

Antibiotic Treatment of Community Acquired Urinary Tract Infections in Infants Under Two Months of Age - A Retrospective Chart Review



Yunji Valerie Lee, B.Sc.(Pharm); Donna Leung, B.Sc.(Pharm), ACPR; Karen Ng, B.Sc.(Pharm), ACPR, PharmD, BCPS, BCIDP

Background

- Urinary tract infections (UTI) occur in ~5% of febrile infants
- Febrile infants ≤ 2 months are generally admitted to the hospital for diagnostic work up and monitoring of complications
- The optimal duration of parenteral or total antibiotic treatment is unknown.
- Risk of undetected bacteremia historically prompted prolonged treatment with parenteral antibiotics (e.g., 14 days)
- Some literature suggests shorter duration of intravenous (IV) therapy may be sufficient to manage UTIs in young infants.
- However, because data in UTI management in infants ≤ 2 months is sparse and limited, variability in practice exists.

Study Objectives

- Primary:** Characterize treatment of uncomplicated community acquired UTIs in infants ≤ 2 months old at BC Children's Hospital, examining the routes and durations of antibiotics used
- Secondary:** Evaluate efficacy and safety outcomes of short-term (< 6 days) vs. long-term (≥ 6 days) IV therapy
 - Efficacy (UTI-related and all-cause readmission)
 - Safety (Adverse drug events of IV lines and PO antibiotics)

Methods

- Patients were identified via ICD-10 codes for discharge diagnosis of UTI and the microbiology records for positive urine cultures for patients ≤ 2 months old
- Convenient sample of 100 patients from July 2012- August 2018

Inclusion Criteria

- ≤ 2 months old
- ICD-10 code for UTI
- Positive urine culture with a single uropathogen meeting the guideline definition of UTI
 - Suprapubic aspiration: any growth
 - In-and-out catheterization: ≥ 1x10⁷ CFU/L
 - Midstream: ≥ 1x10⁸ CFU/L

Exclusion Criteria

- Urine cultures growing ≥ 2 organisms
- Positive blood culture
- Diagnosis of other infections requiring parenteral antibiotics
- Known congenital renal abnormality
- Immunodeficiency
- Previous UTI before study period

- Data collection: REDCap database
- Data analysis: SPSS Statistics Program (Version 18) with Mann-Whitney U test and Chi-square test

