



# Annual Surveillance Summary: *Pseudomonas aeruginosa* Infections in the Military Health System (MHS), 2017

NMCPHC-EDC-TR-379-2018

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## Abstract

The EpiData Center (EDC) conducts routine surveillance of *Pseudomonas aeruginosa* incidence and prevalence among all beneficiaries seeking care within the Military Health System (MHS). This report describes demographics, clinical characteristics, prescription practices, and antibiotic resistance patterns observed for *P. aeruginosa* infections in the calendar year (CY) 2017.

Multiple data sources were linked to assess descriptive and clinical factors related to *P. aeruginosa*. Health Level 7 (HL7)-formatted Composite Health Care System (CHCS) microbiology data identified *P. aeruginosa* infections. These infections were matched to HL7-formatted CHCS pharmacy data to assess prescription practices, the Standard Inpatient Data Record (SIDR) to determine healthcare-associated exposures, and the Defense Manpower Data Center (DMDC) rosters to determine burden among Department of Defense (DOD) active duty (AD) service members.

Overall, incidence rates (IRs) of *P. aeruginosa* infections in the MHS beneficiary and DOD AD populations are decreasing. The incidence of *P. aeruginosa* in the MHS decreased in 2017 compared to the historical average. The majority of infections occurred in those over 65 years of age. Similar to 2016, 47.9% of all prevalent *P. aeruginosa* infections were found to be healthcare-associated. A growing concern both in and outside of the hospital setting is the rise of multidrug-resistant (MDR) *P. aeruginosa* infections. *P. aeruginosa* infections did not display 100% susceptibility to any antibiotics in 2017. There was a statistically significant increase in gentamicin susceptibility, while a significant decrease in susceptibility was identified in ceftazidime. Findings suggest that fluoroquinolones are being used as the first line of defense, but are likely followed by piperacillin and cephalosporins due to their greater efficacy.

Due to the decreasing efficacy of relevant antibiotics, the rise of MDR *P. aeruginosa*, and the resilient nature of the organism, continued surveillance of *P. aeruginosa* is recommended.



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## Background, Methods, and Limitations

The EpiData Center (EDC) at the Navy and Marine Corps Public Health Center (NMCPHC) prepares a retrospective report each calendar year (CY) that summarizes the demographics, clinical characteristics, prescription practices, and antibiotic susceptibility patterns for *Pseudomonas aeruginosa* infections among Military Health System (MHS) beneficiaries. This report presents analytical results and discussion of CY 2017 data for *P. aeruginosa* infections in the MHS.

The background, methods, and limitations relevant to this analysis have been discussed in previous reports (CY 2015 and 2016 annual reports for *P. aeruginosa*<sup>1,2</sup>). The CY 2017 report does not include an analysis of burden associated with deployment-related infections using Contingency Tracking System (CTS) data; all other methods and limitations are the same as in recent years. Recent literature reviews did not present any relevant developments in *P. aeruginosa* research since CY 2016 analyses.

The EDC also monitors other multidrug-resistant organisms (MDROs) of interest in the MHS.<sup>3,4</sup>



## Results

### Section A – Descriptive Epidemiology

#### Incidence of *P. aeruginosa*

In 2017, the annual incidence rate (IR) for *P. aeruginosa* infection among MHS beneficiaries treated at a military treatment facility (MTF) was 30.6 per 100,000 persons per year. This reflects a 4.0% change below the weighted historic IR. Similar decreases were demonstrated within the Air Force, Army, and Marine Corps beneficiary populations; however, a 1.6% change above the weighted historic IR occurred for the Navy beneficiary population. IR rates among Air Force and Marine Corps beneficiaries were below two standard deviations of the weighted historic IR, while the Navy beneficiary 2017 IR was more than two standard deviations above the weighted historic average. IR rates for Army beneficiaries and the Department of Defense (DOD) active duty (AD) populations were within two standard deviations of the weighted historic IRs of *P. aeruginosa* (Table 1).

**Table 1.** Incidence Rate (IR) for *P. aeruginosa* Infections in the MHS, CY 2017

Population	2017 IR	Weighted Historic <sup>a</sup> IR 2014 - 2016	Two Standard Deviations: Weighted Historic <sup>a</sup> IR	2017	
				Direction	Percent Change <sup>b</sup>
MHS Beneficiaries	30.6	31.9	1.2	↓	4.0%
Air Force	23.9	27.1	2.3	↓	11.9%
Army	28.4	28.9	2.1	↓	1.5%
Marine Corps	24.6	31.9	4.3	↓	22.9%
Navy	29.2	28.8	0.1	↑	1.6%
DOD Active Duty	26.5	27.7	2.7	↓	4.4%

Rates are presented as the rate per 100,000 persons per year.

A green arrow indicates an increasing percent change and a blue arrow indicates a decreasing percent change.

