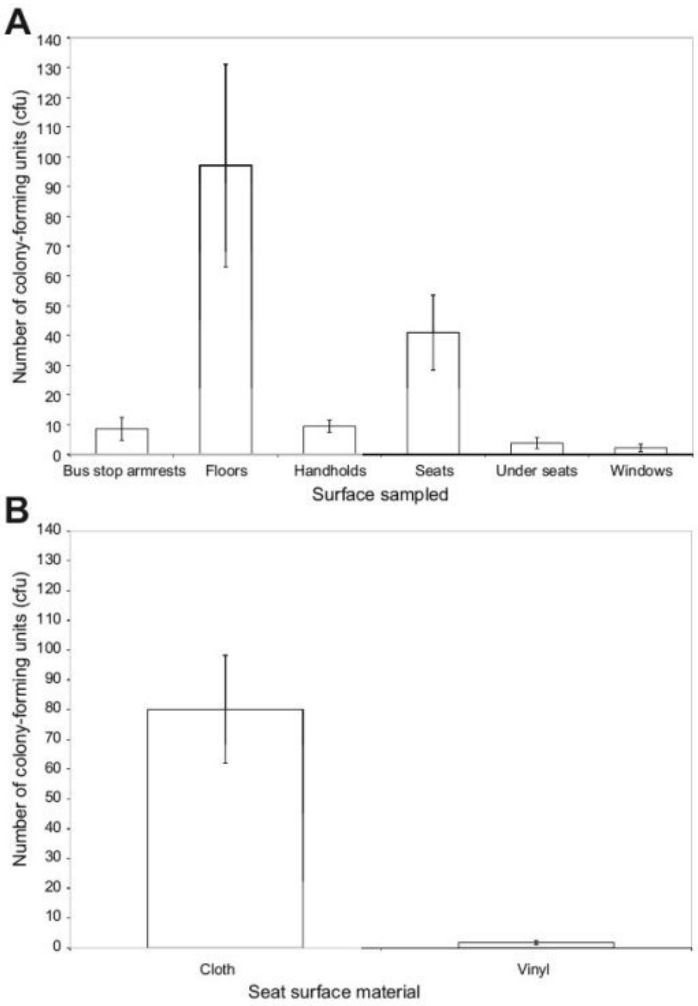
Lesson 2 - **READING #2** (abstract from): A DIVERSITY OF ANTIBIOTIC-RESISTANT STAPHYLOCOCCUS SPP. IN A PUBLIC TRANSPORTATION SYSTEM

OBJECTIVES

Our goal was to determine the diversity and abundance of Staphylococcus bacteria on different components of a public transportation system in a mid-sized US city (Portland, Oregon) and to examine the level of drug resistance in these bacteria.

METHODS

We collected 70 samples from 2 cm × 4 cm sections from seven different areas on buses and trains in Portland, USA, taking 10 samples from each area. We isolated a subset of 14 suspected Staphylococcus spp. colonies based on phenotype, and constructed a phylogeny from 16S rRNA sequences to assist in identification. We used the Kirby–Bauer disk diffusion method to determine resistance levels to six common antibiotics.



RESULTS

We found a range of pathogenic Staphylococcus species. The mean bacterial colony counts were 97.1 on bus and train floors, 80.1 in cloth seats, 9.5 on handrails, 8.6 on seats and armrests at bus stops, 3.8 on the underside of seats, 2.2 on windows, and 1.8 on vinyl seats per 8 cm2 sample area. These differences were significant ($p < 0.001$). Of the 14 isolates sequenced, 11 were staphylococci, and of these, five were resistant to penicillin and ampicillin, while only two displayed intermediate resistance to bacitracin. All 11 isolates were sensitive to trimethoprim-sulfamethoxazole, vancomycin, and tetracycline.

