17% increase in the proportion receiving the appropriate duration (95% confidence interval, 2-33%; P = 0.03) and no change over time. **Conclusion:** Feedback reports generated from electronically-derived metrics of antibiotic choice and duration, combined with ongoing clinician education, increased the proportion of children with CAP treated with the appropriate antibiotic duration. Electronic feedback reports are a scalable and impactful intervention to improve antibiotic use in children hospitalized with CAP.

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Antimicrobial use among under-five hospitalized children in Bangladesh: Findings from a Point Prevalence Survey

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Background: The use of antibiotics and the occurrence of antimicrobial resistance in Bangladesh are very high. Inappropriate use of antibiotics among hospitalized children has contributed to a high rise in antimicrobial resistance in Bangladesh. Data on the rational use of antibiotics in Bangladeshi hospitals are limited. This study documented current antimicrobial usage among children under five in selected tertiary hospitals in Bangladesh. **Methods:** From August to September 2022, we conducted a point prevalence survey in four tertiary hospitals in Bangladesh. We used the World Health Organization's Point Prevalence Survey (PPS) methods and guidelines to conduct the study. Study participants were hospitalized under the age of five years children, and we collected information from the pediatric and neonatal wards of each hospital. Antibiotic-suggesting shapes were analyzed according to WHO AWaRe metrics and Anatomical Therapeutic Chemical (ATC) Classification. **Results:** The assessment included 189 children under the age of five, with the majority (78.8%, 149/189) being under one year children. Approximately three-fourths (75.1%) of children had peripheral vascular catheters following admission. Overall, 86.2% (163/189) of children were given antibiotics after being admitted to the hospital, with infants receiving the most (81.0%, 132/163). The majority of antibiotics were administered by parents (84.7%). Antibiotics from the Watch Group were most commonly prescribed (73.0%, 119/163), followed by a combination of the Watch and Access Groups (23.3%) to treat the children. Ceftriaxone (63.8%), Meropenem (16.0%), and Ceftazidime/Amikacin (8.0%) were the most regularly prescribed antibiotics. Young children (< 1 year) were more likely to get antibiotics (AOR: 3.54, p-value: 0.003) than the other children under the age of five. **Conclusion:** The data showed that most children received empirical antibiotics during hospitalization, and overuse of broad-spectrum Watch group antibiotics was common practice in hospital settings. Developing and implementing antibiotic use guidelines is critical to limit the inappropriate use of antibiotics for young children

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Greenhouse Gas Emissions Due to Unnecessary Antibiotic Prescriptions for Respiratory Diagnoses

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Background: Healthcare accounts for 8.5% of total US greenhouse gas emissions (GHGE), with US healthcare the main contributor. Yet little effort has been made to measure healthcare related GHGE. Specifically, GHGE related to unnecessary antibiotic prescriptions is unclear, and to our knowledge, no one has used estimates of GHGE of unnecessary antibiotics as an antibiotic stewardship tool. We aimed to measure GHGE from solid waste associated with unnecessary antibiotic prescriptions for respiratory conditions. **Methods:** We calculated emissions for an outpatient prescription including the plastic bottle, paper leaflet, and paper bag (photos) based on the weight of each item multiplied by US Environmental Protection Agency (EPA) GHGE factors. Emission factors depend on waste type and treatment method which we assumed to be landfilled. To estimate unnecessary antibiotic prescriptions for respiratory infections, visits from nine University of Utah Health Urgent Care Centers from 2019-2022 were electronically identified and included if they had an ICD-10-CM code for a respiratory diagnosis where antibiotics are not indicated. Waste emissions of the paper and plastic in an individual prescription were then multiplied by the number of unnecessary respiratory antibiotic prescriptions for designated time periods to arrive at total landfilled waste emissions. We used similar methods applied to published 2014 data from CDC to estimate national waste emissions due to unnecessary antibiotic prescriptions for respiratory infections. Finally, we used the EPA's GHG Equivalencies Calculator to convert emissions into tangible GHGE for providers and patients. **Results:** A prescription has 32g of paper and 15g of plastic waste. Among 124,461 urgent care visits (Table 1) in 2019-2022, 18,531 (14.9%) received an antibiotic. This equates to 593 kg of paper waste and 278 kg of plastic waste leading to a total landfilled waste emissions of 0.479 MT CO2e/ton. Using the EPA GHG Equivalencies Calculator, this equates to driving an average gasoline-powered car 1,228 miles. There were 14,482,976 unnecessary antibiotic prescriptions (Table 2) in the US for respiratory infections in 2014. Our estimates suggest these prescriptions led to 375.109 CO2e/ton of GHGE, the same as driving 961,610 miles by an

