

What's More Hygienic; Electronic Hand Dryers Or Paper Towels?

The Facts

Hygiene is a key factor in modern society today. Good health, together with an improved quality of life, is directly related to good hygiene. One of the most important products for good hygiene is tissue paper, developed for all kinds of wiping and cleaning.

Hand hygiene is recognised by the World Health Organisation as an important element in infection control in hospitals. The impact of antibiotic-resistant micro-organisms on both health and the health economy demonstrates that hand hygiene, economics, and quality of life are directly related. Keeping hands clean is one of the most important steps people can take to avoid sickness and spreading micro-organisms.

Handwashing

The purpose of hand washing is to reduce the number of microbes on the hands and to prevent harmful microbes directly entering the body via the hands or indirectly via food or surfaces. Hand washing is a key element of personal hygiene.

The drying method

Washing of the hands loosens micro-organisms on the surface of the skin and brings them from the deeper layers of the skin to the surface. Rinsing the hands with water does not remove these micro-organisms: drying plays a crucial role in microbe removal.

Removal of microbes

Most people do not know what the optimal method of hand drying is to ensure a reduction in the number of harmful microbes on the skin. But scientific studies have demonstrated that the use of absorbent single-use towels (for example, paper hand towels) offers the optimal level of both hand and wash-room hygiene.

Warm and jet-air dryers are not as effective in removing microbes from the hands as single-use towels. Paper towels effectively remove residual moisture that may facilitate the spread of micro-organisms both inside and outside of the washroom. Scientific studies have shown that the use of warm and jet-air dryers can increase the number of micro-organisms on the hands after drying, as well as potentially contaminate the wash-room environment.^{1,2,3}

When wash-room hygiene is considered, three recent peer-reviewed scientific studies have confirmed marked differences in the extent of aerosolization of microbes during drying with different methods.^{4,5,6} The first study⁴ demonstrated higher levels of airborne microbe dissemination by jet-air dryers, particularly if hand washing is suboptimal.

The jet-air dryer dispersed liquid and microbes from users' hands further and over a greater range (up to 1.5m) than other drying methods. The height distribution of the liquid and microbes was also measured and for electric driers, the greatest number of droplets was observed at a height of 0.6m and 1.2m.

The second study⁵ showed that when paint droplets were used as a model for water droplets on the hands, drying with electric dryers contaminated both the user of the dryer and a bystander. Most droplets were observed in the region of the chest and the greatest numbers were seen when the jet-air drier was used. In contrast, no paint droplets were seen on the user and bystander when they used paper hand towels to dry the hands. This study also found that air bacterial counts were 4 and 27-fold higher in the immediate area of the jet-air dryer, than in those of warm air dryers and paper towel dispensers, respectively. Also, the aerosolized bacteria were seen to remain in the air for up to 15 minutes after hand drying.

The third study⁶ compared the potential of three hand drying methods to disperse viruses and contaminate the immediate environment during use. The results of the study showed that the use of jet-air dryers leads to significantly greater and further dispersal of viral particles from artificially contaminated hands than warm air dryers and paper towels.

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Recently, two new studies carried out in operational hospital washrooms have been published.^{7,8} The second study⁸ confirmed the results of a pilot study performed in washrooms at a UK hospital over 7 non-consecutive days. The new multicentre study, the largest of its type was carried out over 12 weeks in each of 3 hospitals (UK/France/Italy) and compared the bacterial contamination levels in washrooms where hand-drying was performed using either paper towels (PT) or a jet air dryer (JAD). Over 120 sampling sessions occurred over the 12 weeks in each of the 3 hospitals and bacteria were cultured from air, multiple surfaces and dust. Bacterial recovery was significantly greater from the external surfaces of JADs at all 3 hospitals. In the UK and France, a similar effect was seen with higher numbers of the bacteria (enterobacteria and enterococci) recovered from the JAD surfaces when compared with the PT dispenser. Low numbers of antibiotic resistant bacteria were also detected, and these were most commonly found on floors, dryer surfaces and dust in JAD washrooms. For example, in the UK, the recovery of methicillin resistant *Staphylococcus aureus* was significantly more frequent from the floors of JAD versus PT washrooms (21 versus 7, p=0.002).

In the discussion, the authors state: 'Consequently, we believe that electric hand dryers are not suited to clinical settings, and as such existent (for example, NHS) infection control building guidance needs to be amended and strengthened. Furthermore, it is difficult to justify a hand drying method that is associated with considerably greater propensity for microbe dispersal when potential pathogens are prevalent, including at certain times of the year or in specific settings. For example, during periods of high influenza and norovirus activity, airborne dispersal of pathogens, potentially during hand drying following suboptimal hand washing, is an infection control and/or public health concern.'

Finally, a study reported in the Mayo Clinic Proceedings⁹, reviewed the published research between January 1970 and March 2012 on the hygienic efficacy of four different hand-drying methods. The study found little agreement regarding the relative effectiveness of electric air dryers (jet air dryers and warm air dryers). However, the authors stated 'most studies suggest that paper towels can dry hands efficiently, remove bacteria effectively, and cause less contamination of the washroom environment. From a hygiene viewpoint, paper towels are superior to electric air dryers. Paper towels should be recommended in locations where hygiene is paramount, such as hospitals and clinics.'

Sources

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Consensus Statement from a Panel of Experts on Hygienic Hand Drying

The European Tissue Symposium has sponsored annual scientific panels on hygienic hand drying with eminent microbiologists and hospital hygienists from across Europe since 2013. Panellists were asked to review the science on hand drying and the hygienic performance of hand drying devices, such as paper towels, textile towels, and hot air dryers, and to make recommendations for future scientific research and public policy.

After a review of the key scientific literature, the experts prepared a Consensus Statement on hygienic hand drying, the document can be accessed at:

<http://europeantissue.com/hygiene/consensus-statement-on-hygienic-hand-drying/expert-consensus-statement/>

Conclusions

The studies suggest that clean and absorbent single-use towels (for example, paper hand towels) are the most hygienic solution for drying hands, as the skin must be thoroughly dried after washing to remove any remaining water droplets. Paper towels effectively remove residual moisture that may facilitate the spread of micro-organisms both inside and outside of the washroom.

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