Cleveland Clinic

Outcomes 2006

The Children's Hospital





Cover photograph by Jennie Jones

Outcomes | 2006

Quality counts when referring patients to hospitals and physicians, so Cleveland Clinic has created a series of outcomes books similar to this one for its institutes and departments. Designed for a health care provider audience, the outcomes books contain a summary of our surgical and medical trends and approaches; data on patient volume and outcomes; and a review of new technologies and innovations. We hope you find these data valuable. To view all our outcomes books, visit Cleveland Clinic's Quality Web site at clevelandclinic.org/quality/outcomes.



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Chairman's Letter



Dear Friends,

Pediatrics has been a vital part of Cleveland Clinic since the Clinic opened its doors in 1921. The Children's Hospital, dedicated in 1987 provides care for pediatric patients through a staff of more than 200 pediatric medical and surgical sub-specialists. Our vision is to lead a world-class system of comprehensive health care for children, where innovation, discovery and partnership ensure superior patient care. Thank you for your interest in Cleveland Clinic Children's Hospital. I would like to take this opportunity to share with you some exciting news.

We have established pediatric multispecialty clinics at Fairview and Hillcrest hospitals to bring highly skilled Children's Hospital specialists closer to where patients and families live. This major strategic initiative of 2006 allows our medical and surgical subspecialists to provide comprehensive on-site support, complementing the services of pediatric emergency departments and critical care units in the community.

Our Children's Hospital Pediatric Intensive Care Unit (PICU), one of the few PICUs in the country staffed around the clock with a pediatric intensive care physician, continues to produce superior outcomes while treating some of the most severely ill patients. In 2005, pediatric critical care physicians developed a transport service that specializes in transferring sick children from anywhere in the country. In the past year, we transported nearly 1,000 children from more than 13 states.

Our Center for Pediatric and Congenital Heart Diseases produced some of the best outcomes in Ohio and the country for both 2005 and 2006.

Cleveland Clinic Children's Hospital serves as the only comprehensive pediatric transplant center in Northern Ohio, performing heart, lung, liver and kidney transplantation. In 2006, this service continued to grow after we performed record numbers of solid organ transplants in 2005.

The Neonatal Intensive Care Unit (NICU) at our Children's Hospital, also staffed around the clock with neonatologists and neonatal nurse practitioners, is a major referral center for infants and provides a full range of specialty expertise on site. In addition, the Fetal Care Center facilitates the diagnosis and treatment of fetal problems in the womb or immediately after birth.

Children's Hospital's Shaker Campus, the only freestanding facility of its kind in Ohio, offers many unique programs for behavioral and rehabilitation needs. In the fall of 2006, we continued to expand its services by breaking ground for the Center for Autism.

The Children's Hospital puts tremendous effort into assuring we deliver the safest care possible to our young patients. Through interdisciplinary teamwork, all staff work to identify where we can provide better care and actively participate in creating a safe environment for our patients. Practices known to ensure the safest care are implemented in all facets of care including the inpatient units, outpatient offices and operating rooms. We encourage the families of our patients to join our team as a partner in safe care, asking them to speak up if there is something they think could be wrong. Our culture of safety is a model for Cleveland Clinic and others providing care to children

I am pleased to share this quality and outcomes report with you.

Robert Wyllie, M.D.
Physician-In-Chief, Cleveland Clinic Children's Hospital

Department Overview

2006 Children's Hospital Volumes

Outpatient Visits	
General Pediatrics	269,746
Ophthalmology	19,528
Neurosciences	15,531
Heart Center	13,757
Gastroenterology	10,164
Cancer Center	7,850
Pulmonary	4,650
Endocrinology	4,378
Post Acute Medicine	3,558
Behavioral Medicine	3,286
General Surgery	3,099
Nephrology	2,793
Allergy	2,299
Infectious Disease	776
Neonatology	250
Other	69,088
Total	431,958
Surgical Cases	
General Surgery	1,417
Cardiothoracic Surgery	127
Total	1,544
Pediatric Cardiology	
Cardiac Catheterization Procedures	418
Pediatric Echocardiograms	5,194
Other Diagnostic Procedures	577
Total Cases	6,189

Pediatric Gastroenterology	
Pediatric Endoscopy	1,130
Other Diagnostic Procedures	1,062
Total	2,192
Inpatient Cases	
Critical Care	1000
Pediatric-Congenital Heart	301
Pediatric-Gastroenterology	152
Pediatric-Hospitalists	1,009
Pediatric-General Surgery	352
Pediatric-Hematology Oncology	416
Pediatric-Neonatology	158
Pediatric-Other Subpecialties	190
Total	2,769
Admissions	
Hospital	2,886
PICU	1,000
NICU	180
Total	3,777
Patient Days	
Hospital	14,276
PICU	2,989
NICU	3,096
Total	20,361

Children's Hospital Beds

NICU	18
PICU	15
Infant/Toddler	18
Epilepsy Monitoring Unit	6
Child/Adolescent	21
Cardiac	22
Inpatient Rehabilitation	36
Total Beds	136

Cleveland Clinic Children's Hospital has been providing world-class, family-centered care to pediatric patients and their families since 1951. More than 130 pediatric specialists and sub-specialists within Children's Hospital provide state-of-the-art care and treatment programs for children with serious and complex medical problems.

In 2006, Cleveland Clinic Children's Hospital was recognized by *U.S.News & World Report* as one of the top 20 children's hospitals in the nation. In addition, 50 physicians were recognized as "Best Doctors," as reported in *Cleveland Magazine* (March 2006). These outside endorsements validate the world-class care delivered at Cleveland Clinic Children's Hospital every day.

Children's Hospital has medical, surgical, psychiatric and intensive care beds and offers the latest technologies, including a computerized pediatric epilepsy monitoring unit, a level III Neonatal Intensive Care Unit, a Pediatric Intensive Care Unit and dedicated pediatric operating suites. The program also features Pediatric Emergency Departments at Fairview and Hillcrest hospitals, the only pediatric emergency facilities in the suburban Cleveland area, as well as the Urgent Care Center at Cleveland Clinic main campus.

Pediatric multi-specialty clinics at Fairview and Hillcrest hospitals bring highly skilled Children's Hospital specialists closer to where patients and their families live. This major strategic initiative allows our medical and surgical sub-specialists to provide comprehensive on-site support, complementing the services of pediatric emergency departments and critical care units in the community. There are also 14 Cleveland

Clinic Family Health Centers throughout the region, with plans for further expansion in the region.

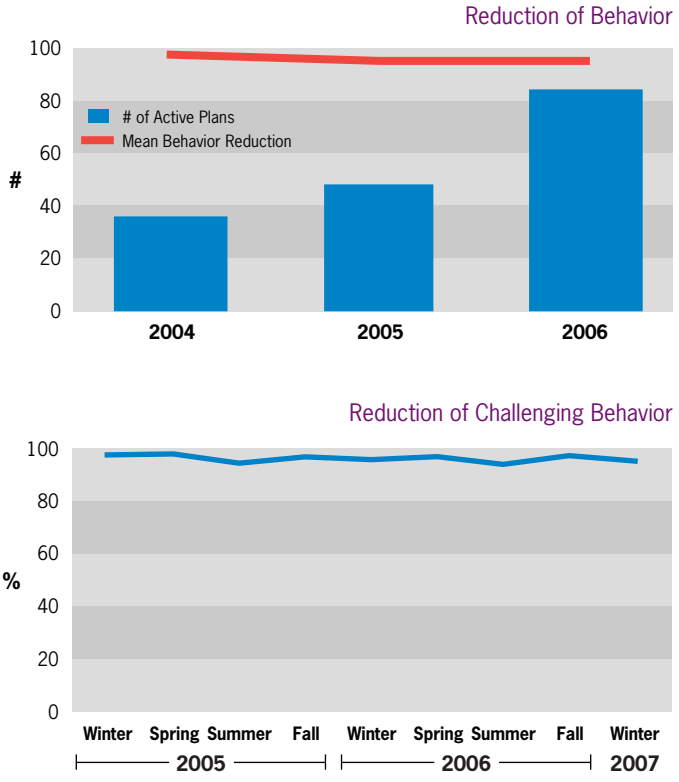
Cleveland Clinic Children's Hospital Shaker Campus provides developmental services to children and youth with disorders of neurodevelopment, movement, feeding and other vital conditions. Its rehabilitation experts guide the next steps for those recovering from trauma, surgery, or hospitalization in an intensive care setting. Shaker's rehabilitation outcomes exceed national benchmarks, restoring more function and giving children greater ability to rejoin mainstream life. Children thrive because Shaker merges the talents of doctors and eight allied health specialties in three settings: inpatient, outpatient and day-hospital. Its three suburban locations put care where families need it.

Shaker Campus is bustling with new and expanded kinds of care. Its Cleveland Clinic Center for Autism is building a specially-designed structure for its rapidly growing population. Shaker operates the nation's second pediatric cardiac rehabilitation program and is developing a program for children with chronic pain. The campus also has Northeast Ohio's only pediatric dialysis unit.

Quality & Outcome Measures

Children's Hospital, Shaker Campus
The Lerner School for Autism

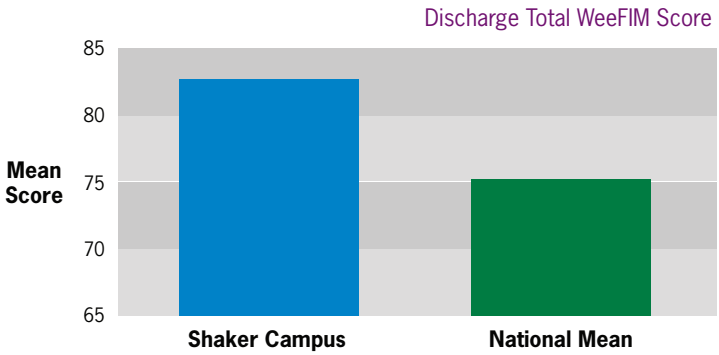
The Behavior Management Committee (BMC) at Cleveland Clinic's Center for Autism provides clinical oversight and monitoring for challenging and disruptive behavior. Each student at the Lerner School has an individual, formal behavior management program. The data in the illustration demonstrate the results of the average percentage reduction of challenging behaviors, over six behavioral classifications: Aggression, Self-Stimulatory Behavior, Non-Contextual Verbalizations, Screaming Behavior, Self-Injurious Behavior, and Anxiety Behavior. Below is a three year comparison of average behavior reduction percentages.

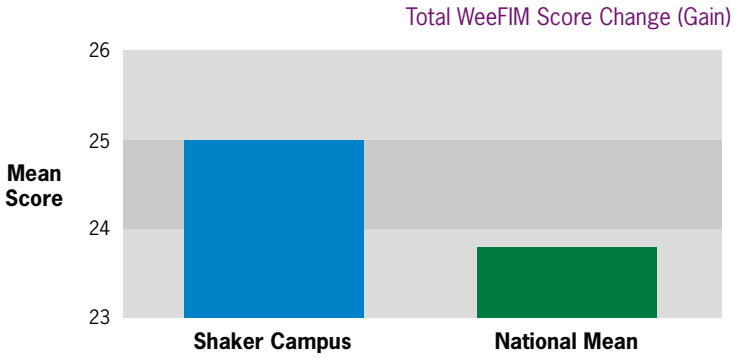


Children with Autism frequently exhibit maladaptive behaviors — behaviors which interfere with being able to function in activities of daily living and in social situations with other individuals. One of the key outcomes for The Center for Autism School is to decrease the incidence of these types of behaviors. The graph displays the program's success rate each quarter in reducing these behaviors. The 95% success rate, over all the plans initiated, represents a reduction from 1,063 occurrences to 53 occurrences daily.

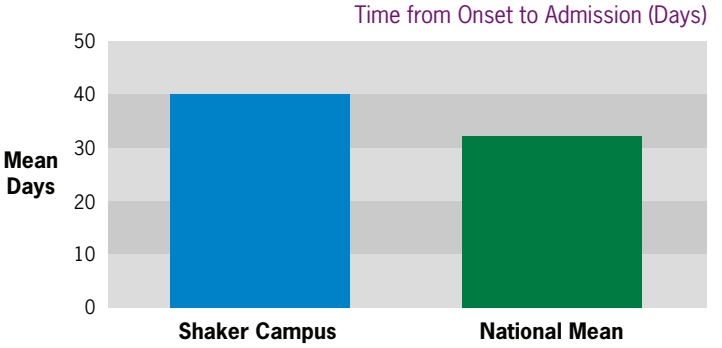
Department of Developmental & Rehabilitation Pediatrics
WeeFIM Data

The WeeFIM instrument measures and tracks the development of functional independence, measured by such activities as self-care (*e.g.* bathing), mobility (*e.g.* walking), and cognition (*e.g.* memory). Children requiring rehabilitative services at The Children's Hospital, Shaker Campus typically achieve a higher functional status than the national average for children's rehabilitation hospitals.





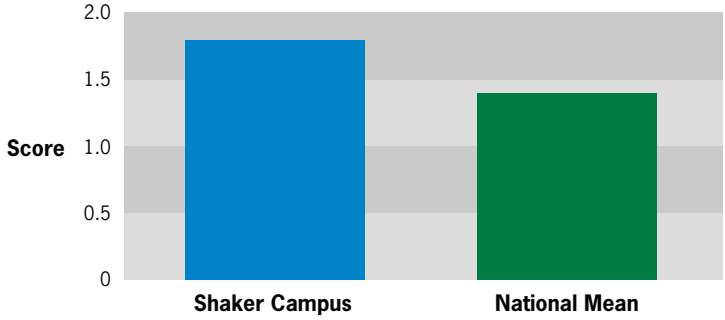
This measure represents the number of points gained by a child during the hospitalization; the higher the gain, the more functional independence the child has gained.



Note: A lower score is better than a higher score.

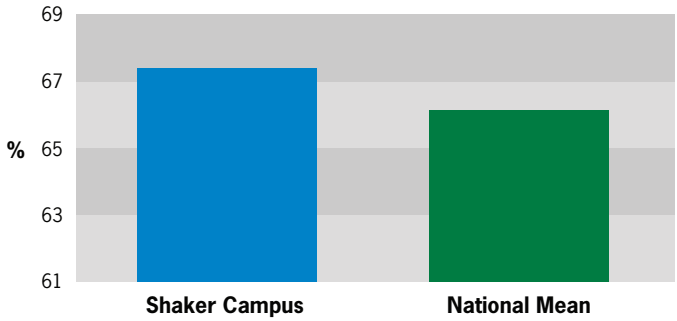
Time from Onset to Admission measures the number of days between the onset of the disability and admission to the rehabilitation program. Research indicates starting rehabilitation as soon as intensive therapy can be tolerated maximizes the functional gain a child may achieve.

Length of Stay Efficiency (Total WeeFIM Score Change/LOS)



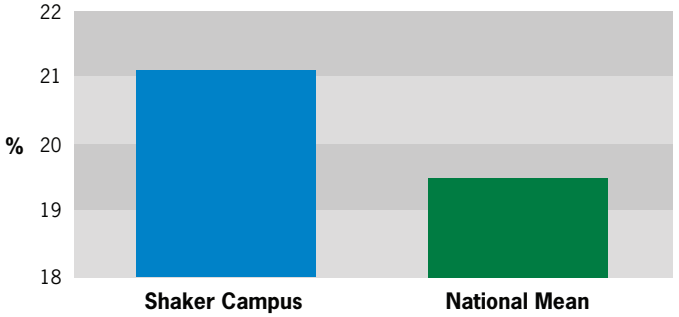
Note: A higher score is better than a lower score.