<sup>a</sup> Historic IR reflects the weighted average of the three years prior to the analysis year.

<sup>b</sup> This reflects the percent change from the weighted historic IR to the IR of the current analysis year.

Data Source: NMCPHC HL7-formatted CHCS microbiology and MHS M2 databases.

Prepared by the EpiData Center, Navy and Marine Corps Public Health Center, on 01 May 2018.



### Demographic Distribution of *P. aeruginosa*

In 2017, there were 2,878 incident *P. aeruginosa* infections identified among all MHS beneficiaries treated at an MTF. The incidence rate among males (33.0 per 100,000 persons) was higher than the female rate (28.2 per 100,000 persons). By age, individuals younger than 35 years had lower incidence rates, with the lowest burden among those aged 18 to 24 years (18.4 per 100,000 persons). For individuals older than 35 years, incidence rates increased by age group, with the highest burden among individuals 65 years and older (51.3 per 100,000 persons). By beneficiary type, family members demonstrated the lowest rates (24.6 per 100,000 persons) (Table 2).

**Table 2.** Demographic Characteristics of *P. aeruginosa* Infections in the MHS, CY 2017

	N = 2,878	
	Count	Rate
<b>Gender</b>		
Female	1,301	28.2
Male	1,577	33.0
<b>Age Group (in Years)</b>		
0-17	441	22.6
18-24	208	18.4
25-34	257	21.7
35-44	228	26.9
45-64	595	29.1
65+	1,149	51.3
<b>Beneficiary Type</b>		
Active Duty	360	26.5
Family Members	1,342	24.6
Retired	721	32.8
Other <sup>a</sup>	455	--

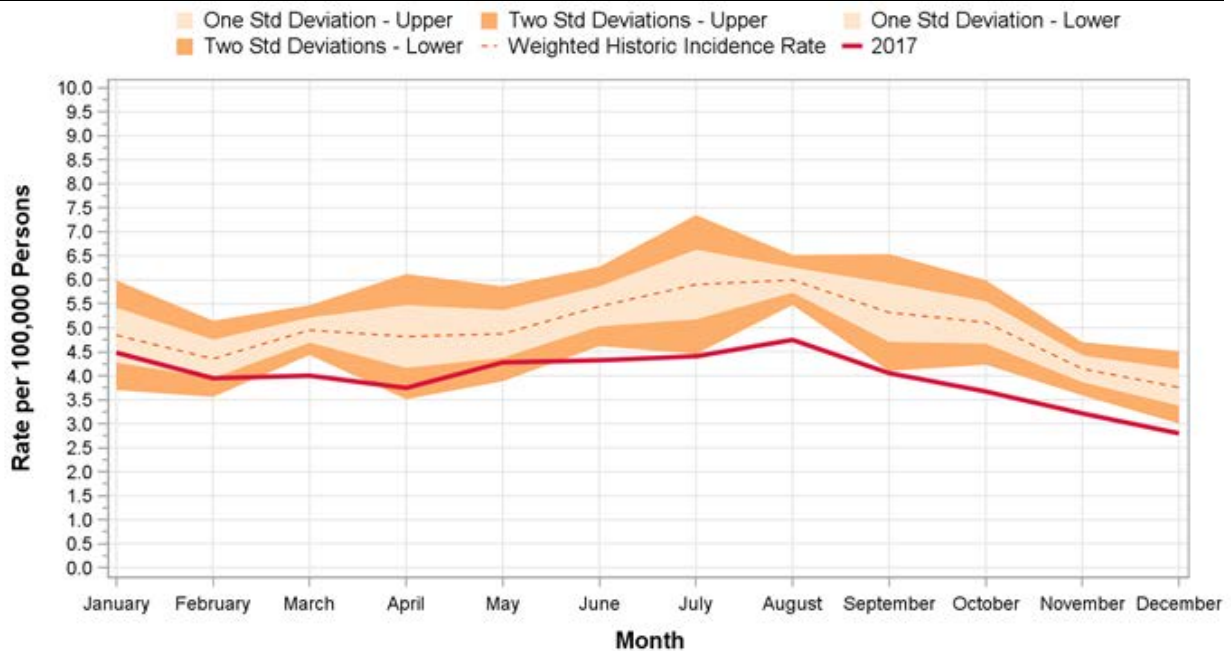
<sup>a</sup> Rate is not reported due to variation in population denominator. Rates are presented as the rate per 100,000 persons per year.  
 Data Source: NMCPHC HL7-formatted CHCS microbiology and MHS M2 databases.  
 Prepared by the EpiData Center, Navy and Marine Corps Public Health Center, on 01 May 2018.



## Seasonality

Monthly IRs of *P. aeruginosa* infections in 2017 were lower than the weighted historic IR for the entire calendar year. The 2017 IR was more than two standard deviations below the weighted historic IR in March and for the second half of the calendar year, June through December. IRs of *P. aeruginosa* infections in January and February were within one standard deviation of the weighted historic IR, while rates of *P. aeruginosa* infections in April and May were within two standard deviations (Figure 1).

