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**Methodology:  
U.S. News & World Report  
Best Children's Hospitals 2016-17**

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## Executive Summary

Pediatrics has been an element of Best Hospitals ever since 1990, when U.S. News & World Report published the first annual version of the “America’s Best Hospitals” rankings, as they were then called. The initial evaluations in 12 specialties took the form of short lists of centers identified through a survey of physician specialists as providing the best care for the most challenging patients.

The intent was to provide patients and families with a tool that could narrow their search for a hospital suited to someone whose difficult procedure, underlying condition or other medical issue calls for an especially high level of skilled care. That core mission remains unchanged. In 2015, however, U.S. News broadened its scope of Best Hospitals by adding ratings of some 4,600 hospitals in relatively commonplace procedures and conditions such as heart bypass surgery, knee and hip joint replacement and COPD.

In 1993 hard data was incorporated into most Best Hospitals specialty rankings, but until 2007, the pediatric rankings were an exception. They continued to rely entirely on an annual survey of pediatric specialists because of the absence of hard data comparable to the MedPAR files for Medicare recipients. Pediatric-specific data are critical because benchmarking and data generated from adult patients cannot be applied to children and may be entirely absent. Coordinated care for congenital conditions such as spina bifida and cystic fibrosis, determination of drug dosages and vulnerability to infection are only a few of the factors that make pediatric patients unique.

Lacking robust pediatric data bases, U.S. News elected to collect data directly from children’s hospitals through a comprehensive clinical and operational survey. The first rankings to incorporate data from such a survey, developed by RTI International\*, were published in 2007 as the top 30 children’s centers in General Pediatrics. Specialty rankings were not included.

Data collection was subsequently broadened and deepened. The current methodology continues to include reputational survey results, as well as supplemental information from resources such as the National Cancer Institute. Best Children’s Hospitals now ranks the top 50 centers in 10 specialties: Cancer, Cardiology & Heart Surgery, Diabetes & Endocrinology, Gastroenterology & GI Surgery, Neonatology, Nephrology, Neurology & Neurosurgery, Orthopedics, Pulmonology and Urology.

In addition, to provide parents with information about more centers and to demonstrate transparency, the 2016-17 results for the first time publicly display pediatric centers below the line – that is, those that did not achieve a top-50 national ranking. (That has been the case for unranked adult Best Hospitals for several years.) Pediatric centers that provided sufficient data to receive an

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

overall U.S. News Score but fell short of the top 50 are displayed without rank or score but with their calculated metrics.

The 183 facilities surveyed for the 2016-17 Best Children’s Hospitals rankings are either freestanding children’s hospitals or a “hospital within a hospital” – a large and essentially autonomous multidisciplinary pediatric department within a major medical center. Most are members of the Children’s Hospital Association (CHA).<sup>†</sup>

RTI International<sup>‡</sup> collects and analyzes the data for the “Best Children’s Hospitals” rankings. The methodology reflects the level and quality of *hospital resources* directly related to patient care, such as staffing, technology and special services; *delivery of healthcare*, such as reputation among pediatric specialists, programs that prevent infections and adherence to best practices; and *clinical outcomes*, such as patient survival, infection rates and complications.

In the 2016-17 rankings, 78 of the 183 surveyed hospitals were ranked in one or more specialties. The Best Children’s Hospitals Honor Roll recognizes hospitals with scores in the top 10 percent in at least three specialties. The 2016-17 Honor Roll lists 11 such hospitals.

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<sup>†</sup> In 2012, the National Association for Children’s Hospitals and Related Institutions (NACHRI) was renamed the Children’s Hospital Association. For more information, please visit: <http://www.childrenshospitals.net>.

<sup>‡</sup> RTI International is the trade name of Research Triangle Institute.

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## I. Introduction

Rankings in pediatrics were included when U.S. News introduced the “America’s Best Hospitals” rankings in 1990. Until 2007, however, the pediatric rankings relied entirely on reputational surveys of board-certified pediatricians and adolescent-medicine specialists. Quantitative measures in pediatrics barely existed. A large, rich database, comparable to the Centers for Medicare & Medicaid Services MedPAR (Medicare Provider Analysis and Review) files that determine mortality in 12 adult specialties, was unavailable\*\*. Reliable structural measures also were absent. Available data sources generally reported volume, advanced technologies and patient services for the hospital as a whole and did not break out pediatric-specific information.

Continuing to rank children’s hospitals solely on reputation for an indeterminate period while performance data were codified and the means of collecting and verifying them were settled was no longer felt to be acceptable. U.S. News therefore asked RTI International, the U.S. News contractor for the adult Best Hospitals rankings, to develop a rigorous methodology for ranking hospitals in pediatrics that would incorporate data obtained by directly surveying the hospitals.

The resulting methodology and initial version of a direct hospital survey (referenced in this report as the Pediatric Hospital Survey) produced General Pediatrics rankings of 30 hospitals, published in the September 3, 2007, issue of U.S. News & World Report as “Best Children’s Hospitals.” The issue was separate from the issue with the adult rankings, to highlight the change and minimize possible confusion.

The Pediatric Hospital Survey and the reputational Physician Survey were expanded in 2008, permitting pediatric hospitals to be ranked in six pediatric specialties as well as in General Pediatrics.†† In 2009, General Pediatrics was dropped and the number of specialties was expanded to the following 10, which still define the list:

- Cancer
- Cardiology & Heart Surgery
- Diabetes & Endocrinology
- Gastroenterology & GI Surgery
- Neonatology
- Nephrology
- Neurology & Neurosurgery
- Orthopedics
- Pulmonology
- Urology

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\*\* A relatively small number of children, under narrow eligibility definitions, do receive care under Medicare because of legislatively mandated changes in coverage over time.

†† Previous methodology reports are available online at [www.rti.org/besthospitals](http://www.rti.org/besthospitals).



Like their adult counterpart, the Best Children's Hospitals rankings reflect the interrelationship between structure, process and outcomes, the three components of the Donabedian paradigm.<sup>1-5</sup> Individual measures, their weights and approach to scoring are quite different in the pediatric rankings, however.

The Donabedian components represent the following healthcare concepts:

- *Structure* refers to hospital resources directly related to patient care. Examples include the ratio of nurses to patients, specialized clinics and programs, and certification by recognized external organizations.
- *Process* encompasses overall rendering of diagnosis, treatment, prevention and patient education. In both the pediatric and adult rankings, process is represented primarily by a reputational score based on the annual survey of board-certified physicians cited above. Starting with the 2012-13 rankings, the pediatric methodology has incorporated compliance with best practices and activities to prevent infections and other patient safety issues.
- *Outcomes* most obviously include survival but can also include functional success, such as in children with cystic fibrosis and adverse events, such as bloodstream infections and failure of transplanted organs.

Each major component of the Best Children's Hospitals ranking score—structure, outcomes and process—is worth exactly one-third of the overall score. The specific measures, their weights and the way in which hospitals are scored in the pediatric rankings are quite different from those in their adult counterparts.

**Section II** of this report outlines the general eligibility requirements for consideration in the pediatric rankings. As in previous years, most structure and outcomes data for the 2016-17 rankings were obtained directly from children's hospitals through the Pediatric Hospital Survey (**Section III**). Data for three measures were supplied by external organizations: the American Nurses Credentialing Center (Nurse Magnet recognition), the Foundation for the Accreditation of Cellular Therapy (FACT accreditation for BMT and tissue transplant) and National Association of Epilepsy Centers (commitment to best practices).

The specific mission of the Best Children's Hospitals rankings is to identify hospitals that provide the highest quality of care for children with the most serious or complicated medical conditions, using the most robust and sensitive measures available to represent the three Donabedian components. **Section IV** describes the data and the construction of each component.

The methodology also incorporates nominations of hospitals from board-certified pediatric specialists in each of the 10 specialties through the Pediatric Physician Survey, as described in *Section VI*.

## **II. Eligibility**

### **A. General Eligibility**

To be considered for the pediatric rankings, hospitals had to provide extensive data about their services and capabilities through the 2016-17 Pediatric Hospital Survey ([https://usnewspediatricsurvey.rti.org/Documents/PediatricHospitalSurvey\\_Full\\_2016-17.pdf](https://usnewspediatricsurvey.rti.org/Documents/PediatricHospitalSurvey_Full_2016-17.pdf)). Eligible programs fell into one of three categories: a freestanding children’s hospital; a “hospital within a hospital” (as described above, a pediatric service that functions autonomously within a larger medical center), or a specialty hospital (such as orthopedics).

Historically, initial eligibility for the rankings was determined by membership in the Children’s Hospital Association (CHA)<sup>[1]</sup> or by nomination from teams of expert advisers. U.S. News and RTI also consider the size and scope of the pediatric program as well as the interest on the part of the hospital to engage in public reporting.

Of the 183 hospitals that qualified for 2016-17 inclusion, 106 submitted sufficient data through the Pediatric Hospital Survey to be considered for ranking in at least one specialty, a response rate of 58 percent.

Starting with the 2016-17 rankings, hospitals that submitted data had to agree that their data would be evaluated and publically displayed even a hospital was not ranked among the top 50 in a specialty. In previous years, only results for the top 50 hospitals in a specialty were publically available. The purpose of this change was to further ensure transparency of the Best Children’s Hospital rankings process.

### **B. Specialty-Specific Eligibility**

To be eligible for ranking within a given specialty, hospitals had to satisfy two additional requirements:

- In specialties other than Neonatology, a hospital had to verify in the Pediatric Hospital Survey that services in the specialty were in fact available. A hospital also had to have a Level IV neonatal intensive care unit (NICU) to be eligible for ranking

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<sup>[1]</sup> More information about CHA and its member hospitals can be found at [www.childrenshospitals.net](http://www.childrenshospitals.net).

in Neonatology. For validating the latter status, we accepted hospitals that either have been granted Level IV status by their state or that meet the eligibility requirements for a Level IV NICU as specified by the American Academy of Pediatrics guidelines.<sup>‡</sup>

- A full-time equivalent (FTE) of at least 1.0 attending physicians in certain specialty-related medical fields was required. The physician categories are shown in **Table 1**. Text and table references (e.g. “B2a”) indicate the related section and question in the Pediatric Hospital Survey.

**Table 1. Specialty-Specific Eligibility Requirements**

| <b>Specialty</b>              | <b>Must have at least 1.0 FTE attending staff in the following categories:</b>  |
|-------------------------------|---|
| Cancer                        | Pediatric hematologist/oncologist (B2a)*  |
| Cardiology & Heart Surgery    | Pediatric cardiothoracic surgeon (E2a) <b>and</b><br>Pediatric cardiac intensivist (from training in cardiology, pediatric critical care or anesthesiology) <b>or</b><br>Other pediatric cardiac specialist (pediatric cardiac interventionalist, pediatric cardiac electrophysiologist or pediatric anesthesiologist with specialty cardiac training) (E2b, E2c, E2d, E2e, E2f or E2g) |
| Diabetes & Endocrinology      | Pediatric endocrinologist (C2a)   |
| Gastroenterology & GI Surgery | Pediatric gastroenterologist (D2a)  |
| Neonatology                   | Pediatric neonatologist (F2a)   |
| Nephrology                    | Pediatric nephrologist (G2a)  |
| Neurology & Neurosurgery      | Pediatric neurologist (H2a) <b>or</b><br>Pediatric neurosurgeon (H2b)   |
| Orthopedics                   | Pediatric orthopedic surgeon (I2a)  |
| Pulmonary                     | Pediatric pulmonologist (J2a) <b>or</b><br>Pediatric sleep medicine physician (J2b)   |
| Urology                       | Pediatric urologist (K2a)   |

\* Parenthetical references indicate related survey questions

### III. Pediatric Hospital Survey

As part of the process of creating the initial pediatric rankings, RTI convened advisory panels to inform the hospital survey. These working groups have been retained to help the survey

<sup>‡</sup> AAP guidelines, Pediatrics, 2012, 130:587-597.

evolve by providing new findings and perspectives that can be incorporated before the survey is finalized and sent to hospitals.

Panel members are recruited through an announcement sent by RTI to the pediatric hospital community to propose candidates with broad expertise in both general and specialty pediatric medical care and familiarity with current research on hospital quality. The 2016-17 panels comprised pediatric physicians, nurses, hospital quality experts, health information systems/coding experts and other healthcare professionals. A group of infection-control experts worked with the 10 specialty panels to address specialty-specific infection-control and prevention issues.

Through conference calls, ad hoc phone discussions and emails during the summer and fall of 2015, panel members proposed, reviewed and discussed revisions to the previous survey, including prospective new measures.

The RTI project team created a draft set of measures and a survey instrument. A smaller group of advisors reviewed both the broad content and specific information, such as individual ICD-9-CM (*International Classification of Diseases, Ninth Revision, Clinical Modification*) codes that identify diagnoses and treatments.<sup>6</sup> In addition, experts at several children's hospitals extensively reviewed the survey to ensure that the questions were appropriate and answerable. The final result was to slightly expand and refine the 2016-17 survey.

The survey was provided as a Microsoft Word document to hospitals in mid-November 2015 on an FYI basis, to give them as much time as possible to collect and organize data before the official start date. They received the data submission form in early January 2016 via a dedicated Web page; the form was administered through March.

Some measures were ultimately excluded after data were submitted because the results failed to demonstrate meaningful variability. The remaining items defined the majority of the structural, process and outcomes measures. The items are described in detail below. References to the corresponding survey question numbers are provided in parentheses.

The Pediatric Hospital Survey data submission form will continue to be updated and modified in subsequent years to reflect the quality of care provided by U.S. pediatric facilities and the evolving discipline of quality improvement.

## **IV. Structure**

The structural component is represented by volume, technology, clinical services and other characteristic features of a high-quality pediatric hospital. In the Best Hospitals adult specialty

rankings, most structural measures and their associated data are extracted from the American Hospital Association (AHA) annual survey. Because the AHA survey focuses primarily on overall hospital and system measures, the pediatric data from the survey lack specificity. Structural data were therefore collected through the Pediatric Hospital Survey.

All measures used in the rankings are described in the following sections. The print version of the rankings displays a subset of the online measures.

## **A. Structural Measures**

The structural measures used in the rankings were selected because they represent fundamental elements of high-quality, hospital-based pediatric care. Descriptions of the measures and the specialties to which they are applied are listed alphabetically. Text and table references such as (A6a) indicate the related section and question in the Pediatric Hospital Survey. The relative weight of each measure within a specialty is provided in *Section IV.B. Normalization and Weighting*.

### **Active Fellowship Program (All Specialties)**

Participation in fellowship training programs represents a commitment by hospitals to provide high-quality care in a specialty area and assure that their programs meet standards of quality. Hospitals that offer fellowship programs accredited by the Accreditation Council for Graduate Medical Education were awarded 1 point for each fellowship program that had at least one active fellow in the program in the past academic year. *Table 2* indicates fellowships credited.

### **Adequacy of Nurse Staffing (All Specialties)**

This measure is a relative ratio of the number of nurses to the average daily patient census. The numerator is the number of on-staff registered nurses (RNs) dedicated to inpatient pediatric clinical care, expressed as FTEs (A2). Nurses are included only if they have an RN degree from an approved nursing school and hold a current state license. The denominator is the average daily number of pediatric inpatients (A1). The source was the Pediatric Hospital Survey. This measure was used in all specialties. For Neonatology, the measure counted only nurses dedicated specifically to the NICU (F4a) and the average daily census comprised only NICU patients (F6). For scoring purposes, nurse-patient values above 4.0 were capped at 4.0 in all specialties to prevent skewness in this measure.

### **Adoption of Health Information Technology (All Specialties)**

In each specialty, hospitals received up to 12 points for incorporating and using a computerized physician order entry (CPOE) system and electronic medical records (EMRs).

**Table 2. Active Fellowship Programs by Specialty**

| <b>Fellowship Program*</b>  | <b>Cancer</b> | <b>Cardiology &amp; Heart Surgery</b> | <b>Diabetes &amp; Endocrinology</b> | <b>Gastroenterology &amp; GI Surgery</b> | <b>Neonatology</b> | <b>Nephrology</b> | <b>Neurology &amp; Neurosurgery</b> | <b>Orthopedics</b> | <b>Pulmonology</b> | <b>Urology</b> |
|---|---------------|---------------------------------------|-------------------------------------|--|--------------------|-------------------|-------------------------------------|--------------------|--------------------|----------------|
| Child neurology (A6a)   |               |                                       |                                     |  | ●                  |                   | ●                                   |                    |                    |                |
| Congenital cardiac surgery (A6b)                                    |               | ●                                     |                                     |  | ●                  |                   |                                     |                    |                    |                |
| Neonatal-perinatal medicine (A6c)                                   |               |                                       |                                     |  | ●                  |                   |                                     |                    |                    |                |
| Neurosurgery (with training in pediatrics) (A6d)                    |               |                                       |                                     |  | ●                  |                   | ●                                   |                    |                    |                |
| Pediatric cardiology(A6e)   |               | ●                                     |                                     |  | ●                  |                   |                                     |                    |                    |                |
| Pediatric endocrinology (A6f)                                       |               |                                       | ●                                   |  |                    |                   |                                     |                    |                    |                |
| Pediatric gastroenterology (A6g)                                    |               |                                       |                                     | ●  | ●                  |                   |                                     |                    |                    |                |
| Pediatric hematology-oncology (A6h)                                 | ●             |                                       |                                     |  |                    |                   |                                     |                    |                    |                |
| Pediatric nephrology (A6i)  |               |                                       |                                     |  |                    | ●                 |                                     |                    |                    |                |
| Pediatric orthopedics (A6j)   |               |                                       |                                     |  |                    |                   |                                     | ●                  |                    |                |
| Neuroradiology (with training in pediatrics) (A6k)                  | ●             |                                       |                                     |  | ●                  |                   |                                     |                    |                    |                |
| Pediatric pulmonology (A6l)   |               |                                       |                                     |  | ●                  |                   |                                     |                    | ●                  |                |
| Pediatric urology (A6m)   |               |                                       |                                     |  |                    |                   |                                     |                    |                    | ●              |
| Pediatric surgery (A6n)   | ●             | ●                                     |                                     |  |                    |                   |                                     |                    |                    |                |
| Pediatric infectious diseases (A6o)                                 | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Orthopedic surgery of the spine (with training in pediatrics) (A6p) |               |                                       |                                     |  |                    |                   |                                     | ●                  |                    |                |
| Pediatric critical care medicine (A6q)                              | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Pediatric advanced transplant hepatology (A6r)                      |               |                                       |                                     | ●  |                    |                   |                                     |                    |                    |                |
| Pediatric rheumatology (A6s)  |               |                                       | ●                                   |  |                    |                   |                                     | ●                  |                    |                |
| Pediatric medicine and rehabilitation (A6t)                         | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Pediatric radiology (A6u)   | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |

(continued)

**Table 2. Active Fellowship Programs by Specialty (continued)**

| <b>Fellowship Program*</b>   | <b>Cancer</b> | <b>Cardiology &amp; Heart Surgery</b> | <b>Diabetes &amp; Endocrinology</b> | <b>Gastroenterology &amp; GI Surgery</b> | <b>Neonatology</b> | <b>Nephrology</b> | <b>Neurology &amp; Neurosurgery</b> | <b>Orthopedics</b> | <b>Pulmonology</b> | <b>Urology</b> |
|--|---------------|---------------------------------------|-------------------------------------|--|--------------------|-------------------|-------------------------------------|--------------------|--------------------|----------------|
| Pediatric interventional radiology (with training in pediatrics) (A6v) | ●             |                                       |                                     |  | ●                  | ●                 | ●                                   |                    |                    |                |
| Advanced motility training program (D34)                               |               |                                       |                                     | ●  |                    |                   |                                     |                    |                    |                |
| Advanced nutritional training program (D35)                            |               |                                       |                                     | ●  |                    |                   |                                     |                    |                    |                |
| Advanced hepatology training program (D36)                             |               |                                       |                                     | ●  |                    |                   |                                     |                    |                    |                |
| <b>Total Elements</b>  | <b>8</b>      | <b>7</b>                              | <b>6</b>                            | <b>9</b>                                 | <b>13</b>          | <b>6</b>          | <b>7</b>                            | <b>7</b>           | <b>5</b>           | <b>5</b>       |

\* Parenthetical references indicate related survey questions

Hospitals received up to 6 points for CPOE: 1 point for implementing a CPOE system (A20), 1 point for documenting 95% or more of inpatient medication orders (A21a), 1 point for identifying medication orders if an allergy to the medication is documented (A21b), 1 point for including alerts for dosing errors for high-risk medications (A21c) and up to 2 points for providing details on two or more current projects using CPOE that focus on dosing errors for high-risk medications (A21.1).

Hospitals received up to 4 points for EMR: 1 point for implementation (A22), 1 point if the EMR identifies and reports potential adverse events for patients (A23) and up to 2 points for providing details on two current projects with the EMR system that identify potential adverse events (A23.1).

Hospitals received 2 points based on their current Meaningful Use certification (A23.2). Meaningful Use is used to evaluate a hospital's EMR to improve quality, safety, and care coordination as well as engage patients and their families. Hospitals that have achieved Stage 2 achieved 2 points, and hospitals that achieved stage 1 received 1 point

### **Adult Congenital Heart Program (Cardiology & Heart Surgery)**

In Cardiology & Heart Surgery, hospitals received up to 10 points for having an adult congenital heart program. Hospitals received 1 point for providing an organized adult congenital

heart program (E16). Hospitals could also receive 1 additional point if the program was listed with the Adult Congenital Heart Association (E20). These programs are often provided by pediatric heart centers, which frequently have the most expertise in inherited and congenital heart disorders.

Up to 6 additional points were awarded if the adult congenital heart program provided the following: a formal plan to transition patients from the pediatric to adult congenital heart program (E17a); joint participation from adult and pediatric cardiologists (E17b); participation from cardiothoracic surgeons (E17c), cardiothoracic interventionalists (E17d) and cardiothoracic electrophysiologists, who have specialty expertise in the care of adults with congenital heart disease (E17e); and specialty care for high-risk obstetrics patients with congenital heart disease (E17f).

Hospitals received 1 point for performing from 1 to 49 cardiac surgical encounters<sup>§§</sup> on patients age 18 and above in the past four calendar years and 2 points for performing 50 or more surgical encounters in the past four calendar years (E19).

### **Advanced Clinical Services (All Specialties)**

Hospitals frequently offer clinical services and organize teams or programs to address special needs of specific groups of patients. These services or programs may be organized around a particular diagnosis, need or age group. The structure of the services or programs ensures that a range of resources is available. Specialized skills of a multidisciplinary staff improve overall quality of care and, presumably, outcomes. The clinical services recognized in each specialty are described in **Table 3**. Four points were awarded for having a pediatric trauma center in Neurology & Neurosurgery, Orthopedics, and Pulmonology. The trauma center measure recognizes the enhanced resources and staff available to hospitals that provide this service, which benefit other inpatient specialty care. One point was awarded for the additional services listed for each specialty.

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<sup>§§</sup> Specific adult cardiac surgical operations included are listed in Table 7 of the STS Congenital Heart Surgery Database for the past four reporting years.



**Table 3. Advanced Clinical Services Offered by Specialty**

| <b>Cancer (20 points)</b>     |  |               |
|-------------------------------|--|---------------|
| <b>Service</b>                | <b>Description*</b>  | <b>Points</b> |
| Cancer care coordination      | Primary oncologist involved in 80% or of the evaluations and management visits with pediatric patient on active cancer therapy (B7)  | 1             |
| Support staff/programs        | Offers the following programs and supporting staff (B11, B11.1, and B11.2): <ul style="list-style-type: none"> <li>• Complementary and alternative medicine or holistic health program</li> <li>• Pediatric cancer child-life specialists</li> <li>• Psychosocial support program</li> <li>• Social work support</li> <li>• School programs for hospitalized patients</li> <li>• Neuropsychological evaluation focused on school re-entry issues</li> <li>• APHON chemotherapy/biotherapy course and safe handling procedures</li> <li>• Adolescent and young adult support program</li> <li>• Having 50% or more of direct clinical care RNs with national oncology certification</li> <li>• Having 50% or more of chemotherapy patients with a formal initial psychosocial assessment before or within 4 weeks of therapy</li> </ul> | 10            |
| Chemotherapy support services | Offers the following: <ul style="list-style-type: none"> <li>• Dedicated pediatric chemotherapy pharmacy (B15a)</li> <li>• Pediatric oncology pharmacist (B15b)</li> <li>• Pharmacists assigned to participate in daily inpatient rounds with the pediatric cancer treatment team (B15c)</li> <li>• Outpatient pediatric chemotherapy facility (B15d)</li> <li>• Formal annual chemotherapy training (e.g., order writing, dispensing, administration) (B15e)</li> <li>• Formal chemotherapy safety program with standardized procedures and event tracking (including order misses/near-misses) (B15f)</li> <li>• Designated pediatric oncology faculty leader for the chemotherapy safety program (B15g)</li> </ul>  | 7             |
| Chemotherapy orders           | 1 point for orders written using word processing or spreadsheet software; 2 points for CPOE (B16)  | 2             |

\* Parenthetical references indicate related survey questions

(continued)

**Table 3. Advanced Clinical Services Offered by Specialty (continued)**

| <b>Cardiology &amp; Heart Surgery (16 points)</b> |  |               |
|---|--|---------------|
| <b>Service</b>                                    | <b>Description*</b>  | <b>Points</b> |
| ECMO  | ECMO program designated as center of excellence by the Extracorporeal Life Support Organization (ELSO) (A9)  | 1             |
| Echocardiography laboratory                       | Offers certified echocardiography laboratory (E5) in: <ul style="list-style-type: none"> <li>• Transthoracic echocardiographic testing</li> <li>• Transesophageal echocardiographic testing</li> <li>• Fetal echocardiographic testing</li> </ul>  | 3             |
| Cardiovascular services                           | Offers these diagnostic and treatment services (E6a-j, E6l): <ul style="list-style-type: none"> <li>• Inpatient cardiology consultation</li> <li>• Dedicated pediatric cardiac surgical operating room</li> <li>• Cardiac intensive care unit</li> <li>• Remote monitoring capability</li> <li>• Cardiac diagnostic catheterization laboratory</li> <li>• Cardiac interventional catheterization laboratory</li> <li>• Electrophysiology laboratory</li> <li>• Ventricular assist program</li> <li>• 24/7 ECMO</li> <li>• Cardiovascular genetics clinic</li> <li>• Pediatric cardiac anesthesia services</li> </ul> | 11            |
| Circulatory support                               | Provided ventricular assist devices (other than ECMO) for one or more patients in the past 4 years (E26)   | 1             |
| <b>Diabetes &amp; Endocrinology (20 points)</b>   |  |               |
| <b>Service</b>                                    | <b>Description*</b>  | <b>Points</b> |
| Diabetes & Endocrinology support staff            | Having the following staff, all of whom are Certified Diabetes Educators, provide diabetes education to patients: <ul style="list-style-type: none"> <li>• Nurses, pharmacists, social workers, psychologists (C5a and C5c)</li> <li>• Dietitians (C5b)</li> </ul>   | 2             |
|   | Having at least 1 of the following staff provide onsite services to pediatric endocrinology patients: <ul style="list-style-type: none"> <li>• Social workers (C6a)</li> <li>• Psychologists (C6b)</li> <li>• Genetic counselors (C7a)</li> <li>• Certified exercise physiologists or physical therapists (C7b)</li> <li>• Psychiatrists (C7c)</li> <li>• Pharmacists (C7d)</li> </ul>   | 6             |
| Remote access to records                          | 1 point for providing physicians with remote access (e.g., EHRs) to patient records or 2 points for providing remote access for both inpatients and outpatients (C8)   | 2             |

\* Parenthetical references indicate related survey questions

(continued)

**Table 3. Advanced Clinical Services Offered by Specialty (continued)**

| <b>Diabetes &amp; Endocrinology, continued (20 points)</b> |  |               |
|--|--|---------------|
| <b>Description*</b>  | <b>Description*</b>  | <b>Points</b> |
| Diabetes patient services                                  | <p>Provides the following services onsite (C9):</p> <ul style="list-style-type: none"> <li>• Written educational protocol used to evaluate and prepare patients for use of an insulin pump</li> <li>• Certified pump educators to provide insulin pump training to patients and their families</li> <li>• Written education program used to evaluate and prepare patients for use of continuous glucose monitors (CGMs)</li> <li>• Certified CGM trainers to provide CGM training to patients and their families</li> <li>• Written educational program for families of new-onset diabetes patients</li> <li>• Formal diabetes educational program for school nurses through a yearly school nurse education conference</li> <li>• A specified RN or CDE who is responsible for advising and supporting schools in setting up safe programs for managing diabetes</li> </ul> | 7             |
| Support services   | <p>Offered the following programs or services in the last calendar year:</p> <ul style="list-style-type: none"> <li>• Hosted or was actively involved in organizing diabetes-specific support group for parents and families (C12)</li> <li>• Took a leadership role in organizing or supporting family-support groups for special populations other than diabetes (e.g., Turner syndrome) (C60)</li> <li>• A Family Advisory Board that includes families of non-diabetes Endocrinology patients (C61)</li> </ul>   | 3             |
| <b>Gastroenterology &amp; GI Surgery (7 points)</b>        |  |               |
| <b>Service</b>   | <b>Description*</b>  | <b>Points</b> |
| Gastro-intestinal (GI) specialists                         | <p>Has following specialists available for consultation 7 days a week (D8):</p> <ul style="list-style-type: none"> <li>• Pediatric gastroenterology/liver-specialized pathologists</li> <li>• Pediatric gastroenterology interventional radiologists</li> </ul>  | 2             |
| GI support groups  | <p>Provides access to the following support groups (D12):</p> <ul style="list-style-type: none"> <li>• Inflammatory bowel disease</li> <li>• Celiac disease</li> <li>• Liver disease or transplant</li> <li>• Eosinophilic esophagitis</li> <li>• Chronic intestinal failure</li> </ul>  | 5             |

\* Parenthetical references indicate related survey questions

(continued)

**Table 3. Advanced Clinical Services Offered by Specialty (continued)**

| <b>Neonatology (4 points)</b>                            |   |               |
|--|---|---------------|
| <b>Service</b>   | <b>Description*</b>   | <b>Points</b> |
| NICU support staff                                       | <p>NICU-dedicated staff in these units:</p> <ul style="list-style-type: none"> <li>• NICU-specific pharmacist onsite who attends weekday work rounds daily with clinical team (F7a)</li> <li>• NICU-dedicated respiratory therapy team who attends weekday work rounds daily with clinical team (F7b)</li> <li>• NICU-designated dietician who attends weekday work rounds daily with clinical team (F7c)</li> <li>• NICU-dedicated social workers (F11)</li> </ul>   | 4             |
| <b>Nephrology (8 points)</b>                             |   |               |
| <b>Service</b>   | <b>Description*</b>   | <b>Points</b> |
| Maintenance dialysis staff                               | <p>Has at least 1.0 FTE of the following staff dedicated to maintenance dialysis (G5):</p> <ul style="list-style-type: none"> <li>• Clinical nurses</li> <li>• Social workers</li> <li>• Dieticians</li> </ul> <p>Has at least 0.5 FTE of Child life specialists</p>  | 4             |
| Dialysis treatment                                       | <p>Provides following dialysis options for acute kidney insufficiency (G7):</p> <ul style="list-style-type: none"> <li>• Hemodialysis</li> <li>• Peritoneal dialysis</li> <li>• Continuous renal replacement therapy</li> </ul>   | 3             |
| Kidney transplant  | United Network for Organ Sharing (UNOS)-recognized kidney transplant program (G28)  | 1             |
| <b>Neurology &amp; Neurosurgery (14 points)</b>          |   |               |
| <b>Service</b>   | <b>Description*</b>   | <b>Points</b> |
| Pediatric trauma center                                  | Level 1 or 2 pediatric trauma center certified by American College of Surgeons or state licensing board (A19)   | 4             |
| Neurology & neurosurgery support services and technology | <p>Offers the following:</p> <ul style="list-style-type: none"> <li>• Ketogenic diet evaluation and management program (H5c)</li> <li>• Neuroendovascular interventionalists (H5d)</li> <li>• Neuroanesthesia program (H5e)</li> <li>• Neurocritical care program (H24)</li> <li>• Inpatient pediatric rehabilitation program with pediatric physiatrist (H13)</li> <li>• Inpatient pediatric rehabilitation program certified by Commission on Accreditation of Rehabilitation Facilities (H13.1)</li> <li>• Inpatient pediatric rehabilitation program that participates in and submits data to the Universal Data System for Medical Rehabilitation (UDSMR) (H13.2)</li> <li>• Neuropsychological testing by pediatric neuropsychologists (H14)</li> </ul> | 8             |

