



Empiric Vancomycin Dosing in Pediatric Patients in Fraser Health



Tanveer Brar, B.Sc., B.Sc.(Pharm); Claire MacLeod, B.Sc.(Pharm), ACPR, PharmD; Brandi Newby, B.Sc.(Pharm), ACPR

Background

- Vancomycin is commonly used in pediatric patients
- Serum trough concentrations of 15 to 20 mg/L recommended for complicated infections
- Previous studies showed 60 mg/kg/day led to subtherapeutic levels
 - Delayed treatment of infection may result in ↑ morbidity and mortality
- Fraser Health (FH) empiric dosing regimen was changed to 20 mg/kg IV q6h (80 mg/kg/day) following a residency project in 2012/2013

Objectives

- Determine the proportion of patients empirically prescribed vancomycin 20 mg/kg IV q6h
- Determine the proportion of patients that achieved trough levels ≥ 10 mg/L
- Determine the proportion of patients that achieved trough levels of 15 to 20 mg/L overall and also with 20 mg/kg IV q6h

Methods

- Chart Review
 - May 2012 to May 2016
 - Pediatric wards across FH
- Inclusion:**
 - 45 weeks post menstrual age to 16 years
 - Received intravenous vancomycin
 - ≥ 1 trough level
- Exclusion:**
 - Unable to interpret level
- Analysis:**
 - Descriptive statistics

Results

Characteristic	Number of Patients or Mean \pm SD (Range) (n=100)
Age (years)	7.2 \pm 5.5 (0.1 to 16)
Sex, male	51
Weight (kg)	33.0 \pm 25.4 (4.7 to 100.9)
Type of Infection:	
Meningitis	21
Pneumonia	21
Osteomyelitis	4
Bacteremia	16
Skin and Soft Tissue Infections	18
Other	20
Length of hospitalization (days)	7.2 \pm 5.5 (2 to 37)
Duration of therapy (days)	5.2 \pm 4.4 (2 to 36)
Number of vancomycin levels	1.7 \pm 1.1 (1 to 9)
Empiric vancomycin dose (mg/kg/day)	57.7 \pm 14.6 (6.2 to 111.1)