**Figure 1.** Monthly Incidence of *P. aeruginosa* Infections and Weighted Historic Incidence Rate (IR) Comparisons in the MHS, CY 2017



Rates are presented as the rate per 100,000 persons per year.  
 Bands indicate one and two standard deviations above and below the weighted historic monthly IRs.  
 The weighted historic monthly IR is a weighted average of the three years prior to the analysis year.  
 Data Source: NMCPHC HL7-formatted CHCS microbiology and MHS Data Mart (M2) databases.  
 Prepared by the EpiData Center, Navy and Marine Corps Public Health Center, on 01 May 2018.



### *P. aeruginosa* Clinical Characteristics

There were 3,350 prevalent *P. aeruginosa* infections identified among all MHS beneficiaries treated at an MTF in 2017. The infection burden was higher in the outpatient setting (80.3%) and generally consisted of non-invasive infections (92.3%). Thirty-nine percent of *P. aeruginosa* infections were collected from urine samples; respiratory samples represented the second highest proportion of collection sites (29.2%) followed by skin and soft tissue infection (SSTI)/wound sites (20.9%).

**Table 3.** Clinical Characteristics of *P. aeruginosa* Prevalent Infections in the MHS, CY 2017

	N = 3,350	
	Count	Percent
<b>Specimen Collection Location</b>		
Inpatient	660	19.7
Outpatient	2,690	80.3
<b>Infection Type</b>		
Invasive	259	7.7
Non-Invasive	3,091	92.3
<b>Body Collection Site</b>		
Blood	52	1.6
Respiratory	979	29.2
SSTI/Wound	700	20.9
Urine	1,307	39.0
Other	312	9.3

Data Source: NMCPHC HL7-formatted CHCS microbiology database.

Prepared by the EpiData Center, Navy and Marine Corps Public Health Center, on 01 May 2018.



## Exposure Burden Metrics

In 2017, there were 226,808 direct care inpatient admissions across all MHS MTFs. Table 4 details two MDR *P. aeruginosa* infection metrics related to community and healthcare exposures.

The admission MDRO prevalence rate measures the rate of MDR *P. aeruginosa* importation into the MHS and includes 1) hospitalized patients in 2017 that tested positive for the infection within the first three days of admission and 2) all other hospitalized patients in 2017 that tested positive for the infection or colonization in 2016. The 2016 samples are included in the calculation of the admission prevalence rate to estimate the reservoir of *P. aeruginosa* impacting the MHS. In 2017, the admission MDRO prevalence rate for *P. aeruginosa* infection was 0.7 per 1,000 inpatient admissions. Within the MHS, the US South region had the highest admission MDRO prevalence rate (1.2 per 1,000 inpatient admissions).

The overall MDRO prevalence rate measures the cumulative community reservoir and healthcare-associated exposure burden for *P. aeruginosa* and includes 1) hospitalized patients in 2017 that tested positive for the infection at any time during admission and 2) all other hospitalized patients in 2017 that tested positive for the infection or colonization in 2016. The 2016 samples are included in the calculation of the overall prevalence rate to estimate the reservoir of *P. aeruginosa* impacting the MHS. In 2017, the overall MDRO prevalence rate for *P. aeruginosa* infection was 0.9 per 1,000 inpatient admissions. The US South region also had the highest overall MDRO prevalence rate (1.5 per 1,000 inpatient admissions).

By definition, admission MDRO prevalence infections are included in the calculation of the overall MDRO prevalence rate. In 2017, the admission prevalence rate comprised 78.9% of the overall prevalence rate of *P. aeruginosa* in the MHS (0.7 of the 0.9 per 1,000 inpatient admissions). This suggests that the majority of *P. aeruginosa* infections were imported into the MHS from the community reservoir.



**Table 4.** MDRO Community- and Healthcare-Associated Exposure Burden Metrics among *P. aeruginosa* in the MHS, CY 2017

Region	Admission MDRO Prevalence <sup>a</sup>		Overall MDRO Prevalence <sup>b</sup>		Percentage <sup>d</sup> of Admission (Imported) Prevalent Infections among Overall Prevalent Infections
	Count	Rate <sup>c</sup>	Count	Rate <sup>c</sup>	
OCONUS	4	--	4	--	--
US Midwest	4	--	4	--	--
US Northeast	0	--	0	--	--
US South	63	1.2	79	1.5	79.7
US South Atlantic	51	0.7	69	0.9	73.9
US West	39	0.6	48	0.7	81.3
<b>Total</b>	<b>161</b>	<b>0.7</b>	<b>204</b>	<b>0.9</b>	<b>78.9</b>

<sup>a</sup> Admission MDRO prevalence included hospitalized patients in 2017 that tested positive for the infection within the first three days of admission and all other hospitalized patients in 2017 that tested positive for the infection or colonization in 2016.

