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# **America's Best Children's Hospitals**

## **2008 Methodology**

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## I. Introduction

*U.S. News & World Report* has ranked hospitals in pediatrics since the launch of the annual “America’s Best Hospitals” rankings in 1990; however, until 2007, this specialty was ranked solely on the basis of reputation, as determined by an annual survey of board-certified pediatricians. Data-driven quality measures comparable to those incorporated into most other ranked specialties were unavailable for pediatrics.

For example, Medicare data (i.e., MedPAR) are used to determine mortality in other specialties. While some children are treated under Medicare, because of legislatively mandated changes in rules over time, the number is low and the category of children eligible narrowly defined. Thus, no large mortality database existed—nor does one exist now—for pediatric inpatients. Reliable structural measures also were absent. In available data sources, hospitals generally report volume, advanced technologies, and patient services for the entire institution and do not break out information related to pediatric care.

Continuing to rank this important specialty on reputation alone, until experts could work out definitions of performance data and the best ways to collect and verify these data, was deemed unacceptable. Information available in early 2007 suggested that reaching a consensus merely on definitions would take until 2010 or well beyond.

*U.S. News* therefore enlisted RTI International\* to develop an enhanced methodology for ranking children’s hospitals in General Pediatrics. Revised rankings were published in 2007 as “America’s Best Children’s Hospitals,” the first time pediatric rankings were published separately from other ranked specialties.† The 2008 rankings have been further developed and expanded to include six pediatric specialties:

- Cancer
- Digestive Disorders
- Heart and Heart Surgery
- Neonatal Care
- Neurology and Neurosurgery
- Respiratory Disorders

The 2008 methodology incorporates data obtained from the Survey of Pediatric Hospitals, a direct survey of a defined universe of children’s hospitals, which was conducted in January and February 2008; the methodology also incorporates nominations of hospitals from a survey of board-certified pediatric specialists. The Survey of Pediatric Hospitals collected various structural and outcome data.

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\* RTI International is the trade name of Research Triangle Institute.

† A description of the 2007 methodology report is available online at [www.rti.org/besthospitals](http://www.rti.org/besthospitals).

The purpose of separating the pediatric rankings from the adult specialty rankings was to highlight the change and avoid possible confusion caused by the superficially similar ranking approach used for both the pediatric and adult specialties. While the pediatric rankings still reflect the interrelationship between *structure*, *process*, and *outcomes*, as described in the Donabedian paradigm,<sup>1-5</sup> the specific measures, weights, and scoring are quite different, in part reflecting the constraints on the available data. A brief description of the three Donabedian components in the context of the pediatric methodology follows.

*Structure* refers to hospital resources directly related to patient care. Examples include the ratio of nurses to patients; availability of advanced care; and significant certifications by recognized external organizations, such as designation as a Nurse Magnet hospital by the American Nurse Credentialing Center (ANCC) or accreditation by the Foundation for the Accreditation of Cellular Therapy (FACT).

The *process* of health care delivery encompasses the overall rendering of diagnosis, treatment, prevention, and patient education. In the pediatric hospital rankings, as in the adult rankings, process is represented by a reputational score based on an annual survey of board-certified physicians.

The third and final component of the quality triad is *outcomes*, the most obvious of which is whether patients live or die, but also can include readmissions and other measures that have a direct relationship to a patient's outcome.

Using the most robust and sensitive measures available at this time for the three Donabedian elements, the rankings are designed to identify hospitals that provide the highest-quality care for children with the most serious or complicated medical conditions. Section III describes the data and how each element is combined.

## **II. Eligibility**

Hospitals were eligible for ranking in 2008 if they were members of the National Association for Children's Hospitals and Related Institutions (NACHRI) in any of three classifications: a freestanding children's *hospital*; an associate children's hospital member; or a children's "hospital within a hospital," essentially an autonomous pediatric service that does not physically stand alone. Certain non-NACHRI members were added based on previous appearances in the Best Hospitals rankings or the recommendation of expert advisory panels that participated in a review of pediatric hospital quality measures in the fall of 2007. As of

January 1, 2008, 143 hospitals met this criterion. More information about NACHRI and its member hospitals can be found at [www.childrenshospitals.net](http://www.childrenshospitals.net).

### III. Structure

The structural elements represent volume (typically expressed as the average daily census of inpatients), technology, and other features of a high-quality pediatric hospital. Most data were derived from the Survey of Pediatric Hospitals. Three external organizations provided additional measures: the American Nurse Credentialing Center (ANCC), the Cancer Oncology Group (COG), and the Foundation for the Accreditation of Cellular Therapy (FACT).

#### A. Source: *U.S. News & World Report* Survey of Pediatric Hospitals

Most of the structural measures and data in the Best Hospitals adult specialty rankings come from the American Hospital Association (AHA) annual survey. Pediatric data from the survey, however, lack specificity because the primary focus of the survey is on adult specialties. To obtain the data necessary for the pediatric rankings, the *U.S. News* Survey of Pediatric Hospitals<sup>‡</sup> was conducted. The survey was administered to 137 NACHRI member institutions and 6 other recognized leading pediatric centers. Of the 143 institutions surveyed, 113 participated, for a response rate of 79.0.<sup>§</sup>

To help develop the hospital survey, advisory panels were convened in General Pediatrics and in each of the six specialties. Members were recruited through NACHRI, who requested nominations from the pediatric hospital community of individuals with broad-ranging expertise in general and specialty pediatric medical care and in current research assessing hospital quality. The seven advisory panels were composed of pediatric physicians, nurses, and hospital quality experts, as well as other health care professionals. During the fall of 2007, the panels identified candidate measures of quality of care that could be used to evaluate pediatric hospitals. These measures were reviewed and discussed by the various advisory panels. The RTI project team and *U.S. News* created a proposed set of measures, and a survey instrument was created and vetted by a subset of advisors. The final Web-based version was administered to hospitals in January and February 2008.

To be a useful discriminator, a quality measure should demonstrate variability among hospitals. After reviewing the survey results, a number of items were dropped from consideration

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<sup>‡</sup> The *U.S. News* Survey of Pediatric Hospitals was conducted by RTI International.

<sup>§</sup> American Association for Public Opinion Research standard response rate 2 (standard definitions are located on the Web at [www.aapor.org/pdfs/standarddefs\\_ver3.pdf](http://www.aapor.org/pdfs/standarddefs_ver3.pdf)).

because the responses lacked variability. The remaining survey questions were determined to have adequate discriminatory power across hospitals and were therefore used to develop the majority of the structural scores for the rankings. These measures included volume, programs, nurse staffing, advanced technologies, patient and family services, cardiovascular services, palliative care, and advanced care services. These items are described in detail below.

The Survey of Pediatric Hospitals will be expanded and fine-tuned over time to best reflect the quality of care in U.S. pediatric facilities.

## **Volume**

Volume measures were constructed differently for General Pediatrics than for the pediatric specialties. For General Pediatrics, the volume measure was the hospital's average daily inpatient census equal to the number of inpatient days divided by 365 (or by the number of days the hospital was open if fewer than 365). For the pediatric specialties, volume was based on a set of specialty-specific procedures or diagnoses. *Table 1* presents volume measures for General Pediatrics and for each specialty and presents the score given based on the number of discharges/patients reported in each category.

## **Programs**

Hospitals frequently organize teams or programs to address special needs of specific groups of patients. These teams/programs may be organized around a particular diagnosis, need, or age group. Their structure facilitates care and ensures that a variety of resources are available to meet patient needs. Patients being seen in these programs or by these teams also frequently benefit from specialized skills of the multidisciplinary staff who provide care, improving the overall quality of care and, thus, presumably the outcomes. The teams or programs offered in each specialty are described below. Data for these measures come from the *U.S. News Survey of Pediatric Hospitals*.

### *Cancer*

Hospitals received 1 point if they offered a pediatric **brain tumor program**.

**Table 1. Volume Measures by Specialty**

Specialty	Volume Measures	Volume	Score
General Pediatrics	Daily inpatient volume: <ul style="list-style-type: none"> <li>Average daily inpatient census</li> </ul>	0:	0 pt.
		1–99:	1 pt.
		100–199:	2 pt.
		200+:	3 pt.
Cancer	Cancer program volume: <ul style="list-style-type: none"> <li>Acute lymphocytic leukemia</li> <li>Brain tumor</li> <li>Solid tumor</li> </ul>	0:	0 pt.
		1–49:	1 pt.
		150–299:	2 pt.
		300+:	3 pt.
Digestive Disorders	Digestive program volume: <ul style="list-style-type: none"> <li>Intestinal rehabilitation program (for patients with short-gut syndrome)</li> <li>Cystic fibrosis treatment program (including gastroenterologists and nutritionists in treatment team)</li> <li>Total parenteral nutrition support program</li> <li>Pediatric intensive feeding program</li> <li>Pediatric obesity/weight loss program</li> <li>Pediatric bariatric surgery program</li> <li>Inflammatory bowel disease program</li> </ul>	0:	0 pt.
		1–499:	1 pt.
		500–999:	2 pt.
		1,000+:	3 pt.
	Diagnostic procedure volume: <ul style="list-style-type: none"> <li>Capsule endoscopy</li> <li>Endoscopic band ligation</li> <li>Esophageal impedance monitoring</li> <li>Endoscopic retrograde cholangiopancreatography</li> <li>Antroduodenal and full colonic motility studies</li> </ul>	0:	0 pt.
		1–29:	1 pt.
		30–99:	2 pt.
		100+:	3 pt.
	GI transplant volume: <ul style="list-style-type: none"> <li>Intestinal transplant</li> <li>Liver transplant</li> </ul>	0:	0 pt.
		0–9:	1 pt.
		10+:	2 pt.
Heart and Heart Surgery	Catheter procedure volume: <ul style="list-style-type: none"> <li>Balloon angioplasty and stent implantation</li> <li>Transcatheter occlusion of cardiac shunts</li> <li>Transcatheter arrhythmia ablation</li> </ul>	0:	0 pt.
		1–74:	1 pt.
		75–149:	2 pt.
		150+:	3 pt.
	Surgical volume: <ul style="list-style-type: none"> <li>Risk Adjustment for Congenital Heart Surgery Coding System (RACHS-1), Levels 3–6</li> </ul>	0:	0 pt.
		1–49:	1 pt.
		50–99:	2 pt.
		100+:	3 pt.

(continued)



**Table 1. Volume Measures by Specialty (continued)**

Specialty	Volume Measures	Volume	Score
Neonatal Care	Neonatal care volume:		
	<ul style="list-style-type: none"> <li>• Extracorporeal membrane oxygenation (ECMO)</li> <li>• Necrotizing enterocolitis</li> <li>• Patent ductus arteriosus</li> <li>• Retinopathy of prematurity treatment and/or laser therapy</li> <li>• Cardiac surgeries</li> <li>• Surgical care of gastroschisis or omphalocele</li> <li>• Tracheoesophageal fistula or esophageal atresia repair</li> </ul>	0: 1–99: 100–199: 200+:	0 pt. 1 pt. 2 pt. 3 pt.
Neurology and Neurosurgery	Neurology clinics/program volume:		
	<ul style="list-style-type: none"> <li>• Meningocele, spina bifida, and tethered cord repair</li> <li>• Craniofacial surgery related to neurological and related congenital anomalies</li> <li>• Surgery related to epilepsy</li> <li>• Extracranial ventriculoperitoneal shunt placement</li> <li>• Head trauma</li> <li>• Excision of tumor</li> </ul>	0: 1–749: 750–1,499: 1,500+:	0 pt. 1 pt. 2 pt. 3 pt.
	Seizure patient volume:		
	<ul style="list-style-type: none"> <li>• Principal diagnosis of seizure</li> </ul>	0: 1–199: 200–399: 400+:	0 pt. 1 pt. 2 pt. 3 pt.
	Brain tumor patient volume:		
	<ul style="list-style-type: none"> <li>• First surgical admission for brain tumor excision</li> </ul>	0: 1–14: 15–29: 30+:	0 pt. 1 pt. 2 pt. 3 pt.
Respiratory Disorders	Respiratory procedure volume:		
	<ul style="list-style-type: none"> <li>• Electrophrenic respiration or diaphragm pacing</li> <li>• Infant pulmonary function testing</li> <li>• Bronchoscopy</li> <li>• Extracorporeal membrane oxygenation (ECMO) on pediatric patients in the neonatal intensive care unit (NICU)</li> <li>• Extracorporeal membrane oxygenation (ECMO) on pediatric patients in the pediatric intensive care unit (PICU)</li> </ul>	0: 1–124: 125–249: 250+:	0 pt. 1 pt. 2 pt. 3 pt.
	Cystic fibrosis patient volume:		
	<ul style="list-style-type: none"> <li>• Cystic fibrosis patients</li> </ul>	0: 1–74: 75–149: 150+:	0 pt. 1 pt. 2 pt. 3 pt.

*Digestive Disorders*

Hospitals received 1 point for each of the seven Digestive Disorders programs offered. Brief descriptions follow.

