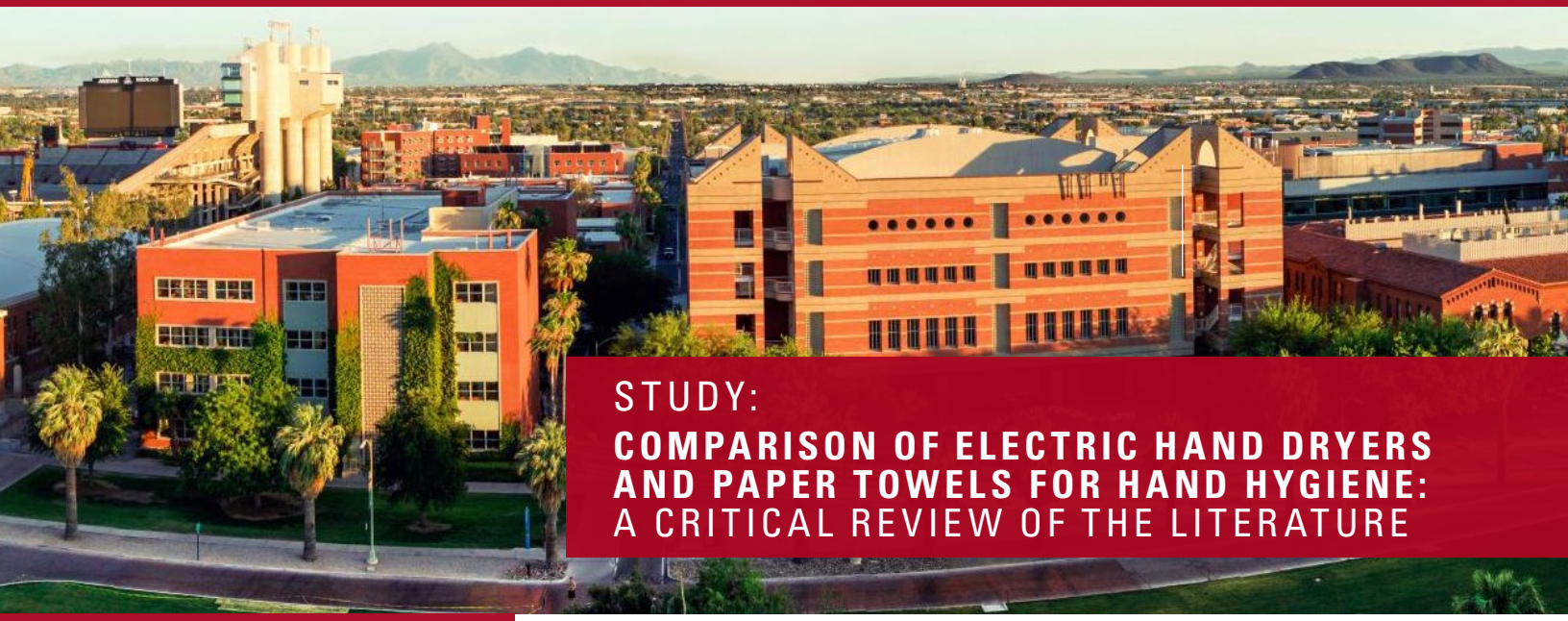
SUMMARY OF UNIVERSITY OF ARIZONA SCOPING REVIEW

NEW STUDY BY:
THE UNIVERSITY OF ARIZONA
MEL & ENID ZUCKERMAN
COLLEGE OF PUBLIC HEALTH



STUDY:
COMPARISON OF ELECTRIC HAND DRYERS AND PAPER TOWELS FOR HAND HYGIENE: A CRITICAL REVIEW OF THE LITERATURE

"From a health and safety perspective, we found no empirical data to support one hand-drying method [hand dryers vs paper towels] over another."

» **KELLY REYNOLDS, PH.D.,**
DIRECTOR OF THE ENVIRONMENT, EXPOSURE SCIENCE & RISK ASSESSMENT CENTER,
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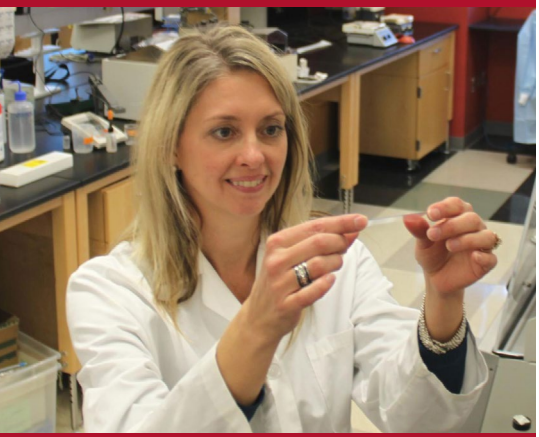


The great debate of hand dryers vs. paper towels has gone on for years through studies largely funded by the paper towel industry—and most recently via news articles and viral news articles and social media posts. The problem with these stories is that they are often one sided and written in a manner to either sensationalize —elicit fear—or both.

