

# End-of-Life Use of Antibiotics in Pediatric Patients

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### INTRODUCTION

- The American Academy of Hospice & Palliative Medicine (AAHPM) Statement on Withholding and Withdrawing Nonbeneficial Medical Interventions lists antimicrobials as a medical intervention that may be appropriate to withhold/withdraw in end-of-life (EOL) care, along with interventions such as ventilatory support and artificial nutrition/hydration. [1]
- The Infectious Diseases Society of America (IDSA) and the Society for Healthcare Epidemiology of America (SHEA) recommend that antimicrobial stewardship programs offer guidance for care at EOL. [2]
- In adults, almost 90% of patients with advanced cancer receive antimicrobials during the final week of life and are continued until the day prior to death. [3]
- A survey on EOL antimicrobial use from two pediatric tertiary-care institutions concluded that 86.2% of physicians believed that respecting a parent's wish to continue antimicrobials was important. [4]
- Reasons for continued antimicrobial use at EOL included meeting prognostic uncertainty, reducing patient pain or discomfort, family expectations, and wanting to avoid the perception of "giving up" [4-7].

### OBJECTIVES

- Describe pediatric patients who receive antimicrobials at EOL, quantify antibiotic utilization, and categorize indications for use.
- Examine documentation of antibiotics in end-of-life conversations.
- Explore opportunities for improved multidisciplinary collaboration in pediatric EOL care and antimicrobial stewardship.

### METHODS

- Single-center retrospective chart review at tertiary-care, free-standing children's hospital.
- Inclusion Criteria: death during inpatient hospitalization 2013-2019 and receipt of pediatric palliative care (PPC) consultation.
- Exclusion Criteria: receipt end-of-life care outside hospitalization, patients lost to follow-up.
- Data collection: demographic information, primary diagnosis, supportive care measures, antibiotic days of therapy (DOTs) within the last 30 days of life, antibiotic indication, microbiology results, code status at death, PPC consultation, and Infections Disease (ID) consultation.
- Medians, frequencies and proportions were calculated.

Table 1: Demographics & Diagnoses

Category	Number/Median (%)
Age at death	5.0 years
Female	111 (45.7)
Race/Ethnicity	
Hispanic	78 (32.0)
Non-Hispanic White	77 (31.7%)
Non-Hispanic Black	49 (20.2)
Asian	13 (5.3)
Other	16 (6.6)
Unknown	10 (4.1)
Primary Diagnosis	
Oncology/BMT	105 (43.2)
Cardiac	43 (17.7)
Genetic Metabolic	29 (11.9)
Neurological	28 (11.5)
Pulmonary	23 (9.5)
GI/Liver/Kidney	6 (2.5)
Other	9 (3.7)
Chronic Progressive Illness	217 (89.3)

- 1,169 patients with consults by PPC during the study period.
- 243 had in-hospital death and met inclusion criteria.
- 214 (88%) patients received at least one antibiotic DOT in the last 30 days of life.
- Discussion of antibiotic risk/benefit with families was not documented (<5%) despite presence of other therapeutic limitations.

