SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

To compare the hand-drying methods of paper towels, warm air dryers, and jet air dryers for their potential to spread viruses and contaminate the surrounding environment.

Evaluation of the Potential for Virus Dispersal During Hand Drying: A Comparison of Three Methods

Kimmitt, P.T., Redway, K.F. 2016 | *Journal of Applied Microbiology, Volume 120, Issue 2, Pages 478-486*

Key Concepts/Context

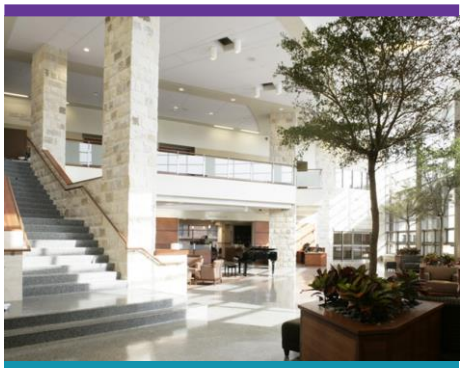
A previously published literature review found that the main factors influencing bacterial counts on peoples' hands were the type of soap and the drying method used. Previous research has also established that inadequately dried hands are more likely to transmit micro-organisms than fully dried hands. While previous studies have focused on how different hand drying methods contribute to the spread of micro-organisms within the immediate environment, few have focused specifically on virus particles in this context.

Methods

The authors used "bacteriophage MS2, "a surrogate for human viruses, to simulate the spread of viral particles after the use of paper towels, warm air hand dryers, and jet air hand dryers. The MS2 phage was applied to the gloved hands of two participants, who then performed hand washing and all three drying methods as they normally would. Specially prepared petri dishes collected dispersed MS2 particles while attached to a vertical board. This allowed researchers to assess the height and distance levels of viral spreads by counting plaque-forming units (PFUs) after each method was performed. Ten air samples were gathered from various positions around the participants. All experiments took place in a teaching laboratory where the washing and drying areas were about 5 meters apart.

Findings

After assessing air samples and the vertical board equipped with petri dishes, the authors found that the jet air dryer dispersed a far higher number of virus particles than the two other hand drying methods. With regard to the petri dishes, the warm



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air dryer dispersed 167-fold fewer PFUs than the jet air dryer, while the paper towels dispersed 8340-fold fewer PFUs. For air samples, the jet air dryer dispersed 30-fold and 13-fold more PFUs compared to the warm air dryer and paper towels, respectively. In sum, paper towels disperse the fewest contagions due to their absorbent and relatively air-free properties. Warm air dryers are slightly better than jet air dryers due to their dependence on evaporation and the downward trajectory of their airflow.

Limitations

The authors note that the standardized methods of hand drying observed in this study do not take individualized, unique, or varied methods into account. The fact that all observations and data were gathered in one laboratory environment also may have affected results. Both participants in this study had similar physical dimensions, which may have affected data regarding the height and distance of viral dispersion. Lastly, the authors note that only one model of each hand drying device was used, making it difficult to apply these results to all devices under the three categories.

Design Implications

In areas where hands are washed and dried, particularly in shared spaces with hand washing and drying areas, designers should carefully consider the microorganism and virus-dispersing potential of both warm air dryers and jet air dryers. Jet air dryers repeatedly have been found to disperse high amounts of microorganisms throughout a given environment; designers should weigh these findings against the demand for jet air dryers within a given facility before immediately choosing the most modern jet air drying systems.