

How scary is this?

Characterizing Antibiotic Use for Type III Tibia Fractures

The Major Extremity Trauma Research Consortium (METRC)

www.METRC.org

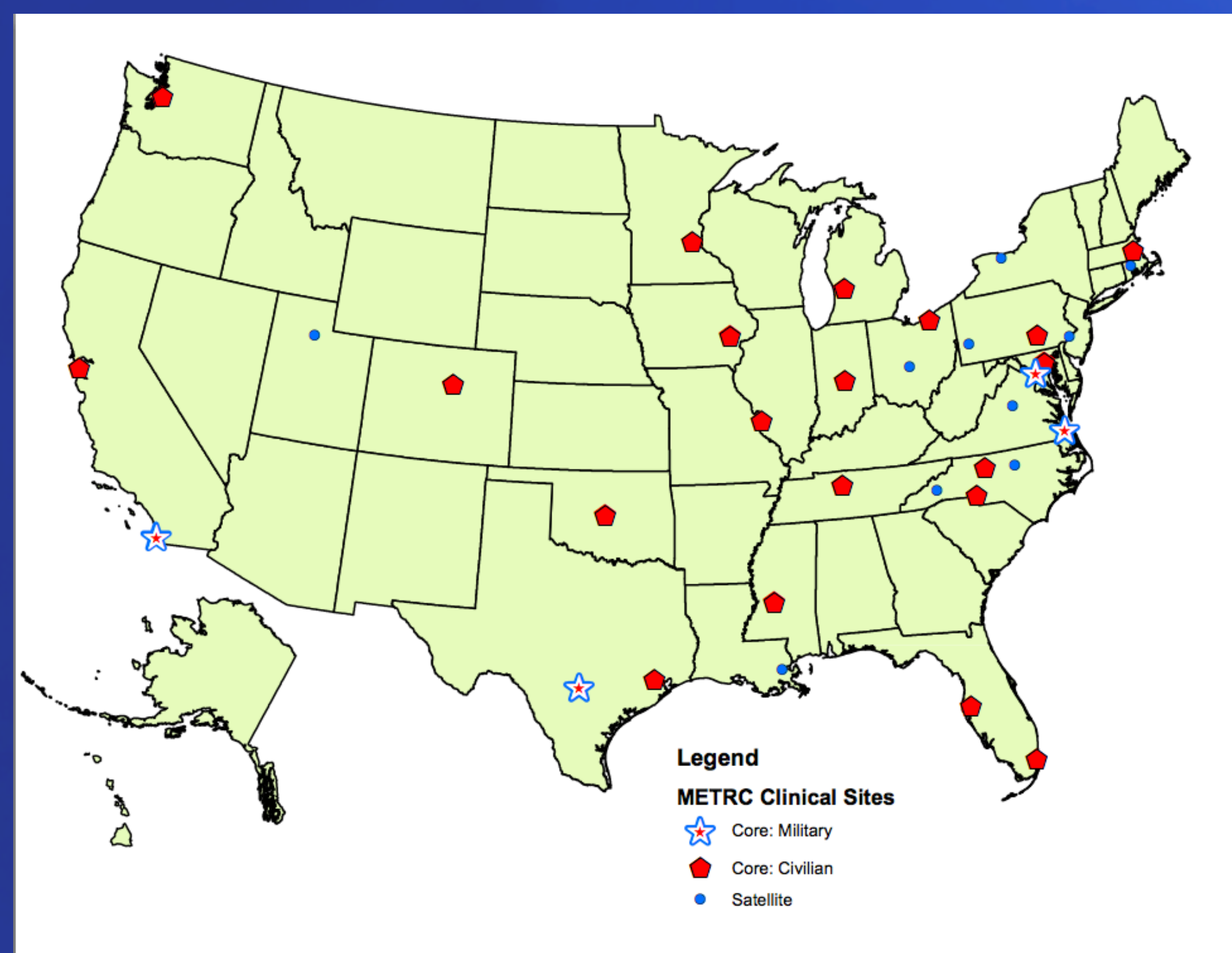
PURPOSE

Infection remains the most common and significant complication following high-energy fractures, and is a particular concern for open tibia fractures. The use of antibiotics is a key component of the treatment of these injuries and the prevention of subsequent infection. However, little is known about variation in the use of antibiotics or the confounding use of antibiotics by other treating teams for other trauma related conditions. The goal of this analysis is to characterize antibiotic use during the index hospitalization for type III tibia fractures.