Results

Proportion of Patients Receiving Short versus Long Term IV Antibiotics

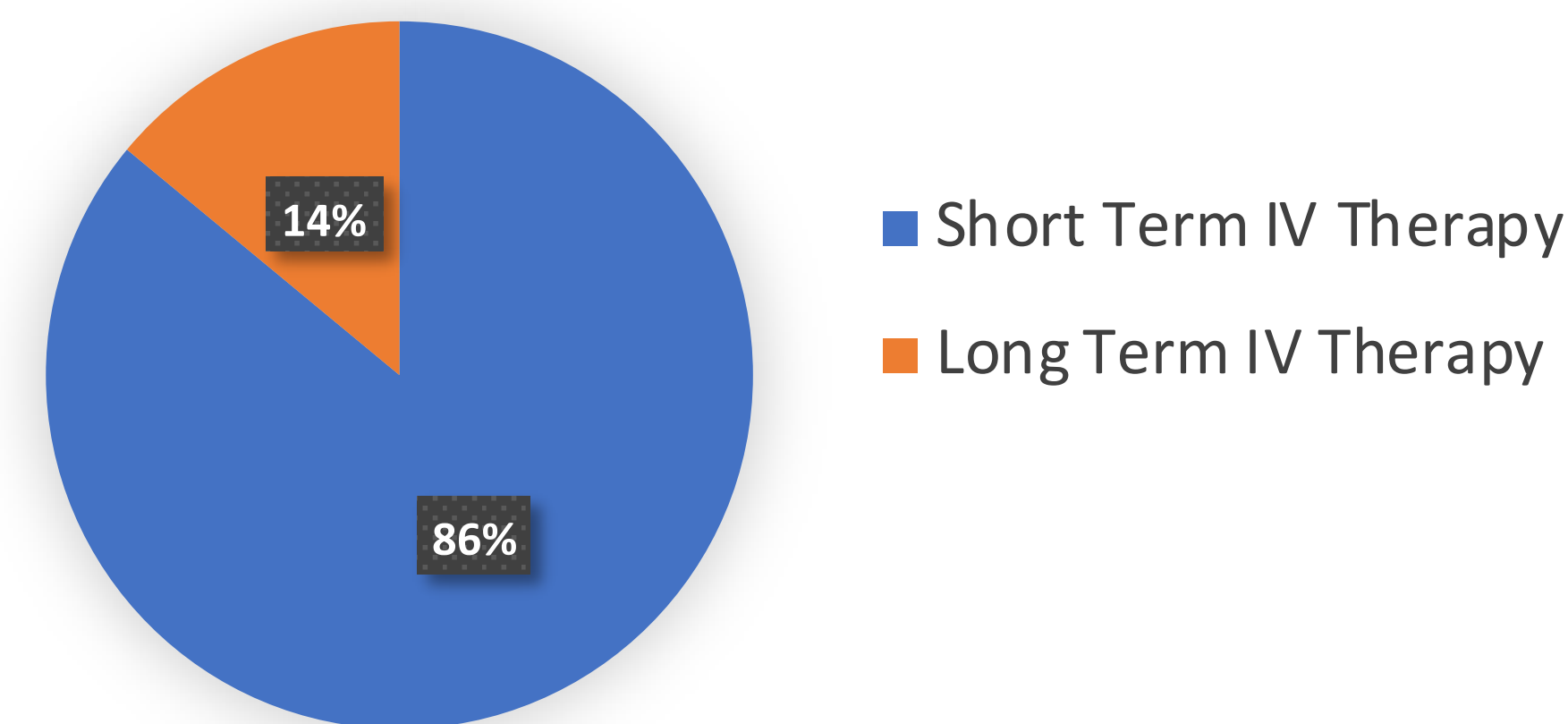


Figure 1: Short and Long Term IV Therapy for UTI

Table 1: Patient Characteristics (N=100)

| | n (%) | |
|------------------------------|---------------|-------------|
| | Short (n= 86) | Long (n=14) |
| Male | 65 (76) | 9 (64) |
| Age, Mean (SD), days | 34 (15) | 32 (16) |
| Infecting Organism | | |
| <i>Escherichia coli</i> | 72 (84) | 12 (86) |
| Cefotaxime susceptible | 67 (93) | 7 (58) |
| <i>Enterococcus faecalis</i> | 6 (7) | 1 (7) |

