Table 2: *Efficacy of Hand Drying Methods*

Publication Details	**Principal Study Objective**	**Context**	**Hand Drying Device(s)**	**Study Design**	**Summary of Findings**
Gustafson etal, 2000. US.	To evaluate the effects of 4 different drying methods to remove bacteria from washed hands.	Potential recruits for the study were excluded if they had acute or chronic nail or skin disorders, including eczema, or were considered by an examining physician to have compromised immunity. One hundred healthy adults older than 18 years were enrolled in the study. This number was chosen following the results of a pilot study. Of the 100 people recruited to participate in the study, 1 failed to complete the experiment under all 4 hand drying conditions and was removed from the data set,	Paper towels, cloth towels, warm air dryer and room air evaporation.	One hundred adult volunteers participated in this randomised prospective study. All bacterial counts were determined using a modified glove-juice sampling procedure. The difference was determined between the amounts of bacteria on hands artificially contaminated with the bacterium Micrococcus luteus before washing with a nonantibacterial soap and after drying by 4 different methods. The results were analysed using a nonparametric analysis (the Friedman test). By this method, changes in bacterial colony forming unit	No statistically significant differences in the efficiency of 4 different hand-drying methods for removing wetness or bacteria from washed hands.

		leaving 99 subjects available for analysis.		values for each drying method were ranked for each subject.	
Jensen etal, 2015. US.	To establish the importance of soap, soil, time and drying method, in reducing microorganisms during hand washing.	This research was undertaken to establish the importance of several key factors (soap, soil, time, and drying method) in reducing microorganisms during hand washing.	Paper towels and warm air.	A nonpathogenic nalidixic acid-resistant Enterobacter aerogenes surrogate for Salmonella was used to assess the efficacy of using soap or no soap for 5 or 20 s on hands with or without ground beef debris and drying with paper towel or air. Each experiment consisted of 20 replicates, each from a different individual with ~ 6 log CFU/ml E. aerogenes on their hands. A reduction of 1.0 + 0.4 and 1.7 + 0.8 log CFU of E. aerogenes was observed for a 5 s wash with no soap and a 20 s wash with soap, respectively.	Significantly greater reductions in foodborne disease transmission by migrating cross contamination with paper towel drying compared with warm air.

Patrick, Findon & Miller, 1997. New Zealand.	To assess the effectiveness of hand hygiene procedures, namely the amount of residual moisture left on the hands after washing and drying.	Male and female volunteers from the administrative and technical staff of the Department of Medicine at Auckland Hospital participated in the bacterial translocation studies. Public rest rooms were monitored for studies involving 'use' hand drying practices.	Cloth towel and warm air dryer.	Participants hands were wet under running tap water for 5 s, flicked twice, and then dried for either 0, 2, 4, 6, 8, 10, 15 or 45 s for cloth and 0, 5, 10, 20, 30 or 45 s for the air towel. The amount of water left on the hands after each drying period was quantified by finishing the drying using a pre-weighed paper towel. This was then reweighed to determine the amount of water remaining on the hands and subsequently transferred to the pre-weighed paper towel, after the above drying times.	Around 45 seconds for an air dryer to achieve the equivalent results in 20 seconds using a cloth, in terms of moisture reduction. Careful hand drying is a critical factor determining the level of touch-contact-associated bacterial transfer after hand washing and its recognition could make a significant contribution towards improving handcare practices in clinical and public health sectors.
Redway & Fawdar, 2008. UK.	Measure the drying efficiency of paper towel, warm air dryer and jet air dryer. Assess any potential contamination of users	The experimental protocol used in this study attempted to reproduce the public's usual hand washing and	Paper towel, warm air dryer and jet air dryer.	Sets of 5 paper towels were placed in sterile plastic bags and weighed prior to use. Two volunteers were asked to dip their hands up to the wrists in warm water for 10	Paper towels are likely to cause considerably less contamination of other users and of the washroom environment than jet air dryers; which were found to disperse artificial hand contamination to a distance of at least 2 metres. Paper towels and warm air dryers produced more positive results than jet air dryers

	and the washroom environment caused by the use of paper towel, warm air dryer and jet air dryer.	drying practices as closely as possible.		seconds, shake them thrice, and then dry them for 10 seconds using one of the 7 hand drying methods. All the water remaining on the surface of the hands was then carefully removed by the investigator with one of the sets of 5 pre-weighed paper towels using a standardised protocol for 40 seconds. The damp towels were returned to their plastic bag, re-weighed and the amount of water removed from the hands calculated. The operation was repeated using increasing drying times at 10-second intervals: 20, 30, 40, 50 and 60 seconds. The order of drying times and the drying methods were randomised to minimise any possible effect of external factors such as	regarding contamination of the washroom environment. Paper towels created less contamination at 0 metres (directly below the device) than warm air dryers, although there was no significant difference at greater distances. In environments with jet air dryers such as public washrooms, noise levels could constitute a potential risk to those people exposed to it for long periods of time.

				variations in room temperature, relative humidity or human behaviour.	
Snelling etal, 2010. UK.	To compare an ultra-rapid hand dryer against warm air dryers, with regard to: A: Bacterial transfer after drying B: The impact on bacterial numbers of rubbing hands during dryer use.	The Airblade dryer uses two air 'knives' to strip water from still hands, whereas conventional dryers use warm air to evaporate moisture whilst hands are rubbed together. These approaches were compared using 14 volunteers, the Airblade and two types of warm air dryer.	Jet air dryer and warm air dryer.	In study A: Hands were contaminated by handling meat and then washed in a standardised manner. After dryer use, fingers were pressed onto foil and transfer of residual bacteria enumerated. In study B: Drying was performed + hand rubbing. Contact plates enumerated bacteria transferred from palms, fingers and fingertips before and after drying.	Effective hand drying is important for reducing transfer of commensals or remaining contaminants to surfaces. Rubbing hands during warm air drying can counteract the reduction in bacterial numbers accrued during hand washing. The jet air dryer was superior to the warm air dryers for reducing bacterial transfer. 10 s drying time should encourage greater compliance with hand drying and thus help reduce the spread of infectious agents via hands.
Yamamoto, Ugai & Takahashi, 2005. Japan.	Evaluate warm air and paper towel drying for removing bacteria from washed hands.	Each drying method was performed as a randomised trial using 30 hands.	Paper towel and warm air dryer.	After hands were washed with non-antibacterial soap, they were dried using warm air with and without ultraviolet light, while being	Holding hands stationary and not rubbing them was desirable for removing bacteria. Ultraviolet light reinforced the removal of bacteria during warm air drying. Paper towels were useful for removing bacteria from fingertips but not palms and fingers.

				rubbed or held stationary, or paper towels.	