- **Intestinal rehabilitation program (for patients with short-gut syndrome).** A program designed to restore nutritional status and improve bowel function in pediatric patients with a variety of chronic intestinal problems, including dysmotility, malabsorption, and short-gut syndrome.
- **Cystic fibrosis treatment program (including gastroenterologists and nutritionists in treatment team).** A multidisciplinary program for treating patients with cystic fibrosis. The program seeks to help meet the specific dietary needs of cystic fibrosis patients by aggressive involvement of pediatric gastroenterologists, nutritionists, pulmonologists, and others to ensure healthy development.
- **Total parenteral nutrition (TPN) support program.** A program that supports the feeding of patients intravenously. Program staff work with the patient, family, and other medical providers to ensure proper assessment and delivery of TPN services.
- **Pediatric intensive feeding program.** A multidisciplinary approach for the assessment and treatment of pediatric feeding disorders.
- **Pediatric obesity/weight loss program.** A program focused on the diagnosis and treatment of pediatric patients at risk for or suffering from obesity.
- **Pediatric bariatric surgery program.** Bariatric surgery alters the structure of the stomach and intestines to treat severe obesity in children and adolescents. The procedure is supported by a weight loss program helping patients maintain weight loss after surgery.
- **Inflammatory bowel disease program.** A multidisciplinary program that provides diagnosis and treatment services for infants, children, and adolescents with intractable intestinal inflammation resulting from chronic conditions, such as Crohn's disease and ulcerative colitis.

### *Heart and Heart Surgery*

No programs were included for Heart and Heart Surgery.

### *Neonatal Care*

Hospitals were rewarded for having **specialized neonatal intensive care unit (NICU) teams/clinics** available in neonatal care. Hospitals received 1 point for having each of the following teams.

- **Craniofacial team and follow-up clinic.** Includes pediatric plastic surgeons, pediatric neurosurgeons, pediatric otolaryngologists, social workers, and case managers.
- **Spina bifida team and follow-up clinic.** Includes pediatric neurosurgeons, pediatric urologists, pediatric nephrologists, pediatric orthopedists, pediatric physiotherapy/rehabilitation specialists, and nurse coordinators.
- **Comprehensive retinopathy of prematurity program.** Includes dedicated pediatric ophthalmologists and dedicated retinal specialists.
- **Extracorporeal membrane oxygenation (ECMO) team.** Includes medical directors, clinical managers, a neonatal respiratory team, a pediatric respiratory team, a neonatal/pediatric cardiac team, and a rapid deployment team.

Hospitals were also recognized for having **home transition programs** available to help patients transition from the NICU back to their home. These programs could be offered directly by the hospital or through a formal arrangement with another organization. Hospitals received 1 point for having each of the four programs.

- **Metabolic team.** Includes geneticists, metabolic specialists, developmental specialists, and nutritionists.
- **Home total parenteral nutrition (TPN) team.** Includes pediatric gastroenterologists, pediatric nutritionists, and nurse coordinators.
- **Home enteral tube feeding team.** Includes pediatric gastroenterologists, pediatric nutritionists, and wound ostomy continence registered nurses (RNs).
- **Home ventilator management team.** Includes pediatric pulmonologists, social workers, and case managers.

### *Neurology and Neurosurgery*

Six programs are included in the Neurology and Neurosurgery programs. Hospitals received 1 point for each program offered. Brief descriptions follow.

- **Epilepsy center.** Brings together specialists including physicians board-certified in pediatric neurology and pediatric neurosurgery, registered nurses, psychologists, social workers, and dieticians to determine and deliver the most effective treatments to ensure optimal functioning and quality of life for children with epilepsy. A

program must be able to perform diagnostic and treatment services (including surgery for epilepsy).

- **Brain tumor program.** Brings together specialists including pediatric neurosurgeons, neuro-oncologists, neurologists, and radiation oncologists to determine and deliver the most effective treatments to ensure optimal functioning and quality of life for children with brain tumors. A program must have a dedicated neuro-oncologist and nursing coordinator and have weekly multidisciplinary conferences.
- **Spina bifida clinic.** Brings together specialists including developmental pediatricians, pediatric nurse practitioners, nurses, physical therapists, social workers, neurosurgeons, orthopedic surgeons, urologists, and genetic counselors to determine and deliver optimal care for pediatric patients with spina bifida.
- **Craniofacial program.** Brings together specialists including anesthesiologists, audiologists, clinical nurse specialists, craniofacial surgeons, craniofacial clinical nurse coordinators, dentists, geneticists, neurosurgeons, nurses, orthodontists, otolaryngologists, psychiatrists, social workers, and speech language pathologists to determine and deliver optimal treatment.
- **Neurofibromatosis program.** Brings together specialists including geneticists, ophthalmologists, radiologists, neurologists, neurosurgeons, and orthopedic physicians to determine and deliver optimal treatment for pediatric patients with neurofibromatosis.
- **Tuberous sclerosis program.** Brings together specialists including dermatologists, radiologists, pediatric neurologists, pediatric neurosurgeons, geneticists, social workers, cardiologists, and ophthalmologists to determine and deliver optimal treatment for pediatric patients with tuberous sclerosis.

### *Respiratory Disorders*

Four programs/clinics are included in the Respiratory Disorders measures. Hospitals received 1 point for each program offered. These programs could be offered directly by the hospital or through a formal arrangement with another organization. Brief descriptions follow.

- **Multidisciplinary neuromuscular disease team.** A multidisciplinary team that seeks to diagnose and treat problems related to neuromuscular diseases in pediatric patients. This encompassed significant maladies that cause dysfunction of the peripheral nervous system and muscles. Depending on the area affected, there may be motor

symptoms (muscle weakness, fatigue, wasting, incoordination), sensory symptoms (tingling, decreased sensation, pain), or autonomic symptoms (incontinence, diarrhea, lack of sweating).

- **Multidisciplinary ventilator/tracheostomy dependent team.** A multidisciplinary team that works with pediatric patients (and their families) who are tracheostomy and/or ventilator dependent. The goal of this team is to address the medical and practical needs of patients while supporting their discharge from the inpatient environment to home or another suitable care environment.
- **Congenital central hypoventilation program.** A treatment program focused on the care of pediatric patients with congenital central hypoventilation syndrome, a disorder of the central nervous system that impairs the automatic control of breathing. This program works with patients, their families, and healthcare providers to achieve appropriate care.
- **Pulmonary hypertension program.** A program designed to address the care of pediatric patients with pulmonary hypertension, a condition involving high blood pressure in the arteries that supply the lungs. This program works with patients, their families, and health care providers to achieve appropriate care.

Hospitals could also receive up to 7 points for each of the following **home care services** offered by their pediatric respiratory program. These programs could be offered directly by the hospital or through a formal arrangement with another organization.

- Nurse home visits
- Total parental nutrition therapies
- Intravenous (IV) antibiotics
- Tracheostomy care
- Ventilator care
- Venipunctures, central line care, and peripherally inserted central catheter lines
- Apnea monitoring

## **Nurse Staffing**

Nurse staffing is a ratio reflecting the number of nurses relative to average daily patient census. The numerator is the number of on-staff RNs, expressed in full-time equivalents, devoted

to inpatient care. Only nurses that have RN degrees from approved nursing schools and hold a current state license are included. The denominator is the average daily number of pediatric inpatients. The source of data was the *U.S. News Survey of Pediatric Hospitals*. The index was used in General Pediatrics and all specialties. For Neonatal Care, the index uses equivalent measures for nurses dedicated specifically to NICU care.

Standardization was performed to ensure that the data were distributed normally, with a mean of zero. This was necessary to prepare the data for factor analysis, restoring balance so that trimmed and untrimmed measures had equal influence on the final score. See *Section III. C* for a description of the trimming process to reduce the effect of extreme variation.

### *RN Advanced Education Index*

The RN advanced education index, an additional measure of the nurse staffing, was included in General Pediatrics. The index is the proportion of RNs with a master's degree or higher compared with the total number of RNs. This measure represents a variation on nursing measures recommended by the Pediatric Data Quality Systems Collaborative.<sup>6</sup> The presumption is that nurses with advanced training and certifications provide higher-quality and more specialized care than those with less training. If the proportion of RNs with a master's degree or higher in nursing was greater than zero but less than 5%, a hospital received 1 point. If the proportion was between 5.0% and 9.9%, a hospital received 2 points, and if the proportion was 10.0% or greater, a hospital received 3 points.

### **Clinical Support Services**

Many hospitals provide access to medical and surgical clinical support services through the hospital's health system, a local community network, or a contractual arrangement or joint venture with another provider in the community. Both on-site and off-site services were given 1 full point when calculating the rankings.

Up to 10 services are included in the clinical support services index, depending on the specialty. Brief descriptions follow. Data for these measures came from the *U.S. News Survey of Pediatric Hospitals*.

- **Neonatal intensive care unit (NICU).** Provides mechanical ventilation, neonatal surgery, and special care for the sickest infants, including those with the lowest birth weights (below 1,500 grams), born in the hospital or transferred from another

institution. It is a unit separate from the newborn nursery. A full-time neonatologist serves as director.

- **Pediatric intensive care unit (PICU).** Staffed with specially trained personnel and equipped with monitoring and specialized support equipment for treating pediatric patients who, because of shock, trauma, or other life-threatening conditions require, intensified, comprehensive observation and care.
- **Surgical intensive care unit (SICU).** Provides pediatric care that is more intensive than usual on the basis of physicians' orders and approved nursing care plans. These units are staffed with specially trained nursing personnel and equipped with monitoring and specialized support technologies for patients who, because of shock, trauma, other life-threatening conditions, or surgical procedures, require intensified comprehensive observation and care. Includes mixed intensive care units.
- **Reverse isolation/infection control facilities.** A controlled environment that protects patients from getting an infection caused by bacteria, viruses, or fungi in the environment or carried in by staff and visitors.
- **Genetic testing/counseling.** A service equipped with adequate laboratory facilities and directed by a qualified physician to educate and advise parents and prospective parents in cases of genetic defects. A genetic test is the analysis of human DNA, RNA, chromosomes, proteins, and certain metabolites in order to detect heritable disease-related genotypes, mutations, phenotypes, or karyotypes for clinical purposes. Genetic tests can have diverse purposes, including the diagnosis of genetic diseases in newborns, children, and adults; the identification of future health risks; the prediction of drug responses; and the assessment of risks to future children.
- **Rapid response team.** A rapid response team, also known as a medical emergency team, is distinct from a "code" team. A rapid response team is available 24 hours a day and has three essential characteristics: (1) The team creates tools and provides staff education for recognizing an acute deterioration in patient condition. (2) The team creates a method (often called SBAR—situation, background, assessment, recommendation) to communicate such a change in condition effectively and efficiently (i.e., an escalation policy). (3) The team responds to the change in condition with the goal of reducing or eliminating preventable "codes."
- **Pediatric anesthesia program.** Provides anesthesia care for children before, during, and after surgery (or other medical procedures). Provides 24-hour coverage by board-certified anesthesiologists who specialize in pediatric anesthesia.

- **Pediatric pain management program.** A recognized clinical service or program that provides specialized medical care, drugs, or therapies, administered by specially trained physicians and other clinicians, to manage acute or chronic pain and other distressing symptoms suffered by children from an acute illness of diverse causes.
- **Pediatric infectious disease program.** Provides consultation and treatment for children who have severe illnesses with an infectious origin. Provides 24-hour coverage by physicians board-certified in pediatric infectious diseases.
- **Multidisciplinary pediatric acute pain/sedation service.** Provides monitored anesthesia care and sedation within the hospital (but not within an operating room or PICU), emergency airway management, and acute and chronic pain management for neonates and pediatric patients on a 24-hour basis. A qualified program must have at least an identified medical director (general pediatrician, pediatric subspecialist, or anesthesiologist) with documented education in conscious sedation and an RN coordinator or pain management clinical nurse specialist.

For eligible hospitals, specialty-specific mixes of medical and surgical services are used in computing the score for this index. *Table 2* presents the complete list of medical and surgical services considered for each specialty in 2008.

## **Advanced Technologies**

Many hospitals provide access to technology through the hospital's health system, a local community network, or a contractual arrangement or joint venture with another community provider. Both on- and off-site services were given 1 full point when calculating the rankings. A subset of 28 services is included in the advanced technologies index, depending on the specialty. Brief descriptions follow. Data for the advanced technology index are drawn from the *U.S. News Survey of Pediatric Hospitals*.

- **Positron emission tomography (PET) scanning.** A computerized nuclear medicine imaging technology that uses radioactive (positron-emitting) isotopes created in a cyclotron or generator to produce composite images of the brain and heart at work. PET scanning produces sectional images depicting metabolic activity or blood flow rather than anatomy.



**Table 2. Clinical Support Services by Specialty**

Clinical Support Service	General Pediatrics	Cancer	Digestive Disorders	Heart and Heart Surgery	Neonatal Care	Neurology and Neurosurgery	Respiratory Disorders
Neonatal intensive care unit (NICU)							
Pediatric intensive care unit (PICU)							
Surgical intensive care unit (SICU)							
Reverse isolation/infection control facilities							
Genetic testing/counseling							
Rapid response team (available onsite 24 hours a day)							
Pediatric anesthesia program (available onsite 24 hours a day)							
Pediatric pain management program (available onsite 24 hours a day)							
Pediatric infectious disease program (available onsite 24 hours a day)							
Multidisciplinary pediatric acute pain/sedation service (available onsite 24 hours a day)							
<b>Total Elements</b>	<b>10</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>7</b>	<b>3</b>	<b>4</b>

~ Indicates a service is included in the index for that specialty.

