

# Antibiotic Use Metrics to Guide Antibiotic Stewardship Priorities: Dental Antibiotic Prescribing in the U.S. Veterans Affairs (VA) System

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## Background

- In the private sector, dentists prescribe approximately 1 out of every 10 antibiotic prescriptions and are the top specialty prescriber of antibiotics.
- Guidelines for the use of antimicrobial prophylaxis for the prevention of infective endocarditis and prosthetic joint infections during dental procedures were updated in 2007 and 2012, respectively, significantly reducing the number of patients requiring antibiotic prophylaxis. Infection prophylaxis is recommended in patients with select cardiac conditions undergoing certain dental procedures. Antibiotics before dental procedures are no longer recommended per guidelines to prevent prosthetic joint infections. However, this is controversial and select clinical scenarios may be appropriate (e.g, poor oral hygiene).
- Standardized metrics of antibiotic consumption (ie, antibiotic days) are useful to guide stewardship efforts, but have not been reported for dentistry.
- In 2014, the Department of Veterans Affairs (VA) established a policy for the implementation and maintenance of Antimicrobial Stewardship Programs (ASP) in all VA facilities. One of the mandatory components of the VA policy is to measure and report overall antibiotic use for each VA facility.
- VA is the largest provider of dental care in the U.S. VA Dental Services cares for 500,000 Veterans and delivers approximately 1.9 million dental visits annually. VA provides general preventative care and all subspecialties of dentistry (ie, endodontics).
- However, it is unknown the extent to which VA dental patients receive antibiotics, the frequency of broad spectrum agents, and the prescribed duration.

## Objectives

- To estimate the prevalence of dental antibiotic prescribing overall, by spectrum of activity, and by class in Veterans receiving care from VA dentists and/or at VA dental clinics.
- To determine antibiotic use metrics (i.e, antibiotic days and days of therapy) overall, by spectrum of activity, and by class for antibiotics prescribed by VA dentists

## Methods

- Patient population:** Adult patients treated by a VA dentist or at a VA dental clinic.
- Study design and sample :** Cross-sectional study of all Veteran users of dental services in 215 VA dental clinics from January 1, 2013-December 31, 2013.
- Data collection:** National VA clinical and pharmacy datasets were used to collect baseline demographics, healthcare utilization, and medication exposure.
- Definitions:** Broad spectrum antibiotics were defined as those agents in the carbapenem, quinolone, anti-pseudomonal penicillin, 3<sup>rd</sup>/4<sup>th</sup> generation cephalosporin, macrolide, tetracycline, and aminoglycoside classes
- Measures:** Antibiotic use metrics were calculated at the patient-level (across 2013) where  $\geq 1$  day and/or  $\geq 1$  dose of a systemic antibiotic was prescribed by a dentist
  - Antibiotic Days (AD) - Average number of days/patient where any antibiotic was administered.
  - Days of Therapy (DOT) - Average number of days/patient where a unique agent was administered.
- Statistical analysis:** Results are reported overall (for all antibiotics prescribed by VA dentists/dental clinics across the VA) and by VA drug class for antibacterial agents using Student's t-tests and Wilcoxon Signed Rank as appropriate. A p value < 0.05 was considered statistically significant. SAS 9.4 (SAS Institute, Cary, NC) was used for data and statistical analyses.

## Results

Figure 1. Proportion of VA Dental Patients Receiving Antibiotics.

