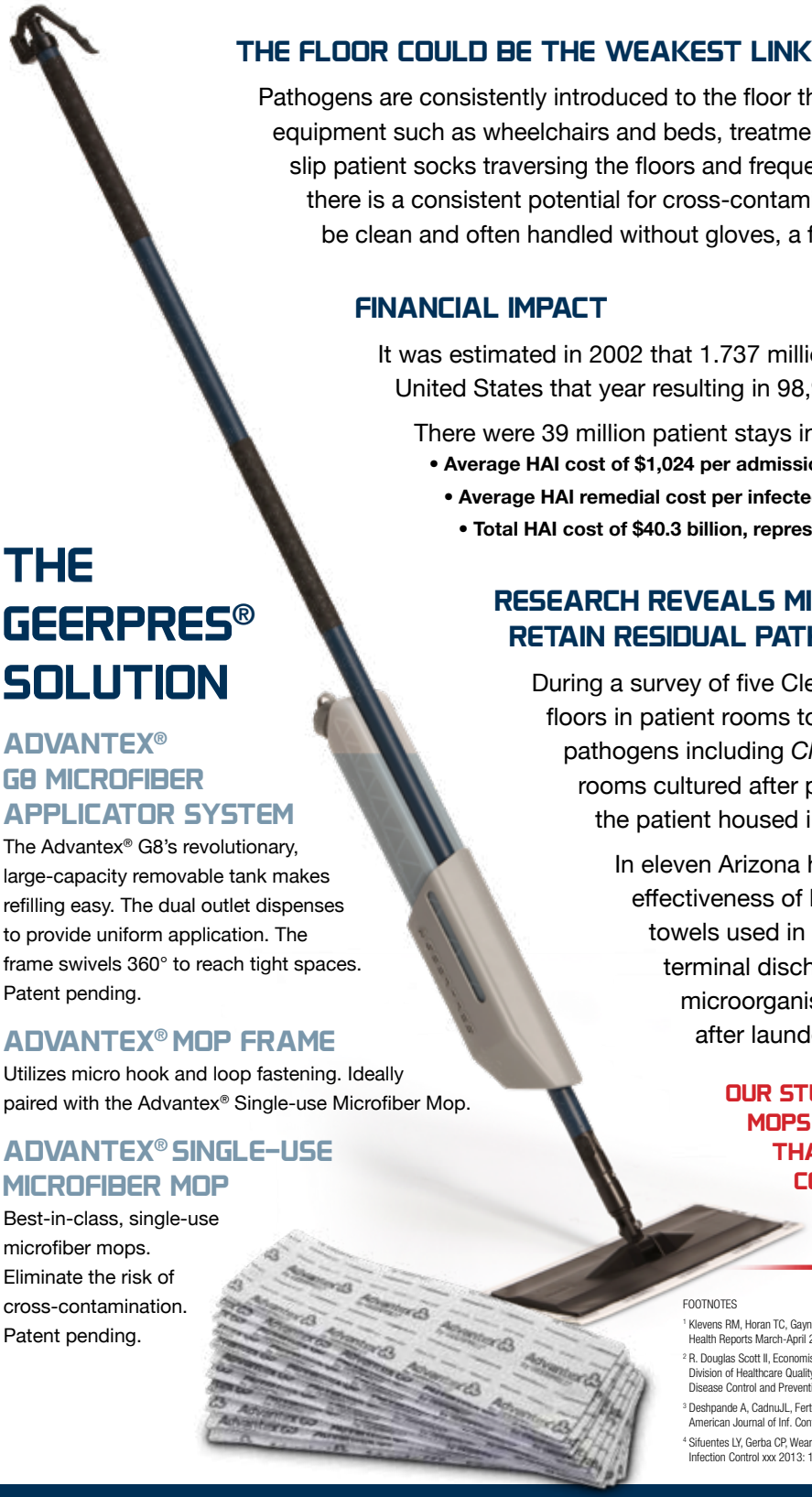
THE ADVANTEX® ADVANTAGE

FROM THE FLOOR UP – THE BATTLE TO CONTROL HAIs



THE FLOOR COULD BE THE WEAKEST LINK IN FIGHTING HAIs

Pathogens are consistently introduced to the floor throughout the day by shoes, transport equipment such as wheelchairs and beds, treatment devices or computer carts, and non-slip patient socks traversing the floors and frequently, directly into a bed. More importantly, there is a consistent potential for cross-contamination on the floor by an item expected to be clean and often handled without gloves, a freshly laundered mop.