IN SHORT: THEY DO NOT TELL THE WHOLE STORY OR SHARE THE WHOLE TRUTH.

To wade through materials and point to the facts, researchers from the University of Arizona reviewed existing studies. Their findings, published in the Journal of Applied Microbiology in August 2020, identified which hygiene studies are credible and should be consulted for their results and recommendations.

ANSWERS TO RESEARCH QUESTIONS:

ARE HAND DRYERS MORE HYGIENIC THAN PAPER TOWELS?

Hand dryers and paper towels were both found to be equally hygienic hand-drying solutions.

ARE PAPER TOWELS SAFER THAN HAND DRYERS RELATIVE TO HUMAN INFECTION RISKS?

From a health and safety perspective, empirical data in available research studies does not support one hand-drying method over another.

RIGOR SCORING

A relative rigor score was calculated by assigning a Positive (+) = two, Neutral= one; Negative (-)= zero to the following categories:

- Sample Size
- Methodology
- Realistic Conditions
- Funding
- Data Quality

The researchers categorized and prioritized studies based on their scientific rigor in study design. In short: they looked at the credibility of the findings of these previous studies, and identified each study's strengths and weaknesses.

SAMPLE SIZE

LARGER SAMPLE SIZES GENERALLY PROVIDE MORE ACCURATE MEAN VALUES, IDENTIFY OUTLIERS THAT COULD SKEW THE DATA IN A SMALLER SAMPLE, AND PROVIDE A SMALLER MARGIN OF ERROR.

The number of participants in the studies ranged from a few to greater than 100.

Sample Size	Count
Positive (+)= two	7
Neutral= one	9
Negative (-)= zero	7

METHODOLOGY

METHODOLOGY THAT IS INCONSISTENT BETWEEN PARTICIPANTS OR THAT IS DIFFICULT TO REPLICATE IS UNLIKELY TO YIELD ACCURATE RESULTS. THE MAJORITY OF THE STUDIES INCLUDED AS PART OF THE REVIEW DID NOT HAVE A METHODOLOGY THAT WAS CONSIDERED A FAVORABLE STUDY ATTRIBUTE.

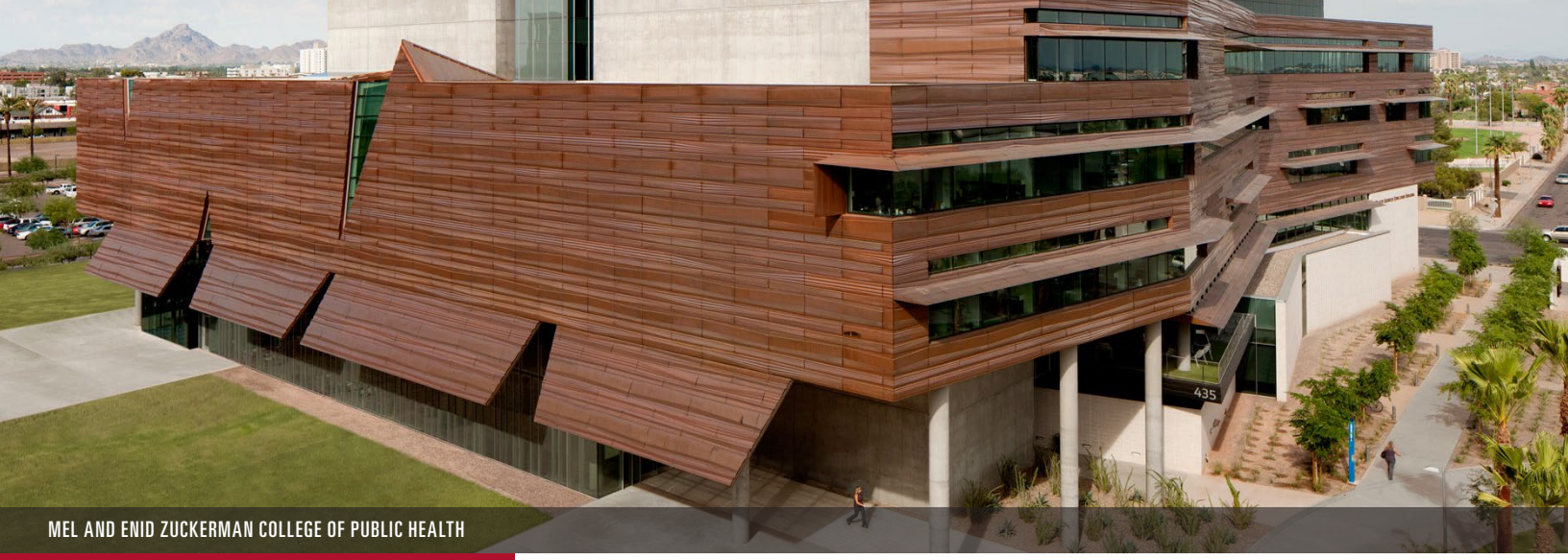
Research methodology includes the specific procedures or techniques used to identify, select, process, and analyze information about a topic.