- **Positron emission tomography/computed tomography (PET/CT) single-console combined scanning unit.** Combines the capabilities of PET and CT in a single device. Provides metabolic functional information for monitoring chemotherapy, radiotherapy, and surgical planning
- **Intraoperative magnetic resonance imaging (ioMRI).** Uses a uniform magnetic field and radio frequencies to study tissue and structure of the body. Enables visualization of biochemical cellular activity in vivo without the use of ionizing radiation, radioisotopes, or ultrasound.
- **3 Tesla magnetic resonance imaging (3T MRI).** A higher-powered version of magnetic resonance imaging (MRI) that offers improved morphological and functional studies of the brain compared with the more common field strength of 1.5 Tesla (1.5T).

- **Image-guided radiation therapy (IGRT).** An automated system that produces high-resolution x-ray images to pinpoint tumor sites, adjust patient positioning, and generally make treatment more effective and efficient.
- **Intensity-modulated radiation therapy (IMRT).** A three-dimensional radiation therapy that improves the targeting of treatment delivery in a way that is likely to decrease damage to normal tissues and allow varying intensities.
- **Linac or other linear particle accelerator.** The device most commonly used for external beam radiation treatments for patients with cancer. The linear accelerator can also be used in stereotactic radiosurgery within the brain and other parts of the body. It delivers a uniform dose of high-energy x-rays to a specific region of the patient's tumor.
- **Gamma knife, Cyberknife, or other shaped-beam stereotactic radiation therapies.** A precise, noninvasive treatment that involves targeted beams of radiation mirroring the size and shape of a specific area of a tumor to shrink or destroy cancerous cells. Intense doses of radiation can be administered to the targeted area(s) while largely sparing the surrounding tissues, often in one session. The gamma knife can be used for a variety of conditions including malignant brain tumors, benign brain tumors, blood vessel defects, and functional problems such as trigeminal neuralgia.
- **Dynamic contrast-enhanced magnetic resonance imaging (MRI).** A special application of MRI used with a paramagnetic contrast agent and special algorithms to estimate blood flow over time.
- **Multislice computed tomography (MSCT).** A specialized CT procedure that provides three-dimensional processing and allows more sections and narrower sections, increasing spatial resolution and reducing scanning time as compared with a regular CT scan.
- **Bone marrow transplantation.** A procedure that transplants healthy bone marrow stem cells into a patient whose bone marrow is not functioning properly. The healthy bone marrow may be taken from the patient prior to chemotherapy or radiation treatment (autograft) or from a donor (allograft). Only for patients with ICD-9 procedure code 41.0x, bone marrow or hematopoietic stem cell transplant.
- **Meta-iodine-benzyl-guanidine with I-131 radionuclide (I-131 MIBG).** A functional imaging agent used to help locate and diagnose tumors of adrenergic tissues such as neuroblastoma and pheochromocytoma.

- **Robotic surgery.** The use of robots in performing surgery. Permits surgery to be conducted by a surgeon at a workstation, allowing three-dimensional imaging of the surgical site and greater precision.
- **Continuous electroencephalograph (EEG) monitoring.** A technology for measuring electrical activity produced by the brain, as recorded from electrodes placed on the scalp. EEG monitoring provides the ability to collect brain electrical activity continuously to help detect and diagnose neurological problems.
- **Continuous electroencephalograph (EEG) reading.** Reading is done by a board-certified physician or psychologist trained in diagnosing disorders related to brain activity.
- **Magnetic resonance imaging (MRI).** A diagnostic scanning technique used to visualize the structure and function of the body. It provides detailed images of the body in any plane. A magnetic field aligns hydrogen atoms in the body to create visual images.
- **Molecular diagnostic/virology laboratory.** A diagnostic laboratory that supports the NICU by conducting culture and tissues studies to determine the nature of biological and virological conditions.
- **Specialized chemistry laboratory with tandem mass spectroscopy.** A specialized diagnostic laboratory with the ability to use tandem mass spectroscopy and other advanced techniques to aid in the diagnosis of medical conditions in NICU patients.
- **Capsule endoscopy.** A procedure that permits examination of the small intestine with a small video camera that captures pictures as it travels through the small intestine and transmits images outside the body.
- **Endoscopic band ligation.** Endoscopic band ligation is a procedure in which elastic bands are placed around esophageal varices.
- **Esophageal impedance monitoring.** A method for detecting the flow of liquids and gas through hollow viscera for esophageal function testing.
- **Endoscopic retrograde cholangiopancreatography.** Combines X-rays and endoscopy to diagnose and treat conditions of the bile ducts, including gallstones, inflammatory strictures, leaks, and cancer.
- **Antroduodenal and full colonic motility studies.** Catheters with pressure sensors are placed in the esophagus, stomach, upper small intestine or large intestine to assess contractions to determine if patient symptoms are due to motility problems.

- **Intraoperative brain mapping neurosurgery.** A technique used by neurosurgeons using electrical stimulation to identify and preserve areas of the brain critical to movement, sensation and language. Surgeons then work around the functional areas while removing the maximum amount of the tumor.
- **Functional magnetic resonance imaging.** A relatively new use of magnetic resonance imaging to measure the haemodynamic response related to neural activity in the brain or spinal cord of humans or other animals.
- **Magnetic resonance spectroscopy.** Magnetic resonance spectroscopy (MRS) complements magnetic resonance imaging (MRI) as a non-invasive means for the characterization of neurological tissue. While MRI uses the signal from hydrogen protons to form anatomic images, proton MRS uses this information to determine the concentration of brain metabolites such as N-acetyl aspartate (NAA), choline (Cho), creatine (Cr) and lactate in the tissue examined. The most widely used clinical application of MRS is for evaluating central nervous system disorders.
- **Magnetoencephalography.** An imaging technique used to measure the magnetic fields produced by electrical activity in the brain via extremely sensitive devices such as superconducting quantum interference devices (SQUIDs). Typical uses of MEG in pediatric care include assisting surgeons in localizing neurological pathology.

For eligible hospitals, specialty-specific mixes of technology were used in computing the score for this index. The score was then included in the advanced care index. **Table 3** presents the complete list of technology services considered for each specialty\*\* in 2008.

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\*\* Please see Cardiovascular Services for the technologies included for Heart and Heart Surgery.

**Table 3. Advanced Technologies by Specialty<sup>a</sup>**

<b>Technology</b>	<b>General Pediatrics</b>	<b>Cancer</b>	<b>Digestive Disorders</b>	<b>Neonatal Care</b>	<b>Neurology and Neurosurgery</b>	<b>Respiratory Disorders</b>
Positron emission tomography (PET) scanning						
Positron emission tomography/computed tomography (PET/CT)						
Intraoperative magnetic resonance imaging (ioMRI)						
3 Tesla magnetic resonance imaging (3T MRI)						
Image-guided radiation therapy (IGRT)						
Intensity-modulated radiation therapy (IMRT)						
Linac or other linear particle accelerator						
Gamma knife, Cyberknife, or other shaped-beam stereotactic radiation therapy						
Dynamic contrast-enhanced magnetic resonance imaging						
Multislice computed tomography (MSCT)						
Bone marrow transplantation						
Meta-iodine-benzyl-guanidine with I-131 radionuclide (I-131 MIBG)						
Robotic surgery						
Continuous electroencephalograph (EEG) monitoring						
Continuous electroencephalograph (EEG) reading						
Magnetic resonance imaging (MRI)						
Molecular diagnostic/virology laboratory						
Specialized chemistry laboratory with tandem mass spectroscopy						
Capsule endoscopy						
Endoscopic band ligation						
Esophageal impedance monitoring						
Endoscopic retrograde cholangiopancreatography						
Antroduodenal and full colonic motility studies						

(continued)

**Table 3. Advanced Technologies by Specialty<sup>a</sup>**

Technology	General Pediatrics	Cancer	Digestive Disorders	Neonatal Care	Neurology and Neurosurgery	Respiratory Disorders
Intraoperative brain mapping neurosurgery						
Functional magnetic resonance imaging (fMRI)						
Magnetic resonance spectroscopy (MRS)						
Magnetoencephalography (MEG)						
<b>Total Elements</b>	<b>8</b>	<b>13</b>	<b>8</b>	<b>6</b>	<b>10</b>	<b>1*</b>

~ Indicates a service is included in the index for that specialty.

<sup>a</sup>See Cardiovascular Services for the technologies used in Heart and Heart Surgery.

\*For Respiratory Disorders only 1 point was given for having either PET or PET/CT.

### **Patient and Family Services Measure**

Nine services are included in the patient and family services index. All nine services were used to compute scores for the pediatric specialties. Hospitals could receive a score between 0 and 9 on this item. Brief descriptions follow. Data for the patient and family services index come from the *U.S. News Survey of Pediatric Hospitals*.

- Certified child life specialists (available onsite 7 days a week)
- Family support specialists (available onsite 7 days a week) Pediatric psychologists (available onsite 7 days a week)
- Interpreter services (available onsite 7 days a week)
- Parent advisory committee
- Family resource center
- Sleep rooms for parents/siblings
- School intervention program
- Ronald McDonald House or other residential facility convenient to the hospital for parents

## Cardiovascular Services

This index was used in the General Pediatrics and Heart and Heart Surgery specialties. For eligible hospitals, all 11 cardiovascular services were used to compute the *U.S. News* scores. Brief descriptions follow. Data for the cardiovascular services index are drawn from the *U.S. News* Survey of Pediatric Hospitals.

- **Inpatient cardiology consultation services.** Consultation services available to inpatients to evaluate, monitor, and/or treat heart conditions, chest pain, and related symptoms.
- **Dedicated cardiac surgical operating room(s).** Operating rooms designed and maintained for the surgical care of cardiac patients only.
- **Cardiac intensive care unit (CICU).** A specialized unit designed to meet the needs of pediatric cardiac patients. This includes (a) newborns diagnosed with critical congenital heart disease, (b) infants and children with congenital or acquired heart disease, (c) infants and children with arrhythmias, (d) candidates for heart transplantation, and (e) patients with heart disease who require intensive care services following noncardiac surgery. The CICU is staffed with a multidisciplinary care team, including cardiac intensivists, cardiothoracic surgeons, and cardiac nurses.
- **Dedicated cardiac inpatient unit with remote monitoring capability.** An inpatient unit with specialized equipment allowing physicians, nurses, and other medical staff to monitor each patient's status using real-time remote electronic monitoring equipment.
- **Cardiac diagnostic catheterization laboratory.** A diagnostic facility where cardiac catheterization is performed to detect the presence of heart disease. Cardiac catheterization involves puncturing an artery or vein and inserting a catheter that can be guided into the heart and major vessels around the heart. The catheter is moved through the heart with the aid of fluoroscopy (x-ray machine). This is usually performed to help diagnose heart problems.
- **Cardiac interventional catheterization laboratory.** A diagnostic facility where interventional catheterization is used to treat cardiac conditions. The use of specialized catheters include balloon catheters that can open up narrowed valves or arteries, as well as catheters in which devices can be deployed that close extra openings or vessels in the heart.

- **Electrophysiology laboratory.** A facility designed to perform diagnostic, therapeutic, and interventional electrophysiology-based procedures such as pacemaker, internal cardiac defibrillator, loop device, and biventricular devices insertions; arrhythmia mapping; catheter ablation for atrial fibrillation; and supraventricular tachycardias.
- **Echocardiography laboratory.** A facility that provides echocardiographic evaluations to determine the presence of heart-related problems. Echocardiography allows physicians to noninvasively assess the heart's anatomy and function and obtain measures of blood flow within the heart.
- **Fetal echocardiography laboratory.** Similar to an echocardiography laboratory, this service provides echocardiographic evaluations of the fetus in utero to detect cardiac problems.
- **Ventricular assist program.** A program designed to support placement, monitoring, and support of patients who require the implantation of a ventricular assist device (VAD) to treat their heart condition. A VAD is a mechanical blood pump that takes over the function of a heart ventricle.
- **Congenital heart disease clinic.** A clinic specializing in the diagnoses and treatment of congenital heart conditions such as aortic coarctation, atrial septal defect, bacterial endocarditis, ebstein anomaly, Eisenmenger's syndrome, pulmonary stenosis, tetralogy of fallot, transposition of the great arteries, and ventricular septal defect.

## **Palliative Care**

A qualifying palliative care program is organized and staffed for children nearing the end of life or living with conditions that limit their lifespan or quality of life. Its purpose is to minimize pain and discomfort, provide emotional and spiritual support for children and their families, assist with financial guidance and social services, and support decision making. The following standards had to be met for a hospital to receive 1 point in General Pediatrics or Cancer.

1. A program must include at least one physician providing direct patient care; a nurse coordinator; and a social worker, certified child life specialist, or pastoral counselor.
2. All program staff must have training in palliative care.
3. A program must have had at least 12 palliative care consults in the past year.



## Advanced Care

Each specialty also included a number of specialty-specific advanced care items. The elements in the advanced care measure were selected because they are key in providing high-quality care and thus are expected from a “best” pediatric hospital. Because most measures are specialty specific, they only apply to one or two specialties.

### *General Pediatrics*

- **Hospitalist utilization.** Hospitalists are physicians who focus on hospital medicine. Hospitalist activities typically include direct patient care, teaching, research, and leadership related to hospital care. Their primary function is to help manage patients throughout the continuum of hospital care, frequently seeing patients in the emergency department, admitting them as inpatients, following them as necessary into the critical care unit, and organizing post-acute care. A hospital received 1 point if it reported that at least 50 percent of hospitalists’ time is devoted to pediatric inpatient care.
- **Fellowships.** Participation in fellowship training programs represents a commitment by hospitals to provide high-quality care in a particular specialty area and achieve recognition that the program meets standards of quality. Therefore, hospitals that offer fellowship programs accredited by the Accreditation Council for Graduate Medical Education were awarded points. Hospitals that offered one fellowship received 1 point, and hospitals that offered two or more fellowships received 2 points.
- **Extracorporeal membrane oxygenation (ECMO) services.** A complex technology involving a pump that circulates blood through an artificial lung back into the bloodstream of a very ill neonate, essentially providing heart-lung bypass support outside the child’s body. A hospital received 1 point if an ECMO program was available 24 hours a day.
- **Trauma center.** The trauma center indicator is dichotomous. One point is awarded for either Level 1 or Level 2 trauma certification as a Level 1 or Level 2 Pediatric Trauma Center by the American College of Surgeons or the state licensing board.