Discharge Functional Quotient Score

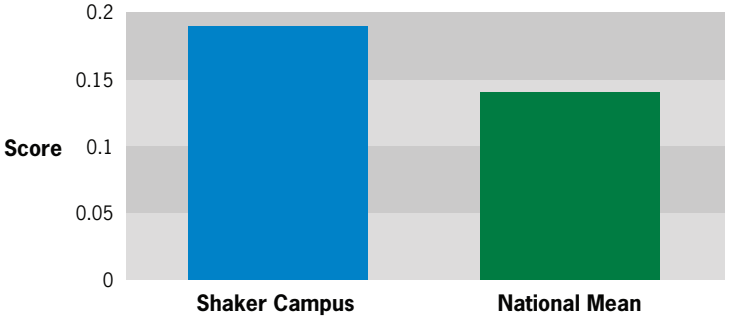


The Discharge Functional Quotient Score measures how a child functions in comparison to a child of the same age without a disability. Children discharged from Children's Hospital, Shaker Campus, function at a higher level than the national mean.

Functional Quotient Score Change

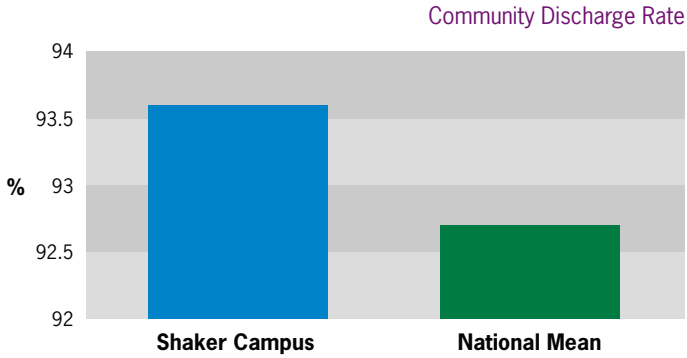


Therapy Unit Efficiency
(Change in WeeFIM Score per Therapy Unit)



Note: A higher score is better than a lower score.

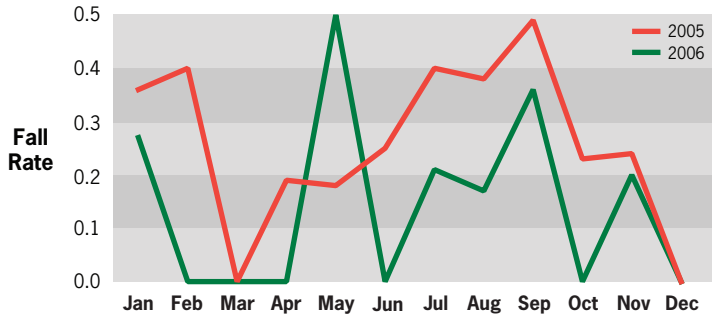
A therapy unit represents 15 minutes of therapy treatment. Each unit of therapy provided results in a great change in function. The length of time the therapy session lasts is determined by what the patient can tolerate. Typically, inpatient rehabilitation patients are expected to have three hours of therapy per day. This graph shows that children at Shaker Campus gain more function per unit of therapy delivered.



Children's Hospital Nursing

Inpatient Fall Rate

The Children's Hospital, Shaker Campus conducts a falls risk assessment on each patient every day and implements falls precautions for children at risk. Data compiled are discussed, shared, and disseminated with team leaders every month. Of the nine falls in 2006, there were no injuries to patients.



Influenza Vaccine

Children who currently receive chemotherapy, those who have been off chemotherapy less than six months, and those with sickle cell disease should receive influenza vaccine.

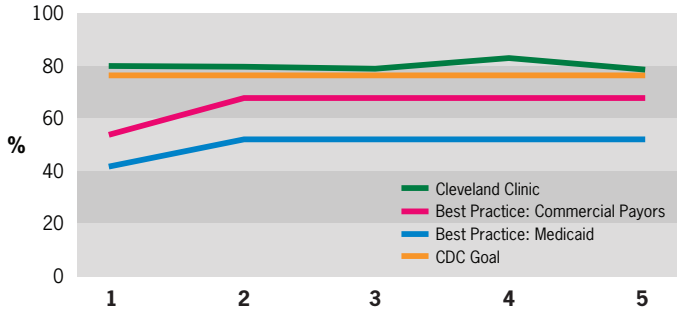
The Pediatric Oncology outpatient areas have a system to ensure influenza vaccine is administered. Children who do not receive the vaccine may be ill at the time of the visit or may have received the vaccine from a primary care physician. Parents may refuse the administration of the vaccine.

Oncology and Hematology Patients
Receiving Influenza Vaccine



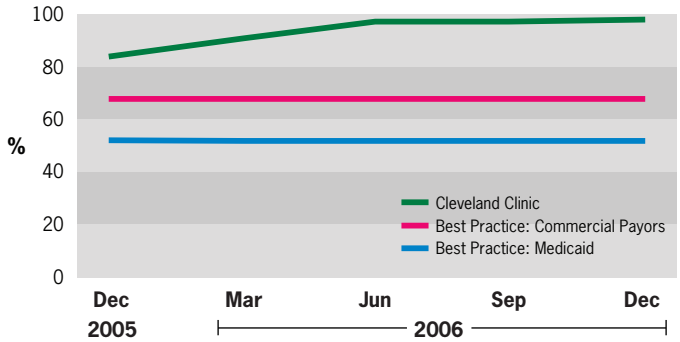
General Pediatrics

Childhood Immunization Status Combination II:
Two Year Olds with Current Recommended Vaccinations



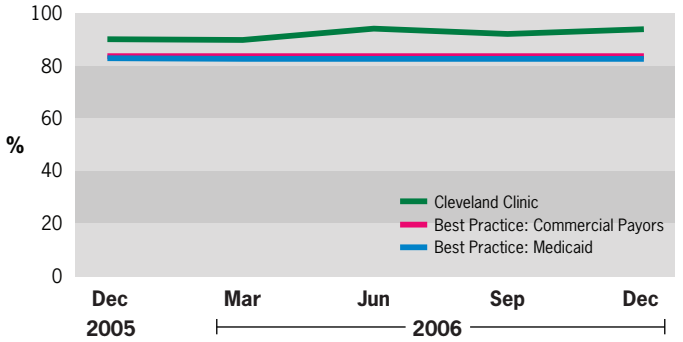
We promote vaccinations by reviewing immunization status at all visits (including sick visits and follow-up appointments) and providing vaccinations where indicated. Current vaccination recommendations include: 4 DTaP/DT vaccinations, 3 OPV/IPV vaccinations, 1 MMR, 3 HIB, 3 Hep B and at least 1 VZV by age two years.

Appropriate Testing for Children with Pharyngitis: Patients 2-18 Years
who had a Group A Strep Test and Prescribed Antibiotics



A measure of practice quality is the use of a Group A Strep diagnostic test concurrent with the prescription of antibiotics for children with pharyngitis. Antibiotic use for viral infections leads to antibiotic resistance in the community. Our practice assures each child with this diagnosis is tested for Group A Strep infection before antibiotics are prescribed. Currently, we are achieving a rate of streptococcus testing better than 95% in children with pharyngitis – higher than national benchmarks and best practices.

Appropriate Treatment for Children with Upper Respiratory Infection (URI) without Comorbidities: Patients 3 Months - 18 Years with a Diagnosis of URI, Not Prescribed Antiobiotics



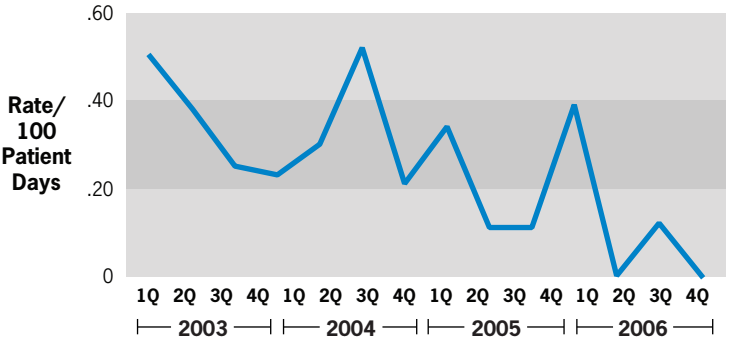
Viral upper respiratory infections do not require antibiotics. We provide education and suggestions for symptomatic care for upper respiratory infections to families.

Neonatology

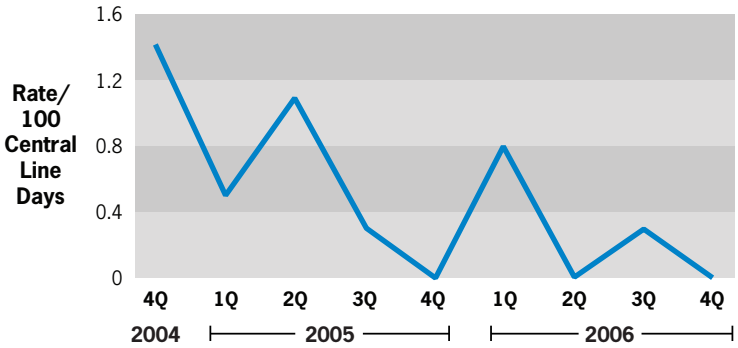
Bloodstream Infections (BSI)

Bloodstream Infection is a major source of morbidity and mortality in NICU patients. The graph below depicts the rate of hospital acquired BSI in Children's Hospital Neonatal Intensive Care Unit (NICU).

NICU Acquired Blood Stream Infection Rate



NICU Primary Bloodstream
Infections per Central Line Days



The rate of primary line infection was 0.64 per 100 central line days. The three blood stream infections had a central line source.

There were no ventilator associated pneumonias, nosocomial viral infections or catheter-related urinary tract infections in 2006.

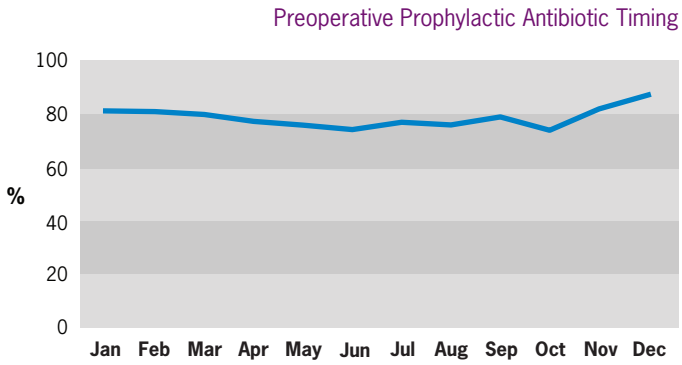
APR-DRGs use clinical logic to classify patients into similar severity of illness and risk of mortality groupings. Comparisons can then be made in terms of length of stay, cost, mortality and severity of illness, for example, which allows statistical differences to be identified and addressed.

APR DRG	Description	# of Cases	Mean Length of Stay	Expected Length of Stay	Severity of Illness Index	# of Deaths	Expected Deaths	SMR
639	Neonate Birthwt >2499G W Other Significant Condition	15	5.53	5.13	0.894	0	0.35	-
634	Neonate, Birthwt >2499G W Resp Dist Synd/Oth Maj Resp Cond	15	10.87	10.82	3.085	0	0.57	-
633	Neonate Birthwt >2499G W Major Anomaly	15	5.73	7.29	1.944	0	1.10	-
640	Neonate Birthwt >2499G, Normal Newborn Or Neonate W Other Problem	14	3.07	2.90	0.262	0	0.00	-
593	Neonate Birthwt 750-999G W/O Major Procedure	4	85.25	57.50	14.685	0	0.43	-
614	Neonate Bwt 1500-1999G W Or W/O Other Significant Condition	3	17.33	18.16	3.144	0	0.03	-
588	Neonate Bwt <1500G W Major Procedure	3	26.67	93.18	25.884	2	0.72	2.77

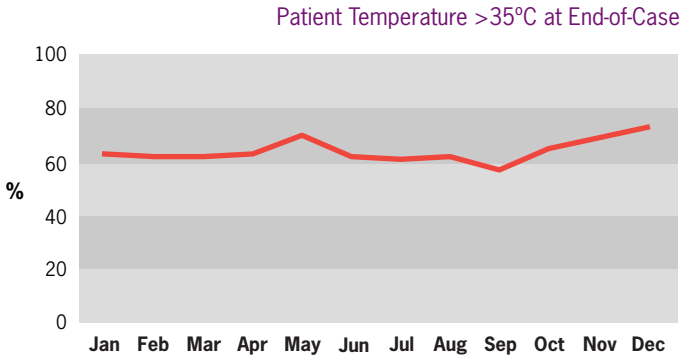
Pediatric Anesthesiology

Surgical Infection Prevention

Surgical site infections contribute to surgical morbidity and mortality in all specialties. The timely administration of antibiotics prior to surgery in appropriate patients has been shown to reduce surgical site infections. A multidisciplinary team, involving Surgery, Infectious Disease, Anesthesia, Nursing and Quality, work to ensure patients receive antibiotics in a timely fashion. The goal for anesthesia providers is to administer antibiotics ordered by the surgeon in 60 minutes or less prior to incision time (with the exception of Vancomycin which has a two hour administration window prior to incision).



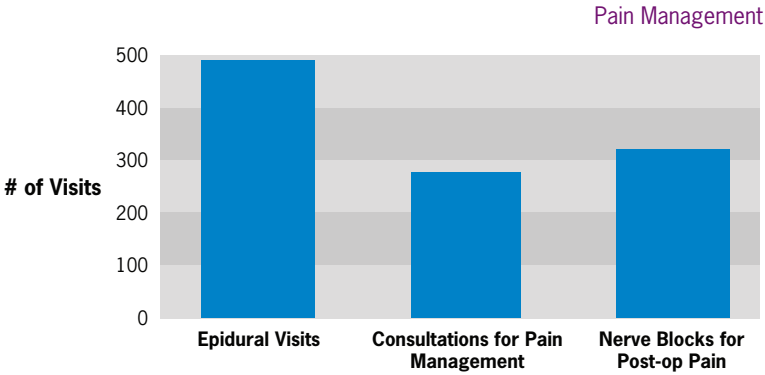
Presently, there are no pediatric benchmarks for this data. The Department of Pediatric General Surgery is working with the National Surgical Quality Improvement Project to become a pediatric beta site to develop these benchmarks. Data source: Anesthesia Record Keeping System (ARKS).

