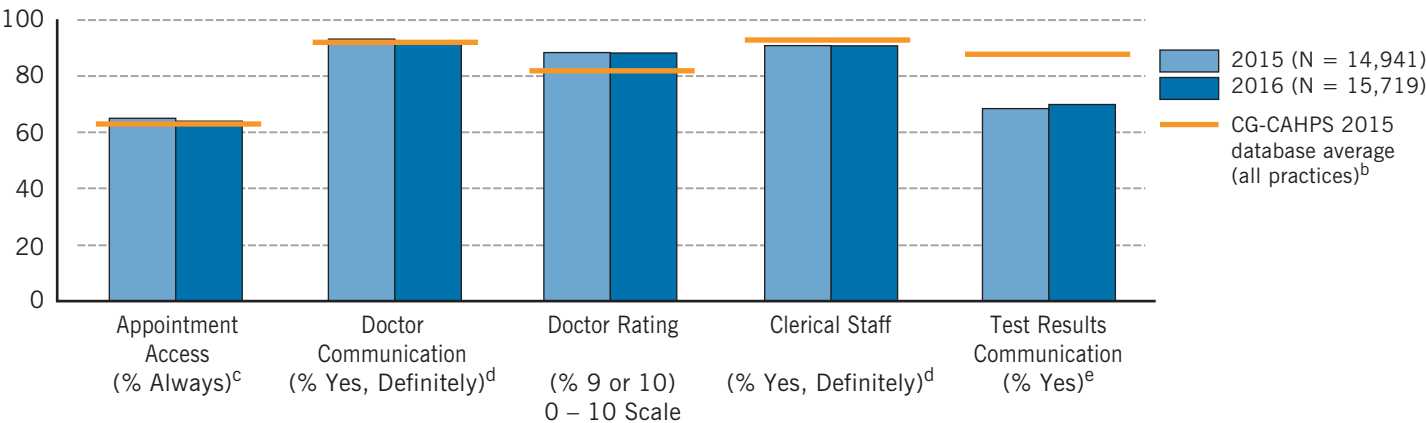
Cleveland Clinic recognizes that patient experience goes well beyond patient satisfaction surveys. Nonetheless, sharing the survey results with caregivers and the public affords opportunities to improve how Cleveland Clinic delivers exceptional care.

Outpatient Office Visit Survey — Digestive Disease & Surgery Institute

CG-CAHPS Assessment^a

2015 – 2016

Percent Best Response



^aIn 2013, Cleveland Clinic began administering the Clinician and Group Practice Consumer Assessment of Healthcare Providers and Systems surveys (CG-CAHPS), standardized instruments developed by the Agency for Healthcare Research and Quality (AHRQ) and supported by the Centers for Medicare & Medicaid Services for use in the physician office setting to measure patients' perspectives of outpatient care.

^bBased on results submitted to the AHRQ CG-CAHPS database from 2829 practices in 2015

^cResponse options: Always, Usually, Sometimes, Never

^dResponse options: Yes, definitely; Yes, somewhat; No

^eResponse options: Yes, No

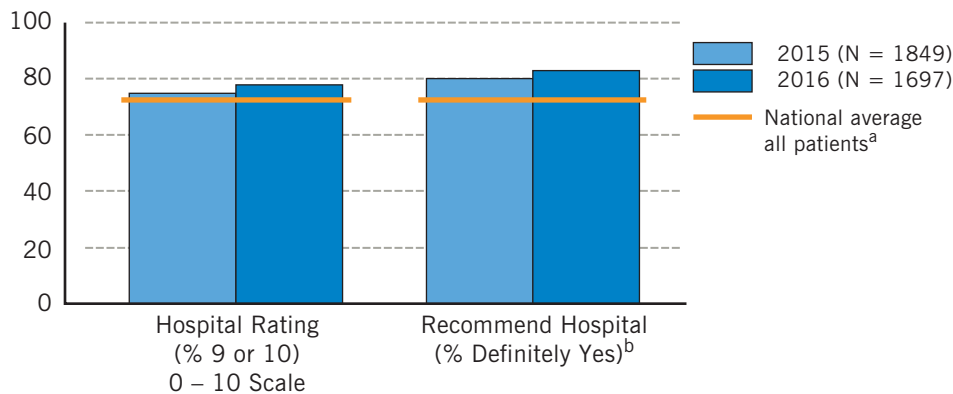
Source: Press Ganey, a national hospital survey vendor

Inpatient Survey — Digestive Disease & Surgery Institute

HCAHPS Overall Assessment

2015 – 2016

Best Response (%)



^aBased on national survey results of discharged patients, January 2015 – December 2015, from 4172 US hospitals. medicare.gov/hospitalcompare

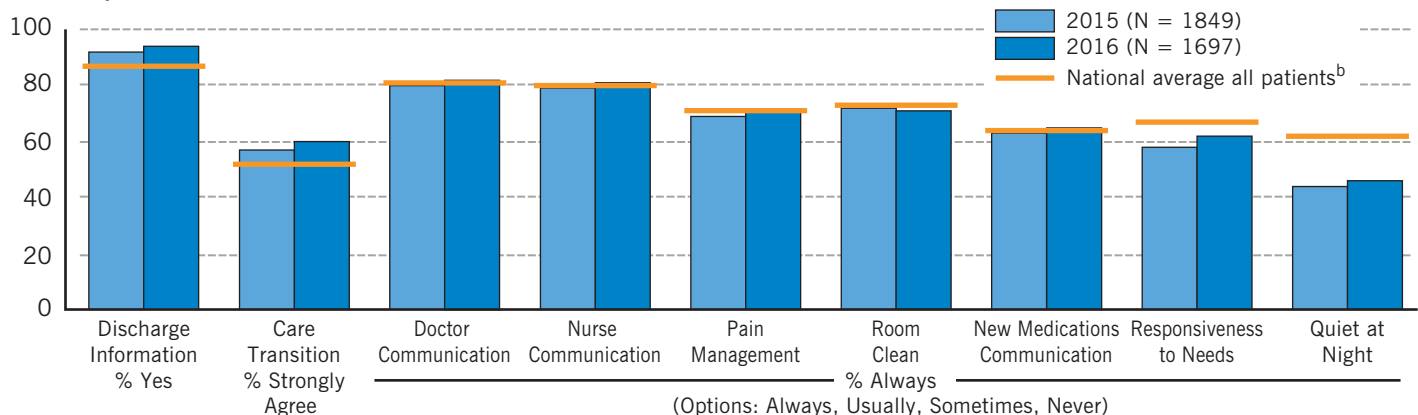
^bResponse options: Definitely yes, Probably yes, Probably no, Definitely no

The Centers for Medicare & Medicaid Services requires United States hospitals that treat Medicare patients to participate in the national Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, a standardized tool that measures patients' perspectives of hospital care. Results collected for public reporting are available at medicare.gov/hospitalcompare.

