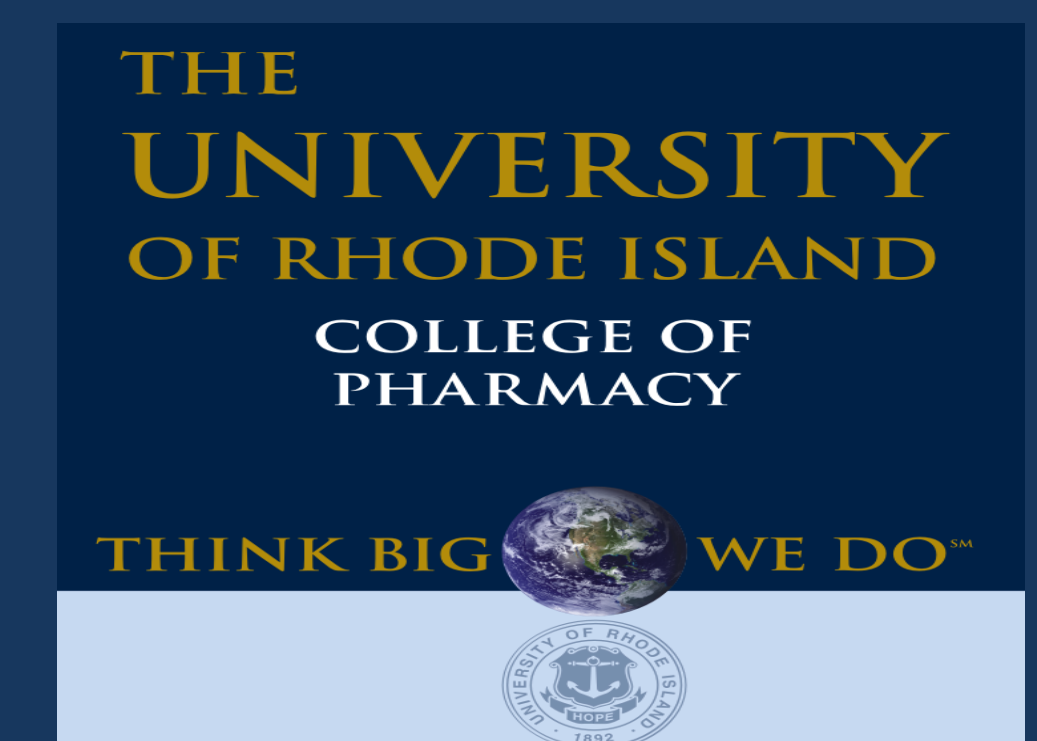




Trends in *Acinetobacter baumannii* antibiotic resistance rates

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ABSTRACT

Background: Carbapenem-resistant *Acinetobacter baumannii* is described as an urgent threat by the Centers for Disease Control and Prevention and several older studies have indicated increasing resistance in *Acinetobacter*. We sought to describe these trends in the national Veterans Affairs (VA) Healthcare System.

Methods: We assessed *A. baumannii* positive clinical cultures collected from VA patients (≥ 18 years) from 2010 to 2018. We categorized cultures based on location at the time of collection: VA medical center (VAMC), community living center (CLC), or outpatient (Outpt). Multidrug resistance (MDR) and extensive drug resistance (XDR) were defined as resistance to > 1 drug in > 3 or all of the following categories, respectively: extended-spectrum cephalosporins (es-CS), fluoroquinolones (FQ), aminoglycosides (AMG), carbapenems (CARB), piperacillin/tazobactam (PIP/TAZ), and ampicillin/sulbactam (AMP/SUL). Joinpoint Software was used for regression analyses of trends over time and to estimate annual average percent changes (AAPC) with 95% confidence intervals.

Results: We identified 19,376 *A. baumannii* positive cultures over the study period (53% VAMCs, 4% CLCs, 43% Outpts), which represented 0.5% of all positive cultures in the VA. In VAMCs, the number of *A. baumannii* cultures decreased significantly by 11.9% per year. Of all positive cultures in VAMCs, the proportion that were *A. baumannii* decreased significantly by 5.4% per year. Similar trends were observed in CLCs, while Outpt cultures remained stable. Over the 9-year study period, resistance decreased significantly, with MDR decreasing by 10.2% per year and XDR decreasing by 9.4%. Carbapenem resistance decreased significantly by 4.9% per year in VAMCs (2010, 39%; 2018 28%) and 11.3% in Outpts (2010, 12%; 2018, 6%). Similar annual significant decreases were observed with AMG (9.4%), es-CS (1.4%), and FQ (7.4%) in VAMCs; es-CS (2.7%) and FQ (5.6%) in CLCs; and AMG (9.5%) and FQ (8.2%) in Outpts.