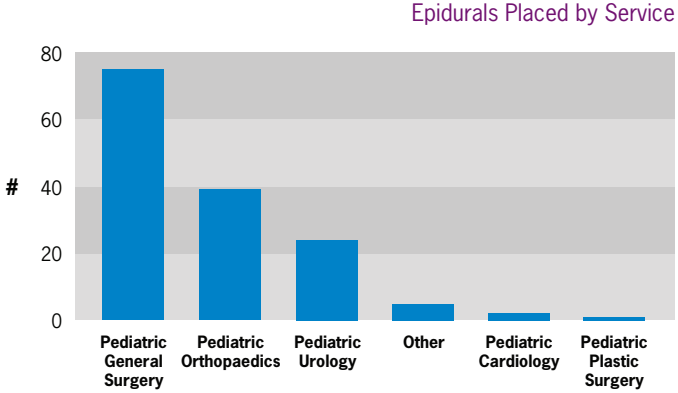


Data source: Anesthesia Record Keeping System (ARKS)

Measurement of end-of-case temperatures excludes cardiac and spine cases where induced hypothermia is a clinically useful technique to decrease organ damage. A case is considered normothermic if the mean of the last four to five temperature readings is >35° C.

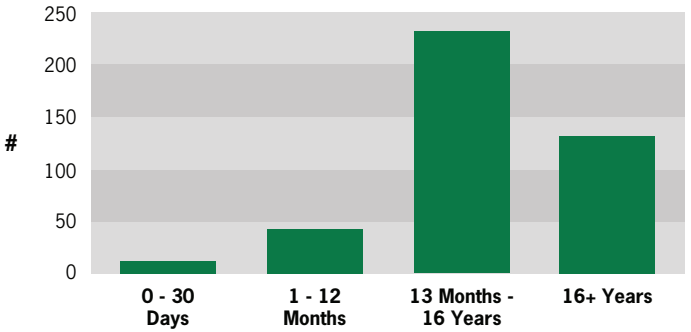
Pain Management



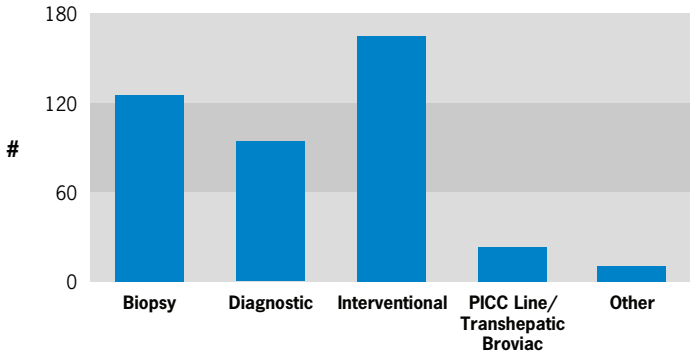


Pediatric Cardiology

Pediatric Cardiac Catheterizations: Age of Patients



Pediatric Cardiac Catheterizations by Procedure

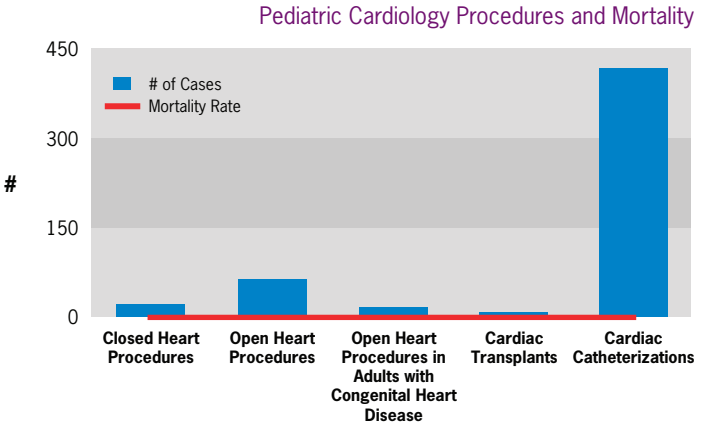


Biopsy cases are done to ascertain the diagnoses of myocarditis or cardiomyopathy, or to follow transplanted heart immunosuppression. Diagnostic cases are typically done to measure intracardiac and intravascular pressures and to quantify systemic and pulmonary blood flows. Interventional cases include ASD and VSD occluder cases, vascular dilation cases and vascular occlusion cases.

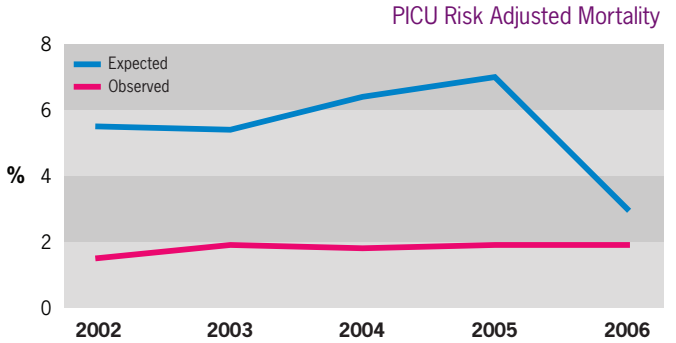
APR-DRGs use clinical logic to classify patients into similar severity of illness and risk of mortality groupings. Comparisons can then be made in terms of length of stay, cost, mortality and severity of illness, for example, which allows statistical differences to be identified and addressed.

APR DRG	Description	# of Cases	Mean Length of Stay	Expected Length of Stay	Severity of Illness Index	# of Deaths	Expected Deaths	SMR
120	Major Respiratory & Chest Procedures	26	7.04	6.41	2.339	0	0.23	-
160	Major Cardiothoracic Repair Of Heart Anomaly	25	7.12	10.42	8.780	0	1.63	-
175	Percutaneous Cardiovascular Procedures W/O Ami	24	1.42	1.76	1.965	0	0.09	-
167	Other Cardiothoracic Procedures	15	4.53	6.71	4.589	0	0.24	-
201	Cardiac Arrhythmia & Conduction Disorders	12	2.67	2.52	0.534	0	0.02	-
163	Cardiac Valve Procedures w/o Cardiac Catheterization	11	4.82	8.79	5.757	0	0.68	-
200	Cardiac Structural and Valvular Disorders	7	6.86	4.04	1.142	0	0.06	-
169	Major Thoracic and Abdominal Vascular Procedures	7	7.86	10.76	4.856	1	0.59	1.71
191	Cardiac Catheterization with Circ Disord Exc Ischemic Heart Disease	7	12.43	47.77	1.702	0	0.30	-

Bureau for Children with Medical Handicaps (BCMH) Data

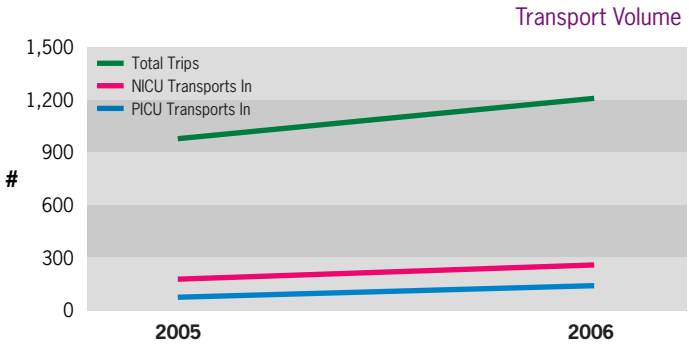


Pediatric Critical Care Medicine



The Pediatric Intensive Care Unit (PICU) consistently demonstrates superior mortality outcomes over time. Each patient admitted to the PICU is assessed using a nationally based physiologic acuity profile. Risk of mortality is calculated based on a nationally derived database. The difference in actual mortality versus expected mortality indicates that among the children discharged each year from our PICU, there are 5 to 10 children who might have died had they been hospitalized elsewhere. Because of a decline in the number of congenital heart surgery cases, the predicted mortality of PICU patients declined in 2006. The actual mortality rate continues to be very low.

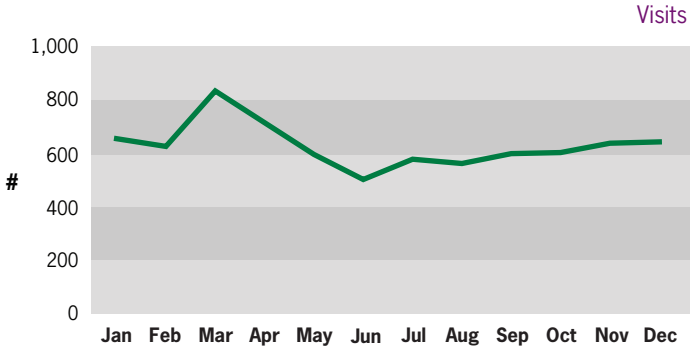
Pediatric Critical Care Transport

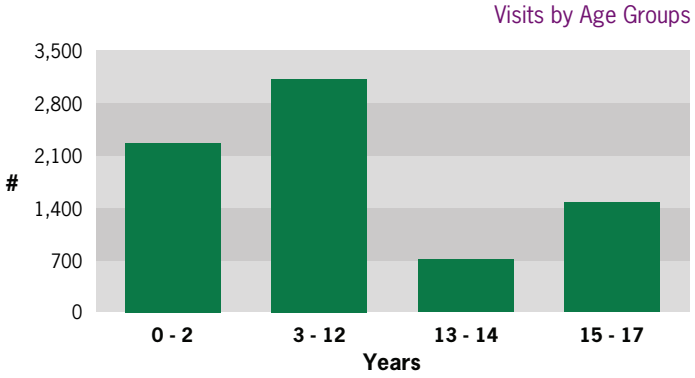


In its second year, the Pediatric Critical Care Transport Team increased transports of all types, to all units in Children's Hospital. Transfers in to the Neonatology Intensive Care Unit (NICU) increased by almost 100% while the Pediatric Intensive Care Unit received 50% more transfers in via the Critical Care Transport Team. There were no mortalities en route.

Pediatric Emergency Medicine

Members of the Section of Urgent Care in the Department of General Pediatrics provide evaluation and treatment of children with acute medical and surgical conditions in Cleveland Clinic's Emergency Department. They coordinate diagnostic studies and consultations with pediatric sub-specialists as indicated.





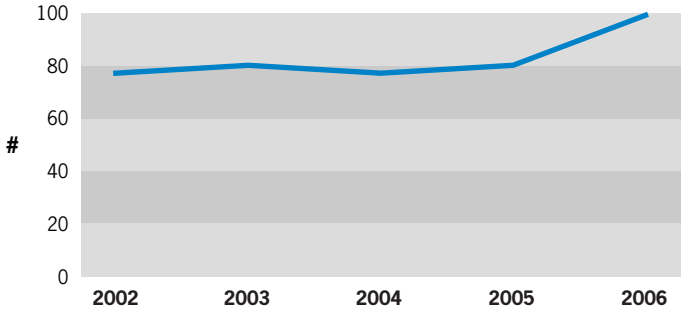
Pediatric Epilepsy

Many children have epilepsy that cannot be easily controlled. They undergo repeated trials of new drugs, frequently at high doses. These children often incur side effects from these medications that limit their effectiveness.

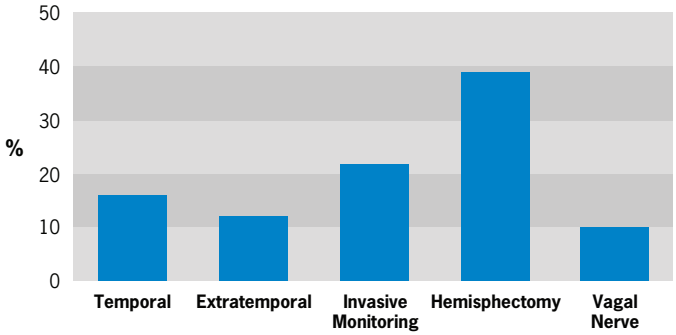
Epilepsy specialists at Children's Hospital evaluate children with intractable epilepsy using all the latest diagnostic tools: continuous video monitored electroencephalography, computerized tomography (CT) scanning, magnetic resonance imaging (MRI) scanning, positron emission tomography (PET) scanning,

functional tests (such as the WADA test) and, where indicated, invasive brain surface electroencephalography. Many children are judged candidates for seizure surgery of varying types. The commonly performed procedures are focused lesion removal, invasive monitoring to guide and tailor a resection, lobectomies and, in the case of severe, catastrophic epilepsy, functional or anatomic hemispherectomy.

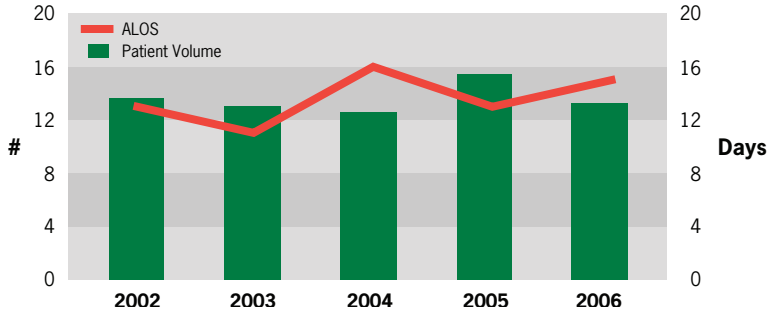
Pediatric Epilepsy Surgery



Pediatric Epilepsy Surgery Procedures

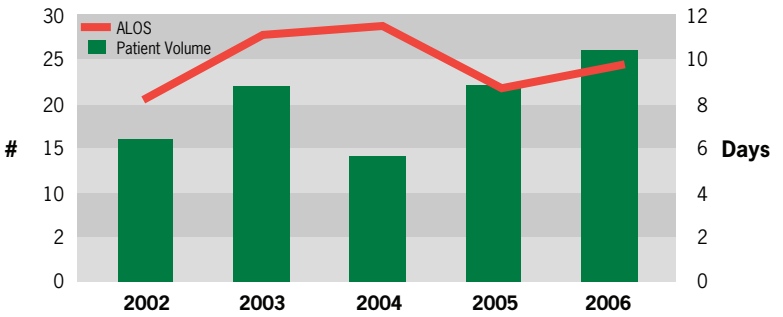


Craniotomy, Invasive Studies, < 18 Years



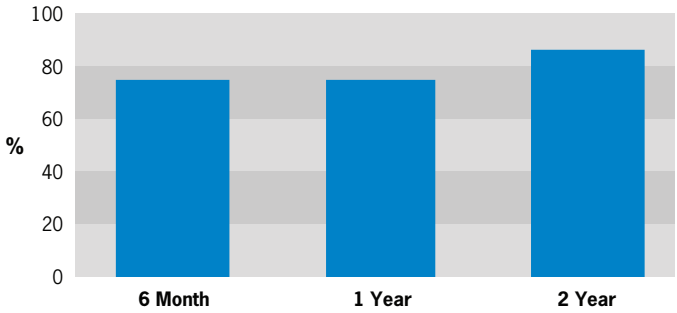
Children may have seizures arising from vital or eloquent areas of their brain, such as the speech motor areas or the motor strips. Invasive monitoring and mapping allows a maximum therapeutic resection while sparing vital brain areas. Due to the episodic nature of this disease, patients are often monitored for several days post procedure, leading to variable lengths of stay.

Craniotomy for Hemispherectomy, < 18 Years



Some children have catastrophic intractable epilepsy: they may have dozens to hundreds of seizures a day. If the evaluation determines the major sources of seizure discharges localize to one hemisphere, such children may achieve lessened seizure frequency by the techniques of functional or anatomic hemispherectomy.