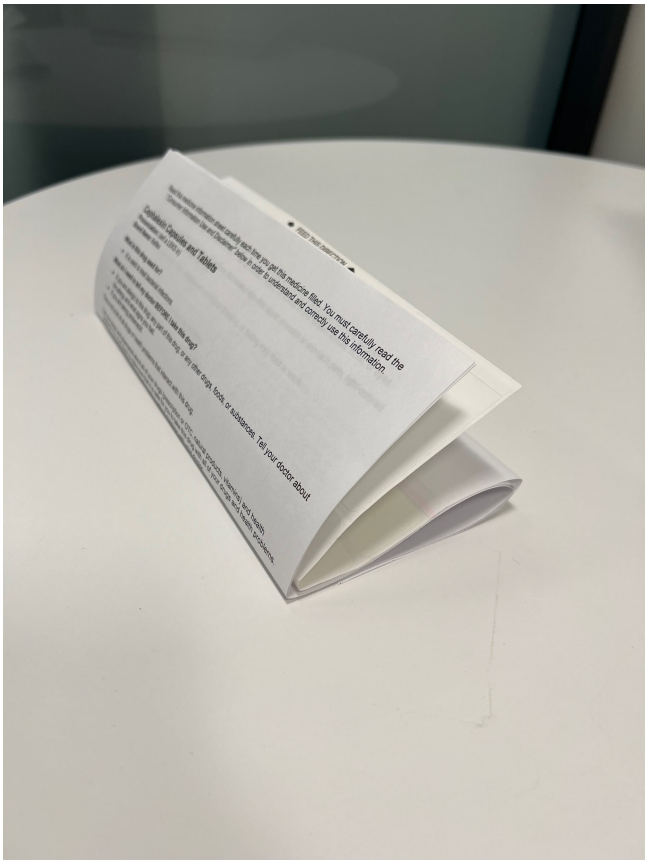

Table 1. University of Utah Urgent Care Waste Emissions Due to Unnecessary Respiratory Antibiotic Prescriptions

Year	Tier 3 urgent care encounters	Tier 3 Prescribing, n encounters, (%)	Paper weight[1]	Paper landfilled waste emissions (MT CO_2 e/ton)[2]	Plastic weight[3]	Plastic landfilled waste emissions (MT CO_2 e/ton)[4]	Total landfilled waste emissions (MT CO_2 e/ton)	Greenhouse Gas Equivalent
2019	19,545	4222 (21.6)	135.1 kg	0.108	63.3 kg	0.001	0.109	13,259 smartphones charged
2020	26,012	2965 (11.4)	94.9 kg	0.076	44.5 kg	0.001	0.077	9366 smartphones charged
2021	29,928	4340 (14.5)	138.9 kg	0.111	65.1 kg	0.001	0.112	13,624 smartphones charged
2022	48,976	7004 (14.3)	224.1 kg	0.179	105.1 kg	0.002	0.181	22,017 smartphones charged
Total	**124,461**	**18,531 (14.9)**	**593 kg**	**0.474**	**278 kg**	**0.005**	**0.479**	**58,266 smartphones charged or 1,228 miles driven by an average gasoline-powered vehicle**

[1]Weight of paper leaflet = 22g; weight of paper bag = 10 g

[2] Emissions factor of 0.80

[3] Weight of plastic bottle = 15g

[4]Emissions factor of 0.02

Table 2. Annual US Estimates of Waste Emissions Due to Unnecessary Respiratory Antibiotic Prescriptions based on 2014 CDC Data

	Estimated mean annual no. of 5nappropriate antibiotic prescriptions (95% CI)	Paper weight[1]	Paper landfilled waste emissions (MT CO_2 e/ton)[2]	Plastic weight[3]	Plastic landfilled waste emissions (MT CO_2 e/ton)[4]	Total landfilled waste emissions (MT CO_2 e/ton)	Greenhouse Gas Equivalent
0 – 19 years of age	4,430,555 (3,275,355-5,585,754)	141,778 kg	113.430	66,458 kg	1.329	114.759	294,190 miles driven by an average gasoline-powered vehicle
20 – 64 years of age	7,655,808 (5,879,398-9,432,219)	244,986 kg	195.989	114,837 kg	2.297	198.286	508,316 miles driven by an average gasoline-powered vehicle
≥ 65 years of age	2,396,613 (1,663,576-3,129,649)	76,692 kg	61.354	35,949 kg	0.719	62.073	159,127 miles driven by an average gasoline-powered vehicle
Total	**14,482,976**	**463,455 kg**	**370.764**	**217,245 kg**	**4.345**	**375.109**	**961,610 miles driven by an average gasoline-powered vehicle**

[1]Weight of paper leaflet = 22g; weight of paper bag = 10 g

[2] Emissions factor of 0.80

[3] Weight of plastic bottle = 15g

[4]Emissions factor of 0.02

average gasoline-powered vehicle. **Conclusion:** Unnecessary antibiotic prescriptions are associated with substantial GHGE. This estimate demands further evaluation across diagnoses and care delivery sites, and most importantly action. Additionally, the large GHG contribution of unnecessary antibiotics should be used as a stewardship tool to highlight low-value care that is likely contributing to global climate change.

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