Conclusion: In the national VA Healthcare System, the prevalence of *A. baumannii* is decreasing, as is the resistance previously observed with this organism. MDR *A. baumannii* still made up one-third of cultures in VAMCs and CLCs in 2018, and thus remains a treatment challenge.

INTRODUCTION

Carbapenem-resistant *Acinetobacter baumannii* (CRAB) was upgraded to an urgent threat by the CDC in 2019. Despite reductions in CRAB infections in the United States, co-resistance to other antibiotics in CRAB is a major concern as standard-of-care antibiotics may be ineffective, presenting unique treatment challenges.

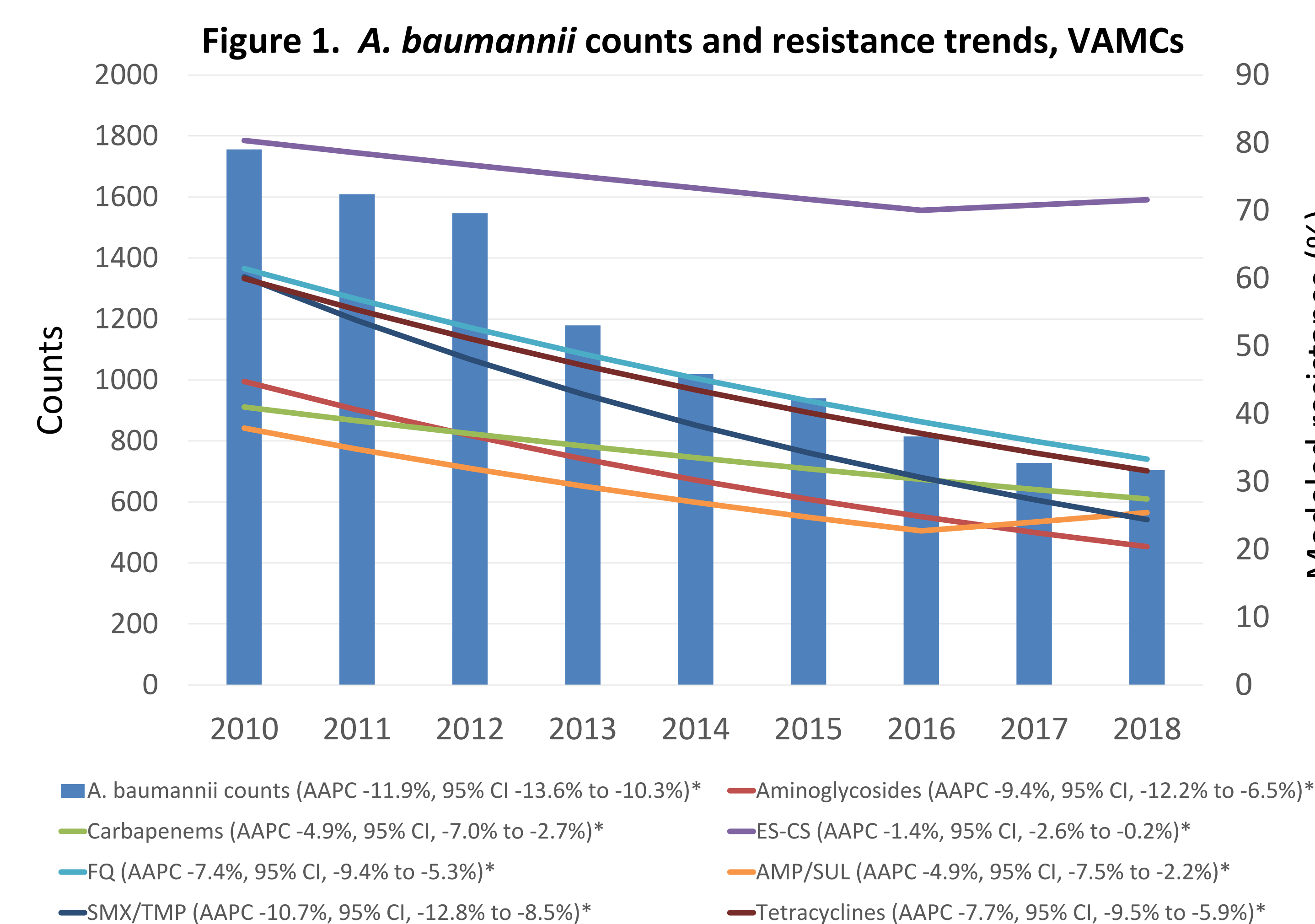
OBJECTIVE

Identify trends in resistance rates of *A. baumannii* isolates across the Veterans Affairs (VA) Healthcare System nationally.