HCAHPS Domains of Care^a

2015 – 2016

Best Response (%)



^aExcept for "Room Clean" and "Quiet at Night," each bar represents a composite score based on responses to multiple survey questions.

^bBased on national survey results of discharged patients, January 2015 – December 2015, from 4172 US hospitals. medicare.gov/hospitalcompare

Source: Press Ganey, a national hospital survey vendor, 2016

Cleveland Clinic — Implementing Value-Based Care

Overview

Cleveland Clinic health system uses a systematic approach to performance improvement while simultaneously pursuing 3 goals: improving the patient experience of care (including quality and satisfaction), improving population health, and reducing the cost of healthcare. The following measures are examples of 2016 focus areas in pursuit of this 3-part aim. Throughout this section, “Cleveland Clinic” refers to the academic medical center or “main campus,” and those results are shown.

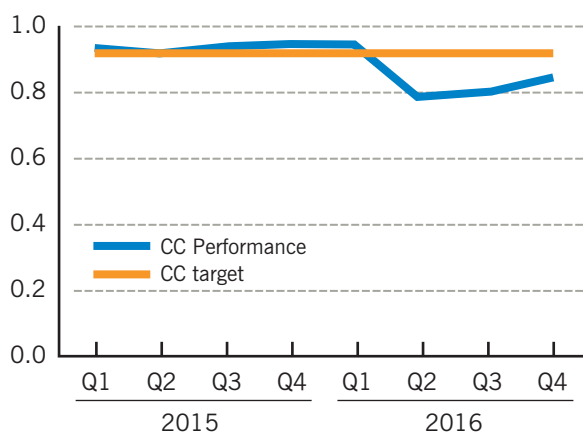
Real-time data are leveraged in each Cleveland Clinic location to drive performance improvement. Although not an exact match to publicly reported data, more timely internal data create transparency at all organizational levels and support improved care in all clinical locations.

Improve the Patient Experience of Care

Cleveland Clinic Overall Mortality Ratio

2015 – 2016

O/E Ratio



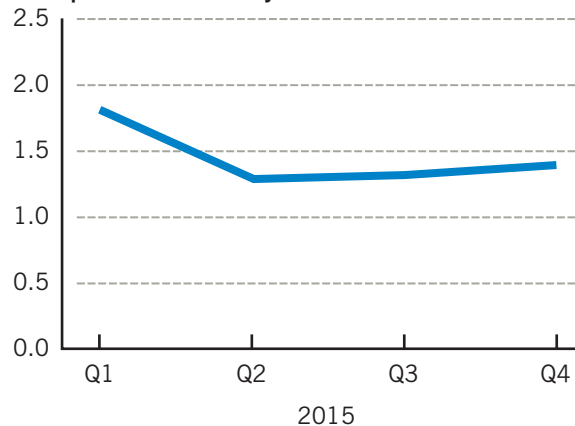
Source: Data from the Vizient Clinical Data Base/Resource Manager™ used by permission of Vizient. All rights reserved.

Cleveland Clinic’s observed/expected (O/E) mortality ratio outperformed its internal target derived from the Vizient 2016 risk model. Ratios less than 1.0 indicate mortality performance “better than expected” in Vizient’s risk adjustment model.

Cleveland Clinic Central Line-Associated Bloodstream Infection, reported as Standardized Infection Ratio (SIR)

2015 – 2016

Rate per 1000 Line Days

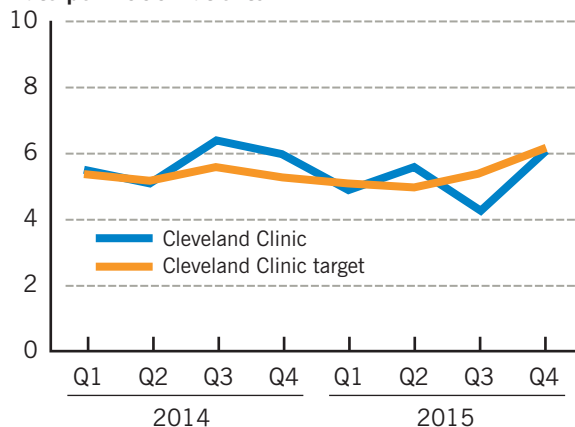


Cleveland Clinic has implemented several strategies to reduce central line-associated bloodstream infections (CLABSIs), including a central-line bundle of insertion, maintenance, and removal best practices. Focused reviews of every CLABSI occurrence support reductions in CLABSI rates in the high-risk critical care population.

Cleveland Clinic Postoperative Respiratory Failure Risk-Adjusted Rate

2015 – 2016

Rate per 1000 Patients



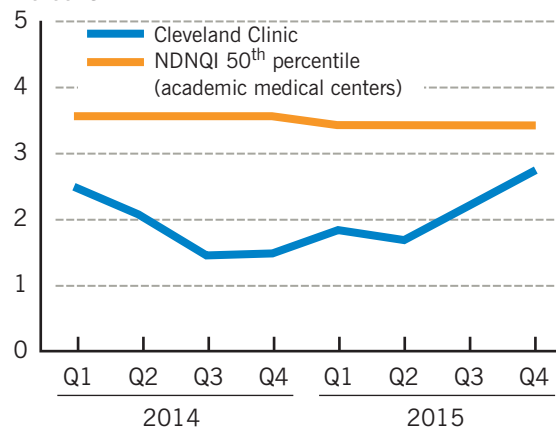
Source: Data from the Vizient Clinical Data Base/Resource Manager™ used by permission of Vizient. All rights reserved.