Figure 001 (left): Comparison of the number of colony-forming units (cfu) found in 8 cm2 locations within the Portland public transit system. There were significant mean differences in the number of cfu between these types of surface. (A) Number of cfu shown for various surface types within TriMet buses and trains, and for bus stops (mean ± standard error). (B) Number of cfu for all seats broken down into surface type:cloth seats found on buses, and vinyl seats found on trains (mean ± standard error).

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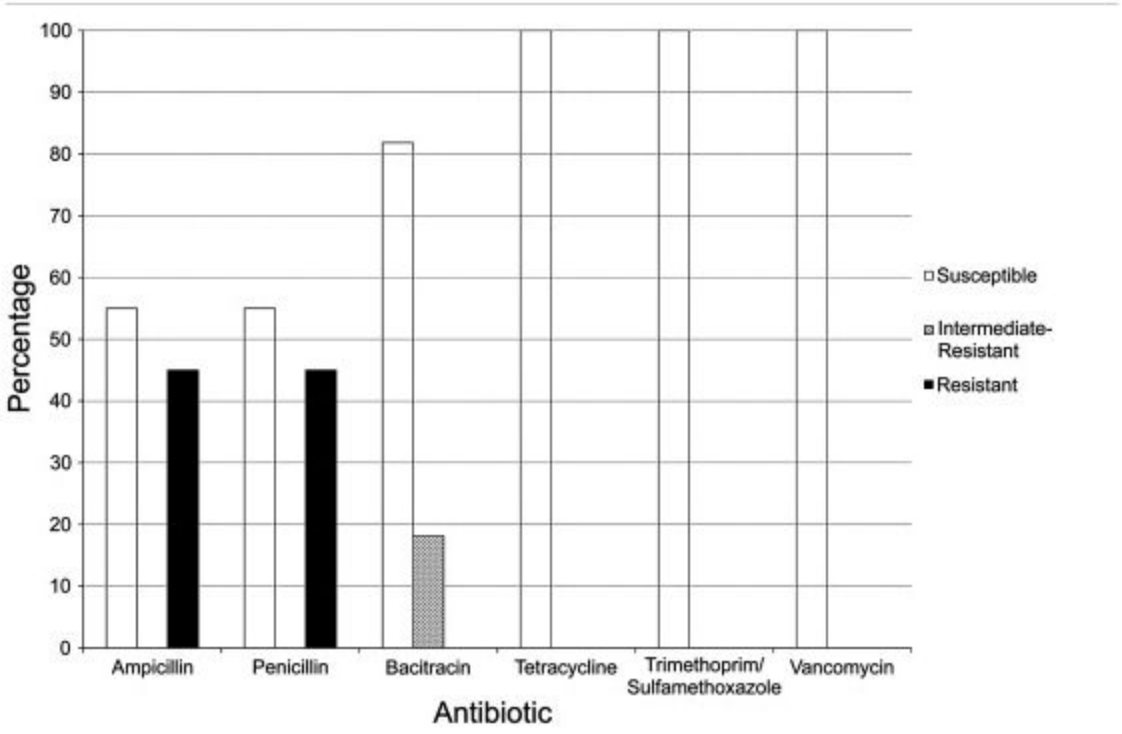

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Figure 3. Resistance to antibiotics among confirmed *Staphylococcus* isolates. Among the 14 isolates sequenced, 16S sequences indicated that 11 were staphylococci. The resistance of these strains to several antibiotics, as determined by a disk diffusion method, is shown on the graph in percentages. The percentages of isolates that were susceptible are shown as white bars, isolates with intermediate resistance are shown as hatched bars, and resistant isolates are shown as black bars. There is a diversity of resistance levels among strains and antibiotics.

CONCLUSIONS

We found six different strains of Staphylococcus, and while there were varying levels of drug resistance, we did not find extensive levels of multidrug-resistant bacteria, and no S. aureus was found. We found floors and cloth seats to be areas on buses and trains that showed particularly high levels of bacteria.

Abstract (from http://www.sciencedirect.com/science/article/pii/S2210909911000968)