\* Parenthetical references indicate related survey questions

(continued)

**Table 3. Advanced Clinical Services Offered by Specialty (continued)**

| <b>Neurology &amp; Neurosurgery, continued (14 points)</b> |  |               |
|--|--|---------------|
| <b>Service</b>   | <b>Description*</b>  | <b>Points</b> |
| Epilepsy treatment   | Offers the following: <ul style="list-style-type: none"> <li>• Electroencephalography (EEG) lab staffed 24/7, accredited by ABRET (H7)</li> <li>• Epilepsy monitoring unit with emergency management of seizures protocols (H30)</li> </ul>  | 2             |
| <b>Orthopedics (11 points)</b>                             |  |               |
| <b>Service</b>   | <b>Description*</b>  | <b>Points</b> |
| Pediatric trauma center                                    | Level 1 or 2 pediatric trauma center certified by American College of Surgeons or state licensing board (A19)  | 4             |
| Advanced care services                                     | Comprehensive pediatric orthopedic program with: <ul style="list-style-type: none"> <li>• Designated inpatient unit for pediatric orthopedic patients (I7)</li> <li>• Dedicated pediatric imaging center (I8)</li> <li>• Imaging center staffed by a pediatric radiologist (I9)</li> <li>• Multidisciplinary musculoskeletal oncology program (I16)</li> <li>• Advanced Motion Analyses Laboratory (gait laboratory) (I19)</li> <li>• Gait laboratory accredited by the Commission for Motion Laboratory Accreditation (CMLA) (I19.1)</li> <li>• Providing seating services or wheelchair clinics for at least 1 patient with neuromuscular disorders (I43 &amp; I44)</li> </ul> | 7             |
| <b>Pulmonology (23 points)</b>                             |  |               |
| <b>Service</b>   | <b>Description*</b>  | <b>Points</b> |
| Pediatric trauma center                                    | Level 1 or 2 pediatric trauma center certified by American College of Surgeons or state licensing board (A19)  | 4             |
| Asthma care specialists                                    | At least 1 FTE staff with clinical responsibilities (J5): <ul style="list-style-type: none"> <li>• Respiratory therapists</li> <li>• Certified asthma educators</li> <li>• Social workers</li> <li>• Dieticians</li> <li>• Physical therapists</li> <li>• Psychiatrists or psychologists</li> </ul>  | 6             |

\* Parenthetical references indicate related survey questions

(continued)

**Table 3. Advanced Clinical Services Offered by Specialty (continued)**

| <b>Pulmonology, continued (23 points)</b> |  |               |
|---|--|---------------|
| <b>Description*</b>                       | <b>Description*</b>  | <b>Points</b> |
| Dedicated staff                           | <p>Following cystic fibrosis center staff who attend clinic or participate in patient care conferences (J17):</p> <ul style="list-style-type: none"> <li>• Gastroenterologist</li> <li>• Endocrinologist</li> <li>• Psychiatrists or psychologists</li> </ul> <p>Following staff who support patients with neuromuscular weakness disorders (J32):</p> <ul style="list-style-type: none"> <li>• Pulmonologist</li> <li>• Physiatrist</li> <li>• Orthopedist</li> <li>• Cardiologist</li> <li>• Neurologist</li> <li>• Physical therapist</li> <li>• Psychiatrists or psychologists</li> <li>• Dietician</li> </ul> | 11            |
| Support services                          | <p>Offers following:</p> <ul style="list-style-type: none"> <li>• Cystic fibrosis center accredited by Cystic Fibrosis Foundation (J16)</li> <li>• Sleep center accredited by American Academy of Sleep Medicine (J35)</li> </ul>  | 2             |
| <b>Urology (4 points)</b>                 |  |               |
| <b>Service</b>                            | <b>Description*</b>  | <b>Points</b> |
| Treatment options                         | <p>Offers the following treatment modalities (K11):</p> <ul style="list-style-type: none"> <li>• Stone treatment, including shock wave lithotripsy</li> <li>• Laparoscopic orchiopexy/orchidectomy</li> <li>• Robotic-assisted laparoscopic pediatric surgery</li> <li>• Laparoscopic surgery, including cyst ablation, pyeloplasty, nephrectomy and partial nephrectomy</li> </ul>  | 4             |

\* Parenthetical references indicate related survey questions

### **Advanced Technologies (All Specialties)**

To receive credit, hospitals must either provide access to key diagnostic and treatment technologies directly, through the hospital's health system or a local community network, or indirectly, through a contractual arrangement or joint venture with another community provider. On- and off-site services received equal credit. Data are from the Pediatric Hospital Survey. The values for this measure were based on specialty-specific mixes of technology, as listed in *Table 4*. Definitions can be found in the glossary in *Appendix A*.

**Table 4. Advanced Technologies by Specialty**

| Specialty  | Technologies*  |
|--|--|
| <p><b>Cancer<br/>(15 technologies)</b></p>       | <ul style="list-style-type: none"> <li>• Positron emission tomography (PET)/ magnetic resonance imaging (MRI) or PET/computerized tomography (CT) scanning (A10a or A10b)</li> <li>• Intraoperative magnetic resonance imaging (ioMRI) (A10c)</li> <li>• 3-Tesla magnetic resonance imaging (3T MRI) (A10d)</li> <li>• Image-guided radiation therapy (A10e)</li> <li>• Intensity-modulated radiation therapy (A10f)</li> <li>• Linear accelerator or other linear particle accelerator, gamma knife, CyberKnife, or other shaped-beam stereotactic radiation therapies (A11)</li> <li>• Magnetic resonance spectroscopy (B8a)</li> <li>• Therapeutic meta-iodine-benzyl-guanidine with I-131 radionuclide (B8b)</li> <li>• Functional magnetic resonance (B8c)</li> <li>• Intraoperative ultrasound for vascular access procedures (B8d)</li> <li>• Stereotactic radiosurgery (B8e)</li> <li>• Dedicated pediatric anesthesiology for radiation therapy (B8f)</li> <li>• Intra-arterial chemotherapy or embolization for solid tumors (B8g)</li> <li>• Radiofrequency ablation and/or cryoablation (B8h)</li> <li>• Pediatric interventional radiology equipment and room (B9)</li> </ul> |
| <p><b>Cardiology &amp; Heart Surgery (6)</b></p> | <ul style="list-style-type: none"> <li>• EKG gated CT angiography (E7a)</li> <li>• Cardiac MRI (E7b)</li> <li>• Stress echo testing (E7c)</li> <li>• Quantitative Pulmonary Perfusion Scan (E7d)</li> <li>• Transcatheter arrhythmia ablation methodologies (three-dimensional mapping, cryoablation or radiofrequency ablation) (E14a-c)</li> <li>• Transesophageal echocardiographic testing (E6k)</li> </ul>  |
| <p><b>Diabetes &amp; Endocrinology (10)</b></p>  | <ul style="list-style-type: none"> <li>• PET/MRI or PET/CT scanning (A10a or A10b)</li> <li>• Diagnostic radioisotope scan (C51a)</li> <li>• Therapeutic radioiodine treatment for Graves' disease (C51b)</li> <li>• Therapeutic radioiodine treatment for thyroid cancer (C51c)</li> <li>• Fine needle aspiration of thyroid nodule (C51d)</li> <li>• Thyroidectomy(C51e)</li> <li>• Dual-energy x-ray absorptiometry (DXA) scans using pediatric software and normative data (C51f)</li> <li>• Intraoperative PTH assay (C51g)</li> <li>• Intravenous bisphosphonate therapy (C51h)</li> <li>• Endocrine testing and infusion studies (with endocrinology providers on site) (C55)</li> </ul>  |

\* Parenthetical references indicate related survey questions

(continued)

**Table 4. Advanced Technologies, by Specialty (continued)**

| Specialty                                     | Technologies*  |
|---|--|
| <b>Gastroenterology &amp; GI Surgery (12)</b> | <ul style="list-style-type: none"> <li>• PET/MRI or PET/CT scanning (A10a or A10b)</li> <li>• Magnetic resonance cholangiopancreatography (D7a)</li> <li>• Magnetic resonance enterography (D7b)</li> <li>• DXA scan (D7c)</li> <li>• Capsule endoscopy (D11a)</li> <li>• Endoscopic band ligation/sclerotherapy (D11b)</li> <li>• Esophageal impedance or resolution esophageal manometry (D11c)</li> <li>• Endoscopic retrograde cholangiopancreatography (D11d)</li> <li>• Antroduodenal and full colonic motility studies (D11e)</li> <li>• Esophageal dilation, either bougie or pneumatic (D11f)</li> <li>• Alternative hemostatis therapies (D11g)</li> <li>• Deep enteroscopy-single or double balloon (D11h)</li> </ul> |
| <b>Neonatology (6)</b>                        | <ul style="list-style-type: none"> <li>• PET/MRI or PET/CT scanning (A10a or A10b)</li> <li>• Continuous video electroencephalography (EEG) monitoring and reading with pediatric neurology support (F12a)</li> <li>• Non-sedated MRI (F12b)</li> <li>• Virology laboratory with weekday 24 hour availability (F12c)</li> <li>• Specialized chemistry laboratory (F12d)</li> <li>• Onsite genetic specialists with expertise in interpreting and counseling family about exome sequencing results (F12e)</li> </ul>  |
| <b>Nephrology (1)</b>                         | <ul style="list-style-type: none"> <li>• PET/MRI or PET/CT scanning (A10a or A10b)</li> </ul>  |
| <b>Neurology &amp; Neurosurgery (7)</b>       | <ul style="list-style-type: none"> <li>• PET/MRI or PET/CT scanning (A10a or A10b)</li> <li>• ioMRI (A10c)</li> <li>• 3T MRI (A10d)</li> <li>• Neurophysiological intraoperative monitoring (H5a)</li> <li>• EEG source localization (H5b)</li> <li>• Functional MRI (H5f)</li> <li>• Availability of 24/7 EEG monitoring in pediatric intensive care unit (PICU)/neonatal intensive care unit (NICU) (H5g)</li> </ul>   |
| <b>Orthopedics (2)</b>                        | <ul style="list-style-type: none"> <li>• PET/MRI or PET/CT scanning (A10a or A10b)</li> <li>• Digitally stored test results, images, and medical records (I10c)</li> </ul>   |
| <b>Pulmonology (1)</b>                        | <ul style="list-style-type: none"> <li>• PET/MRI or PET/CT scanning (A10a or A10b)</li> </ul>  |
| <b>Urology (3)</b>                            | <ul style="list-style-type: none"> <li>• PET/MRI or PET/CT scanning (A10a or A10b)</li> <li>• Dedicated laparoscopic skills lab for faculty and trainees (K7a)</li> <li>• Video pediatric urodynamic fluoroscopy (K7b)</li> </ul>  |

\* Parenthetical references indicate related survey questions

### **Bone Marrow Transplant Services (Cancer)**

In Cancer, hospitals could receive up to 21 points for having a stem cell transplant program. Stem cell transplants are critical in treating a variety of cancers:



- Hospitals received 1 point for having a stem cell transplant unit with specially trained pediatric nurses and physicians (B17).
- Hospitals received up to 6 points for offering various stem cell transplant services (B18): cord blood stem cell transplantation, autologous stem cell transplantation, allogeneic matched unrelated transplantation, allogeneic matched related donor, haploidentical (half-matched) transplantation and cellular therapy infusions.
- Hospitals received up to 12 points based on transplant volume (B18). For each of the six types of transplantation listed above, hospitals received points as follows: 1 point for conducting from 2 to 10 transplants in the past 3 years and 2 points for conducting 11 or more transplants in the past 3 years.
- Hospitals received up to 2 points for recognition as a transplant center by the National Marrow Donor Program (B19b) and for membership in the Pediatric Blood and Marrow Transplant Consortium (B19c).

### **Clinical Support Services (All Specialties)**

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. On- and off-site services received equal credit. Up to 11 services are included in the clinical support services, depending on specialty. Data came from the Pediatric Hospital Survey. For eligible hospitals, specialty-specific mixes of medical and surgical services are used in computing the points for this measure. *Table 5* presents the complete list of medical and surgical services considered for each specialty in 2016-17. Definitions can be found in the glossary in *Appendix A*.

### **Commitment to Clinical Research (All Specialties)**

Networks, clinical trials and other research activities advance the ability of the field to treat pediatric patients and also enhance care by making new or novel treatments available at centers that participate in such research.

**Table 5. Clinical Support Services, by Specialty**

| <b>Clinical Support Service*</b>  | <b>Cancer</b> | <b>Cardiology &amp; Heart Surgery</b> | <b>Diabetes &amp; Endocrinology</b> | <b>Gastroenterology &amp; GI Surgery</b> | <b>Neonatology</b> | <b>Nephrology</b> | <b>Neurology &amp; Neurosurgery</b> | <b>Orthopedics</b> | <b>Pulmonology</b> | <b>Urology</b> |
|---|---------------|---------------------------------------|-------------------------------------|--|--------------------|-------------------|-------------------------------------|--------------------|--------------------|----------------|
| Neonatal intensive care unit (A7a)  | ●             | ●                                     | ●                                   | ●  |                    | ●                 | ●                                   | ●                  | ●                  | ●              |
| Pediatric intensive care unit (A7b)   | ●             | ●                                     | ●                                   | ●  |                    | ●                 | ●                                   | ●                  | ●                  | ●              |
| Patient care rooms with protective environment (A7c)  | ●             |                                       |                                     |  |                    |                   |                                     |                    |                    |                |
| Genetic testing/counseling (A7d)  | ●             |                                       | ●                                   | ●  | ●                  |                   |                                     |                    |                    |                |
| Palliative care program (A7e)   | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Rehabilitation program and consultation service (A7f)   | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Vascular tumor program (A35)  | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Rapid response team available onsite 24/7 (A8a)   | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Pediatric anesthesia program available onsite 24 hours a day (A8b)                              | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Pediatric pain management program available onsite 24/7 (A8c)                                   | ●             | ●                                     | ●                                   | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| Multidisciplinary pediatric acute pain/sedation service available onsite 24/7 hours a day (A8d) | ●             | ●                                     |                                     | ●  | ●                  | ●                 | ●                                   | ●                  | ●                  | ●              |
| <b>Total Elements</b>   | <b>11</b>     | <b>9</b>                              | <b>9</b>                            | <b>10</b>                                | <b>8</b>           | <b>9</b>          | <b>9</b>                            | <b>9</b>           | <b>9</b>           | <b>9</b>       |

\* Parenthetical references indicate related survey questions

**Cancer (12 points).** Hospitals received up to 12 total points for participating in clinical research activities such as clinical trials or other translational research activities. Hospitals received up to 4 points for participating in cancer research networks (B24) such as the Children’s Oncology Group, National Cancer Institute (NCI) Phase 1/Pilot Consortium, NCI-Designated Cancer Center or another cancer-related organized clinical research network. Hospitals received 1 point each for enrolling at least one patient in a Phase I or Phase II clinical trial (translational research) during the past two years (B25). Hospitals received up to 5 points for engaging in clinical trials in these specific areas (B26): leukemia/lymphoma, solid tumors, CNS tumors, transplants, or trials for biologically targeted novel agents that are not disease-specific (e.g., tyrosine kinase inhibitors). Hospitals could

receive an additional 1 point by demonstrating the depth of their involvement in any of the clinical trials (B26.1).

***Cardiology & Heart Surgery (12 points).*** Hospitals received points for participating in externally audited, national quality-improvement research networks. Hospitals received up to 10 points for participating and contributing data to the following organizations:

- Society of Thoracic Surgeons (E29a)
- Congenital Heart Surgeons' Society (E29b)
- National Pediatric Cardiology Quality Improvement Collaborative (E29c)
- Congenital Cardiac Anesthesia Society database (E29d)
- National Cardiovascular Disease Registry—improving pediatric and adult congenital treatment (E29e)
- ELSO registry (E29f)
- Pediatric Cardiac Critical Care Consortium or Virtual Pediatric ICU System (E29g)
- Pediatric Heart Transplant Study (E29h)
- Radiation reduction with either the Reducing Radiation Risk Quality Initiative or the Congenital Cardiac Catheterization Project (E29i)
- Other externally audited national quality-improvement initiatives (E29.1)

Hospitals received up to 2 additional points based on the number of investigative studies they participate in (E30). Hospitals were awarded 1 point for participating in 1 or 2 of the following types of studies and 2 points for participating in 3 or more of the following types of studies: single institution retrospective studies, multi-institutional retrospective studies, basic science studies with extramural funding, prospective clinical trials or studies with industry funding, or prospective clinical trials or studies with competitive extramural funding.

***Diabetes & Endocrinology (3 points).*** Hospitals received up to 3 points based on the number of trials that give patients access to novel, unlabeled medications, diagnostic/monitoring devices or treatment options in the following areas (C68). Hospitals received 1 point for participating in 1-5 studies, 2 points for participating in 6 to 9 studies, and 3 points for participating in 10 or more studies in the past year.

***Gastroenterology & GI Surgery (5 points).*** Hospitals received up to 5 points for participating in externally audited, national quality-improvement research networks. Hospitals

received 1 point each for participating in prospective research activities (D15): randomized clinical trials, observational studies, clinical databases on patient care, or non-randomized clinical trials. Hospitals received 1 point for having at least one IRB-approved study being led by the Pediatric Gastroenterology & GI Surgery program (D16).

***Neonatology (4 points).*** Hospitals received up to 4 total points for participation in externally audited, national NICU treatment and quality-improvement research networks. Hospitals received 1 point for participating in clinical research activities, registered on [clinicaltrials.gov](http://clinicaltrials.gov), that allow patients access to novel medications or experimental treatment options (F25). Hospitals received up to 3 additional points for participation in the following organizations (F24):

- Vermont Oxford Network, Children’s Hospitals Neonatal Consortium or Child Health Corporation of America database
- ELSO data exchange network/registry
- Other clinical research or data exchange program.

***Nephrology (9 points).*** Hospitals received points for participation in externally audited, national quality-improvement research networks. Hospitals received 1 point for participating in specialty-specific clinical research activities that allow patients access to novel medications or experimental treatment options (G39). Hospitals received up to 8 additional points for participation in the following research collaboratives (G40):

- Midwest Pediatric Nephrology Consortium
- International Pediatric Dialysis Network
- North American Pediatric Renal Trials and Collaborative Studies
- Prospective Pediatric Acute Kidney Injury Research Group
- Pediatric Trials Network
- Chronic Kidney Disease in Children cohort study
- Nephrotic Syndrome Study Network
- CHA Peritonitis Collaborative (SCOPE).

***Neurology & Neurosurgery (4 points).*** Hospitals received 1 point for belonging to a neuro-oncology clinical research consortium (H21) and up to 3 additional points for participating in IRB approved, active clinical studies (patient-related observation studies or trials) (H6): 1 point for 1-4 studies, 2 points for 5-9 studies, and 3 points for 10 or more studies.

***Orthopedics (1 point).*** Hospitals received 1 point for participating in 1 or more IRB-approved trials, studies or databases, such as prospective randomized clinical trials, prospective observational studies or prospective clinical database on patient care (I38).

***Pulmonology (5 points).*** Hospitals received 1 point for participating in 1 or more IRB-approved trials, studies or databases, such as prospective randomized clinical trials, prospective observational studies or prospective clinical database on patient care (J51). Hospitals received up to four points for being members of the following research networks (J52): Children’s Interstitial Lung Disease Foundation; Therapeutics Development Network of the CF Foundation; certified site for the Severe Asthma Research Program, the Inner City Asthma Consortium or Asthma-Net; and American Lung Association Asthma Clinical Research Centers.

***Urology (3 points).*** Hospitals received up to 3 total points for participating in the following prospective research activities: randomized clinical trials, observational studies or clinical databases on patient care (K18).

## **Commitment to Quality Improvement (All Specialties)**

Hospitals received points in all specialties for participation in quality-improvement activities. Such activities promote internal review and improvement programs and procedures that often lead to improvements in care. The number of points varies by specialty, but in all specialties, hospitals could receive up to 16 points for participating in the following quality improvement activities:

- 1 point for publicly reporting performance data on one or more quality metrics (A16 and A16.1);
- Hospitals received up to 3 points for sponsoring quality improvement activities that provide credit to physicians for maintenance of certification (MOC) Part IV (A17):
  - 1 point for being approved by the ABMS as a multispecialty portfolio program (MSPP) sponsor,
  - 1 point for being approved by the ABP as a pediatric portfolio sponsor;
  - 1 point for sponsoring one or more projects that are approved by the ABP.
- 1 point for participating in an external review process for measuring patient/parent satisfaction (A18 and A18.1);
- 1 point for participating in the American College of Surgeons National Surgical Quality Improvement Program (A30a);
- 1 point for participating in the Children’s Hospital Solutions for Patient Safety learning network (A30b);

- 1 point for bedside care staff (e.g., nurses, physicians assistants, nurse practitioners) participating in quality and safety initiatives (A40);
- Up to 2 points for having a physician serve as a designated Chief Quality/Safety Officer (A41):
  - 2 points for at least .50 FTE
  - 1 point for at least .25 FTE but less than .50 FTE.

In all specialties, hospitals received up to 6 additional points for implementing specialty-specific quality measures (B23/B23.1, C53/C53.1, D25/D25.1, E28/E28.1, F27/F27.1, G11/G11.1, H23/H23.1, I11/I11.1, J45/J45.1, K5/K5.1). These include 1 point each for implementing a formal program review plan, determining appropriate performance-based metrics, regularly tracking patient data, regularly presenting results of clinical quality performance metrics to clinical staff, participating in one or more quality improvement initiatives specific to cancer care, and demonstrating how the improvement initiative improved the quality of care.

In Diabetes & Endocrinology, hospitals received an additional 1 point (17 points total) for supporting development of a physician-led innovation to improve health care delivery for Pediatric Endocrinology patients (C67).

In Gastroenterology & GI Surgery, hospitals received up to 3 additional points (19 points total) for participating in the following formal quality initiatives: studies of pediatric liver transplantation (D14a), Improve Care Now (D14b) or other formal multicenter quality initiatives (D14c and D14.1).

In Neonatology, hospitals received up to 3 additional points (19 points total) if the quality initiatives included having a specified quality-improvement or safety leader and including a parent or family member. Hospitals received 1 point for having a safety leader with less than 0.5 FTE devoted to quality improvement or safety and 2 points for 0.5 FTE or more (F28). Hospitals received 1 point for having a parent/family member of a former NICU patient involved in one or more initiatives as an integral member of the QI/safety team (F28.1).

### **Congenital Heart Program (Cardiology & Heart Surgery)**

In Cardiology & Heart Surgery, hospitals received up to 23 points for having a congenital heart program. Hospitals were rewarded for tracking and reporting data for their congenital heart surgery program and for the volume and type of congenital heart surgeries offered:

- Hospitals received 1 point for having at least one congenital heart surgeon who performed 75 or more congenital heart procedures in the past calendar year and 2 points for having two or more surgeons (E39).
- Hospitals could receive up to 8 points based on the mechanism for determining and reporting volume and outcomes measures. For each of the past four reporting years, hospitals received 2 points each year for reporting to the Society of Thoracic Surgeons (STS) Congenital Heart Surgery Database or 1 point for reporting to another organization (E18).
- Hospitals received 1 point for treating 1 to 4 patients with a Berlin Heart or other ventricular assist device and 2 points for treating 5 or more patients (E26).
- Hospitals received up to 8 points based on the number of cardiac surgical procedures performed in the operating room in the four reporting years: 1 point for 100-249 surgeries/year and 2 points for 250 or more surgeries/year (E38).
- Hospitals received up to 3 points based on the number of neonatal cardiac operations: 1 point for 1-44 operations, 2 points for 45-89 operations, and 3 points for 90 or more operations (E20.1).

## **ECMO Availability (Neonatology)**

Extracorporeal membrane oxygenation (ECMO) technology involves 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. In Neonatology, hospitals received up to 9 points for ECMO services. Hospitals received 1 point for having a specialized, multidisciplinary ECMO team (F14d), and 1 point if the ECMO program is designated as a Center for Excellence by ELSO (A9). Hospitals received 1 point if the NICU has the capability of providing inhaled nitric oxide therapy during transport with high-risk pre-ECMO patients whenever indicated (F13.1). Hospitals received 1 point for having a NICU with the capability of reporting response times for emergent neonatal transports (F13.2).

Hospitals received up to 5 points providing neonatal-specific transports from the time of the transport call to the time of the team with each of the following (F13):

- A medical director who is board-certified in Neonatal-Perinatal Medicine
- At least 2 clinicians (e.g., RN, RT, MD, DO, NNP, PA) on each transport who are non-drivers
- All RN's and RT's on the neonatal transport team have at least 1 year of NICU level III or IV experience

- Neonatal transport team is immediately available 24 x 7 to respond to emergent neonatal transports
- Active servo-controlled cooling on transport for term and near term infants with hypoxic ischemic encephalopathy

### **FACT Accreditation (Cancer)**

Accreditation indicates that as of March 1, 2016, a hospital met standards set by FACT for transplanting cells to treat pediatric cancer, an indication of a high degree of care in handling and using cellular tissue. Programs 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 Cancer specialty, a hospital was awarded 1 point if it was accredited by FACT as a pediatric service provider for allogeneic transplants (B19a). Currently accredited facilities are listed at <http://www.factwebsite.org>.

### **Family Involvement (All Specialties)**

This measure reflects the extent to which a hospital involves parents and families in care. It included a core set of measures that applied to all pediatric specialties and was worth up to 7 points. Hospitals received 1 point for having a parent advisory committee that meets one to three times a year or 2 points for having a committee that meets four or more times a year (A14.1). Hospitals received up to 4 additional points if the hospital met all of the following requirements (A15): At least one parent or family member is an active member of the strategic or facility committee; at least one parent or family member is an active member of one or more standing committees (e.g., quality improvement, patient safety, ethics); parents or family members are regularly involved in clinical decision-making through such ways as family-centered rounds, care conferences or other participatory programs, and parents or family members can participate in family-centered rounds. Hospitals received 1 additional point for describing the impact of having patients' family members serve on advisory committees (A15.1).

In Neonatology, hospitals could receive 1 additional point (for a total of 8 points) for having a NICU-specific parent advisory committee that meets at least quarterly (F9).

### **Fulltime Subspecialists Available (All Specialties)**

This measure evaluates the presence of a variety of physician specialists, surgeons and dedicated full-time medical staff who are critical to the delivery of appropriate care by pediatric hospitals. *Table 6* identifies the relevant specialists, surgeons and other medical staff for each pediatric specialty. Hospitals received 1 point for each appropriate specialist or surgeon and 1 point for having at least 1.0 FTE of the other medical staff relevant to the specialty.



**Table 6. Subspecialists by Specialty**

| <b>Cancer* (15 points)</b>                         |   |
|--|---|
| Physician specialists                              | <p>At least one of the following staff:</p> <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul>  |
| Pediatric surgeons                                 | <p>At least one of the following staff:</p> <ul style="list-style-type: none"> <li>• Pediatric head and neck surgeon (A5a)</li> <li>• Pediatric general surgeon (A5c)</li> <li>• Pediatric neurosurgeon (A5d)</li> <li>• Pediatric ophthalmology surgeon (A5e)</li> <li>• Pediatric orthopedic surgeon (A5f)</li> <li>• Pediatric urology surgeon (A5g)</li> </ul>  |
| Other medical staff                                | <p>At least 1.0 FTE of the following staff:</p> <ul style="list-style-type: none"> <li>• Pediatric hematologists/oncologists (B2a)</li> <li>• Other attending on-staff physicians with specific involvement in pediatric cancer program (B2b)</li> <li>• Nurse practitioner and/or physician assistant (B3a and B3b)</li> </ul>   |
| <b>Cardiology &amp; Heart Surgery* (13 points)</b> |   |
| Physician specialists                              | <p>At least one of the following staff:</p> <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul>  |
| Other medical staff                                | <p>At least 2.0 FTE of the following staff:</p> <ul style="list-style-type: none"> <li>• Pediatric cardiothoracic surgeon (E2a)</li> <li>• Pediatric cardiac intensivists (cardiologists, pediatric critical care or anesthesiologists) (E2b, E2c, or E2d)</li> <li>• Pediatric cardiac interventionalists (E2e)</li> </ul> <p>At least 1.0 FTE of the following staff:</p> <ul style="list-style-type: none"> <li>• Pediatric cardiac electrophysiologist (E2f)</li> <li>• Anesthesiologist with pediatric training/experience (E2g)</li> <li>• Clinical nurse and/or physician assistant (E4a and E4b)</li> </ul> <p>1 point for 24/7 in-house coverage to the cardiac ICU with providers trained in management of congenital heart disease (E3, E3.1 and E3.2)</p> |

\* Parenthetical references indicate related survey questions

(continued)

**Table 6. Subspecialists by Specialty (continued)**

| <b>Diabetes &amp; Endocrinology* (14 points)</b>      |   |
|---|---|
| Physician specialists                                 | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric rheumatologist (A4e)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul> |
| Pediatric surgeons                                    | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric head and neck surgeon (A5a)</li> <li>• Pediatric general surgeon (A5c)</li> <li>• Pediatric neurosurgeon (A5d)</li> </ul>   |
| Other medical staff                                   | At least 1.0 FTE of the following staff: <ul style="list-style-type: none"> <li>• Pediatric endocrinologist (C2a)</li> <li>• Nurse practitioner and/or physician assistant (C3)</li> <li>• Bachelor’s-level registered nurse dedicated to outpatient care (C4b)</li> <li>• Master’s-level or doctorate- level registered nurse dedicated to outpatient care (C4c, C4d)</li> </ul>   |
| <b>Gastroenterology &amp; GI Surgery* (10 points)</b> |   |
| Physician specialists                                 | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul>   |
| Pediatric surgeons                                    | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric general surgeon (A5c)</li> </ul>  |
| Other medical staff                                   | At least 1.0 FTE of the following staff: <ul style="list-style-type: none"> <li>• Pediatric gastroenterologist (D2a)</li> <li>• Pediatric surgeon available 7 days a week (D2.2)</li> <li>• Nurse practitioner and/or physician assistant (D3)</li> </ul>   |

\* Parenthetical references indicate related survey questions

(continued)

**Table 6. Subspecialists by Specialty (continued)**

| <b>Neonatology* (17 points)</b> |  |
|---------------------------------|--|
| Physician specialists           | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul>                |
| Pediatric surgeons              | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric head and neck surgeon (A5a)</li> <li>• Pediatric cardiothoracic surgeon (A5b)</li> <li>• Pediatric general surgeon (A5c)</li> <li>• Pediatric neurosurgeon (A5d)</li> <li>• Pediatric ophthalmology surgeon (A5e)</li> <li>• Pediatric orthopedic surgeon (A5f)</li> <li>• Pediatric urology surgeon (A5g)</li> <li>• Pediatric plastic surgeon (A5h)</li> </ul> |
| Other medical staff             | At least 1.0 FTE of the following staff: <ul style="list-style-type: none"> <li>• Pediatric neonatologist (F2a)</li> <li>• Clinical registered nurse (F4a)</li> </ul> At least 1 Physician extenders (F3)  |
| <b>Nephrology* (9 points)</b>   |  |
| Physician specialists           | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul>                |
| Pediatric surgeons              | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric general surgeon (A5c)</li> </ul>   |
| Other medical staff             | At least 1.0 FTE of the following staff: <ul style="list-style-type: none"> <li>• Pediatric nephrologist (G2a)</li> <li>• Nurse practitioner and/or physician assistant (G3)</li> </ul>  |

\* Parenthetical references indicate related survey questions

(continued)

