Hospital Discharge Data, 2005
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Potentially Avoidable Pediatric Hospitalizations in Tennessee, 2005

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The Concept of a Potentially Avoidable Pediatric Hospitalization

Potentially avoidable pediatric hospitalizations are those inpatient cases that can be prevented by effective primary care delivered earlier to the hospitalized children in the community setting.[1] These hospitalizations can now be identified using an analytical tool developed and released by the federal Agency for Healthcare Research and Quality (AHRQ) based on a set of clinically verified inpatient diagnostic codes.[2] This *Issue Brief* uses this new tool called The Pediatric Quality Indicators (PDIs)[3] and applies it to Tennessee pediatric inpatient discharge records for 2005 to produce the data analyzed in this report.

The development of the analytical tools for identifying potentially avoidable hospitalizations (PAHs) for the pediatric population followed closely the evolution and progress of the AHRQ Quality Indicators Project. In the initial efforts to identify these indicators, investigators at Stanford University and the University of California who worked under a contract with AHRQ concluded that quality care inside the hospital might be reflected by a set of measures called the Prevention Quality Indicators. These could be used with hospital inpatient discharge data to identify hospitalizations for ambulatory care sensitive conditions (ACSCs) for which expected optimal outpatient care delivered earlier should have prevented the need for an inpatient admission at a later time. In the first release of the Prevention Quality Indicators in 2004, a set of sixteen (16) inpatient diagnoses and their ICD-9 codes were introduced for identifying PAHs and they included diagnoses for both adult and pediatric populations.[4]

In 2006, AHRQ reported its first Pediatric Quality Indicators (PDIs) for measuring quality care for hospitalized pediatric patients. These are the first set of measures developed by AHRQ exclusively for children and have just begun to be used by researchers and state health analysts in the evaluation of the quality and adequacy of primary care in a state or a region of a state and in assessing for possible disparities between groups using a statewide discharge dataset.

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Data and Methods

Data source. Tennessee law (Tennessee Code Annotated (TCA), Section 68-1-108) requires that every licensed hospital report all claims data found on the UB-92 Form to the Planning and Assessment of the Department of Health. Since 1997, the Division of Health Statistics in the Office of Policy Planning and Assessment of the Tennessee Department of Health has established a data system, the Hospital Discharge Planning System (HDDS), to collect, compile and disseminate hospital discharge data annually.[5] The data presented in this report contain excerpts from the 2005 HDDS dataset that covers the data period from January 1, 2005 through December 31, 2005.

Study Population. The study population is restricted to pediatric patients defined as those under 18 years of age, not in Major Diagnostic Category (MDC) 14 (Pregnancy, Childbirth and the Puerperium), and not in an adult Diagnosis Related Group (DRG). They must be discharged from a non-federal short-stay Tennessee hospital such as a general medical and surgical hospital, women's or OB/GYN hospital, or a pediatric hospital.[6] Excluded are patients from long-term, psychiatric, rehabilitation, and other specialty hospitals. Also excluded, following the guidelines for using the AHRQ Pediatric Quality Indicators, are patients who were transferred from another institution and patients discharges against medical advice.

Identification of Area-Level PDIs. For this report, we used the revised AHRQ definitions for PDIs as reported in the March 2007 revision of the AHRQ Publication, *Measures of Pediatric Health Care Quality Based on Hospital Administrative Data, The Pediatric Quality Indicators, Ver. 3.1*.[3] This publication, together with its companion publication, *AHRQ Quality Indicators – Prevention Quality Indicators: Technical Specifications 3.2*,[7] provides a comprehensive review of the origins, background, and technical specifications of the AHRQ Quality Indicators Project.

AHRQ released two sets of PDIs in the March 2007 revision: Provider-Level Indicators and Area-Level Indicators. The former are for measuring the quality of pediatric care received in a hospital while the latter identify potentially avoidable hospitalizations thereby allowing policy makers to target specific population groups that appear to be developing more severe diseases requiring hospitalization. Higher than anticipated rates of the Area-Level PDI cases may reflect poor access to care, barriers to timely care, barriers to adherence to medical advice, cultural influences that preclude seeking early treatment, or higher prevalence of poor health behaviors. Interventions may address any of these factors. The results for this *Issue Brief* are reported based upon the Area-Level PDIs listed below.