Figure 1: Percent Total Antibiotic Use by Indication

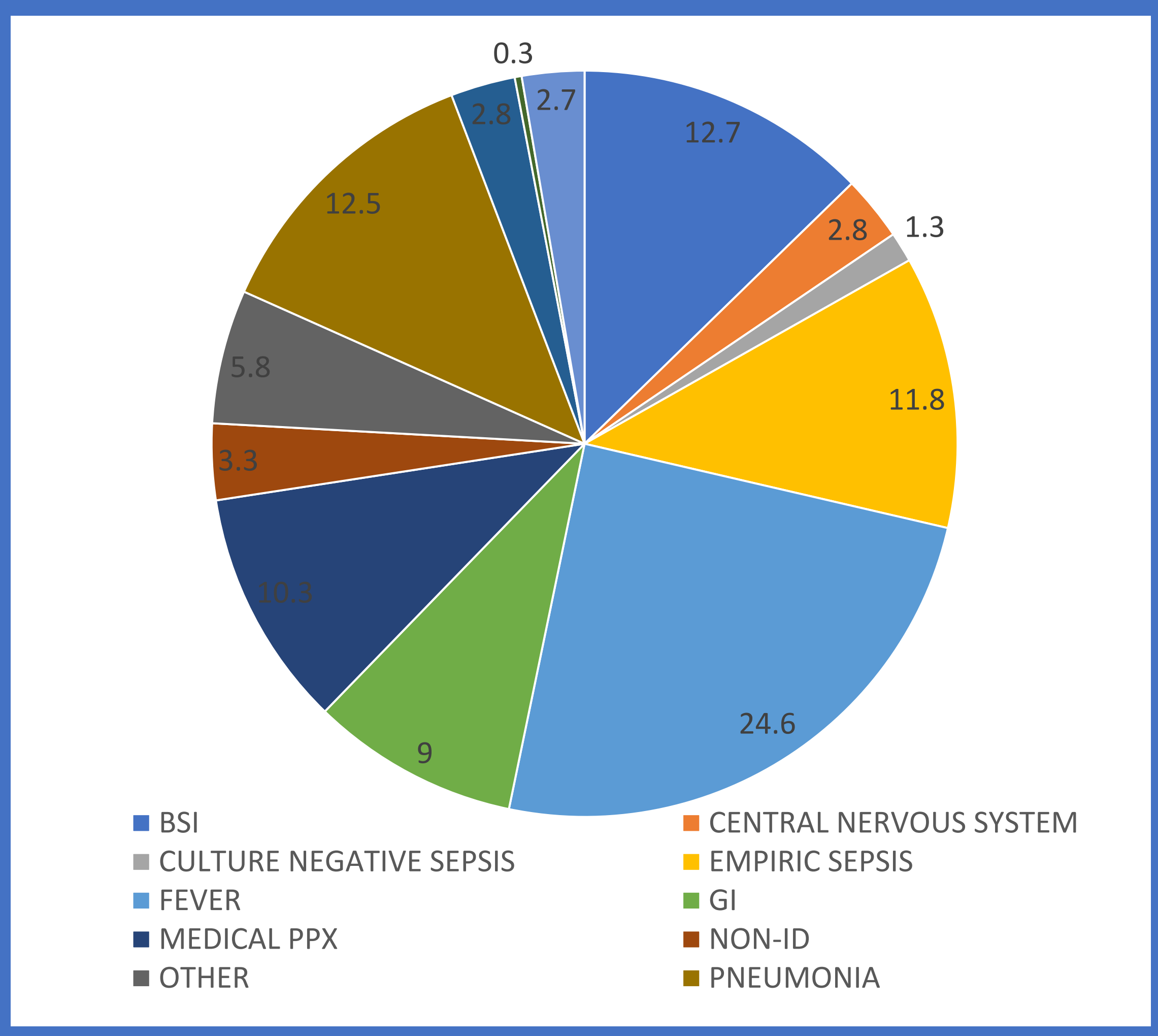


Table 2: Supportive Measures, Hospice, & Code Status

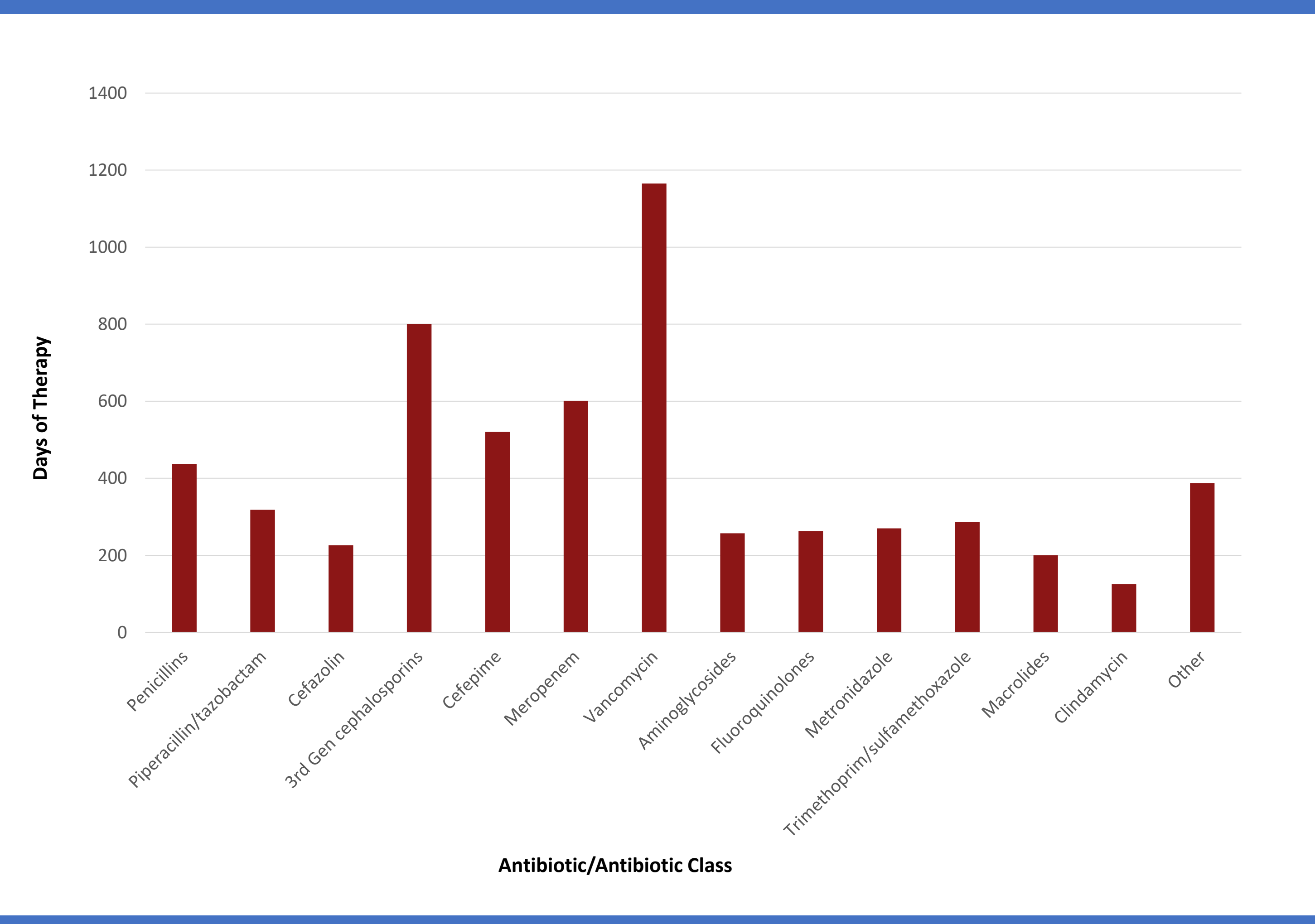
	Number of Patients	Percentage
Length of Hospitalization	Median: 22 days	
Code Status Limitation?*		
Yes	203	83.5%
No	36	14.8%
Unclear	4	0.17%
Hospice Enrollment	22	9.1%
ICU Care	208	85.6%
Chemotherapy	47	19.3%
CRRT/Dialysis	43	17.7%
VAD/ECMO	20	20.3%

\*Code status limitation defined as Do not Resuscitate (DNR) or partial DNR status.

Table 3: Incidence of Infection by Patient

Type of Infection	Number of Patients
Bacterial	114
Bacterial+Viral/Fungal	12
Viral/Fungal	17
No Infection	79
Indeterminate	21
Total	243

Figure 2: Antibiotic Days of Therapy in the Last 30 Days of Life



### RESULTS

- The median number of unique antimicrobials was 4 and maximum number was 11.
- 5847 Total antibiotic DOTs.
- 60 patients received treatment for 72 culture-positive infections in the blood, urine, or cerebrospinal fluid.
  - 40 blood stream infections (BSI)
  - 14 BSIs due to common skin commensals
- 45 patients were treated for culture-positive infections at non-sterile body sites (tracheitis, pneumonia, wound/skin and soft tissue infections)
- 81 patients had ID consults.
- 125 patients received antibiotic courses with duration >3 calendar days for empiric use without positive cultures, for culture negative sepsis, or without a specified indication.
  - 105 patients had some limitation in code status
  - Total DOT were 1221.

### CONCLUSIONS & FUTURE DIRECTIONS

- Antibiotic exposure in pediatric EOL care is highly prevalent.
- Approximately half of 243 patients received treatment for at least one bacterial infection, though some antibiotic use may be directed at commensal flora or contaminants.
- ID consultation may be a resource to guide antibiotic decision-making particularly for patients with prolonged empiric courses with negative cultures.
- Despite specification of limits in resuscitation for most patients, goals or limits of antibiotics were not documented.
- There are opportunities for collaboration amongst multidisciplinary teams to more effectively facilitate shared decision-making and goal-concordant care at end-of-life, in accordance with IDSA and SHEA guidelines.
- Avenues for future use include patient/parent expectations for antibiotic use, including understanding of adverse events, and impact of antibiotic use on antibiotic resistance.

### REFERENCES

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