**Table 6. Subspecialists by Specialty (continued)**

| <b>Neurology &amp; Neurosurgery* (12 points)</b> |  |
|--|--|
| Physician specialists                            | At least one of the following staff (A4a – A4g): <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist</li> <li>• Pediatric critical care specialist</li> <li>• Pediatric radiologist specializing in diagnostic radiology</li> <li>• Pediatric radiologist specializing in interventional radiology</li> <li>• Pediatric infectious disease specialist</li> <li>• Pediatric physiatrist</li> </ul>  |
| Pediatric surgeons                               | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric general surgeon (A5c)</li> <li>• Pediatric neurosurgeon (A5d)</li> </ul>   |
| Other medical staff                              | At least 1.0 FTE of the following staff: <ul style="list-style-type: none"> <li>• Pediatric neurologist (H2a)</li> <li>• Pediatric neurosurgeon (H2b)</li> <li>• Nurse practitioner and/or physician assistant (H3)</li> </ul>   |
| Certified RNs                                    | 1 point if 25% of nurses or more are clinical certified neuroscience nurses (CRNs) (H4)  |
| <b>Orthopedics* (21 points)</b>                  |  |
| Physician specialists                            | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric rheumatologist (A4e)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul>  |
| Pediatric surgeons                               | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric general surgeon (A5c)</li> <li>• Pediatric orthopedic surgeon (A5f)</li> <li>• Pediatric plastic surgeon (A5h)</li> <li>• Pediatric orthopedic surgery fellow (I6.1a)</li> <li>• Pediatric orthopedic surgery resident (I6.1b)</li> </ul> At least 1 of the following specialists: <ul style="list-style-type: none"> <li>• Hand surgery (I6a)</li> <li>• Spinal surgery (I6b)</li> <li>• Musculoskeletal oncologist (I6c)</li> <li>• Sports medicine surgery (I6d)</li> <li>• Hip preservation specialist (I6e)</li> <li>• Musculoskeletal radiologist (I6f)</li> </ul> |

\* Parenthetical references indicate related survey questions

(continued)

**Table 6. Subspecialists by Specialty (continued)**

| <b>Orthopedics* continued (21 points)</b> |   |
|---|---|
| Other medical staff                       | At least 1.0 FTE of the following staff: <ul style="list-style-type: none"> <li>• Pediatric orthopedic surgeon (I2a)</li> <li>• Nurse practitioner and/or physician assistant (I3)</li> <li>• Clinical registered nurses or medical assistants (I4)</li> </ul>  |
| <b>Pulmonology* (11 points)</b>           |   |
| Physician specialists                     | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul> |
| Pediatric surgeons                        | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric general surgeon (A5c)</li> </ul>  |
| Other medical staff                       | At least 1.0 FTE of the following staff: <ul style="list-style-type: none"> <li>• Pediatric pulmonologist (J2a)</li> <li>• Pediatric sleep medicine physician (J2b)</li> <li>• Nurse practitioner and/or physician assistant (J3)</li> <li>• Clinical registered nurse (J4)</li> </ul>  |
| <b>Urology* (12 points)</b>               |   |
| Physician specialists                     | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric anesthesiologist (A4a)</li> <li>• Pediatric critical care specialist (A4b)</li> <li>• Pediatric radiologist specializing in diagnostic radiology (A4c)</li> <li>• Pediatric radiologist specializing in interventional radiology (A4d)</li> <li>• Pediatric infectious disease specialist (A4f)</li> <li>• Pediatric physiatrist (A4g)</li> </ul> |
| Pediatric surgeons                        | At least one of the following staff: <ul style="list-style-type: none"> <li>• Pediatric general surgeon (A5c)</li> <li>• Pediatric urology surgeon (A5g)</li> <li>• Pediatric plastic surgeon (A5h)</li> </ul>  |
| Other medical staff                       | At least 1.0 FTE of the following staff: <ul style="list-style-type: none"> <li>• Pediatric urologist (K2a)</li> <li>• Nurse practitioner and/or physician assistant (K3)</li> <li>• Clinical registered nurse (K4)</li> </ul>  |

\* Parenthetical references indicate related survey questions

(continued)

## **Heart Transplant Program (Cardiology & Heart Surgery)**

In Cardiology & Heart Surgery, hospitals received up to 11 points for having a heart transplant program. Hospitals received 1 point for having an on-site heart or heart-lung transplant program recognized by the United Network for Organ Sharing (UNOS) (E21). Hospitals received up to 3 points based on the number of unique patients who received heart transplants in the past 4 years combined (E22): 1 point for 1-7 transplants, 2 points for 8-15 transplants and 3 points for 16 or more transplants. 3 additional points were awarded based on the number of patients < 1 year of age who received heart transplants (E22.1): 1 point for 1-4 patients, 2 points for 5-9 patients, and 3 points for 10 or more patients. Hospitals also received 1 point for having performed cardiac transplantation in a recipient with high ( $\geq 10\%$ ) panel reactive antibody (PRA) (E25a), 1 point for having a written protocol for the management of recipients with high ( $\geq 10\%$ ) PRA (E25b), 1 point for having performed an ABO-incompatible heart transplant (E25c), and 1 point for having a written protocol for the management of ABO incompatible recipients (E25d).

## **Help for Patients and their Families (All Specialties)**

The Patient and Family Services measure evaluates access to medical specialists and services. The Pediatric Hospital Survey supplied the data. A core set of submeasures for all specialties is worth up to 8 points, which includes providing direct access to a family resource center (A13a), sleep rooms for parents or siblings (A13b), a school intervention program (A13c), a Ronald McDonald House (or other residential facility) (A13d), certified child life specialists (A12a), family-support specialists (A12b), pediatric psychologists or psychiatrists (A12c) and in-person interpreter services (A12.1).

In Neonatology, hospitals could receive up to 8 additional points (for a total of 16 points). Hospitals received points for offering the following patient and family services (F8): NICU-specific family psychosocial support program, 24/7 parental visitation, sibling visitation, influenza vaccination program for parents/primary caregivers of NICU patients, NICU-specific parent-to-parent support groups, designated psychologists or psychiatrists available for referrals and consultations with parents, Child Life support team available to NICU families and NICU-dedicated multidisciplinary developmental care team.

In Nephrology, hospitals could receive up to 4 additional points (for a total of 12 points). Hospitals received 1 point for offering summer camp for kidney transplant patients (G33b). Hospitals received up to an additional 3 points for offering the following programs to support patients in a pediatric maintenance dialysis program (G9): teachers dedicated to working with patients, a standard review of school performance and patient's Individualized Education Program and/or summer camp.

## **Liver Transplant Program (Gastroenterology & GI Surgery)**

In Gastroenterology & GI Surgery, hospitals received up to 5 points for having a liver transplant program. Hospitals received 1 point for having a UNOS-recognized liver transplant program (D20), 1 point for having at least 1 transplant hepatologist (D20.1) and up to 3 points based on the number of unique patients who received a liver transplant in the past 5 years (D21a and D22a): 1 point for 1-9 patients, 2 points for 10-19 patients, and 3 points for 20 or more patients.

## **Lung Transplant Program (Pulmonology)**

In Pulmonology, hospitals received up to 5 points for having a lung transplant program. Hospitals received 1 point for offering a UNOS-recognized lung transplant program (J46). Hospitals received 1 point for performing one lung transplant between January 2010 and June 2012 or 2 points for performing two or more lung transplants between January 2010 and June 2012 (J48a). Hospitals received 1 point for performing one lung transplant between July 2012 and December 2014 or 2 points for performing two or more lung transplants between July 2012 and December 2014 (J47a).

## **Management of Asthma Patients (Pulmonology)**

In Pulmonology, hospitals received up to 18 points for management of asthma patients. Hospitals received up to three points for their treatment of severe asthma patients: hospitals received 1 point for having a system to identify and treat patients with severe asthma (J7), 1 point for having a written protocol for evaluation of patients with severe asthma (J8) and 1 point for monitoring medication adherence in severe asthma patients (J8.1). Hospitals received up to 15 additional points based on the percentage of asthma patients following five specific protocols. The protocols evaluated were the following: providing inpatients with documentation of a personalized asthma management plan (J10b/J10a), completing an outpatient follow-up visit within 30 days of discharge (J10g/J10f), providing outpatients in subspecialty care clinics with documentation of a personalized asthma management plan (J10d/J10c), providing eligible outpatients in subspecialty care clinics with a documented assessment of asthma control (e.g., ACT, ATAQ) (J10e/J10h), and successfully managing outpatients so that they were not admitted for care related to their asthma (J10f/J10c<sup>\*\*\*</sup>). For the first four protocols, up to 3 points were awarded for the percentage of patients following the protocol: 1 point for  $\geq 50\%$  and  $< 75\%$ , 2 points for  $\geq 75\%$  and  $< 90\%$  and 3 points for  $\geq 90\%$ . For the last protocol were awarded for a *lower* percentage of patients being admitted for care related to their asthma: 3 points for  $\leq 10\%$  of patients admitted, 2 points for  $>10\%$  and  $\leq 25\%$  and 1 point for  $>25\%$  and  $\leq 50\%$ .

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\*\*\* This survey item was reverse scored so that hospitals were rewarded for having FEWER outpatients admitted for asthma related care.

## **Management of Lung Disease of Prematurity (Pulmonology)**

In Pulmonology, hospitals received up to 6 points for management of lung disease of prematurity. Hospitals received up to 6 points based on the percentage of patients diagnosed with chronic lung disease or prematurity (J28a) who received respiratory syncytial virus (RSV) prophylaxis (J28b) and the percentage of patients who received all of their recommend doses for the most recent RSV prophylaxis season (J28c). Hospitals received up to 3 points for each item as follows: 1 point for  $\geq 50\%$  and  $< 75\%$ , 2 points for  $\geq 75\%$  and  $< 90\%$  and 3 points for  $\geq 90\%$ .

## **Management of Neuromuscular Weakness Disorder (Pulmonology)**

In Pulmonology, hospitals received up to 6 points for muscular dystrophy management. This measure is composed of two items: the percentage of muscular dystrophy patients who had pulmonary function testing in the past calendar year (J30) and the percentage of muscular dystrophy patients undergoing general anesthesia who had pulmonary function testing within 90 days prior to the procedure (J31). Hospitals received up to 3 points for each item based on the percentage of patients as follows: 1 point for  $\geq 50\%$  and  $< 75\%$ , 2 points for  $\geq 75\%$  and  $< 90\%$ , and 3 points for  $\geq 90\%$ .

## **Nurse Magnet Status (All Specialties)**

The Nurse Magnet status measure is a formal designation by the Magnet Recognition Program®. The Magnet Recognition Program was developed by the American Nurses Credentialing Center (ANCC) to recognize healthcare organizations that meet certain quality indicators on specific standards of nursing excellence. The list of Magnet-recognized facilities is updated throughout the year as organizations apply for designation and redesignation status. Hospitals received credit based on their Magnet Recognition status as of April 1, 2016. The current list of Magnet-recognized organizations is shown at <http://www.nursecredentialing.org/Magnet/FindaMagnetFacility>.

Starting with the 2016-17 rankings, the Nurse Magnet measure has been updated to better reflect program coverage for children's hospitals that are part of a special merger<sup>†††</sup> or a multiplex healthcare system. These combined entities only received full credit (1 point) if the primary or flagship hospital in the combination had Nurse Magnet recognition. If the primary hospital has Nurse Magnet recognition but the specialty or secondary hospital does not, then the combined entity received half credit (0.5 points).

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<sup>†††</sup> Special mergers are when two separate hospitals operate as one hospital and their data is combined for the Best Hospitals rankings. Examples include Massachusetts General Hospital and Massachusetts Eye & Ear Hospital. All specialty or secondary hospitals that are combined with the primary hospital are noted on the US News website for that hospital.



## **Palliative Care Program (Cancer)**

In Cancer, hospitals received up to 8 points for palliative care. Hospitals received 1 point for offering a qualified palliative care program onsite (B29). A qualified program is defined as one that is organized and staffed for children nearing the end of life or living with conditions that limit lifespan or quality of life. It is intended 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 program must include at least one physician providing direct patient care as well as a nurse coordinator and either a social worker, certified child life specialist or pastoral counselor, and all staff must have training in palliative care.

Hospitals could receive up to 4 points for offering the following pain control programs (B29.1): patient-controlled analgesia, nurse-controlled analgesia, pediatric pain service consults and pediatric outpatient pain management services.

Hospitals received 1 point for having at least 1 physician board-certified in Hospice and Palliative Medicine (B29.2).

Hospitals could receive up to 2 points based on the percentage of patients with advanced and refractory cancer who were referred to the palliative care program (B30): 1 point for  $\geq 50\%$  and  $< 75\%$ , and 2 points for  $\geq 75\%$ .

## **Specialized Clinics and Programs (Cancer, Cardiology & Heart Surgery, Diabetes & Endocrinology, Gastroenterology & GI Surgery, Neonatology, Neurology & Neurosurgery, Orthopedics, Urology)**

***Cancer (6 points).*** Hospitals received 1 point for each of the following specialized treatment programs (B10): clinical brain tumor program, clinical bone and soft tissue sarcomas program, clinical leukemia/lymphoma program, comprehensive longer-term survivors program, fertility preservation program or cancer genetics/hereditary program.

***Cardiology & Heart Surgery (12 points).*** Hospitals received 1 point for offering, to at least one patient in the past calendar year, the following procedures and tests: balloon angioplasty; balloon valvuloplasty; stent implantation; transcatheter occlusion of cardiac shunts; transcatheter placement (or attempted placement) of stented pulmonary valves (e.g. Melody); stent re-dilation; aortic and pulmonary catheter-based valvuloplasty; transcatheter arrhythmia ablations; ablations for atrial tachycardia, supraventricular tachycardia and ventricular tachycardia; and implantation of permanent transvenous pacing/cardioversion/defibrillation or event recording devices (E8, E9, E11, E12, E15).

***Diabetes & Endocrinology (26 points).*** Hospitals received up to 2 points for specialized treatment programs for endocrine patients. Hospitals received one point for having the following programs and an additional point for each program if pediatric endocrinologists regularly attended the program (C46): lipid disorders, hypertension, comprehensive weight management, Turner syndrome, cystic fibrosis-related diabetes, oncology or brain tumors, gender dysphoria, disorders of sexual development, metabolic bone disorders, thyroid nodules, 22q11.2 Deletion Syndrome, Muscular Dystrophy, or Prader Willi Syndrome.

***Gastroenterology & GI Surgery (12 points).*** Hospitals received 1 point for each of the following interdisciplinary treatment programs for gastrointestinal disorders (D10): intestinal rehabilitation, cystic fibrosis treatment, total parenteral nutrition (TPN), pediatric intensive feeding, multidisciplinary childhood obesity management, inflammatory bowel disease, multidisciplinary allergic gastrointestinal disease, chronic liver disease, neurogastrointestinal, aerodigestive, pancreatic disease, and anorectal or colorectal.

***Neonatology (17 points).*** Hospitals received 1 point for having a cardiac ICU to care for newborn infants (<28 days) that need specialized care for heart conditions (F17), and up to 16 additional points for providing specialized treatment teams or clinics to deal with particularly challenging conditions (F14a-c, F14e-l, F15). Hospitals received 1 point for each of the following: craniofacial team, spina bifida team, comprehensive retinopathy of prematurity program, neonatal-neurointensive care program, palliative care program, micrognathia team, chronic lung disease team, congenital diaphragmatic hernia team, chronic pulmonary hypertension team, neonatal dialysis team, multidisciplinary team for follow-up with congenital diaphragmatic hernia patients after discharge, metabolic team, bowel rehabilitation team, home ventilator management team, neurodevelopmental follow-up clinic for premature/high-risk NICU patients and neurodevelopmental clinic for high-risk congenital heart neonatal patients.

***Neurology & Neurosurgery (18 points).*** Hospitals received up to 18 points for access to specialized treatment clinics or programs for pediatric neurological disorders (H12a-r). To receive credit, a hospital had to have an organized program that included a medical director and nursing coordinator. One point was awarded for each of the following clinics or programs: cerebral palsy/spasticity clinic, cerebrovascular accident, craniofacial surgical, movement disorders, neurofibromatosis, neuromuscular, neuro-oncology, spina bifida, tuberous sclerosis, brachial plexus, genetic metabolic, neonatal neurology, multidisciplinary spine, head trauma/post-concussion, new-onset seizures, neuro-fetal, headache and pain.

***Orthopedics (9 points).*** Hospitals received up to 9 points for providing specialized treatment clinics or programs to treat significant conditions (I15a-i). To receive credit, the clinic had to be attended regularly by the pediatric orthopedic service. Hospitals received 1 point for each of

the following clinics or programs: spina bifida, spasticity, skeletal dysplasia, brachial plexus, neurofibromatosis, muscle disease, pain, sports medicine and sports concussion program.

***Urology (6 points).*** Hospitals received 1 point for each of the following specialized treatment clinics or programs to treat significant urological conditions (K10): spina bifida, voiding dysfunction, comprehensive stone program, prenatal intervention, disorders of sexual differentiation and exstrophy/cloaca/GU sinus program.

## **Transplants to Dialysis Patients (Nephrology)**

Hospitals received up to 12 points in Nephrology based on the percentage of end-stage renal disease (ESRD) patients receiving maintenance dialysis (G20) who received kidney transplants within the past 2 years (G21). In the Nephrology specialty, four groups of patients were evaluated separately: children under 5 receiving hemodialysis, children aged 5-19 receiving hemodialysis, children under 5 receiving peritoneal dialysis and children aged 5-19 receiving peritoneal dialysis. For each type of patient, hospitals received up to 3 points for having a higher percentage of patients receiving transplants as follows: 1 point if  $\geq 25\%$  and  $< 50\%$ , 2 points if  $\geq 50\%$  and  $< 75\%$ , and 3 points if  $\geq 75\%$ .

## **Volume of Patients (All Specialties)**

Unless noted otherwise, volume measures indicate the number of unique patients in the past calendar year who had the specified diagnoses or conditions or who received the specified procedures or treatments. If data were unavailable for the most recent calendar year, hospitals were instructed to use data from the most recent 12 months that data were available.

For most measures, low-, medium- and high-volume categories were created based on the distribution of volume across all hospitals. For other measures, categories were based on conceptual thresholds for the number of patients or procedures needed to indicate a sufficient level of experience. We assigned points based on categories rather than on continuous values to ensure that one or two hospitals with extremely high volumes did not skew scoring. Hospitals that had zero volume or that did not respond received 0 points. Hospitals in the lowest-volume category received 1 point, medium-volume hospitals received 2 points and high-volume hospitals received 3 points. For items with extremely low volume, such as GI and urological surgical procedures, the measure was divided only into low and medium volumes, with a maximum of 2 points. **Table 7** identifies the volume measures used by specialty and the points assigned to volume scores within a certain range.

**Table 7. Volume Measures by Specialty**

| <b>Cancer<br/>Volume Measures*</b>                                    | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|---|-------------------------------------|---|---------------------------------------|
| <b>Number of new patients, 2 years (B6),</b><br>(max points = 3)      | 1-99                                | 100-399                                 | 400+                                  |
| <b>Number of patients</b> (max points = 9)                            |                                     |   |                                       |
| • Leukemia (B27a1)  | 1-149                               | 150-299                                 | 300+                                  |
| • Brain tumors (B27b1)  | 1-149                               | 150-299                                 | 300+                                  |
| • Solid tumors (B27c1)  | 1-199                               | 200-399                                 | 400+                                  |
| <b>Number of surgeries** (B27),</b> (max points = 6)                  |                                     |   |                                       |
| • Brain tumors (B27b2)  | 1-29                                | 30-59                                   | 60+                                   |
| • Solid tumors (B27c2)  | 1-99                                | 100-199                                 | 200+                                  |
| <b>Cardiology &amp; Heart Surgery<br/>Volume Measures, continued*</b> | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
| <b>Number of catheter procedures**</b> (max points = 33)              |                                     |   |                                       |
| • Balloon angioplasty (E8a)   | 1-29                                | 30-59                                   | 60+                                   |
| • Balloon valvuloplasty (E8b)   | 1-19                                | 20-39                                   | 40+                                   |
| • Stent implantation (E8c)  | 1-34                                | 35-69                                   | 70+                                   |
| • Transcatheter occlusion of cardiac shunt (E8d)                      | 1-59                                | 60-119                                  | 120+                                  |
| • Transcatheter placement of stented<br>pulmonary valve (E8e)         | 1-14                                | 15-29                                   | 30+                                   |
| • Stent re-dilation (E8f)   | 1-14                                | 15-29                                   | 30+                                   |
| • Aortic/pulmonary catheter-based<br>valvuloplasty (E10)              | 1-6                                 | 7-13                                    | 14+                                   |
| • Atrial tachycardia (E12a)   | 1-19                                | 20-39                                   | 40+                                   |
| • Supraventricular tachycardia (E12b)                                 | 1-39                                | 40-79                                   | 80+                                   |
| • Ventricular tachycardia (E12c)                                      | 1-4                                 | 5-8                                     | 9+                                    |
| • Placement of permanent transvenous pacing<br>(E15)                  | 1-19                                | 20-39                                   | 40+                                   |
| <b>Number of Norwood or hybrid surgeries</b> (max points = 12)        |                                     |   |                                       |
| • Patients receiving hybrid or Norwood Stage 1,<br>year 1 (E40a)      | 1-6                                 | 7-13                                    | 14+                                   |
| • Patients receiving hybrid or Norwood Stage 1,<br>year 2 (E40b)      | 1-6                                 | 7-13                                    | 14+                                   |
| • Patients receiving hybrid or Norwood Stage 1,<br>year 3 (E40c)      | 1-6                                 | 7-13                                    | 14+                                   |
| • Patients receiving hybrid or Norwood Stage 1,<br>year 4 (E40d)      | 1-6                                 | 7-13                                    | 14+                                   |

\* Parenthetical references indicate related survey questions.

\*\* Volume represents procedures, not patients.

(continued)

**Table 7. Volume Measures by Specialty (continued)**

| <b>Cardiology &amp; Heart Surgery<br/>Volume Measures, continued*</b>   | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|---|-------------------------------------|---|---------------------------------------|
| <b>Number of surgeries</b> (max points = 12)  |                                     |   |                                       |
| • STAT*** Level 2: Years 1-4 (E42)  | 1-299                               | 300-599                                 | 600+                                  |
| • STAT Level 3: Years 1-4 (E42)   | 1-149                               | 150-299                                 | 300+                                  |
| • STAT Level 4: Years 1-4 (E42)   | 1-149                               | 150-299                                 | 300+                                  |
| • STAT Level 5: Years 1-4 (E42)   | 1-59                                | 60-119                                  | 120+                                  |
| <b>Diabetes &amp; Endocrinology<br/>Volume Measures*</b>  | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
| <b>Number of patients</b> (max points = 48)   |                                     |   |                                       |
| • Type 1 diabetes outpatient visits (C28.1a)  | 1-299                               | 300-799                                 | 800+                                  |
| • Type 2 diabetes outpatient visits (C28.1b)  | 1-74                                | 75-149                                  | 150+                                  |
| • Diabetes-related care admissions for Type 1 patients (C28.1c)   | 1-49                                | 50-99                                   | 100+                                  |
| • Diabetes-related care admissions for Type 2 patients (C28.1d)   | 1-9                                 | 10-19                                   | 20+                                   |
| • Congenital adrenal hyperplasia (C47a)   | 1-39                                | 40-79                                   | 80+                                   |
| • CNS and endocrine tumors (C47b)   | 1-99                                | 100-199                                 | 200+                                  |
| • Diabetes insipidus (C47c)   | 1-24                                | 25-49                                   | 50+                                   |
| • Hypopituitarism (C47d)  | 1-99                                | 100-199                                 | 200+                                  |
| • Turner Syndrome (C47e)  | 1-24                                | 25-49                                   | 50+                                   |
| • Noonan Syndrome(C47f)   | 1-24                                | 25-49                                   | 50+                                   |
| • Gender dysphoria (C47g)   | 1-24                                | 25-49                                   | 50+                                   |
| • Disorders of sexual development (C47h)  | 1-24                                | 25-49                                   | 50+                                   |
| • Metabolic bone disease (C47i)   | 1-24                                | 25-49                                   | 50+                                   |
| • Newly diagnosed growth hormone deficiency or multiple pituitary hormone deficiencies that include growth hormone deficiency (C48) | 1-24                                | 25-49                                   | 50+                                   |
| • Nondiabetes endocrine disorders outpatients (C57a1)   | 1-1,999                             | 2,000-3,999                             | 4,000+                                |
| • Nondiabetes endocrine disorders inpatients (C57b1)  | 1-124                               | 125-249                                 | 250+                                  |

\* Parenthetical references indicate related survey questions.

(continued)

\*\* Volume represents procedures, not patients.

\*\*\* Society of Thoracic Surgery & European Association for Cardio-Thoracic Surgery Congenital Heart Surgery Mortality Categories (STAT)

**Table 7. Specialty-Specific Volume Measures (continued)**

| <b>Diabetes &amp; Endocrinology<br/>Volume Measures, continued*</b>   | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|---|-------------------------------------|---|---------------------------------------|
| <b>Number of procedures**</b> (max points = 42)                       |                                     |   |                                       |
| • Diagnostic radioisotope (C51a)                                      | 1-19                                | 20-39                                   | 40+                                   |
| • Therapeutic radioiodine for Graves' disease (C51b)                  | 1-5                                 | 6-10                                    | 11+                                   |
| • Therapeutic radioiodine for thyroid cancer (C51c)                   | 1-3                                 | 4-7                                     | 8+                                    |
| • Fine needle aspiration of thyroid nodule (C51d)                     | 1-4                                 | 5-9                                     | 10+                                   |
| • Thyroidectomy (C51e)  | 1-4                                 | 5-9                                     | 10+                                   |
| • Dual-energy x-ray absorptiometry (DXA) scans (C51f)                 | 1-39                                | 40-79                                   | 80+                                   |
| • Intravenous bisphosphonate therapy (C51h)                           | 1-39                                | 40-79                                   | 80+                                   |
| • Thyroid cancer surgery (C51.1a)                                     | 1-4                                 | 5-9                                     | 10+                                   |
| • Parathyroid surgery (C51.1b)  | 1                                   | 2                                       | 3+                                    |
| • Brain tumor surgery involving hypothalamus or pituitary (C51.1c)    | 1-9                                 | 10-19                                   | 20+                                   |
| • Abdominal endocrine surgery (C51.1d)                                | 1                                   | 2-3                                     | 4+                                    |
| • Brain or pituitary MRI (2 years) (C49a)                             | 1-29                                | 30-59                                   | 60+                                   |
| • Growth hormone therapy (C49b)                                       | 1-29                                | 30-59                                   | 60+                                   |
| • Serum IGF-1 measurement (C49c)                                      | 1-29                                | 30-59                                   | 60+                                   |
| <b>Gastroenterology &amp; GI Surgery<br/>Volume Measures*</b>         | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
| <b>Number of nonsurgical procedures**</b> (max points = 24)           |                                     |   |                                       |
| • Capsule endoscopy (D11a)  | 1-19                                | 20-39                                   | 40+                                   |
| • Endoscopic band ligation/sclerotherapy (D11b)                       | 1-9                                 | 10-19                                   | 20+                                   |
| • Esophageal impedance or high resolution esophageal manometry (D11c) | 1-49                                | 50-99                                   | 100+                                  |
| • Endoscopic retrograde cholangiopancreatography (D11d)               | 1-29                                | 30-59                                   | 60+                                   |
| • Antroduodenal and full colonic motility studies (D11e)              | 1-14                                | 15-29                                   | 30+                                   |
| • Esophageal dilation (D11f)  | 1-49                                | 50-99                                   | 100+                                  |
| • Alternative hemostasis therapies (D11g)                             | 1-7                                 | 8-15                                    | 16+                                   |
| • Deep enteroscopy-single or double balloon (D11h)                    | 1-3                                 | 4-7                                     | 8+                                    |

\* Parenthetical references indicate related survey questions.

(continued)

\*\* Volume represents procedures, not patients.

**Table 7. Specialty-Specific Volume Measures (continued)**

| <b>Gastroenterology &amp; GI Surgery<br/>Volume Measures, continued*</b>             | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|--|-------------------------------------|---|---------------------------------------|
| <b>Number of patients</b> (max points = 63)  |                                     |   |                                       |
| • Intestinal rehabilitation program (D10a)   | 1-44                                | 45-89                                   | 90+                                   |
| • Cystic fibrosis treatment program (D10b)   | 1-99                                | 100-199                                 | 200+                                  |
| • Total parenteral nutrition support program (D10c)                                  | 1-299                               | 300-599                                 | 600+                                  |
| • Pediatric intensive feeding program (D10d)   | 1-299                               | 300-599                                 | 600+                                  |
| • Childhood obesity program (D10e)   | 1-299                               | 300-599                                 | 600+                                  |
| • Inflammatory bowel program (D10f)  | 1-299                               | 300-599                                 | 600+                                  |
| • Multidisciplinary allergic gastrointestinal disease program (D10g)                 | 1-149                               | 150-299                                 | 300+                                  |
| • Chronic liver disease program (D10h)   | 1-199                               | 200-399                                 | 400+                                  |
| • Neurogastrointestinal program (D10i)   | 1-99                                | 100-199                                 | 200+                                  |
| • Aerodigestive program (D10j)   | 1-99                                | 100-199                                 | 200+                                  |
| • Pancreatic disease program (D10k)  | 1-99                                | 100-199                                 | 200+                                  |
| • Anorectal or Colorectal program (D10l)   | 1-99                                | 100-199                                 | 200+                                  |
| • Pseudo-obstruction (D13a)  | 1-12                                | 13-24                                   | 25+                                   |
| • Chronic intestinal failure (D13b)  | 1-29                                | 30-59                                   | 60+                                   |
| • Chronic liver disease (D13c)   | 1-69                                | 70-139                                  | 140+                                  |
| • Recurring acute or chronic pancreatitis (D13d)                                     | 1-34                                | 35-69                                   | 70+                                   |
| • Biliary atresia (D13e)   | 1-19                                | 20-39                                   | 40+                                   |
| • Portal hypertension (D13f)   | 1-19                                | 20-39                                   | 40+                                   |
| • Celiac disease (D13g)  | 1-149                               | 150-299                                 | 300+                                  |
| • Inflammatory bowel disease (D13h)  | 1-249                               | 250-499                                 | 500+                                  |
| • Eosinophilic esophagitis (D13i)  | 1-74                                | 75-149                                  | 150+                                  |
| <b>Number of surgeries</b> (max points = 16)   |                                     |   |                                       |
| • Hepatopertoenterostomy or Kasai procedure on a patient with biliary atresia (D17a) | 1-3                                 | 4+                                      | n/a                                   |
| • Bowel lengthening (D17b)   | 1                                   | 2+                                      | n/a                                   |
| • Laparoscopic gastrointestinal surgeries (D17c)                                     | 1-19                                | 20+                                     | n/a                                   |
| • Bariatric surgery (D17d)   | 1-3                                 | 4+                                      | n/a                                   |
| • Posterior sagittal anorectoplasties (D17e)   | 1-4                                 | 5+                                      | n/a                                   |
| • Laparoscopic procedures for ulcerative colitis (pouch) and Crohn's disease (D17g)  | 1-19                                | 20+                                     | n/a                                   |
| • Laparoscopic pyloromyotomies for pyloric stenosis (D17h)                           | 1-4                                 | 5+                                      | n/a                                   |
| • Esophageal atresia repair (D17i)   | 1-4                                 | 5+                                      | n/a                                   |

\* Parenthetical references indicate related survey questions.

(continued)

\*\* Volume represents procedures, not patients.

