Possible Infectious Disease Transmission in Waterpipes

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Disclosures

- This research was funded by the American Lung Association (Social Behavioral Research Grant)
- I have no industry affiliation or relationships

Outline

- Background on hookah bars
- Research on Disease Transmission
- Methods
- Lab Procedures
- Results
- Conclusions

Hookah Smoking in Bars/Restaurants

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Infectious Disease Risks of Hookah Smoking

- Mononucleosis from Epstein Barr virus - possible
- Herpes Simplex - possible
- Tuberculosis – one case

Noonan, D., & Kulbok, P. A. (2009). New tobacco trends: waterpipe (hookah) smoking and implications for healthcare providers. *Journal of the American Academy of Nurse Practitioners*, *21*(5), 258-260.

Knishkowy, B., & Amitai, Y. (2005). Water-pipe (narghile) smoking: an emerging health risk behavior. *Pediatrics*, *116*(1), e113-e119.

Research Question

- Does hookah use in a community setting pose a risk of infectious disease transmission?

Study

- Collaboration between public health and biology researchers at the University of Tampa
- IRB approved study
- Trainings

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Field Methods

- Ten hookah bars in Hillsborough county were selected for culturing

Methods

Hose Connector

mouthpiece

Hose

Specimen Collection

- Ten hookah bars – one pipe at each bar
- Three sites on pipe cultured at each of the ten bars

=30 streaked nutrient agar plates collected

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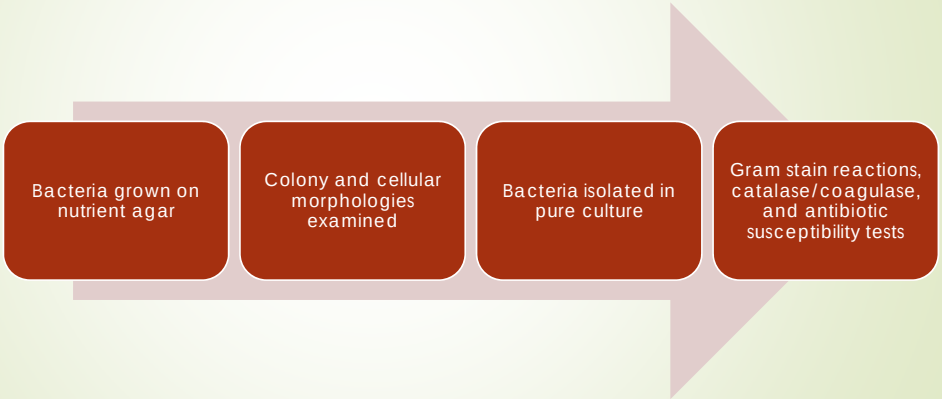
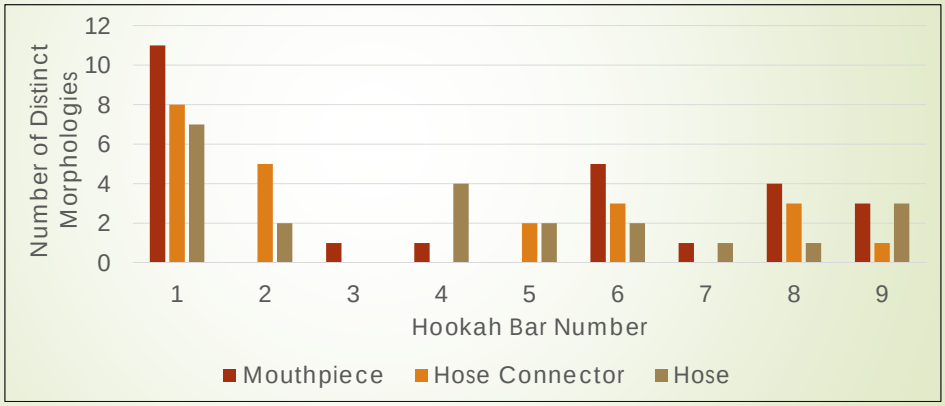
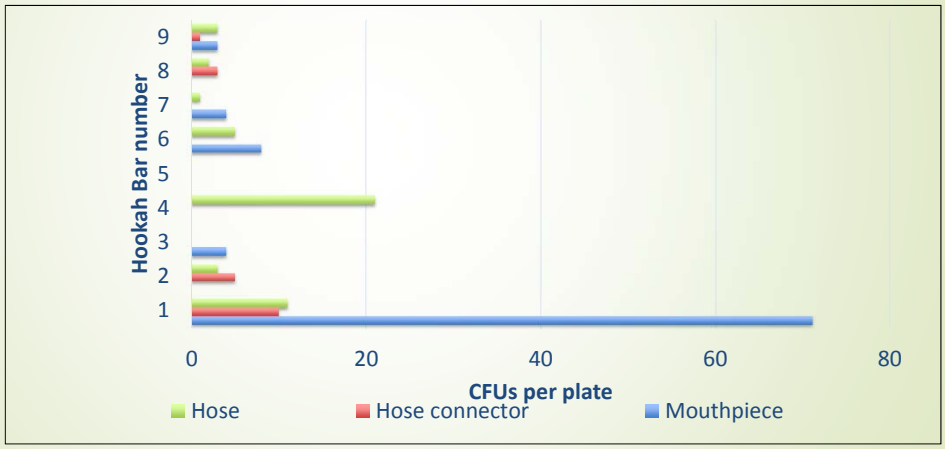
Laboratory Methods