Efforts continue toward reducing intubation time, assessing readiness for extubation, and preventing the need for reintubation. Cleveland Clinic has leveraged the technology within the electronic medical record to support ongoing improvement efforts in reducing postoperative respiratory failure (AHRQ Patient Safety Indicator 11). Prevention of respiratory failure remains a safety priority for Cleveland Clinic.

Cleveland Clinic Hospital-Acquired Pressure Ulcer Prevalence (Adult)

2015 – 2016

Percent



Source: Data reported from the National Database for Nursing Quality Indicators® (NDNQI®) with permission from Press Ganey.

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 position on their own. Cleveland Clinic caregivers have been trained to provide appropriate skin care and regular repositioning 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.

Cleveland Clinic strategies to mitigate the risk of these pressure injuries include routine rounding to accurately stage pressure injuries, monthly multidisciplinary wound care meetings, and ongoing nursing education, both in the classroom and at the bedside.

Cleveland Clinic — Implementing Value-Based Care

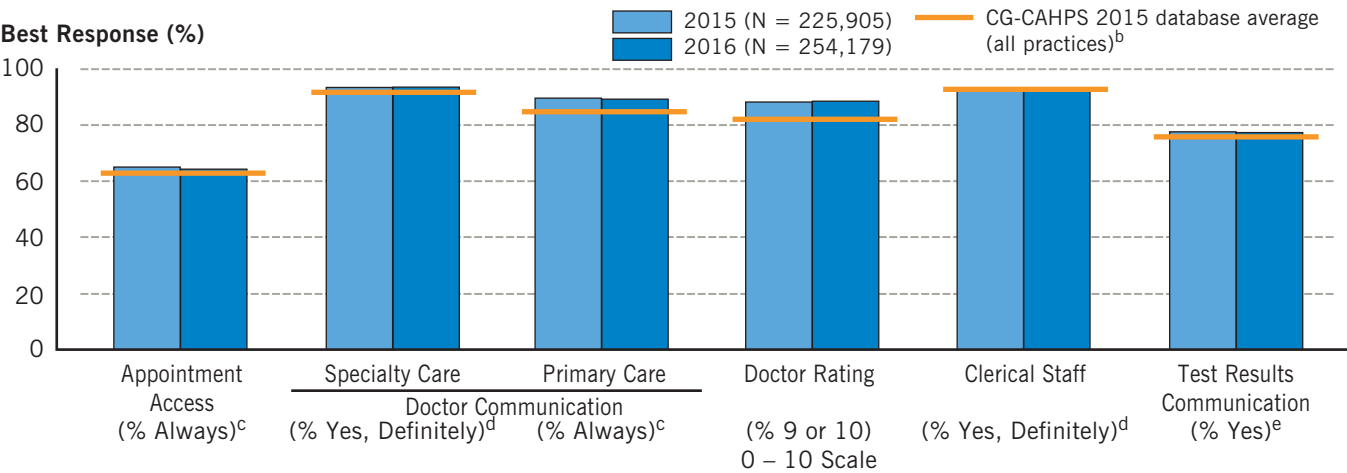
Keeping patients at the center of all that we do is critical. Patients First is the guiding principle at Cleveland Clinic. Patients First is safe care, high-quality care, in the context of patient satisfaction, and high value. Ultimately, our caregivers have the power to impact every touch point of a patient's journey, including their clinical, physical, and emotional experience.

We know that patient experience goes well beyond patient satisfaction surveys. Nonetheless, by sharing the survey results with our caregivers and the public, we constantly identify opportunities to improve how we deliver exceptional care.

Outpatient Office Visit Survey — Cleveland Clinic

CG-CAHPS Assessment^a

2015 – 2016



^aIn 2013, Cleveland Clinic began administering the Clinician and Group Practice Consumer Assessment of Healthcare Providers and Systems surveys (CG-CAHPS), standardized instruments developed by the Agency for Healthcare Research and Quality (AHRQ) and supported by the Centers for Medicare & Medicaid Services for use in the physician office setting to measure patients' perspectives of outpatient care.

^bBased on results submitted to the AHRQ CG-CAHPS database from 2829 practices in 2015

^cResponse options: Always, Usually, Sometimes, Never

^dResponse options: Yes, definitely; Yes, somewhat; No

^eResponse options: Yes, No

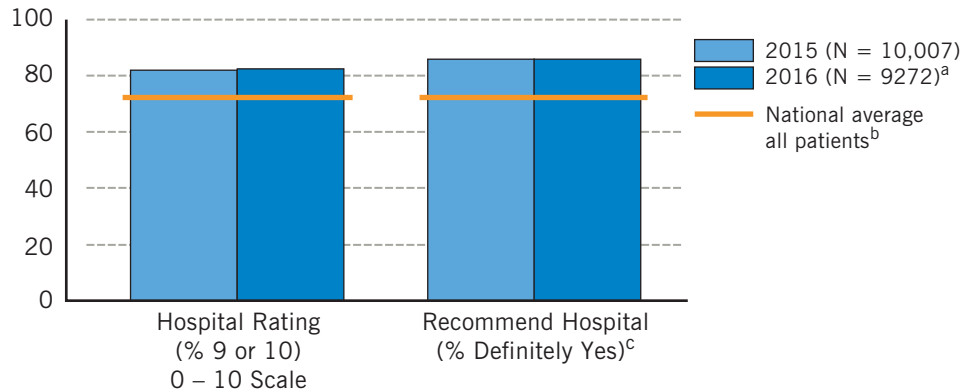
Source: Press Ganey, a national hospital survey vendor

Inpatient Survey — Cleveland Clinic

HCAHPS Overall Assessment

2015 – 2016

Best Response (%)



^aAt the time of publication, 2016 ratings have not been reported by the Centers for Medicare & Medicaid Services and ratings are not adjusted for patient mix.