### *Cancer*

- **Fellowships.** Hospitals received 1 point for each fellowship program sponsored in pediatric hematology/oncology, pediatric pathology, and pediatric radiation oncology.

- **Bone marrow transplant program.** Hospitals received 1 point if they offered bone marrow transplantation.
- **Cancer care coordination.** Hospitals received 1 point if, for all patients with a history of cancer, regardless of admitting diagnosis, they ensured that the patient's oncology specialist was consulted and that, if there was no oncology specialist, a referral was made to one. One point was also awarded if, when pediatric cancer patients went to the cancer center for evaluations and management, they consistently saw the same oncology specialist. A total of 2 points was possible for this measure.

### *Digestive Disorders*

- **Fellowships.** Hospitals received 1 point for a fellowship program sponsored in pediatric gastroenterology.

### *Heart and Heart Surgery*

- **Fellowships.** Hospitals received 1 point for each fellowship program sponsored in pediatric cardiothoracic surgery and pediatric cardiology.
- **ICAEL accreditation.** Hospitals received 1 point if their pediatric echocardiography laboratory was certified by the Intersocietal Commission for Accreditation of Echocardiography Laboratories (ICAEL).
- **2+ Congenital heart surgeons.** Hospitals received 1 point if they had two or more on-staff congenital heart surgeons.
- **1+ Congenital heart surgeons who conduct 125+ surgeries/year.** Hospitals received 1 point in a separate measure if they had one or more congenital heart surgeons who performed 125 or more complex procedures in the last year.
- **High-volume operating rooms.** Hospitals received 1 point if their pediatric cardiac surgical operating room(s) have the capacity to support 250 or more cardiac surgeries a year.
- **Clinical registry participation.** Hospitals received 1 point if they participated in one or more multi-institutional databases for heart and heart surgery, such as the Society of Thoracic Surgeons Congenital Cardiac Surgery Database.
- **Participation in quality initiatives.** Hospitals received 1 point for each of the following quality initiatives offered by their pediatric heart and heart surgery programs: (1) regular multidisciplinary morbidity and mortality conferences, (2)

home surveillance program for infants after Stage 1 palliation for hypoplastic left heart syndrome, and (3) formal follow-up for children at risk for adverse neurodevelopmental outcomes.

### *Neonatal Care*

- **Fellowships.** Hospitals received 1 point for each fellowship program sponsored in neonatology, pediatric cardiology, and pediatric pulmonology.
- **ECMO services.** A hospital received 1 point for each of the three ECMO service features available at their hospital:
  1. An ECMO program was available 24 hours a day.
  2. An ECMO transport team was at the hospital.
  3. An ECMO program was designated as a center of excellence by the Extracorporeal Life Support Organization (ELSO).
- **Dedicated NICU pharmacist.** Hospitals received 1 point if they had a dedicated pharmacist onsite 24 hours a day.
- **Clinical registry participation.** Hospitals received 1 point each for participating in the following clinical research programs:
  1. Vermont Oxford Network
  2. ELSO data exchange network/registry
  3. Other clinical research or data exchange program

### *Neurology and Neurosurgery*

- **Fellowships.** Hospitals that offered a fellowship in either pediatric neurology or pediatric neurosurgery received 1 point; hospitals that offered fellowships in both received 2 points.
- **Neuro-oncology research site.** Hospitals received 1 point if they were a member of a national Phase 1 neuro-oncology clinical research consortium.

### *Respiratory Disorders*

- **Fellowships.** Hospitals that offered a fellowship in pulmonology received 1 point.

- **Lung transplant program.** Hospitals received 1 point if they offered pediatric lung transplantation.
- **ECMO services.** Hospitals received 1 point if they had an ECMO program available 24 hours a day.
- **Academy of Sleep Medicine (AASM)-certified sleep center.** Hospitals received 1 point if they offered either a Sleep Center or a Sleep Laboratory accredited by AASM.
- **CFF registry participation.** Hospitals received 1 point if they were a member of the Cystic Fibrosis Foundation Therapeutics Development Network.
- **Clinical registry participation.** Hospitals received 1 point if they were a member of a respiratory-related organized clinical research network such as the Cystic Fibrosis Foundation Registry or the National Institutes of Health Asthma Clinical Research Network.

## **B. External Organizations**

Additional structural measures are based on data provided by sources and organizations other than the *U.S. News Pediatric Survey*.

### **Children’s Oncology Group**

The Children’s Oncology Group (COG) is the world’s largest cancer research and clinical trial collaborative. It is supported by the National Cancer Institute. Its aim is to study, research, and identify treatments for childhood cancers. For the Cancer specialty, hospitals were awarded 1 point if they were a COG member as of March 1, 2008. COG member hospitals are listed at [www.cureresearch.org/resources/cog.aspx](http://www.cureresearch.org/resources/cog.aspx).

### **FACT Accreditation**

This accreditation indicates that as of March 1, 2008, a hospital met standards set by the Foundation for the Accreditation of Cellular Therapy (FACT) for transplantation of cells for treatment of cancer in pediatrics. FACT-accredited programs represent the highest level of care in the handling and use of cellular tissue in the treatment of cancer. Programs that have undergone FACT accreditation can be certified as an adult or as a pediatric service provider and as offering two types of transplant services: autologous and allogeneic. For the General Pediatrics and Cancer specialties, hospitals were awarded 1 point if they were accredited as a

pediatric service provider for allogeneic transplants as of March 1, 2008. Currently accredited FACT facilities are listed at [www.factwebsite.org/FacilitySearch.aspx?SearchType=FACT](http://www.factwebsite.org/FacilitySearch.aspx?SearchType=FACT).

## **Nurse Magnet Hospital**

“Nurse Magnet” is a formal designation by the American Nurses Credentialing Center (ANCC), an arm of the American Nursing Association (ANA). The designation indicates that a hospital meets specific standards of nursing excellence. The list of Nurse Magnet hospitals is updated throughout the year as hospitals apply for designation and redesignation status.

Hospitals accorded Nurse Magnet status by the ANCC as of March 1, 2008, received 1 point in all specialties. The current list of Nurse Magnet hospitals is at [www.nursingworld.org/ancc/magnet/facilities.html](http://www.nursingworld.org/ancc/magnet/facilities.html).

## **C. Trimming, Imputation, Standardization, and Weighting**

### **Trimming**

Distributions for mortality, volume, and the nursing index were transformed using the inverse logit transformation. This process was initially introduced to the adult specialty rankings in 2006. The function  $\exp(x) / \{1 + [\exp(x)]\}$  is used to transform the variables before standardization. This technique is sensitive to the number of outliers and produces a transformed distribution that more closely resembles the true distribution, while reducing the effect of extreme outliers.

### **Imputation**

When a hospital did not report data for a particular structural measure, the lower of the following was substituted for calculation purposes:

- The median for that measure across hospitals
- The value for the measure corresponding to the hospital's percentile score on all structural measures

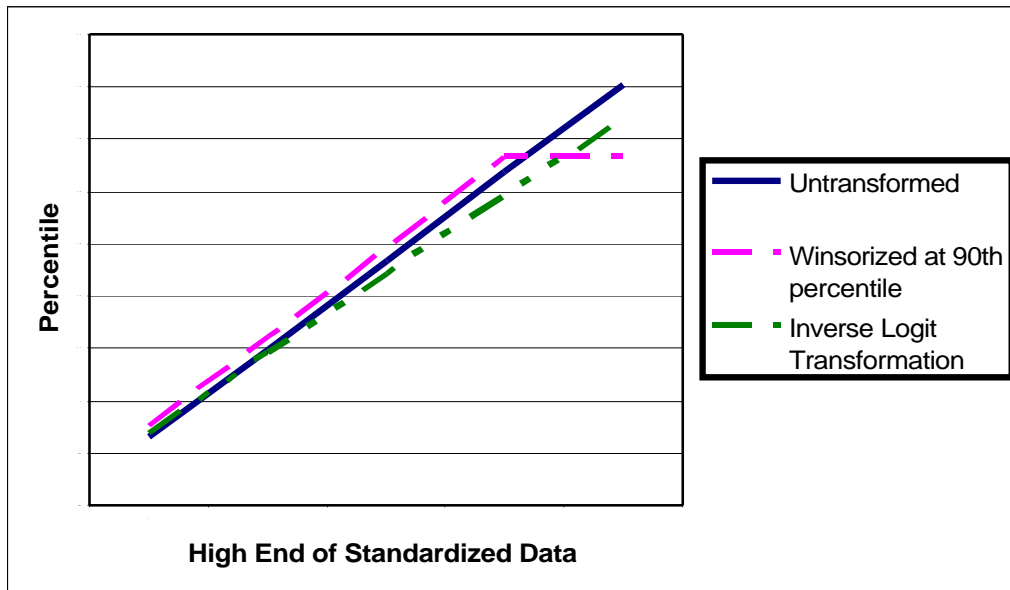
### **Standardization and Weighting**

Standardization was performed on the structural measures to ensure that the data were distributed normally, with a mean of zero. This step was necessary to prepare the data for factor

analysis, restoring balance so that trimmed and untrimmed measures had the same influence on the final score.

*Figure 1* shows the effect of Winsorization at the 90th percentile versus the inverse logit transformation at the high end of a standardized distribution. In addition, for all specialties, the Nurse Staffing index was capped at 4.0 to further reduce the effect of extreme outliers.

**Figure 1. Effect of Winsorization at the 90th Percentile vs. Inverse Logit Transformation**



To combine the structural variables from the Survey of Pediatric Hospitals and external databases, the elements were weighted to create a composite measure. Using factor analysis, we reduced the number of variables to force a one-factor solution. Factor analysis is a statistical technique used to identify underlying similarities among the structural variables. More simply, variables that are strongly associated with one another receive lower factor loadings than those that have a unique distribution. The factor loading for each measure was divided by the total of the factor loadings to derive a weight. Each measure's weight was applied to reduce the effect of multiple variables that, because of their strong association, may measure the same concept.

#### **IV. Outcomes**

Patient outcomes from hospital care can be measured in a variety of ways. For the adult "America's Best Hospitals" specialties, we generally use risk-adjusted mortality 30 days after admission as an outcome measure of the quality of hospital care. Other measures that are now

used as quality measures in health care research<sup>††</sup> include readmissions following surgical or hospital discharge, patient functional status (or improvement), infection rates, and medical complications.

Because there are no comprehensive national sources of pediatric outcomes data equivalent to the MedPAR data used in the adult rankings, the project collected outcomes directly from pediatric hospitals using the *U.S. News & World Report Survey of Pediatric Hospitals*. Outcomes-related data were collected in four of the seven pediatric specialties representing mortality, readmission, or patient functional status. Other mortality measures will be added to the Survey of Pediatric Hospitals over the next few years to address the need for relevant outcomes for each pediatric specialty and to provide a more complete picture of outcomes related to pediatric hospital care. The measures for the 2008 rankings were developed based on recommendations from expert advisory panels of physicians, nurses, hospital quality experts, and other health care professionals. These measures are described briefly below.

## A. Measures

**Mortality.** Mortality data were reported for the Survey of Pediatric Hospitals using the *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* and the *Risk Adjustment for Congenital Heart Surgery Coding System (RACHS-1)*. The ICD-9-CM is the official system used by the National Center for Health Statistics to assign codes to diagnoses and procedures associated with hospital utilization in the United States.<sup>7</sup> The RACHS-1 is a coding system that classifies heart surgical procedures into six different categories ranging from simple to very complex.<sup>8-9</sup> The descriptions of the measures and relevant ICD-9-CM diagnoses or RACHS-1 categories for each measure are described below.

**Surgical mortality (Heart and Heart Surgery).** Represents the rate of patient deaths that occurred following moderately complex to very difficult heart surgery procedures (RACHS-1 categories 3 to 6) at pediatric hospitals in the last year. First, for each RACHS-1 category (3, 4, and 5 and 6 combined), an aggregate mortality rate (i.e., the sum of deaths divided by the sum of patients) was computed. Then, for each hospital, the sum of the hospital's actual number of deaths was divided by the product of the hospital's number of patients in each RACHS-1 category and the aggregate mortality ratio for each RACHS-1 category. Lower numbers indicate a lower rate of death following surgery.

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<sup>††</sup> For more information on hospital quality measures and updates on national quality of hospital care initiatives, please see reports from the Agency for Healthcare Research and Quality (AHRQ) at [http://www.qualitymeasures.ahrq.gov/summary/summary.aspx?doc\\_id=6043](http://www.qualitymeasures.ahrq.gov/summary/summary.aspx?doc_id=6043) and the Joint Commission at <http://www.jointcommission.org/PerformanceMeasurement/PerformanceMeasurement/Current+NHQM+Manual.htm>.