**Table 7. Specialty-Specific Volume Measures (continued)**

| <b>Neonatology<br/>Volume Measures*</b>   | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|---|-------------------------------------|---|---------------------------------------|
| <b>Number of patients</b> (max points = 30)                                       |                                     |   |                                       |
| • Congenital diaphragmatic hernia (F16a)  | 1-5                                 | 6-11                                    | 12+                                   |
| • Hirschsprung’s disease (F16b)   | 1-4                                 | 5-9                                     | 10+                                   |
| • Hypothermia treatment (F16c)  | 1-8                                 | 9-17                                    | 18+                                   |
| • Spina bifida treatment (F16d)   | 1-7                                 | 8-15                                    | 16+                                   |
| • Gastroschisis (F16e)  | 1-8                                 | 9-17                                    | 18+                                   |
| • Tracheoesophageal fistula (F16f)  | 1-4                                 | 5-9                                     | 10+                                   |
| • Omphalocele (F16g)  | 1-3                                 | 4-7                                     | 8+                                    |
| • Small bowel atresia (F16h)  | 1-8                                 | 9-17                                    | 18+                                   |
| • Imperforate anus (F16i)   | 1-4                                 | 5-9                                     | 10+                                   |
| • Extracorporeal life support therapy (F16j)                                      | 1-4                                 | 5-9                                     | 10+                                   |
| <b>Nephrology<br/>Volume Measures*</b>  | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
| <b>Number of dialysis patients, 2 years</b> (max points = 18)                     |                                     |   |                                       |
| • End-stage renal disease (ESRD) patients < 5 years of age on hemodialysis (G20a) | 1-2                                 | 3-4                                     | 5+                                    |
| • ESRD patients 5-19 years of age on hemodialysis (G20b)                          | 1-10                                | 11-26                                   | 27+                                   |
| • ESRD patients < 5 years of age on peritoneal dialysis (G20c)                    | 1-3                                 | 4-8                                     | 9+                                    |
| • ESRD patients 5-19 years of age on peritoneal dialysis (G20d)                   | 1-6                                 | 7-20                                    | 21+                                   |
| • Dialysis treatment volume in days (previous year) (G8a)                         | 1-249                               | 250-499                                 | 500+                                  |
| • Dialysis treatment volume in days (current year) (G8b)                          | 1-249                               | 250-499                                 | 500+                                  |
| <b>Number of kidney biopsies, 2 years</b> (max points = 6)                        |                                     |   |                                       |
| • Native kidney percutaneous biopsies (G14a)                                      | 1-25                                | 26-75                                   | 76+                                   |
| • Protocol and Nonprotocol kidney transplant biopsies (G27)                       | 1-19                                | 20-39                                   | 40+                                   |

n/a = not applicable.

(continued)

\* Parenthetical references indicate related survey questions.

\*\* Volume represents procedures, not patients.



**Table 7. Specialty-Specific Volume Measures (continued)**

| <b>Nephrology<br/>Volume Measures, continued*</b>                 | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|---|-------------------------------------|---|---------------------------------------|
| <b>Number of kidney transplants, 5 years</b> (max points = 6)     |                                     |   |                                       |
| • Deceased-donor kidney transplant patients (G32.1a1 and G32.2a1) | 1-8                                 | 9-17                                    | 18+                                   |
| • Living-donor kidney transplant patients (G32.1a2 and G32.2a2)   | 1-7                                 | 8-16                                    | 17+                                   |
| <b>Number of patients, 2 years</b> (max points = 36)              |                                     |   |                                       |
| • Acute kidney injury (G6)  | 1-99                                | 100-249                                 | 250+                                  |
| • Primary nephrotic syndrome (G18a)                               | 1-10                                | 11-24                                   | 25+                                   |
| • Henoch-Schönlein purpura (G18b)                                 | 1-8                                 | 9-16                                    | 17+                                   |
| • Hemolytic uremic syndrome (G18c)                                | 1-5                                 | 6-11                                    | 12+                                   |
| • Chronic kidney disease (nontransplant) Stages II-IV (G18d)      | 1-29                                | 30-59                                   | 60+                                   |
| • Primary or essential hypertension (G18e)                        | 1-50                                | 51-99                                   | 100+                                  |
| • Polycystic kidney disease (G18f)                                | 1-19                                | 20-45                                   | 46+                                   |
| • Membranoproliferative glomerulonephritis (G16a)                 | 1-5                                 | 6-9                                     | 10+                                   |
| • IgA nephropathy (G16b)  | 1-10                                | 11-20                                   | 21+                                   |
| • Systemic lupus erythematosus with renal involvement (G16c)      | 1-8                                 | 9-16                                    | 17+                                   |
| • Membranous nephropathy (G16d)                                   | 1-3                                 | 4-6                                     | 7+                                    |
| • Focal segmental glomerulosclerosis (G16e)                       | 1-5                                 | 6-10                                    | 11+                                   |
| <b>Neurology &amp; Neurosurgery<br/>Volume Measures*</b>          | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
| <b>Number of clinic patients</b> (max points = 60)                |                                     |   |                                       |
| • Cerebral palsy/spasticity clinic (H12a)                         | 1-249                               | 250-499                                 | 500+                                  |
| • Cerebrovascular accident (stroke) program (H12b)                | 1-49                                | 50-99                                   | 100+                                  |
| • Craniofacial surgical program (H12c)                            | 1-249                               | 250-499                                 | 500+                                  |
| • Movement disorders program (H12d)                               | 1-199                               | 200-399                                 | 400+                                  |
| • Neurofibromatosis clinic (H12e)                                 | 1-69                                | 70-139                                  | 140+                                  |
| • Neuromuscular clinic (H12f)                                     | 1-199                               | 200-399                                 | 400+                                  |
| • Neuro-oncology program (H12g)                                   | 1-99                                | 100-199                                 | 200+                                  |
| • Spina bifida program (H12h)                                     | 1-149                               | 150-299                                 | 300+                                  |
| • Tuberous sclerosis clinic (H12i)                                | 1-39                                | 40-79                                   | 80+                                   |
| • Brachial plexus / Peripheral nerve clinic (H12j)                | 1-49                                | 50-99                                   | 100+                                  |

\* Parenthetical references indicate related survey questions.

(continued)

\*\* Volume represents procedures, not patients.

**Table 7. Specialty-Specific Volume Measures (continued)**

| <b>Neurology &amp; Neurosurgery<br/>Volume Measures, continued*</b>  | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|--|-------------------------------------|---|---------------------------------------|
| • Genetic metabolic clinic (H12k)                                    | 1-79                                | 80-159                                  | 160+                                  |
| • Neonatal neurology clinic (H12l)                                   | 1-149                               | 150-299                                 | 300+                                  |
| • Spine program (H12m)   | 1-199                               | 200-399                                 | 400+                                  |
| • Head trauma/post-concussion (H12n)                                 | 1-199                               | 200-399                                 | 400+                                  |
| • New-onset seizures (H12o)  | 1-299                               | 300-599                                 | 600+                                  |
| • Neuro-fetal program (H12p)   | 1-29                                | 30-59                                   | 60+                                   |
| • Headache clinic (H12q)   | 1-299                               | 300-599                                 | 600+                                  |
| • Pain clinic (H12r)   | 1-299                               | 300-599                                 | 600+                                  |
| • Demyelinating disorders clinic (H12s)                              | 1-49                                | 50-99                                   | 100+                                  |
| • Autism spectrum disorders clinic (H12t)                            | 1-299                               | 300-599                                 | 600+                                  |
| <b>Number of epilepsy workups and treatments**</b> (max points = 15) |                                     |   |                                       |
| • Initial medical evaluations for epilepsy (H9a)                     | 1-599                               | 600-1,199                               | 1,200+                                |
| • Standard EEG evaluations (H9b)                                     | 1-999                               | 1,000-1,999                             | 2,000+                                |
| • Long-term video EEG evaluations (H9c)                              | 1-599                               | 600-1,199                               | 1,200+                                |
| • Number of first-time surgical procedures for epilepsy (H9d)        | 1-24                                | 25-49                                   | 50+                                   |
| • VNS placements or surgical revisions (H9e)                         | 1-24                                | 25-49                                   | 50+                                   |
| <b>Number of surgeries</b> (max points = 45)                         |                                     |   |                                       |
| • Surgical resection for epilepsy (H8)                               | 1-74                                | 75-149                                  | 150+                                  |
| • Brain tumors (benign/malignant) (H16a)                             | 1-34                                | 35-69                                   | 70+                                   |
| • Craniostomy (H16b)   | 1-29                                | 30-59                                   | 60+                                   |
| • Hydrocephalus shunt procedures (H16c)                              | 1-49                                | 50-99                                   | 100+                                  |
| • In utero repair of myelomeningocele (H16d)                         | 1-8                                 | 9-17                                    | 18+                                   |
| • Medically intractable epilepsy (H16e)                              | 1-19                                | 20-39                                   | 40+                                   |
| • Spinal dysraphism (H16f)   | 1-19                                | 20-39                                   | 40+                                   |
| • Chiari I malformation/syringomyelia (H16g)                         | 1-19                                | 20-39                                   | 40+                                   |
| • Endoscopic third ventriculostomy (H16h)                            | 1-24                                | 25-49                                   | 50+                                   |
| • Brachial plexus exploration/reconstruction (H16i)                  | 1-7                                 | 8-15                                    | 16+                                   |
| • Spasticity (H16j)  | 1-19                                | 20-39                                   | 40+                                   |
| • Vascular cases including endovascular procedures (H16k)            | 1-24                                | 25-49                                   | 50+                                   |
| • Brain stimulation (H16l)   | 1-24                                | 25-49                                   | 50+                                   |
| • Spinal instrumentation (H16m)                                      | 1-19                                | 20-39                                   | 40+                                   |
| • Craniofacial procedures (H33)                                      | 1-29                                | 30-59                                   | 60+                                   |

\* Parenthetical references indicate related survey questions.

\*\* Volume represents procedures, not patients.

(continued)

**Table 7. Specialty-Specific Volume Measures (continued)**

| <b>Orthopedics<br/>Volume Measures*</b>  | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|--|-------------------------------------|---|---------------------------------------|
| <b>Number of patients</b> (max points = 57)  |                                     |   |                                       |
| • Spina bifida clinic (I15a)   | 1-149                               | 150-299                                 | 300+                                  |
| • Spasticity or cerebral palsy clinic (I15b)   | 1-299                               | 300-599                                 | 600+                                  |
| • Skeletal dysplasia clinic (I15c)   | 1-99                                | 100-199                                 | 200+                                  |
| • Brachial plexus clinic (I15d)  | 1-59                                | 60-119                                  | 120+                                  |
| • Neurofibromatosis clinic (I15e)  | 1-59                                | 60-119                                  | 120+                                  |
| • Muscle disease clinic (I15f)   | 1-149                               | 150-299                                 | 300+                                  |
| • Pain clinic (I15g)   | 1-149                               | 150-299                                 | 300+                                  |
| • Sports medicine clinic (I15h)  | 1-1,499                             | 1,500-2,999                             | 3,000+                                |
| • Sports concussion program (I15i)   | 1-349                               | 350-699                                 | 700+                                  |
| • Arthrogryposis clinic (I15j)   | 1-39                                | 40-79                                   | 80+                                   |
| • Limb deficiency / limb reconstruction /<br>prosthetics clinic (I15k)   | 1-199                               | 200-399                                 | 400+                                  |
| • Skeletal health / metabolic bone health clinic<br>(I15l)   | 1-199                               | 200-399                                 | 400+                                  |
| • Pediatric trauma patients with fractures or<br>musculoskeletal injuries (I14)  | 1-999                               | 1,000-<br>1,999                         | 2,000+                                |
| • Scoliosis correction patients (I31a-d)   | 1-74                                | 75-149                                  | 150+                                  |
| • Hip reconstruction surgery (I45a)  | 1-34                                | 35-69                                   | 70+                                   |
| • Posterior spinal fusion surgery (I45b)   | 1-14                                | 15-29                                   | 30+                                   |
| • Preoperative nutritional and pulmonary<br>assessments (I45c)   | 1-39                                | 40-79                                   | 80+                                   |
| • Single event multi-level surgery (I45d)  | 1-19                                | 20-39                                   | 40+                                   |
| • Pediatric trauma patients who received<br>pediatric orthopedic trauma surgery within 72<br>hours of admission (I14.1c) | 1-249                               | 250-499                                 | 500+                                  |

\* Parenthetical references indicate related survey questions.

\*\* Volume represents procedures, not patients.

(continued)

**Table 7. Specialty-Specific Volume Measures (continued)**

| <b>Orthopedics<br/>Volume Measures, continued*</b>                          | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|---|-------------------------------------|---|---------------------------------------|
| <b>Number of procedures and surgeries**</b> (max points = 23)               |                                     |   |                                       |
| • Motion laboratory evaluations (I20)                                       | 1-24                                | 25-49                                   | 50+                                   |
| • Open reduction developmental dysplasia of the hip (I24a)                  | 1-59                                | 60-119                                  | 120+                                  |
| • Ponsetti treatment for clubfoot in patients < 1 years old (I24b)          | 1-69                                | 70-139                                  | 140+                                  |
| • Bernese pelvic osteotomy in patients < 18 years old (I24c)                | 1-6                                 | 7-13                                    | 14+                                   |
| • Cast treatment for infantile scoliosis < 5 years old (I24d)               | 1-6                                 | 7-13                                    | 14+                                   |
| • ACL reconstruction (males < 14 years old or females < 12 years old)(I24e) | 1-9                                 | 10-19                                   | 20+                                   |
| • Femoral and tibial leg lengthening surgery (I24f)                         | 1-3                                 | 4-7                                     | 8+                                    |
| • Pollicization hand surgeries (I24g)                                       | 1                                   | 2+                                      | n/a                                   |
| <b>Pulmonology<br/>Volume Measures*</b>                                     | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
| <b>Number of nonsurgical procedures**</b> (max points = 12)                 |                                     |   |                                       |
| • 12- or 32- channel polysomnographic studies (J36)                         | 1-699                               | 700-1,399                               | 1,400+                                |
| • Non-invasive positive pressure ventilation support (J37)                  | 1-74                                | 75-149                                  | 150+                                  |
| • Home nocturnal PAP or bilevel therapy (J38)                               | 1-74                                | 75-149                                  | 150+                                  |
| • Bronchoscopy (J49)  | 1-249                               | 250-499                                 | 500+                                  |
| <b>Number of patients</b> (max points = 21)                                 |                                     |   |                                       |
| • Asthma inpatients (J10a)  | 1-399                               | 400-799                                 | 800+                                  |
| • Asthma outpatients in subspecialty care clinics (J10c)                    | 1-1,499                             | 1,500-2,999                             | 3,000+                                |
| • CF patients (J24a)  | 1-124                               | 125-249                                 | 250+                                  |
| • Neuromuscular weakness disorders (J29)                                    | 1-39                                | 40-79                                   | 80+                                   |
| • Ventilator dependent patients, 3 years (J40)                              | 1-59                                | 60-119                                  | 120+                                  |
| • Rare lung disease (J26)   | 1-29                                | 30-59                                   | 60+                                   |
| • Lung disease of prematurity (J27)   | 1-59                                | 60-119                                  | 120+                                  |

\* Parenthetical references indicate related survey questions.

(continued)

\*\* Volume represents procedures, not patients.

| <b>Urology<br/>Volume Measures*</b>   | <b>Low<br/>Volume<br/>(1 point)</b> | <b>Medium<br/>Volume<br/>(2 points)</b> | <b>High<br/>Volume<br/>(3 points)</b> |
|---|-------------------------------------|---|---------------------------------------|
| <b>Number of minimally invasive procedure volume</b> (max points = 12)  |                                     |   |                                       |
| • Stone treatment/shock wave lithotripsy (K11a)   | 1-7                                 | 8-15                                    | 16+                                   |
| • Laparoscopic orchiopexy/orchidectomy (K11b)   | 1-24                                | 25-49                                   | 50+                                   |
| • Robotic laparoscopic pediatric surgery (K11c)   | 1-9                                 | 10-19                                   | 20+                                   |
| • Laparoscopic cyst ablation, pyeloplasty, nephrectomy and partial nephrectomy (K11d)   | 1-11                                | 12-23                                   | 24+                                   |
| <b>Number of patients</b> (max points = 24)   |                                     |   |                                       |
| • Pediatric urology outpatients (2 years), (K8b)  | 1-7,999                             | 8,000-15,999                            | 16,000+                               |
| • Pediatric urology surgical cases** (2 years) (K9)   | 1-999                               | 1,000-1999                              | 2,000+                                |
| • Spina bifida program (K10a)   | 1-124                               | 125-249                                 | 250+                                  |
| • Voiding dysfunction program (K10b)  | 1-599                               | 600-1,199                               | 1,200+                                |
| • Comprehensive stone program (K10c)  | 1-99                                | 100-199                                 | 200+                                  |
| • Prenatal program (K10d)   | 1-99                                | 100-199                                 | 200+                                  |
| • Disorders of sexual differentiation program (K10e)  | 1-49                                | 50-99                                   | 100+                                  |
| • Exstrophy/cloaca/GU sinus program (K10f)  | 1-49                                | 50-99                                   | 100+                                  |
| <b>Number of surgeries</b> (max points = 28)  |                                     |   |                                       |
| • Open pyeloplasty** (K12a)   | 1+                                  | n/a                                     | n/a                                   |
| • Radical or partial nephrectomy for malignancies** (K12b)  | 1-4                                 | 5+                                      | n/a                                   |
| • Open heminephrectomy, ureteral reimplantation or ureteroureterostomy for patients with duplication anomalies of the kidney** (K12c)         | 1-19                                | 20+                                     | n/a                                   |
| • Laparoscopic heminephrectomy, ureteral reimplantation or ureteroureterostomy for patients with duplication anomalies of the kidney** (K12d) | 1-4                                 | 5+                                      | n/a                                   |
| • Exstrophy closures (K13a)   | 1-2                                 | 3+                                      | n/a                                   |
| • Reconstructive procedures for incontinence or hostile bladder - open (K13b)   | 1-39                                | 40+                                     | n/a                                   |
| • Endoscopic procedure for incontinence or hostile bladder (K13c)   | 1-9                                 | 10+                                     | n/a                                   |
| • Posterior urethral valve ablation (K13d)  | 1-8                                 | 9+                                      | n/a                                   |
| • Proximal urethroplasty for hypospadias (K13e)   | 1-44                                | 45+                                     | n/a                                   |
| • Female reconstructive procedures (K13f)   | 1-5                                 | 6+                                      | n/a                                   |
| • Distal hypospadias** (K14a)   | 1-74                                | 75-149                                  | 150+                                  |
| • Proximal hypospadias** (K14b)   | 1-74                                | 75-149                                  | 150+                                  |
| • Pyeloplasty** (K14c)  | 1-74                                | 75-149                                  | 150+                                  |

n/a = not applicable.

\* Parenthetical references indicate related survey questions.

\*\* Volume represents procedures, not patients.

## B. Normalization

Starting with the 2012-13 rankings, all structural measures have been normalized prior to weighting. Normalization transforms index values into a distribution between 0 and 1 based on the range of possible values for a given measure. The formula for normalization is provided in Equation (1):

$$\text{Equation (1)} \quad \text{Normalized Value} = X_i / (\text{Maximum}_i - \text{Minimum}_i)$$

where

$X_i$  = the value for measure  $i$  and

$\text{Maximum}_i$  = the highest *possible* value for measure  $i$ .

$\text{Minimum}_i$  = the lowest *possible* value for measure  $i$ .

For example, the Urology patient volume measure is worth a maximum of 24 points. If a given hospital received 18 out of 24 points, the normalized value for Urology patient volume would be  $18/(24-0) = 0.75$ . For adequacy of nurse staffing, which does not have an absolute maximum, we capped the maximum value at 4.0 to reduce skewness in the data.

## C. Weighting

For the 2012-13 rankings, we convened a special panel to provide feedback on the weighting of each measure within the three major rankings components. This evaluation was conducted both across specialties to build in a degree of consistency in weighting, and within specialties to identify keys to quality in a particular specialty. Overall, the weights were determined using input from the project team and working groups based on how important each measure was in defining the Donabedian components of quality of care within hospitals. The weights have been revised slightly for 2016-17, based on changes to the measures used in each specialty.

**Table 8** shows the relative weight, by specialty, for each measure that makes up the structural component of the specialty rankings. The combined structural components comprise 33.3% of the overall score in each specialty. To determine the total structural points for a hospital, multiply the normalized value of each measure by the measure weight. In the example provided under normalization (Section IV.B), a hospital that received 18 out of 24 points for Urology patient volume would have a normalized score of 0.75. The relative weight for patient volume in Urology is 1. Therefore the hospital would have a total of 0.75 for patient volume. Do this for all measures in a specialty, and then sum the values to determine the total points received. To determine the percent of the overall score for a given measure, divide the individual measure relative weight by the total

weight for that specialty and multiply by 33.3 (since the combined structural components comprise 33.3% of the overall score in each specialty).

**Table 8. Relative Weights of Individual Structural Measures by Specialty**

| Measure  | Cancer | Cardiology & Heart Surgery | Diabetes & Endocrinology | Gastroenterology & GI Surgery | Neonatology | Nephrology | Neurology & Neurosurgery | Orthopedics | Pulmonology | Urology |
|--|--------|----------------------------|--------------------------|-------------------------------|-------------|------------|--------------------------|-------------|-------------|---------|
| Active fellowship program                      | 1.25   | 1.25                       | 1.25                     | 1.25                          | 1.25        | 1.25       | 1.25                     | 1.25        | 1.5         | 1.25    |
| Adequacy of nurse staffing                     | 2      | 2                          | 2                        | 2                             | 2           | 2          | 2                        | 2           | 2           | 2       |
| Adoption of health information technology      | 1      | 1                          | 1                        | 1                             | 1           | 1          | 1                        | 1           | 1           | 1       |
| Adult congenital heart program                 |        | 1.25                       |                          |                               |             |            |                          |             |             |         |
| Advanced clinical services                     | 1      | 1                          | 1                        | 1                             | 1           | 1          | 1                        | 1           | 1           | 1       |
| Advanced technologies                          | 1      | 1                          | 1                        | 1                             | 1           | 1          | 1                        | 1           | 1           | 1       |
| Bone marrow transplant services                | 1      |                            |                          |                               |             |            |                          |             |             |         |
| Clinical support services                      | 1      | 1                          | 1                        | 1                             | 1           | 1          | 1                        | 1           | 1           | 1       |
| Commitment to clinical research                | 1.5    | 1.25                       | 1.25                     | 1.25                          | 1.25        | 1          | 1.25                     | 1.25        | 1.5         | 1.5     |
| Commitment to quality improvement              | 1.5    | 1.5                        | 1.5                      | 1.5                           | 1.5         | 1.5        | 1.5                      | 1.5         | 1.5         | 1.5     |
| Congenital heart program                       |        | 1.25                       |                          |                               |             |            |                          |             |             |         |
| ECMO availability                              |        |                            |                          |                               | 1           |            |                          |             |             |         |
| FACT accreditation                             | 1.5    |                            |                          |                               |             |            |                          |             |             |         |
| Family involvement                             | 1.5    | 1.25                       | 1.25                     | 1.25                          | 1.25        | 1.25       | 1.25                     | 1.25        | 1.25        | 1.25    |
| Fulltime subspecialists available              | 1      | 1                          | 1                        | 1                             | 1           | 1          | 1                        | 1           | 1           | 1       |
| Help for patients and their families           | 1      | 1                          | 1                        | 1                             | 1           | 1          | 1                        | 1           | 1           | 1       |
| Management of asthma patients                  |        |                            |                          |                               |             |            |                          |             | 1.25        |         |
| Management of lung disease of prematurity      |        |                            |                          |                               |             |            |                          |             | 1.25        |         |
| Management of neuro-muscular weakness disorder |        |                            |                          |                               |             |            |                          |             | 1.25        |         |
| Nurse Magnet status                            | 2      | 1.5                        | 1.5                      | 1.5                           | 1.5         | 1.5        | 1.5                      | 1.5         | 1.5         | 1.5     |
| Palliative care program                        | 1.5    |                            |                          |                               |             |            |                          |             |             |         |

(continued)

**Table 8. Relative Weights of Individual Structural Measures by Specialty  
(continued)**

| <b>Measure</b>                                   | <b>Cancer</b> | <b>Cardiology &amp;<br/>Heart Surgery</b> | <b>Diabetes &amp;<br/>Endocrinology</b> | <b>Gastroenterology<br/>&amp; GI Surgery</b> | <b>Neonatology</b> | <b>Nephrology</b> | <b>Neurology &amp;<br/>Neurosurgery</b> | <b>Orthopedics</b> | <b>Pulmonology</b> | <b>Urology</b> |
|--|---------------|---|---|--|--------------------|-------------------|---|--------------------|--------------------|----------------|
| Specialized clinics and programs                 | 1.25          | 1   | 1                                       | 1  | 1                  |                   | 1                                       | 1                  |                    | 1              |
| Transplant program                               |               | 1.25                                      |   | 1  |                    |                   |   |                    | 1.25               |                |
| Transplants to dialysis patients                 |               |   |   |  |                    | 1.25              |   |                    |                    |                |
| Volume: Number of catheter procedures            |               | 1   |   |  |                    |                   |   |                    |                    |                |
| Volume: Number of dialysis patients              |               |   |   |  |                    | 0.67              |   |                    |                    |                |
| Volume: Number of kidney biopsies                |               |   |   |  |                    | 0.67              |   |                    |                    |                |
| Volume: Number of epilepsy workups and treatment |               |   |   |  |                    |                   | 1                                       |                    |                    |                |
| Volume: Number of kidney transplants             |               |   |   |  |                    | 0.67              |   |                    |                    |                |
| Volume: Number of minimally invasive procedures  |               |   |   |  |                    |                   |   |                    |                    | 1              |
| Volume: Number of new patients                   | 1             |   |   |  |                    |                   |   |                    |                    |                |
| Volume: Number of nonsurgical procedures         |               |   |   | 1  |                    |                   |   |                    | 1                  |                |
| Volume: Number of Norwood or hybrid surgeries    |               | 1   |   |  |                    |                   |   |                    |                    |                |
| Volume: Number of patients                       | 1             |   | 1                                       | 1  | 1.5                | 0.67              | 1                                       | 1.5                | 1                  | 1              |
| Volume: Number of procedures                     |               |   | 1                                       |  |                    |                   |   |                    |                    |                |
| Volume: Number of procedures and surgeries       |               |   |   |  |                    |                   |   | 1.5                |                    |                |
| Volume: Number of surgeries                      | 1             | 1.5                                       |   | 1  |                    |                   | 1                                       |                    |                    | 1              |
| <b>Total</b>                                     | <b>24</b>     | <b>23.00</b>                              | <b>17.75</b>                            | <b>19.75</b>                                 | <b>18.25</b>       | <b>18.43</b>      | <b>18.75</b>                            | <b>18.75</b>       | <b>22.25</b>       | <b>19.00</b>   |

## V. Process

The process component in Best Children’s Hospitals is represented by three measures—commitment to best practices, ability to prevent infections, and reputation with pediatric specialists. The combined process measures are worth 33.3% of the overall score.



## A. Commitment to Best Practices

This measure evaluates hospitals' commitment to following and implementing best practices. Best practices were identified for all specialties. *Table 9* identifies the best practices identified for each specialty and the number of points awarded.