METHODS

Participants (N=509) with open Gustilo Type III tibia fractures or traumatic tibial amputation were recruited across 31 level 1 trauma centers and followed for 6 months following definitive soft tissue closure. Analyses that follow were conducted using data for 433 participants with complete antibiotic use data at the index hospitalization. Trained research coordinators documented antibiotic use during the index hospitalization (defined as the procedure during which the definitive soft tissue closure occurred). Antibiotics were documented by course (as opposed to individual doses). Antibiotics were required to be considered a new course when any of the following had changed: a) the antibiotic itself; b) the method of administration; or c) the reason for prescribing. Participants were 74% male, 69% white, 88% poly-traumatized, and had a mean age of 39.0.

STUDY SITES



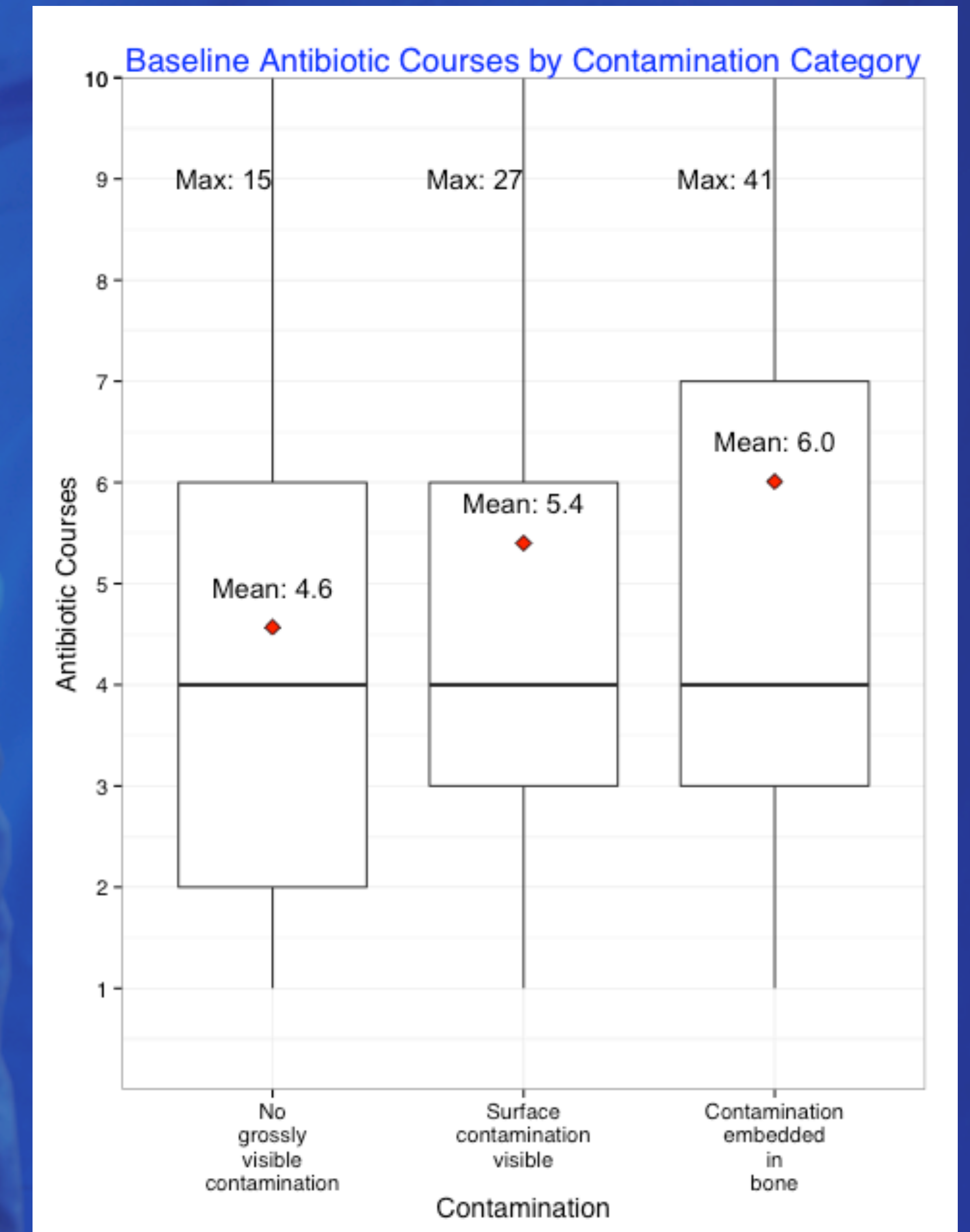
RESULTS

Overall, for the 433 participants, we document 2371 antibiotic courses during the index hospitalization. The overwhelming majority (93%) of antibiotic courses were given by IV or other surgical means of administration. The mean, standard deviation (SD), median, minimum (Min) and maximum (Max) number of antibiotic courses per participant was 5.5 (SD: 4.7; median: 4; Min: 1; Max: 41). Similarly, mean number of classes of antibiotics per participant was 2.6 (SD: 1.3; median: 2; Min: 1; Max: 7). The percent of courses using the most common antibiotics are shown on the left hand side of the table below. The percent of courses receiving the most common antibiotic classes used in our sample are shown in the middle columns of the table below. The percent of participants receiving the most common antibiotic class combinations (profiles) used in our sample are shown on the right hand side of the table below.

Breakdown of Antibiotics by Name and Class During Index Hospitalization					