<sup>b</sup> Overall MDRO prevalence included hospitalized patients in 2017 that tested positive for the infection at any time during admission and all other hospitalized patients in 2017 that tested positive for the infection or colonization in 2016.

<sup>c</sup> Rates are presented as the rate per 1,000 inpatient admissions per year. Rates are not provided when the prevalence count is less than or equal to 5.

<sup>d</sup> Percentage reflects the proportion of MDRO infections that were imported into the healthcare system in the calendar year.

Data Source: NMCPHC HL7-formatted CHCS microbiology and SIDR databases.

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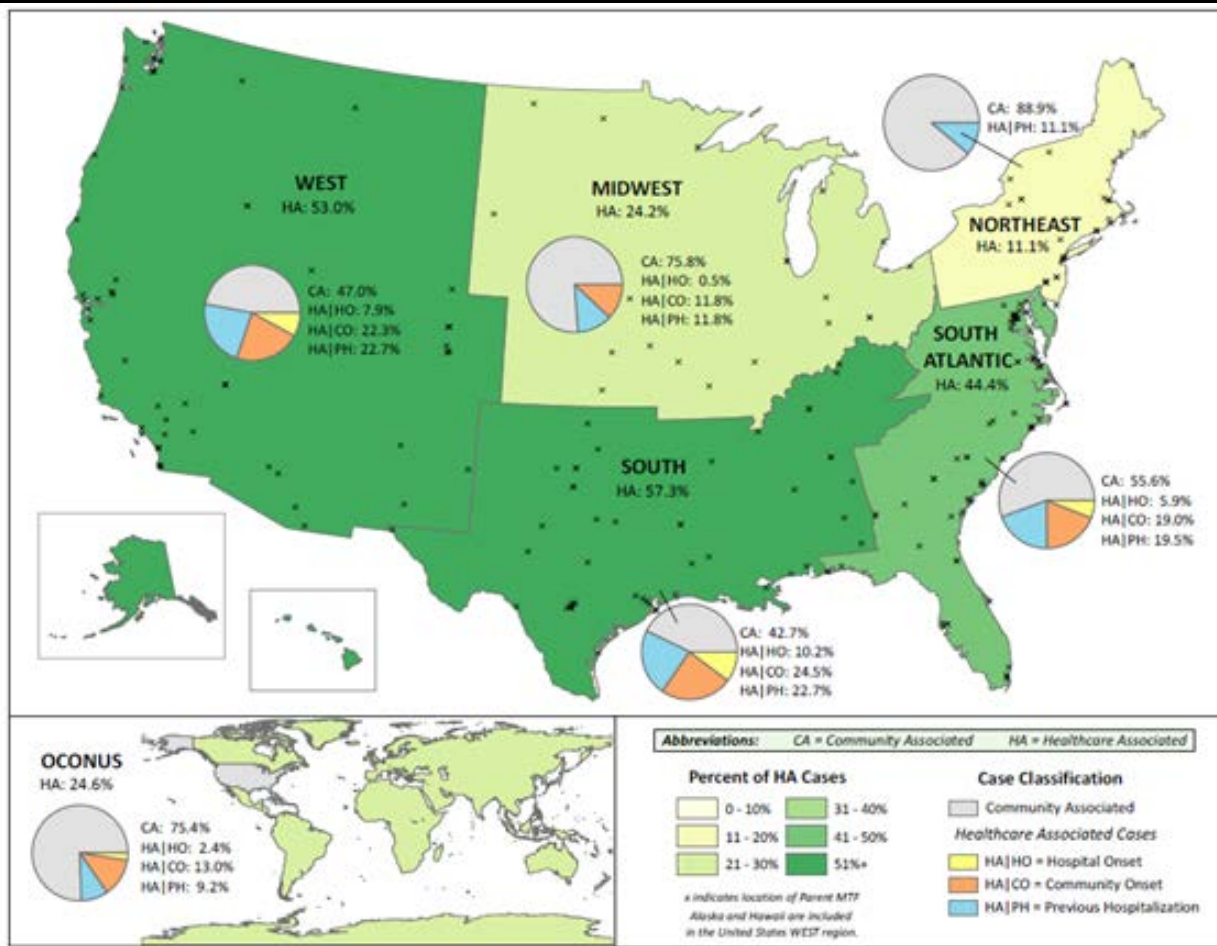
## Regional Epidemiologic Infection Classifications

Among all prevalent *P. aeruginosa* infections identified in the MHS in 2017, 52.1% were community-associated (CA) cases and 47.9% were healthcare-associated (HA) cases. Regionally, the US South reported the highest proportion of HA *P. aeruginosa* cases (57.3%), followed by the US West (53.0%), US South Atlantic (44.4%), OCONUS regions (24.6%), US Midwest (24.2%), and US Northeast (11.1%) (Figure 2).