FINANCIAL IMPACT

It was estimated in 2002 that 1.737 million HAIs occurred in hospitals in the United States that year resulting in 98,987 deaths, a rate of 5.8%.[1]

There were 39 million patient stays in hospitals during 2009.

- **Average HAI cost of $1,024 per admission.**
- **Average HAI remedial cost per infected patient is $23,735.**
- **Total HAI cost of $40.3 billion, represents 11% of total hospital spend in 2009.[2]**

RESEARCH REVEALS MICROFIBER LAUNDERED MOPS CAN RETAIN RESIDUAL PATHOGENS

During a survey of five Cleveland-area hospitals, researchers found floors in patient rooms to be frequently contaminated with HAI pathogens including *Clostridium difficile* (C. diff), found in 44% of rooms cultured after patient discharge cleaning and 53% with the patient housed in the room.[3]

In eleven Arizona hospitals, a study to examine the effectiveness of laundering cloth and microfiber reusable towels used in cleaning and disinfection of rooms after terminal discharge of patients, revealed that viable microorganisms were found on 93% of the towels after laundering.[4]

OUR STUDY EVALUATED LAUNDERED MICROFIBER MOPS FROM ELEVEN HOSPITALS AND FOUND THAT 27.3% OF THE NEWLY LAUNDERED MOPS CONTAINED MICROBIAL CONTAMINATION, INCLUDING HAI PATHOGENS.

THE GEERPRES® SOLUTION

ADVANTEX® G8 MICROFIBER APPLICATOR SYSTEM

The Advantex® G8's revolutionary, large-capacity removable tank makes refilling easy. The dual outlet dispenses to provide uniform application. The frame swivels 360° to reach tight spaces. Patent pending.

ADVANTEX® MOP FRAME

Utilizes micro hook and loop fastening. Ideally paired with the Advantex® Single-use Microfiber Mop.

ADVANTEX® SINGLE-USE MICROFIBER MOP

Best-in-class, single-use microfiber mops. Eliminate the risk of cross-contamination. Patent pending.

FOOTNOTES

[1] Klevens RM, Horan TC, Gaynes RP, Pollock DA, Cardo DM. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. Pub Health Reports March-April 2007: vol 122:160-164.

[2] R. Douglas Scott II, Economist. The direct medical costs of healthcare-associated infections in U.S. hospitals and the benefits of prevention, Division of Healthcare Quality Promotion, National Center for Preparedness, Detection, and Control of Infectious Diseases Coordinating Center for Disease Control and Prevention, March 2009.

[3] Deshpande A, CadnuJL, Fertelli D, et al. Are hospital floors an underappreciated reservoir for transmission of health care-associated pathogens? American Journal of Inf. Control. 45, 2017: 336-338.

[4] Sifuentes LY, Gerba CP, Weart I, Engelbrecht K, Koenig DW. Microbial contamination of hospital reusable cleaning towels. American Journal of Infection Control xxx 2013: 1-4.

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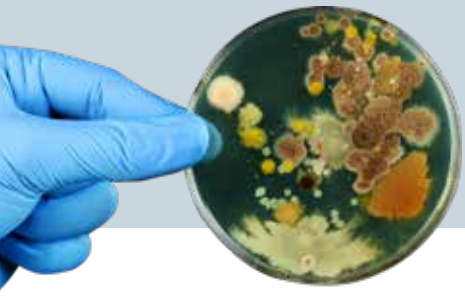


LAB RESULTS OF LAUNDERED MOPS

IMPACT OF LAUNDRY PROCESSES ON MICROFIBER'S STRUCTURE & EFFICACY

LAUNDERED MICROFIBER MOP STUDY – TABLE I

MOVING TO SINGLE-USE MOPS

Many hospitals are moving to single-use microfiber mops and wipes to help reduce the risk of HAIs from floor surfaces. Single-use mops remove the potential of cross-contamination with virgin microfiber in every use, while eliminating the risk of efficacy degradation through microfiber structural breakdown or pathogen retainage in the mop, as a result of an inadequate laundering process.

Three of the eleven hospitals' mops were positive for pathogens, representing a 27.3% contamination rate as one of the hospitals was tested twice to confirm findings.