Table 1: Patient Demographics

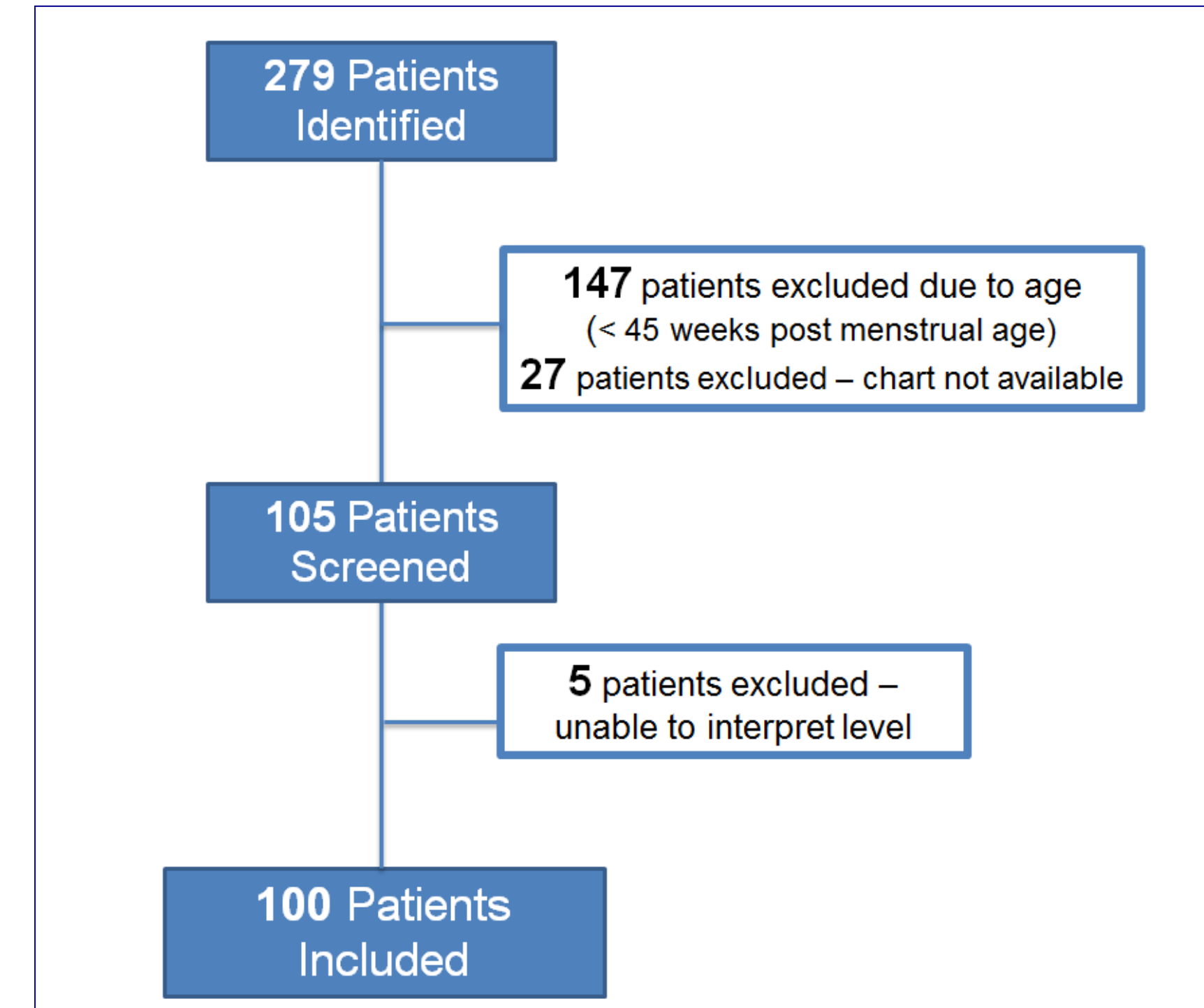


Figure 1: Patient Inclusion Flowchart

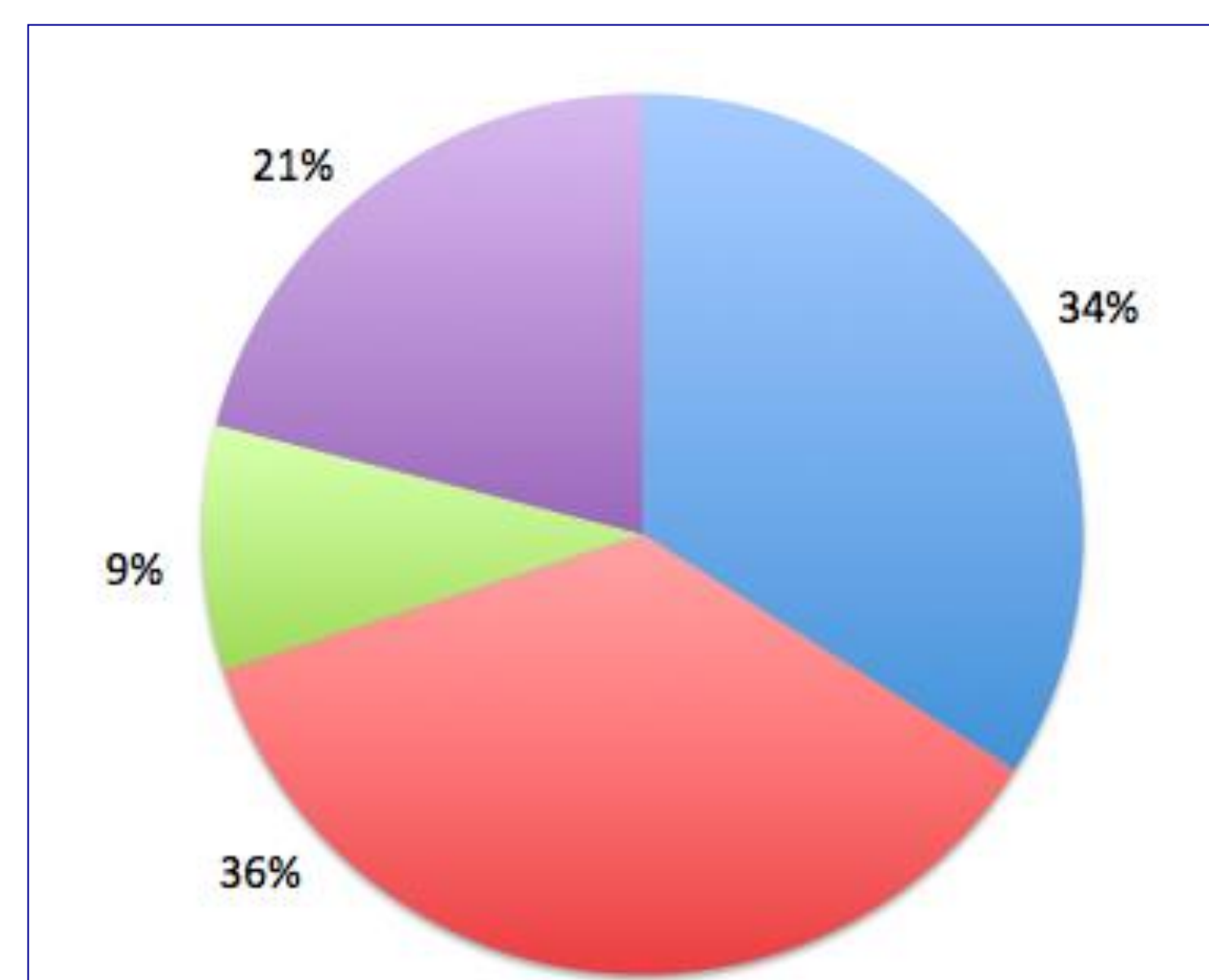


Figure 2: Empiric Dosing Regimens

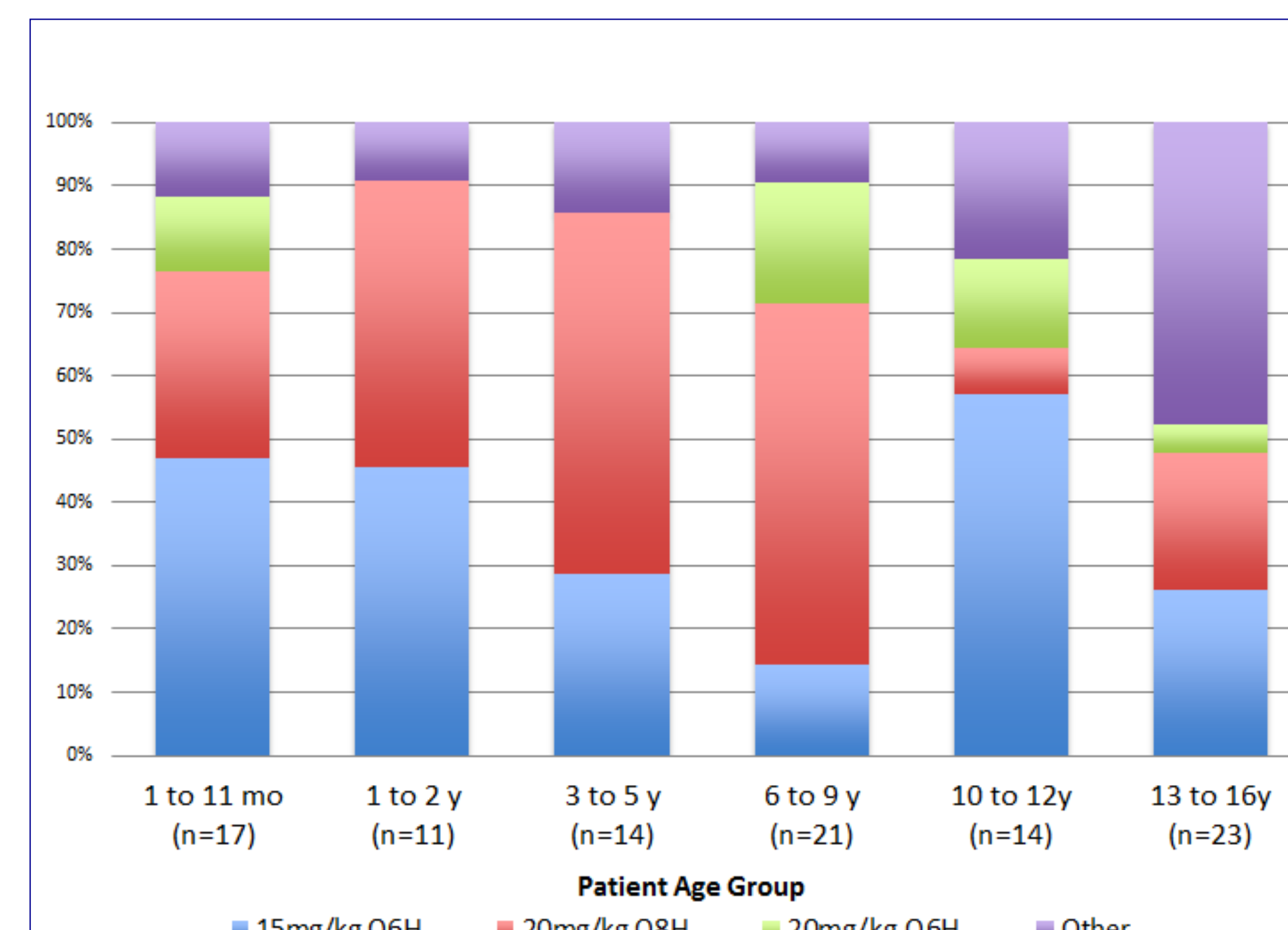


Figure 3: Empiric Dosing Regimen by Age

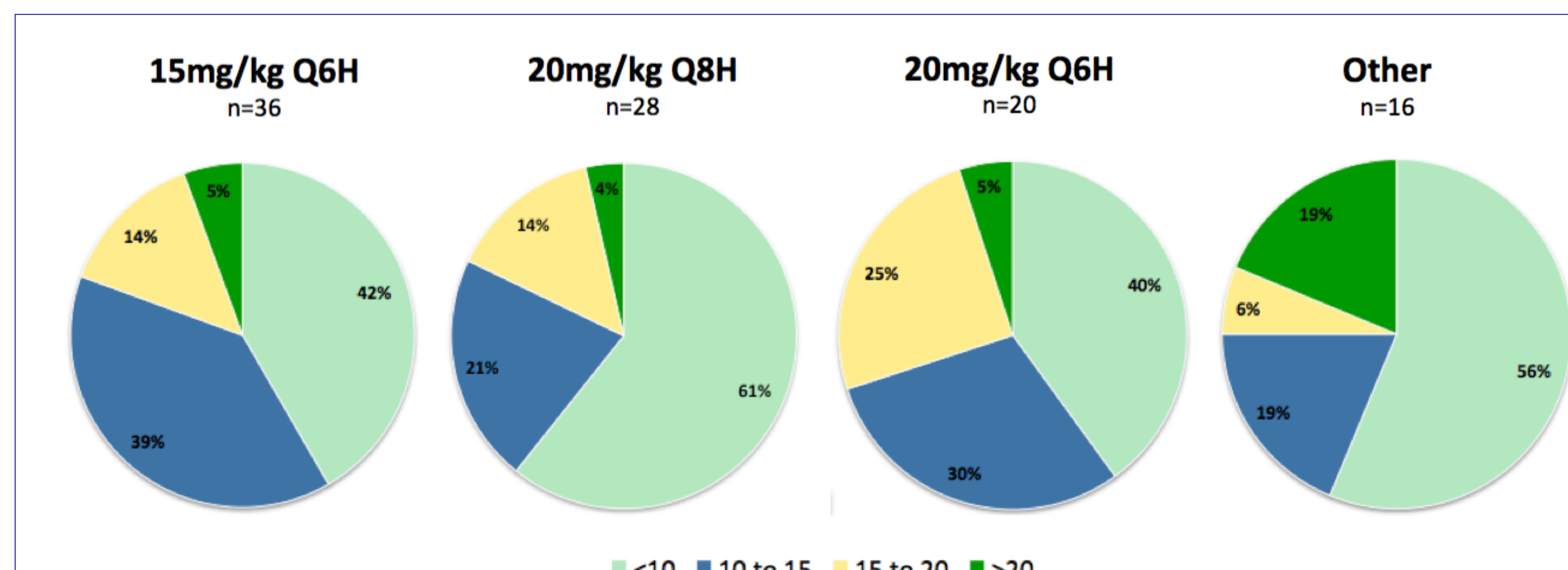


Figure 4: Serum Trough Concentration (mg/L) by Dosing Regimen

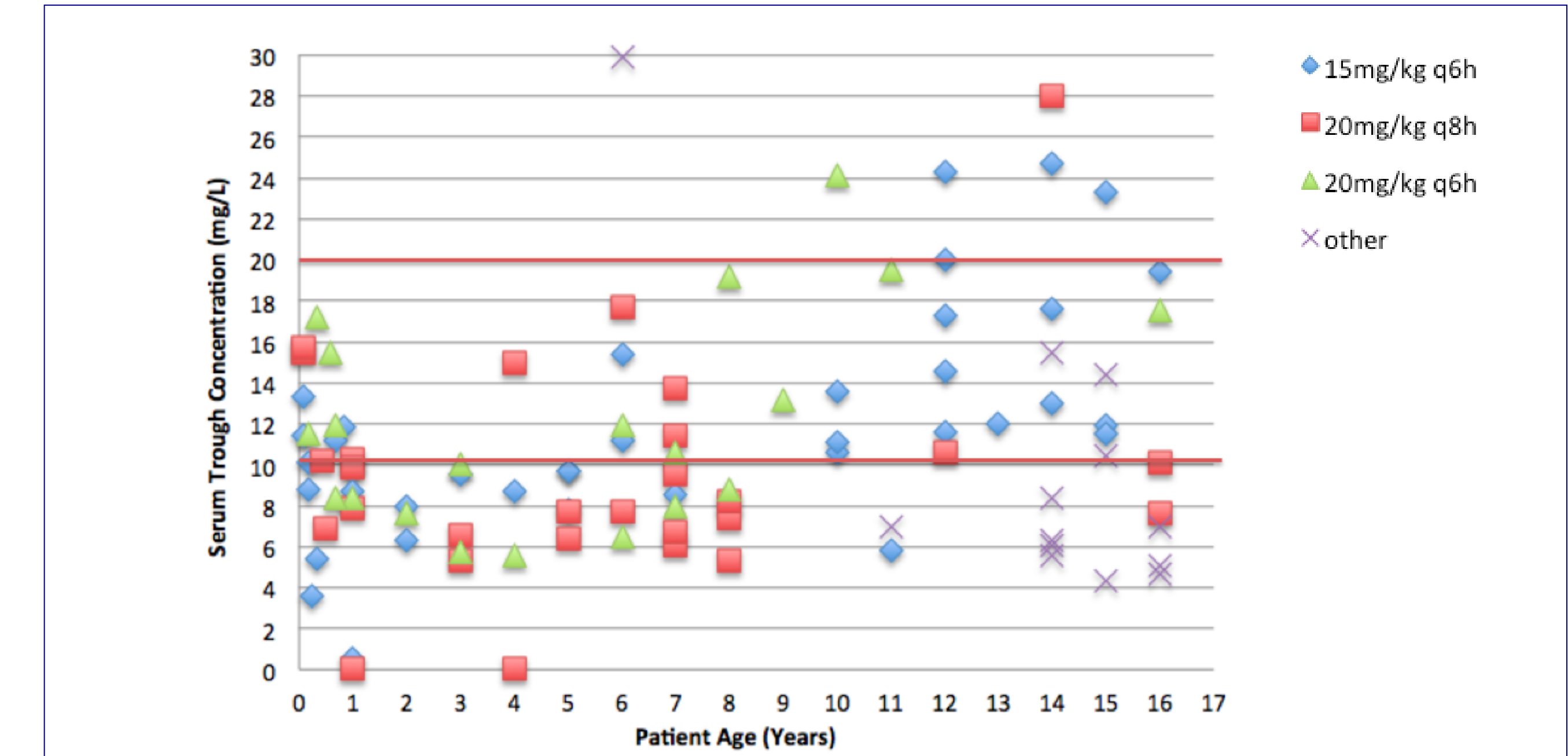


