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# The disproportionate impact of obesity among hospitalized children

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**Title: The disproportionate impact of obesity among hospitalized children**

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**Describe role of Submitting/Presenting Trainee in this project (limit 150 words):**

Kate Kyler is the 3<sup>rd</sup> year Pediatric Hospital Medicine Fellow. She is the principal investigator on this project, and will be the primary author on the manuscript. Her primary research interest is in how obesity affects hospitalized children, including outcomes and health services research.

**Background, Objectives/Goal, Methods/Design, Results, Conclusions limited to 500 words**

**Background:** Obesity continues to affect children at epidemic proportions and is associated with poor hospitalization outcomes. As the number of hospitalized children with obesity rises, it is important for hospitals to determine which service lines care for large proportions of children with obesity, allowing for targeted planning and intervention to improve the safety of care provided to this population.

**Objectives/Goal:** To determine the overall prevalence and the annual change in prevalence of obesity for hospitalized children by clinical service line and All Patient-Refined Diagnosis Related Groups (APR-DRG).

**Methods/Design:** We performed a retrospective, longitudinal cohort study of children aged 2-19 years hospitalized at a single academic institution between 1/1/2009 and 12/31/2016. Body mass index (BMI) was calculated from documented height and weight; children with obesity were defined using age and sex specific BMI percentile guidelines established by the Centers for Disease Control and Prevention (CDC). Annual rates of obesity were calculated for service line and APR-DRG group. Chi-square tests determined statistical differences between groups and the Cochran-Armitage test of trend described changes in obesity over time.

**Results:** Of 83,329 hospitalized children, 15.0% (n=12,525) had obesity, with an increasing trend from 14.5% of hospitalizations in 2009-10 to 15.4% in 2015-16 ( $p<0.001$ ). Service lines with the highest prevalence of obesity included: Orthopedics (19.8%), Infectious Disease (18.3%), and Neuroscience (16.5%) (Figure 1). The annual prevalence of obesity increased within three service lines: Digestive Disease (12.2% in 2009-10 to 14.2% in 2015-16,  $p=0.004$ ), Infectious Disease (16.5% in 2009-10 to 18.3% in 2015-16,  $p=0.037$ ), and Other Surgery (15.0% in 2009-10 to 17.2% in 2015-16,  $p=0.008$ ). The APR-DRGs with the highest obesity prevalence for the Orthopedics, Infectious Disease, and Neuroscience service lines were hip and femur procedures (n= 957, obesity prevalence: 26.5%), skin and soft tissue infections (n=1,901, obesity prevalence: 19.9%) and seizure (n= 3,037, obesity prevalence: 15.6%), respectively (Table 1).

**Conclusions:** Certain hospital service lines are disproportionately impacted by rising obesity rates in hospitalized children. As obesity rates rise in hospitalized children, hospitalization planning efforts should target these disproportionately affected groups through interventions improving safety, equity of care, and patient accommodations.

**Table 1.** Service lines and APR-DRGs with the highest prevalence of obese hospitalized children.

<b>Service Line</b>	<b>APR-DRG Description</b>	<b>N</b>	<b>% Obese</b>
<b>Cancer Care / Hematology</b>	Chemotherapy*	2961	12.3
	Major hematologic/immunologic diagnosis*	1372	10.1
	Sickle cell anemia crisis	1291	7.8
<b>Cardiac Care</b>	Percutaneous cardiovascular procedures w/o AMI	388	12.4
	Cardiac arrhythmia & conduction disorders*	356	14.6
	Other cardiothoracic procedures*	355	8.5
<b>Respiratory Service</b>	Asthma	7365	15.9
	Pneumonia	2825	13.9
	Bronchiolitis & RSV pneumonia	1156	11.1
<b>Orthopedics</b>	Hip & femur procedures for non-trauma	957	26.5
	Dorsal & lumbar fusion procedures	674	13.6
	Knee & lower leg procedures except foot	637	25.6
<b>Transplants</b>	Bone marrow transplant	214	11.2
	Kidney transplant	91	15.4
	Liver transplant &/or intestinal transplant	20	15.0
<b>Digestive Disease</b>	Appendectomy	3105	15.2
	Other digestive system diagnoses	2855	15.0
	Non-bacterial gastroenteritis w nausea & vomiting	2620	10.2
<b>Neuroscience Service</b>	Seizure	3037	15.6
	Migraine & other headaches	906	21.0
	Other disorders of nervous system	738	21.3
<b>Infectious Disease</b>	Cellulitis & other bacterial skin infections	1901	19.9
	Viral illness	711	13.6
	Fever	421	12.6
<b>Other Medicine</b>	Diabetes	2474	13.1
	Infections of upper respiratory tract	1842	13.9
	Poisoning of medicinal agents	1340	18.4
<b>Other Surgery</b>	Tonsil & adenoid procedures	3946	20.1
	Other ear, nose, mouth & throat procedures	645	14.0
	Kidney & urinary tract procedures	426	10.1

**Figure 1.** Percent of hospitalizations of patients with obesity by service line