Seizure Freedom - 2004 Cases
6-Month, 1-Year, and 2-Year Follow-up



The results following hemispherectomy at Children's Hospital are very good. Seventy-five percent of children undergoing this procedure were seizure-free one year postoperatively. Two years postoperatively, 86% of patients were seizure free. These results are particularly gratifying as this group of children were severely incapacitated by their seizure frequency.

Pediatric Gastroenterology

Sedation Reactions

During 2006, 266 children and adolescents underwent out-patient upper endoscopy or colonoscopy. To ensure patient comfort and safety sedation is routinely administered to pediatric patients undergoing these procedures. Defining a procedural adverse event as hemodynamic instability, medication reaction, bleeding or unanticipated admission to the hospital, no adverse events occurred in the year 2006.

Autoimmune Hepatitis in Children: Long-term Outcomes

Autoimmune hepatitis (AIH) is a chronic relapsing inflammatory disease of the liver that affects both children and adults. A long-term retrospective review of the records of 33 children followed with the diagnosis of autoimmune hepatitis, ages 2-18 years, in the Department of Pediatric Gastroenterology was done to assess the significance of specific prognostic factors, the impact of medical therapy and liver transplantation and evaluate long-term outcome.

Our study found that in contrast to adult patients with autoimmune hepatitis, the finding of cirrhosis on biopsy at the time of initial diagnosis in children, did not predict poor long-term outcome. In our series of patients, the 10-year survival of children with autoimmune hepatitis was 80%.

Estimated survival in children with AIH compared to expected survival in the age- and gender-matched U.S. population is illustrated.



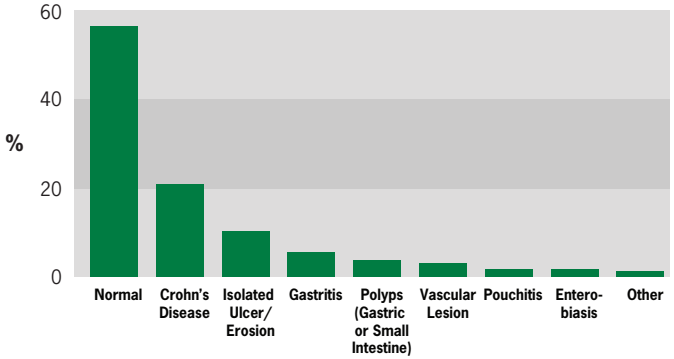
Wireless Capsule Endoscopy in Children

Wireless capsule endoscopy is a recently introduced technology available for the evaluation of small intestinal abnormalities. In children, this test can be helpful in the evaluation of symptoms including abdominal pain, gastrointestinal bleeding, the assessment of the presence and extent of inflammatory bowel disease, such as Crohn's Disease, and the detection of other mucosal and vascular abnormalities. Since 2004, 167 wireless capsule endoscopies have been performed in children and adolescents in the Department of Pediatric Gastroenterology. Indications for this study included abdominal pain, inflammatory bowel disease, gastrointestinal bleeding, and polyposis.

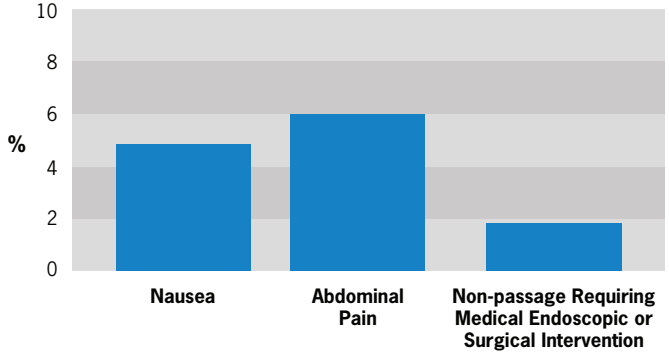
Results:

Total Patients:	167
Evaluation completed to cecum:	147 (87.5%)

Endoscopy Findings

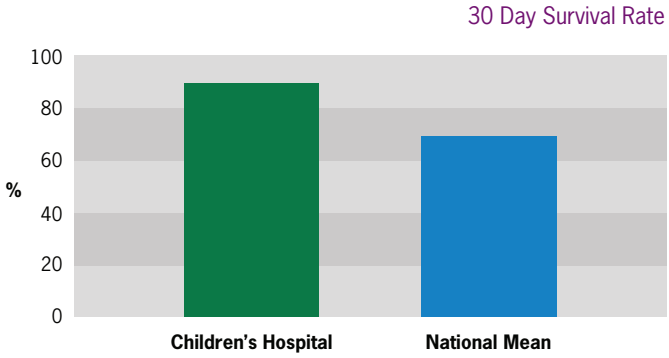


Complications



Pediatric General Surgery

Congenital Diaphragmatic Hernia (CDH)

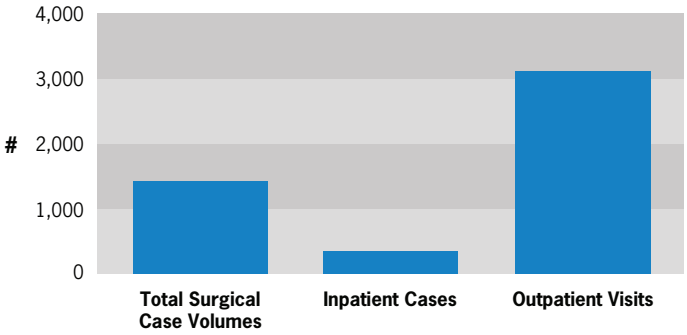


In 2006, no patients undergoing congenital diaphragmatic hernis repair experienced recurrent disease and only 4% required home oxygen.

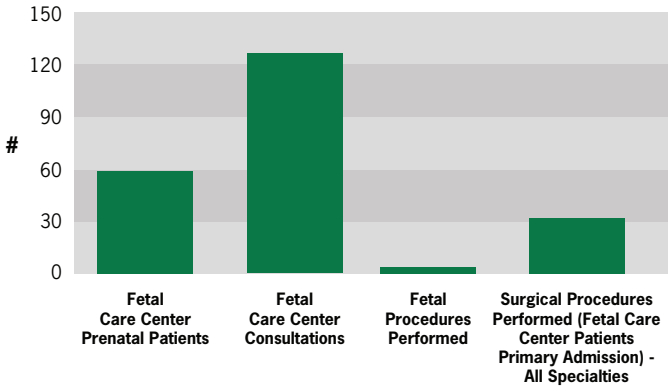
APR-DRGs use clinical logic to classify patients into similar severity of illness and risk of mortality groupings. Comparisons can then be made in terms of length of stay, cost, mortality and severity of illness, for example, which allow statistical differences to be identified and addressed.

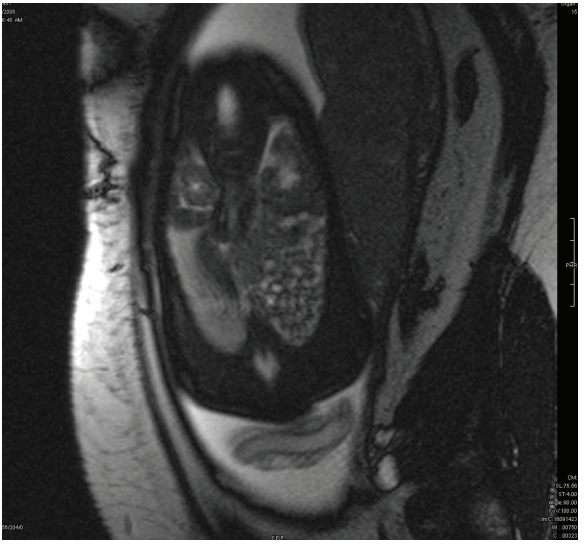
APR DRG	APR Description	# of Cases	Children's Hospital LOS	Expected LOS	Children's Hospital Deaths	Peer Expected Deaths
220	Major Stomach, Esophageal & Duodenal Procedures	26	6.58	8.59	0	0.48
221	Major Small & Large Bowel Procedures	45	9.76	8.31	1	1.28
222	Other Stomach, Esophageal & Duodenal Procedures	17	2.35	2.66	0	0.00
223	Other Small & Large Bowel Procedures	12	3.33	4.82	0	0.01
225	Appendectomy	46	3.15	2.78	0	0.00
227	Hernia Procedures Except Inguinal, Femoral & Umbilical	2	1.50	2.84	0	0.00
228	Inguinal, Femoral & Umbilical Hernia Procedures	20	1.55	2.31	0	0.01
229	Other Digestive System & Abdominal Procedures	8	3.75	7.70	0	0.23
247	Intestinal Obstruction	18	2.56	3.70	0	0.01
262	Cholecystectomy Except Laparoscopic	4	6.50	8.81	0	0.03
263	Laparoscopic Cholecystectomy	15	3.47	3.97	0	0.00
650	Splenectomy	2	2.00	4.05	0	0.02
120	Major Respiratory & Chest Procedures	26	7.04	6.41	0	0.23

Pediatric General Surgery Volumes



Pediatric General Surgery: Fetal Care Center Statistics



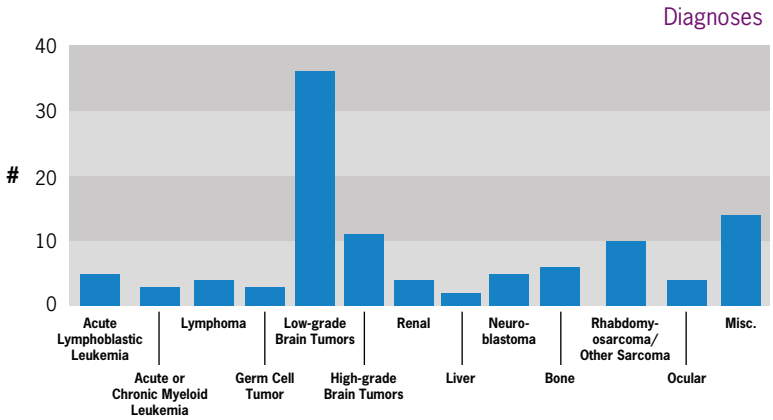


Fetal MRI at 32 weeks gestation showing left-sided congenital diaphragmatic hernia with intra-abdominal organs present in the left chest.

Pediatric Hematology/Oncology

New Oncology Diagnoses

New patient visits for the Department increased in 2006.

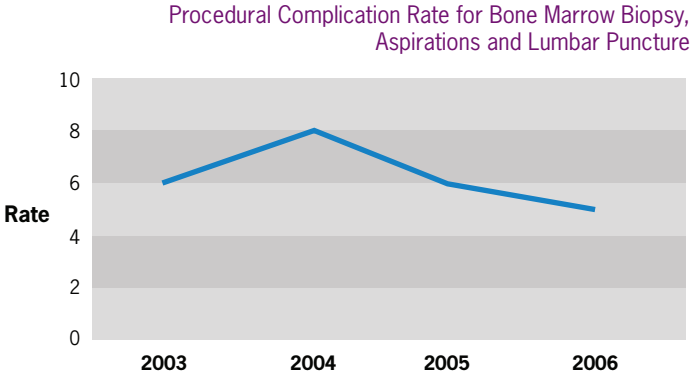


Procedural Complications

Bone marrow aspirations, bone marrow biopsies and lumbar punctures are performed on children for the diagnosis of leukemia and solid tumors, as well as to monitor ongoing chemotherapy. Lumbar punctures are performed to assess the possibility of central nervous system spread of leukemia and solid tumors, and to prophylaxis against the spread of malignancies. Rates of bleeding or infection at bone marrow aspiration and biopsy sites and the rate of post lumbar puncture headache were trended as quality measures.

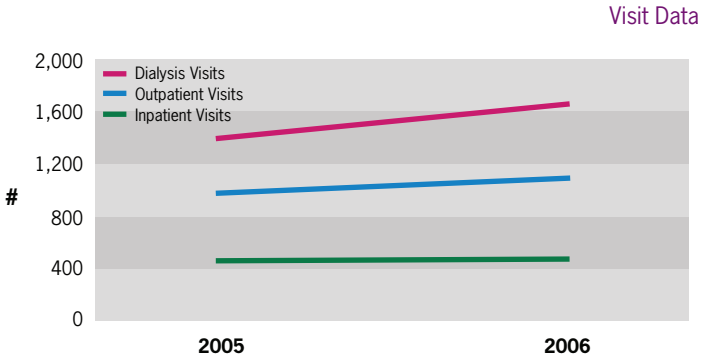
Evaluation of Procedural Complications

The most common complications seen for the procedures were spinal headaches, multiple attempts to get the spinal fluid or bone marrows on very large or small patients. One patient had an infection at the LP site.



Pediatric Nephrology

The Section of Pediatric Nephrology and Hypertension is a significant contributor to the Children's Hospital's international reputation for excellence in the medical and surgical care for renal disease patients. Section physicians provide primary and consultative care and treatment to children and adolescents with all forms of kidney disease, including genitourinary disease, hematuria, proteinuria, hypertension, dialysis, and renal transplantation.



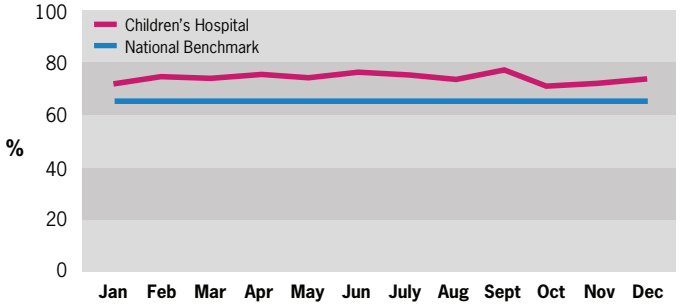
The Power Dialysis Center, housed at Children's Hospital, Shaker Campus, provides pediatric peritoneal and hemodialysis services to children and adolescents through 21 years of age. A multidisciplinary team approach involving pediatric nephrologists, vascular surgeons, interventional radiologists, certified nephrology nurses, renal dietitians, pediatric renal social workers, recreational therapists and tutors makes this facility unique and allows for the holistic approach to patient care. These characteristics resulted in the unit receiving a special Medicare pediatric exception, with the acknowledgement of providing above standard care to these children. It was cited as a model for creation of other pediatric dialysis units in Pennsylvania, Canada, New Jersey, and North Carolina. This unit consistently surpassed quality standards, established by The National Kidney Foundation Dialysis Outcome Quality Initiative (NKF/DOQI), since its creation in 2002.