PDI Number	Description
14	Asthma Admission Rate
15	Diabetes Short-term Complication Rate
16	Gastroenteritis Admission Rate
17	Perforated Appendix Admission Rate
18	Urinary Tract Infection Admission Rate

Results

As shown in Table 1, 6,725 pediatric hospitalizations fit the definition of one of the five PDIs and were thus identified as potentially avoidable pediatric hospitalizations

(PAPHs). This represents about 5.1% of the 131,023 of total hospitalizations of children under the age of 18 in Tennessee.

Table 1 - Potentially Avoidable Pediatric Hospitalizations in Tennessee and U.S., 2005

PDI #	Pediatric Quality Indicators (PDI)	Total Discharges	Rate per 100,000 TN Pediatric Population[2]	Rate per 100,000 US Pediatric Population[1]
14	Asthma Admission Rate[3]	1,927	150.2	180.9
15	Diabetes Short-Term Complication Admission Rate[4]	505	52.3	29.0
16	Gastroenteritis Admission Rate[5]	2,923	203.9	182.5
17	Perforated Appendix Admission Rate[6]	370	36.0	31.2
18	Urinary Tract Infection Admission Rate[7]	1,000	69.8	52.9
	Total	6,725		

Notes:

[1] Source: The HCUP Kids' Inpatient Database, 2003; Rates are per 100,000 except for perforated appendix (per 100 discharges for appendicitis) (AHRQ Quality Indicators, http://www.qualityindicators.ahrq.gov)

[2] Source of Tennessee Population: U.S. Census Bureau Estimate - Tennessee (2005) by Age (www.census.gov, downloaded 6/27/08)

[3] Denominator = TN population age 2-17 years (2005)

[4] Denominator = TN population age 6 -17 years (2005)

[5] Denominator = TN population age 3 months - 17 years (2005)

[6] Denominator = All non-maternal discharges for appendicitis (ICD-9 codes: 5400, 5401, 5409 and 541)

[7] Denominator = TN population age 2-17 years (2005)

Among the five diagnostic categories, gastroenteritis was the leading PDI accounting for 43.5% of the state total of PAPHs in 2005. This was followed by asthma (28.7% of total) and urinary tract infection (14.9% of total). Diabetes short-term complication (7.5% of total) and perforated appendix (5.5% of total) were the two least common PDIs in 2005.

Compared to the U.S., Tennessee experienced a higher rate of PAPHs per 100,000 children under 18 years of age in four of the five PDIs with asthma as the only exception. For example, Tennessee exceeded the U.S. by a large margin in the rates of Diabetes Short-Term Complication (52.3 vs. 29.0 per 100,000 children in the general population), Gastroenteritis (203.9 vs. 182.5 per 100,000 children in the general population), and Urinary Track Infection (69.8 vs. 52.9 per 100,000 children in the general population).

In terms of gender distribution shown in Table 2, a practically identical proportion of male and female PAPH discharges were reported for 2005, with boys and girls reporting 5.2% and 5.1% of their respective total discharges as PAPHs.

Table 2 - Potentially Avoidable Pediatric Hospitalizations by Gender, 2005

Gender	All Pediatric Discharges	Pediatric PAHs	% PAHs of Total
Female	64,621	3,274	5.1%
Male	66,378	3,451	5.2%
Unknown	24	0	0.0%
Total	131,023	6,725	5.1%

Table 3 summarizes PAPHs by race. In 2005, Black and White children in Tennessee reported 27,378 and 88,565 inpatient hospitalizations, respectively, for all conditions. Black pediatric patients appeared to have a slightly higher rate of PAPHs than White patients (6.0% vs. 5.2%), while Hispanics and other small racial groups, such

as Asians, Native Americans and Pacific Islanders, exhibited much lower rates than either the White or Black population subgroup.

Table 3 - Potentially Avoidable Pediatric Hospitalizations by Race, 2005

Race	All Pediatric Discharges	Pediatric PAHs	% PAHs of Total
White	88,565	4,597	5.2%
Black	27,378	1,635	6.0%
Hispanic	4,905	209	4.3%
Other	4,229	142	3.4%
Unknown	5,946	142	2.4%
Total	131,023	6,725	5.1%

Table 4 reports total pediatric discharges for all conditions by major payer group and corresponding PAPHs. For children, Medicare discharges were the smallest (141 or less than 1% of 131,023 of total discharges for all conditions), with TennCare (63,809 or 48.7% of total) and Commercial/Blue Cross and Blue Shield (55,117 or 42.1% of total) as the two highest payer groups. The Uninsured/Self Pay category (3,446 or 2.6% of total) includes primarily patients who reported no insurance coverage at the time of admission. Other payer groups (i.e., Champus/Military and Workers Compensation) accounted for 8,510 or 6.5% of pediatric discharges across all conditions. A comparison of the rates of PAPHs as a percentage of total discharges across the payer groups indicates that 1.4% of all Medicare discharges were PAPHs, followed by TennCare (5.4%), Commercial/Blue Cross and Blue Shield (4.8%) and Self Insured/Self Pay (5.0%). The “Other” category reported the lowest rate of PAPHs at 5.0%.