**Mortality (Neurology and Neurosurgery).** Represents the rate of patient deaths that occurred in select neurological diagnoses (i.e., a principal diagnosis of seizures and/or a first surgical admission for brain tumor excision) at pediatric hospitals in the last year. Lower numbers indicate a lower rate of death.

**Readmission (General Pediatrics).** Represents the rate at which patients returned to the hospital within 30 days of discharge following an inpatient stay for a surgical procedure. Lower numbers indicated a lower rate of readmission.

**Cystic Fibrosis Outcomes (Respiratory Disorders).** Represents the success of the respiratory program at improving the functional status of cystic fibrosis patients. Includes a composite of median body mass index and forced expiratory volume for pediatric cystic fibrosis patients treated at hospital-based respiratory programs in the last year. Higher scores indicate better outcomes (or better functional status) for patients.

## **B. Scoring**

Scoring for outcome measures was based on the distribution of the data. Cut-off points and scoring were established based on scores that served to differentiate between hospitals. A description for each measure appears in *Table 4*, along with the scoring rules that were used to assign points to hospitals for these outcomes.

## **V. Process**

The reputational component of the rankings represents the process measure, in that it reflects a hospital's reputation across a wide variety of processes that lead to the quality of care provided. This also can be seen as peer review. For General Pediatrics, the process score is based on cumulative responses from three surveys of board-certified pediatricians, conducted in 2006, 2007, and 2008, in which those surveyed were asked to nominate up to five "best hospitals" in pediatrics, irrespective of expense or location, for patients with the most serious or difficult conditions. In 2006 and 2007, when children's facilities were ranked only generally, physicians surveyed were pediatricians without specialty certification and pediatricians with specialty certification in adolescent medicine. In 2008, physicians surveyed for the General Pediatrics rankings included pediatricians without specialty certification and pediatricians with a specialty certification other than in the six ranked specialties. For the pediatric specialties, because this is the first year that these specialties have been included in the rankings, the score is based on responses to surveys conducted for 2008 only. In future years, survey responses for these specialties will also be cumulated for a 3-year period.



**Table 4. Description and Scoring Rules for Outcomes**

Measure	Description	Scoring Rules
Surgical mortality (Heart and Heart Surgery) <sup>a</sup>	Ratio of pediatric deaths to the number of RACHS-1 category 3–6 surgical procedures	Score equals 1 if adjusted mortality rate <0.5 2 if adjusted mortality rate =0.5 to <1.5 3 if adjusted mortality rate =1.5  For the rankings, scores appeared as above such that lower scores indicate lower mortality; however, for the ranking calculation, scores were reversed so that lower mortality received more points.
Mortality (Neurology and Neuro-surgery) <sup>b</sup>	Score represents a composite for pediatric patients with seizure and brain tumor	Inpatient mortality rate for principal diagnosis of seizure disorder equals 0 points if rate >0.02 1 point if rate >0.01 to =0.02 2 points if rate =0.01  Inpatient mortality rate for first surgical admission for brain tumor excision equals 0 points if rate >0.050 1 point if rate >0.025 to =0.050 2 points if rate =0.025  Points are then reverse scored for ranking tables so that 1 is best (range 1–5); however for ranking calculation purposes, the original scores were used such that lower mortality received more points.
Readmission (General Pediatrics)	Score calculated by dividing the number of readmissions following surgery by the number of surgical discharges.	Score equals 1 if readmission rate =5% 2 if readmission rate >5% to =10% 3 if readmission rate >10%  For the ranking tables, scores appeared as above such that lower scores indicate lower readmission rates; however, for the ranking calculation, scores were reversed so that lower readmission rates received more points.
Cystic fibrosis outcomes (Respiratory Disorders) <sup>c</sup>	Score represents a composite of points awarded for median body mass index (BMI) and forced expiratory volume (FEV1) for all pediatric cystic fibrosis patients ages 6–17	Median BMI equals 0 points if <40 1 point if =40 to <50 2 points if =50  Median FEV1 (ages 6–12) equals 0 points if <90 1 point if =90 to <100 2 points if =100  Median FEV1 (ages 13–17) equals 0 points if <80 1 point if =80 to <90 2 points if =90  Points are added up for each measure so that 6 is best (range 0–6).

<sup>a</sup>Hospitals were only eligible to receive a surgical mortality (Heart and Heart Surgery) score if they conducted at least one heart surgery in categories 5 or 6 (the most difficult) of the RACHS-1 scoring system.

<sup>b</sup>Hospitals were only eligible to receive a seizure mortality score (Neurology and Neurosurgery) if they treated at least 30 patients with seizures. Hospitals were only eligible to receive a brain tumor mortality (Neurology and Neurosurgery) score if they treated at least 20 patients with brain tumors.

<sup>c</sup>Hospitals were only eligible to receive a cystic fibrosis outcomes (Respiratory Disorders) score if they reported data to the Cystic Fibrosis Foundation registry. For more information on this program, see <http://www.cff.org/LivingWithCF/QualityImprovement/PatientRegistryReport/>.

The 2008 survey sample consisted of 1,100 board-certified pediatricians selected from the American Board of Medical Specialties (ABMS). Stratifying by census region ([http://www.census.gov/geo/www/us\\_regdiv.pdf](http://www.census.gov/geo/www/us_regdiv.pdf)) and by specialty within region, we selected a probability (i.e., random) sample of 200 pediatricians for General Pediatrics and 150 pediatricians for each of the six specialty areas. The final sample included federal and nonfederal medical and osteopathic physicians practicing in all 50 states and the District of Columbia.

## Eligibility Requirements

To define a probability sample of physicians who properly represented the seven specialty groupings, we used two rules of eligibility: (1) a mapping between the 7 *U.S. News* specialties and the 23 ABMS member boards and (2) a mapping between the ABMS specialty and specialty boards. Physicians who designated a primary specialty in one of the areas listed were eligible for the survey. **Table 5** displays the association among the specialty listed in “America’s Best Children’s Hospitals” and the corresponding member board. For the General Pediatrics specialty, physicians were chosen from the American Board of Pediatrics, as well as from a variety of pediatric specialties that were not included in the six other specialty samples; the other six specialty areas included physicians with board certification in the specialty boards listed in Table 5. For all specialties, the sample was stratified by region and then drawn proportional to the size of the population (i.e., general pediatrics and/or specialty boards) for that region. For example, because there are more general pediatricians in each region than there are pediatric specialists, there are more general pediatricians in the sample.

## Survey Procedure

### *Materials*

For 2008, sampled physicians in each specialty were mailed a one-page, single-sided questionnaire containing a single question. Respondents were asked to list as many as five hospitals in their specialty that they believe provide the best care to children with serious conditions, regardless of location or expense (see **Appendix A**). The survey asked physicians not to nominate hospitals in which they practice. Along with the questionnaire, physicians were sent a cover letter introducing the survey, a business reply envelope, and a \$2 bill (a token incentive used since the first set of rankings in 1990). Physicians were given the option of mailing, faxing, or submitting their completed surveys via the Web.

**Table 5. Physician Sample Mapping**

America's Best Hospitals Specialty	American Board of	Subspecialties
General Pediatrics	Pediatrics	Adolescent Medicine
		Developmental-Behavioral Pediatrics
		Hospice and Palliative Medicine
		Pediatric Critical Care Medicine
		Pediatric Endocrinology
		Pediatric Infectious Diseases
		Pediatric Nephrology
		Pediatric Rheumatology
		Pediatric Emergency Medicine
Cancer	Pediatrics	Pediatric Hematology-Oncology
Digestive Disorders	Pediatrics	Pediatric Gastroenterology
		Pediatric Transplant Hepatology
Heart and Heart Surgery	Pediatrics	Pediatric Cardiology
Neonatal Care	Pediatrics	Neonatal-Perinatal Medicine
Neurology and Neurosurgery	Pediatrics	Neuro-developmental Disabilities
		Sleep Medicine
	Psychiatry and Neurology	Child Neurology
Respiratory Disorders	Pediatrics	Pediatric Pulmonary

### *Mailings*

Physician survey mailings were conducted in stages during several weeks in the fall of 2007. The initial mailing was sent via U.S. Postal Service (USPS) First Class metered mail. Two weeks later, a replacement survey and new cover letter were sent to the sampled physicians. Two weeks after the second mailing, another replacement survey and new cover letter were sent to the sampled physicians. Two weeks following the reminders, RTI sent a USPS Priority mailing to nonresponders, along with another copy of the questionnaire, a new cover letter, and a business reply envelope. Two weeks after the priority mailing, a fourth survey mailing was sent overnight via Federal Express to the remaining nonresponders; the packet included the questionnaire, a cover letter, and a business reply envelope. See **Table 6** for a simplified schedule of the physician survey mailing.

### **Survey Response Weighting**

The physician survey was stratified by specialty and census region (Midwest, Northeast, South, and West). Weights were constructed and applied to each physician's survey response to make nominations representative at the national level. Weights were based on probability of selection within each unique specialty-region combination, adjusting to account for nonresponders.

**Table 6. Physician Survey Mailing Schedule**

Materials Mailed	Sent via	Sent to	Date
1st copy of physician survey	USPS, First Class letter	Full physician sample	September 14, 2007
2nd copy of physician survey	USPS, First Class letter	Sample members who did not respond	September 28, 2007
3rd copy of physician survey	USPS, First Class letter	Sample members who did not respond	October 12, 2007
4th copy of physician survey	Priority mail	Sample members who did not respond	October 26, 2007
5th copy of physician survey	Federal Express	Sample members who did not respond	November 9, 2007

**Response Rates**

Of the 1,100 physicians sampled for this year's report, 51 were deemed ineligible after determining that they were no longer actively practicing. Of the remaining 1,049 physicians, more than half (544) returned the completed questionnaire by the deadline of February 29, 2008. The final response rate was 51.9 percent, using American Association for Public Opinion Research standard response rate 6 (standard definitions are located on the Web at [www.aapor.org/pdfs/standarddefs\\_ver3.pdf](http://www.aapor.org/pdfs/standarddefs_ver3.pdf)), which treats undeliverables as ineligible cases. **Table 7** shows the response rate for 2008 by region and specialty.

**Table 7. Response Rates, by Region and Specialty, 2008**

Specialty	Midwest	Northeast	South	West	Total
	%	%	%	%	%
General Pediatrics	44.9	33.3	52.1	34.0	<b>41.1</b>
Cancer	50.0	55.6	63.9	48.6	<b>54.5</b>
Digestive Disorders	73.7	77.8	67.6	80.0	<b>74.8</b>
Heart and Heart Surgery	44.4	65.7	52.8	51.4	<b>53.5</b>
Neonatal Care	41.7	45.9	36.1	41.7	<b>41.4</b>
Neurology and Neurosurgery	42.9	43.2	30.3	38.2	<b>38.8</b>
Respiratory Disorders	63.6	66.7	54.1	64.9	<b>62.2</b>
<b>Total</b>	<b>51.3</b>	<b>54.3</b>	<b>51.2</b>	<b>50.6</b>	<b>51.9</b>

## VI. U.S. News Score

In calculating the *U.S. News* ranking scores, the structural measure received 40% of the weight in all specialties. For specialties where outcome measures were available, the process measures received 50%, and the outcome measures received 10% of the weight. For specialties where outcome measures were not available, process received 60% of the weight. **Table 8** shows each component's weights by specialty.

**Table 8. Percentage of Total Weight by Specialty**

Specialty	Structure	Process	Outcomes
General Pediatrics	40%	50%	10%
Cancer	40%	60%	NA
Digestive Disorders	40%	60%	NA
Heart and Heart Surgery	40%	50%	10%
Neonatal Care	40%	60%	NA
Neurology and Neurosurgery	40%	50%	10%
Respiratory Disorders	40%	50%	10%

NA = Not Applicable. This component received 0% of the final weight.

Although each measure represents a specific aspect of quality, a single score provides a result that is easy to use and understand and that portrays overall quality more accurately than would any one of the three elements individually. The rankings for the top 30 hospitals in each of the pediatric specialties by *U.S. News* score are shown in **Appendix B**.

The formula for calculating the *U.S. News* score is in Equation (1). The score can be thought of as a simple weighted sum of structural, process, and outcome measures. Please note that this formula is meant for illustrative purposes only. It cannot be used to directly calculate a score for an individual hospital; standardized data values are adjusted based on the distribution of measures across all eligible hospitals.

$$Score = \left\{ [(S_1 \times F_1) + (S_2 \times F_2) + K + (S_n \times F_n)] + 4 * \left[ \left( P \times \sum_1^n F \right) \right] + \left[ \left( M \times \sum_1^n F \right) \right] \right\}, \quad (1)$$

where

- $Score$  = *U.S. News* score for pediatrics,
- $S_n$  = standardized value for structural indicator  $n$  (STRUCTURE),
- $F_n$  = factor loadings for structural indicator  $n$ ,
- $P$  = standardized nomination score (PROCESS), and
- $M$  = standardized mortality score (OUTCOMES).

For presentation purposes, we transformed the raw *U.S. News* scores to a scale that assigns a score of 100 to the top hospital. The formula for the transformation is shown in Equation (2):

$$(Raw\ U.S.\ News\ score_i - minimum_i) / range_i \quad (2)$$

## VII. Future Improvements

In the coming years, we plan further refinements of the measures used for the current pediatric specialties, as well as additional measures for new pediatric specialties. Specifically, we plan to conduct the following improvements.