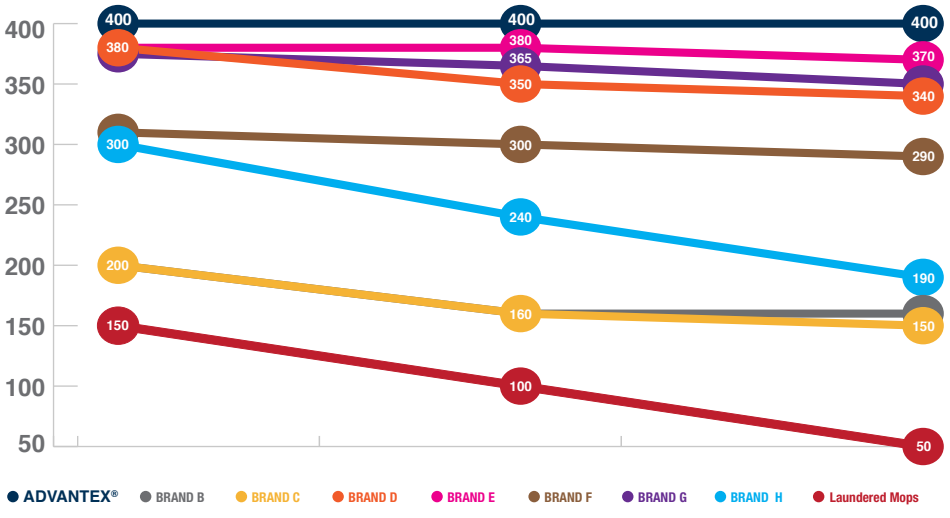
DATA Result / # Microorganisms PER MOP					
sample #	TAC Ttl Aerobic Count	MRSA *Staphylococcus*	E-Coli *Escherichia coli*	C-Diff *Clostridium difficile*	Yeast
1	<1000	<1000	<1000	<1000	<1000
2	<1000	<1000	<1000	<1000	<1000
3	<1000	<1000	<1000	<1000	<1000
4	<1000	<1000	<1000	<1000	<1000
5	<1000	<1000	<1000	<1000	<1000
6	11,500,000	1,200,000	<1000	430,000	2,860,000
7	8,000,000	120,000	330,000	230,000	790,000
8	350,000	40,000	<1000	150,000	40,000
9	3,500,000	600,000	<1000	1,340,000	170,000
10	300,000	20,000	<1000	150,000	20,000
11	<1000	<1000	<1000	<1000	<1000
12	<1000	<1000	<1000	<1000	<1000
13	200,000	100,000	<1000	20,000	<1000
14	<1000	<1000	<1000	<1000	<1000
15	<1000	<1000	<1000	<1000	<1000
16	<1000	<1000	<1000	<1000	<1000
17	<1000	<1000	<1000	<1000	<1000
18	<1000	<1000	<1000	<1000	<1000
19	<1000	<1000	<1000	<1000	<1000
20	240,000	20,000	<1000	<1000	<1000
21* Cloth	2,430,000	940,000	20,000	<1000	<1000

MICROFIBER MOPS IN NEUTRALIZING QUATERNARY AMMONIUM DISINFECTANT

QUATERNARY COMPATIBILITY

(1 MOP in 400 ML of 400 PPM)

As shown in Figure 2, additional tests were run to evaluate the potential of disinfectant neutralization on several brands of single-use and laundered microfiber mops.



(500 ml of Quat Required for Laundered Mop to Provide Enough Solution for Testing)

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FROM THE FLOOR UP – THE BATTLE TO CONTROL HAIs

SUMMARY & RESULTS

Studies have shown that floors may harbor HAI pathogen organisms. These pathogens may not be neutralized by using mops that bind disinfectants or may be transported through unexpected means, including socks or laundered mops damaged by the laundering process and reducing their ability to effectively clean and disinfect the floor.

Laundered mops can be reintroduced to the hospital with remnant HAI pathogens. Using a single-use microfiber mop helps reduce HAI risks.