The National Kidney Foundation Dialysis Outcomes Quality Initiative (NKF/DOQI) has established a number of benchmarks as markers of quality practice for patients with kidney failure. These benchmarks include:

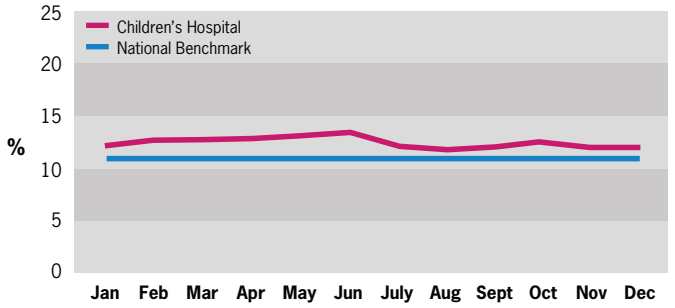
Urea Reduction Rate (URR) > 65%
Kt/V >1.2 (a measure of dialysis efficiency)
Hemoglobin >11.0 gm/dL
Serum Albumin >3.5 gm/dL

Children's Hospital patients had the following outcomes for these quality parameters:

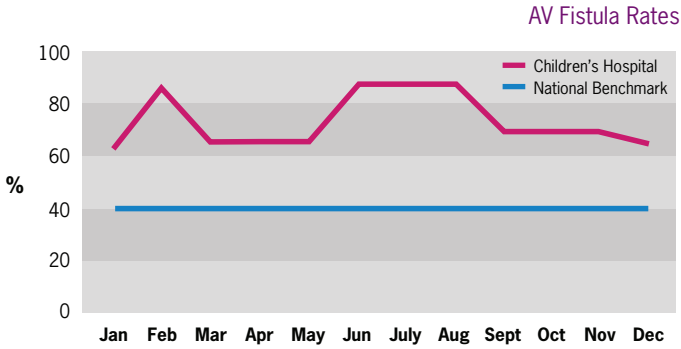
Urea Reduction Rates



Anemia Control



Deepa Chand, M.D. is co-chair of the International Pediatric Fistula First Initiative. With a mean of 73%, the unit's arteriovenous fistula rate exceeded the national recommended guidelines of >40% in prevalent dialysis patients.



Kidney Transplants

A multidisciplinary team approach is utilized in providing care for pediatric kidney transplant patients, including pediatric nephrologists, urologists, transplant nurse coordinators, dietitians and social workers. This approach allows the team to provide comprehensive care for these patients. Services include deceased and living donor transplants, as well as pre- and postoperative management. Having received referrals regionally, nationally, and internationally, the transplantation staff is well versed in providing services to a wide variety of recipients. Cleveland Clinic's kidney transplant program is a member of the United Network for Organ Sharing (UNOS) and meets all requirements for kidney transplantation.

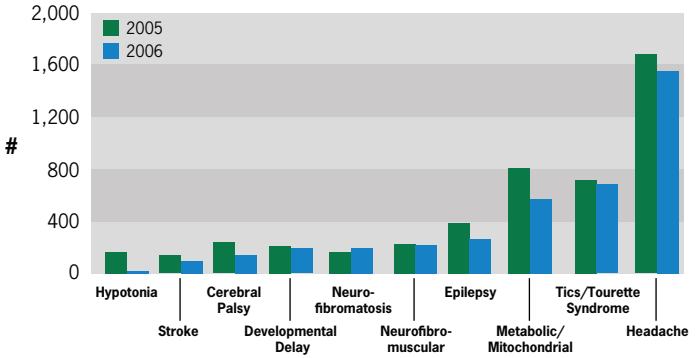
Pediatric renal transplantation services have been provided at Cleveland Clinic since 1971. Over the past 20 years, 84 pediatric renal transplants have been performed. The average one-year survival of pediatric grafts is 94% (national average 90%) and one-year patient survival is 100% (national average 90%). In 2006, seven pediatric renal transplants were performed. The pediatric population comprises nearly 25% of all living donor renal transplants performed at this institution.

The section is very actively involved in clinical research. The faculty is active as co-investigators for NIH sponsored national clinical trials as well as independent research. Over the past few years, section faculty gave numerous regional and national lectures, had three publications in peer reviewed journals, two book chapters, and presented several abstracts at national/international meetings. Faculty members have been appointed to national society leadership positions and have served as reviewers for journals and national meetings. Dr. Chand was appointed the co-chair of the International Pediatric Fistula First Initiative. The faculty has approximately 15 open research protocols, many are multi-center, national clinical trials.

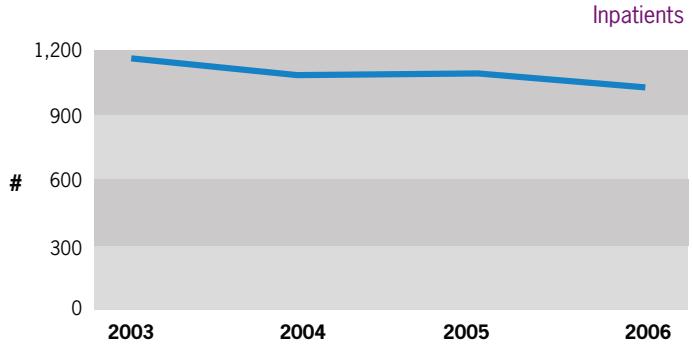
Pediatric Neurology

Cleveland Clinic's Pediatric Neurology physicians saw nearly 6,000 children in 2006 for an array of neurological disorders. Together, our team offers state-of-the-art care for a wide range of pediatric neurological conditions which include brain malformations, cerebral palsy and spasticity, headache, metabolic and mitochondrial disorders, white matter disease, Tourette syndrome and other movement disorders, neuromuscular disease, including muscular dystrophy, fetal and neonatal neurological problems, brain and spinal cord tumors, neurological complications of cardiac disease, stroke and epilepsy.

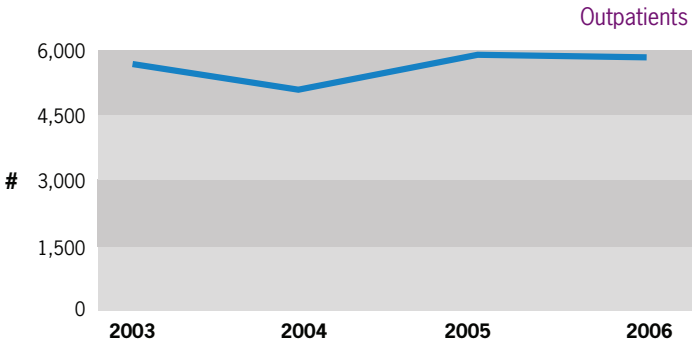
Top Pediatric Neurology Diagnoses



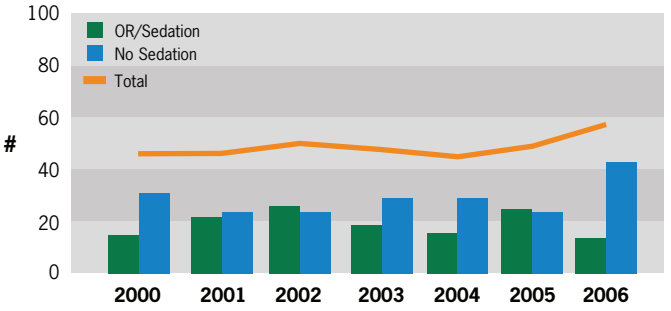
Our nationally and internationally respected physicians (all Board certified in both pediatrics and neurology) collaborate with Cleveland Clinic Children's Hospital sub-specialists in every medical and surgical field to offer multidisciplinary care for children with neurological disorders. Several of our staff are listed among the top physicians in Ohio and some are listed among the top physicians in the United States.



The availability of increased outpatient treatment options, particularly for headache and migraine, have resulted in decreased admissions for patients with neurologic diseases.



Electromyography Procedures



Test results in electromyography procedures are more accurate when the use of sedation is lessened.

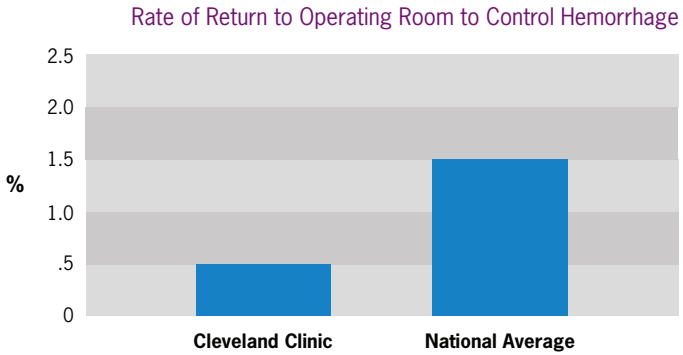
Pediatric Otolaryngology

The Section of Pediatric Otolaryngology remains clinically active and expanded to a three-physician practice in 2006. Since 2002, the section has performed over 4,500 procedures.

Tonsillectomy, with or without adenoidectomy, remains a common procedure in the pediatric population and is generally considered the most common major surgery performed on children in the United States. In recent years, the primary indication for this operation shifted from recurrent infections to upper airway obstruction from hypertrophied tonsils and/or adenoids. Prior analysis of our operative indications showed approximately 60% of pediatric patients undergo tonsillectomy secondary to obstructive symptoms and 40% to relieve chronic infections.

Tonsillectomy Outcomes

Since 2002, the Section of Pediatric Otolaryngology performed over 1,280 tonsillectomies or adenotonsillectomies. Postoperative hemorrhage is one of the most common, and potentially life-threatening, complications of this procedure nationwide. Many children require return trips to the operating room to control post-tonsillectomy bleeding. Children's Hospital overall 0.5% rate of return to the operating room to control hemorrhage is significantly lower than the national average of 1% - 2%.

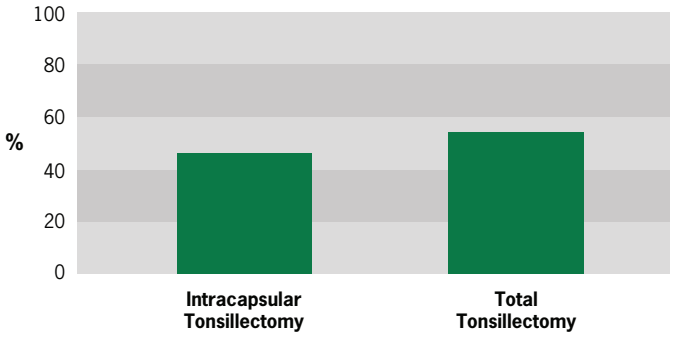


As our awareness of the consequences of sleep apnea grows, an increasing number of younger children are being evaluated for upper airway obstruction secondary to adenotonsillar hypertrophy. Many of these children have other associated co-morbidities, such as craniofacial disorders or cardiopulmonary disease, making them a distinctly different patient population compared to older children with adenotonsillar hypertrophy. It is recommended all children ages 4 and younger receive at least overnight observation following surgery prior to discharge home. Children ages two and younger are generally considered at higher risk for complications which include postoperative hemorrhage, airway compromise and late readmission secondary to dehydration following adenotonsillectomy. In this patient population, many studies report a readmission rate up to 4% following tonsillectomy secondary to dehydration.

In recent years partial, or intracapsular, tonsillectomy gained in nationwide popularity amongst otolaryngologists. During this procedure, a small rim of tonsil tissue is left against the lateral pharyngeal wall, preventing exposure of the pharyngeal musculature. In the young patient, intracapsular tonsillectomy procedures are particularly attractive, given the findings that children generally experience less pain and resume oral diet more quickly. Postoperative hemorrhage rates are also believed lower following this procedure. The potential for tonsil re-growth, as well as the lack of ability to treat the infectious indications for tonsillectomy, limit the number of patients who qualify for intracapsular procedures.

Since 2002, the Section of Pediatric Otolaryngology performed 140 tonsillectomies in children ages two and younger, comprising approximately 11% of all tonsillectomies performed. Sixty-four of 140 tonsillectomies were intracapsular, comprising 46% of all tonsillectomies in the ages two and younger group.

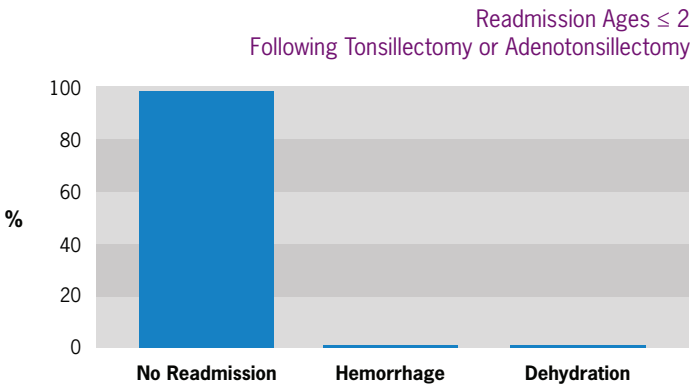
Breakdown of Tonsillectomy Procedures in Children Age ≤ 2



In general, this patient population is kept for overnight observation with prolonged hospital stays necessary for poor oral intake or airway symptoms. Discharge from the hospital after a one-night stay was possible in 81% of the patients who underwent intracapsular tonsillectomy and 53% of those who underwent traditional (total) tonsillectomy. Overall, 62% of patients spent only one night in the hospital after surgery.

A postoperative hemorrhage rate of 0.7% was observed in patients ages two and under, which is nearly identical to our overall rate of 0.5%. Two studies that looked specifically at this patient population cited postoperative hemorrhage rates between 4% - 5.7%. There were no postoperative hemorrhages in patients who underwent intracapsular tonsillectomies.

Overall, 3.6% of patients under age two were evaluated by physicians for poor oral intake and dehydration in the postoperative period. A re-admission rate of 1.4% was observed, lower than published rates of 3% - 4%. No patients who underwent intracapsular tonsillectomies developed clinically significant dehydration.



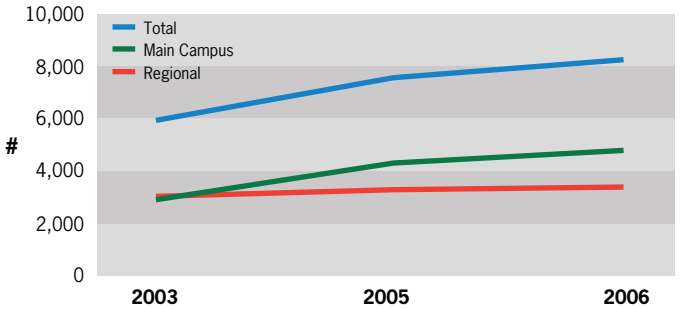
Future Directions

In a joint effort with our colleagues in the Department of Pediatrics, we are undertaking a project to study long-term outcomes of our patients who have undergone intracapsular tonsillectomy. The potential for tonsil re-growth certainly exists after this procedure but the exact rate of re-growth is not known. Furthermore, this may occur in the absence of any obstructive symptoms making re-growth insignificant clinically. Another outcome that needs to be addressed is the rate of development of chronic Streptococcal pharyngitis in this population, necessitating revision tonsillectomy.

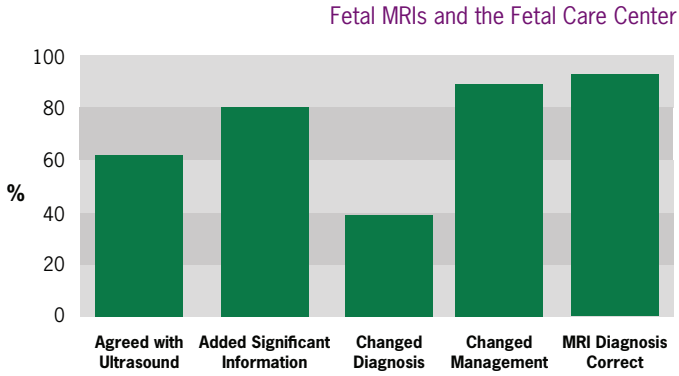
Pediatric Radiology

Cleveland Clinic's Section of Pediatric Radiology performs a full range of diagnostic imaging studies in patients 18 years of age and younger, as well as adult patients with congenital disease. Pediatric Radiology also operates a busy fetal magnetic resonance imaging (MRI) program to investigate fetal anomalies detected at prenatal ultrasound. Pediatric radiologists image all body systems and work in all imaging modalities except angiography and nuclear medicine. As part of its mission, this section has responded to the national concern of the potential harmful effects of excess ionizing radiation by developing imaging modalities that do not require radiation such as ultrasound and MRI, and by reducing dose in radiographic studies. As a result, there has been a significant increase in the total MRI volume this year.