HA cases were further categorized into hospital-onset (HO), community-onset (CO), or previous hospitalization (PH) groupings. Among all prevalent *P. aeruginosa* infections (regardless of HA or CA classification or region), 20.6% were classified as CO cases, indicating that the infection most likely originated from the community. PH cases accounted for 20.2% of all prevalent *P. aeruginosa* infections, indicating that the infections were not associated with a current admission but that the patient had a prior hospitalization in the previous 12 months. Only 7.1% of prevalent *P. aeruginosa* infections were HO, indicating that the infection was identified after the third day of admission and likely contracted during the current hospitalization. A similar distribution of HA case classifications was observed by region, where CO cases accounted for the largest proportion, followed by PH cases and HO cases (Figure 2).



**Figure 2.** Proportion of Healthcare- and Community-Associated Cases among *P. aeruginosa* Infection in the MHS by Region, CY 2017



Data Source: NMCPHC HL7-formatted CHCS microbiology, SIDR, and MHS M2 databases.  
 Prepared by the EpiData Center, Navy and Marine Corps Public Health Center, on 01 May 2018.



## Section B – Antimicrobial Resistance and Use

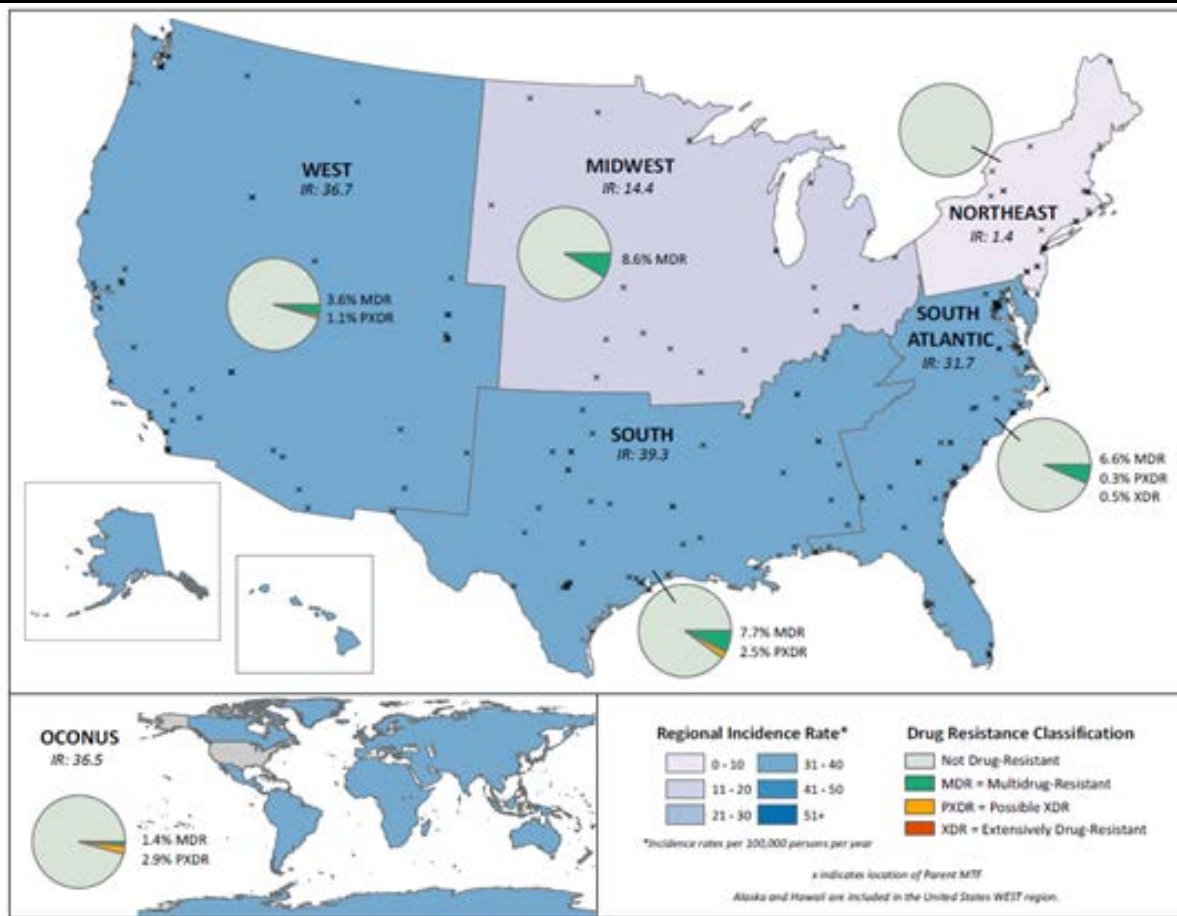
### Regional Multidrug Resistance

In 2017, the IR of *P. aeruginosa* infection was 30.6 infections per 100,000 persons per year; the IR of drug-resistant *P. aeruginosa* infection (i.e., resistant to antibiotics in at least three classes) was 1.6 infections per 100,000 persons per year. Regionally, the US South (39.3 per 100,000 persons), US West (36.7 per 100,000 persons), and OCONUS regions (36.5 per 100,000 persons) had the highest total IRs. The South Atlantic region had a total IR of 31.7 per 100,000 persons. The US Midwest and US Northeast regions accounted for the lowest total *P. aeruginosa* IRs by region (14.4 per 100,000 persons and 1.4 per 100,000 persons, respectively) (Figure 3).

Prevalent drug-resistant *P. aeruginosa* infections are further categorized by drug-resistance type; among the 3,350 drug-resistant prevalent infections identified during 2017, 5.8% (n=194) were classified as MDR, 0.1% (n=5) were extensively drug-resistant (XDR), and 1.3% (n=42) were classified as possibly XDR (PXDR) (data not shown). These drug-resistant *P. aeruginosa* classifications are described as a proportion of all prevalent infections by region in Figure 3. The US South region had the greatest percentage of drug-resistant *P. aeruginosa* infections at 7.7% MDR and 2.5% PXDR. OCONUS regions had the largest proportion of prevalent infections classified as PXDR (2.9%). The US Northeast region did not report any multidrug-resistant *P. aeruginosa* infections.



