

# PAPER OR PLASTIC?

New research looking into hand hygiene and the optimal drying methods has reignited the age old debate of paper towels or automatic hand dryers. Keen to find out more, Tomorrow's Cleaning Editor Matt Waring talked to the man behind the latest study, Keith Redway of the University of Westminster, to find out more.



Little over a year ago, I found myself caught in the middle of a conflict between the European Tissue Symposium (ETS) and Dyson. The creators of the Airblade jet air hand dryers were fairly miffed with some research funded by the ETS that examined the various ways in which people dry their hands in the washroom, and the risks associated with said methods.

The initial research, conducted by Professor Mark Wilcox at the University of Leeds, found that jet air dryers, and to a lesser extent warm air dryers, spread more germs and bacteria around a washroom than their paper counterparts, thus increasing the risk of infection or contamination, particularly in delicate environments such as hospitals, food preparation areas and care homes, where the presence of germs is highly undesirable.

This study came under a lot of criticism from those in the jet air dryer market, with some standout arguments claiming that the research was 'really targeted', 'full of holes' and 'looking to prove something'. These claims were only exacerbated by the fact that the research was funded by the ETS itself, which some claimed only added to the 'targeted' approach.

However, this year, some new, independent research, conducted by microbiologists Keith Redway and Dr. Patrick Kimmitt at the University of Westminster, added further credence to the growing school of thought that suggests paper towels are the most hygienic and effective hand-drying method in washrooms, particularly when it comes to minimising the spread of viruses.

With Keith Redway in attendance at last month's ISSA/InterClean show in Amsterdam to present his findings in a special talk entitled 'Washroom

Hygiene: The dispersal of viruses by different hand-drying methods', we saw it as the perfect opportunity to catch up with him and find out just what this latest study shows.

Keith is something of an authority on the subject of research into washroom hygiene practices, having conducted several studies dating back to 1984 at the University of Westminster, where he worked as a medical microbiologist and is currently an 'emeritus fellow'. These studies have ranged from examining the various hand drying methods (as with the latest research), to more observational examinations, looking at washroom behaviour in general.

And throughout his studies, Keith has noticed a consistent trend in his findings. "I'd say in every study we've done, every test – with colleagues, not just me alone – paper or textile towels have always come out the best."

Keith worked with Mark Wilcox and the team at the University of Leeds during the 2015 study, which used lemon juice and yeast as markers to measure the dispersal of liquids and bacteria using the three main drying methods, and they found that, particularly with people who didn't wash their hands properly, there was a larger risk of bacteria and water being spread across the washroom with the powerful jet air dryers, in no small part due to the air speeds at which they operate.

Following on from the 2015 study, Keith and his team at the University of Westminster set up a new study looking at how the drying systems affected the spread of viruses. In this case, a harmless virus was used, but as Keith explained: "it was a model to demonstrate the potential of different hand drying devices to disperse viruses on the hands into the air, and to see how far it is spread."

And the results were quite illuminating. "When we looked at how far the viruses travel, with the yeast model we picked it up one and a half metres away, but a virus model is more sensitive, so we were picking it up three metres away, which is quite a distance. This was a lot more with a jet air dryer than a warm air dryer, and unsurprisingly because there is less air disturbance, paper performed a lot better.

"We also looked at dispersal at different heights, and for this we had a figure board, split into different height zones, which was 0.4 metres away from the different dryers, which is the average figure in some public toilets in London when they've got banks for them. So what we were illustrating is how much viral contamination we're going to pick up if you're standing near one of them when someone else is using them.

"We found that the highest concentration of contamination, particularly with the jet air dryers, was in the middle region, between 0.6 and 1.2 metres, and one of the slightly worrying things about this is that is about the height of a child when they're standing next to it with their parents, so it'd blow straight into their face. And this risk is increased if they haven't washed their hands properly if they're in a rush."

The final aspect of the study was to test how long the viruses remained in the air after drying took place. Again, the results were particularly eye-opening, as Keith explained: "We sampled the air over a 15-minute period after it had been used to find out how much virus was still in the air, and with jet air dryers, obviously it drops off, but there is still a significant amount in the air, even after 15 minutes.

"So that means if someone hadn't washed their hands properly and they've got norovirus on them, or rotovirus, or if there is an influenza



epidemic, then that contamination is going to be in the air for at least 15 minutes – and some viruses are very infectious, you only need 10 particles for infection.

"With warm air dryers and paper, there was much less contamination in the air. There was some, that's inevitable, but it was very low over the whole time period."