- **Develop additional outcome measures.** For example, we plan to explore alternatives for collecting additional mortality data, infection rates, patient functional measures, and complications rates.
- **Explore methods of risk adjustment.** We will continue to investigate methods for risk adjustment of pediatric mortality data to better take into account the differences between hospitals in patient mix, severity, and comorbidities.
- **Identify and consider additional structural measures.** External certifications of hospital quality, excellence in specialty areas, and awards for high-quality care will be considered for incorporation in the rankings. Furthermore, additional technologies, teams, and practices that define high-quality pediatric services will be evaluated for possible inclusion.
- **Field test the Survey of Pediatric Hospitals.** Testing will be designed to fine-tune the survey and reduce the response burden on participating hospitals.
- **Evaluate different weighting schemes.** As additional measures are included in the rankings, the weights used to calculate the final score will continue to be evaluated and revised to better reflect high-quality pediatric care.

As we did this year, the project team will continue to work with expert advisory panels. These groups will continue to include physicians, nurses, hospital quality experts, and other health care professionals who will provide recommendations and advice to the project.

### **Contact Information**

We welcome suggestions and questions. Readers and users of the rankings are encouraged to contact the Best Hospitals research team at the e-mail address listed below. This report and methodology reports for the adult rankings can be viewed or downloaded online in their entirety from the RTI International Web site at <http://www.rti.org/besthospitals>. Specific questions or comments about this report can be sent via e-mail to [BestHospitals@rti.org](mailto:BestHospitals@rti.org).

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**Appendix A**  
**2008 Sample Physician Questionnaire**

# America's Best Hospitals

THIS SURVEY OF PHYSICIANS' JUDGMENTS PROVIDES THE  
BASIS FOR THE REPUTATIONAL COMPONENT OF THE ANNUAL  
RANKINGS OF HOSPITALS FOR *U.S. NEWS & WORLD REPORT*.



List the five U.S. hospitals (and/or affiliated medical schools) that in your opinion provide the best care for patients with the most serious or difficult medical problems associated with <<SPECIALTY>>, without considering location or expense. (Please do not list any hospital where you currently practice.)

	Hospital and/or affiliated medical school	City	State
a.	<input type="text"/>	<input type="text"/>	<input type="text"/>
b.	<input type="text"/>	<input type="text"/>	<input type="text"/>
c.	<input type="text"/>	<input type="text"/>	<input type="text"/>
d.	<input type="text"/>	<input type="text"/>	<input type="text"/>
e.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Conducted RTI International  
3040 Cornwallis Road, P.O. Box 12194, Research Triangle Park, NC 27709-2194

**Thank you for your participation.**

***RTI International  
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**Appendix B**  
**2008 Pediatric Rankings**

## Pediatrics Rankings 2008—General Pediatrics

Rank	Hospital	U.S. News Score	Reputation (%)	Readmission rate (1 is best)	Daily inpatient volume	Nurse staffing	Nurse Magnet hospital	Advanced technologies (of 8)	Patient & family services (of 9)	Trauma center	ECMO services	Fellowships (of 11)	Hospitalist utilization	Palliative care	RN advanced education index	Clinical support services (of 10)	Cardiovascular services (of 11)
1	Children's Hospital of Philadelphia	100.0	50.0	3	338	3.2	Yes	7	9	Yes	Yes	10	Yes	Yes	0.09	10	11
2	Children's Hospital Boston	94.0	43.6	2	291	3.6	Yes	8	9	Yes	Yes	9	Yes	Yes	0.11	10	11
3	Cincinnati Children's Hospital Medical Center	67.5	24.9	3	228	3.7	No	8	9	Yes	Yes	11	Yes	Yes	0.13	9	11
4	Johns Hopkins Children's Center, Baltimore	60.8	19.5	2	153	2.5	Yes	8	8	Yes	Yes	9	Yes	Yes	0.10	10	10
5	Rainbow Babies and Children's Hospital, Cleveland	60.2	18.0	1	153	2.2	Yes	8	9	Yes	Yes	7	No	Yes	0.12	9	11
6	Texas Children's Hospital, Houston	57.9	18.2	3	396	3.4	Yes	8	9	No	Yes	11	Yes	No	0.09	10	11
7	Children's Hospital, Denver	52.6	14.0	3	187	2.4	Yes	8	9	Yes	Yes	10	Yes	Yes	0.12	10	9
8	Children's Hospital and Regional Medical Center, Seattle	51.8	13.5	2	191	2.6	No	6	8	No	Yes	11	Yes	Yes	0.06	10	11
9	Children's Hospital Los Angeles	50.0	9.9	1	248	1.9	Yes	7	9	Yes	Yes	6	Yes	No	0.11	9	11
10	Children's Hospital of Pittsburgh of UPMC	49.3	11.4	3	210	2.7	No	7	8	Yes	Yes	10	Yes	Yes	0.09	10	11
11	New York-Presbyterian Medical Center	48.7	9.8	2	260	3.2	No	8	9	Yes	Yes	8	Yes	No	0.16	9	11
12	Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.	48.2	9.0	1	174	2.3	No	7	8	Yes	Yes	6	Yes	Yes	0.27	9	11
13	Children's National Medical Center, Washington, D.C.	46.8	8.9	3	202	2.5	No	8	9	Yes	Yes	7	Yes	Yes	0.36	10	10
14	Children's Hospital Cleveland Clinic	46.7	6.3	1	224	2.4	Yes	8	9	No	Yes	7	Yes	Yes	0.14	10	11
15	Nationwide Children's Hospital, Columbus, Ohio	45.1	6.0	2	289	2.0	Yes	8	9	Yes	Yes	10	Yes	Yes	0.14	10	11
16	Mattel Children's Hospital UCLA, Los Angeles	44.3	5.0	1	145	2.5	Yes	8	9	Yes	Yes	7	Yes	Yes	0.13	9	11
17	St. Louis Children's Hospital	44.3	7.6	3	190	2.9	Yes	7	9	Yes	Yes	11	No	Yes	0.18	10	11
18	Children's Memorial Hospital, Chicago	44.0	7.6	3	184	3.0	Yes	7	9	Yes	Yes	9	Yes	Yes	0.04	10	11
19	Children's Healthcare of Atlanta	41.9	4.6	2	373	2.9	No	8	9	Yes	Yes	8	Yes	No	0.28	9	11
20	UCSF Children's Hospital, San Francisco	41.6	5.7	2	124	3.3	No	6	8	No	Yes	6	Yes	Yes	0.10	9	11
21	Massachusetts General Hospital for Children, Boston	40.1	4.6	2	79	1.9	Yes	8	9	Yes	Yes	2	Yes	Yes	0.10	10	9
22	Primary Children's Medical Center, Salt Lake City	39.8	3.2	2	194	4.0	No	8	9	Yes	Yes	10	Yes	Yes	0.01	10	11
23	Monroe Carell Jr. Children's Hospital at Vanderbilt, Nashville	39.4	3.1	3	206	3.1	Yes	7	9	No	Yes	7	Yes	Yes	0.10	10	11
24	Arkansas Children's Hospital, Little Rock	39.3	4.5	3	234	3.1	No	7	9	No	Yes	4	No	Yes	0.09	9	11
25	Children's Medical Center Dallas	39.2	1.9	2	241	2.1	No	7	9	Yes	Yes	9	Yes	Yes	0.18	10	11
26	C.S. Mott Children's Hospital, Ann Arbor	39.2	3.0	2	165	2.6	No	7	9	Yes	Yes	8	Yes	Yes	0.07	9	11
27	Duke Children's Hospital and Health Center, Durham, N.C.	38.0	3.2	3	135	2.4	Yes	7	8	Yes	Yes	6	No	Yes	0.23	10	11
28	Children's Hospital at Montefiore, New York	37.9	1.3	1	94	2.1	No	8	9	No	Yes	11	Yes	Yes	0.15	10	11
29	Schneider Children's Hospital, North Shore-LIJ Health System, New Hyde Park, N.Y.	37.9	1.7	2	201	1.8	No	8	9	Yes	Yes	7	Yes	Yes	0.05	10	10
30	Children's Hospital of Wisconsin, Milwaukee	37.7	1.7	3	226	2.5	Yes	6	9	Yes	Yes	6	Yes	Yes	0.12	10	11

\* Hospital did not respond to the survey.

NR = Hospital did not respond to this item.

## Pediatrics Rankings 2008—Cancer

Rank	Hospital	U.S. News Score	Reputation (%)	Volume	Nurse staffing	Nurse Magnet hospital	Clinical support services (of 5)	Advanced technologies (of 13)	Palliative care	Patient & family services (of 9)	Bone marrow transplant program	Brain tumor program	COG member	Cancer care coordination	FACT accreditation	Fellowships (of 3)
1	Children's Hospital of Philadelphia	100.0	71.3	1,070	3.2	Yes	5	12	Yes	9	Yes	Yes	Yes	2	Yes	2
2	Children's Hospital Boston	93.4	64.7	262	3.6	Yes	5	13	Yes	9	Yes	Yes	Yes	2	Yes	2
3	Texas Children's Hospital, Houston	66.6	35.5	464	3.4	Yes	5	12	No	9	Yes	Yes	Yes	2	Yes	3
4	Cincinnati Children's Hospital Medical Center	63.7	31.9	366	3.7	No	5	13	Yes	9	Yes	Yes	Yes	2	Yes	3
5	Children's Hospital and Regional Medical Center, Seattle	58.5	27.8	2,253	2.6	No	5	10	Yes	8	Yes	Yes	Yes	2	Yes	3
6	St. Jude Children's Research Hospital, Memphis	58.4	58.8	*	*	No	*	*	*	*	*	*	Yes	*	Yes	*
7	Johns Hopkins Children's Center, Baltimore	51.2	19.9	577	2.5	Yes	5	13	Yes	8	Yes	Yes	Yes	2	Yes	1
8	Memorial Sloan-Kettering Cancer Center, New York	48.2	19.2	1,553	2.1	No	5	13	No	7	Yes	Yes	Yes	2	Yes	1
9	Children's Hospital Los Angeles	45.2	13.9	1,864	1.9	Yes	5	12	No	9	Yes	Yes	Yes	2	Yes	2
10	Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.	41.7	10.9	929	2.3	No	5	12	Yes	8	Yes	Yes	Yes	2	Yes	1
11	Children's Memorial Hospital, Chicago	41.6	8.5	1,365	3.0	Yes	5	12	Yes	9	Yes	Yes	Yes	2	Yes	2
12	Children's Hospital, Denver	40.6	8.3	164	2.4	Yes	5	13	Yes	9	Yes	Yes	Yes	2	Yes	2
13	Children's Healthcare of Atlanta	40.2	10.2	3,281	2.9	No	4	12	No	9	Yes	Yes	Yes	2	Yes	1
14	Duke Children's Hospital and Health Center, Durham, N.C.	37.4	7.2	227	2.4	Yes	5	11	Yes	8	Yes	Yes	Yes	1	Yes	1
15	Children's Medical Center Dallas	36.7	4.8	7,226	2.1	No	5	11	Yes	9	Yes	Yes	Yes	2	Yes	2
16	Children's National Medical Center, Washington, D.C.	36.1	4.7	935	2.5	No	5	11	Yes	9	Yes	Yes	Yes	2	Yes	1
17	St. Louis Children's Hospital	35.3	1.2	536	2.9	Yes	5	11	Yes	9	Yes	Yes	Yes	2	Yes	3
18	Mattel Children's Hospital UCLA, Los Angeles	35.3	2.4	3,382	2.5	Yes	5	13	Yes	9	Yes	Yes	Yes	2	Yes	1
19	University of Minnesota Children's Hospital, Fairview	35.0	3.6	477	2.0	Yes	5	13	Yes	9	Yes	Yes	Yes	0	Yes	1
20	UCSF Children's Hospital, San Francisco	35.0	4.9	297	3.3	No	5	10	Yes	8	Yes	Yes	Yes	2	Yes	1
21	Children's Cancer Hospital at M.D. Anderson, Houston	34.7	4.8	280	1.8	Yes	3	13	Yes	8	Yes	Yes	Yes	2	Yes	1
22	Nationwide Children's Hospital, Columbus, Ohio	34.6	1.4	557	2.0	Yes	5	12	Yes	9	Yes	Yes	Yes	2	Yes	2
23	Rainbow Babies and Children's Hospital, Cleveland	34.5	2.3	486	2.2	Yes	4	13	Yes	9	Yes	Yes	Yes	2	Yes	1
24	Children's Hospital of Pittsburgh of UPMC	34.1	2.7	269	2.7	No	5	12	Yes	8	Yes	Yes	Yes	2	Yes	2
25	Riley Hospital for Children Clarian Health Partners, Indianapolis	33.9	0.0	1,837	2.5	Yes	5	12	Yes	8	Yes	Yes	Yes	2	Yes	3
26	Primary Children's Medical Center, Salt Lake City	33.4	0.0	857	4.0	No	5	13	Yes	9	Yes	Yes	Yes	2	Yes	2
27	C.S. Mott Children's Hospital, Ann Arbor	33.3	2.3	213	2.6	No	5	12	Yes	9	Yes	Yes	Yes	2	Yes	1
28	Children's Hospital Cleveland Clinic	33.2	1.2	177	2.4	Yes	5	13	Yes	9	Yes	Yes	Yes	2	Yes	1
29	Children's Hospital of Michigan, Detroit	33.1	1.2	212	2.1	Yes	5	12	Yes	8	Yes	Yes	Yes	2	Yes	2
30	New York-Presbyterian Medical Center	32.8	1.2	396	3.2	No	5	13	No	9	Yes	Yes	Yes	2	Yes	1

\* Hospital did not respond to the survey.

