

THE EFFECTS OF SUSCEPTIBILITY AND
RESISTANCE TESTING OF STANDARD ANTIBIOTIC
TREATMENT FOR POSSIBLE UNKNOWN GRAM-
POSITIVE BACTERIAL SPECIES

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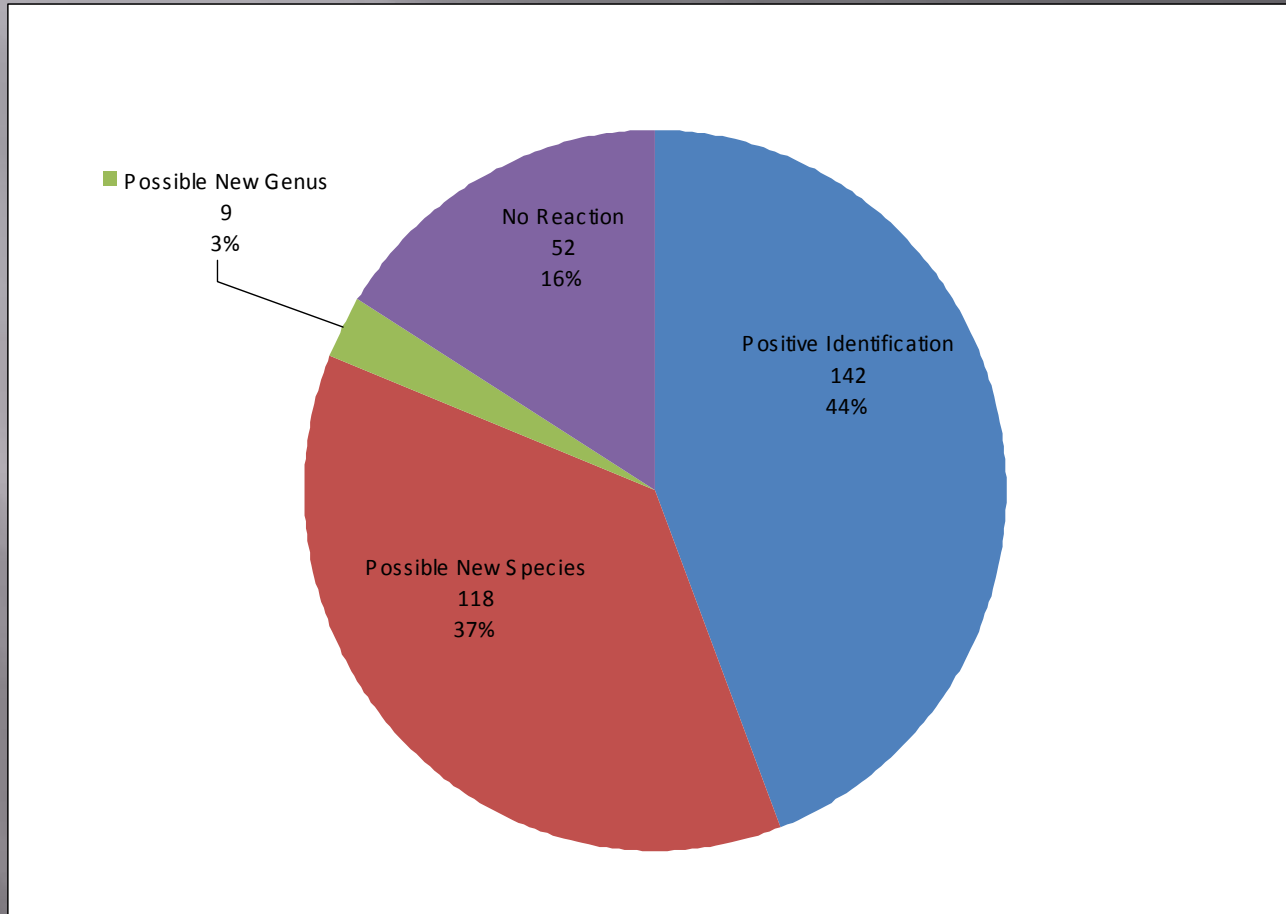
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Introduction

- ❑ Billions of microbial species harbor in the air we breathe in (discuss the different kinds of species in it- micrococcus, bacillus. especially in DC)
- ❑ Asthma and Allergy foundation and American lung association (1 in 10 children suffer from asthma and top 5 challenging places for people with asthma to live)
- ❑ Bacterial populations may be related to increases in certain diseases in the DC area
- ❑ Lack of an alternative means of cultivating pathogenic microorganism before infection and the pathogenic significance of these airborne microbials.
- ❑ A total of 321 isolates were identified to 8 bacterial genera (Enterobacter, Yesinia, Escherichia, pseudomonas, pantoea, klebsiella, and enterococcus)

Identification of Airborne Microbials by percentages



Bacterial genera

Eight
bacterial
genera

Bacillus



Enterobacter

Yersinia

Escherichia

Pseudomonas

Pantoea

Klebsiella

Enterococcus



Gram positive/Gram negative

- ▣ The target of the antibiotic therapy has focused on the peptidoglycan layer and the ribosomal subunit of bacterial species.
- ▣ Gram positive cells have a thick mesh-like cell wall made of peptidoglycan unlike Gram negative cells.
- ▣ Gram negative cells have an LPS (lipid polysaccharide) coating that elicits an immune response after infection of the host therefore, possibly compromising the immune system.

All microbial species were previously analyzed for the presence of the 16s rDNA

- ▣ Traditional PCR was performed.
- ▣ Confirmation performed using electrophoresis

- ▣ According to the CDC, there has been an increase of Methicillin-resistant *Staphylococcus aureus* (MRSA) microorganisms in the Washington, DC Metro area.
- ▣ These microbials are known to have Gram positive cell wall structure.
- ▣ Gram positive organisms are responsible for increase outbreaks of food poisoning.