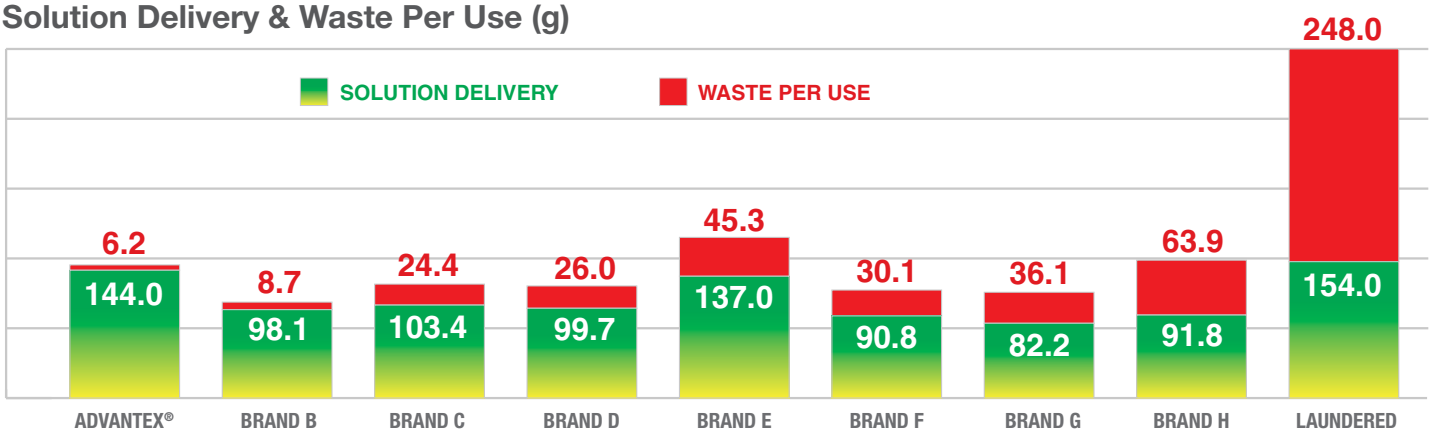
Test Results for Several Microfiber Mop Brands for Absorption, Application Efficacy, and Wasted Disinfectant Product

MOP Absorbency and Application Efficacy

MOP	Dry Wt. (g)	Wet Wt. (g)	Solution Absorbed Wt. (g)	Post Application Wt. (g)	Solution Delivery (g)	% Fluid Release	Floor Coverage (sq. ft.)	Solution Waste (g) per Use	% Fluid Waste	Quat Binding (1 Hr)	Quat Binding (3 Hr)
ADVANTEX®	18.8	168.9	150.1	24.9	144.0	95.9%	250	6.2	4.3%	NO	NO
Brand B	15.7	122.6	106.9	24.5	98.1	91.8%	168	8.7	8.9%	YES	YES
Brand C	13.2	141.0	127.8	37.6	103.4	80.9%	185	24.4	23.6%	YES	YES
Brand D	13.1	138.8	125.7	39.1	99.7	79.3%	178	26.0	26.1%	YES	YES
Brand E	22.8	205.1	182.2	68.1	137.0	75.2%	245	45.3	33.0%	YES	YES
Brand F	16.2	137.1	120.9	46.3	90.8	75.1%	158	30.1	33.1%	YES	YES
Brand G	12.5	130.9	118.4	48.6	82.2	69.5%	147	36.1	43.9%	YES	YES
Brand H	23.6	179.3	155.7	87.5	91.8	59.0%	159	63.9	69.6%	YES	YES
Laundered Mops	94.0	496.0	402.0	342.0	154.0	38.3%	267	248.0	161.0%	YES	YES

This study evaluated Advantex® (Brand A) and several brands of single-use microfiber mops and determined that differences vividly exist between brands on several critical criteria such as disinfectant neutralization, absorbency and dispersion/release efficacy, floor coverage, and wasted chemical solution. The full-length microfiber mop case study and lab results are available upon request. (By David Harry and Jack McGurk, MPA.)

Solution Delivery & Waste Per Use (g)



SUMMARY & RESULTS

Advantex® delivers the most solution per single-use mop targeted to cover an entire patient room and the least waste per use of all mops.