NR = Hospital did not respond to this item.

## Pediatrics Rankings 2008—Digestive Disorders

Rank	Hospital	U.S. News Score	Reputation (%)	Volume	Programs (of 7)	Nurse staffing	Nurse Magnet hospital	Clinical support services (of 5)	Advanced technologies (of 8)	Patient & family services (of 9)	Diagnostic procedure volume	GI transplant volume	Fellowships (of 1)
1	Children's Hospital Boston	100.0	66.5	3,886	6	3.6	Yes	5	8	9	337	14	1
2	Children's Hospital of Philadelphia	97.5	64.8	3,300	7	3.2	Yes	5	7	9	95	16	1
3	Cincinnati Children's Hospital Medical Center	95.8	62.3	2,370	7	3.7	No	5	8	9	412	24	1
4	Texas Children's Hospital, Houston	69.1	34.9	2,144	7	3.4	Yes	5	8	9	72	14	1
5	Children's Hospital, Denver	62.8	28.2	2,813	7	2.4	Yes	5	7	9	171	11	1
6	Children's Hospital of Pittsburgh of UPMC	53.6	22.0	2,767	6	2.7	No	5	5	8	42	45	1
7	Children's Hospital of Wisconsin, Milwaukee	45.6	13.1	881	7	2.5	Yes	5	7	9	87	8	1
8	New York-Presbyterian Medical Center	44.2	9.3	2,102	7	3.2	No	5	7	9	129	16	1
9	Nationwide Children's Hospital, Columbus, Ohio	44.0	10.9	2,275	7	2.0	Yes	5	7	9	236	0	1
10	Mattel Children's Hospital UCLA, Los Angeles	43.6	7.8	1,048	7	2.5	Yes	5	8	9	340	33	1
11	Johns Hopkins Children's Center, Baltimore	42.2	7.7	2,189	7	2.5	Yes	5	8	8	152	2	1
12	Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.	40.0	6.6	2,721	7	2.3	No	5	7	8	40	33	1
13	UCSF Children's Hospital, San Francisco	38.5	7.5	471	7	3.3	No	5	5	8	37	10	1
14	Children's Healthcare of Atlanta	37.8	4.8	7,223	7	2.9	No	4	6	9	93	22	1
15	Children's Hospital Cleveland Clinic	37.8	3.2	3,497	6	2.4	Yes	5	8	9	388	5	1
16	Riley Hospital for Children Clarian Health Partners, Indianapolis	37.6	3.9	1,029	6	2.5	Yes	5	7	8	2,024	8	1
17	Children's Mercy Hospitals and Clinics, Kansas City, Mo.	35.4	3.0	3,244	6	3.6	Yes	5	4	9	98	5	1
18	Mayo Clinic, Rochester, Minn.	35.2	3.7	804	7	3.4	Yes	4	8	6	55	6	1
19	Children's Memorial Hospital, Chicago	35.1	3.8	809	6	3.0	Yes	5	4	9	8	15	1
20	C.S. Mott Children's Hospital, Ann Arbor	35.0	3.2	662	6	2.6	No	5	7	9	55	7	1
21	Rainbow Babies and Children's Hospital, Cleveland	34.9	3.3	866	7	2.2	Yes	4	8	9	74	0	1
22	Primary Children's Medical Center, Salt Lake City	34.8	3.2	985	6	4.0	No	5	8	9	24	7	1
23	St. Louis Children's Hospital	34.7	1.1	1,872	6	2.9	Yes	5	5	9	35	17	1
24	Children's Hospital Los Angeles	34.5	1.5	1,075	6	1.9	Yes	5	5	9	41	35	1
25	Children's National Medical Center, Washington, D.C.	34.5	6.1	994	6	2.5	No	5	6	9	68	0	0
26	Children's Medical Center Dallas	34.4	0.5	7,174	7	2.1	No	5	7	9	46	24	1
27	Massachusetts General Hospital for Children, Boston	34.3	0.4	1,156	7	1.9	Yes	5	8	9	371	0	1
28	Schneider Children's Hospital, North Shore-LIJ Health System, New Hyde Park, N.Y.	34.3	3.0	1,505	6	1.8	No	5	7	9	71	0	1
29	Yale-New Haven Children's Hospital, New Haven, Conn.	34.2	6.1	1,676	3	1.6	No	5	6	7	15	6	1
30	Connecticut Children's Medical Center, Hartford	34.0	9.1	620	5	2.1	No	5	3	8	5	0	0

\* Hospital did not respond to the survey.

NR = Hospital did not respond to this item.

## Pediatrics Rankings 2008—Heart and Heart Surgery

Rank	Hospital	U.S. News Score	Reputation (%)	Surgical mortality	Surgical volume	Catheter procedure volume	Cardiovascular services (of 11)	Nurse staffing	Nurse Magnet hospital	Patient & family services (of 9)	Fellowships (of 2)	ICAEEL accreditation	Clinical registry participation (of 2)	High volume operating rooms	Participation in quality initiatives	2+ congenital heart surgeons	1+ congenital heart surgeons w/ 125+ surgeries/year	Clinical support services (of 3)
1	Children's Hospital Boston	100.0	87.2	2	376	959	11	3.6	Yes	9	1	Yes	2	Yes	3	Yes	Yes	3
2	Children's Hospital of Philadelphia	99.3	85.2	2	241	386	11	3.2	Yes	9	2	Yes	2	Yes	3	Yes	Yes	3
3	Texas Children's Hospital, Houston	80.8	58.7	2	292	62	11	3.4	Yes	9	2	Yes	2	Yes	3	Yes	Yes	3
4	C.S. Mott Children's Hospital, Ann Arbor	75.2	49.8	2	391	445	11	2.6	No	9	2	Yes	2	Yes	2	Yes	Yes	3
5	Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.	63.7	34.9	2	268	72	11	2.3	No	8	1	Yes	2	Yes	3	Yes	Yes	3
6	New York-Presbyterian Medical Center	56.4	17.7	1	307	370	11	3.2	No	9	2	Yes	2	Yes	2	Yes	Yes	3
7	Children's Hospital of Wisconsin, Milwaukee	51.2	12.3	2	209	221	11	2.5	Yes	9	1	No	2	Yes	3	Yes	Yes	3
8	Cincinnati Children's Hospital Medical Center	50.4	12.3	3	123	192	11	3.7	No	9	2	Yes	2	Yes	3	Yes	Yes	3
9	Nationwide Children's Hospital, Columbus, Ohio	48.5	5.6	1	133	174	11	2.0	Yes	9	2	Yes	2	Yes	2	Yes	Yes	3
10	Children's Healthcare of Atlanta	47.8	9.1	3	308	348	11	2.9	No	9	2	Yes	2	Yes	3	Yes	Yes	2
11	Children's Hospital Los Angeles	47.2	6.6	2	212	197	11	1.9	Yes	9	1	No	2	Yes	3	Yes	Yes	3
12	Children's Memorial Hospital, Chicago	46.9	7.9	3	133	256	11	3.0	Yes	9	1	No	2	Yes	3	Yes	Yes	3
13	Miami Children's Hospital	46.7	6.3	1	67	220	10	1.8	Yes	9	0	Yes	2	Yes	3	Yes	Yes	2
14	Children's National Medical Center, Washington, D.C.	46.6	7.7	3	163	336	10	2.5	No	9	2	Yes	2	Yes	3	Yes	Yes	3
15	Primary Children's Medical Center, Salt Lake City	46.1	3.0	2	196	317	11	4.0	No	9	2	Yes	2	Yes	3	Yes	Yes	3
16	Children's Hospital of Pittsburgh of UPMC	45.4	4.1	2	133	129	11	2.7	No	8	2	Yes	2	Yes	3	Yes	Yes	3
17	St. Louis Children's Hospital	45.2	1.8	2	155	361	11	2.9	Yes	9	2	No	2	Yes	3	Yes	Yes	3
18	UCSF Children's Hospital, San Francisco	45.2	3.4	1	153	364	11	3.3	No	8	1	No	1	Yes	2	Yes	Yes	3
19	Medical University of South Carolina Children's Hospital, Charleston	45.0	0.0	1	148	212	11	2.9	No	7	2	Yes	2	Yes	3	Yes	Yes	3
20	Mattel Children's Hospital UCLA, Los Angeles	44.8	2.9	1	71	186	11	2.5	Yes	9	2	No	2	Yes	2	Yes	No	3
21	Mayo Clinic, Rochester, Minn.	44.6	5.6	2	104	124	11	3.4	Yes	6	1	Yes	1	Yes	3	Yes	Yes	2
22	Children's Medical Center Dallas	44.4	4.8	2	169	128	11	2.1	No	9	2	Yes	2	Yes	1	Yes	Yes	3
23	Duke Children's Hospital and Health Center, Durham, N.C.	43.9	3.7	3	139	236	11	2.4	Yes	8	1	Yes	2	Yes	3	Yes	Yes	3
24	Rainbow Babies and Children's Hospital, Cleveland	43.6	1.8	1	69	62	11	2.2	Yes	9	1	Yes	2	Yes	3	Yes	Yes	2
25	Cook Children's Medical Center, Fort Worth	43.2	0.0	1	120	70	11	3.1	Yes	9	0	Yes	2	Yes	3	Yes	Yes	3
26	Arnold Palmer Hospital for Children, Orlando, Fla.	43.2	0.0	1	56	169	11	2.5	No	9	0	No	2	Yes	3	Yes	Yes	3
27	Children's Hospital, Denver	42.8	2.9	3	126	262	9	2.4	Yes	9	2	Yes	2	Yes	2	Yes	Yes	3
28	Arkansas Children's Hospital, Little Rock	42.6	1.8	3	130	216	11	3.1	No	9	1	No	2	Yes	3	Yes	Yes	3
29	Johns Hopkins Children's Center, Baltimore	42.6	0.0	2	158	188	10	2.5	Yes	8	2	Yes	1	Yes	3	Yes	Yes	3
30	Children's Hospital and Regional Medical Center, Seattle	42.6	1.1	2	77	280	11	2.6	No	8	2	No	2	Yes	2	Yes	Yes	3

\* Hospital did not respond to the survey.

NR = Hospital did not respond to this item.



## Pediatrics Rankings 2008—Neonatal Care

Rank	Hospital	U.S. News Score	Reputation (%)	Volume	NICU nurse staffing	Nurse Magnet hospital	Clinical support services (of 7)	Advanced technologies (of 6)	Patient & family services (of 9)	ECMO services	ECMO Center of Excellence	ECMO transport team for NICU	Fellowships (of 3)	Clinical registry participation (of 4)	Dedicated NICU pharmacist	Specialized NICU teams/clinics	Home transition programs (of 4)
1	Children's Hospital of Philadelphia	100.0	45.3	977	3.3	Yes	7	6	9	Yes	No	No	3	3	Yes	4	4
2	Rainbow Babies and Children's Hospital, Cleveland	90.2	38.9	91	3.0	Yes	6	6	9	Yes	No	Yes	3	4	Yes	4	4
3	Children's Hospital Boston	82.2	33.4	194	4.0	Yes	7	6	9	Yes	Yes	No	3	2	Yes	4	4
4	New York-Presbyterian Medical Center	71.7	26.9	681	2.2	No	6	6	9	Yes	Yes	Yes	3	3	Yes	4	4
5	Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.	60.2	20.8	101	2.8	No	7	6	8	Yes	No	No	3	4	Yes	3	3
6	Cincinnati Children's Hospital Medical Center	58.8	18.5	102	3.6	No	7	6	9	Yes	No	Yes	3	4	No	4	4
7	Children's Hospital, Denver	54.9	16.3	267	2.7	Yes	7	6	9	Yes	No	No	3	3	Yes	4	4
8	Texas Children's Hospital, Houston	54.9	15.9	359	2.4	Yes	7	6	9	Yes	No	Yes	3	3	Yes	4	4
9	Children's National Medical Center, Washington, D.C.	47.6	11.0	236	3.1	No	7	6	9	Yes	Yes	Yes	3	2	Yes	4	4
10	UCSF Children's Hospital, San Francisco	46.5	12.4	136	3.0	No	7	5	8	Yes	No	No	3	3	No	4	4
11	St. Louis Children's Hospital	43.8	9.4	187	2.6	Yes	7	6	9	Yes	No	No	3	3	Yes	4	4
12	Riley Hospital for Children Clarian Health Partners, Indianapolis	43.5	8.1	369	2.7	Yes	7	6	8	Yes	Yes	No	3	4	Yes	4	4
13	Johns Hopkins Children's Center, Baltimore	43.0	9.2	224	2.5	Yes	7	6	8	Yes	No	No	3	2	Yes	4	4
14	Monroe Carell Jr. Children's Hospital at Vanderbilt, Nashville	40.7	6.7	207	3.4	Yes	7	6	9	Yes	No	No	3	3	Yes	4	4
15	C.S. Mott Children's Hospital, Ann Arbor	39.9	5.7	264	2.7	No	7	6	9	Yes	Yes	Yes	3	3	Yes	4	4
16	Massachusetts General Hospital for Children, Boston	39.2	6.5	119	3.3	Yes	7	6	9	Yes	Yes	Yes	1	3	No	4	3
17	Miami Children's Hospital	38.3	7.9	155	2.3	Yes	6	5	9	Yes	No	Yes	0	3	No	4	3
18	Children's Memorial Hospital, Chicago	38.2	5.6	258	2.4	Yes	7	6	9	Yes	No	No	3	3	Yes	4	4
19	Duke Children's Hospital and Health Center, Durham, N.C.	37.7	4.3	290	2.7	Yes	7	6	8	Yes	Yes	Yes	3	3	Yes	4	4
20	University of Chicago Comer Children's Hospital	37.6	4.3	192	2.5	Yes	7	6	9	Yes	Yes	Yes	3	3	Yes	4	4
21	Children's Hospital Los Angeles	36.5	2.8	183	3.8	Yes	7	6	9	Yes	Yes	Yes	2	4	Yes	4	4
22	Children's Hospital of Pittsburgh of UPMC	36.0	3.8	121	3.5	No	7	6	8	Yes	No	Yes	3	3	Yes	4	4
23	Children's Hospital and Regional Medical Center, Seattle	35.3	4.1	146	4.0	No	7	6	8	Yes	No	No	3	2	Yes	4	4
24	Nationwide Children's Hospital, Columbus, Ohio	35.2	4.1	110	2.0	Yes	7	6	9	Yes	No	No	3	3	Yes	4	4
25	Children's Hospital Cleveland Clinic	35.1	3.9	68	3.1	Yes	7	6	9	Yes	No	Yes	2	2	Yes	4	4
26	Children's Mercy Hospitals and Clinics, Kansas City, Mo.	34.7	4.1	264	2.4	Yes	7	4	9	Yes	Yes	No	1	3	Yes	4	4
27	Children's Hospitals and Clinics of Minnesota, Minneapolis	34.7	2.9	470	3.5	Yes	7	6	9	Yes	No	Yes	1	4	Yes	3	4
28	Rady Children's Hospital-San Diego	34.7	2.8	335	2.7	No	6	6	8	Yes	Yes	Yes	3	3	Yes	4	4
29	Children's Hospital at Montefiore, New York	34.4	2.6	208	1.9	No	7	6	9	Yes	Yes	Yes	3	3	Yes	4	4
30	Children's Hospital of Wisconsin, Milwaukee	33.7	1.4	298	2.6	Yes	7	6	9	Yes	Yes	Yes	3	3	Yes	4	4