MRI Patients, ≤ 18 Years of Age



Fetal MRI Impacts Patient Care

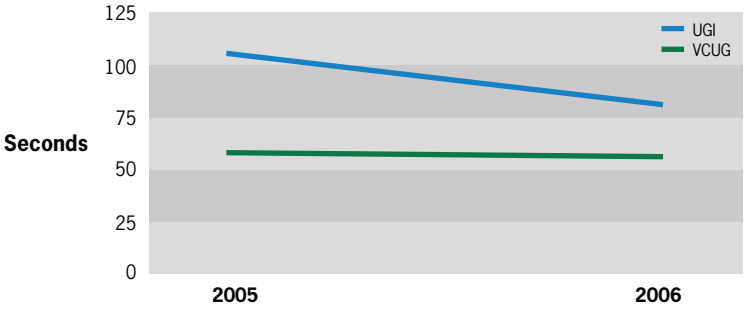


The Fetal MRI Program run by Pediatric Radiology works closely with the Fetal Care Center to provide exquisite imaging of complex fetal anomalies detected at prenatal ultrasound. The experience at Cleveland Clinic parallels that in the largest fetal MRI centers in the United States in improving diagnostic accuracy and positively directing patient counseling and obstetrical management.

Radiation Reduction in Fluoroscopy

Pediatric Radiology implemented measures (*e.g.* low frequency pulsed fluoroscopy, "image store" and decreased imaging time) during routine studies such as voiding cystourethrogram (VCUG) and upper gastrointestinal examinations (UGI) to decrease radiation dose. This resulted in a 5% reduction for VCUG and 25% reduction for UGI over the last year.

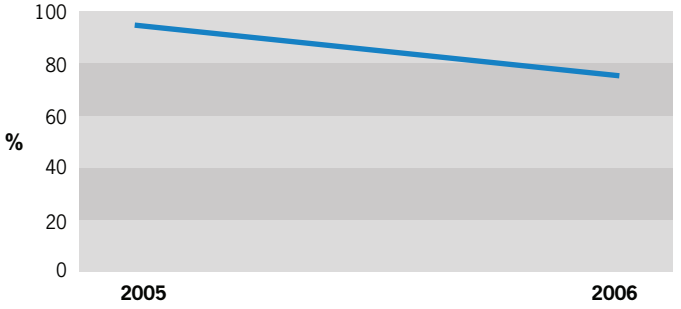
Fluoroscopy Mean Study Time



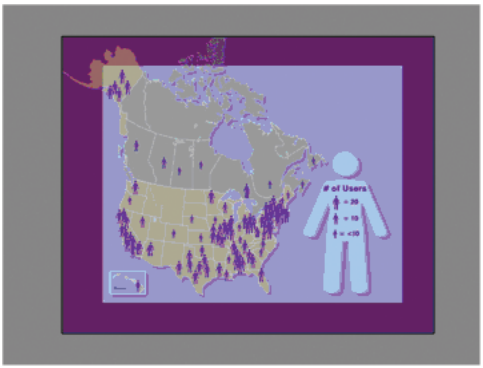
Radiation Reduction in Pediatric Computed Tomography (CT)

Pediatric Radiology implemented a weight-based radiation protocol for body and chest CT for all patients between 0 and 18 years of age. This measure resulted in an 18% reduction in radiation in pediatric CT patients.

Mean Radiation Dose Reduction



Leaders in Pediatric Radiology Education

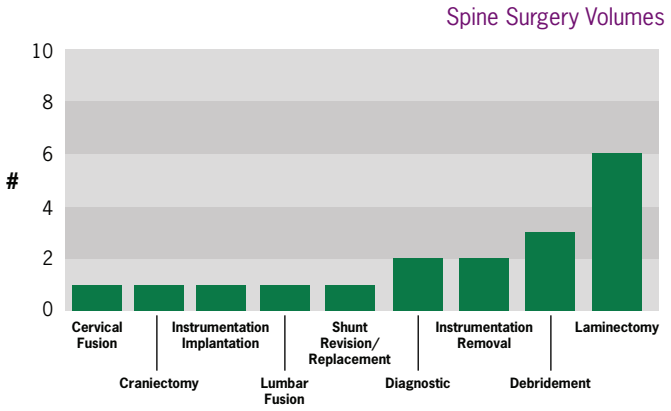


Pediatric radiologists at Cleveland Clinic created the largest pediatric radiology educational resource available online. This e-learning program is required material by more than 90% of radiology training programs in North America.

Radiation Reduction in Radiography

Diagnostic x-rays are a leading source of ionizing radiation. Excess radiation in childhood has been shown to increase the rates of certain cancers later in adulthood. Good quality radiographs require proper positioning of the patient; failure to do so may necessitate repeating the film in order to obtain diagnostic information. The pediatric radiologists initiated a quality and safety measure to decrease excess radiation exposure by monitoring film quality and exposure for every study. From this, a quality index will be determined and measures will be instituted to reach a negligible rate of repeat films.

Pediatric Spine Institute



In 2006, Cleveland Clinic's Spine Institute (CCSI) performed 18 surgeries on patients under the age of 18. In this patient population, there were no mortalities, one minor complication (dural tear), and no postoperative complications. These do not include pediatric scoliosis cases.

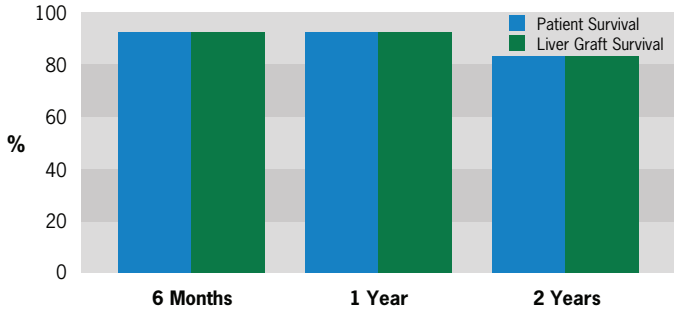
This information was gathered from the CCSI Surgical Log, CCSI Complication Registry and ORIS.

Pediatric Transplant

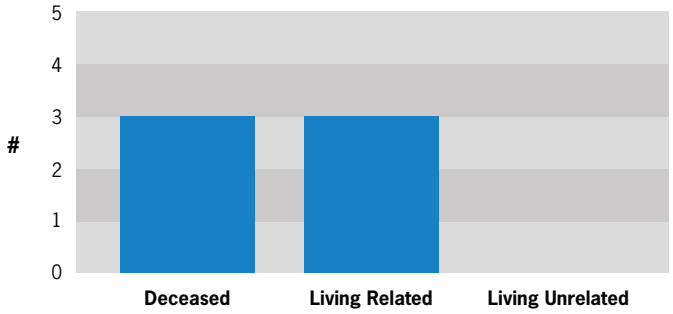
Liver Transplants

Since 2002, there have been 12 primary liver transplants in pediatric patients at the Children's Hospital, with one in 2006. In 2005 and 2006, the median number of days on the waiting list, for deceased donor types, was 64.5 days. The median length of stay for pediatric liver transplants patients, post-transplant, was 17 days for 2005 and 2006.

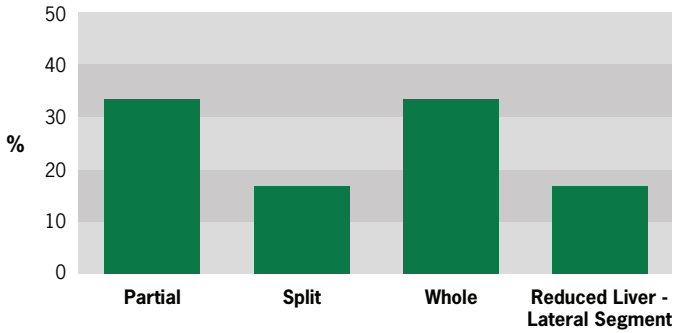
Survival Analysis (2002 - 2006)



Donor Types (2005 - 2006)



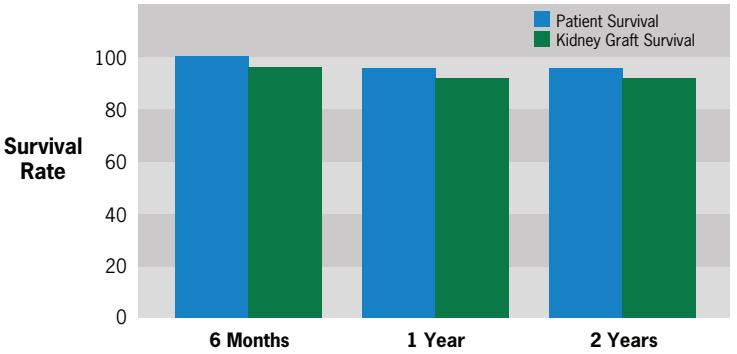
Transplant Types (2005 - 2006)



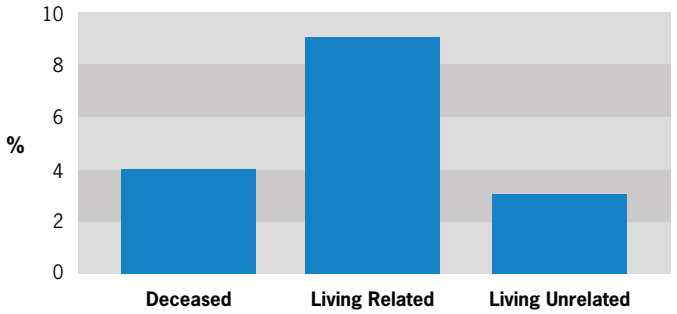
Kidney Transplants

Since 2002, there have been 24 primary kidney transplants in pediatric patients at the Children's Hospital, with four in 2006. In both 2005 and 2006, the median number of days on the waiting list, for deceased donor types, was 103.5 days. The median length of stay for pediatric kidney transplants patients, post- transplant, was seven days in 2005 and 2006.

Survival Analysis (2002 - 2006)



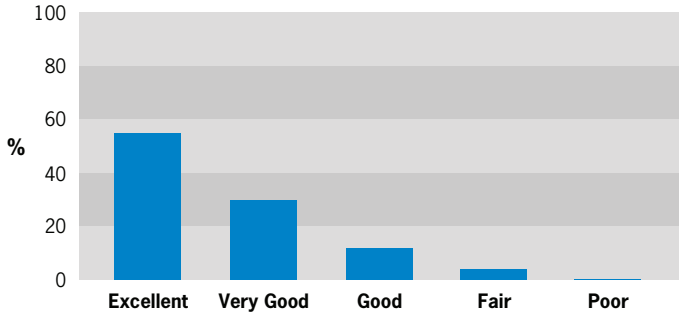
Transplant Donor Types (2005 - 2006)



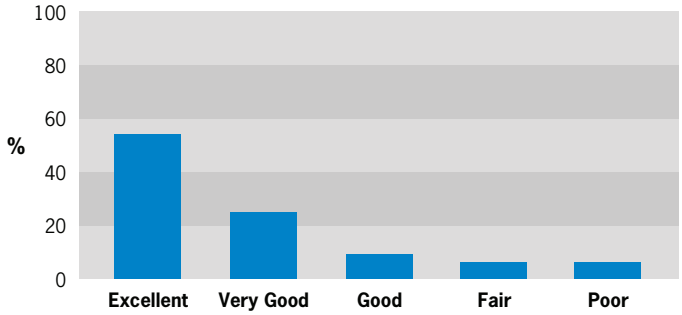
Patient Experience

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

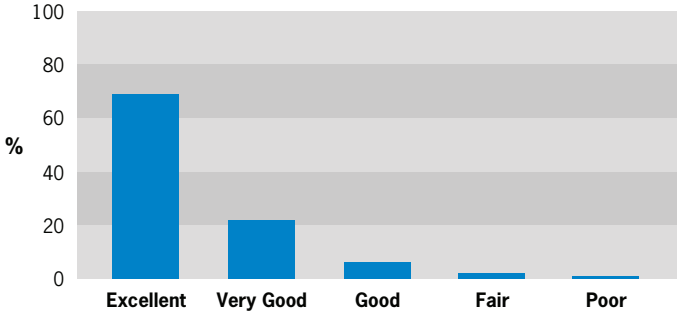
The Children's Hospital
Inpatient
Overall Rating of Care 2006



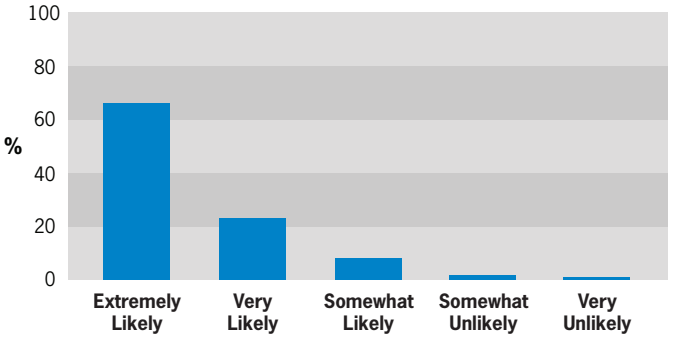
The Children's Hospital
Outpatient
Overall Rating of Care 2006



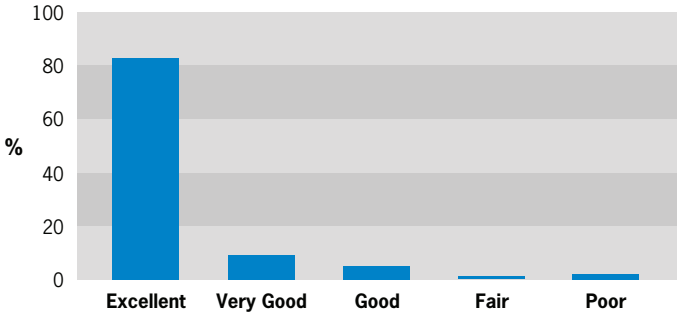
Gastroenterology
Outpatient
Overall Rating of Care 2006



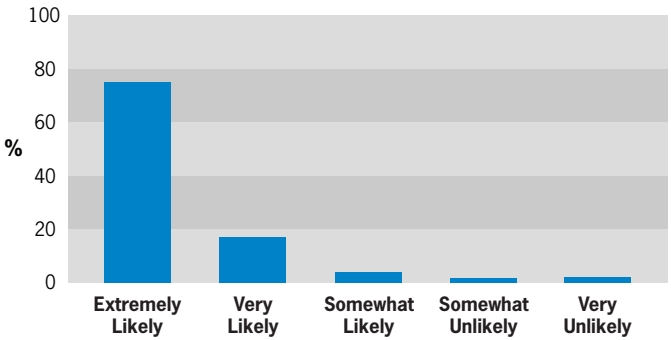
Gastroenterology
Outpatient
Would Recommend Provider 2006