^bBased on national survey results of discharged patients, January 2015 – December 2015, from 4172 US hospitals. medicare.gov/hospitalcompare

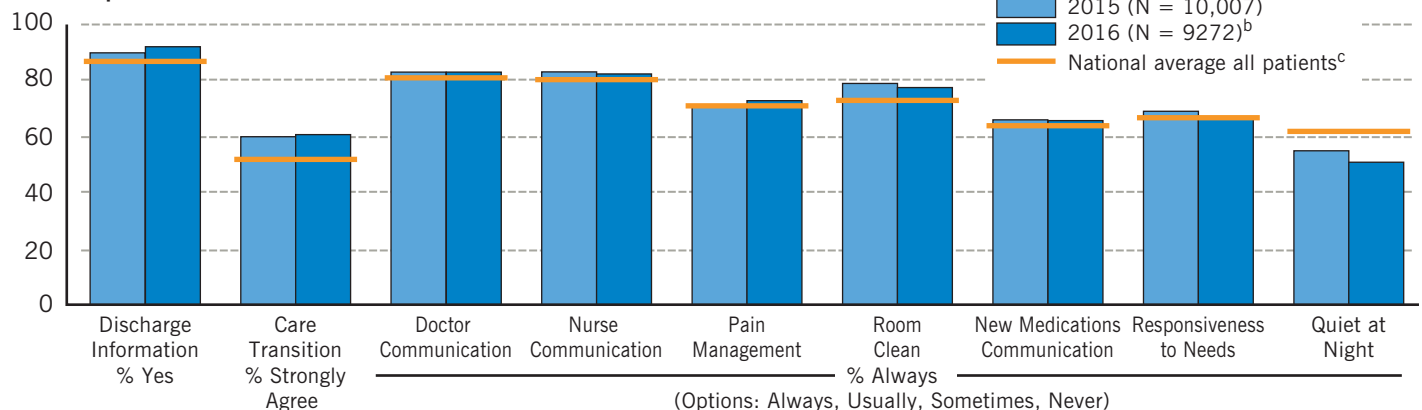
^cResponse options: Definitely yes, Probably yes, Probably no, Definitely no

The Centers for Medicare & Medicaid Services requires United States hospitals that treat Medicare patients to participate in the national Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, a standardized tool that measures patients' perspectives of hospital care. Results collected for public reporting are available at medicare.gov/hospitalcompare.

HCAHPS Domains of Care^a

2015 – 2016

Best Response (%)



^aExcept for "Room Clean" and "Quiet at Night," each bar represents a composite score based on responses to multiple survey questions.

^bAt the time of publication, 2016 ratings have not been reported by the Centers for Medicare & Medicaid Services and ratings are not adjusted for patient mix.

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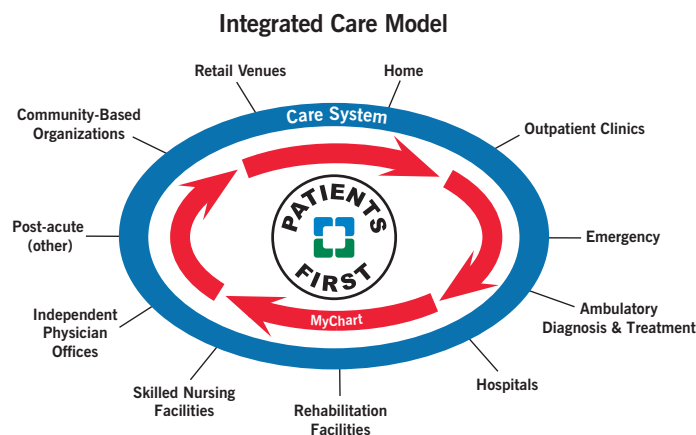
Source: Centers for Medicare & Medicaid Services, 2015; Press Ganey, a national hospital survey vendor, 2016

Cleveland Clinic — Implementing Value-Based Care

Focus on Value

Cleveland Clinic has developed and implemented new models of care that focus on “Patients First” and aim to deliver on the Institute of Medicine goal of Safe, Timely, Effective, Efficient, Equitable, Patient-centered care. Creating new models of Value-Based Care is a strategic priority for Cleveland Clinic. As care delivery shifts from fee-for-service to a population health and bundled payment delivery system, Cleveland Clinic is focused on concurrently improving patient safety, outcomes, and experience.

What does this new model of care look like?



The Cleveland Clinic Integrated Care Model (CCICM) is a value-based model of care, designed to improve outcomes while reducing cost. It is designed to deliver value in both population health and specialty care.

- The patient remains at the heart of the CCICM.
- The blue band represents the care system, which is a seamless pathway that patients move along as they receive care in different settings. The care system represents integration of care across the continuum.
- Critical competencies are required to build this new care system. Cleveland Clinic is creating disease- and condition-specific care paths for a variety of procedures and chronic diseases. Another facet is implementing comprehensive care coordination for high-risk patients to prevent unnecessary hospitalizations and emergency department visits. Efforts include managing transitions in care, optimizing access and flow for patients through the CCICM, and developing novel tactics to engage patients and caregivers in this work.
- Measuring performance around quality, safety, utilization, cost, appropriateness of care, and patient and caregiver experience is an essential component of this work.