\* Hospital did not respond to the survey.

NR = Hospital did not respond to this item.

## Final Pediatrics Rankings 2008—Neurology and Neurosurgery

Rank	Hospital	U.S. News Score	Reputation (%)	Mortality	Volume	Nurse staffing	Nurse Magnet hospital	Advanced technologies (of 10)	Patient & family services (of 9)	Brain tumor patient volume	Seizure patient volume	Fellowships (of 2)	Neurology clinics/programs	Neurology clinics/program volume	Neuro-oncology research site	Clinical support services (of 3)
1	Johns Hopkins Children's Center, Baltimore	100.0	55.8	2	1,137	2.5	Yes	9	8	178	820	2	6	2,449	Yes	3
2	Children's Hospital Boston	95.0	47.7	1	2,965	3.6	Yes	10	9	105	949	2	6	6,639	Yes	3
3	Children's Hospital of Philadelphia	93.3	46.4	1	3,427	3.2	Yes	9	9	61	781	2	6	6,812	Yes	3
4	Children's Hospital Cleveland Clinic	72.7	27.2	1	2,983	2.4	Yes	10	9	34	513	1	6	3,856	Yes	3
5	Texas Children's Hospital, Houston	67.7	21.5	1	2,098	3.4	Yes	10	9	105	601	2	5	3,273	Yes	3
6	St. Louis Children's Hospital	63.4	18.3	1	2,378	2.9	Yes	9	9	76	769	2	6	4,063	No	3
7	Mayo Clinic, Rochester, Minn.	56.7	16.9	1	1,008	3.4	Yes	9	6	47	348	1	6	850	No	2
8	Children's Hospital and Regional Medical Center, Seattle	56.5	14.1	1	1,499	2.6	No	7	8	43	532	2	4	5,569	Yes	3
9	Rainbow Babies and Children's Hospital, Cleveland	54.8	14.7	2	987	2.2	Yes	10	9	41	324	1	6	3,807	No	2
10	Children's Hospital of Pittsburgh of UPMC	54.0	9.4	1	3,443	2.7	No	9	8	47	571	2	6	3,932	Yes	3
11	New York-Presbyterian Medical Center	53.6	10.6	2	1,802	3.2	No	10	9	67	738	1	6	2,317	Yes	3
12	Children's National Medical Center, Washington, D.C.	51.8	6.7	1	1,952	2.5	No	10	9	48	663	2	6	5,522	Yes	3
13	Children's Hospital Los Angeles	50.3	7.7	1	1,570	1.9	Yes	9	9	57	210	1	6	1,355	Yes	3
14	Mattel Children's Hospital UCLA, Los Angeles	50.2	8.0	1	1,393	2.5	Yes	10	9	26	1,318	1	6	4,265	No	3
15	Children's Hospital, Denver	49.7	5.7	2	2,190	2.4	Yes	9	9	61	478	2	6	4,218	Yes	3
16	Children's Memorial Hospital, Chicago	49.0	4.3	1	3,671	3.0	Yes	9	9	63	266	2	6	5,092	Yes	3
17	Cincinnati Children's Hospital Medical Center	48.9	4.4	1	1,694	3.7	No	10	9	21	656	2	6	3,241	Yes	3
18	Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.	48.4	11.0	1	711	2.3	No	9	8	25	118	1	4	2,045	No	3
19	UCSF Children's Hospital, San Francisco	48.2	12.5	2	394	3.3	No	8	8	34	177	0	4	NR	Yes	3
20	Monroe Carell Jr. Children's Hospital at Vanderbilt, Nashville	45.9	3.0	1	1,318	3.1	Yes	9	9	42	318	1	6	2,586	Yes	3
21	Children's Hospital of Michigan, Detroit	45.1	1.5	1	2,164	2.1	Yes	8	8	33	653	2	6	2,567	No	3
22	Miami Children's Hospital	44.7	4.9	1	1,574	1.8	Yes	6	9	59	775	0	3	4,375	No	2
23	Children's Medical Center Dallas	44.6	1.5	1	2,127	2.1	No	8	9	53	821	2	6	4,473	No	3
24	Nationwide Children's Hospital, Columbus, Ohio	44.5	3.3	1	842	2.0	Yes	9	9	26	696	2	5	1,453	No	3
25	Schneider Children's Hospital, North Shore-LIJ Health System, New Hyde Park, N.Y.	44.4	0.0	1	2,599	1.8	No	10	9	44	1,114	2	6	2,252	Yes	3
26	Riley Hospital for Children Clarian Health Partners, Indianapolis	43.9	1.5	2	2,534	2.5	Yes	8	8	81	277	2	6	7,254	Yes	3
27	Children's Healthcare of Atlanta	43.8	0.0	1	2,997	2.9	No	9	9	72	814	2	5	2,507	Yes	2
28	Children's Hospital of Wisconsin, Milwaukee	43.8	2.9	2	1,655	2.5	Yes	8	9	32	760	1	6	1,276	No	3
29	C.S. Mott Children's Hospital, Ann Arbor	43.0	1.4	1	1,184	2.6	No	8	9	45	247	1	6	3,031	Yes	3
30	Primary Children's Medical Center, Salt Lake City	42.9	0.0	1	3,893	4.0	No	10	9	765	4,756	2	5	1,089	No	3

\* Hospital did not respond to the survey.

NR = Hospital did not respond to this item.

## Final Pediatrics Rankings 2008—Respiratory Disorders

Rank	Hospital	U.S. News Score	Reputation (%)	Cystic fibrosis outcomes (6 is best)	Cystic fibrosis volume	Nurse staffing	Nurse Magnet hospital	Clinical support services (of 4)	Patient & family services (of 9)	ECMO services	Respiratory programs/clinics	Respiratory procedure volume	Fellowships (of 1)	Home care services (of 7)	Lung transplant program	CFF registry participation	Clinical registry participation	AAISM certified sleep center	Advanced technologies (of 1)
1	Children's Hospital of Philadelphia	100.0	58.1	5	300	3.2	Yes	4	9	Yes	4	741	1	7	Yes	Yes	Yes	Yes	Yes
2	Texas Children's Hospital, Houston	92.7	53.3	2	281	3.4	Yes	4	9	Yes	4	309	1	7	Yes	Yes	Yes	Yes	Yes
3	Cincinnati Children's Hospital Medical Center	85.3	44.0	5	190	3.7	No	4	9	Yes	4	1,108	1	7	No	Yes	Yes	Yes	Yes
4	Children's Hospital Boston	83.9	40.0	6	371	3.6	Yes	4	9	Yes	3	540	1	7	Yes	Yes	Yes	Yes	Yes
5	Children's Hospital, Denver	72.5	31.3	4	401	2.4	Yes	4	9	Yes	3	414	1	7	No	Yes	Yes	Yes	Yes
6	Children's Hospital of Pittsburgh of UPMC	63.4	20.2	5	254	2.7	No	4	8	Yes	4	288	1	7	Yes	Yes	Yes	No	Yes
7	University of North Carolina Children's Hospital, Chapel Hill	63.2	22.6	3	263	2.6	No	4	9	Yes	1	654	1	7	Yes	Yes	Yes	Yes	Yes
8	Johns Hopkins Children's Center, Baltimore	62.2	19.6	4	259	2.5	Yes	4	8	Yes	4	147	1	7	Yes	Yes	Yes	Yes	Yes
9	Children's Hospital and Regional Medical Center, Seattle	61.0	20.1	4	356	2.6	No	4	8	Yes	4	206	1	7	No	Yes	Yes	Yes	Yes
10	Rainbow Babies and Children's Hospital, Cleveland	59.0	18.4	2	335	2.2	Yes	4	9	Yes	4	273	1	7	No	Yes	Yes	Yes	Yes
11	Children's Hospital Los Angeles	55.6	16.8	1	200	1.9	Yes	4	9	Yes	3	204	1	6	Yes	Yes	Yes	No	Yes
12	St. Louis Children's Hospital	53.3	10.1	3	387	2.9	Yes	4	9	Yes	3	262	1	7	Yes	Yes	Yes	Yes	Yes
13	National Jewish Medical and Research Center, Denver	51.5	26.2	0	0	4.0	No	2	6	No	0	52	1	0	No	Yes	Yes	Yes	No
14	Riley Hospital for Children Clarian Health Partners, Indianapolis	48.0	4.6	4	320	2.5	Yes	4	8	Yes	4	933	1	7	No	Yes	Yes	Yes	Yes
15	Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.	47.8	6.4	3	264	2.3	No	4	8	Yes	3	517	1	3	Yes	Yes	Yes	Yes	Yes
16	C.S. Mott Children's Hospital, Ann Arbor	47.5	1.1	6	326	2.6	No	4	9	Yes	4	375	1	6	Yes	Yes	Yes	Yes	Yes
17	Massachusetts General Hospital for Children, Boston	47.4	3.7	5	325	1.9	Yes	4	9	Yes	4	238	1	7	No	Yes	Yes	Yes	Yes
18	University of Minnesota Children's Hospital, Fairview	46.0	0.0	6	200	2.0	Yes	4	9	Yes	4	157	1	6	Yes	Yes	Yes	Yes	Yes
19	Children's Hospitals and Clinics of Minnesota, Minneapolis	45.8	1.6	6	127	4.0	Yes	4	9	Yes	4	265	0	7	No	Yes	Yes	Yes	Yes
20	New York-Presbyterian Medical Center	45.5	2.9	6	130	3.2	No	3	9	Yes	4	108	1	6	Yes	Yes	Yes	No	Yes
21	Children's Healthcare of Atlanta	45.2	1.6	5	612	2.9	No	4	9	Yes	4	194	1	6	No	Yes	Yes	Yes	Yes
22	Children's National Medical Center, Washington, D.C.	44.7	2.2	6	121	2.5	No	4	9	Yes	3	177	1	6	No	Yes	Yes	No	Yes
23	Children's Memorial Hospital, Chicago	44.6	1.1	4	190	3.0	Yes	4	9	Yes	4	135	1	7	No	Yes	Yes	Yes	Yes
24	Nationwide Children's Hospital, Columbus, Ohio	44.4	0.0	4	346	2.0	Yes	4	9	Yes	3	383	1	6	Yes	Yes	Yes	Yes	Yes
25	UCSF Children's Hospital, San Francisco	43.6	1.8	4	82	3.3	No	4	8	Yes	3	197	1	7	Yes	Yes	Yes	No	Yes
26	Children's Hospital of Wisconsin, Milwaukee	43.5	0.0	4	197	2.5	Yes	4	9	Yes	4	262	1	4	No	Yes	Yes	Yes	Yes
27	Primary Children's Medical Center, Salt Lake City	43.1	0.0	5	228	4.0	No	4	9	Yes	4	60	1	6	No	Yes	Yes	Yes	Yes
28	Duke Children's Hospital and Health Center, Durham, N.C.	43.0	1.9	4	95	2.4	Yes	4	8	Yes	3	110	1	6	Yes	Yes	Yes	No	Yes
29	Cook Children's Medical Center, Fort Worth	42.1	1.6	2	252	3.1	Yes	4	9	Yes	4	452	0	7	No	Yes	Yes	No	Yes
30	Penn State Hershey Children's Hospital, Hershey, Penn.	42.1	0.0	5	285	2.0	Yes	3	9	Yes	3	439	0	6	No	Yes	Yes	Yes	Yes

\* Hospital did not respond to the survey.  
 NR = Hospital did not respond to this item.