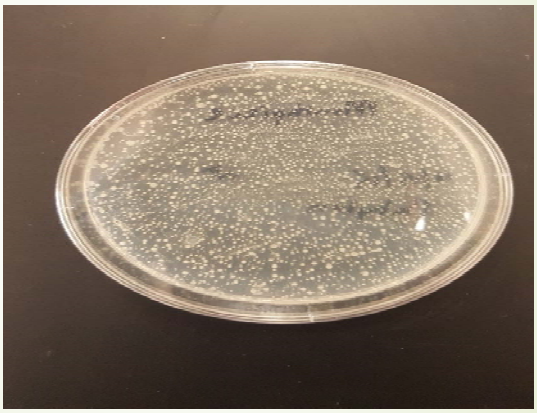


Distinct Morphologies per area of pipe from each bar

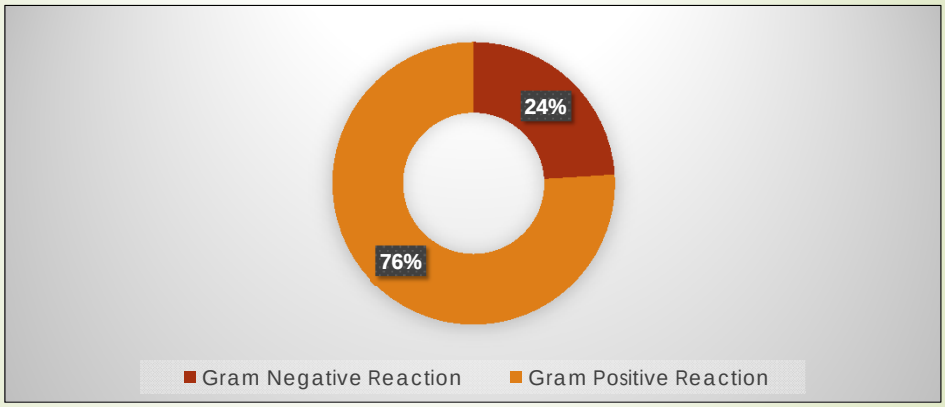


Colony Forming Units





Gram Staining



Continued Microbiology Procedures

- The isolates were also subjected to growth on differential/selective media.
- Isolates that showed growth on this media were analyzed using an enterotube.
- The genomic DNA of 20 bacterial isolates was extracted and analyzed via PCR amplification of the 16s ribosomal gene.

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Sample Bacteria and Clinical Relevance

Bacteria	Clinical Relevance
Neisseria mucosa	Endocarditis/Meningitis
Bacillus cereus	Food poisoning
Staphylococcus pasteuri	Nosocomial infection/Blood contaminant
Monococcus cerebrosis	Endophthalmitis

Tronel, H., Chaudemanche, H., Pechier, N., Doutrelant, L. and Hoen, B. (2001), Endocarditis due to Neisseria mucosa after tongue piercing. Clinical Microbiology and Infection, 7: 275–276. doi: 10.1046/j.1469-0691.2001.00241.x
Trouvé, C., Reyniers, R., Descheemaeker, P., & Nulens, E. (2015). Acute Post-Cataract Endophthalmitis Caused by Morococcus cerebrosus. Clinical Microbiology Newsletter, 37(8), 66-67.
Savini, Vincenzo, et al. "Epidemiology, pathogenicity and emerging resistances in Staphylococcus pasteuri: from mammals and lampreys, to man." Recent patents on anti-infective drug discovery 4.2 (2009): 123-129.
Anja Kotiranta, Kari Lounatmaa, Markus Haapasalo, Epidemiology and pathogenesis of Bacillus cereus infections, Microbes and Infection, Volume 2, Issue 2, February 2000, Pages 189-198.

16S Similarity[3]
Bacillus aryabhattai
Bacillus megaterium
Bacillus drentensis
Bacillus licheniformis
Bacillus megaterium
Bacillus cereus
Pseudomonas parafulva
Bacillus megaterium
Staphylococcus pasteuri
No significant similarities found
Bacillus aryabhattai
Microbacterium paraoxydans

Antibiotic Resistance

Bacteria	Antibiotic Resistance
Neisseria mucosa	+
Bacillus cereus	+
Staphylococcus pasteuri	+
Monococcus cerebrosis	+

Final Comments

- **Identification of a notable number bacteria species present in the hookah pipes indicate that communal hookah use is a potential vector for disease transmission.**
- **Some of the identified strains are potentially pathogenic and even display varying degrees of antibiotic resistance.**
- **The spread of these potentially pathogenic bacteria may pose a risk to those who participate in hookah smoking at these hookah bars.**
- **Future studies could assess the pathogenicity of collected bacterial samples, add collection of viral sample and potential for transmission via oral ingestion.**

Thank you!

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