Objectives

- ▣ To identify Gram positive unknown species
- ▣ Determine percentage of microbial isolates susceptible and/or resistant to standard antibiotic medical therapy.

Materials and Methods

Sampling

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graph TD; Sampling[Sampling] --> Culturing[Culturing]; Culturing --> GramStaining[Gram-Staining]; Culturing --> AntibioticTests[Antibiotic Tests];
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Culturing

Gram-Staining

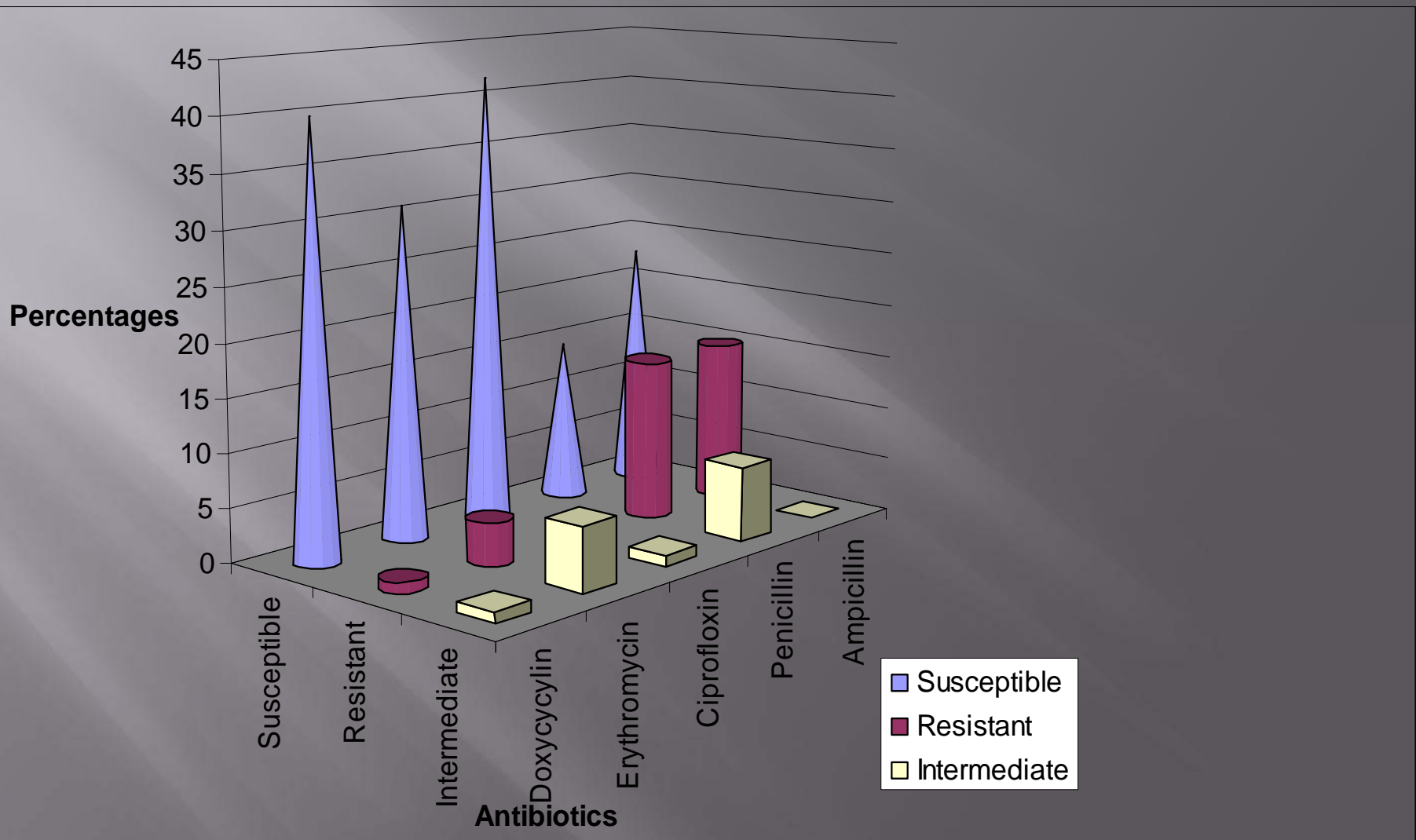
**Antibiotic
Tests**

Results

Results for *Bacillus* Genera

Antibiotic	# of susceptible isolates	# of resistant isolates
<i>Ampicillin</i>	23	15
<i>Penicillin</i>	15	15
<i>Ciprofloxin</i>	42	0
<i>Erythromycin</i>	31	4
<i>Doxycyclin</i>	40	1

Results for Bacillus Genera



Enterococcus

Antibiotic	verdict
Doxycycline	<i>Susceptible</i>
Vancomycin	<i>Susceptible</i>
Gentamycin	<i>Susceptible</i>
**Streptomycin	<i>Intermediate</i>

**Streptomycin has been the leading choice of drugs for Enterococcus related illness

Conclusion

- ▣ Due to the recent outbreak of methycillin resistant organisms in the Washington DC Metro area, and the air quality reports released from the CDC, the study results provide critical insight of microbial biodiversity in the Washington DC, Metro Area, and the need to revise medical therapy and the development of new antibiotics to fight this family of possible new microorganisms.
- ▣ These microorganisms tested, have the potential for impacts on human respiratory health as well as other human disease conditions.

References

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Future studies

- ▣ To test for Virulence factors.
- ▣ Taxonomy-identification and classification for the next six months of previous collected isolates.
- ▣ Provide valuable data for the research and development of new antibiotics.

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