**Figure 3.** Annual Incidence Rate (IR) and Percentage of Multidrug Resistance among *P. aeruginosa* Infections in the MHS by Region, CY 2017



Rates are presented as the rate per 100,000 persons per year.







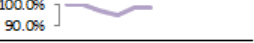
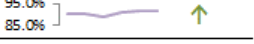
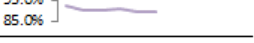
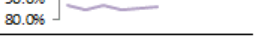



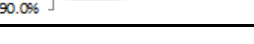
Data Source: NMCPHC HL7-formatted CHCS microbiology, SIDR, and MHS M2 databases.

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## Antibiogram

Table 5 displays an antibiogram of *P. aeruginosa* incident infections for all MHS beneficiaries during CYs 2012-2017. In 2017, *P. aeruginosa* infections were susceptible to a wide range of antibiotics, with susceptibility above 94% for doripenem (98.7%), amikacin (96.1%), tobramycin (96.0%), and colistin (94.3%). Infections were least susceptible to ticarcillin/clavulanate (75.6%) and aztreonam (79.9%). A statistically significant decrease in susceptibility was observed in ceftazidime and a significant increase in susceptibility was observed in gentamicin (Table 5).

**Table 5.** Antibiogram of *P. aeruginosa* Infections Identified in the MHS, CY 2012-2017

Antibiotics	2012	2013	2014	2015	2016	2017	Susceptibility Trend <sup>a</sup>	Comment <sup>b</sup>
Amikacin	95.1%	94.2%	94.8%	95.0%	94.9%	96.1%		
Aztreonam	77.4%	78.4%	76.6%	79.4%	78.3%	79.9%		
Cefepime	93.5%	93.5%	93.4%	92.7%	93.3%	93.9%		
Ceftazidime	95.2%	94.7%	94.6%	94.8%	93.9%	93.7%		↓
Ciprofloxacin	88.8%	86.8%	88.5%	87.5%	88.6%	89.7%		
Colistin	98.8%	97.3%	95.1%	95.4%	97.3%	94.3%		
Doripenem	100.0%	100.0%	97.5%	95.2%	98.8%	98.7%		
Gentamicin	90.7%	90.5%	89.3%	91.3%	91.6%	92.1%		↑
Imipenem	92.3%	90.2%	90.3%	90.6%	89.6%	89.1%		
Levofloxacin	86.8%	84.9%	86.9%	84.8%	85.7%	86.3%		
Meropenem	93.6%	94.2%	93.8%	92.2%	91.0%	93.3%		
Piperacillin	96.1%	96.3%	93.5%	95.2%	95.7%	92.6%		
Piperacillin/Tazobactam	94.2%	94.4%	93.6%	93.5%	93.2%	93.5%		
Ticarcillin/Clavulanate	84.2%	50.0%	42.0%	63.1%	46.7%	75.6%		
Tobramycin	96.4%	95.4%	95.3%	95.0%	96.1%	96.0%		

'-' indicates that fewer than 30 isolates were tested.

<sup>a</sup> Susceptibility trends are displayed only for antibiotics with susceptibility data for at least five consecutive years.

<sup>b</sup> Arrow indicates the antibiotics with a significant change in direction of trend for significant two-tailed Cochran-Armitage tests for trend established for a single antibiotic over time. A significant increase in susceptibility is denoted by a green upward arrow and a significant decrease in susceptibility is denoted by a blue downward arrow.