**Table 9. Commitment to Best Practices by Specialty**

| <b>Cancer* (36 points)</b>  | <b>Points</b>  |
|---|--|
| Participating in regular morbidity and mortality conferences (B12)  | 1  |
| Having multidisciplinary tumor boards that meet at least monthly to discuss the following patient populations in active treatment (B13):  |  |
| <ul style="list-style-type: none"> <li>• Hematologic malignancy</li> <li>• Solid tumor</li> <li>• Brain tumor</li> <li>• Stem cell transplant</li> </ul>  | 4  |
| Promoting ease of access through the following mechanisms (B14):  |  |
| <ul style="list-style-type: none"> <li>• Offering on-site direct oncology-specific patient care from hematology/oncology providers during evenings and weekends</li> <li>• A coordinated outreach program that provides community-based follow-up care</li> <li>• Multidisciplinary clinics allowing patients to see multiple care providers in a single visit</li> </ul>   | 3  |
| Percentage of patients presenting with febrile neutropenia who receive intravenous antibiotics within one hour of initial triage (B31.1)  | 1: $\geq 75\%$ & $< 85\%$<br>2: $\geq 85\%$ & $< 95\%$<br>3: $\geq 95\%$ |
| Having at least 1.0 FTE nurse practitioners, physician assistants or clinical nurses devoted to case management for each of the following patient populations (B4):   |  |
| <ul style="list-style-type: none"> <li>• Hematologic malignancies</li> <li>• Solid tumors</li> <li>• Brain tumors</li> <li>• Stem cell transplants</li> </ul>   | 4  |
| Engaging in activities designed to ensure high reliability (A39):   |  |
| <ul style="list-style-type: none"> <li>• All clinical staff are trained in code response using simulations or other team trainings</li> <li>• Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>• Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>• Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>• All team trainings end with the development of an action plan to address problems identified during the training or simulation</li> </ul> | 5  |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Cancer* continued (36 points)</b>  | <b>Points</b>                |
|---|------------------------------|
| Offering the following to reduce radiation exposure to patients and staff (A10.1):  |                              |
| <ul style="list-style-type: none"> <li>• Participation in Image Gently</li> <li>• Iterative reconstruction software in computed tomography (CT)</li> <li>• MRI safety program compliant with the American College of Radiology guidelines</li> </ul>  | 3                            |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)   | 1                            |
| Maintaining the following certifications (A10.3):   |                              |
| <ul style="list-style-type: none"> <li>• Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>• Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>• Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists</li> </ul>  | 3                            |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)   | 1                            |
| Offering an institutional code team to immediately address emergencies in outpatient cancer treatment clinics (B5)  | 1                            |
| Offering a parent advisory committee that meets at least twice a year (B11.3)   | 1                            |
| Percentage of patients 3-5 years post-completion of therapy seen in a formally structured late effects or off-therapy clinic from over the past 3 years (B28)   | 1: ≥ 50% & < 75%<br>2: ≥ 75% |
| Percentage of patients with brain tumors and leukemia, 3-5 years post-therapy, who had formal neuropsychological evaluations in the past year (B28.1)   | 1: ≥ 25% & < 75%<br>2: ≥ 75% |
| Percentage of school-age patients with brain tumors and leukemia were formally assessed for school intervention services in the past year (B28.2)   | 1: ≥ 25% & < 75%<br>2: ≥ 75% |
| <b>Cardiology &amp; Heart Surgery* (45 points)</b>  | <b>Points</b>                |
| Offering the following conferences/programs (E27):  |                              |
| <ul style="list-style-type: none"> <li>• Multidisciplinary morbidity and mortality conferences</li> <li>• Multidisciplinary maternal/fetal medicine conferences</li> <li>• Active home surveillance program for infants after Stage 1 palliation for hypoplastic left heart syndrome</li> <li>• A follow-up program for children with complex congenital heart disease or at risk for adverse neurodevelopmental outcomes</li> <li>• Patient planning conference</li> <li>• Support groups for patients and families with congenital heart conditions</li> <li>• Multidisciplinary management program for complex congenital heart disease patients who experience long term change to physical or cognitive functioning</li> </ul> | 7                            |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Cardiology &amp; Heart Surgery* continued (45 points)</b>   | <b>Points</b>                  |
|--|--------------------------------|
| Engaging in the following surgical safety procedures for cardiac surgical procedures (E35):  |                                |
| <ul style="list-style-type: none"> <li>• Conventional pre-procedural "time-out"</li> <li>• Pre-procedural briefings</li> <li>• Post-procedural debriefings</li> <li>• Implementation of a hand-off protocol or briefing</li> </ul>   | 4                              |
| Engaging in the following surgical safety procedures for cardiac catheterization procedures (E35.1):   |                                |
| <ul style="list-style-type: none"> <li>• Conventional pre-procedural "time-out"</li> <li>• Pre-procedural briefings</li> <li>• Implementation of a hand-off protocol or briefing</li> </ul>  | 3                              |
| Using clinical practice guidelines to manage perioperative and postoperative care for the following patient populations (E36):   |                                |
| <ul style="list-style-type: none"> <li>• Single ventricle/shunt management</li> <li>• Two-ventricle repairs</li> <li>• Infant feeding</li> <li>• Anticoagulation with Coumadin</li> <li>• Sedation and pain management</li> </ul>  | 5                              |
| Routinely tracking and reporting every occurrence of the following surgical admission outcomes parameters to the STS database (E37):   |                                |
| <ul style="list-style-type: none"> <li>• Unplanned reoperation during the same hospital admission</li> <li>• Re-exploration for bleeding</li> <li>• Deep sternal wound infection/mediastinitis requiring debridement</li> <li>• Atrioventricular block requiring placement of a permanent pacemaker</li> </ul> | 4                              |
| Routinely tracking and submitting to IMPACT every unplanned cardiothoracic surgical or vascular surgical procedure due to a catheterization complication (E37.1)   | 1                              |
| Participating in the STS Public Reporting On-Line Program (E18.3)  | 2                              |
| Number of pediatric cardiothoracic surgeons with subspecialty certification in congenital heart surgery (E2.1)   | 1: 1 surgeon<br>2: 2+ surgeons |
| Percent of hybrid and Norwood Stage 1 surgery patients alive 1 year after surgery who had a neurodevelopment evaluation prior to 24 months of age (E40.2):   |                                |
| <ul style="list-style-type: none"> <li>• At least 75% of patients in evaluation (Year 1)</li> <li>• At least 75% of patients in evaluation (Year 2)</li> <li>• At least 75% of patients in evaluation (Year 3)</li> <li>• At least 75% of patients in evaluation (Year 4)</li> </ul>                           | 4                              |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Cardiology &amp; Heart Surgery* continued (45 points)</b>  | <b>Points</b> |
|---|---------------|
| Engaging in activities designed to ensure high reliability (A39):   |               |
| <ul style="list-style-type: none"> <li>All clinical staff are trained in code response using simulations or other team trainings</li> <li>Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>All team trainings end with the development of an action plan addressing problems identified during training or simulation</li> </ul> | 5             |
| Offering the following to reduce radiation exposure to patients and staff (A10.1):  |               |
| <ul style="list-style-type: none"> <li>Participation in Image Gently</li> <li>Iterative reconstruction software in computed tomography (CT)</li> <li>MRI safety program compliant with the American College of Radiology guidelines</li> </ul>  | 3             |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)   | 1             |
| Maintaining the following certifications (A10.3):   |               |
| <ul style="list-style-type: none"> <li>Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul>   | 3             |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)   | 1             |
| <b>Diabetes &amp; Endocrinology* (108 points)</b>   | <b>Points</b> |
| Having pediatric diabetes staff take a leadership role in a formal advocacy effort supporting the rights of patients (C11)  | 1             |
| Hosting or actively involved in organizing a diabetes-specific technology education program (C13)   | 1             |
| Administering a formal, written assessment of diabetes management knowledge after initial education and yearly thereafter (C15)   | 1             |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Diabetes &amp; Endocrinology* continued (108 points)</b>  | <b>Points</b>   |
|--|---|
| Percent of diabetes patients on insulin therapy admitted as inpatients to other services, but seen by providers in the pediatric diabetes program (C16 and C16.1)  | 1: ≥ 50% & < 75%<br>2: ≥ 75% & < 90%<br>3: ≥ 90%                      |
| Having a formal written transition program to prepare pediatric patients for the transition to an adult diabetes program (C17)   | 1   |
| Percentage of diabetes patients receiving a written (or electronic) report of their diagnosis/findings and a treatment plan at the conclusion of their most recent visit:  |   |
| <ul style="list-style-type: none"> <li>• Outpatients (C18a)</li> <li>• Inpatients (C18b)</li> </ul>  | For each measure:<br>1: ≥ 50% & < 75%<br>2: ≥ 75% & < 90%<br>3: ≥ 90% |
| Always including the following elements in summaries given to patients in outpatient clinic visits (C19):  |   |
| <ul style="list-style-type: none"> <li>• Complete insulin dosages</li> <li>• Blood glucose testing and record-keeping recommendations</li> <li>• A1c values from today</li> <li>• Next visit date and time</li> <li>• Information on when and how to contact the Diabetes Center</li> <li>• Referrals made for laboratory, ophthalmological, dental and mental health before next visit</li> <li>• Behavioral goals</li> </ul>   | 7   |
| Having a clinical database of attributes of current, active diabetes patients that is used for quality assessment and improvement (C20)  | 1   |
| Having a written plan to review inpatient incidents of insulin-related medication errors and adverse drug events requiring IV glucose treatment (C21)  | 1   |
| Having written consensus protocols for management of the following patient populations (C22):  |   |
| <ul style="list-style-type: none"> <li>• Inpatient management of diabetic ketoacidosis</li> <li>• Glucagon mini-dose for families</li> <li>• Periodic screening for complications of diabetes in the outpatient clinic</li> <li>• Evaluation of hyperglycemia in critically ill inpatients</li> <li>• Outpatient management of Type 2 diabetes patients</li> <li>• Outpatient management of pre-diabetes patients who typically have obesity and insulin resistance</li> </ul> | 6   |
| Performing care review for all patients admitted with a primary diagnosis of diabetes at an interdisciplinary team prior to discharge (C23)  | 1   |
| Conducting bedside rounds of all diabetes inpatients every weekday involving an exchange of information between the interdisciplinary diabetes team members, the bedside nurse and the patient/family (C24)  | 1   |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Diabetes &amp; Endocrinology* continued (108 points)</b>  | <b>Points</b>  |
|--|--|
| Having regularly scheduled interdisciplinary care conferences to discuss diabetes patients with poor control (C25 and C26)   | 1: 1-11 times/year<br>2: 12+ times/year  |
| Having written protocols for identifying "high risk" patients and enrolling them in special pathways (C27)   | 1  |
| Interacting with clinical laboratory or pathology service to review lab findings, problems and updates (C28)   | 1  |
| Percentage of primary diabetes care patients with following face-to-face visits (C30):   |  |
| <ul style="list-style-type: none"> <li>Medical nutrition therapy</li> <li>Diabetes education with CDE or equivalent</li> </ul>   | For each measure:<br>1: $\geq 50\%$ & $< 75\%$<br>2: $\geq 75\%$                             |
| <ul style="list-style-type: none"> <li>Social worker or psychologist assessment</li> </ul>   | 1: $\geq 25\%$ & $< 50\%$<br>2: $\geq 50\%$  |
| Percentage of Type 1 primary care diabetes patients:   |  |
| <ul style="list-style-type: none"> <li>with a TSH documented in their medical chart in past 2 years (C31a)</li> <li>over 10 years of age who had a lipid profile within the past 5 years (C31b)</li> </ul>   | For each measure<br>1: $\geq 50\%$ & $< 75\%$<br>2: $\geq 75\%$ & $< 90\%$<br>3: $\geq 90\%$ |
| Percentage of Type 1 and Type 2 primary care diabetes patients over 10 years of age (with diabetes for at least 5 years):  |  |
| <ul style="list-style-type: none"> <li>who received a microalbuminuria screening in the past year (C31c)</li> <li>who received a dilated retinal or non-mydratiac camera examination with documentation of the findings of the exam in the medical record in the past year (C31d)</li> </ul> | For each measure<br>1: $\geq 50\%$ & $< 75\%$<br>2: $\geq 75\%$ & $< 90\%$<br>3: $\geq 90\%$ |
| Percentage of Type 1 primary care diabetes patients treated in the past 12 months or longer:   |  |
| <ul style="list-style-type: none"> <li>scheduled for 4 or more outpatient clinic visits in past 12 months (C32a)</li> <li>attended 4 or more outpatient clinic visits (C32b)</li> </ul>  | For each measure<br>1: $\geq 50\%$ & $< 75\%$<br>2: $\geq 75\%$ & $< 90\%$<br>3: $\geq 90\%$ |
| Percentage of Type 1 primary care diabetes patients on an insulin pump in the past calendar year (C33)   | 1: $\geq 25\%$ & $< 50\%$<br>2: $\geq 50\%$  |
| Percentage of Type 1 and Type 2 primary diabetes care patients aged 13-17 screened for depression in the past calendar year (C34)  | 1: $\geq 25\%$ & $< 50\%$<br>2: $\geq 50\%$  |
| Percentage of Type 1 diabetes outpatients with daily glucose blood glucose measurements available for review for the past 2 weeks (C36)  | 1: $\geq 50\%$ & $< 75\%$<br>2: $\geq 75\%$ & $< 90\%$<br>3: $\geq 90\%$                     |
| Having a written curriculum for diabetes self-management education that addresses self-care behaviors (C37)  | 1  |
| Tracking the number of school days missed for diabetes-related reasons (C38)   | 1  |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Diabetes &amp; Endocrinology* continued (108 points)</b>   | <b>Points</b>   |
|---|---|
| Having 5% or fewer children attending school who are on <b>private</b> insurance miss more than 5 days of school in the past calendar year for diabetes-related reasons (C39) | 1   |
| Having 10% or fewer children attending school who are on <b>Medicaid</b> miss more than 5 days of school in the past calendar year for diabetes-related reasons (C39)         | 1   |
| Providing a dedicated team of Type 2 diabetes providers (C40)   | 1   |
| Distributing patient education materials that address the details of their conditions to patients with the following conditions (C44):  |   |
| <ul style="list-style-type: none"> <li>• Adrenal insufficiency</li> <li>• Congenital hypothyroidism</li> <li>• Diabetes insipidus</li> </ul>                                  | 3   |
| Distributing patient education materials to patients that address the potential side effects of taking the following medications (C45):                                       |   |
| <ul style="list-style-type: none"> <li>• Anti-thyroid medication</li> <li>• Growth hormone</li> <li>• Cortisol</li> <li>• Oral contraceptive pills</li> </ul>                 | 4   |
| Discussing thyroid cancer patient cases in active treatment at a tumor board at least once a quarter (C56)  | 1   |
| Diabetes staff taking a leadership role in organizing and running a diabetes camp (C10)   | 1   |
| Using a clinical database used by the program to evaluate performance (C54 and C54.1)   | 1   |
| Percentage of patients admitted to the hospital in the past year with an endocrine disorder that were seen by a physician in the pediatric endocrinology program (C58)        | 1: <50%<br>2: ≥50%  |
| Diabetes education program recognized by American Diabetes Association or American Association of Diabetes Educators (C14)  | 1   |
| Implementing a policy where all bone films are ordered by Pediatric Endocrinology and interpreted by the ordering pediatric endocrinologist or a radiologist (C50)            | 1: Outside radiologist without formal evaluation<br>2: In-house pediatric radiologist or the ordering pediatric endocrinologist |
| Making use of a patient portal to enable families to access electronic medical records and communicate with their physicians and medical staff (C62)                          | 1   |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| Diabetes & Endocrinology* continued(108 points)   | Points   |
|---|--|
| Having a system in place to alert providers that the following types of patients have not returned for care (C63):  |  |
| <ul style="list-style-type: none"> <li>• Type 1 diabetes</li> <li>• Congenital hypothyroidism</li> <li>• Congenital adrenal hyperplasia</li> <li>• Growth hormone therapy</li> <li>• Precocious puberty on therapy</li> <li>• Hyperthyroidism on anti-thyroid medication</li> </ul>   | <p>1: 1-3 types<br/>2: 4-6 types</p>               |
| Participating in multidisciplinary evaluation and management of the following types of patients (C65):  |  |
| <ul style="list-style-type: none"> <li>• Endocrine complications in hematology/oncology patients</li> <li>• Endocrine complications in post-transplant patients</li> <li>• Metabolic bone disease and osteogenesis imperfecta</li> <li>• Inborn errors of metabolism or evaluation of hypoglycemia</li> </ul>   | <p>1: 1-2 types<br/>2: 3-4 types</p>               |
| Hosting or conducting the following conferences or educational programs in the last year (C66):   |  |
| <ul style="list-style-type: none"> <li>• Joint case conferences with Internal Medicine</li> <li>• Joint case conferences with genetics program</li> <li>• Pediatric endocrinology case conference</li> <li>• Pediatric endocrinology journal club</li> <li>• CME-granting education activity conferences</li> </ul>   | <p>1: 1-34 conferences<br/>2: ≥ 35 conferences</p> |
| Engaging in activities designed to ensure high reliability (A39):   |  |
| <ul style="list-style-type: none"> <li>• All clinical staff are trained in code response using simulations or other team trainings</li> <li>• Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>• Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>• Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>• All team trainings end with the development of an action plan to address problems identified during the training or simulation</li> </ul> | <p>5</p>   |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)   | <p>1</p>   |

\* Parenthetical references indicate related survey questions.

(continued)



**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Diabetes &amp; Endocrinology* continued (108 points)</b>   | <b>Points</b>                   |
|---|---------------------------------|
| Offering the following to reduce radiation exposure to patients and staff (A10.1):  |                                 |
| <ul style="list-style-type: none"> <li>• Participation in Image Gently</li> <li>• Iterative reconstruction software in computed tomography (CT)</li> <li>• MRI safety program compliant with the American College of Radiology guidelines</li> </ul>  | 3                               |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)   | 1                               |
| Maintaining the following certifications (A10.3):   |                                 |
| <ul style="list-style-type: none"> <li>• Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>• Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>• Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul> | 3                               |
| Having regularly scheduled multidisciplinary case conferences with pediatric radiologists to review each of the following test results (A10.4):   |                                 |
| <ul style="list-style-type: none"> <li>• Brain and pituitary MRIs</li> <li>• Abdominal and pelvic ultrasounds</li> <li>• Abnormal thyroid ultrasounds</li> </ul>  | 3                               |
| <b>Gastroenterology &amp; GI Surgery* (24 points)</b>   | <b>Points</b>                   |
| Having regular, multidisciplinary morbidity and mortality conferences for pediatric GI patients (D26)   | 1                               |
| Having a standard mechanism to determine if complications have occurred in patients who underwent outpatient GI procedures (D27)  | 1                               |
| Having 1 or more IRB-approved protocols that provide GI patients access to drugs or devices through compassionate use (D28)   | 1                               |
| Providing educational programs for the following disease-specific GI conditions (D9):   |                                 |
| <ul style="list-style-type: none"> <li>• Inflammatory bowel disease, Crohn’s disease or colitis</li> <li>• Celiac disease</li> <li>• Liver disease</li> <li>• Eosinophilic esophagitis</li> <li>• Chronic intestinal failure</li> </ul>   | 5                               |
| Average “third next available” appointment time for new patients for an outpatient office visit (D6)  | 1: >7 & ≤14 days<br>2: ≤ 7 days |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)   | 1                               |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Gastroenterology &amp; GI Surgery* continued (24 points)</b>   | <b>Points</b> |
|---|---------------|
| Offering the following to reduce radiation exposure to patients and staff (A10.1):  |               |
| <ul style="list-style-type: none"> <li>• Participation in Image Gently</li> <li>• Iterative reconstruction software in computed tomography (CT)</li> <li>• MRI safety program compliant with the American College of Radiology guidelines</li> </ul>  | 3             |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)   | 1             |
| Maintaining the following certifications (A10.3):   |               |
| <ul style="list-style-type: none"> <li>• Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>• Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>• Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul>   | 3             |
| Having regularly scheduled multidisciplinary case conferences with pediatric radiologists to review abdominal and pelvic ultrasounds (A10.4b)   | 1             |
| Engaging in activities designed to ensure high reliability (A39):   |               |
| <ul style="list-style-type: none"> <li>• All clinical staff are trained in code response using simulations or other team trainings</li> <li>• Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>• Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>• Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>• All team trainings end with the development of an action plan to address problems identified during the training or simulation</li> </ul> | 5             |

\* Parenthetical references indicate related survey questions.

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**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Neonatology* (81 points)</b>   | <b>Points</b>                           |
|---|---|
| Patient load per nurse practitioner or physician assistant (F3)   | 1: ≥ 9<br>2: < 9                        |
| Patient load per neonatologist (F5)   | 1: ≥ 18<br>2: < 18                      |
| Patient load per nutritionist (F7.1)  | 1: ≥ 20<br>2: < 20                      |
| Patient load per staff person:  |   |
| <ul style="list-style-type: none"> <li>Licensed independent contractor (attending, fellow, resident or physician extender) on the night shift (F5.1)</li> <li>Social workers (F11.1)</li> </ul>   | For each measure:<br>1: ≥ 15<br>2: < 15 |
| Percent of eligible direct clinical care RNs who are nationally certified in neonatal intensive care (F4b)  | 1: ≥ 50% & <75%<br>2: ≥ 75%             |
| Engaging in the following interaction with hospital's NICU (F18):   |   |
| <ul style="list-style-type: none"> <li>All preterm cardiac patients &lt;28 days of age receive a neonatology consult</li> <li>All newborn cardiac patients &lt;28 days of age (preterm and full term) receiving a neonatology consult</li> </ul>  | 2                                       |
| Providing a percutaneous intravenous central catheter (PICC) team with specialized training to place and maintain PICC lines in NICU patients (F20)   | 1                                       |
| Availability of PICC line placement services (F20.1)  | 1: Day shift<br>2: 24/7 coverage        |
| Mandating that core NICU staff participate in the following training protocols at least once every 2 years (F22):   |   |
| <ul style="list-style-type: none"> <li>Neonatal unplanned code response</li> <li>Arrhythmia treatment including use of defibrillator</li> <li>Simulation of emergency evacuation of the NICU</li> <li>Simulation for maintenance of Neonatal Resuscitation Program and/or Pediatric Advanced Life Status active status</li> <li>ECMO emergency simulation training</li> <li>Exchange transfusion simulation or just in time training</li> <li>Other training</li> </ul> | 7                                       |
| Having at least 75% of neonatal fellows complete training in the following procedure protocols (F23.1):   |   |
| <ul style="list-style-type: none"> <li>Chest tube placement</li> <li>Intubation</li> <li>Neonatal resuscitation program</li> </ul>  | 3                                       |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| Neonatology* continued (81 points)  | Points   |
|---|--|
| Having at least 75% of neonatal physician extenders complete training in the following procedure protocols (F23.1):   |  |
| <ul style="list-style-type: none"> <li>• Chest tube placement</li> <li>• Intubation</li> <li>• Neonatal resuscitation program</li> </ul>  | 3  |
| Having at least 75% of attending physicians participate in a competency simulation for an infrequently performed procedure in the last 24 months (F23.2)  | 1  |
| Tracking the proportion of infants discharged on breast milk (F10)  | 1  |
| Offering a dedicated area within the facility for milk and formula preparation (F10.2)  | 1  |
| Offering the following for nutrition and breastfeeding (F10.3):   |  |
| <ul style="list-style-type: none"> <li>• NICU-dedicated certified lactation specialists</li> <li>• Cohort of NICU RNs specially trained in lactation counseling</li> <li>• NICU-specific breast milk committee</li> <li>• Process to rent breast pumps to families</li> <li>• NICU specific risk reduction program that includes process designed to reduce breast milk errors</li> <li>• Donor breast milk program with written institution-specific criteria for the initiation and discontinuation of donor breast milk</li> </ul> | 6  |
| Employing the following risk-reduction practices (F10.4):   |  |
| <ul style="list-style-type: none"> <li>• Individual breast milk warmers at each bedside</li> <li>• Bar coding system for correct breast milk identification</li> <li>• Dedicated breast milk technician who prepares milk for proper identification and distribution</li> </ul>   | 3  |
| Tracking breast milk administration error rate (F10.5)  | 1  |
| Having a mandatory neonatal consult or a neonatologist co-managing care for surgical patients in the NICU (F16.1)   | 1  |
| Having at least 75% of anesthesiologists with board-certification in pediatric anesthesia (F16.2)   | 1  |
| Having or being associated with a fetal diagnosis and counselling program (F34.1)   | 2 points: in hospital or attached hospital<br>1 point: in unattached or non-proximate hospital |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| Neonatology* continued (81 points)  | Points                       |
|---|------------------------------|
| Number of standardized hand-off tools used by physicians and physician extenders to inform clinical staff during shift transitions (F29.1)  | 1: 1-2 tools<br>2: 3-4 tools |
| Number of standardized hand-off tools used by nurses to inform clinical staff during shift transitions (F30.1)  | 1: 1 tool<br>2: 2-3 tools    |
| Engaging in activities designed to ensure high reliability (A39):   |                              |
| <ul style="list-style-type: none"> <li>• All clinical staff are trained in code response using simulations or other team trainings</li> <li>• Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>• Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>• Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>• All team trainings end with the development of an action plan to address problems identified during the training or simulation</li> </ul> | 5                            |
| Tracking patients' first postoperative temperatures and using it as a quality metric (F31)  | 1                            |
| Percentage of first postoperative temperatures under 36°C (F31.1)   | 1: >8% and ≤15%<br>2: ≤8%    |
| Tracking unintended extubation of NICU patients (F32)   | 1                            |
| Frequency of quality review process (F32.2):  |                              |
| <ul style="list-style-type: none"> <li>• 1 point for a multidisciplinary review at some regular interval</li> <li>• 1 point for a mini-root cause analysis review within 12 hours</li> </ul>  | 2                            |
| Tracking hospital readmissions of NICU graduates within 7 days of discharge home from the NICU (F33)  | 1                            |
| Conducting multidisciplinary review of readmissions to determine if preventable (F33.2)   | 1                            |
| Providing the following for very-low-birth-weight and low gestational age infants (F34):  |                              |
| <ul style="list-style-type: none"> <li>• Starter protein solution available on day of admission</li> <li>• Very low birth weight feeding protocol</li> <li>• "Kangaroo care" routinely provided for infants receiving mechanical ventilation</li> </ul>   | 3                            |
| Providing prescriber directed feedback for medication prescribing errors (F35)  | 1                            |
| Having a medication error reporting system/database (F36)   | 1                            |
| Having a formalized process for evaluating medication errors (F36.1)  | 1                            |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Neonatology* continued (81 points)</b>  | <b>Points</b>       |
|--|---------------------|
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)  | 1                   |
| Offering the following to reduce radiation exposure to patients and staff (A10.1):   |                     |
| <ul style="list-style-type: none"> <li>• Participation in Image Gently</li> <li>• Iterative reconstruction software in computed tomography (CT)</li> <li>• MRI safety program compliant with the American College of Radiology guidelines</li> </ul>   | 3                   |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)  | 1                   |
| Maintaining the following certifications (A10.3):  |                     |
| <ul style="list-style-type: none"> <li>• Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>• Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>• Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul>  | 3                   |
| Having regularly scheduled multidisciplinary case conferences with pediatric radiologists to review each of the following test results (A10.4):  |                     |
| <ul style="list-style-type: none"> <li>• Brain and pituitary MRIs</li> <li>• Abdominal and pelvic ultrasounds</li> <li>• Abnormal thyroid ultrasounds</li> </ul>   | 3                   |
| <b>Nephrology* (52 points)</b>   | <b>Points</b>       |
| Percentage of school-age pediatric dialysis patients enrolled in a school or vocational rehabilitation program (G10)   | 1: <50%<br>2: ≥ 50% |
| Participating in regular interdisciplinary clinical conferences to review and coordinate the care of patients in the following specialties (G17):  |                     |
| <ul style="list-style-type: none"> <li>• Urology/uroradiology</li> <li>• Renal pathology</li> <li>• Rheumatology</li> </ul>  | 3                   |
| Engaging in activities designed to ensure high reliability (A39):  |                     |
| <ul style="list-style-type: none"> <li>• All clinical staff are trained in code response using simulations or other team trainings</li> <li>• Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>• Team trainings are videotaped to allow review of performance and need for improvement</li> <li>• Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>• All team trainings end with the development of an action plan to address problems identified during the training or simulation</li> </ul> | 5                   |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| Nephrology* continued (52 points)  | Points  |
|--|---|
| Providing the following services in support of the pediatric dialysis unit (G19):  |   |
| <ul style="list-style-type: none"> <li>• Designated medical director board-certified in pediatric nephrology</li> <li>• Quality Assurance Performance Improvement activities reviewed independently from the adult dialysis service</li> <li>• Pediatric maintenance dialysis patients receive treatment in a unit independent from adult patients</li> <li>• Dedicated nursing staff with formal training in pediatric dialysis</li> <li>• At-home maintenance hemodialysis program for adolescents</li> <li>• At-home maintenance peritoneal dialysis program</li> </ul> | 6   |
| Availability and prescription of plasmapheresis to patients (G19.1):   |   |
| <ul style="list-style-type: none"> <li>• Available and prescribed by Pediatric Nephrology (2 points)</li> <li>• Available but NOT prescribed by Pediatric Nephrology (1 point)</li> </ul>  | 2   |
| Availability of ABPM to patients and report generated (G19.2):   |   |
| <ul style="list-style-type: none"> <li>• Available and report generated by Pediatric Nephrology (2 points)</li> <li>• Available but report NOT generated by Pediatric Nephrology (1 point)</li> </ul>  | 2   |
| For patients with catheters, ratio of catheters placed per patient for each of the following categories (G22a and G22b):   |   |
| <ul style="list-style-type: none"> <li>• Permanent hemodialysis vascular central venous catheters placed in children &lt; 5 years of age)</li> <li>• Permanent hemodialysis vascular central venous catheters placed in children, 5-19 years of age</li> </ul>   | For each measure:<br>1: > 1.5 & ≤ 4<br>2: > 0 & ≤ 1.5   |
| For patients with catheters, ratio of catheters placed per patient for each of the following categories (G22c, G22d, and G22e):  |   |
| <ul style="list-style-type: none"> <li>• Hemodialysis AV fistula/graft access placements in children, 5-19 years of age</li> <li>• Peritoneal dialysis catheters placed in children &lt; 5</li> <li>• Peritoneal dialysis catheters placed in children and adolescents, 5-19</li> </ul>  | For each measure:<br>1: > 1.25 & ≤ 4<br>2: > 0 & ≤ 1.25 |
| Offering a formal transition program for kidney transplant patients from pediatric to adult care when needed (G25)   | 1   |
| Offering a formal transition program for dialysis patients into adult care when needed (G26)   | 1   |
| Percentage of living donor nephrectomies conducted via laparoscopic procedure (G29)  | 1: ≤ 50%<br>2: > 50%                                    |
| Reviewing the care of all kidney transplant inpatients at an interdisciplinary care conference (G30)   | 1   |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| Nephrology* continued (52 points)   | Points               |
|---|----------------------|
| Maintaining a database of current kidney transplant patients with clinical data to allow for quality assessment and improvement of care (G38)   | 1                    |
| Offering the following programs to support pediatric patients undergoing kidney transplant (G33):   |                      |
| <ul style="list-style-type: none"> <li>• Quality of life assessment</li> <li>• Child life program for kidney transplant patients</li> <li>• Transplant pharmacist</li> </ul>  | 3                    |
| Percentage of kidney transplant patients <18 years of age that were preemptive (G31)  | 1: 10-20%<br>2: >20% |
| At least 50% of native kidney biopsies were performed by a pediatric nephrologist or pediatric nephrology fellow using real-time image guidance utilizing ultrasound (G14.1)  | 1                    |
| At least 50% of percutaneous kidney biopsies were performed by a pediatric nephrologist or pediatric nephrology fellow (G27.1)  | 1                    |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)   | 1                    |
| Offering the following to reduce radiation exposure to patients and staff (A10.1):  |                      |
| <ul style="list-style-type: none"> <li>• Participation in Image Gently</li> <li>• Iterative reconstruction software in computed tomography (CT)</li> <li>• MRI safety program compliant with the American College of Radiology guidelines</li> </ul>  | 3                    |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)   | 1                    |
| Maintaining the following certifications (A10.3):   |                      |
| <ul style="list-style-type: none"> <li>• Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>• Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>• Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul> | 3                    |
| Having regularly scheduled multidisciplinary case conferences with pediatric radiologists to review abdominal and pelvic ultrasounds test results (A10.4)   | 1                    |

\* Parenthetical references indicate related survey questions.