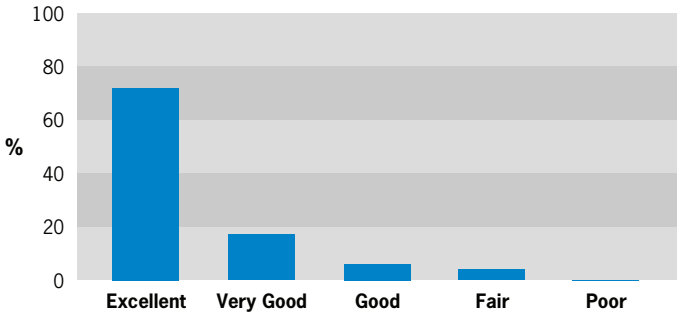
Hematology-Oncology
Outpatient
Overall Rating of Care 2006



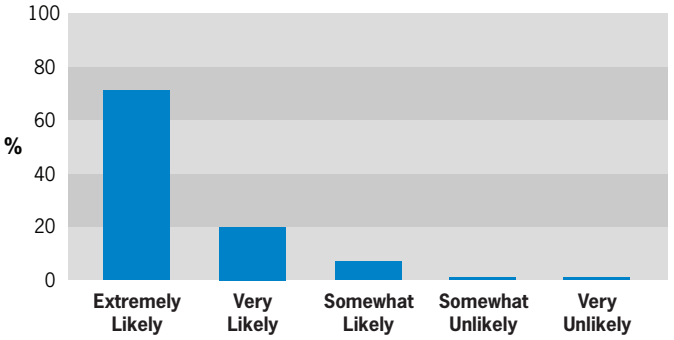
Hematology-Oncology
Outpatient
Would recommend Provider 2006



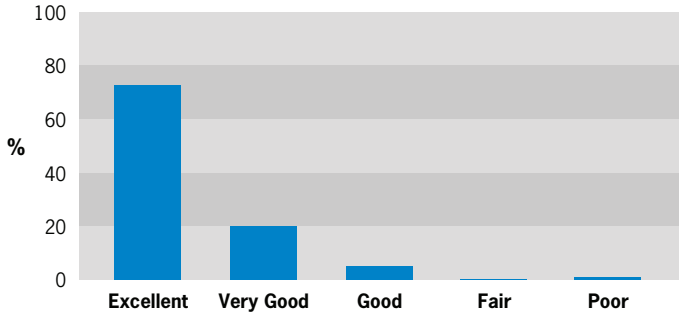
General Surgery
Outpatient
Overall Rating of Care 2006



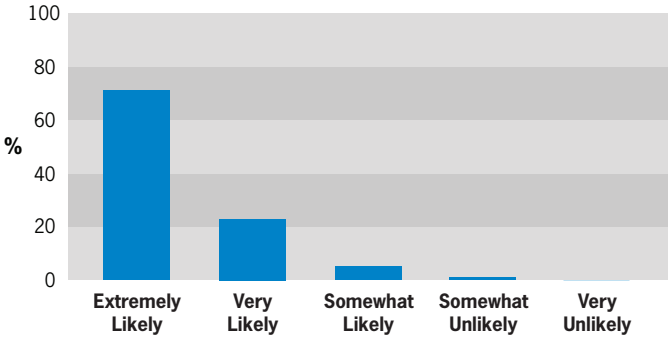
General Surgery
Outpatient
Would recommend Provider 2006



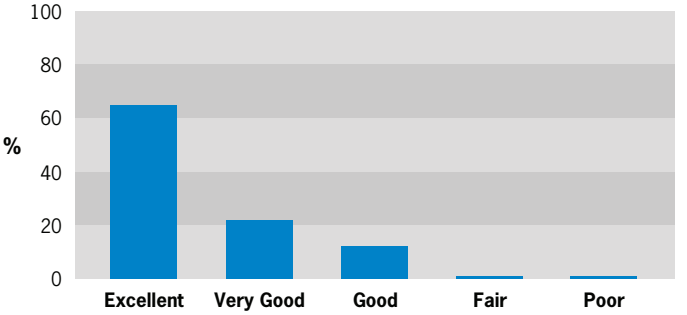
Pediatric Cardiology
Outpatient
Overall Rating of Care 2006



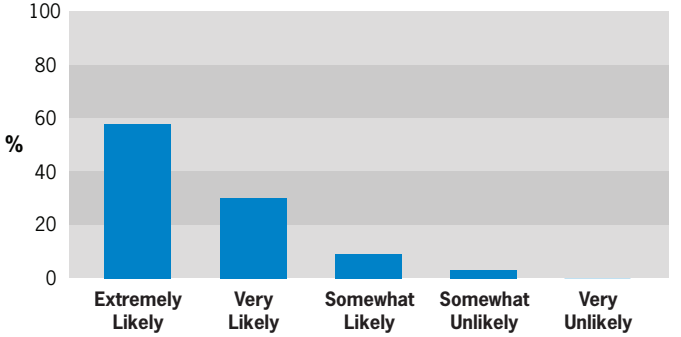
Pediatric Cardiology
Outpatient
Would recommend Provider 2006



Behavioral Health
Outpatient
Overall Rating of Care 2006



Behavioral Health
Outpatient
Would recommend Provider 2006



Innovations

Advancing and Measuring a Culture of Patient Safety

Senior leadership at the Children's Hospital places patient safety at the top of the agenda. Efforts focus on improving event reporting rates across all clinical units, promoting a safety culture, and encouraging departments in the hospital to take on quality projects and process improvement to enhance the safety and quality of care delivery. An analysis of the existing safety infrastructure and safety data was completed in early 2006. Information evaluated included the event reporting system, sentinel events trends, claims data, safety climate survey, discussions with frontline staff and discussions with the health system quality and safety leadership. This process helped identify the existing safety champions in our system. As a result of this evaluation, several initiatives were put into place in the Children's Hospital.

- Weekly Executive Leadership Safety Walkrounds where frontline staff engage the Children's Hospital leadership in frank dialogue about concerns for patient safety.
- Appointment of a Patient Safety Officer provides focused leadership to effort in the hospital. This physician champion is accountable for safety initiatives and proactively plans and executes the initiatives of the Children's Hospital with the Chief Quality Officer and the Quality Manager.
- Voluntary event reporting reflects institutional culture and is encouraged. A vibrant safety culture encourages the identification and reporting of safety concerns. Quantitative safety culture measures can identify safety leaders within the institution. Clinical units where reporting is engrained in the culture can be identified and engaged as culture leaders.
- Follow-up safety briefings to individuals and units to describe the system improvements put in place as a result of reporting and walkrounds have enhanced safety culture and further encouraged reporting.
- Semiannual State of Safety Grand Rounds give the employees and staff an accounting of our successes and areas for improvement.
- Trained performance/process improvement staff dedicated to the Children's Hospital gives professional support to the safety initiatives.

- An annual safety climate survey gives a baseline climate assessment.
- A monthly safety newsletter is distributed to all staff and employees to provide ongoing education through "hot topics" formats.

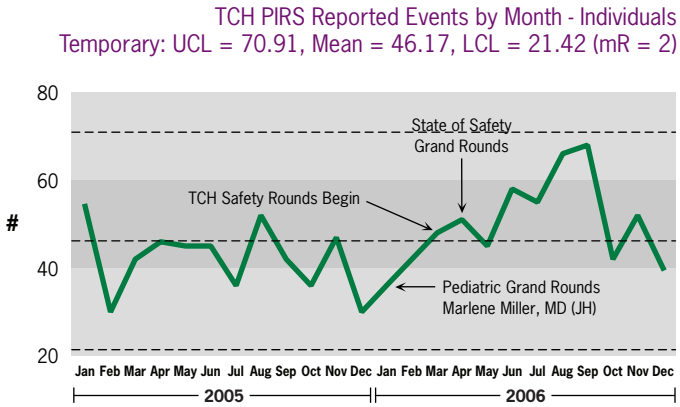
Event reporting is up 43% in 2006 compared to 2005, reflecting enhanced reporting, not a less safe environment. Reporting rates per 1,000 patient days are increasing on inpatient units across the hospital campuses. Safety is a standing agenda item at all Department meetings and Children's Hospital leadership meetings. A quality and safety retreat was held in Fall 2006 to educate quality review officers about the national safety landscape and about our hospital agenda. Because the Chairman of the Children's Hospital recognizes the critical importance of safety and quality work, the Quality Review Officers in the Children's Hospital have been given protected time to perform these important tasks. Financial resources have been invested in making some necessary physical improvements to enhance safety. This effort provides a template for several safety initiatives health system wide.

Event Reporting Rate (per 1,000 patient days)

	2005	2006
Main	11.3	18.4
Shaker Campus	10.7	19.4
Total	11.1	18.6

Event reporting

Year	Events
2002	241
2003	361
2004	435
2005	432
2006 YTD	486



Pediatric Cardiac Rehabilitation Program

Over the last 10 years, surgical techniques and the quality of perioperative care and monitoring have greatly improved the mortality associated with surgery for congenital heart disease and cardiac transplantation in children. With improved mortality, the focus is shifting to issues of morbidity and the ability of this population of children to function optimally both short- and long-term. Impaired cardiac function can severely limit a child's activity level leading to overall

deconditioning and decreased exercise capacity. Academically, the group of children who undergo cardiac surgery are an at-risk group with at least one-third needing educational supports. Preliminary long-term follow-up studies show increased problems with depression and other emotional problems even after successful cardiac surgery.

A Pediatric Cardiac Rehabilitation (PCR) Program was developed by Gerard Boyle, M.D., Chaiman of Pediatric Cardiology and an expert in pediatric cardiac transplant, and a rehabilitation team from the Shaker Campus led by Peggy Bouguignon, Manager of Physical Therapy and Dr. Nancy Roizen, Chief of Developmental and Rehabilitation Pediatrics. The purpose of the PCR Program is two fold:

1. To prevent or decrease the deconditioning associated with congenital heart disease and cardiomyopathy in the preoperative period.

2. To provide postoperative rehabilitation that focuses on increasing exercise capacity as well as developmental and emotional assessments and supports to enable the child the best recovery and the best physical, cognitive, and emotional trajectory. Much of this is provided in the outpatient setting at the Shaker campus day-hospital.

Dehabilitating congenital heart disease and cardiomyopathies are low frequency but high impact diseases. Approximately 8 out of every 1,000 newborns have congenital heart defects with approximately one-third requiring cardiac surgery. Cleveland Clinic has one of the highest volume heart transplant programs in the country, with an average of 6-10 patients per year receiving a heart transplant.

Fetal Intervention Cardiac Catheterization Procedure

A fetal interventional cardiac catheterization was performed for the first time at Hillcrest Hospital by Larry Latson, M.D. These procedures require an entire team, including a high risk obstetrician, pediatric echocardiographer and a pediatric interventional catheterization specialist. Cleveland Clinic's team is one of only a handful of centers which have successfully performed these procedures attempting to alter the development of the heart in the unborn fetus.

Fetal Echocardiography

The Fetal Echocardiography Program, in conjunction with the Fetal Care Center, gained a significant reputation, expanding services from Cleveland Clinic to Hillcrest and Fairview hospitals. This program is one of a few of its kind in the country, providing early detection and treatment of congenital cardiac defects prior to birth.

Pediatric Cardiac MRI

Janine Arruda, M. D., obtained joint appointment with the Department of Radiology to perform pediatric cardiac MRIs. Pediatric Cardiac MRI is the state-of-the-art method for detecting and diagnosing cardiac abnormalities. Few centers in the country have this capability for pediatric patients.

Down Syndrome Clinic

Patients with Down Syndrome frequently have unmet needs and may not receive consistent adherence to health monitoring guidelines recommended by the American Academy of Pediatrics, early counseling and medication intervention for behavioral problems and a focus on the development academic and adaptive life skills. With the recruitment of Dr. Nancy Roizen, a developmental and behavioral pediatrician and a nationally known expert in the care of the child with Down syndrome, the Down Syndrome Clinic opened its doors to the Cleveland community. The Down Syndrome Clinic assesses the whole child by evaluating medical needs, behavior, language skills, educational level and mental, physical and social development. Parents are given information on medical issues and guidelines, where their child fits within the spectrum of Down syndrome, and whether the child's development is typical or atypical for Down syndrome. As part of Cleveland Clinic Children's Hospital, the Down Syndrome Clinic offers streamlined access to many pediatric specialists in fields such as cardiology, endocrinology, gastroenterology, neurology, ophthalmology, otolaryngology, psychology, and rheumatology.

Medication Monitoring Clinic

The Medication Monitoring Clinic is a collaboration between the Departments of Behavioral Medicine and Developmental and Rehabilitation Pediatrics. Psychological evaluations of children suspected of having attention deficit hyperactivity disorder (ADHD) are conducted by Drs. Michael Manos and Thomas Frazier of the ADHD Center for Evaluation and Treatment (ACET). The parents of children diagnosed with ADHD are provided with information and recommendations that cover behavioral and educational interventions. This year, the parents and primary care provider may participate in a blinded trial of the two most frequently prescribed stimulants, a long acting type of methylphenidate (*e.g.* Ritalin) and Adderall XR, a long acting mixed dextroamphetamine, at two different doses and a week of placebo medication. The children are monitored at the beginning of the five-week trial, and then weekly for reported side effects (possible "cost") and the effect of the medication on the targeted symptoms (possible benefit). At the end of the trial period, medications and doses are evaluated to determine the best prescription for the patient.

Pediatric Voiding Dysfunction Clinic

A team of medical and behavioral specialists was created to offer comprehensive evaluation and treatment of bedwetting, day wetting, painful voiding and other voiding problems. The child undergoes a thorough medical assessment to identify the physical concomitants to incontinence and is then assessed for the psychological aspects of the problem. Effective medical and behavioral therapies are offered in a collaborative treatment plan and appropriate follow-up is provided.

The Fetal Care Center

The Fetal Care Center was created in late 2005 with John DiFiore, M.D. (Pediatric Surgery) and Lewis Rubin, M.D. (Neonatology) as co-directors and Donna Patno, R.N., C.N.M., D.N.P., coordinator. The Center provides consultation and management for fetal disorders and continuity of care for expectant mothers, newborns and maternal-medicine specialists.

- Fifty-nine patients from eight Ohio counties represented 36 different prenatal diagnoses.
- The center performed 126 prenatal consultations and 43 fetal MRI studies.
- Fetal procedures performed by physicians were amnioreduction (2), intrauterine transfusion (1) and intrauterine aortic balloon valvuloplasty (1).
- The Center scheduled 12 Cesarean deliveries at the main campus.
- There were 18 NICU or PICU direct admissions or transfers soon after delivery. Patient days equaled 541 (2-112 days), not including repeat admissions.
- The Center cared for 26 newborns requiring one or more surgeries: abdominal, thoracic, cardiac, neurosurgical, urologic.