Improve Population Health

Cleveland Clinic Accountable Care Organization Measure Performance

2016

National Percentile Ranking

90th

- Falls Screening
- Heart Failure
- Ischemic Vascular Disease
- BMI Screening
- Tobacco Screening

80th

- Coronary Artery Disease
- Diabetes
- Breast Cancer Screening
- Pneumonia Vaccination

70th

- Colorectal Cancer Screening
- Influenza Vaccination
- Blood Pressure Screening
- Hypertension

50th

- Depression Screening

Higher percentiles are better

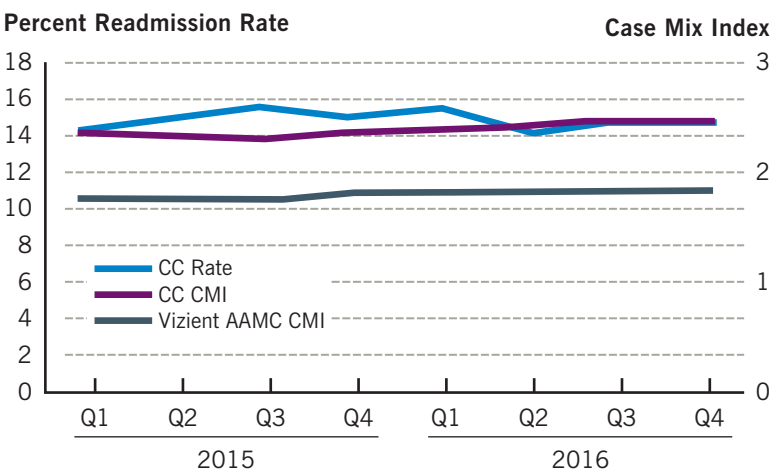
As part of Cleveland Clinic’s commitment to population health and in support of its Accountable Care Organization (ACO), these ACO measures have been prioritized for monitoring and improvement. Cleveland Clinic is improving performance in these measures by enhancing care coordination, optimizing technology and information systems, and engaging primary care specialty teams directly in the improvement work. These pursuits are part of Cleveland Clinic’s overall strategy to transform care in order to improve health and make care more affordable.

Cleveland Clinic — Implementing Value-Based Care

Reduce the Cost of Care

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

2015 – 2016

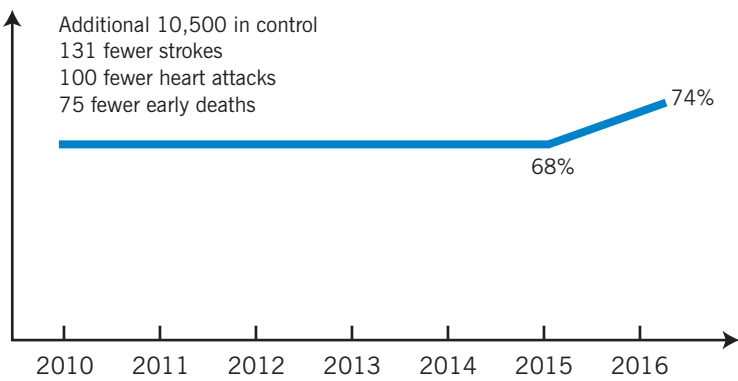


Cleveland Clinic monitors 30-day readmission rates for any reason to any of its system hospitals. Unplanned readmissions are actively reviewed for improvement opportunities. Comprehensive care coordination and care management for high-risk patients has been initiated in an effort to prevent unnecessary hospitalizations and emergency department visits. Sicker, more complex patients are more susceptible to readmission. Case mix index (CMI) reflects patient severity of illness and resource utilization. Cleveland Clinic's CMI remains one of the highest among American academic medical centers.

CMI = case mix index

Source: Data from the Vizient Clinical Data Base/Resource Manager™ used by permission of Vizient. All rights reserved.

Accountable Care Organization (ACO) Improving Outcomes and Reducing Costs



Cleveland Clinic was one of the top performing new ACOs in the United States (for 2015 performance as determined in 2016) due to efficiency, cost reduction, and improvements in effectiveness of chronic disease management such as treating hypertension, reducing preventable hospitalizations through care coordination, and optimizing the care at skilled nursing facilities through its Connected Care program.

For example, a system-wide effort to improve the control of blood pressure for patients with hypertension was begun in 2016 and resulted in an additional 10,500 patients with blood pressure controlled. This will translate to many fewer strokes, heart attacks, and preventable deaths.

Levita™ Magnetic Surgical System: First US Experience

The Levita Magnetic Surgical System is the first magnetic surgical platform to receive FDA approval. It includes a deployable, magnetic 5-cm bowel grasper and an external magnet to manipulate the grasper. Cleveland Clinic's Department of General Surgery is the first in the US to utilize and pilot the Levita system during laparoscopic cholecystectomy. Preliminary data (N = 6) showed that surgeons were able to eliminate the right lateral trocar without increasing operative time and with no associated complications. Four patients were discharged to home on the day of surgery and the other 2 were discharged on postoperative day 1. The pilot study findings suggest that Levita is safe and feasible in patients undergoing laparoscopic cholecystectomy, potentially leading to less tissue trauma and improved cosmesis.

Liver Transplantation: First-in-Human Trial Using Ex Vivo Normothermic Machine Perfusion

Liver transplant researchers received FDA approval to conduct the first US human liver transplant trial involving livers preserved using a noncommercial normothermic ex vivo perfusion device designed and built at Cleveland Clinic. This dramatic advance from traditional cold-storage preservation involves the circulation of warm oxygenated blood along with nutrients and medication to the donor organ to keep it metabolically active while awaiting transplant. Ten patients have been transplanted during the safety and efficacy phase of the trial. Preliminary data suggest that this technique is a feasible and safe preservation method for patients. About 20% of livers currently left unused could be transplanted successfully using this technology, which would substantially reduce organ discard and thereby reduce wait-list mortality.

Utilization of a Novel Treatment for Fecal Incontinence

Cleveland Clinic is one of two hospitals in the state of Ohio that has implemented use of the Fenix® Continence Restoration System, a novel magnetic anal sphincter augmentation technique for treatment of patients with fecal incontinence. This restoration system used by the Department of Colorectal Surgery includes a flexible ring of magnets that helps support a weak sphincter muscle. Use of Fenix is authorized by the FDA as a humanitarian device for the treatment of fecal incontinence in patients who are not candidates for or have previously failed conservative treatment and less invasive therapy options, such as injectable bulking agents, radiofrequency ablation, or sacral nerve stimulation. Such treatment, where no other options are available, can have a tremendous impact on patients' quality of life.