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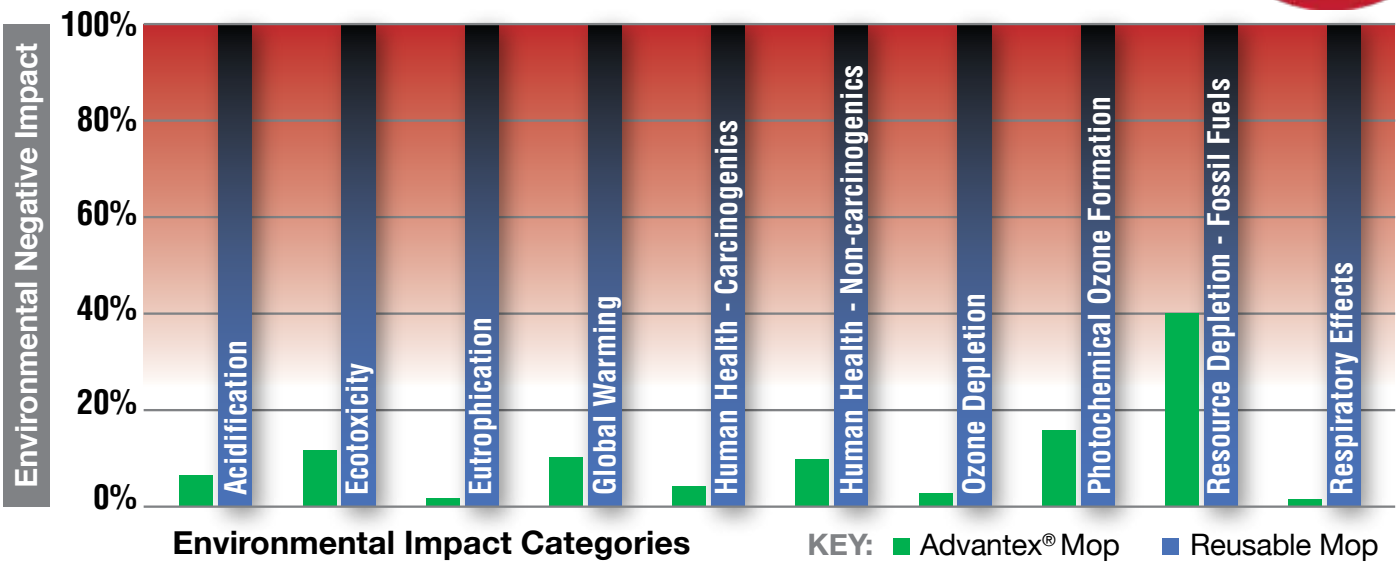
ENVIRONMENTAL LIFE-CYCLE ANALYSIS OF SINGLE-USE AND REUSABLE MOPS

Richard Venditti, Elis and Signe Olsson Professor, Department of Forest Biomaterials, North Carolina State University, Room 1204 Pulp and Paper Labs, Raleigh, NC 27695-8005



SUMMARY & RESULTS

The Advantex® Single-use Mop has a significantly lower environmental impact than a reusable laundered mop in every category assessed in the EPA TRACI model. A contribution analysis on the global warming potential of the two indicates that the electrical power and chemistry needed to wash and dry the reusable mop dominates environmental adverse implications.

This report summarizes the findings of an environmental impact analysis of two types of mops, the Advantex® Single-use Microfiber Mop (disposable) and a reusable microfiber mop. Each type of mop was evaluated for 100 uses. The Advantex® Single-use Mop included 100 mops that were each used one time and then disposed of after being transported 20 miles to an incineration facility.

The reusable mop was used one time for each application, followed by a washing and disinfection step, followed by drying. The reusable mop was used, cleaned, dried, and transported 40 miles daily and then to an incineration facility. Cleaning of the reusable mop included the use of a washing machine and both detergent and bleach. **For the Advantex® Single-use Mop, it was assumed that 93% of the chemistry was delivered to the floor. The reusable mop was assumed that 40% of the chemistry was delivered to the floor.**

The life-cycle inventory (LCI) chart tabulates all the environmentally-relevant mass and energy streams included in the study. The key difference is that the raw materials for the Advantex® Single-use Mop are much higher than the reusable mop since 100 single-use mops are used. This also translates into more waste for the single-use mops. The reusable mops, on the other hand, require a washing/drying step for reuse and as such use considerable water, chemicals, and energy.

NOTE: The complete report, all data, tables and results are available upon request.

REPORT MODEL

The LCI results were input into an OpenLCA environmental life-cycle analysis software package that used the Environmental Protection Agency (EPA) TRACI model to calculate the environmental impact categories for each type of mop.

Geerpres® Advantex® Mops are constructed of 71% post-consumer material.

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