Table 4 - Potentially Avoidable Pediatric Hospitalizations by Payer, 2005

Payer	All Pediatric Discharges	Pediatric PAHs	% PAHs of Total
Medicare	141	2	1.4%
TennCare	63,809	3,473	5.4%
Commercial & BC/BS	55,117	2,653	4.8%
Self Insured/Self Pay	3,446	173	5.0%
Other	8,510	424	5.0%
Total	131,023	6,725	5.1%

Table 5 reports total costs by PDI for 2005. Total costs were not available directly from the Tennessee Discharge Database. We estimated them from total dollar amounts of discharges reported by the Discharge Database and deflate them by a cost-to-charge ratio calculated for each hospital based on the cost and discharge data reported in the 2005 edition of the *Tennessee Joint Annual Report of Hospitals*. Total costs for Asthma ($5,163,281) were the highest, followed by Gastroenteritis ($4,584,433), Perforated Appendices ($3,167,600), Urinary Tract Infection ($2,601,700), and Diabetes Short-Term Complication ($2,081,736). In terms of cost per discharge, Perforated Appendices hospitalizations had the highest mean cost ($8,561 per discharge), followed by Diabetes Short-Term Complication ($4,122), Asthma ($2,679), Urinary Tract Infection ($2,602), and Gastroenteritis ($1,568).

Table 5 - Total and Mean Costs of Potentially Avoidable Pediatric Hospitalizations, 2005

PDI #	Pediatric Quality Indicators (PDI)	Total Discharges	Total Costs	Mean Cost/Case
14	Asthma Admission Rate	1,927	$5,163,281	$2,679
15	Diabetes Short-Term Complication Admission Rate	505	$2,081,736	$4,122
16	Gastroenteritis Admission Rate	2,923	$4,584,433	$1,568
17	Perforated Appendix Admission Rate	370	$3,167,600	$8,561
18	Urinary Tract Infection Admission Rate	1,000	$2,601,700	$2,602
	Total	6,725	$17,598,750	$2,617

Note: Total costs were calculated from total dollars of discharges recorded in the Tennesse Discharge Database and deflated by a cost-to-discharge ratio calculated for each hospital based on the cost and discharge data from the 2005 edition of Tennessee Joint Annual Report of Hospitals.

Discussion

This *Issue Brief* presents data describing patterns of pediatric hospitalizations in Tennessee for Ambulatory Care-Sensitive Conditions (ACSCs) for which effective primary care should reduce the need for later hospitalization. It also demonstrates how the new AHRQ definitions of Pediatric Quality Indicators can be used in conjunction with state-level hospital discharge data to produce useful health system information regarding the efficient allocation of health care resources. The major findings for 2005 are:

- In 2005, a total 6,725 pediatric hospitalizations (5.1% of pediatric hospitalizations for all conditions) were PAPHs.
- Children in Tennessee had higher rates of PAPHs than those experienced by the children in the United States as a whole in four of the five pediatric ACSCs.
- Tennessee's PAPH rates were particularly high for "Diabetes Short-Term Complication," a chronic condition that has both long-run and short-run consequences both financially and clinically for children who suffer from diabetes.
- There was no discernable difference in the rate for PAPHs between boys and girls, but Black children appeared to have higher rates than White children and children of other races.
- Among the different third-party payers, TennCare or Tennessee's managed care Medicaid program had a slightly higher PAPH rate in 2005 than other three major payer categories, which had rates between 4.8% and 5.0%. Medicare had a negligibly small proportion of total hospitalizations for all conditions in Tennessee as well as the lowest PAPH rate.
- The 6,725 of PAPH discharges cost hospitals a total of $17.6 million in 2005.

The patient-level hospital discharge data reported in this *Issue Brief* contains a wide range of data variables including primary and secondary diagnoses, utilization of services, comorbidity conditions, procedures performed, and hospital charges. Regular analysis and reporting using innovative tools such as the AHRQ's Pediatric Quality Indicators used in this report can improve the efficiency and productivity of the health delivery system by contributing timely and vital information to public health surveillance and evaluation.

References:

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