Risk Calculator for Postdischarge Venous Thromboembolism After Bariatric Surgery

Venous thromboembolism (VTE) remains a major cause of morbidity and mortality after bariatric surgery. The American Society for Metabolic and Bariatric Surgery recommends that some form of pharmacoprophylaxis should be administered to bariatric surgery patients in the absence of contraindications. It is unclear, however, which patients should receive a more aggressive therapy, such as chemoprevention or extended prophylaxis after hospital discharge. Therefore, clinician scientists from Cleveland Clinic's Department of General Surgery and the Bariatric and Metabolic Institute have developed a risk calculator for postdischarge VTE. Models allow providers to consider extended postdischarge pharmacoprophylaxis for high-risk patients. See <https://apervita.com/community/clevelandclinic> to access the risk calculator, or see <https://www.ncbi.nlm.nih.gov/pubmed/26967631> for more detail on the development of the calculator.

Contact Information

Colorectal Surgery, Gastroenterology and Hepatology, and General Surgery Appointments/Referrals

800.223.2273, ext. 47000

Bariatric Surgery Appointments/Referrals

216.445.2224 or

800.223.2273, ext. 52224

Breast Center Appointments/Referrals

800.223.2273, ext. 43024

Center for Human Nutrition Appointments/Referrals

800.223.2273, ext. 43046

Cleveland Clinic Florida Appointments

877.463.2010

On the Web at

clevelandclinic.org/digestive or
clevelandclinic.org/breastlocations

Staff Listing

For a complete listing of Cleveland Clinic's Digestive Disease & Surgery Institute staff, please visit clevelandclinic.org/staff.

Publications

Digestive Disease & Surgery Institute staff authored **272** publications in 2016 as indexed within Web of Science.

Locations

For a complete listing of Digestive Disease & Surgery Institute locations, please visit clevelandclinic.org/digestive or clevelandclinic.org/breastlocations.





Additional Contact Information

General Patient Referral

24/7 hospital transfers or physician consults

800.553.5056

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

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

About Cleveland Clinic

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 3500 Cleveland Clinic staff physicians and scientists in 140 medical specialties and subspecialties care for more than 7.1 million patients across the system annually, performing nearly 208,000 surgeries and conducting more than 652,000 emergency department visits. Patients come to Cleveland Clinic from all 50 states and 185 nations. Cleveland Clinic's CMS case-mix index is the second-highest in the nation.

Cleveland Clinic is an integrated healthcare delivery system with local, national, and international reach. The main campus in midtown Cleveland, Ohio, has a 1400-bed hospital, outpatient clinic, specialty institutes, labs, classrooms, and research facilities in 44 buildings on 167 acres. Cleveland Clinic has more than 150 northern Ohio outpatient locations, including 10 regional hospitals, 18 full-service family health centers, 3 health and wellness centers, an affiliate hospital, and a rehabilitation hospital for children. Cleveland Clinic also includes Cleveland Clinic Florida; Cleveland Clinic Nevada; Cleveland Clinic Canada; Cleveland Clinic Abu Dhabi, UAE; Sheikh Khalifa Medical City (management contract), UAE; and Cleveland Clinic London (opening in 2020). Cleveland Clinic is the largest employer in Ohio, with more than 51,000 employees. It generates \$12.6 billion of economic activity a year.

Cleveland Clinic supports physician education, training, consulting, and patient services around the world through representatives in the Dominican Republic, Guatemala, India, Panama, Peru, Saudi Arabia, and the United Arab Emirates. Dedicated Global Patient Services offices are located at Cleveland Clinic's main campus, Cleveland Clinic Abu Dhabi, Cleveland Clinic Canada, and Cleveland Clinic Florida.

The Cleveland Clinic Model

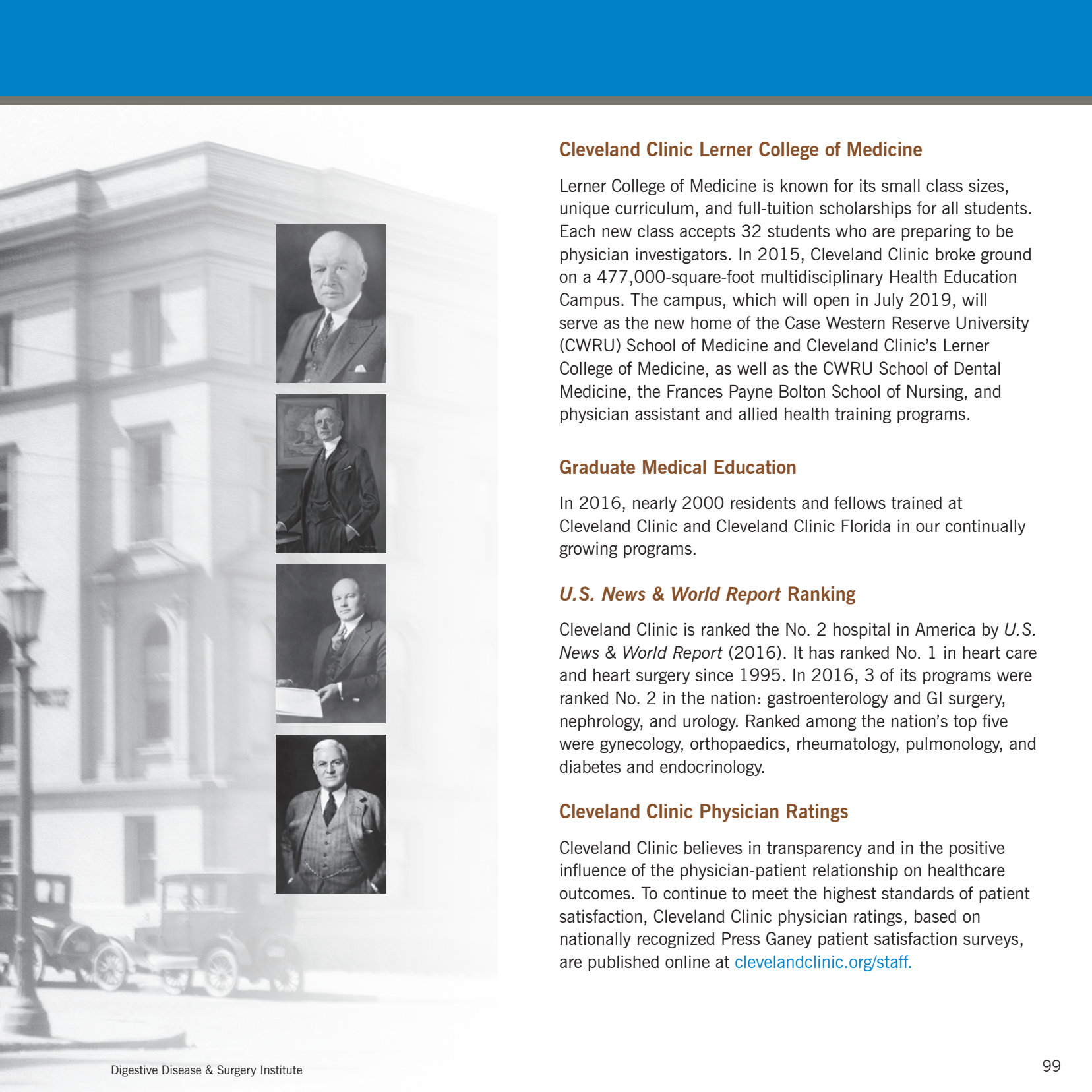
Cleveland Clinic was founded in 1921 by 4 physicians who had served in World War I and hoped to replicate the organizational efficiency of military medicine. The organization has grown through the years by adhering to the nonprofit, multispecialty group practice they established. All Cleveland Clinic 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.