Figure 5: Serum Trough Concentration by Dose and Age

Age Group	Mean Dose Before Level (mg/kg/day)	Mean Trough Concentration (mg/L)	No. of Troughs > 10mg/L (%)	Mean Dose After Level (mg/kg/day)
1 to 11 months (n=17)	64.6 \pm 10.1	11.1 \pm 3.7	12 (71)	68.6 \pm 18.2
1 to 2 years (n=11)	62.9 \pm 8.3	8.5 \pm 1.3 (n=9) 2 undetectable troughs	1 (9)	79.1 \pm 23.6
3 to 5 years (n=14)	63.5 \pm 9.0	8.3 \pm 2.6 (n=13) 1 undetectable trough	2 (14)	77.2 \pm 23.0
6 to 9 years (n=21)	60.1 \pm 9.9	11.3 \pm 5.7	10 (48)	75.9 \pm 23.8
10 to 12 years (n=14)	64.8 \pm 15.8	17.8 \pm 13.2	12 (86)	62.8 \pm 12.6
13 to 16 years (n=23)	50.0 \pm 15.3	12.4 \pm 6.8	14 (61)	54.5 \pm 12.8

Table 2: Mean Dose and Serum Trough Concentration by Age

Limitations

- Retrospective
- Small sample size
- Limited number of patients prescribed 20 mg/kg q6h

Conclusions

- 9% of patients empirically prescribed 20 mg/kg q6h
 - 20% of patients received 20 mg/kg q6h before first level
- 51% of patients achieved trough levels ≥ 10 mg/L
 - 60% if received 20 mg/kg q6h
- 15% of patients achieved 15 to 20 mg/L
 - 25% if received 20 mg/kg q6h
- Further education regarding the empiric vancomycin dosing regimen for pediatric patients is required