Infant Development Clinic

In 2006, Drs. Jennifer Peterson (Neonatology), Roberta Bauer and Nancy Roizen (Developmental & Rehabilitation Pediatrics) organized a comprehensive, multidisciplinary Infant Development Clinic (IDC) for infants with a variety of special needs: sequelae of prematurity, fetal growth restriction, hyperbilirubinemia, multiple gestation, neurodevelopmental disorders, birth defects, congenital heart disease and fetal interventions.

Clinical Metabolic Service

A Metabolic Service was established in order to coordinate multidisciplinary consultation, diagnosis and therapy for abnormal newborn screen tests, inborn errors of metabolism, neurodegenerative conditions, storage disorders and mitochondrial disease. The Metabolic Service Team works closely with obstetricians, Cleveland Clinic's Center for Personalized Genetic Healthcare and the Fetal Care Center to facilitate prenatal risk assessment, diagnosis and fetal therapies. The team includes specialists in endocrinology, genetics, gastroenterology, hematology, neonatal and pediatric intensive care, neurology, nursing and nutrition.

End to Invasive Liver Biopsies

Nonalcoholic fatty liver disease (NAFLD) is the most common chronic liver disease in both children and adults. While simple steatosis, an accumulation of fat in the liver, is the most common form of fatty liver disease and is usually benign, nonalcoholic steatohepatitis (NASH), a more severe form of fatty liver disease, can be a very serious condition. As many as 25% of patients with NASH progress to cirrhosis and can develop complications such as liver failure and hepatocellular carcinoma. Until now, only an invasive liver biopsy, which carries a risk of complications, could distinguish between these two conditions.

A group of researchers led by Ariel Feldstein, M.D., of the Department of Pediatric Gastroenterology and Nutrition, developed a non-invasive way to diagnose NASH, and assess the degree of liver damage by using a simple blood test. They found a significant correlation between blood levels of this marker and the degree of liver damage. The researchers looked for indicators of liver cell death, specifically, caspase-generated CK-18 fragments in the blood of patients with fatty liver disease. The test showed a high sensitivity, specificity, and positive and negative

predictive values, suggesting it is potentially an important clinical tool. Currently, the research team is in the process of completing a large multicenter prospective study to validate these results.

The Lysosomal-Mitochondrial Axis in Nonalcoholic Fatty Liver Disease

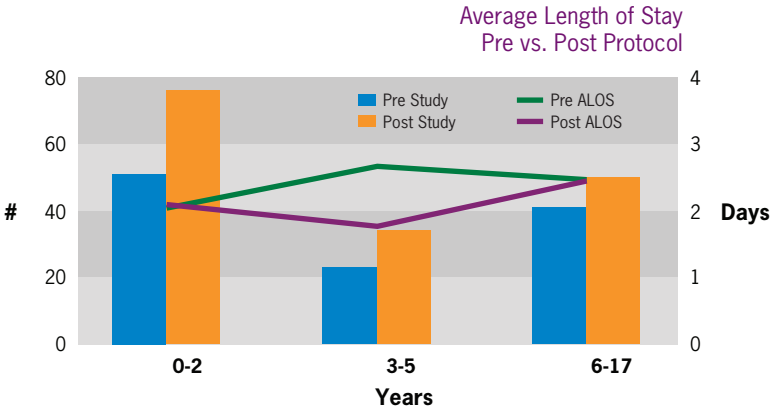
Ariel Feldstein, M.D., Department of Pediatric Gastroenterology and Nutrition, received a grant in the amount of $1,738,125 to study the Lysosomal-Mitochondrial Axis in Nonalcoholic Fatty Liver Disease (NAFLD). This grant enables the study of the underlying mechanisms of liver damage and disease progression in NAFLD and may potentially result in novel therapeutic and diagnostic strategies for this condition. This prestigious grant is awarded by the National Institutes of Health's National Diabetes, Digestive and Kidney Diseases Institute.

Integrative Approaches to Childhood Functional Gastrointestinal Disorders

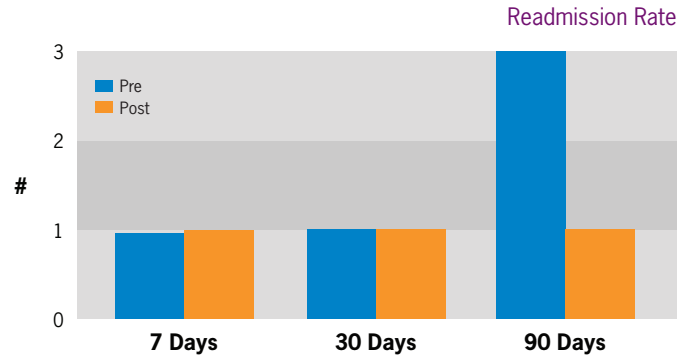
Beginning in 2007, an Integrative Abdominal Pain Clinic will be offered which includes gastrointestinal, psychological/behavioral, and nutritional specialists as well as access to effective complementary and alternative therapies to continue to expand biobehavioral (multispecialty) approaches to recurrent abdominal pain, constipation/encopresis, and other pediatric gastrointestinal disorders that have a functional component, like vomiting, irritable bowel syndrome, diarrhea, and defecation difficulties.

Asthma Care Pathway

A clinical measure of a quality Pediatric Hospital Medicine Program is standardization accomplished through increased effective and efficient care. In late 2005, The Asthma Care Pathway was introduced. Data from 2006 demonstrate a decreased length of stay and excellent compliance with The Joint Commission quality measures since the initiation of the pathway. In early 2007, we expect the pathway to be utilized in the Emergency Department, further standardizing and improving our care.



Pediatric Inpatient Asthma Quality Measures	Compliance Rate
Use of bronchodilators	100%
Use of beta-agonists	100%
Family asthma education	100%

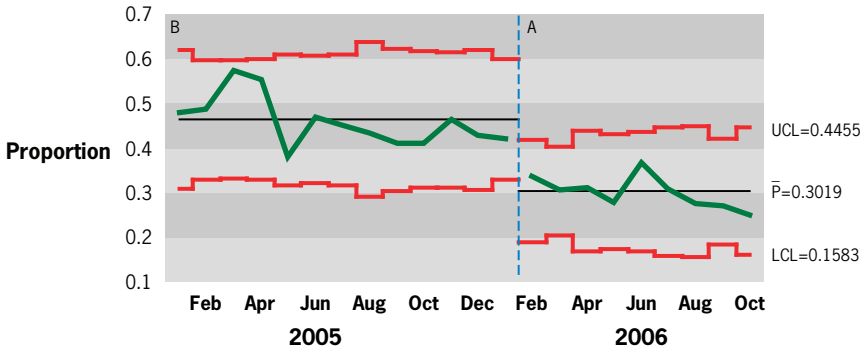


Children's Hospital Admission Process

The Section of Pediatric Hospitalist Medicine completed an Observation versus Admission project to accurately assign patient status (observation or full admission) on entry into the hospital. Retrospective data at the start of the project showed the observation rate for the Pediatric Hospital Medicine service at 47%.

Education of the intensivists and hospitalists and the adoption of InterQual criteria resulted in a 50% decrease in the percentage of status assignment errors in pediatrics; a 17% decrease in re-work related to improper form use, and a statistically significant decrease in observation designation from 47% to 32% on the Pediatric Hospitalist service ($p < 0.001$). To date, there has been a significant revenue impact based on this project.

Number of Observation Patients (Pre-and Post Project)



Primary Care Psychology Consult Service

In the effort to improve access to mental health resources for primary care patients, the Children's Hospital with two staff physicians, Kimberly Giuliano, M.D. and Michael Macknin, M.D., from the Department of General Pediatrics initiated a trial psychology consult service. This service is designed to improve access to quality mental health care by eliminating the process of scheduling an initial appointment and significantly decreasing the time interval between referral, scheduling of the first appointment, and date of the first appointment. When a patient who may benefit from a psychological consultation is identified, the physician communicates directly with the psychology consultant. After the consultant's initial evaluation, a plan for treatment is developed, which may include individual or family treatment by the psychologist, referral to an established group treatment offered through Behavioral Medicine, or assistance to the family in pursuing an evaluation through their child's school district or the appropriate community agency. Once the evaluation process is complete, the patient's pediatrician receives communication from the psychology consultant on the outcomes and treatment plans developed.

Pediatric Neurology

- Co-founding the Ohio Pediatric Stroke Consortium and its pediatric stroke registry
- Developing a multidisciplinary day program with the Cleveland Clinic Children's Rehabilitation Hospital for treatment of persistent chronic headache
- Establishment of a team for diagnosis and treatment of neurometabolic and neurogenetic disorders causing white matter degeneration, mental retardation or epilepsy
- Development of a Fetal Care Center for diagnosis and treatment of a variety of prenatal and newborn conditions affecting the brain and spinal cord
- Development of innovative approaches to selection of pediatric candidates for epilepsy surgery
- Establishment of a multidisciplinary clinic for the evaluation of the neuromuscular, genetic and metabolic causes of cardiomyopathy in children

Integrative Approach to Vocal Cord Dysfunction

Gerard Banez, M.D. and Margaret Richards, M.D. developed and are now evaluating an innovative treatment of vocal cord dysfunction (VCD) in young athletes. The primary goal of the approach is to promote relaxed breathing as a means of preventing and managing VCD symptoms. This protocol goes beyond traditional approaches in that it teaches young athletes to control breathing during exercise to handle stress related to their symptoms. Preliminary findings reveal a 74% improvement in the respiratory symptom rated worst prior to treatment and a 56% improvement in overall respiratory symptoms.

Transfer to Action Support Group

Children's Hospital developed a college-age attention deficit hyperactivity disorder (ADHD) impact group with Notre Dame College of Ohio in conjunction with the Academic Support Center (ASC). Students participate in a bi-weekly group, learning organizational skills, study skills, daily living skills and goal setting techniques, as well as counseling on relationship/roommate difficulties throughout the school year. Students are taught techniques to aid in their success and to become their own advocate for their continued college career. Referrals to psychologists, psychiatrists and primary care physicians are made for medication management or other concerns.

New Knowledge |

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Direct Admission or Hospital Transfers: 216.444.8302

RATE Service: Rapid Access To Evaluation: 216.636.1234

On the web: www.clevelandclinic.org/pediatrics

Appointments at Cleveland Clinic Children's Hospital

Outpatient Medical and Surgical Subspecialty Appointments:
216.444.KIDS (5437); 1.800.223.2273, ext 45437

Outpatient Main Campus Primary Care Appointments:
216.444.GENP (4367)

Appointments at Cleveland Clinic Children's Hospital, Shaker Campus

Cleveland Clinic Children's Hospital for Rehabilitation
216-721-7002

Cleveland Clinic Center for Autism
216-721-1292

Judith A. Power Dialysis Unit
216-721-1494

Children's Hospital, Shaker Campus, Outpatient Therapy Services
216-636-KIDS (5437)

Children's Hospital, Shaker Campus, Physician Services
216-721-1496

For more information or to make an appointment with Cleveland Clinic Children's Hospital specialists, call 216.444.KIDS (5437).

Locations

When it's your child's health that needs attention, you want the highest level of pediatric specialty and subspecialty care. The medical and surgical experts of Cleveland Clinic Children's Hospital offer just that, at the following community locations:



Main Campus
9500 Euclid Ave.
Cleveland, Ohio 44195

Shaker Campus
2801 Martin Luther King Drive
Cleveland, Ohio 44104

Hillcrest Hospital
6780 Mayfield Road
Mayfield Heights, Ohio 44124

Fairview Hospital
18101 Lorain Avenue
Cleveland, Ohio 44111

Huron Hospital
General Pediatrics Continuity Clinic
13951 Terrace Road
Cleveland, Ohio 44122

Ashtabula Regional Medical Center
2420 Lake Avenue
Ashtabula, Ohio 44004

Beachwood
26900 Cedar Road
Beachwood, Ohio 44122

Independence
5001 Rockside Road
Independence, Ohio 44131

Lorain
5700 Cooper Foster Road
Lorain, Ohio 44053

Solon
29800 Bainbridge Road
Solon, Ohio 44022

Strongsville
16761 Southpark Center
Strongsville, Ohio 44136

Avon
36901 American Way
Avon, Ohio 44011

Willoughby Hills
2570 SOM Center Road
Willoughby Hills, Ohio 44094

Wooster
1740 Cleveland Road
Wooster, Ohio 44691

Cleveland Clinic Overview

Cleveland Clinic, founded in 1921, is a not-for-profit academic medical center that integrates clinical and hospital care with research and education. Today, 1,700 Cleveland Clinic physicians and scientists practice in 120 medical specialties and subspecialties.

Cleveland Clinic's main campus, with 41 buildings on 130 acres in Cleveland, Ohio, includes a 1,000-bed hospital, outpatient clinic, subspecialty centers and supporting labs and facilities. Cleveland Clinic also operates 13 family health centers, eight community hospitals, two affiliate hospitals, and a medical facility in Weston, Florida.

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

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

For more details about Cleveland Clinic, visit clevelandclinic.org

Online Services

eCleveland Clinic

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

DrConnect

Online Access to Your Patient's Treatment Progress

Whether you are referring from near or far, our new eCleveland Clinic service, Dr**Connect**, can streamline communication from Cleveland Clinic physicians to your office. This new online tool offers you secure access to your patient's treatment progress at Cleveland Clinic. With one-click convenience, you can track your patient's care using the secure Dr**Connect** Web site. To establish a Dr**Connect** account, visit eclevelandclinic.org or e-mail drconnect@ccf.org.

MyConsult

My**Consult** Remote Second Medical Opinion is a secure, online service providing specialist consultations and remote second medical opinions for more than 600 life-threatening and life-altering diagnoses. My**Consult** remote second medical opinion service allows you to gather information from nationally recognized specialists without the time and expense of travel. For more information, visit eclevelandclinic.org/myconsult, e-mail eclevelandclinic@ccf.org or call 800.223.2273, ext 43223.

Cleveland Clinic Contact Numbers

How to Refer Patients
24/7 Hospital Transfers or Physician Consults
800.553.5056

General Information
216.444.2200

Hospital Patient Information
216.444.2000

Patient Appointments
216.444.2273 or 800.223.2273

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

International Center
Complimentary assistance for international patients and families
216.444.6404 or visit www.clevelandclinic.org/ic

Cleveland Clinic in Florida
866.293.7866

www.clevelandclinic.org

Cleveland Clinic is determined to exceed the expectations of patients, families and referring physicians. In light of this goal, we are committed to providing accurate and timely information about our patient care. Through participation in national initiatives, we support transparent public reporting of healthcare quality data and participate in the following public reporting initiatives:

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

In addition, this publication was produced to assist patients and referring physicians in making informed decisions. To that end, information about care and services is provided, with a focus on outcomes of care. For more information, please visit the Cleveland Clinic Quality Web site at clevelandclinic.org/quality.



Cleveland Clinic

9500 Euclid Avenue, Cleveland, OH 44195

Cleveland Clinic is a not-for-profit multispecialty academic medical center. Founded in 1921, it is dedicated to providing quality specialized care and includes an outpatient clinic, a hospital with more than 1,000 staffed beds, an education division and a research institute.

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