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European Tissue Symposium

Position on the use of air dryers versus paper hand towels

Introduction

ETS is the European Tissue Paper Industry Association. The members of ETS represent the majority of tissue paper producers throughout Europe and around 90% of the total European tissue production.
ETS was founded in 1971 and is based in Brussels.

Summary

The current document outlines ETS' position in favour of the use of paper hand towels for hand drying after washing for the promotion of good hand hygiene within the general population.

As the consumers' awareness regarding the necessity of hand hygiene continues to increase, most consumers do not understand what is the most efficient and hygienic method of drying the hands.

Scientific studies have demonstrated that the use of absorbent paper towels to dry the hands offers the optimal level of hand hygiene.

In particular warm air and jet air dryers, either with or without UV light bulbs, are not as effective in removing bacteria as paper towels, as both warm air and jet air devices do not remove any micro-organisms remaining on the hands after washing and rinsing. The friction generated by rubbing hands against the towel and the high absorption qualities of tissue make that paper is more effective in reducing the bacterial loads on the hands. Indeed, scientific studies have shown that the use of warm air and jet air dryers can actually increase the number of micro-organisms on the hands after drying as well as potentially contaminate the washroom environment.

Context

Hygiene is one of the most important factors in the development of modern society. 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 now generally recognized as a very important and determining element in the more general approach towards good health. Recent attention on these issues and the impact of MRSA (Methicillin Resistent *Staphylococcus aureus*: a strain of Staphylococci resistant to certain antibiotics) on both health and the health economy, demonstrate that hand hygiene, economics and the ever improving quality of life are directly related. Keeping hands clean is one of the most

important steps we can take to avoid sickness and spreading microorganisms in the environment. This can easily be avoided by washing and drying the hands thoroughly.

Although the necessity of this basic hygienic activity has been generally accepted, non-conclusive discussions continued until recently as to what is the most efficient and effective manner of drying hands, in order to arrive at the best hand hygiene. In hospital environments the guidelines to avoid contamination for instance consist in not sharing personal items such as towels, and there is a real concern as to contamination via air movement also caused by air-conditioning equipment.

However this common sense approach still seems to be restricted to the healthcare industry. Outside this professional area a continuing lack of focus on the real solutions and the misperceptions regarding alternative systems of hand drying in the context of hygiene, seems to be prevalent; this is highly worrying to the paper industry.

Health and Hygiene – The Link

All kinds of micro-organisms attach themselves to the skin on the hands. These micro-organisms are present both on the surface and deep in the skin. In addition, the hands regularly attract microbes (bacteria, fungi and various spores) by touching contaminated surfaces or materials, or from the general environment. Although most microbes are vital for the good functioning of the human body, many of these micro-organisms are a threat to our health.

The First Steps

- ***Hand preventive washing***

Microbes and bacteria stick to the surface of the skin and typically disappear after a while. Some of them can, however, cause illness and be harmful to human beings, particularly when they are transferred to food or directly into the mouth or nose. The purpose of hand washing is to reduce the number of transient bacteria and thus to prevent harmful microbes from directly entering the body via the hands or indirectly via food. Hand washing is a key element of personal hygiene.

- ***The drying method***

Washing of the hands loosens these micro-organisms on the surface of the skin and brings them from the deeper layers of the skin to the surface. The rinsing does not, however, remove all micro-organisms: drying plays a crucial role.

The Evidence

'Clean hands are safer hands' states the WHO[1]. In the 'hand-washing techniques with soap and water' published in the WHO's global guidelines to reduce contaminations, the instructions end with 'rinse hands with water' and 'dry thoroughly with a single use towel'.
The role of correct hand drying after washing recently has been recognised as a key factor in the whole process of hand hygiene. Mid 2010 the ECDC published new recommendations in the context of the ECDC Influenza Programme.

