

# Microbial Epidemiology of Infectious Endocarditis in the Intravenous Drug Abuse Population: A Retrospective Study in East Tennessee.

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## Goals:

- Identify what the most common organisms are for infectious endocarditis in the intravenous drug user population in East Tennessee.
- Identify what side of the heart is most often infected in intravenous drug users who have infectious endocarditis in East Tennessee.

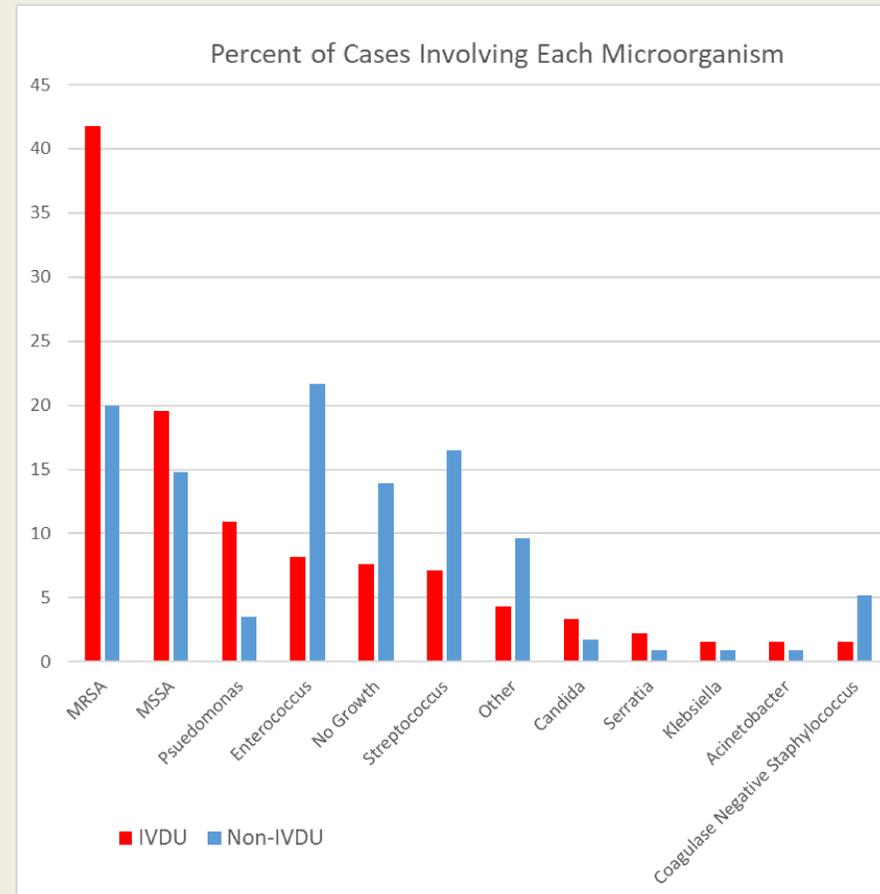
## Background:

Intravenous drug users (IVDU) have a higher incidence of infectious endocarditis (IE) compared to the general population. There are a limited number of recent reports on the microbial epidemiology of this infection for IVDU, and relatively none from our geographic region. From the reports that are published *Staphylococcus aureus* is considered the most common bacteria associated with IVDU IE. Other commonly reported bacteria, in IVDU, include other staphylococci and *Pseudomonas*, along with *Candida* being the most common fungus.<sup>1-3</sup> Previous research has shown that IVDU are at risk of infections from usually non-pathogenic organisms due to using dirty needles, using tap water for dissolving the drug, and licking needles before injecting.<sup>4</sup> Studies have also shown that IE from IVDU affects the right side of the heart significantly more often than the left.<sup>3</sup>

Due to there being extremely sparse information on the epidemiology of this infection from the South Eastern United States, we sought to determine the prevalence and the microbial epidemiology of IE cases at our institution and compare this to data from published literature.

## Methods:

A retrospective cohort of 299 cases of IE was analyzed between January 2013 and July 2017. The location was a large tertiary referral hospital in East Tennessee that has a referral base of East Tennessee, Western Virginia, Western North Carolina, and South Eastern Kentucky. Demographic, microbiologic, intravenous substance use status, radiological, and echocardiographic data were collected. These were then recorded in a spreadsheet for analysis. Chi-square analysis and odds ratios were used to compare groups. Each chart was also individually reviewed to determine if there was evidence that the patient was actively using intravenous drugs.



## Uncommon "Other" Isolated Microorganisms

Organism	Number of Cases
Brevibacterium casei	1
Corynebacterium	1
Kocuria Species	1
Granulicatella adiacens	2
Legionella	1
Stenotrophomonas maltophilia	3
Enterobacter	2
Achromobacter xylosoxidans	1
Chryseobacterium species	1
Bacillus Species (Not anthracis)	1
Lactobacillus	2
Elizabethkingia meningoseptica	1

## Results:

Of the 299 cases, 184 (61.5%) had findings consistent with IVDU, and 115 cases (38.5%) did not. IVDU and non-IVDU positive cultures rates were similar at 87% and 86% respectively. Methicillin-resistant *Staphylococcus aureus* (MRSA) was more likely to occur in IVDU (OR 2.8,  $p < 0.001$ ), and was the most common pathogen in 77 out of the 184 cases (42%). Twenty three of the 115 (20%) cases grew MRSA in the non-IVDU population. Methicillin-sensitive *Staphylococcus aureus* was the second most common bacteria for IVDU with 36 out of 184 cases (19.6%). IVDU patients were more likely infected with *Pseudomonas aeruginosa* (OR 3.384,  $p = 0.027$ ), which occurred in 20 of the 184 cases (10.9%), IVDUs also experienced more right heart involvement versus left sided involvement (OR 2.19,  $p = 0.004$ ). Some of the cases were polymicrobial.

## Conclusion:

*Staphylococcus aureus* was the most common pathogen involved with IE in the IVDU population followed by *Pseudomonas aeruginosa*. Data from this study solidifies that in IVDU, or if there is suspicion for IVDU, first line broad-spectrum antibiotics with excellent MRSA and *Pseudomonas* coverage is essential to empirically cover for IE. Extra attention for right sided heart involvement should also be made on IVDU with imaging modalities.

## Take Away Points:

- MRSA and *Pseudomonas* were both more likely to occur in a patient using intravenous drugs compared to a non-IVDU IE patient.
- IVDU IE is highly associated with right heart involvement.

## References:

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