Antibiotics:	Percent of Courses:	Antibiotic Classes:	Percent of Courses:	Antibiotic Profiles:	Percent of Participants:
Ancef	42.3	Cephalosporins	46.8	Cephalosporins Alone	17.8
Vancomycin	14.4	Aminoglycosides	15.3	Cephalosporins + Aminoglycosides	28.2
Gentamicin	9.4	Penicillins	5.2	Cephalosporins + Glycopeptide	15.0
Tobramycin	5.7	Quinolones	3.8	Cephalosporins + Aminoglycosides + Glycopeptides	23.1
Piperacillin	3.5	Carbapenems	1.4	Cephalosporins + Other	9.9
Clindamycin	3.2	Antifungal	0.3	No Cephalosporins	6.0
Other	21.4	All Other IV	22.0		
		All Others PO	5.3		

Reason Course Ended	Percent
Course completed as planned	83.6
Not applicable (course not ended)	3.0
Another infection identified	1.7
Clinical improvement	1.0
No infection identified	0.6
Administration method contraindicated	0.7
Side effects	0.5
Other	8.8

More than 4/5 of the antibiotic courses given to patients were completed as planned (see table bottom center), though the data suggests many of these courses were followed up by additional and different courses of antibiotics. Interestingly, we see an uptick in the mean number (and total range) of antibiotic courses as the contamination level of the wound (as measured by the OTA Open Fracture Classification) increases (see box plot below).



CONCLUSIONS

These data show that even during a single hospitalization, trauma patients are receiving a wide range of antibiotics and antibiotic classes, with 4 antibiotics and 3 antibiotic classes appearing to be the norm. The consequences of exposure to multiple antibiotics on wound flora and the development of resistant strains are not known. The results emphasize the importance of developing and implementing improved microbial identification approaches that might be able to better inform clinician decision making around antibiotic use.

Improving outcomes through collaborative research...

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