Data Source: NMCPHC HL7-formatted CHCS microbiology database.

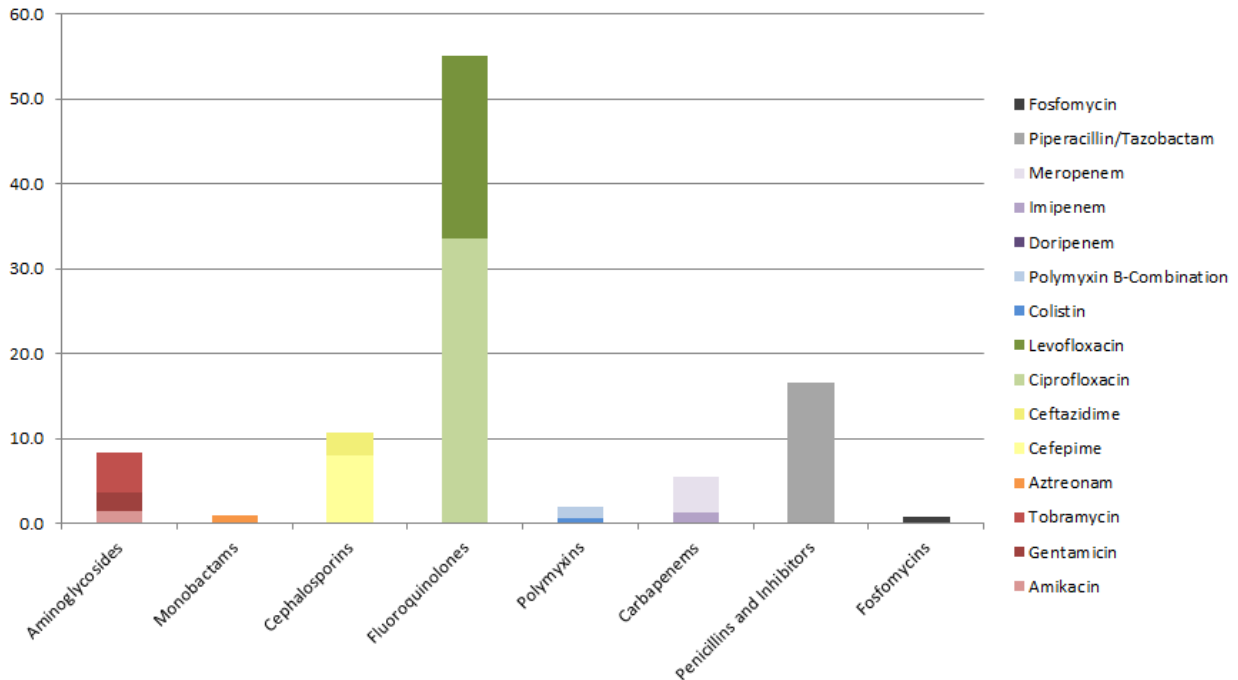
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### Antimicrobial Consumption/Prescription Practices

Among all MHS beneficiaries, the most commonly prescribed antibiotic classes associated with prevalent *P. aeruginosa* infections in 2017 were fluoroquinolones (55.1%), penicillins and inhibitors (16.6%), and cephalosporins (10.7%) (Figure 4). Within the fluoroquinolone class, ciprofloxacin (33.5%) and levofloxacin (21.6%) were prescribed. Among penicillins and inhibitors, piperacillin/tazobactam (16.6%) were prescribed.

**Figure 4.** *P. aeruginosa* Infection and Prescription Practices in the MHS, CY 2017



Only the first occurrence of a unique antibiotic was counted per person per infection, regardless of administration route.

Data Source: NMCPHC HL7-formatted CHCS microbiology and HL7-formatted pharmacy databases.

Prepared by the EpiData Center, Navy and Marine Corps Public Health Center, on 01 May 2018.



## Discussion

The incidence of *P. aeruginosa* in the MHS decreased in 2017 compared to the historical average.<sup>2</sup> The IR decline among DOD AD service members and MHS beneficiaries in 2017 provides further evidence that *P. aeruginosa* trends are stabilizing. Marine Corps and Air Force beneficiary IRs decreased 22.9% and 11.9%, respectively. Similar to previous years, the incidence rate among those over the age of 65 was the highest compared to the incidence rate of any other age group.

*P. aeruginosa* is an opportunistic gram-negative bacterium and expected to most greatly affect the immunocompromised. It tends to target the very young and elderly populations, as well as those in a hospital setting. Approximately one-fifth of the MHS *P. aeruginosa* infections in 2017 were identified in an inpatient setting. Similar to 2016, 47.9% of all prevalent *P. aeruginosa* infections were found to be HA. More than half of the prevalent *P. aeruginosa* infections found in the US West and US South regions were HA. This higher percentage could be attributed to the large number of MTFs found in these regions, providing more exposure to a hospital environment compared to the other US and OCONUS regions.