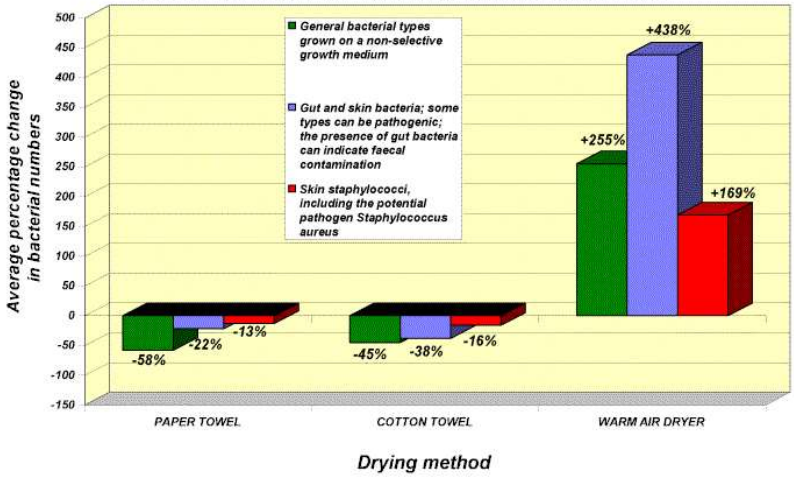
Scientific studies have demonstrated that the use of clean and absorbent paper towels offers the optimal level of hand hygiene.

The Results

- **University of Westminster « Hand drying: a study of bacterial types associated with different hand drying methods and with hot air dryer » (1998).** Westminster University hand drying study 1998
  - The number of bacteria present on the hands decreases by 58% on average when using paper to dry the hands, by 45% when using cloth and is increased by 255% when using hot air dryers. (source: University of Westminster).

Findings of the University of Westminster (1998)

Figure 2: Average percentage change in number of various types of bacteria on the hands after drying using different drying methods



- **TÜV Produkt und Umwelt GmbH (2005) confirmed the Westminster Study findings**. TÜV study 2005
  - The number of bacteria on the surface of the hands decreases after washing and then drying with paper or cloth towels. TÜV demonstrated an average reduction of 24% in the number of most bacterial types present on the hands when using paper, compared with a decrease of

[1] WHO Guidelines on hand hygiene in health care (Advanced draft - 2005)

4% for cloth and an increase of 117% when the hands were dried with hot air. (source: TÜV Produkt and Umwelt GmbH).

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- This same TÜV-study also published **specific findings on the presence of micro-organisms after hand washing**.
    - On hands washed with cloth or paper towels: only fixed micro-organisms were still present due to the high absorption faculties of the paper.
    - On hands washed using hot air dryers, there was still a mixture of bacteria to be found on the hands after drying because this bacteria cannot be absorbed.
    - After using hot air blowers fitted with UV lights the bacteria remained on the hands as the device only makes the water on the hands evaporate and does not remove micro-organism.

The need for using towels when drying hands was emphasised by the transfer of bacteria from the hands to the towels used. Towels, and especially paper towels, remove the bacteria together with the water through absorption. While only very small bacteria populations were detectable on the paper towels before use, their number increase strongly after use.

This finding not only corresponds with that of previous studies, but also indicated that moreover, when using a hot air dryer, additional bacteria may be deposited on the hands by the contaminated air stream.

Limitations of UV Bulbs

Hot air blowers fitted with UV lights have recently been introduced to try to reduce the number of bacteria that can be deposited on the hands by the hot air stream. However, this is not an effective solution for the following reasons:

- UV light penetrates poorly; it will only be effective on the surface of soils/dirt and will not reach micro-organisms embedded in dirt.
- Where heavy contamination organisms occur, the cells shade each other so that in a vertical chain of organisms only the top one is killed.
- UV light will only sanitise the nozzles of the hot air dryer but not the air passing through (not enough time).
- UV light is ineffective against bacteria spores.
- Finally, and most importantly hot air dryers including those fitted with UV light only make the water on the hands evaporate and do not remove the bacteria that remain on the hands after rinsing.