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**Table 9. Commitment to Best Practices by Specialty (continued)**

| Neurology & Neurosurgery* (28 points)   | Points |
|---|--------|
| Offering postoperative neuropsychological evaluations for surgical patients with the following diagnoses (H15):   |        |
| <ul style="list-style-type: none"> <li>• Benign or malignant brain tumors</li> <li>• Traumatic brain injury/concussion</li> <li>• Medically intractable epilepsy</li> <li>• Craniofacial disorders</li> </ul>   | 4      |
| Participating in the following nationally audited research programs that focus on outcome measures specific to neurology and neurosurgery (H19):  |        |
| <ul style="list-style-type: none"> <li>• Neurocritical Care Research Group</li> <li>• International Pediatric Stroke Study</li> </ul>   | 2      |
| Having an epilepsy program designated Level IV by National Association of Epilepsy Centers (H32)  | 1      |
| Engaging in the following activities (H22):   |        |
| <ul style="list-style-type: none"> <li>• Maintaining a surgical mortality database</li> <li>• Holding regular mortality and morbidity conferences</li> <li>• Regularly holding interdisciplinary care conferences</li> </ul>  | 3      |
| Having $\geq 75\%$ of EEG tests incorporated into the patients' medical chart within designated timeframes (H10):   |        |
| <ul style="list-style-type: none"> <li>• Standard EEG medical evaluations interpreted and recorded within 36 hours of being conducted</li> <li>• Long-term vEEG evaluations interpreted and recorded within 5 days from discharge</li> </ul>  | 2      |
| Participating in community outreach programs to improve health in the community (H20.1)   | 1      |
| Engaging in activities designed to ensure high reliability (A39):   |        |
| <ul style="list-style-type: none"> <li>• All clinical staff are trained in code response using simulations or other team trainings</li> <li>• Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>• Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>• Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>• All team trainings end with the development of an action plan to address problems identified during the training or simulation</li> </ul> | 5      |
| Having at least 50% of patients receiving a surgical resection for epilepsy have intraoperative electrocorticography and/or extraoperative monitoring (H8 and H8.1)   | 1      |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)   | 1      |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Neurology &amp; Neurosurgery* continued (28 points)</b>  | <b>Points</b>                                  |
|---|--|
| Offering the following to reduce radiation exposure to patients and staff (A10.1):  |  |
| <ul style="list-style-type: none"> <li>• Participation in Image Gently</li> <li>• Iterative reconstruction software in computed tomography (CT)</li> <li>• MRI safety program compliant with the American College of Radiology guidelines</li> </ul>  | 3  |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)   | 1  |
| Maintaining the following certifications (A10.3):   |  |
| <ul style="list-style-type: none"> <li>• Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>• Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>• Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul>                                     | 3  |
| Having regularly scheduled multidisciplinary case conferences with pediatric radiologists to review brain and pituitary MRIs (A10.4a)   | 1  |
| <b>Orthopedics* (60 points)</b>   | <b>Points</b>                                  |
| Number of pediatric orthopedic surgeons who are active or candidate members of the Pediatric Orthopaedic Society of North America (I5)  | 1: 1-2<br>2: 3+                                |
| Percentage of pediatric orthopedic staff receiving pediatric orthopedic surgery-related continuing education credit or continuing medical credit:   |  |
| <ul style="list-style-type: none"> <li>• Nurse practitioners (I3.1)</li> <li>• Physician assistants (I3.1)</li> <li>• RNs (I4.1)</li> <li>• Medical Assistants (I4.1)</li> </ul>  | For each measure:<br>1: ≥50% & <75%<br>2: ≥75% |
| Having at least 75% of patient MRI and CT examinations read by musculoskeletal radiologists (I9.1)  | 1  |
| Providing pediatric imaging center with the following services (I10):   |  |
| <ul style="list-style-type: none"> <li>• Pediatric protocols to reduce radiation exposure</li> <li>• Digitally stored test results, images, and medical records accessible from locations off-site or away from the hospital</li> <li>• Intraoperative navigation system</li> <li>• Low-dose, three dimensional upright body imaging for evaluating scoliosis</li> <li>• Pediatric anesthesia services to support sedation and general anesthesia for imaging in very young children</li> </ul> | 5  |
| All musculoskeletal cancer patients discussed at a tumor board at least once a quarter (I17)  | 1  |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Orthopedics* continued (60 points)</b>  | <b>Points</b>  |
|--|--|
| More than 75% of tumor boards attended by a musculoskeletal oncologist (I17.1)   | 1  |
| More than 75% of tumor boards attended by a musculoskeletal tumor surgeon (I17.1)  | 1  |
| Participating in regular multidisciplinary morbidity and mortality conferences (I18)   | 1  |
| Percentage of surgical spine patients, 8 or older, completing SRS-22 or SRS-30 (I36)   | 1 : $\geq 50\%$ & $< 75\%$<br>2: $\geq 75\%$                     |
| Percent compliance with written checklists and/or evidence based guidelines for patients with the following orthopedic injuries (I37):   |  |
| <ul style="list-style-type: none"> <li>• Neurological injury associated with surgery for idiopathic scoliosis</li> <li>• Neurovascular injuries associated with supracondylar fractures or dislocation of the knee</li> <li>• Spinal trauma resulting in acute spinal cord injury</li> </ul> | For each measure:<br>1: $\geq 70\%$ & $< 85\%$<br>2: $\geq 85\%$ |
| Having a designated trauma operating room that 100% guarantees orthopedics a "first case of the day start" (I28)   | 1  |
| Having a policy in place that provides even greater operating room access based on periodic demand (I29)   | 1  |
| Having access to at least 1 of the following types of anesthesiologists:   |  |
| Pediatric anesthesiologists or pediatric spine anesthesiologists to assist with pediatric orthopedic surgeries (I34)<br>Pediatric anesthesiologists or pediatric spine anesthesiologists to assist with pediatric surgical correction of scoliosis (I35)                                     | 2  |
| Having at least 1 in-service presentation or formal lecture to an RN audience (I39)  | 1  |
| Establishing a professional relationship with one or more prosthetic/orthotics providers such that they attend clinic on a regular basis (I40)   | 1  |
| Having a fixed surgery support team that are dedicated to working with pediatric orthopedic surgeons (I41)   | 1  |
| Having exactly the same fixed surgery support team working together during normal working hours at least 25% of the time (I41.1)   | 1  |
| Providing afterhours or weekend "on call" service for a fixed surgery support team (I42)   | 1  |
| Having exactly the same fixed surgery support team working together during afterhours or on weekends at least 25% of the time (I42.1)  | 1  |
| Having a preoperative coordinated care review process led by a nursing coordinator to evaluate high-risk patients and prepare them for surgery and hospitalization (I30)   | 1  |
| Having more than 75% of patients receive hip reconstruction and posterior spinal fusion surgeries receive preoperative nutritional and pulmonary assessments (I45)   | 1  |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Orthopedics* continued (60 points)</b>   | <b>Points</b>                |
|---|------------------------------|
| Rate of single-event multi-level surgery patients who received a preoperative physical therapy assessment (I46a / I45d)   | 1: ≥ 50% & < 75%<br>2: ≥ 75% |
| Rate of single event multi-level surgery patients who received a perioperative regional anesthetic (I46b / I45d)  | 1: ≥ 50% & < 75%<br>2: ≥ 75% |
| Rate of single event multi-level surgery patients who received a postoperative assessment by anesthetic/pain team (I46c / I45d)   | 1: ≥ 50% & < 75%<br>2: ≥ 75% |
| Hosting or being actively involved in organizing a cerebral palsy support group (I47)   | 1                            |
| Engaging in activities designed to ensure high reliability (A39):   |                              |
| <ul style="list-style-type: none"> <li>All clinical staff are trained in code response using simulations or other team trainings</li> <li>Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>All team trainings end with the development of an action plan to address problems identified during the training or simulation</li> </ul> | 5                            |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)   | 1                            |
| Offering in the following to reduce radiation exposure to patients and staff (A10.1):   |                              |
| <ul style="list-style-type: none"> <li>Participation in Image Gently</li> <li>Iterative reconstruction software in computed tomography (CT)</li> <li>MRI safety program compliant with the American College of Radiology guidelines</li> </ul>  | 3                            |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)   | 1                            |
| Maintaining the following certifications (A10.3):   |                              |
| <ul style="list-style-type: none"> <li>Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul>   | 3                            |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Pulmonology* (38 points)</b>   | <b>Points</b>                   |
|---|---------------------------------|
| Screening all pulmonology patients for tobacco smoke exposure and actively counseling family members who smoke (J6)   | 1                               |
| Having written consensus protocols for the following conditions (J13):  |                                 |
| <ul style="list-style-type: none"> <li>• Asthma exacerbations</li> <li>• Bronchiolitis</li> <li>• Croup</li> <li>• Cystic fibrosis</li> <li>• Uncomplicated pneumonia</li> <li>• Complicated pneumonia</li> <li>• Initiation of tracheostomy of home ventilator support</li> <li>• Tracheostomy or ventilator-dependent patients</li> <li>• Pneumothorax care pathway</li> <li>• Acute chest syndrome</li> </ul>  | 10                              |
| Routinely involving pulmonologists in outpatient management of pediatric patients with the following conditions (J50):  |                                 |
| <ul style="list-style-type: none"> <li>• Sickle cell anemia</li> <li>• Primary immunodeficiency and/or post-bone marrow transplantation</li> <li>• Rheumatologic disorders</li> <li>• Aerodigestive disorders</li> <li>• Craniofacial disorders</li> </ul>  | 5                               |
| Having a protocol for preparing and assisting in the transition of patients from pediatric to adult pulmonology (J53)   | 1                               |
| Providing financial support for staff to attend extramural continuing education (J54)   | 1                               |
| Average "third next available" appointment time for new patients for an outpatient office visit (J55)   | 1: >7 & ≤14 days<br>2: ≤ 7 days |
| Interpreting exercise challenge and bronchoprovocation testing (J56)  | 1                               |
| Engaging in activities designed to ensure high reliability (A39):   |                                 |
| <ul style="list-style-type: none"> <li>• All clinical staff are trained in code response using simulations or other team trainings</li> <li>• Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>• Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>• Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>• All team trainings end with the development of an action plan to address problems identified during the training or simulation</li> </ul> | 5                               |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Pulmonology* continued (38 points)</b>  | <b>Points</b> |
|--|---------------|
| Providing thorough on-site assessment of patients' home environment and offer guidance for reducing exposures that contribute to asthma (J9)   | 1             |
| Having a pediatric sleep disorders clinic that addresses the needs of patients with ventilation or other sleep disorders and manages the patient's positive airway pressure (J39)  | 1             |
| Having multidisciplinary care team to coordinate the care of long-term ventilator-dependent patients (J42)   | 1             |
| Having a formal plan to actively transition CF patients from pediatric care to adult care (J25)  | 1             |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)  | 1             |
| Offering the following to reduce radiation exposure to patients and staff (A10.1):   |               |
| <ul style="list-style-type: none"> <li>• Participation in Image Gently</li> <li>• Iterative reconstruction software in computed tomography (CT)</li> <li>• MRI safety program compliant with the American College of Radiology guidelines</li> </ul>   | 3             |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)  | 1             |
| Maintaining the following certifications (A10.3):  |               |
| <ul style="list-style-type: none"> <li>• Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>• Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>• Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul>  | 3             |
| <b>Urology* (35 points)</b>  | <b>Points</b> |
| Engaging in activities designed to ensure high reliability (A39):  |               |
| <ul style="list-style-type: none"> <li>• All clinical staff are trained in code response using simulations or other team trainings</li> <li>• Team trainings include clear instructions and demonstration of roles and lines of communication</li> <li>• Team trainings are videotaped to allow review of performance and needs for improvement</li> <li>• Team trainings include critical event debriefing or team discussions that focus on identifying what worked well and where improvement is needed</li> <li>• All team trainings end with development of action plan to address problems identified during the training or simulation</li> </ul> | 5             |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| <b>Urology* continued (35 points)</b>   | <b>Points</b>                   |
|---|---------------------------------|
| Having regular morbidity and mortality conferences to discuss pediatric urology patients (K6a)  | 1                               |
| Having regular case conferences to discuss surgical management of complex cases (K6b)   | 1                               |
| Monitoring reconstructive procedure for incontinence or hostile bladder for the following operative complications (K13.1):  |                                 |
| <ul style="list-style-type: none"> <li>• Post-augment bladder capacity based on either VCUG or Urodynamic study</li> <li>• Compliance based on urodynamic study</li> <li>• Continence</li> <li>• Absence of reflux</li> <li>• Stomal complications</li> </ul>   | 5                               |
| Average "third next available" appointment time for new patients for an outpatient office visit (K20)   | 1: >7 & ≤14 days<br>2: ≤ 7 days |
| Offering the following weekend and afterhours outpatient clinics for elective care (K21)  |                                 |
| <ul style="list-style-type: none"> <li>• Scheduled (non-emergency) weekday evening clinic appointments (after 5pm)</li> <li>• Scheduled (non-emergency) weekend surgical appointments</li> <li>• Scheduled (non-emergency) weekend clinic appointments</li> </ul>   | 3                               |
| Having the following protocols in place (K22)   |                                 |
| <ul style="list-style-type: none"> <li>• Protocol for preparing and assisting in the transition of patients from pediatric to adult urology</li> <li>• Protocol for teaching home intermittent catheterization</li> <li>• Radiation reduction/safety protocols for urology patients (e.g., Retrograde pyelogram protocol, Ureteroscopy protocol)</li> <li>• Standardized clinical pathway for children presenting with acute stone pain to the Emergency Department</li> <li>• Standardized clinical pathway for postoperative patients</li> <li>• Educational materials for patients and families on urological conditions that are updated on a regular basis</li> <li>• Child life specialists for perioperative care in the operating room and for office procedures</li> <li>• Sedation services for VCUG/ noxious procedures</li> </ul> | 8                               |
| Making use of a patient portal to enable families to access electronic medical records and communicate with their physicians and medical staff (K23)  | 1                               |
| Having at least 5 pediatric interventional radiologists with at least 0.2 FTEs each or at least 2 pediatric interventional radiologists with at least 0.5 FTE each (A4.1)   | 1                               |
| Offering the following to reduce radiation exposure to patients and staff (A10.1):  |                                 |
| <ul style="list-style-type: none"> <li>• Image Gently</li> <li>• Iterative reconstruction software in computed tomography (CT)</li> <li>• MRI safety program compliant with the American College of Radiology</li> </ul>  | 3                               |
| Using computerized tomography (CT) protocols that adjust milliampere-seconds (mAs) and peak kilovolts (kVp) (A10.2)   | 1                               |

\* Parenthetical references indicate related survey questions.

(continued)

**Table 9. Commitment to Best Practices by Specialty (continued)**

| Urology* continued (35 points)  | Points |
|---|--------|
| Maintaining the following certifications (A10.3):   |        |
| <ul style="list-style-type: none"> <li>• Accreditation in computerized tomography (CT) imaging from the American College of Radiology (ACR)</li> <li>• Accreditation in nuclear medicine from the American College of Radiology (ACR)</li> <li>• Pediatric sonographer accreditation by the American Registry of Diagnostic Medical Sonographers (ARDMS) or ultrasound accreditation by the American Registry of Radiologic Technologists (ARRT)</li> </ul> | 3      |
| Having regularly scheduled multidisciplinary case conferences with pediatric radiologists to review abdominal and pelvic ultrasounds test results (A10.4)   | 1      |

\* Parenthetical references indicate related survey questions.

## B. Ability to Prevent Infections

Incorporating infection-preventing measures captures the commitment of a hospital to identifying and implementing proven means of reducing the risk of various infections.

### All-Specialty Infection-Preventing Measures

A core set of submeasures for all specialties was worth up to 23 points, as shown in *Table 10*. Specialty-specific measures in all specialties except Urology allowed an additional 2-26 points, depending on the specialty.

### Specialty-Specific Infection-Preventing Measures

**Cancer (5 additional points).** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received 1 point for actively tracking seasonal influenza vaccinations in cancer patients on active chemotherapy (B32). Up to 3 additional points were awarded according to the percentage vaccinated (B33): 1 point for  $\geq 75\%$  and  $< 85\%$ , 2 points for  $\geq 85\%$  and  $< 95\%$ , and 3 points for  $\geq 95\%$ .

**Cardiology & Heart Surgery (10 additional points).** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received 1 point for monitoring compliance with preoperative antibiotic prophylaxis for a sample of cases or 2 points for monitoring compliance for all cardiothoracic surgeries (E32). Up to 2 additional points were awarded according to the percentage of compliance (E33): 1 point if  $\geq 75\%$  and  $< 90\%$ , and 2 points if  $\geq 90\%$ . Hospitals received 2 points for formally monitoring surgical site infections (SSIs) for major cardiothoracic procedures (E34/E34.1).



**Table 10. Core Infection-Preventing Measures, All Specialties (23 points)**

| All Specialties* (23 points)   | Points                                      |
|--|---|
| Auditing hand hygiene compliance rates via electronic monitoring or direct observation (F37 for Neonatology, A24 for all other specialties)  | 1   |
| Auditing hand hygiene compliance rates by electronic monitoring or direct observation for all 5 of the WHO 5 moments of hand hygiene (A25.1)   | 1   |
| Percentage of compliant hand hygiene observations for inpatient care in the past 12 months (F37.1 for Neonatology, A25 for all other specialties)  | 1: $\geq 80\%$ & $< 90\%$<br>2: $\geq 90\%$ |
| Providing at least .50 FTE financial support for a pediatric infectious disease specialist to serve as a dedicated director of the infection prevention program (A26.1)  | 1   |
| Having at least 1.0 FTE infection preventionists (A27)   | 1   |
| Having at least 1 infection preventionist certified by the Certification Board in Infection Control (A27.1)  | 1   |
| Ensuring that at least 90% of the following staff received influenza vaccination (A28): <ul style="list-style-type: none"> <li>• Physicians (including attending physicians, fellows, residents)</li> <li>• Nursing staff and mid-level providers</li> <li>• All other employees (excludes volunteers)</li> </ul>  | 3   |
| Ensuring that at least 75% of the following staff received Tdap vaccination (A29): <ul style="list-style-type: none"> <li>• Physicians (including attending, fellows, residents)</li> <li>• Nursing staff and mid-level providers</li> <li>• All other employees (excludes volunteers)</li> </ul>  | 3   |
| Requiring all volunteers to receive or provide documentation of: <ul style="list-style-type: none"> <li>• Influenza vaccination (A29.1)</li> <li>• Tdap vaccination (A29.2)</li> </ul>   | 2   |
| Having the following elements of antimicrobial stewardship program (A31): <ul style="list-style-type: none"> <li>• Publishing yearly antimicrobial susceptibility summary that is readily available to clinicians</li> <li>• Restricting pharmacy use of selected antimicrobial agents to prevent potential resistance from overuse</li> <li>• Implementing prospective audit with intervention and feedback</li> <li>• At least 0.4 FTE support for a dedicated pharmacist to antimicrobial stewardship program (ASP)</li> <li>• At least 0.2 FTE support for the role of medical director of the pediatric ASP program</li> <li>• Microbiology laboratory that restricts reporting of susceptibilities to some antimicrobials to prevent overuse</li> <li>• At least 0.2 FTE support for a dedicated analyst to support ASP program</li> </ul> | 7   |
| Performing surveillance for both healthcare-acquired respiratory viral infections and influenza viruses (A32)  | 1   |

\* Parenthetical references indicate related survey questions.

Hospitals received up to 3 additional points for engaging in the following surgical site infection prevention procedures (E31): pre-operative bath, no use of razor for hair removal, preparation of skin at surgical site with alcohol containing agent.

***Diabetes & Endocrinology (5 additional points).*** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received 1 point for actively tracking seasonal influenza vaccinations in diabetes outpatients (C42). Up to 3 additional points were awarded according to the percentage vaccinated (C43): 1 point for  $\geq 50\%$  and  $< 75\%$ , 2 points for  $\geq 75\%$  and  $< 90\%$ , and 3 points for  $\geq 90\%$ .

***Gastroenterology & GI Surgery (11 additional points).*** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received up to 2 points for actively tracking seasonal influenza vaccinations for chronic intestinal failure patients (D18) and post-liver transplant patients (D23). Up to 3 points each were awarded based on the percentage of both chronic intestinal failure patients (D19) and liver-transplant patients (D24) vaccinated (6 points total): 1 point for  $\geq 50\%$  and  $< 75\%$ , 2 points for  $\geq 75\%$  and  $< 90\%$ , and 3 points for  $\geq 90\%$ . Hospitals received up to 2 additional points for implementing strategies for preventing central-line associated bloodstream infections for total parenteral nutrition patients (D37): 1 point for implementing one or two strategies, and 2 points for implementing 3 or more strategies.

***Neonatology (2 additional points).*** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received 1 point for having a NICU-specific formal antimicrobial stewardship program (ASP) to monitor and report usage of high risk, broad spectrum antimicrobials in the NICU (F38 and F38.1).

***Nephrology (26 additional points).*** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received 1 point each (up to 6 points) for actively tracking seasonal influenza and pneumococcal vaccinations for hemodialysis patients (G12a, G13a), peritoneal dialysis patients (G12b, G13b) and kidney transplant patients (G34, G35). Up to 3 additional points were awarded for each of the 6 groups (up to 18 points) according to the percentage vaccinated (G12a, G12b, G13a, G13b, G34.1, G35.1): 1 point for  $\geq 50\%$  and  $< 75\%$ , 2 points for  $\geq 75\%$  and  $< 90\%$ , and 3 points for  $\geq 90\%$ . One additional point was awarded for tracking dialysis catheter-associated bloodstream infection (BSI) rates for the past two calendar years using NHSN guidelines for pediatric outpatients on maintenance dialysis (G36).

***Neurology & Neurosurgery (9 additional points).*** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received 1 point for monitoring compliance with preoperative antibiotic prophylaxis for a sample of cases and 2 points

for monitoring compliance for all ventricular surgeries (H25). Up to 2 additional points were awarded based on the percentage of compliance (H26): 1 point if  $\geq 75\%$  and  $< 90\%$ , and 2 points if  $\geq 90\%$ . Hospitals received 1 point for actively tracking SSIs for ventricular shunt surgeries (H27). Up to 3 points were awarded for the rate of surgical site infections per 100 ventricular shunt surgeries performed in the past 2 years (H28). Points were awarded as follows: 1 point if  $> 6\%$  and  $\leq 10\%$ , 2 points if  $> 3\%$  and  $\leq 6\%$ , and 3 points if  $\leq 3\%$ .

***Orthopedics (6 additional points).*** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received 1 point for monitoring compliance with preoperative antibiotic prophylaxis for a sample of cases and 2 points for monitoring compliance for all spinal fusion surgeries (I21). Up to 2 additional points were awarded according to the percentage of compliance (I22): 1 point if  $\geq 75\%$  and  $< 90\%$ , and 2 points if  $\geq 90\%$ . Hospitals received 1 point for actively monitoring SSIs using NHSN criteria (I23 and I23.1).

***Pulmonology (19 additional points).*** Hospitals received 1 point for having a formal program to prevent hospital-acquired pressure ulcers (A36). Hospitals received 1 point each (up to 4 points) for actively tracking seasonal influenza vaccinations for asthma patients (J14), cystic fibrosis patients (J18), neuromuscular weakness disorder patients (J33) or ventilator-dependent patients (J43). Up to 3 additional points were awarded for each of the 4 groups (up to 12 points) according to the percentage vaccinated (J15, J19, J34, J44): 1 point for  $\geq 50\%$  and  $< 75\%$ , 2 points for  $\geq 75\%$  and  $< 90\%$ , and 3 points for  $\geq 90\%$ . Hospitals received 1 additional point for implementing 2 or 3 of the infection-control guidelines recommended by the Cystic Fibrosis Foundation (J20). Hospitals received 1 additional point for having at least 75% of vaccine-eligible patients treated between October 1 and December 31 receive a seasonal influenza vaccine (J27.1).

***Urology (0 additional points).*** There are currently no additional infection prevention measures in Urology.

## **C. Reputation with Pediatric Specialists**

Reputation can be viewed as a form of peer review of the hospital's capabilities across a wide variety of processes related to quality of care. For all specialties, reputational scores were based on responses to the physician surveys conducted in 2014, 2015 and 2016. Scores were calculated separately in each year, and averaged such that each year's scores are given equal weighting in the final reputation score as shown in *Table 11*.

**Table 11. Reputation Weight by Survey Year**

| <b>Sample Source</b>  | <b>Reputation Weight</b> | <b>Overall Weight</b> |
|-----------------------|--------------------------|-----------------------|
| 2016 Physician Survey | 33.3%                    | 5%                    |
| 2015 Physician Survey | 33.3%                    | 5%                    |
| 2014 Physician Survey | 33.3%                    | 5%                    |
| Total                 | 100%                     | 15%                   |

The sections below describe the approach used for the 2016 survey, which was similar to the 2015 survey. The approaches used for the 2014 and 2015 surveys are provided in the corresponding methodology reports for those years, available at [www.rti.org/besthospitals](http://www.rti.org/besthospitals).

## **2016 Survey Approach**

### *Sample Selection*

Prior to 2015, 1,500 specialists were sampled each year, representing a total sample of 4,500 across all three years<sup>§§§</sup>. For the 2015 survey, the sample for the physician survey was expanded from 1,500 specialists to over 8,000, and in 2016 to over 9,000. This resulted in an overall sample for the three years of approximately 19,000 physicians. The significantly larger sample yields a greater number of survey responses and improves precision of survey estimates. The source of the added physicians, who were surveyed via the Web, was the online panel maintained by Doximity, the largest online professional network of U.S. physicians.

Starting in 2015, the sample was drawn from a database of U.S. physicians compiled by Doximity. Similar to the AMA Physician Masterfile, which was used as the sampling frame in previous years, Doximity’s comprehensive Physician Database includes every practicing U.S. physician, identified by National Provider Identifier (NPI) number. Its sources include the U.S. Department of Health and Human Services NPI Registry, specialty boards (e.g., the American Board of Medical Specialties and the American Board of Surgery) and state medical boards. Doximity’s proprietary database is augmented by more than 400,000 registered and verified physician members who review and update their profiles to provide another set of primary data. RTI also used address information from the AMA Masterfile, under license from MMS, Inc., to verify addresses.

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<sup>§§§</sup> This number does not represent 4,500 unique physicians. The universe of physicians in some pediatric specialties is very small, so some physicians were surveyed in more than one year.

*Table 12* provides the population counts of pediatric specialists in the database by Doximity members and nonmembers.

**Table 12. Population Counts by Best Hospitals Specialty, Doximity Members and Nonmembers**

| <b>Best Children’s Hospitals Specialty</b> | <b>Subspecialties</b>             | <b>Doximity Members</b> | <b>Doximity Nonmembers</b> |
|--|-----------------------------------|-------------------------|----------------------------|
| Cancer                                     | Pediatric Hematology-Oncology     | 1,358                   | 797                        |
| Cardiology & Heart Surgery                 | Pediatric Cardiology              | 1,597                   | 653                        |
|  | Congenital Heart Surgeon Society* | 0                       | 131                        |
| Gastroenterology & GI Surgery              | Pediatric Gastroenterology        | 738                     | 436                        |
| Diabetes & Endocrinology                   | Pediatric Endocrinology           | 653                     | 492                        |
| Neonatology                                | Neonatal-Perinatal Medicine       | 2,312                   | 1,804                      |
| Nephrology                                 | Pediatric Nephrology              | 374                     | 225                        |
| Neurology & Neurosurgery                   | Child Neurology                   | 1,098                   | 734                        |
|  | Pediatric Neurological Surgery**  | 0                       | 198                        |
| Orthopedics                                | Pediatric Orthopedics             | 501                     | 207                        |
| Pulmonology                                | Pediatric Pulmonary               | 602                     | 318                        |
| Urology                                    | Pediatric Urology                 | 130                     | 67                         |

\* These specialists were drawn from the Congenital Heart Surgeons Society membership list.

\*\* These specialists were drawn from the American Society of Pediatric Neurosurgeons.

### *Data Collection Procedures*

Doximity members and nonmembers were surveyed separately, as described below.

**Member survey.** The Doximity member survey identified a total of 9,363 physicians across the 10 pediatric specialties in February and March 2016. Physicians received an initial email invitation with a link to the survey. The survey asked for names of up to 10 hospitals in the physician’s specialty that provide the best care to patients with serious conditions, without considering location or expense. Nonresponding physicians received one follow-up email reminder with a link to the survey. In addition, survey-eligible Doximity members – i.e., those who were board

certified in a relevant specialty – received alerts upon login to Doximity.com or use of the Doximity app inviting them to participate.

**Nonmember survey.** The nonmember survey was conducted by randomly sampling 1,500 Doximity nonmembers – 150 specialists in each of the 10 specialty areas. Stratifying by census region ([http://www.census.gov/geo/www/us\\_regdiv.pdf](http://www.census.gov/geo/www/us_regdiv.pdf)), we selected physicians in each region proportional to the size of the population. For example, if 40% of all Doximity nonmembers in a specialty were from the South, then 40% of our sample would have included physicians in that region. Sampling physicians proportional to population size allowed us to minimize the weights needed to produce reputation scores that are representative of the nation.

Sampled physicians were asked to complete a brief survey containing a single nomination element. The survey of nonmembers was identical to the survey of Doximity members but was conducted via mail instead of the web. It asked physicians to supply the names of up to 10 hospitals in their specialty that provide the best care to patients with serious conditions, without considering location or expense. A copy of the mailed survey is available in *Appendix B*.

Up to four mailings were sent to sampled Doximity nonmembers. Each mailing included a cover letter, questionnaire, and business reply envelope. The first survey mailing also included a token incentive, which was either a \$2 bill, a ballpoint pen or both a \$2 bill and ballpoint pen. The survey was conducted from January 5 through March 31, 2016.

## **Response Rates**

The overall response rate for the 2014, 2015 and 2016 surveys was 30.7% using the American Association of Public Opinion Research (AAPOR) standard response rate 6\*\*\*\*, which treats undeliverables as ineligible. The 2016 combined response rate for the Doximity member and nonmember surveys was 25.6% using AAPOR standard response rate 6. Below we provide more detail on the response rates to the 2016 Doximity member and nonmember surveys.

**Member survey.** Of 9,363 Doximity members, 2,231 completed the web survey by March 2, 2016. The final response rate was 23.8% using AAPOR standard response rate 6. *Table 13* shows response rates by region and specialty.

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\*\*\*\* Definitions available at <http://www.aapor.org/Content/aapor/AdvocacyandInitiatives/StandardsandEthics/StandardDefinitions/StandardDefinitions2011.pdf>

**Table 13. Member Survey Response Rates (%) by Region and Specialty, 2016**

| Specialty                     | Midwest     | Northeast   | South       | West        | Total       |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|
| Cancer                        | 38.4        | 20.4        | 25.8        | 20.7        | 26.0        |
| Cardiology & Heart Surgery    | 35.4        | 26.4        | 24.8        | 24.5        | 27.7        |
| Diabetes & Endocrinology      | 38.3        | 23.4        | 19.4        | 16.7        | 24.7        |
| Gastroenterology & GI Surgery | 43.1        | 31.8        | 16.6        | 25.5        | 29.7        |
| Neonatology                   | 22.8        | 16.3        | 15.4        | 9.3         | 15.9        |
| Nephrology                    | 45.6        | 24.5        | 28.2        | 21.1        | 29.9        |
| Neurology & Neurosurgery      | 33.1        | 18.4        | 16.5        | 17.1        | 21.0        |
| Orthopedics                   | 29.7        | 29.9        | 21.5        | 28.1        | 26.9        |
| Pulmonology                   | 38.9        | 23.1        | 18.7        | 20.5        | 25.7        |
| Urology                       | 53.7        | 41.2        | 27.3        | 40.9        | 41.5        |
| <b>Total</b>                  | <b>34.3</b> | <b>22.3</b> | <b>20.2</b> | <b>18.7</b> | <b>23.8</b> |

**Nonmember survey.** Of 1,500 nonmember physicians sampled for this year’s report, 208 were deemed ineligible after determining that they were no longer actively practicing. Of the remaining 1,292 physicians, 492 returned the completed questionnaire by the deadline of April 1, 2016. The final response rate was 38.1% using the AAPOR standard response rate 6. *Table 14* shows response rates by region and specialty.

**Table 14. Nonmember Survey Response Rates (%) by Region and Specialty, 2016**

| Specialty                     | Midwest     | Northeast   | South       | West        | Total       |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|
| Cancer                        | 46.4        | 33.3        | 38.6        | 30.0        | 37.2        |
| Cardiology & Heart Surgery    | 55.2        | 29.6        | 53.7        | 32.1        | 44.9        |
| Diabetes & Endocrinology      | 13.0        | 26.3        | 25.6        | 35.5        | 26.0        |
| Gastroenterology & GI Surgery | 28.6        | 42.1        | 43.2        | 38.5        | 39.5        |
| Neonatology                   | 48.1        | 26.1        | 37.8        | 16.0        | 33.3        |
| Nephrology                    | 43.8        | 25.0        | 34.9        | 10.7        | 29.8        |
| Neurology & Neurosurgery      | 38.7        | 20.0        | 41.9        | 46.2        | 36.9        |
| Orthopedics                   | 53.6        | 40.7        | 35.3        | 27.6        | 38.5        |
| Pulmonology                   | 46.2        | 46.7        | 23.1        | 37.5        | 37.0        |
| Urology                       | 62.5        | 50.0        | 61.7        | 51.2        | 56.9        |
| <b>Total</b>                  | <b>44.2</b> | <b>33.6</b> | <b>40.3</b> | <b>33.3</b> | <b>38.1</b> |

## Survey Response Weighting

For the Doximity member survey, we used post-stratification weights for age by gender (55+ male, <55 male, and female<sup>†††</sup>) as well as census region. Weights were constructed and applied to each physician’s survey response to make nominations representative of Doximity members at the national level. Since all Doximity members were surveyed, weights were used only to adjust for differences in nonresponse by region and demographics. In each specialty, the sample for the Nonmember physician survey was stratified only by census region (Midwest, Northeast, South and West). The sample size in each specialty was too small to stratify by the demographic characteristics used in the Doximity sample. Weights were constructed and applied to each physician’s survey response to make nominations representative of Doximity nonmembers at the national level. Weights were based on probability of selection within each unique specialty-region combination, adjusting to account for nonresponders.

Reputation scores were tabulated separately for Doximity members and nonmembers, and then combined to create the 2016 reputation score. **Table 15** shows the reputation weight for Doximity members and nonmembers in each specialty for 2016. The weight is based on the proportion of Doximity members and nonmembers in the population so the reputation score is representative of all physicians in the nation. Reputation scores for each of the past three years were then averaged to create the final, weighted reputation values that appear in the methodology report.

**Table 15. 2016 Reputation Weight by Specialty, Doximity Members and Nonmembers**

| Best Children’s Hospitals Specialty | Reputation Weight (%) |                     |
|-------------------------------------|-----------------------|---------------------|
|                                     | Doximity Members      | Doximity Nonmembers |
| Cancer                              | 63.0                  | 37.0                |
| Cardiology & Heart Surgery          | 67.1                  | 32.9                |
| Gastroenterology & GI Surgery       | 62.9                  | 37.1                |
| Diabetes & Endocrinology            | 57.0                  | 43.0                |
| Neonatology                         | 56.2                  | 43.8                |
| Nephrology                          | 62.4                  | 37.6                |
| Neurology & Neurosurgery            | 54.1                  | 45.9                |
| Orthopedics                         | 70.8                  | 29.2                |
| Pulmonology                         | 65.4                  | 34.6                |
| Urology                             | 46.4                  | 53.6                |

<sup>†††</sup> Age categories were collapsed for females because there were too few female physicians over 55 in the sample.