Methodology	Count
Positive (+)= two	8
Neutral= one	10
Negative (-)= zero	5

THE STUDY THAT WAS FOUND TO HAVE THE HIGHEST RIGOR SCORE:

- EFFECTS OF 4 HAND-DRYING METHODS FOR REMOVING BACTERIA FROM WASHED HANDS: A RANDOMIZED TRIAL, PUBLISHED BY THE MAYO CLINIC.
- REPORTED NO SIGNIFICANT DIFFERENCE AMONG HAND DRYING METHODS.
- RIGOR SCORE OF II

"...THERE IS NO DIFFERENCE IN BACTERIA COUNTS WHEN DRYING WITH PAPER TOWELS OR HAND DRYERS."



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A COMMON OBSERVATION IN THE RESEARCHER'S ANALYSIS IS THAT MOST OF THE STUDIES, REGARDLESS OF CONCLUSION, LACKED SUFFICIENT RIGOR TO FORM DEFENSIBLE CONCLUSIONS.

REALISTIC CONDITIONS

SOME STUDIES APPLIED PAINT TO PARTICIPANT'S HANDS DURING THE STUDY. WHILE THIS COULD HELP EVALUATE POTENTIAL CONTAMINATION OF RESTROOM SURFACES, IT DOES NOT HELP TO INVESTIGATE OR REPORT ON GERM TRANSFER, SURVIVAL, EXPOSURE POTENTIALS, OR HEALTH OUTCOMES.

The majority of the studies were not conducted in conditions one might encounter in the real world.

Realistic Conditions	Count
Positive (+)= two	7
Neutral= one	9
Negative (-)= zero	7

FUNDING

FIVE STUDIES FAVORING PAPER TOWELS WERE FUNDED BY THE EUROPEAN TISSUE SYMPOSIUM, A TRADE ASSOCIATION THAT REPRESENTS THE MAJORITY OF TISSUE PAPER PRODUCERS THROUGHOUT EUROPE. ADDITIONALLY, 4 OF THESE 5 STUDIES WERE CONDUCTED BY THE SAME RESEARCH COLLABORATORS.

The majority of the studies were sponsored by industries with potential-biased interests.

Funding	Count
Private Funding Source	15
Public Funding Source	6
Funding Source Not Reported	1
None	1

DATA QUALITY

THE QUALITY OF DATA WAS FOUND TO BE A STRENGTH OF 7 STUDIES.

The quality of the findings, that is, their credibility and repeatability, were examined as part of the scoping review.

Data Quality	Count
Positive (+)= two	7
Neutral= one	11
Negative (-)= zero	5

RIGOR SCORE RESULTS

Institution Clinician	Favored Scenario	Relative Score	Sample Size	Methodolgy	Realistic Conditions	Data Quality
Mayo Clinic	Hand Dryer =	11	✓	✓	–	✓
Mutters & Warnes	Hand Dryer	10	✓	–	–	✓
Ansari et al.	Hand Dryer	7	✗	✓	✗	✓
European Tissue Symposium	Paper Towel =	7	✗	✓	✓	–
Consejo Nacional de Ciencia y Tecnología	N/A	7	–	✓	–	–
European Tissue Symposium	Paper Towel	7	–	✓	✗	✓
Sloan Valve	Paper Towel	7	✓	✓	–	✗
Pitt et al.	Paper Towel	6	–	–	✓	–
Georgia-Pacific Health Smart Institute	N/A	6	✓	✗	–	✓
Hygiene Higher Ltd. Scott Ltd., Initial Industrial Services	Paper Towel	6	✓	✗	✗	✓
Building Works Directorate, Department of Health and Social Security	Hand Dryer =	6	–	–	✗	✓
NSERC and Canadian Institute of Health Research	N/A	5	✗	✓	✗	–
New Zealand Towel Services	N/A	5	✓	✗	–	✗
Snelling et al.	Paper Towel =	5	–	✗	–	–
SCA Hygiene Products	Hand Dryer Paper Towel =	5	✓	–	✗	–
European Tissue Symposium	Paper Towel =	5	–	–	–	–
Deakin University Spotless Hygiene Systems	Paper Towel	5	–	–	✗	✗
Warner Howard Group Ltd	Hand Dryer =	4	✗	–	–	–
University Hospital Kuala Lumpur	Paper Towel	4	✗	–	✓	✗
European Tissue Symposium	Paper Towel	4	–	✓	✗	✗
United States Food & Drug Administration	N/A	4	–	–	✗	–
European Tissue Symposium	Paper Towel =	3	✗	–	✗	–
College of Nursing University of Tsukuba	Hand Dryer Paper Towel	2	✗	✗	–	–


Study Favors Hand Dryers

Study Favors Both Equally


Study Favors Paper Towels

✓ Positive

– Neutral

✗ Negative

THE SCOPING REVIEW WAS ACCEPTED FOR PUBLICATION IN THE JOURNAL OF APPLIED MICROBIOLOGY IN AUGUST, 2020 AND IS ACCESSIBLE BY VISITING THE FOLLOWING LINK:
COMPARISON OF ELECTRIC HAND DRYERS AND PAPER TOWELS FOR HAND HYGIENE: A CRITICAL REVIEW OF THE LITERATURE