Cleveland Clinic Florida was established in 1987. Cleveland Clinic began opening family health centers in surrounding communities in the 1990s. Marymount Hospital joined Cleveland Clinic in 1995, followed by regional hospitals including Euclid Hospital, Fairview Hospital, Hillcrest Hospital, Lutheran Hospital, Medina Hospital, South Pointe Hospital, and affiliate Ashtabula County Medical Center. In 2015, the Akron General Health System joined the Cleveland Clinic health system.

Internally, Cleveland Clinic services are organized into patient-centered integrated practice units called institutes, each institute combining medical and surgical care for a specific disease or body system. Cleveland Clinic was among the first academic medical centers to establish an Office of Patient Experience, to promote comfort, courtesy, and empathy across all patient care services.

A Clinically Integrated Network

Cleveland Clinic is committed to providing value-based care, and it has grown the Cleveland Clinic Quality Alliance into the nation's second-largest, and northeast Ohio's largest, clinically integrated network. The network comprises more than 6300 physician members, including both Cleveland Clinic staff and independent physicians from the community. Led by its physician members, the Quality Alliance strives to improve quality and consistency of care; reduce costs and increase efficiency; and provide access to expertise, data, and experience.



Cleveland Clinic Lerner College of Medicine

Lerner College of Medicine is known for its small class sizes, unique curriculum, and full-tuition scholarships for all students. Each new class accepts 32 students who are preparing to be physician investigators. In 2015, Cleveland Clinic broke ground on a 477,000-square-foot multidisciplinary Health Education Campus. The campus, which will open in July 2019, will serve as the new home of the Case Western Reserve University (CWRU) School of Medicine and Cleveland Clinic's Lerner College of Medicine, as well as the CWRU School of Dental Medicine, the Frances Payne Bolton School of Nursing, and physician assistant and allied health training programs.

Graduate Medical Education

In 2016, nearly 2000 residents and fellows trained at Cleveland Clinic and Cleveland Clinic Florida in our continually growing programs.

U.S. News & World Report Ranking

Cleveland Clinic is ranked the No. 2 hospital in America by *U.S. News & World Report* (2016). It has ranked No. 1 in heart care and heart surgery since 1995. In 2016, 3 of its programs were ranked No. 2 in the nation: gastroenterology and GI surgery, nephrology, and urology. Ranked among the nation's top five were gynecology, orthopaedics, rheumatology, pulmonology, and diabetes and endocrinology.

Cleveland Clinic Physician Ratings

Cleveland Clinic believes in transparency and in the positive influence of the physician-patient relationship on healthcare outcomes. To continue to meet the highest standards of patient satisfaction, Cleveland Clinic physician ratings, based on nationally recognized Press Ganey patient satisfaction surveys, are published online at clevelandclinic.org/staff.

Referring Physician Center and Hotline

Call us 24/7 for access to medical services or to schedule patient appointments at 855.REFER.123 (855.733.3712), email refdr@ccf.org, or go to clevelandclinic.org/Refer123. The free Cleveland Clinic Physician Referral App, available for mobile devices, gives you 1-click access. Available in the App Store or Google Play.

Remote Consults

Anybody anywhere can get an online second opinion from a Cleveland Clinic specialist through our MyConsult service. For more information, go to clevelandclinic.org/myconsult, email myconsult@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

Cleveland Clinic offers an array of secure online services that allow referring physicians to monitor their patients' treatment while under Cleveland Clinic care and gives them access to test results, medications, and treatment plans. my.clevelandclinic.org/online-services

DrConnect (online access to patients' treatment progress while under referred care): call 877.224.7367, email drconnect@ccf.org, or visit clevelandclinic.org/drconnect.

MyPractice Community (affordable electronic medical records system for physicians in private practice): 216.448.4617.

eRadiology (teleradiology consultation provided nationwide by board-certified radiologists with specialty training, within 24 hours or stat): call 216.986.2915 or email starimaging@ccf.org.