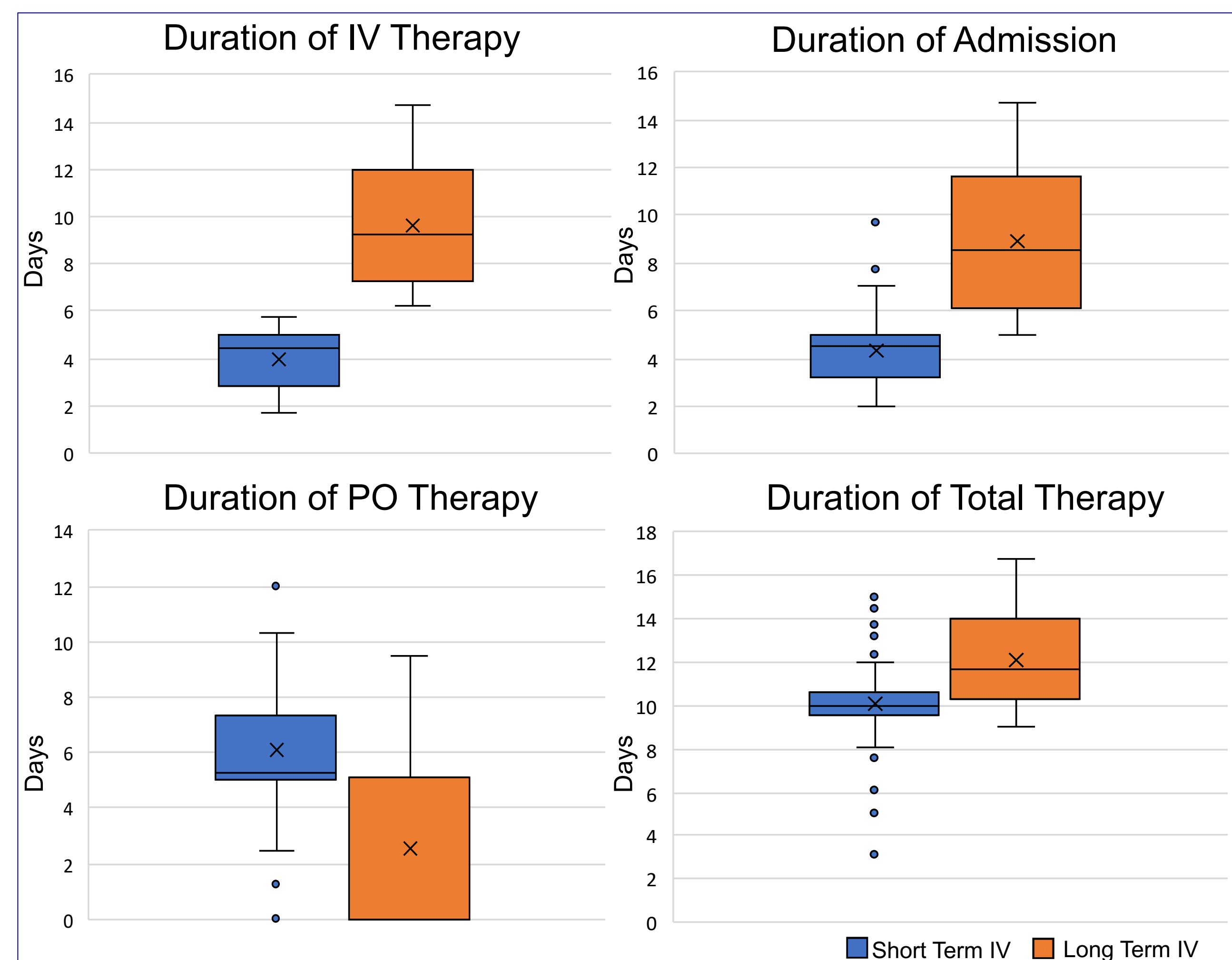


Figure 2: Durations of Antibiotics and Admission

Table 3: Rate of Readmission of Patients Within 30 Days Post Discharge

| Rate of Readmission, n(%) | Short (n=86) | Long (n=14) | p-value |
|---------------------------|--------------|-------------|---------|
| UTI readmission | 3 (4) | 1 (7) | 0.46 |
| All-cause readmission | 6 (7) | 2 (14) | 0.31 |

Table 4: Safety Outcomes of Intravenous Antibiotics

| | n (%) | | p-value |
|---|--------------|-------------|---------|
| | Short (n=86) | Long (n=14) | |
| PICC Line Insertion | 3 (4) | 8 (57) | < 0.01 |
| Adverse Events of Parenteral Therapy | 26 (30) | 6 (43) | 0.35 |
| Infiltration | 24 (92) | 6 (43) | |
| Extravasation | 1 (4) | 0 (0) | |
| Phlebitis | 1 (4) | 0 (0) | |

Table 5: Safety Outcomes of Oral Antibiotics

| | n (%) | | p-value |
|---|--------------|------------|---------|
| | Short (n=84) | Long (n=6) | |
| Adverse Drug Reactions of Oral Therapy | 6 (7) | 2 (33) | 0.029 |
| Vomiting | 1 (17) | 0 (0) | |
| Intestinal Gas | 2 (33) | 0 (0) | |
| Diarrhea | 2 (33) | 0 (0) | |
| Mild Rash | 2 (33) | 2 (100) | |