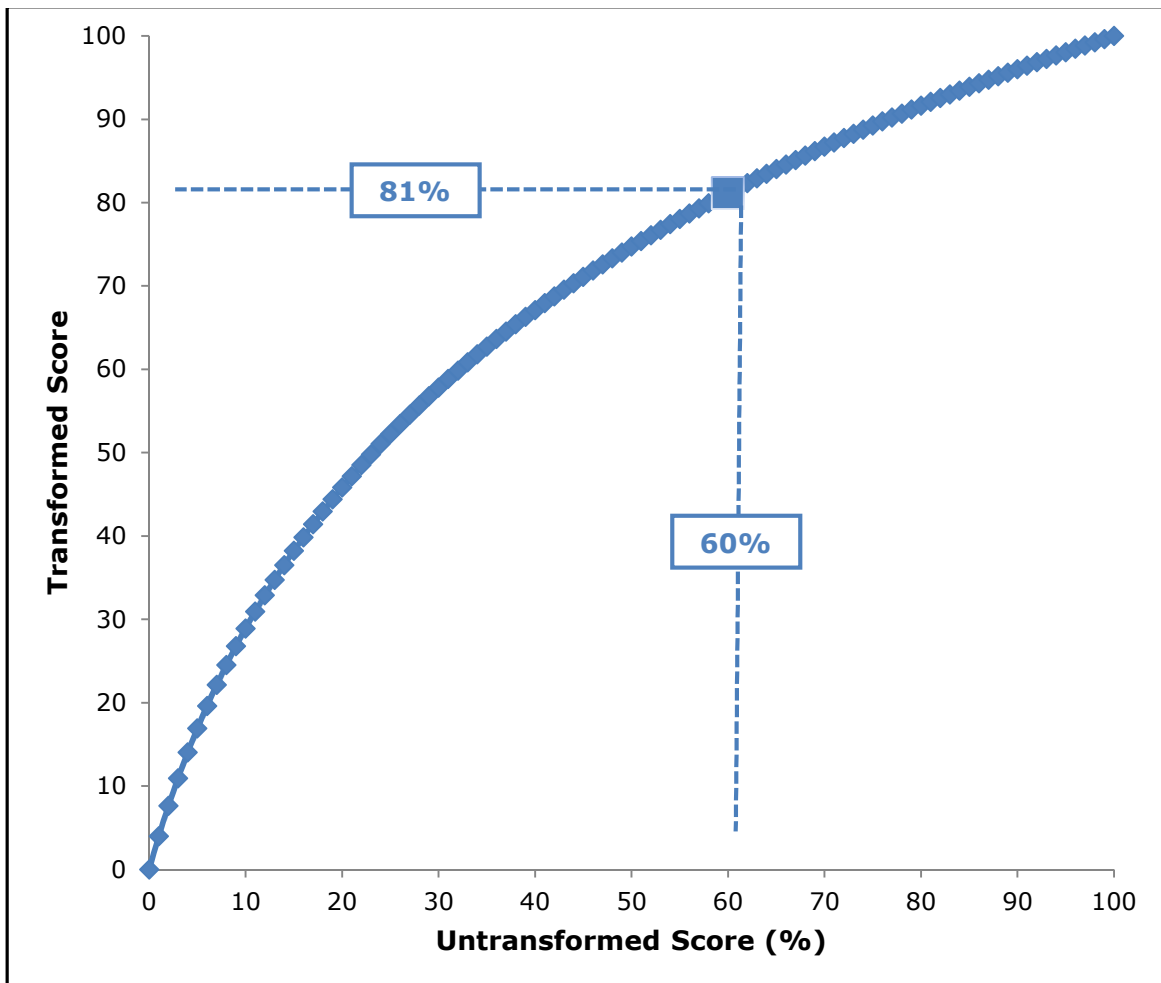


## Log Transformation

Weighted three-year reputation values are displayed in the ranking tables. Before the reputation data were combined into the Index of Hospital Quality (IHQ), log transformation was implemented to adjust for the skewed distribution of values. By its nature, a survey that solicits recommendations for “best hospitals” will result in data that do not follow a normal distribution—relatively few hospitals will receive even one recommendation, and of the hospitals recommended, even fewer will receive a substantial number of nominations. Since other ranking components such as structural measures and mortality are not similarly skewed, reputation would have a greater impact on the final rankings than is warranted if left unadjusted.

Log transformation reshapes the distribution to more closely match reputation data to those of other components. The transformation is applied to the weighted reputation data. The transformed data are then normalized and multiplied by 100 to provide scores ranging from 0 to 100. *Figure 1* demonstrates the effect of the transformation.

**Figure 1. Impact of Log Transformation on Reputation**



The transformed reputation scores are mostly higher than the untransformed scores, but the relative increases are larger for low scores than for high ones. For example, an untransformed reputation value of 1% has a transformed score of 4 (4 times greater), an untransformed value of 10% has a transformed score of 29 (2.9 times greater), and an untransformed value of 60% has a transformed score of 81 (1.4 times greater). Skewness is thus reduced, and the impact of reputation on final standing in the rankings is slightly diminished.

## D. Normalization and Weighting

The process component, which consists of commitment to best practices, infection-prevention program, and reputation, is worth one-third (33.3%) of the overall score in each specialty. The overall measure weight and the process component weight is provided in *Table 16*. The overall weight for reputation was trimmed from 16.7% last year to 15.0% for 2016-17.

**Table 16. Weight of Individual Process Measures**

| Process Measure                       | Overall Weight | Process Component Weight |
|---------------------------------------|----------------|--------------------------|
| Commitment to Best Practices          | 9.15%          | 27.5%                    |
| Ability to Prevent Infections         | 9.15%          | 27.5%                    |
| Reputation with Pediatric Specialists | 15%            | 45.0%                    |
| Total                                 | 33.3%          | 100%                     |

As with the other components, individual process measures were normalized before being combined in the Index of Hospital Quality (IHQ). Normalization, as described in *Section IV.B*, transforms a measure's index values into a distribution between 0 and 1 based on the range of possible values. The range of reputation scores is from 0% (no nominations) to 100% (every surveyed physician nominated the hospital). Starting with the 2013-14 rankings, the normalized reputation score has determined the number of points hospitals received for reputation. After log transformation, if the highest reputation score in a given specialty is 80, for example, the hospital with that score receives a normalized score of 0.80. Because reputation is worth 15% of the overall score, the hospital receives  $0.80 \times 15$ , or 12 points, for reputation. In past years, hospitals with the highest reputation scores received the full point total.

## VI. Outcomes

For the Best Hospitals adult specialty rankings, risk-adjusted mortality 30 days after admission is a key outcome measure. Other measures now used by healthcare researchers as quality

indicators include readmissions following surgical or hospital discharge, patient functional status (or improvement), infection rates, and medical complications.<sup>###</sup>

Because of the absence of comprehensive national sources of pediatric outcomes data comparable to the Medicare Provider Analysis and Review (MedPAR) data used in the adult rankings, outcomes-related data are obtained directly from pediatric hospitals through the Pediatric Hospital Survey. Such data include BSI rates, transplant survival rates, mitigation of adverse events, and surgical outcomes. Other data will be added over time to address the need for relevant outcomes measures and to provide a more complete picture of pediatric hospital care. Measures for the 2016-17 rankings were developed from recommendations by expert advisory panels, as previously described. Details on specific outcomes measures, how they were calculated and how they were scored are provided below.

## **A. Outcome Measures**

Outcome measures are listed below, by specialty. Scoring rules used to assign points to hospitals for these outcomes are also described below. For all outcomes measures, a higher number of points indicates better outcomes (e.g., higher survival, lower mortality, fewer complications).

### **Cancer**

***Ability to Prevent Bedsores (5 points).*** Hospitals received up to 3 points for lower rates of Stage III, Stage IV and unstageable hospital-acquired pressure ulcers (A38.1 and A38.2). For each category, hospitals received 1 point for a pressure ulcer rate of  $\leq 0.1$  per 100 patient admissions assessed over the last four quarters. Hospitals also received up to 2 points for assessing a larger percentage of their total inpatients for pressure ulcers: 1 point for  $\geq 50\%$  and  $< 75\%$  and 2 points for  $\geq 75\%$ .

***Ability to Prevent ICU Infections (20 points).*** The rate of infections in intensive care units (ICUs) is considered a good benchmark of patient safety and outcome because such infections in hospital-based care should be minimal. Rates for two types of infections were tracked: central line-associated blood-stream infections (CLABSIs) and catheter-associated urinary tract infections (CAUTIs). CLABSI rates were calculated as the number of BSIs per 1,000 central-line days during the previous 12 months, and CAUTI rates were calculated as the number of infections per 1,000 catheter days during the previous 12 months.

CLABSI (A33.1) and CAUTI (A34.1) rates were tracked for critical care patients (average across patients in PICU, SICU, medical/surgical critical care and cardiothoracic critical care units).

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<sup>###</sup> For more information on hospital quality measures and updates on national quality of hospital care initiatives, see reports from the Agency for Healthcare Research and Quality (AHRQ) at <http://www.qualitymeasures.ahrq.gov/> and the Joint Commission at <http://www.jointcommission.org/>.

CLABSI rates were also tracked for all oncology/stem cell transplant patients (B22). Hospitals were rewarded for lower rates of infections.

For hospital-wide CLABSI rates, hospitals received up to 5 points per group: 1 point for  $> 2.0$  and  $\leq 3.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 2.0$  infections per 1,000 days, 3 points for  $> 1.0$  and  $\leq 1.5$  infections, per 1,000 days 4 points for  $> 0.5$  and  $\leq 1.0$  infections per 1,000 days, and 5 points for  $\leq 0.5$  infections per 1,000 days. For hospital-wide CAUTI rates, hospitals received up to 5 points per group: 1 point for  $> 3.0$  and  $\leq 5.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 3.0$  infections per 1,000 days, 3 points for  $> 1.0$  and  $\leq 1.5$  infections per 1,000 days, 4 points for  $> 0.5$  and  $\leq 1.0$  infections per 1,000 days, and 5 points for  $\leq 0.5$  infections.

Finally, for oncology/stem cell transplant patients CLABSI rates, hospitals received up to 10 points per group: 2 points for  $> 4.0$  and  $\leq 6.0$  infections per 1,000 days, 4 points for  $> 2.0$  and  $\leq 4.0$  infections per 1,000 days, 6 points for  $> 1.0$  and  $\leq 2.0$  infections per 1,000 days, 8 points for  $> 0.5$  and  $\leq 1.0$  infections and 10 points for  $\leq 0.5$  infections per 1,000 days.

***Five-Year Cancer Survival (12 points).*** This measure evaluated the percentage of pediatric patients at least 18 months old with all subtypes and risk levels of acute lymphoblastic leukemia (ALL), acute myeloid leukemia (AML), Stage I-II neuroblastoma and Stage III-IV neuroblastoma who were alive after 5 years of treatment in the pediatric cancer program (B35). For each of the three measures, hospitals could receive up to 3 points for having a high percentage of 5-year survivors. For ALL, points were awarded as follows: 1 point for  $\geq 70\%$  and  $< 85\%$  survival, 2 points for  $\geq 85$  and  $< 95\%$  survival, and 3 points for  $\geq 95\%$  survival. For AML, points were awarded as follows: 1 point for  $\geq 35\%$  and  $< 50\%$  survival, 2 points for  $\geq 50$  and  $< 60\%$  survival, and 3 points for  $\geq 60\%$  survival. For Stage I-II neuroblastoma, points were awarded as follows: 1 point for  $\geq 35\%$  and  $< 50\%$  survival, 2 points for  $\geq 50$  and  $< 70\%$  survival, and 3 points for  $\geq 70\%$  survival. For Stage III-IV neuroblastoma, points were awarded as follows: 1 point for  $\geq 30\%$  and  $< 50\%$  survival, 2 points for  $\geq 50$  and  $< 70\%$  survival, and 3 points for  $\geq 70\%$  survival.

***Survival after Bone Marrow Transplant (6 points).*** This measure assessed the percentage of pediatric patients aged 20 years or younger receiving allogeneic blood marrow (including cord blood and stem cell) transplants (BMTs) in the past 5 years who survived for at least 100 days following transplant (B20). Hospitals could receive up to 3 points for survival rates for sibling-matched (HLA-identical) allogeneic transplants and up to 3 points for all other allogeneic transplants: 1 point for  $\geq 75\%$  and  $< 90\%$  survival, 2 points for  $\geq 90\%$  and  $< 95\%$  survival, and 3 points for  $\geq 95\%$  survival.

## Cardiology & Heart Surgery

***Ability to Prevent Bedsores (5 points).*** Hospitals received up to 3 points for lower rates of Stage III, Stage IV and unstageable hospital-acquired pressure ulcers (A38.1 and A38.2). For each category, hospitals received 1 point for having a pressure ulcer rate of  $\leq 0.1$  per 100 patient admissions assessed over the last four quarters. Hospitals also received up to 2 points for assessing a larger percentage of their total inpatients for pressure ulcers: 1 point for  $\geq 50\%$  and  $< 75\%$  and 2 points for  $\geq 75\%$ .

***Ability to Prevent ICU Infections (10 points).*** The rate was calculated as the number of CLABSI (A33.1) and CAUTI (A34.1) infections per 1,000 device-days (i.e., central-line days and catheter-days) in critical care patients (weighted average across patients in PICU, SICU, medical/surgical critical care and cardiothoracic critical care units) during the previous 12 months. Hospitals were rewarded for lower rates of infections. For hospital-wide CLABSI rates, hospitals received up to 5 points per group: 1 point for  $> 2.0$  and  $\leq 3.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 2.0$  infections, 3 points for  $> 1.0$  and  $\leq 1.5$  infections, 4 points for  $> 0.5$  and  $\leq 1.0$  infections, and 5 points for  $\leq 0.5$  infections. For hospital-wide CAUTI rates, hospitals received up to 5 points per group: 1 point for  $> 3.0$  and  $\leq 5.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 3.0$  infections per 1,000 days, 3 points for  $> 1.0$  and  $\leq 1.5$  infections per 1,000 days, 4 points for  $> 0.5$  and  $\leq 1.0$  infections per 1,000 days, and 5 points for  $\leq 0.5$  infections.

***Norwood/Hybrid Surgery Survival (12 points).*** Hospitals received up to 12 points based on the percentage of patients who received the hybrid or Norwood Stage 1 procedure in the last 4 years and were alive without a heart transplant at 1 year of age (E40.1). Up to 3 points were awarded for each of the four reporting years for 1-year survival rates. Points were awarded as follows: 1 point for survival rates  $\geq 25\%$  and  $< 50\%$ , 2 points for survival rates  $\geq 50\%$  and  $< 75\%$ , and 3 points for survival rates  $\geq 75\%$ .

***Survival After Various Complex Procedures (24 points).*** This measure represents the rate of operative mortality (patient deaths) following moderately complex to very difficult heart surgery procedures (STAT levels 1-5) at pediatric hospitals in the four most recent reporting periods (E42). For each STAT level 1-5, a survival rate was computed based on data from the past 4 years. In each of the five STAT levels, hospitals received greater points for having a lower operative mortality rate following surgery. Points were assigned as follows:

- **STAT Level 1.** 1 point for operative mortality rates  $> 3\%$  and  $\leq 5\%$ , 2 points for rates  $> 1\%$  and  $\leq 3\%$ , and 3 points for rates  $\leq 1\%$ .

- **STAT Level 2.** 1 point for operative mortality rates  $> 4\%$  and  $\leq 8\%$ , 2 points for rates  $> 2\%$  and  $\leq 4\%$ , and 3 points for rates  $\leq 2\%$ .
- **STAT Level 3.** 1 point for operative mortality rates  $> 6\%$  and  $\leq 12\%$ , 2 points for rates  $> 3\%$  and  $\leq 6\%$ , and 3 points for rates  $\leq 3\%$ .
- **STAT Level 4.** 1 point for operative mortality rates  $> 10\%$  and  $\leq 20\%$ , 2 points for rates  $> 5\%$  and  $\leq 10\%$ , and 3 points for rates  $\leq 5\%$ .
- **STAT Level 5.** 1 point for operative mortality rates  $> 15\%$  and  $\leq 30\%$ , 2 points for rates  $> 8\%$  and  $\leq 15\%$ , and 3 points for rates  $\leq 8\%$ .

Hospitals received 9 additional points for lower rates of reoperation and support after initial surgeries for each of three types of surgeries: Tetralogy of Fallot (TOF) repair (E37.2), Arterial Switch Operations for Transposition of the Great Arteries with intact ventricular septum (TGA, IVS) (E37.3), and Ventricular Septal Defect (VSD) repair surgery (E37.4). For each type, hospitals received 1 point for  $> 4\%$  and  $\leq 8\%$  reoperation or support after the initial surgery, 2 points for  $> 2\%$  and  $\leq 4\%$  reoperation or support, and 3 points for  $\leq 2\%$  reoperation or support.

***Transplant Survival (6 points).*** Hospitals received up to 3 points based on the ratio of observed<sup>§§§§</sup>to expected survival rates for pediatric patients at 1 and 3 years following heart transplant (6 points total) (E23 and E24). The expected survival rate is calculated from statistical models that take into account various factors of both recipients and donors that affect success. A ratio of observed to expected survival rates greater than 1.0 indicates that more patients survived than expected, and a ratio of less than 1.0 indicates that fewer patients survived than expected. Points were awarded for both 1-year and 3-year ratios as follows: 1 point for ratios  $\geq 0.80$  and  $< 0.90$ , 2 points for ratios  $\geq 0.90$  and  $< 1.$ , and 3 points for ratios  $\geq 1.$

## **Diabetes & Endocrinology**

***Diabetic Management Success (36 points).*** This measure evaluated adverse events in Type 1 and Type 2 diabetes outpatients, mean hemoglobin A1c levels in primary care Type 1 diabetes outpatients and inpatient admissions for Type 1 and Type 2 primary care diabetes patients. Diabetes-related adverse events can result from lapse of care. Such events included severe hypoglycemic events, serious diabetes-related morbidity, and diabetes-related mortality (C41) in Type 1 and Type 2 diabetes outpatients. Hospitals received up to 2 points in each of the 3

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conditions (6 points total), with more points for lower levels of adverse events. Points were awarded as follows for hypoglycemic events: 1 point for  $> 1\%$  and  $\leq 3\%$  of patients with hypoglycemic events, and 2 points for having  $\leq 1\%$  of patients with hypoglycemic events. Points were awarded as follows for morbidity and mortality events: 1 point for  $> 0.1\%$  and  $\leq 0.5\%$  of patients with morbidity or mortality events, and 2 points for having  $\leq 0.1\%$  of patients with morbidity or mortality events.

Median hemoglobin A1c percentages were evaluated for two types of payers (private insurance and Medicaid) and three age groups (0-5 years of age, 6-12 years of age and 13-19 years of age). Increases in A1c values increase the risk of microvascular complications in patients. Hospitals received up to 2 points in each of the six groups (12 points total) for maintaining lower median A1c values (C35). Points were awarded as follows: 1 point for median hemoglobin A1c values  $> 8\%$  and  $\leq 10\%$ , and 2 points for values  $\geq 4\%$  and  $\leq 8\%$ .

Successful management of Type 1 and Type 2 diabetes patients is reflected by the type of primary care these patients receive. Hospitals were rewarded for lower incidence of inpatient admissions and visits to the ER/urgent care for diabetes-related causes for two types of payers (private insurance and Medicaid) (C29). For inpatient admissions, up to 2 points were awarded for Type 1 primary care diabetes patients for both insured groups (4 points total) as follows: 1 point for  $> 5\%$  and  $\leq 10\%$  of patients admitted for diabetes-related reasons, and 2 points for having  $\leq 5\%$  of patients admitted. Up to 2 points were awarded for Type 2 primary care diabetes patients for both insured groups (4 points total) as follows: 1 point for having  $> 8\%$  and  $\leq 16\%$  of patients admitted for diabetes-related reasons, and 2 points for having  $\leq 8\%$  of patients admitted. For ER/urgent care visits, up to 2 points were awarded separately for Type 1 and Type 2 primary care diabetes patients for both insured groups (8 points total) as follows: 1 point for having  $> 10\%$  and  $\leq 25\%$  of patients come to ER/urgent care for diabetes-related reasons, and 2 points for having  $\leq 10\%$  of patients come to ER/urgent care.

Hospitals received up to 2 points for LDL cholesterol management (C41.1). Hospitals were rewarded according to the percentage of patients with LDL cholesterol values less than 130 at the most recent measurement. Points were awarded as follows: 1 point for  $> 50\%$  and  $< 85\%$  of patients with low LDL values and 2 points for  $\geq 85\%$  of patients with low LDL values.

***Hypothyroid Management Success (3 points).*** Hospitals received up to 3 points for hypothyroid management (C59). Hospitals received points for having a higher percentage of new congenital hypothyroid patients referred at  $< 21$  days of age who received a confirmatory serum TSH  $> 50\text{uIU/ml}$  and began thyroid hormone therapy also before 21 days of age. Points were awarded as follows: 1 point for  $\geq 90\%$  and  $< 95\%$  of patients beginning therapy, 2 points for

≥ 95% and < 99% of patients beginning therapy, and 3 points for ≥ 99% patients beginning therapy.

## **Gastroenterology & GI Surgery**

***Ability to Prevent Bedsores (5 points).*** Hospitals received up to 3 points for lower rates of Stage III, Stage IV and unstageable hospital-acquired pressure ulcers (A38.1 and A38.2). For each category, hospitals received 1 point for having a pressure ulcer rate of ≤ 0.1 per 100 patient admissions assessed over the last four quarters. Hospitals also received up to 2 points for assessing a larger percentage of their total inpatients for pressure ulcers: 1 point for ≥ 50% and < 75% and 2 points for ≥ 75%.

***Ability to Prevent ICU Infections (10 points).*** The rate was calculated as the number of CLABSI (A33.1) and CAUTI (A34.1) infections per 1,000 device-days (i.e., central-line days and catheter-days) in critical care patients (weighted average across patients in PICU, SICU, medical/surgical critical care and cardiothoracic critical care units) during the previous 12 months. Hospitals were rewarded for lower rates of infections. For hospital-wide CLABSI rates, hospitals received up to 5 points per group: 1 point for > 2.0 and ≤ 3.0 infections per 1,000 days, 2 points for > 1.5 and ≤ 2.0 infections, 3 points for > 1.0 and ≤ 1.5 infections, 4 points for > 0.5 and ≤ 1.0 infections, and 5 points for ≤ 0.5 infections. For hospital-wide CAUTI rates, hospitals received up to 5 points per group: 1 point for > 3.0 and ≤ 5.0 infections per 1,000 days, 2 points for > 1.5 and ≤ 3.0 infections per 1,000 days, 3 points for > 1.0 and ≤ 1.5 infections per 1,000 days, 4 points for > 0.5 and ≤ 1.0 infections per 1,000 days, and 5 points for ≤ 0.5 infections.

***Success of Selected Treatments (9 points).*** This measure comprises of three items: percentage of patients receiving endoscopic procedures with severe complications (D30), percentage of patients receiving successful Kasai procedures (i.e., improvement total in bilirubin, no synthetic dysfunction, no surgical complications and delayed need for liver transplant) (D31.1) and percentage of patients treated for inflammatory bowel disease (IBD) experiencing prednisone-free remission (D32 and D33). For endoscopic procedures, points were awarded for fewer complications as follows: 1 point for > 3% and ≤ 5% complications, 2 points for > 1% and ≤ 3% complications, and 3 points for ≤ 1% complications. For Kasai procedure success, points were awarded as follows: 1 point for ≥ 30% and < 45%, 2 points for ≥ 45% and < 60% and 3 points for ≥ 60%. For IBD prednisone-free remission at the most recent visit, points were awarded as follows: 1 point for ≥ 55% and < 70% success, 2 points for ≥ 70% and < 85% success, and 3 points for ≥ 85% success.



***Survival after Liver Transplant (6 points).*** Hospitals received up to 3 points based on the ratio of observed\*\*\*\* to expected survival rates for pediatric patients at 1 and 3 years after isolated liver transplant (6 points total) (D21 and D22). The expected survival rate is calculated from statistical models that take into account various factors of both recipients and donors that affect success. A ratio of observed to expected survival rates greater than 1.0 indicates more patients survived than expected, and a ratio of less than 1.0 indicates that fewer patients survived than expected. Points were awarded as follows: 1 point for ratios  $\geq 0.80$  and  $< 0.90$ , 2 points for ratios  $\geq 0.90$  and  $< 1$ , and 3 points for ratios  $\geq 1$ .

## **Neonatology**

***Ability to Prevent NICU Infections (5 points).*** The rate was calculated as the number of BSIs per 1,000 central-line days during the previous 12 months (F26.1). Hospitals were rewarded for lower rates. Hospitals received up to 5 points as follows: 1 point for  $> 2.0$  and  $\leq 3.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 2.0$  infections, 3 points for  $> 1.0$  and  $\leq 1.5$ , 4 points for  $> 0.5$  and  $\leq 1.0$  infections, and 5 points for  $\leq 0.5$  infections.

***Breast Milk Management (5 points).*** Hospitals were rewarded for having a lower rate of breast milk administration errors, such as a newborn receiving the wrong breast milk. The rate was calculated as the number of breast milk administration errors per 1,000 breast feeding patient days (F10.6). Hospitals received up to 5 points as follows: 1 point for  $> 2.0$  and  $\leq 3.0$  errors per 1,000 breast milk feeding patient days, 2 points for  $> 1.0$  and  $\leq 2.0$  errors, 3 points for  $> 0.5$  and  $\leq 1.0$  errors, 4 points for  $> 0.25$  and  $\leq 0.5$  errors, and 5 points for  $\leq 0.25$  errors.

***Minimizing 30-Day Readmissions (3 points).*** Hospitals were rewarded for having lower 7-day readmission rates of patients discharged home from the NICU (F33.1). Points were awarded as follows: 1 point for  $> 3\%$  and  $\leq 10\%$ , 2 points for  $> 1\%$  and  $\leq 3\%$ , and 3 points for  $\leq 1\%$ .

***On Breast Milk at Discharge (3 points).*** Hospitals were rewarded for having higher rates of infants admitted at less than 7 days of age being discharged home from the NICU (before 120 days) on partial or full breast milk (F10.1). Points were awarded as follows: 1 point for  $> 0\%$  and  $< 50\%$ , 2 points for  $\geq 50\%$  and  $< 75\%$ , and 3 points for  $\geq 75\%$ .

***Unintended Removal of Breathing Tube (5 points).*** Hospitals were rewarded for having a lower rate of unintended extubations in infants without tracheostomy. The rate was calculated as the number of unintended extubations per 100 patient ventilator days (F32.1). Hospitals received up

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to 5 points as follows: 1 point for  $> 3.0$  and  $\leq 5.0$  extubations per 100 days, 2 points for  $> 2.0$  and  $\leq 3.0$  extubations, 3 points for  $> 1.0$  and  $\leq 2.0$  extubations, 4 points for  $> 0.5$  and  $\leq 1.0$  extubations, and 5 points for  $\leq 0.5$  extubation.

## **Nephrology**

***Ability to Prevent Bedsores (5 points).*** Hospitals received up to 3 points for lower rates of Stage III, Stage IV and unstageable hospital-acquired pressure ulcers (A38.1 and A38.2). For each category, hospitals received 1 point for having a pressure ulcer rate of  $\leq 0.1$  per 100 patient admissions assessed over the last four quarters. Hospitals also received up to 2 points for assessing a larger percentage of their total inpatients for pressure ulcers: 1 point for  $\geq 50\%$  and  $< 75\%$  and 2 points for  $\geq 75\%$ .

***Ability to Prevent Biopsy-Related Complications (6 points).*** This item measures the percentage of native kidney percutaneous biopsy procedures (G14) and percutaneous kidney transplant biopsies (G27) that resulted in a biopsy complication requiring readmission or a lengthened stay (G15 and G27.2). For both rates, hospitals receive more points for having lower complication rates, as follows: 1 point for complication rates  $> 5\%$  and  $\leq 10\%$ , 2 points for complication rates  $> 2\%$  and  $\leq 5\%$ , and 3 points for complication rates  $\leq 2\%$ .

***Ability to Prevent Dialysis-Related Infections (9 points).*** Hospitals received 6 points based on a lower peritonitis rate (months of dialyses/cases of peritonitis) for pediatric outpatients on maintenance peritoneal dialysis (G24). For each of the past 2 years, up to 3 points were awarded: 1 point for a peritonitis rate of  $\geq 1$  and  $< 10$  months between peritonitis cases, 2 points for a rate of  $\geq 10$  and  $< 20$  months between cases, and 3 points for a rate of  $\geq 20$  months between cases.

Hospitals could receive an additional 3 points for having lower hemodialysis catheter-associated BSIs for outpatients on maintenance hemodialysis in the last 2 years (G37). Hospitals received points for each year as follows: 1 point for  $\geq 4.0$  and  $< 8.0$  infections per 100 patient months, and 2 points for  $\geq 2.0$  and  $< 4.0$  infections, and 3 points for  $< 2.0$  infections.

***Ability to Prevent ICU Infections (10 points).*** The rate was calculated as the number of CLABSI (A33.1) and CAUTI (A34.1) infections per 1,000 device-days (i.e., central-line days and catheter-days) in critical care patients (weighted average across patients in PICU, SICU, medical/surgical critical care and cardiothoracic critical care units) during the previous 12 months. Hospitals were rewarded for lower rates of infections. For hospital-wide CLABSI rates, hospitals received up to 5 points per group: 1 point for  $> 2.0$  and  $\leq 3.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 2.0$  infections, 3 points for  $> 1.0$  and  $\leq 1.5$  infections, 4 points for  $> 0.5$  and  $\leq 1.0$  infections, and 5 points for  $\leq 0.5$  infections. For hospital-wide CAUTI rates, hospitals received up

to 5 points per group: 1 point for  $> 3.0$  and  $\leq 5.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 3.0$  infections per 1,000 days, 3 points for  $> 1.0$  and  $\leq 1.5$  infections per 1,000 days, 4 points for  $> 0.5$  and  $\leq 1.0$  infections per 1,000 days, and 5 points for  $\leq 0.5$  infections.

***Managing Dialysis Patients (20 points).*** This measure evaluates outcomes for patients on maintenance dialysis during the past 2 calendar years (G23). Hospitals received up to 12 points for higher percentage of patients with these favorable outcomes: monthly Kt/V values of  $> 1.2$  for patients who received hemodialysis three times a week, percentage of total Kt/V values of  $\geq 1.8$  for patients receiving peritoneal dialysis, and percentage of patients with average Hb between 10g/dl and 13g/dl at least once on record in the past 12 months. Points were awarded separately for the two most recent years for each of the three outcomes. For the first two outcomes, points were awarded as follows: 1 point for desirable outcome rates  $\geq 80\%$  and  $< 90\%$ , and 2 points for desirable outcome rates  $\geq 90\%$ . For the third outcome, points were awarded as follows: 1 point for desirable outcome rates  $\geq 60\%$  and  $< 80\%$ , and 2 points for desirable outcome rates  $\geq 80\%$ .

Hospitals received up to an additional 8 points based on the percentage of end-stage renal disease patients receiving maintenance dialysis for at least 3 consecutive months who survived (G20). Rates were divided into four submeasures: hemodialysis with infants and children under 5 years of age, hemodialysis in children and adolescents aged 5-19, peritoneal dialysis with infants and children under 5 years of age, and peritoneal dialysis in children and adolescents aged 5-19. Up to 2 points per item were awarded: 1 point for survival rates  $\geq 80\%$  and  $< 90\%$ , and 2 points for survival rates  $\geq 90\%$ .

***Survival After Kidney Transplant (24 points).*** Hospitals received up to 24 points based on observed<sup>††††</sup> survival rates at 1 and 3 years of the kidney and of the patient for deceased-donor and living-donor kidney transplants (24 points total) (G32.1b, G32.2b, G32.3b, and G32.4b). A total of eight observed survival rates, each worth up to 3 points were included: 1- and 3-year graft survival rates (deceased donor), 1- and 3-year graft survival rates (living donor), 1- and 3-year patient survival rates (deceased donor), and 1- and 3-year patient survival rates (living donor). Points were awarded in each of the eight groups as follows: 1 point for rates  $\geq 0.50$  and  $< 0.80$ , 2 points for rates  $\geq 0.80$  and  $< 0.90$ , and 3 points for rates  $\geq 0.90$ .

## **Neurology & Neurosurgery**

***Ability to Prevent Surgical Complications (22 points).*** This measure rewards hospitals for having lower readmission rates for surgical complications. Hospitals received up to 8 points total

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for having a lower percentage of patients readmitted for cerebrospinal fluid leaks within 30 days of the following four surgical procedures: craniotomy, spinal surgery for dysraphism, Chiari decompression and shunt placement (H17). Points were awarded in each group as follows: 1 point for  $> 5\%$  and  $\leq 15\%$  readmission rate and 2 points for  $\leq 5\%$  readmission rate.

