Cleaning Matters
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Paper firms launch Airblade offensive

New research funded by the European Tissue Symposium (ETS), suggests electric hand dryers in public toilets can pose health risks. Additional reporting by Gerardine Coyne

According to the 2008 paper, *A comparative study of three different hand drying methods: paper towel, warm air dryer, Dyson Airblade dryer*, conducted by Keith Redway and Shameem Fawdar of the school of biosciences, University of Westminster, electric hand dryers in public toilets could increase the number of bacteria on people's hands after washing and also contaminate the washrooms. The study compared the numbers of bacteria on subjects' hands before and after they had washed and dried them in a public washroom using either paper towels, a traditional warm air dryer or a new-style jet air dryer. The study showed:

- After washing and drying hands with the warm air dryer, the total number of bacteria on the finger pads increased on average by 194% and on the palms by 254%
- Drying with the jet air dryer increased the total number of bacteria on the finger pads on average by 42% and on the palms by 15%
- After washing and drying hands with a paper towel, the total number of bacteria was reduced on average on the finger pads by up to 76% and on the palms by up to 77%.

The scientists also tested the potential for cross contamination of other washroom users and the washroom environment as a result of each type of drying method. They found that:

- The jet air dryer, which blows air out of the unit at claimed speeds of 400 mph, was capable of blowing micro-organisms from the hands and the unit and potentially contaminating other washroom users and the washroom environment up to 2m away
- Use of a warm air hand dryer spread micro-organisms up to 0.25m from the dryer
- Paper towels showed no significant spread of micro-organisms.

The ETS believes that the results will come as a surprise to many people. A recent consumer survey found 58% of people in the UK thought electric hand dryers were more hygienic than both textile-based towels and paper towels[1]. "It was a challenge finding out that people thought dryers were more hygienic," explains Roberto Berardi, ETS chairman, speaking at the University of Westminster, "so we decided to update a 1994 hygiene study and to include the new jet air dryers."

"The results suggest that the use of warm air dryers and jet air dryers should be carefully considered in locations where hygiene is of paramount importance," says Keith Redway. "Using paper towels results in a significant decrease in the numbers of bacteria on the hands, a clear advantage compared with the increases observed for both types of electric hand dryer tested in this study. In addition, paper towels are far less likely to contaminate other washroom users and the washroom environment." Redway was keen to emphasise the study's impartiality. "I want to make clear the university is always independent and all results belong to the university. We can't promise results that clients want and I devised the study method."

The Dyson Airblade claims to have a lifetime anti-microbial HEPA H12 filter, particulate removal tested to 99.5% at 0.15] MPPS according to EN1822, and bacteria removal at 99.9%. Yet Redway's research suggests that the dryer potentially spread contamination. The hands of 10 subjects were artificially contaminated with yeast, they then dried their hands using the three methods. During the drying, open agar plates (a material on which bacterial colonies can grow), were placed at 0.25m intervals from the hand drying device, to a distance of 2m.

"Yeast could not be picked up elsewhere, therefore molecules of it must be from cross-contamination," says Redway.

The significant result, according to Redway, is that at a distance of between 0.25 and 0.5m away from the device, paper towels have an average of less than two yeast colonies, the warm air dryer has less than three, but the Dyson has 76.2 at 0.25m and 37.5 at 0.5m. "If they can disperse yeast, they can disperse bacteria," claims Redway. The University of Westminster study found that that in the washrooms of a mainline London railway station, the average distance between Dyson Airblade dryers was 0.39m.

"I wanted to test the dryers as Dyson claims 400mph is the speed at which air is sent through the blades. In microbiology we know this is conducive to cross-contamination." When asked how this could happen with anti-microbial material, Redway suggested that as the seal at the bottom of the dryer is rubber, it could harbour bacteria: "You're not supposed to touch it, but in a hurry you might". The Dyson has touch-free infra-red activation, but Redway says the dryer is quite narrow and hands could easily touch the sides and bottom. The study's sample of 16 dryers in the male and female washrooms in the railway station showed an average bacterial range of between 85-171 on the inner surfaces and slits of the dryer per cm^2, and between 4745 and 7537 at the bottom of the dryers.

When asked about contamination from a paper towel dispenser, Redway argued, "You don't touch the dispenser, and paper is 'practically' sterile." However, he did concede that if a dispenser wasn't working properly and a person had to put their hands inside to reach around for a towel, then there might be a chance of contamination. Roberto Berardi also agreed that the method of dispensing was important. To see the study visit www.westminster.ac.uk/~redwayk

Dyson: 'He who pays the piper'

A spokesperson for Dyson comments: "This paper towel industry funded research is questionable and Dyson is challenging the university's flawed methodology. The Dyson Airblade hand dryer is hygienic and is endorsed by the Royal Institute of Public Health, National Sanitation Foundation and British Skin Foundation."

In addition to Dyson's statement, NSF International, formerly known as the National Sanitation Foundation made a statement. "To date, the Dyson Airblade is the only hand dryer company to achieve certification to NSF Protocol P335: Hygienic Commercial Hand Dryers," says Rob Donofrio, director of NSF's microbiology laboratories. "The protocol, which was reviewed and approved by a consortium of public health and safety experts, establishes requirements for hygienic hand dryers, including requirements with respect to water disinfection, product cleanability, and the ability to dry a user's hands with air that passes through a high-efficiency particulate air (HEPA) filter, which has been proven to remove more than 99.97% of bacteria-sized particles from the air." **Dyson will respond to this study in full in the April/May issue**

[1] Intermetra, June 2008 - *Users' preferences in hand drying systems*