Medical Records Online

Patients can view portions of their medical record, receive diagnostic images and test results, make appointments, and renew prescriptions through **MyChart**, a secure online portal. All new Cleveland Clinic patients are automatically registered for **MyChart**. clevelandclinic.org/mychart

Access

Cleveland Clinic is committed to convenient access, offering virtual visits, shared medical appointments, and walk-in urgent care for your patients. clevelandclinic.org/access

Critical Care Transport Worldwide

Cleveland Clinic's fleet of ground and air transport vehicles is ready to transfer patients at any level of acuity anywhere on Earth. Specially trained crews provide Cleveland Clinic care protocols from first contact. To arrange a transfer for STEMI (ST-elevation 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 the largest CME program in the country. Live courses are offered in Cleveland and cities around the nation and the world. The center's website (ccfcme.org) is an educational resource for healthcare providers and the public. It has a calendar of upcoming courses, online programs on topics in 30 areas, and the award-winning virtual textbook of medicine, The Disease Management Project.

Clinical Trials

Cleveland Clinic is running more than 2200 clinical trials at any given time for 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. Cancer Clinical Trials is a mobile app that provides information on the more than 200 active clinical trials available to cancer patients at Cleveland Clinic. clevelandclinic.org/cancertrialapp

Healthcare Executive Education

Cleveland Clinic has programs to share its expertise in operating a successful major medical center. The Executive Visitors' Program is an intensive, 3-day behind-the-scenes view of the Cleveland Clinic organization for the busy executive. The Samson Global Leadership Academy is a 2-week immersion in challenges of leadership, management, and innovation taught by Cleveland Clinic leaders, administrators, and clinicians. Curriculum includes coaching and a personalized 3-year leadership development plan. clevelandclinic.org/executiveeducation

Consult QD Physician Blog

A website from Cleveland Clinic for physicians and healthcare professionals. Discover the latest research insights, innovations, treatment trends, and more for all specialties. consultqd.clevelandclinic.org

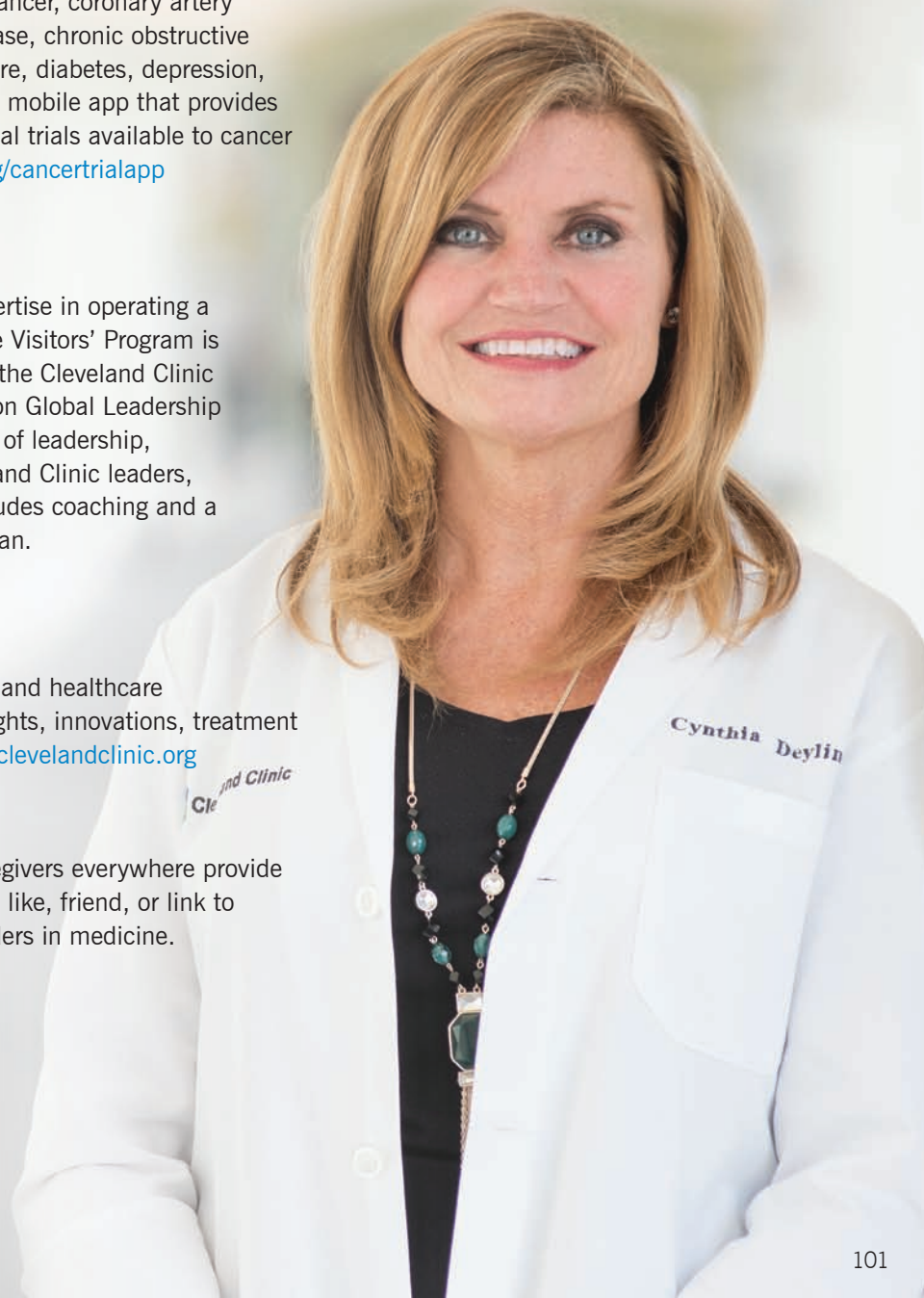
Social Media

Cleveland Clinic uses social media to help caregivers everywhere provide better patient care. Millions of people currently like, friend, or link to Cleveland Clinic social media — including leaders in medicine.

Facebook for Medical Professionals
facebook.com/CMEclevelandclinic

Follow us on Twitter
[@cleclinicMD](https://twitter.com/cleclinicMD)

Connect with us on LinkedIn
clevelandclinic.org/MDlinkedin





Every life deserves world class care.

This project would not have been possible without
the commitment and expertise of a team led by
Laura Buccini, DrPH, MPH.

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9500 Euclid Avenue, Cleveland, OH 44195

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