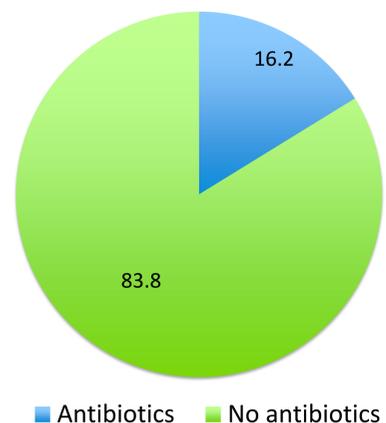
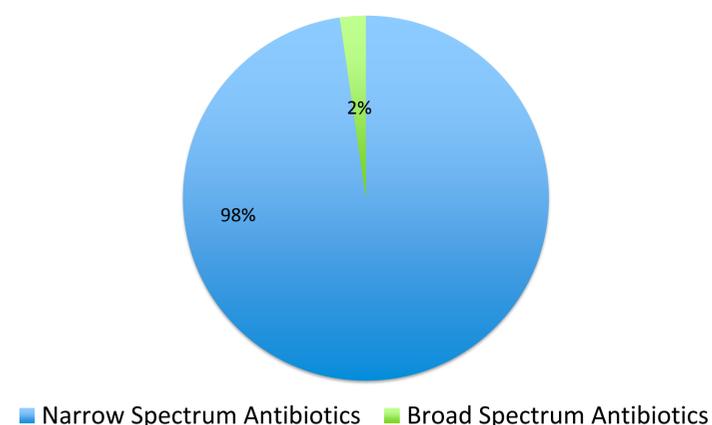


Figure 2. Proportion Receiving Broad- and Narrow-Spectrum Antibiotics.\*



\*Denominator=Patients receiving  $\geq 1$  dose or day of a systematic antibiotic (N=77,305)

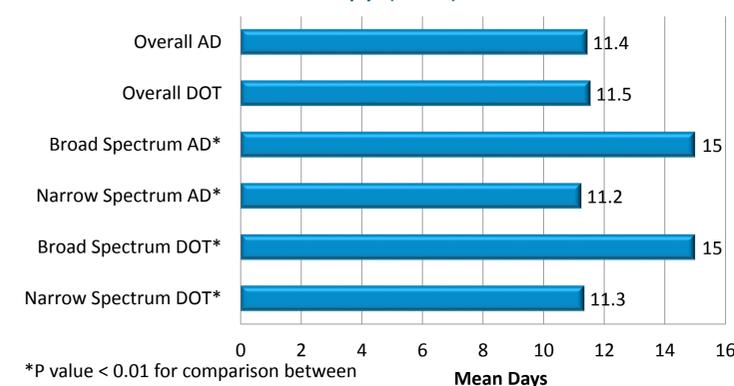
Table 1. Proportion of Veterans prescribed  $\geq 1$  dose/day of each antibiotic class

VA Class	% of VA dental patients receiving $\geq 1$ dose (n=77,305)
Penicillin-G penicillins	12.2
Aminopenicillins	69.4
1 <sup>st</sup> generation cephalosporins	1.4
Macrolides	1.3
Tetracycline	0.8
Lincomycins	21.9
Sulfonamides	0.1
Metronidazole	0.9

Table 2. Antibiotic days (AD) by VA drug class.

VA Class	Mean $\pm$ StDev	Median	Range
Penicillin-G penicillins	9.2 $\pm$ 6.0	7	1-223
Aminopenicillins	10.9 $\pm$ 13.0	7	1-309
1 <sup>st</sup> generation cephalosporins	11.1 $\pm$ 15.3	7	1-174
Macrolides	7.6 $\pm$ 9.4	5	1-116
Tetracycline	27.8 $\pm$ 37.4	14	1-270
Lincomycins	10.2 $\pm$ 11.8	7	1-210
Sulfonamides	10.1 $\pm$ 5.0	7	4-28
Metronidazole	10.8 $\pm$ 5.3	10	1-42

Figure 3. Mean Antibiotic Days (AD) and Days of Therapy (DOT).



\*P value < 0.01 for comparison between broad and narrow mean days

## Acknowledgements/Disclaimer

- This poster was prepared by Michael Wesolowski and Madeline Thornton of CINCCCH, Hines VA Hospital.
- Funding:** The Department of Veterans Affairs, Veterans Health Administration, Office of Research and Development, RR&D (B-1583-P).
- The views expressed in this presentation are those of the presenters and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the U.S. government.

## Conclusions

- Veterans are being prescribed narrow spectrum antibiotics more frequently than broad spectrum antibiotics by dentists.
- Broad spectrum antibiotics prescribed to Veterans have longer average antibiotic days and days of therapy than narrow spectrum antibiotics. However, the prevalence of broad spectrum prescribing was low.
- The patient-level duration of antibiotics prescribed by VA dentists exceeded one week.
- There may be an opportunity to expand the implementation of antimicrobial stewardship efforts to dental providers in the VA.