- **University of Westminster «A comparative study of three different hand drying methods: paper towel, warm air dryer, jet air dryer" (2008).** Westminster University Study 2008
  The research results of this study suggest that people could be putting themselves and others at increased risk of illness by using electric dryers.
    - After washing and drying hands with the warm air dryer, the total number of bacteria was found to increase on average on the finger pads by 194% and on the palms by 254%;

- Drying with the jet air dryer resulted in an increase on average of the total number of bacteria on the finger pads 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%.

Further findings of this study moreover suggest that if only electric air drying devices are available, in terms of bacterial numbers, as washroom user could be better off not washing and drying his hands at all.

- Use of a warm air dryer spread micro-organisms up to 0.25 metres from the dryer;
- A jet air dryer, which blows air out of the unit, was capable of blowing micro-organisms from the hands and from the unit and potentially contaminating other washroom users and the washroom environment up to 2 metres away;
- Paper towels showed no significant spread of micro-organisms.

The Bradford University (UK) Study in 2010, funded by a major hand-dryer manufacturer and **published in the Journal of Applied Microbiology,** confirmed that

- Hand drying is an essential part of hand washing procedures as a diverse mixture of bacteria survive hand-washing;
- Rubbing hands together in an electric hand dryer leaves them coated with more bacteria than just after washing them;
- Paper towels proved the most efficient hand drying technique, halving the bacterial count because paper towels actually scrape off the bacteria, and
- the use of paper towels for drying hands consistently outperformed all the other drying techniques, especially with regard to the bacteria left on the palms and fingertips.

All of these results suggest that the use of electric air drying devices should be carefully considered in locations where hygiene is of paramount importance, such as hospitals, clinics, schools, nurseries, care homes, kitchens and other food preparation areas.

Using paper towels results in a significant decrease in the numbers of bacteria on the hands and are far less likely to contaminate other washroom users and the washroom environment.

User-Preference

Last but not least: the users themselves have expressed a strong preference for hand drying with the single use paper towel.

- A **GFK ConsumerScan** in Germany (2007), which focuses on the importance of consumer experience, demonstrates that on the workplace

the preference for single use paper towel is 4 times higher than hot air dryers.

- An **Intermetra consumer survey** commissioned by ETS (2008) in a number of European countries identifies the users' preference for different hand drying systems in public restrooms. This survey has confirmed that about 2 consumers out of 3 prefer paper tissue towels (while the remaining 1/3 is split among air dryers and textile rolls) and that their key motivation is hygiene, in addition to speed of drying and driest feeling.

Conclusions

The level of awareness regarding the importance of hygiene, especially hand hygiene continues to increase. However, one of the major factors in achieving a better hand hygiene culture is that the population correctly understands what is the most efficient method of drying hands for healthy living.

Clean and absorbent paper towels are the best solutions for drying the hands, as the skin must be thoroughly dried after washing to remove any remaining dirt including bacteria. As physical tests have demonstrated, paper towels can absorb up to nine times their own weight in moisture. This absorptive capacity or moisture absorption of paper towels is relevant for the removal of bacteria when drying hands. The greater its moisture absorption, the more bacteria can be removed by the material.

The Future

The European tissue paper producers will continue to do the following:

- invest in the development of innovative and qualitative paper products that will help in achieving an ever better level of hygiene for all, thus ensuring maximum illness prevention;
- invest in innovation that not only increases the creation of better paper products, but also hygienic and user friendly dispensers, thus contributing to delivery systems that provide hygiene consistency throughout the hand cleaning process;
- to inform all organisations and people concerned on the advantages of using towels for drying hands after washing, in order to create maximum awareness;
- and is prepared to work together with the authorities in providing data, expertise and insights to help in clarifying and identifying the best products and methods for reaching a higher level of hand hygiene.

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Note on Paper Towels and Sustainability

Sustainability is one of the ultimate goals in the minds of the European Tissue Paper Industry. Hence ETS has edited extensive information and several position papers on the sustainability aspects of tissue related to Production, Environment, Health & Safety and Product Safety.
These documents can be found on http://www.europeantissue.com/sustainability/ and http://www.europeantissue.com/position-papers/position-papers/environment/