METHODS

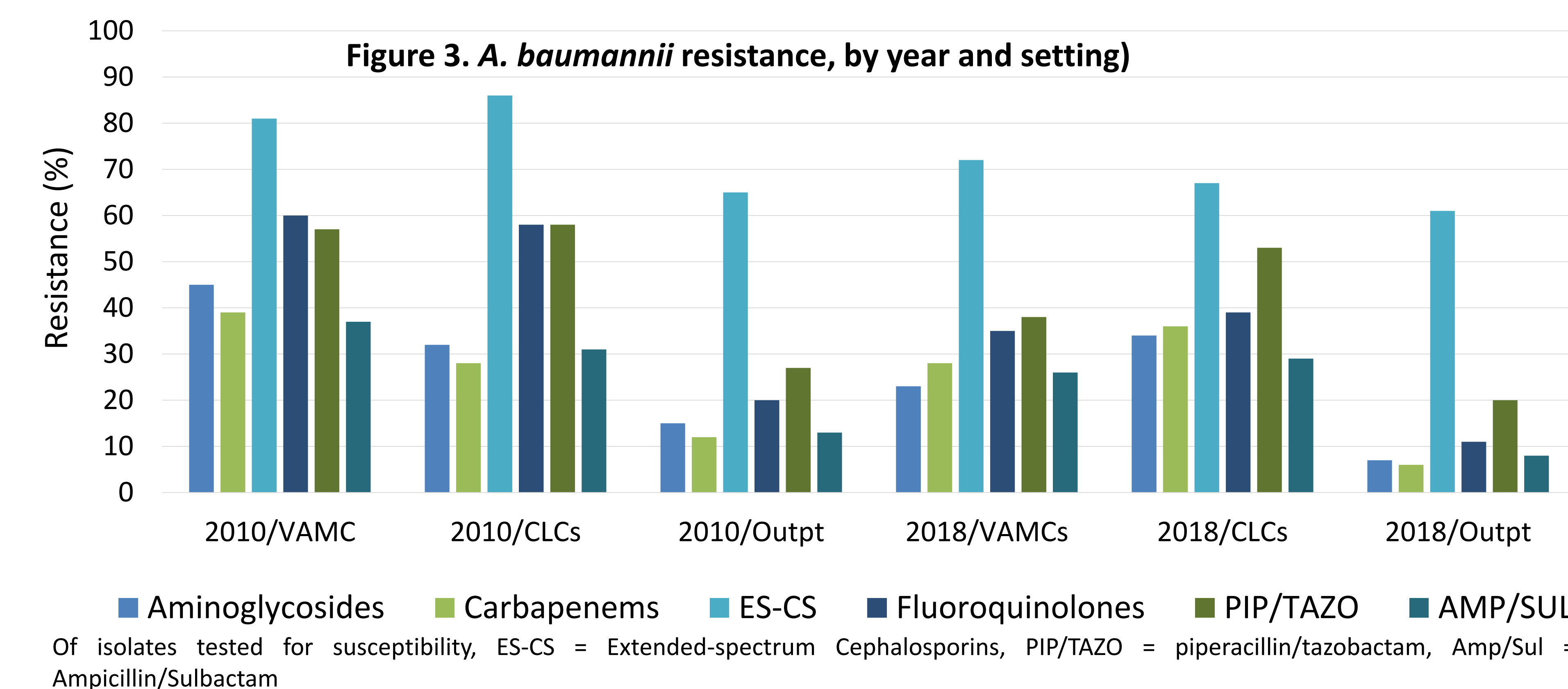
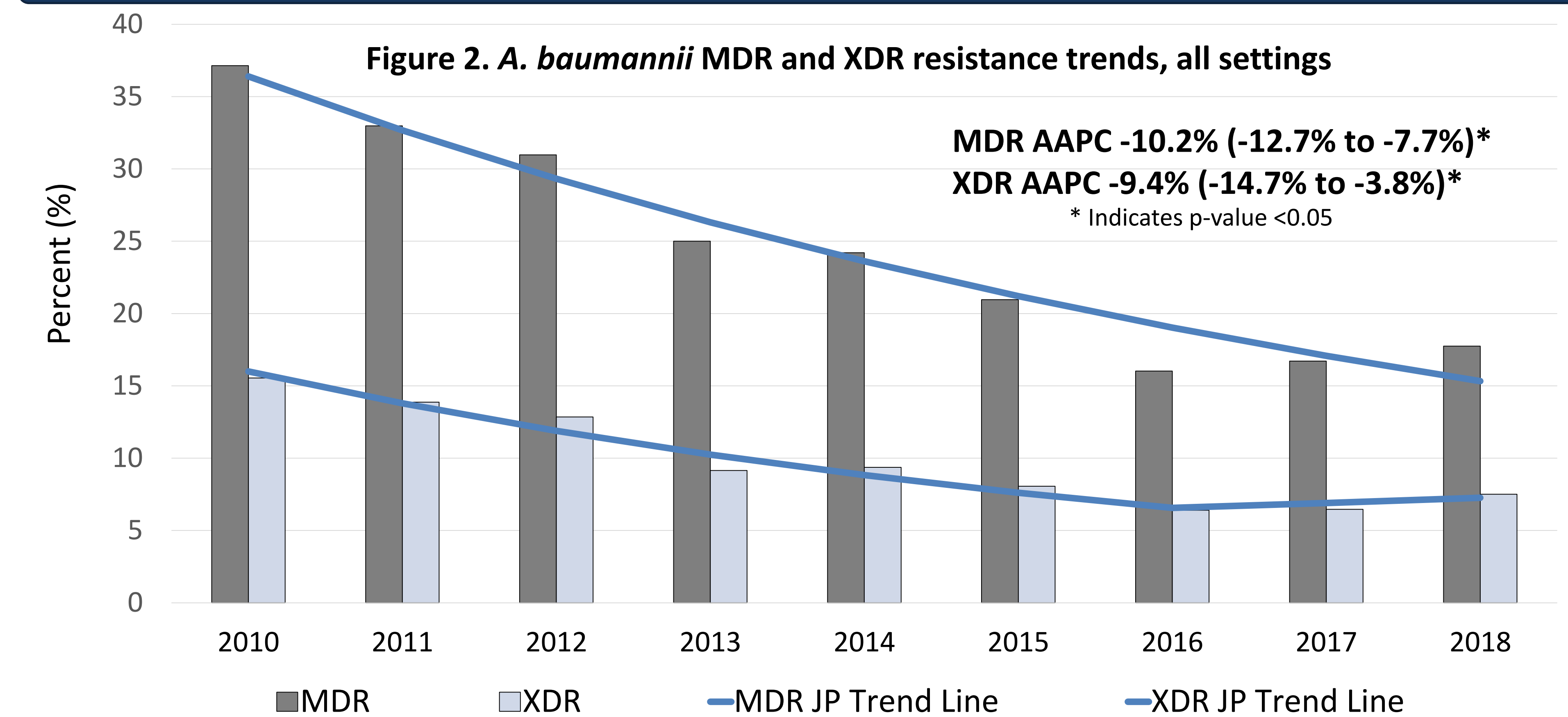
- A. baumannii* clinical cultures, 2010 to 2018 collected in VA medical centers (VAMC), community living centers (CLC), or outpatient clinics (Outpt).
- For resistance, included the first isolate per patient, per facility, per year. Antibiotic susceptibility based on latest Clinical Laboratory Standards Institute breakpoints to numeric minimum inhibitory concentrations (MIC) data were available. Where MIC values were not available, we used the reported textual interpretations (i.e., resistant [R], intermediate [I], or susceptible [S]).
- Time trends assessed with Joinpoint (JP) regression, to calculate average annual percent changes (AAPC) and 95% confidence intervals (CI).

RESULTS



* Indicates p-value <0.05. Aminoglycosides (amikacin, gentamicin, tobramycin), Carbapenems (imipenem, meropenem, doripenem), ES-CS = Extended-spectrum Cephalosporins (cefepime, ceftazidime, cefotaxime, ceftriaxone), Fluoroquinolones (ciprofloxacin, levofloxacin), Antipseudomonal penicillin's + β-lactamase inhibitors (piperacillin/tazobactam, clavulanate/ticarcillin), Amp/Sul = Ampicillin/Sulbactam, SMX/TMP = Sulfamethoxazole/Trimethoprim, Tetracyclines (tetracycline, minocycline, doxycycline).

RESULTS



CONCLUSIONS

We observed significant decreases in *A. baumannii* clinical cultures among VA inpatient populations over our recent 9 year study period. Significant decreases were observed in *A. baumannii* resistance, including MDR (10.2%), XDR (9.4%), CRAB (4.9% VAMC, 11.3% Outpt). In 2018, CRAB was 28% in VAMCs and 36% in long-term care, which present challenges to effective treatment despite these improvements in resistance.

Citation: CDC. Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2019.
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