Hospitals received up to 2 points for having a lower 90-day readmission rates for patients receiving an intrathecal baclofen pump insertion procedure (H18). Points were awarded as follows: 1 point for  $> 5\%$  and  $\leq 15\%$  readmission rate and 2 points for  $\leq 5\%$  readmission rate.

Hospitals received up to 3 points for having lower unplanned returns within 30 days for patients receiving new/initial neurosurgical shunt placements (H29). Points were awarded as follows: 1 point for  $> 5\%$  and  $\leq 15\%$  unplanned return rate, 2 points for  $> 3\%$  and  $\leq 5\%$  unplanned return rate and 3 points for  $\leq 3\%$  unplanned return rate.

Hospitals received up to 3 points for having a lower percentage of unplanned returns to the operating room within two 30 days of receiving a craniotomy (H17.1). Points were awarded as follows: 1 point for  $> 5\%$  and  $\leq 15\%$  readmission rate, 2 points for  $> 3\%$  and  $\leq 5\%$  readmission rate and 3 points for  $\leq 3\%$  readmission rate.

Hospitals received up to 3 points for having a lower complication rate for craniofacial procedures performed (H33 and H34). Points were awarded as follows: 1 point for  $> 5\%$  and  $\leq 15\%$  complication rate, 2 points for  $> 3\%$  and  $\leq 5\%$  complication rate and 3 points for  $\leq 3\%$  complication rate.

Hospitals received up to 3 points for having lower 30-day complication rates for epilepsy surgical resection in patients with convulsive disorders (H8 and H8.2). Points were awarded as follows: 1 point for  $> 5\%$  and  $\leq 10\%$  complication rate, 2 points for  $> 3\%$  and  $\leq 5\%$  complication rate and 3 points for  $\leq 3\%$  complication rate.

***Management of Epilepsy Patients (10 points).*** Hospitals received up to 8 points for the percentage of patients receiving four specific treatments for epilepsy (temporal lobe epilepsy surgery, extra-temporal lobe epilepsy surgery, functional hemispherectomy, and corpus callosotomy for atonic seizures) who achieved Engle Class 1 after 12 months. For temporal lobe epilepsy surgery (H31a) and extra-temporal lobe epilepsy surgery (H31b), hospitals were rewarded for higher rates as follows: 1 point for seizure-free rates  $\geq 50\%$  and  $< 80\%$  and 2 points for seizure-free rates  $\geq 80\%$ . For functional hemispherectomy (H31c), hospitals were rewarded for higher rates as follows: 1 point for seizure-free rates  $\geq 75\%$  and  $< 90\%$  and 2 points for seizure-free rates  $\geq 90\%$ . And for corpus callosotomy (H31d), hospitals were rewarded for higher rates as follows: 1 point for seizure-free rates  $\geq 50\%$  and  $< 75\%$  and 2 points for seizure-free rates  $\geq 75\%$ .

Hospitals received up to 2 points for the percentage of unique patients admitted to the Epilepsy Monitoring Unit who developed convulsive seizures that persisted longer than 30 minutes despite the use of antiseizure medicine (H30.1). Hospitals were rewarded for lower rates as follows: 1 point for  $> 3\%$  and  $\leq 10\%$  of patients having an adverse event and 2 points for  $\leq 3\%$  of patients having an adverse event.

***Surgical Survival (14 points).*** Hospitals received up to 14 points for surgical survival rates for seven significant neurological disorders or procedures (H16), including brain tumors, craniosynostosis, hydrocephalus patient shunts, in utero repair of myelomeningocele for fetal CNS malformation, medically intractable epilepsy, spinal dysraphism and Chiari I malformation/syringomyelia. Lower mortality rates indicate better performance (i.e., a lower rate of death following surgery). Points were awarded as follows: 1 point for survival rates  $\geq 95\%$  and  $<99\%$  and 2 points for survival rates  $\geq 99\%$ .

## **Orthopedics**

***Ability to Prevent Surgical Complications (18 points).*** Hospitals received up to 18 points based on the rate of adverse outcomes for patients who received surgical correction for two types of scoliosis: idiopathic scoliosis and neuromuscular scoliosis. Three adverse outcomes were measured for both types of scoliosis: unplanned admissions within 7 days for scoliosis related issues, unplanned admissions within 8-30 days of procedure for scoliosis-related issues and returns to the operating room for equipment or mechanical issues with 90 days (I32). Hospitals received up to 3 points in each of the six categories, with more points for better performance (i.e., lower levels of adverse events): 1 point for complication rate  $> 7\%$  and  $\leq 10\%$ , 2 points for complication rate  $> 3\%$  and  $\leq 7\%$  and 3 points for complication rate  $\leq 3\%$ .

***Speed and Success with Complex Fractures (6 points).*** Hospitals received up to 4 points for having a higher percentage of patients with an operating room start time within 18 hours of admission to the ER for two conditions: operative reduction and fixation of supracondylar fracture (I25) of the humerus and femoral shaft fracture (I26). Points were awarded for supracondylar fractures as follows: 1 point for  $\geq 60\%$  and  $<90\%$  of patients with operating room start times within 18 hours and 2 points for  $\geq 90\%$ . Points were awarded for femoral shaft fractures as follows: 1 point for  $\geq 40\%$  and  $<80\%$  of patients with operating room start times within 18 hours and 2 points for  $\geq 80\%$ .

Hospitals received up to 2 points for successful outpatient treatment (without requiring hospital admission) of patients with radiographically assisted reductions of displaced forearm fractures (I27). Points were awarded as follows: 1 point for  $\geq 60\%$  and  $<90\%$  of patients without requiring hospital admission and 2 points for  $\geq 90\%$ .

## Pulmonology

***Ability to Prevent Bedsores (5 points).*** Hospitals received up to 3 points for having lower rates of Stage III, Stage IV and unstageable hospital-acquired pressure ulcers (A38.1 and A38.2). For each of the three categories, hospitals received 1 point for having a pressure ulcer rate of  $\leq 0.1$  per 100 patient admissions assessed over the last four quarters. Hospitals also received up to 2 points for assessing a larger percentage of their total inpatients for pressure ulcers: 1 point for  $\geq 50\%$  and  $< 75\%$  and 2 points for  $\geq 75\%$ .

***Ability to Prevent ICU Infections (10 points).*** The rate was calculated as the number of CLABSI (A33.1) and CAUTI (A34.1) infections per 1,000 device-days (i.e., central-line days and catheter-days) in critical care patients (weighted average across patients in PICU, SICU, medical/surgical critical care and cardiothoracic critical care units) during the previous 12 months. Hospitals were rewarded for lower rates of infections. For hospital-wide CLABSI rates, hospitals received up to 5 points per group: 1 point for  $> 2.0$  and  $\leq 3.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 2.0$  infections, 3 points for  $> 1.0$  and  $\leq 1.5$  infections, 4 points for  $> 0.5$  and  $\leq 1.0$  infections, and 5 points for  $\leq 0.5$  infections. For hospital-wide CAUTI rates, hospitals received up to 5 points per group: 1 point for  $> 3.0$  and  $\leq 5.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 3.0$  infections per 1,000 days, 3 points for  $> 1.0$  and  $\leq 1.5$  infections per 1,000 days, 4 points for  $> 0.5$  and  $\leq 1.0$  infections per 1,000 days, and 5 points for  $\leq 0.5$  infections.

***Management of Cystic Fibrosis Patients (16 points).*** Hospitals received up to 14 points for representing better outcomes for patients with cystic fibrosis (J24b-e). Hospitals received up to 12 points (3 points for each item) for improving the functional status of cystic fibrosis patients' median body mass index (BMI), median forced expiratory volume ( $FEV_1$ ), the percentage of children 6-17 who met treatment guidelines for CF patients (at least four outpatient visits, one culture, two spirometries), and median weight-for-length percentile for CF patients 24 months of age or less. More points indicate better outcomes or better functional status. For BMI, points were awarded as follows: 1 point for median BMI percentile  $\geq 40$  and  $< 45\%$ , 2 points for median BMI percentile  $\geq 45\%$  and  $< 50\%$  and 3 points for median BMI percentile  $\geq 50\%$ . For the  $FEV_1$  measure, points were awarded as follows: 1 point for median  $FEV_1 \geq 80$  and  $< 90\%$ , 2 points for median  $FEV_1 \geq 90\%$  and  $< 100\%$  and 3 points for median  $FEV_1 \geq 100\%$ . For the percentage of children meeting treatment guidelines, points were awarded as follows: 1 point for  $\geq 50$  and  $< 75\%$ , 2 points for  $\geq 75\%$  and  $< 90\%$  and 3 points for median  $FEV_1 \geq 90\%$ . For median weight-for-length percentile for CF patients 24 months of age or less, points were awarded as follows: 1 point for  $\geq 25$  and  $< 50\%$ , 2 points for  $\geq 50\%$  and  $< 75\%$  and 3 points for median  $FEV_1 \geq 75\%$ .

Hospitals received up to 2 additional points for meeting performance benchmarks for cystic fibrosis. One point was awarded for having met the benchmark of  $< 10\%$  quantity not sufficient

(QNS) when conducting pilocarpine iontophoresis (sweat test) for cystic fibrosis with infants (0-3 months of age) (J21); 1 additional point was awarded for meeting the benchmark of < 5% QNS for children over 3 months (J22).

Hospitals received up to 2 points for having higher rates of patients over age 10 with cystic fibrosis (not already taking insulin) who completed an oral glucose tolerance test in the previous 12 months (J23). One point was awarded for  $\geq 50\%$  and  $< 75\%$  of patients completing the test and 2 points were awarded for  $\geq 75\%$  of patients completing the test.

***Success with Asthma Inpatients (5 points).*** Success with asthma patients was measured by two factors: shorter inpatient stays and lower readmission rates for asthma-related symptoms. Up to 2 points are awarded for shorter lengths of stay for asthma inpatients (J11): 1 point for an average stay  $> 2$  days and  $\leq 4$  days and 2 points for a stay  $\leq 2$  days.

Hospitals were awarded up to 3 points based on the percentage of asthma inpatients readmitted within 7 days for exacerbation of asthma-related symptoms (J12). Hospitals were rewarded for lower percentages of inpatient readmissions: 1 point for readmission rates  $> 3\%$  and  $\leq 5\%$ , 2 points for rates  $> 1\%$  and  $\leq 3\%$  and 3 points for rates  $\leq 1\%$ .

***Survival after Lung Transplant (6 points).*** Hospitals received up to 6 points based on the observed<sup>\*\*\*\*</sup> survival rates at 1-year and 3-year for pediatric lung transplant patients (J47 and J48). Points were awarded in each group as follows: 1 point for observed survival rates  $\geq 50\%$  and  $< 80\%$ , 2 points for rates  $\geq 80\%$  and  $< 90\%$ , and 3 points for rates  $\geq 90\%$ .

***Ventilator Patient Survival (6 points).*** Hospitals received up to 6 points for lower rates of inpatient deaths and at-home deaths over the last 3 years for ventilator-dependent patients due to accidental obstruction, decannulation or tracheostomy (J41). For both inpatient and at-home, higher survival rates indicate better performance (i.e., lower rate of death of patients on ventilators) and were awarded more points, as follows: 1 point for survival  $\geq 95\%$  and  $< 97\%$ , 2 points for survival  $\geq 97\%$  and  $< 99\%$  and 3 points for survival  $\geq 99\%$ .

## **Urology**

***Ability to Prevent Surgical Complications (27 points).*** This measure evaluated a number of complications and adverse outcomes in patients who received urologic surgical procedures in the last 3 years. Complications included distal hypospadias, proximal hypospadias and pyeloplasty (K15).

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\*\*\*\* The SRTR now uses “estimated” rather than “observed” survival in its public reports. This report uses “observed” for consistency with other Best Children’s Hospitals measures.

Hospitals received up to 9 points total for the three measures, with more points awarded for better performance (i.e., lower complication rates). For distal hypospadias and pyeloplasty the points were awarded as follows: 1 point for rates  $> 3\%$  and  $\leq 5\%$ , 2 points for rates  $> 1\%$  and  $\leq 3\%$  and 3 points for rates  $\leq 1\%$ . For proximal hypospadias: 1 point for rates  $> 10\%$  and  $\leq 15\%$ , 2 points for rates  $> 5\%$  and  $\leq 10\%$  and 3 points for rates  $\leq 5\%$ . Adverse events included unplanned hospital admissions for urologic issue within 30 days of inpatient surgery, unplanned hospital admission within 30 days following an ambulatory procedure, and unplanned reoperation for a urologic issue within 48 days of surgery (K16). Hospitals received up to 3 points for each of the three measures for both major and minor procedures (18 points total), with more points awarded for better performance (i.e., lower adverse event rates). For major procedures, points were awarded as follows: 1 point for rates  $> 5\%$  and  $\leq 10\%$ , 2 points for rates  $> 1\%$  and  $\leq 5\%$  and 3 points for rates  $\leq 1\%$ . For minor procedures points were awarded as follows: 1 point for rates  $> 2\%$  and  $\leq 5\%$ , 2 points for rates  $> 1\%$  and  $\leq 2\%$  and 3 points for rates  $\leq 1\%$ .

***Ability to Prevent Urinary-Tract Infections (5 points).*** The rate was calculated as the number of CAUTI infections per 1,000 catheter-days in critical care patients (weighted average across patients in PICU, SICU, medical/surgical critical care and cardiothoracic critical care units) during the previous 12 months (A34). Hospitals were rewarded for lower rates of infections. For hospital-wide CAUTI rates, hospitals received up to 5 points per group: 1 point for  $> 3.0$  and  $\leq 5.0$  infections per 1,000 days, 2 points for  $> 1.5$  and  $\leq 3.0$  infections per 1,000 days, 3 points for  $> 1.0$  and  $\leq 1.5$  infections per 1,000 days, 4 points for  $> 0.5$  and  $\leq 1.0$  infections per 1,000 days, and 5 points for  $\leq 0.5$  infections.

***Emergency Treatment for Testicular Torsion (2 points).*** This measure evaluates how quickly patients who presented with torsion of the testis received care following their registration for care in the ED or outpatient clinic (K19). Hospitals received 1 point for  $\geq 50\%$  and  $< 90\%$  of patients having an OR start time  $< 4$  hours following check-in at the hospital, and 2 points for  $\geq 90\%$  of patients having an OR start time  $< 4$  hours.

## **B. Normalization and Weighting**

As with structural and process measures, individual outcomes measures were normalized to have a distribution between 0 and 1. **Table 17** shows the relative weight of each measure on the total outcomes score for that specialty. The outcomes measures combined are worth 33.3% of the overall score. To determine the percent of the overall score for a given measure, divide the individual measure relative weight by the total weight for that specialty and multiply by 33.3 (since the combined structural components comprise 33.3% of the overall score in each specialty).



**Table 17. Relative Weights of Outcomes Measures, by Specialty**

| Measure   | Cancer     | Cardiology & Heart Surgery | Diabetes & Endocrinology | Gastroenterology & GI Surgery | Neonatology | Nephrology  | Neurology & Neurosurgery | Orthopedics | Pulmonology | Urology     |
|---|------------|----------------------------|--------------------------|-------------------------------|-------------|-------------|--------------------------|-------------|-------------|-------------|
| Ability to prevent bedsores                     | 0.5        | 0.5                        |                          | 0.5                           |             | 0.5         |                          |             | 0.5         |             |
| Ability to prevent biopsy-related complications |            |                            |                          |                               |             | 1           |                          |             |             |             |
| Ability to prevent dialysis-related infections  |            |                            |                          |                               |             | 1           |                          |             |             |             |
| Ability to prevent ICU infections               | 1          | 1                          |                          | 0.75                          | 2           | 0.75        |                          |             | 1           |             |
| Ability to prevent surgical complications       |            |                            |                          |                               |             |             | 1.25                     | 1           |             | 1.75        |
| Ability to prevent urinary tract infections     |            |                            |                          |                               |             |             |                          |             |             | 1           |
| Breast milk management                          |            |                            |                          |                               | 1           |             |                          |             |             |             |
| Diabetes management success                     |            |                            | 2                        |                               |             |             |                          |             |             |             |
| Emergency treatment for testicular torsion      |            |                            |                          |                               |             |             |                          |             |             | 1           |
| Five-year cancer survival                       | 1          |                            |                          |                               |             |             |                          |             |             |             |
| Hypothyroid management success                  |            |                            | 1                        |                               |             |             |                          |             |             |             |
| Management of cystic fibrosis patients          |            |                            |                          |                               |             |             |                          |             | 2           |             |
| Management of epilepsy patients                 |            |                            |                          |                               |             |             | 1                        |             |             |             |
| Managing dialysis patients                      |            |                            |                          |                               |             | 1           |                          |             |             |             |
| Minimizing 30-day readmissions                  |            |                            |                          |                               | 1           |             |                          |             |             |             |
| Norwood/hybrid surgery survival                 |            | 1                          |                          |                               |             |             |                          |             |             |             |
| On breast milk at discharge                     |            |                            |                          |                               | 1           |             |                          |             |             |             |
| Speed and success with complex fractures        |            |                            |                          |                               |             |             |                          | 1           |             |             |
| Success at selected treatments                  |            |                            |                          | 2                             |             |             |                          |             |             |             |
| Success with asthma inpatients                  |            |                            |                          |                               |             |             |                          |             | 1.5         |             |
| Surgical survival                               |            |                            |                          |                               |             |             | 1                        |             |             |             |
| Survival after bone marrow transplant           | 1          |                            |                          |                               |             |             |                          |             |             |             |
| Survival after transplant                       |            |                            |                          | 1                             |             | 1           |                          |             | 1           |             |
| Survival after various complex procedures       |            | 2                          |                          |                               |             |             |                          |             |             |             |
| Transplant survival                             |            | 1                          |                          |                               |             |             |                          |             |             |             |
| Unintended removal of breathing tube            |            |                            |                          |                               | 1           |             |                          |             |             |             |
| Ventilator patient survival                     |            |                            |                          |                               |             |             |                          |             | 1           |             |
| <b>Total</b>                                    | <b>3.5</b> | <b>5.5</b>                 | <b>3</b>                 | <b>4.25</b>                   | <b>6</b>    | <b>5.25</b> | <b>3.25</b>              | <b>2</b>    | <b>7</b>    | <b>3.75</b> |

## VII. Calculation of the U.S. News Score

The U.S. News ranking score reflects the followings weights for each of the major components and the individual process measures:

- Structure = 33.3%
- Process = 33.3%
  - Commitment to best practices: 9.15%
  - Infection-preventing measures: 9.15%
  - Reputation with pediatric specialists: 15%
- Outcomes = 33.3%

Relative structural measure weights can be found in Table 8, and the relative outcomes measure weights are shown in Table 17.

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 any of the three components would individually. The rankings for the top 50 hospitals in each of the pediatric specialties, by U.S. News score, are shown in **Appendix C**. Starting with the 2012-13 rankings, hospitals with the same U.S. News rounded score are considered tied.

The formula for calculating the U.S. News score for a given hospital is shown in Equation (2). The score can be thought of as a simple weighted sum of structural, process and outcome measures as shown below:

Equation (2)  $Score = (\sum_{i=1}^{n_s} wts_i * s_i) + (\sum_{i=1}^{n_p} wtp_i * p_i) + (\sum_{i=1}^{n_o} wto_i * o_i)$ ,  
 where

- $Score$  = raw hospital score in a given specialty,
- $wts_i$  = weight assigned to structure measure  $i$ ,
- $wtp_i$  = weight assigned to process (reputation) measure  $i$ ,
- $wto_i$  = weight assigned to outcomes measure  $i$ ,
- $s_i$  = normalized value for structural measure  $i$ ,
- $p_i$  = normalized value for process measure  $i$ ,
- $o_i$  = normalized value for outcomes measure  $i$ .

Please note that the formula is meant for illustrative purposes only; it *cannot* be used to directly calculate a score for an individual hospital. For presentation purposes, raw scores are transformed to a scale that assigns a U.S. News score of 100 to the top hospital. The formula for the transformation is shown in Equation (3):

$$\text{Equation (3) } \text{U.S. News Score} = (\text{score} - \text{minimum}) / \text{range}$$

## VIII. Pediatric Honor Roll

In all, 78 different hospitals were ranked in at least one pediatric specialty in the 2016-17 rankings. The Best Children's Hospitals Honor Roll, established in 2009, recognizes excellence across a broad range of pediatric specialties. Honor Roll hospitals are highly ranked in at least three specialties. Within the Honor Roll, hospitals are ordered by points. Starting with the 2012-13 rankings, a hospital received 2 points if it ranked among the top 5% of all ranking-eligible hospitals in a specialty (among the top five in a specialty with 90 to 109 eligible hospitals, for example) and 1 point if ranked in the top 6-10%. For 2016-17, 11 hospitals qualified for the Honor Roll. *Appendix D* lists the 2016-17 Honor Roll hospitals.

## IX. 2016-17 Changes

- **Reputation weight.** The overall weight for reputation was lowered from 16.7% last year to 15% for the current year. The overall weights for Commitment to Best Practices and for Infection-Preventing Measures were increased to 9.15%. The process component weight remains at 33.3%.
- **Transplant survival.** Lung transplant survival was added as an outcomes measure in Pulmonology. Previously it was included in a structural measure focused on lung transplant programs. For Heart and Liver transplants, scores were revised to use a ratio of observed to expected survival rates; for Lung and Kidney transplants, expected survival rates were not available, so these transplants continue to be evaluated based on observed survival.
- **Additional refinements.** Other changes reflect revisions to the survey that improve the quality of the data collected and reported by hospitals. Revisions to scoring ranges and relative weights were also made to better reflect excellent care by hospitals.

## X. Future Improvements

Continued refinements are anticipated during the next few years. They are likely to include the following:

- **Move to ICD-10.** The 2017 version of the Pediatric Hospital Survey will transition to ICD-10 diagnostic and procedure codes. To prepare for the transition, the project team will collaborate with the working groups, children’s hospitals and the CHA to update the survey.
- **Expand outcome measures.** We plan, for example, to explore alternatives for collecting additional mortality data, infection rates, patient functional measures, and complication rates.
- **Explore risk adjustment.** We will continue to investigate methods for risk-adjusting pediatric mortality data to better reflect hospital-to-hospital differences in patient mix, severity and comorbidities. These efforts are complicated by the fact that there are currently no national databases that cover all pediatric health care in the U.S. However, organizations such as the CHA, Children’s Hospital Neonatal Consortium and Society of Thoracic Surgeons are seeking to make some specialty-specific data available for the majority of pediatric institutions across the country. As these databases are developed and further expanded to include more pediatric facilities, we will explore their possible use in creating risk-adjusted outcomes and performance measures of health care.
- **Identify 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. Additional technologies, teams and practices that define high-quality pediatric services also will be evaluated.

The project team will continue to work with advisory panels of physicians, nurses, hospital quality specialists and other healthcare professionals. RTI and U.S. News are grateful to these expert volunteers. Their recommendations and advice have been invaluable.

## XI. Contact Information

We welcome suggestions and questions. Readers and users of the rankings are encouraged to contact the Best Children’s Hospitals research team at [BestHospitals@rti.org](mailto:BestHospitals@rti.org). 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>.

## XII. References

1. Donabedian A. Evaluating the quality of medical care. *Milbank Memorial Fund Quarterly*. 1966; 44:166-203.
2. Donabedian A. Promoting quality through evaluating the process of patient care. *Medical Care*. 1968; 6:181.
3. Donabedian A. The quality of care: How can it be assessed? *Journal of the American Medical Association*. 1988; 260:1743-1748.
4. Donabedian A. The seven pillars of quality. *Archives of Pathology and Laboratory Medicine*. 1990; 114:1115-1118.
5. Donabedian A. The role of outcomes in quality assessment and assurance. *Quality Review Bulletin*. 1992; 18(11):356-360.
6. National Center for Health Statistics. *The international classification of diseases, ninth revision, clinical modification (ICD-9-CM)*. Hyattsville, MD: National Center for Health Statistics. Available at <http://www.cdc.gov/nchs/icd/icd9.htm>. Accessed on April 21, 2006.

**Appendix A**  
**Glossary of Terms**

**Continuous EEG monitoring with pediatric neurology support.** EEG (electroencephalography) is 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 the brain's electrical activity continuously to help detect and diagnose neurological problems.

**Cryoablation.** This process uses cooled, thermally conductive gases and fluids circulated through hollow needles (cryoprobes) that are placed in contact with or inserted into diseased tissue to kill it.

**EEG source localization.** Source localization is the process of identifying the origin or site of seizure activity within the brain. The most common methods of doing this are the use of magnetoencephalography or EEG testing techniques.

**Functional magnetic resonance (fMR).** fMR is a specialized type of MRI scan that measures changes in blood flow related to neural activity.

**Genetic testing/counseling.** A genetic testing/counseling service is equipped with the appropriate laboratory facilities and is directed by a physician qualified to advise parents and prospective parents on potential problems in cases of genetic defects. A genetic test is the analysis of human DNA, RNA, chromosomes, proteins and certain metabolites 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.

**Image-guided radiation therapy (IGRT).** IGRT is 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).** IMRT is 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 allows for varying intensities.

**Intraoperative magnetic resonance imaging (ioMRI).** ioMRI uses a uniform magnetic field and radio frequencies to study tissue and structure of the body. It enables visualization of biochemical cellular activity in vivo without the use of ionizing radiation, radioisotopes or ultrasound.

**Magnetic resonance cholangiopancreatography (MRCP).** MRCP is a noninvasive approach for imaging the biliary and pancreatic ducts using MRI.

**Magnetic resonance spectroscopy (MRS).** MRS differs from MRI in that MRS uses a continuous band of radio wave frequencies to analyze the chemical composition of proton (hydrogen)-hydrogen based molecules in a variety of chemical compounds. This technology evaluates the chemical composition and integrity of functioning upper-motor neurons in the brain.

**Multidisciplinary pediatric acute pain/sedation service (available onsite 24 hours a day).**

This service provides monitored anesthesia care and sedation within the hospital (but not within an operating room or PICU), as well as 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 (e.g., general pediatrician, pediatric subspecialist or anesthesiologist) with documented education in conscious sedation and a registered nurse coordinator (or pain management clinical nurse specialist).

**Neonatal intensive care unit (NICU).** A NICU provides mechanical ventilation, neonatal surgery and special care for the sickest infants, including those with the lowest birth weights (below 1,500 grams), who are born in the hospital or transferred from another institution. The NICU is separate from the newborn nursery. A full-time neonatologist serves as director.

**Neurophysiological intraoperative monitoring.** This uses electrophysiological methods, including electroencephalography and electromyography, to monitor parts of the brain, spinal cord and peripheral nerves during surgery.

**Palliative care program.** A palliative care program is organized and staffed for children nearing the end of life or living with lifespan-limiting conditions. The program's 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. Programs must include at least one physician providing direct patient care; a nurse coordinator; and a social worker, certified child-life specialist or pastoral counselor. All program staff must have training in palliative care.

**Pediatric anesthesia program (available onsite 24 hours a day).** This team provides anesthesia care for children before, during and after surgery (or other medical procedures). The team provides 24-hour coverage by board-certified anesthesiologists who specialize in pediatric anesthesia.

**Pediatric intensive care unit (PICU).** A PICU is staffed with specially trained personnel and has 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.

**Pediatric pain management program (available onsite 24 hours a day).** Administered by specially trained physicians and other clinicians, this is a recognized clinical service or program providing specialized medical care, drugs or therapies for the management of acute or chronic pain and other distressing symptoms among children suffering from an acute illness of diverse causes.

**PET/computed tomography (PET/CT) scanning.** PET/CT combines the capabilities of PET and CT scanning into a single, integrated device that provides metabolic functional information for monitoring chemotherapy, radiotherapy, and surgical planning.

**Positron emission tomography (PET) scanning.** PET scanning is 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 activity. The scans are sectional images depicting metabolic activity or blood flow rather than anatomy.

**Radiofrequency ablation.** This procedure involves placing probes that emit radiofrequency energy into the heart using a catheter. The radiofrequency energy is then used to destroy abnormal electrical activity in the heart tissue.

**Rapid response team.** A rapid response team, also known as a medical emergency team, is distinct from the hospital "code" team. It 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 follows the SBAR (situation, background, assessment, recommendation) method to communicate such a change in condition effectively and efficiently (i.e., escalation policy); and (3) the team responds to the change in condition with the goal of reducing/eliminating preventable "codes."



**Rehabilitation program and consultation service.** This program provides either a rehabilitation unit and/or a consultation service within the pediatric program for patients requiring rehabilitation. The program must include a pediatric physiatrist (board certified/board eligible pediatric rehabilitation physician) as the director.

**Specialized chemistry laboratory.** This specialized diagnostic laboratory has the ability to use tandem mass spectroscopy and other advanced techniques to aid in the diagnosis of medical conditions in NICU patients. Laboratory should be able to complete one or more of the following tests: tandem mass spectroscopy, gas chromatography- mass spectroscopy, or amino acid analysis.

**Surgical intensive care unit (SICU) or dedicated beds in a NICU or a PICU for surgical patients.** A SICU is a specialized unit designed to meet the needs of pediatric surgical patients who require intensive care services following surgery. If you do not have a SICU, having dedicated surgical intensive care beds in your PICU is acceptable.

**Therapeutic meta-iodine-benzyl-guanidine with I-131 radionuclide (I-131 MIBG).** I-131MIBG is a functional imaging and treatment agent used to help locate, diagnose and treat tumors of adrenergic tissues, such as neuroblastoma and pheochromocytoma. For this question, we are only interested in therapeutic use of I-131 MIBG to treat cancer.

**Three-dimensional mapping.** This includes the use of three-dimensional imaging systems such as MRI or ultrasound to guide ablation probes.

**Virology laboratory with weekday 24-hour availability.** This is a diagnostic laboratory that supports the NICU by conducting culture and tissue studies to determine patients' virological conditions. Laboratory should be able to complete one or more of the following tests: HSV PCR from CSF, HSV PCR from blood, or direct HSV antigen testing for skin lesions.

**3-Tesla magnetic resonance imaging (3T MRI).** 3T MRI is a higher-powered version of MRI that offers improved morphological and functional studies of the brain compared with the more common field strength of 1.5T.

**Appendix B**  
**2016-17 Sample Physician Questionnaire**



# Best Children's Hospitals

Your nominations will be reflected in the 2016-17 U.S. News & World Report «specialty» rankings.

Please name up to 10 U.S. hospitals that in your opinion provide the best care in <<specialty>> for patients who have the most challenging conditions or who need particularly difficult procedures. *Do not consider location or cost. For a hospital that is part of a health system or medical school, please name the individual hospital.*

|    | Hospital | City | State |
|----|----------|------|-------|
| a. |          |      |       |
| b. |          |      |       |
| c. |          |      |       |
| d. |          |      |       |
| e. |          |      |       |
| f. |          |      |       |
| g. |          |      |       |
| h. |          |      |       |
| i. |          |      |       |
| j. |          |      |       |

**Fax response to (800) XXX-XXXX  
or return in postpaid envelope.**

## **Appendix C**

### **2016-17 Best Children's Hospital Rankings by Specialty**























## **Appendix D**

### **2016-17 Best Children's Hospitals Honor Roll**

### 2016-17 Best Children's Hospitals Honor Roll

| <b>Rank</b> | <b>Hospital</b>   | <b>Points</b> | <b>Specialties</b> |
|-------------|---|---------------|--------------------|
| 1           | Boston Children's Hospital  | 20            | 10                 |
| 2           | Children's Hospital of Philadelphia                               | 19            | 10                 |
| 3           | Cincinnati Children's Hospital Medical Center                     | 15            | 8                  |
| 4           | Texas Children's Hospital, Houston                                | 12            | 7                  |
| 5           | Seattle Children's Hospital                                       | 6             | 5                  |
| 6           | Ann and Robert H. Lurie Children's Hospital of Chicago            | 5             | 4                  |
| 7           | Children's Hospital Los Angeles                                   | 4             | 4                  |
| 7           | Children's Hospital of Pittsburgh of UPMC                         | 4             | 4                  |
| 9           | Children's Hospital Colorado, Aurora                              | 4             | 3                  |
| 10          | Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif. | 3             | 3                  |
| 10          | Nationwide Children's Hospital, Columbus, Ohio                    | 3             | 3                  |