While the research makes some interesting points regarding the dispersal of germs, there is a school of thought that would argue that, in an ideal world, if people washed their hands properly then there wouldn't be quite as much of a spread, as there would be less bacteria on the hands to begin with.

However, as Keith pointed out:

"unfortunately a lot of people don't wash their hands at all well.

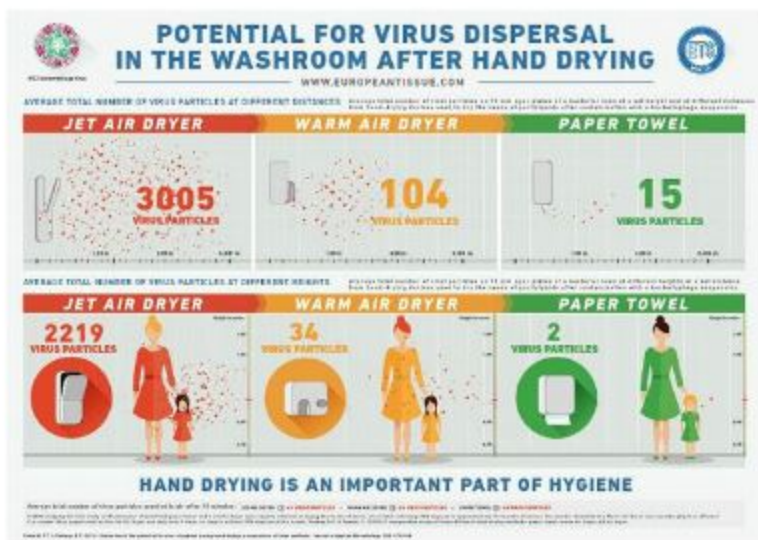
"You're supposed to take 'x' number of seconds to wash your hands, but often it's just a cursory thing so people can tell themselves that they've washed their hands and that they're a hygienic person."

Another argument suggests that, as one of the main ways in which germs are transferred is through contact, either from person to person or via a surface, one of the easiest ways to spread these germs is through having wet hands. Therefore if your hands are dried properly, the contamination risks are reduced. Keith does agree with this point, and admits that when it comes to physically drying the hands, paper and jet air dryers are on a par.

He explained: "When the jet air dryers first came out, I tested them for how efficient they were at drying the hands, and I was very impressed. They produced 95% dryness – and you never get 100% – in 10 seconds, which is the same as you'd get with paper.

"It's good, because if the hands aren't dried properly they've got more chance of transferring contamination and infection, but there's more to it than just getting hands dry."

Keith added that while they may be efficient at drying hands, more problems can arise if the jet air dryers are used incorrectly. "A lot of the public



seem to think that the jet air dryers are more hygienic because you don't touch anything, but what they don't appreciate is that things spread in the air. But even with that, we've sampled the surface areas and they're heavily contaminated.

"Although if you use them correctly you don't touch anything, a lot of people do – particularly if they're in a rush.

"I've done a few observations in Euston station where people are rushing to catch a train and you see them touching the bottom. We did some studies with a fluorescent dye, where we put the dye on people's hands and showed that they did touch the insides quite frequently, so there is a contamination risk there."

So while the results of Keith's study point to paper towels as the most hygienic method of drying hands, Keith has stressed that his research is predominantly for the more sensitive environments, where the risks of infection are higher.

He said: "One of the criticisms of this study is that we used artificial contamination of the hands at quite a high level, but it's been shown that sometimes that will occur, particularly with people that have had diarrhoea and fecal contamination, and they haven't washed it properly.

"But I'd emphasise that the study is a model, and what it is showing is the

potential risks. We're quite careful to say that we don't want to ban jet air dryers completely, but they shouldn't be in sensitive locations where cross-infection is particularly important – that would be hospitals, clinics, food preparation areas, restaurants, possibly schools and care homes."

Although the study itself was independently carried out by the University of Westminster, the findings have been greeted with a positive reaction from the European Tissue Symposium (ETS). Following the publication of the findings, Roberto Berardi, Chairman of the ETS, said: "Our industry places great emphasis on hygiene and studies have consistently shown that single use towels offer the most effective way to limit the spread of microbes in the washroom.

"This latest research not only focuses on viruses for the first time, but it was also undertaken, independently from ETS, by microbiological experts at the University of Westminster and thus serves to further, autonomously, underline our message."

It remains to be seen whether the latest research from Keith and his team will spark some kind of response from jet air dryer manufacturers, but one thing is for sure – the debate certainly shows no sign of slowing down just yet.