A growing concern both in and outside of the hospital setting is the rise of multidrug-resistant *P. aeruginosa* infections. In the MHS in 2017, there was a slightly lower proportion of prevalent multidrug-resistant *P. aeruginosa* infections compared to 2016 (7.2% compared to 8.1%, respectively). OCONUS regions and the US South had the highest proportions of multidrug-resistant *P. aeruginosa* infections classified as PXDR. *P. aeruginosa* did not display 100% susceptibility to any antibiotics; however, several antibiotics displayed at least 94% efficacy.

Ciprofloxacin and levofloxacin, both fluoroquinolones, accounted for more than 50% of all prescriptions associated with *P. aeruginosa* infections in the MHS, and both had an efficacy of less than 90%. The next most frequently prescribed antibiotic, piperacillin/tazobactam, had an efficacy of over 90% with a relatively stable efficacy in 2017 compared to 2016. Cephalosporins were the next most frequently prescribed, and both cefepime and ceftazidime had an efficacy of more than 90% with no statistically significant change or trend for 2017. These findings suggest the fluoroquinolones are being used as the first line of defense, but are likely followed by penicillins and inhibitors, and then cephalosporins, due to their greater efficacy.

Due to the decreasing efficacy of relevant antibiotics, the rise of MDR *P. aeruginosa*, and the resilient nature of the organism, continued surveillance of *P. aeruginosa* is recommended. Further understanding of how *P. aeruginosa* affects the MHS population is needed to continue this year's descending incidence trend. *P. aeruginosa* is the most significant pathogen in CF and infects 60% of all CF patients.<sup>5</sup> The MHS cystic fibrosis (CF) patient population should be identified and analyzed as a population of special interest. A sub-analysis would describe how *P. aeruginosa* interacts with the MHS CF population and influences incidence. These results would provide a more concrete understanding of the organism's effect on the non-CF patient population.



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## Appendix A: Antibiotics Used to Identify Resistance among *Pseudomonas aeruginosa* Infections in the MHS, CY 2017

**Table A1.** Antibiotics Included in the Resistance Definitions for *Pseudomonas aeruginosa* in the DOD, CY 2017

Antibiotic Class	Antibiotics Included in Class
Aminoglycosides	Amikacin
	Gentamicin
	Netilmicin
	Tobramycin
Anti-MRSA Cephalosporins <sup>a</sup>	Ceftaroline
Antipseudomonal penicillins and $\beta$ -lactamase inhibitors	Piperacillin/Tazobactam
	Ticarcillin/Clavulanic Acid
Carbapenems	Doripenem
	Ertapenem
	Imipenem
	Meropenem
1st & 2nd Generation Cephalosporins (non-extended spectrum cephalosporins)	Cefazolin
	Cefuroxime
3rd & 4th Generation Cephalosporins (extended spectrum cephalosporins)	Cefotaxime or ceftriaxone
	Ceftazidime
	Cefepime
Cephameycins	Cefoxitin
	Cefotetan
Fluoroquinolones	Ciprofloxacin
	Levofloxacin
Folate pathway inhibitors	Trimethoprim/Sulfamethoxazole
Fosfomycins	Fosfomicin
Glycylcyclines	Tigecycline
Monobactam	Aztreonam
Penicillins & $\beta$ -lactamase inhibitors	Amoxicillin/Clavulanic Acid
	Ampicillin/Sulbactam
Phenicol	Chloramphenicol
Polymyxins	Colistin
Tetracyclines	Doxycycline
	Minocycline
	Tetracycline

<sup>a</sup> Included only for *Klebsiella pneumoniae* and *K. oxytoca*.

Source: Magiorakos et al., 2012.<sup>6</sup>

Prepared by the EpiData Center, Navy and Marine Corps Public Health Center, on 01 May 2018.



## Appendix B: Acronym and Abbreviation List

Acronym/Abbreviation	Definition
AD	active duty
CA	community-associated
CHCS	Composite Health Care System
CO	community-onset
CONUS	continental United States
CR	carbapenem-resistant
CTS	Contingency Tracking System
CY	calendar year
DMDC	Defense Manpower Data Center
DOD	Department of Defense
DON	Department of the Navy
EDC	EpiData Center
HA	healthcare-associated
HL7	Health Level 7 format
HO	hospital-onset
M2	Military Health System (MHS) Management Analysis and Reporting Tool
MDR	multidrug-resistant
MDRO	multidrug-resistant organism
MHS	Military Health System
MTF	military treatment facility
NMCPHC	Navy and Marine Corps Public Health Center
OCONUS	outside the continental United States
PXDR	possible extensively drug-resistant
PH	previous hospitalization
SIDR	Standard Inpatient Data Record
US	United States
UTI	urinary tract infection