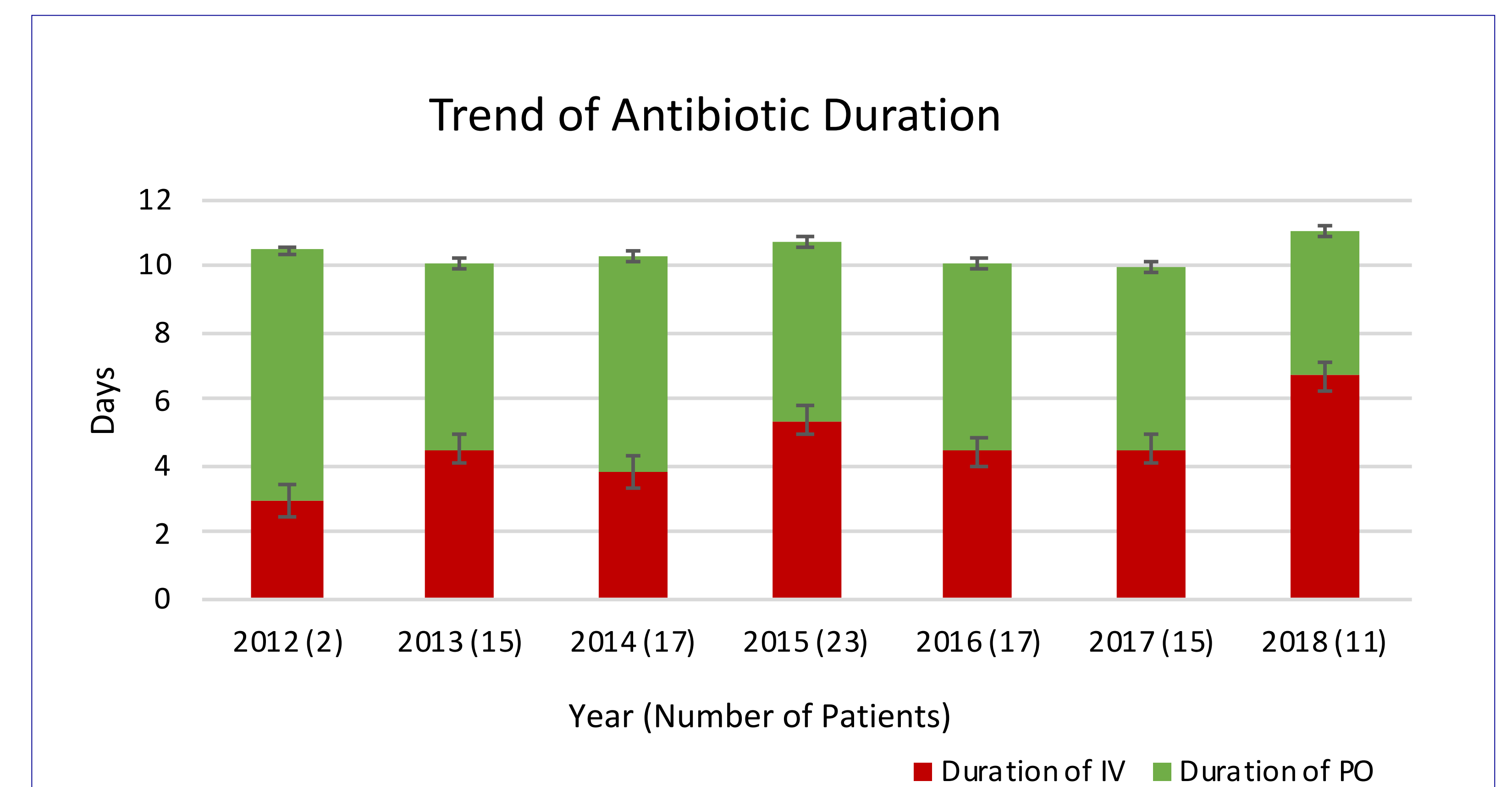


Figure 3: Trend of Antibiotic Duration from 2012-2018

Limitations

- Readmissions to other hospitals were not collected
- Community data documenting courses of oral antibiotics were lacking
- Assumed completion of full courses of oral antibiotics

Conclusions

- Most infants with UTIs were treated with short term IV therapy at BCCH
- Patients treated with short term IV therapy required a shorter duration of hospital admission
- Our study did not find significant differences in rates of UTI and all-cause readmission in short term and long term IV therapy
- There was no observed increase in adverse drug events in short term IV group