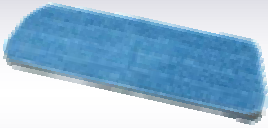


Using Flat Mopping Systems in Hospitals



Patrick Wooliever
and Marcy Yeshnowski
Tetra Tech EM Inc.



Take Home Message

1. Practical, common-sense approach for patient care areas, but **WILL NOT** meet all mopping needs.
2. Immediate water and chemical savings, but most cost savings are a result of reduced labor.
3. Improved ergonomics and cross-contamination infection control
4. Proactively address potential hurdles to implementation.

Mopping Requirements

- Patient care areas cleaned daily; common areas cleaned more often
- Floor cleaners can contain dangerous chemicals
- Special precautions required to avoid cross-contamination



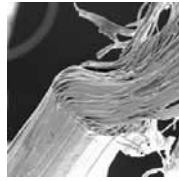
Why Are Hospitals Switching to Flat Mopping Systems?

- Ergonomic issues
- Labor savings
- Reduced chemical and water usage
- Cross-contamination concerns related to conventional mopping



...and what difference does it make for mopping?

- Increases the effective surface area of your mop
- More effective in cleaning up especially small particles
- Microscopic fibers thoroughly clean surfaces



Flat Mopping Systems:
How Do They Work?

1. Place
2. Mop
3. Peel
4. Launder



vs. Conventional Loop Mops

1. Dip and Wring
2. Mop
3. Repeat 3x
4. Change Water
5. Send to Industrial Laundry



Demonstration



Ergonomic Benefits

- During use, similar gross motor skills required
- Unfavorable positions for both methods, but flat mopping systems significantly reduced the frequency and severity of the risk factors



"Case Study: Are Microfiber Mops Beneficial for Hospitals?" Sustainable Hospitals Project



Ergonomic Analysis

Tasks	String Mopping	Flat Mopping
Lift empty metal/plastic bucket from cart	Lift metal bucket (5 lbs) <i>Trunk flexion 60°</i>	Lift plastic basin (1 lbs) <i>Trunk flexion neutral</i>
Carry empty bucket/basin and walk 3 feet	Forces at trunk, shoulders, elbow, hands (<i>carrying 5 lbs</i>)	Negligible forces (<i>carrying 1 lb</i>)
Fill and lift bucket/basin	Forces acting on neck, back, hands, wrist, shoulders (<i>water 16 lbs</i>)	Less forces acting due to lower weight (<i>8 lbs</i>)
Lift bucket of water, walk to cart	Flexion of trunk, hips, knees, shoulders. Forces at trunk, wrist, shoulder, elbow	<i>Upper body posture is neutral; less forces acting on trunk, wrist, shoulder, and lower body</i>

"Case Study: Are Microfiber Mops Beneficial for Hospitals?" Sustainable Hospitals Project



Ergonomic Analysis

Tasks	String Mopping	Flat Mopping
Carry bucket of water, walk to cart	<i>Forces at trunk, wrist, shoulder, and elbow</i>	<i>No longer performed</i>
Lift bucket of water and place on cart surface	Wrist and elbow flexion. Forces acting as previously.	<i>No longer performed</i>
Walk to closet for bottle of cleaning solution on shelf. Reach and grasp.	Neck extension, hips flexion, shoulder flexion <i>120°</i>	Same
Add cleaning solution and replace bottle on shelf	Neck extension, hips flexion, shoulder flexion <i>120°</i>	Same

"Case Study: Are Microfiber Mops Beneficial for Hospitals?" Sustainable Hospitals Project



Ergonomic Analysis

Tasks	String Mopping	Flat Mopping
Pick up wringer and hook it onto lip of bucket	Trunk flexion <i>80°</i> , elbow flexion <i>60°</i> , shoulders flexion <i>80°</i> . <i>Forces acting at trunk.</i>	<i>No longer performed</i>
Push cart to room, distance 25'	Walking with trunk flexion <i>30°</i> , shoulder and elbow flexion <i>80°</i> . <i>Forces acting at trunk.</i>	<i>Walking with trunk flexion neutral. Pushing cart with standard equipment.</i>
Remove excess water from mop	Palmar grasp, shoulder elevation and flexion, elbow flexion (using mop wringer)	Wring cloth, wrist/hand twisting with grip force

"Case Study: Are Microfiber Mops Beneficial for Hospitals?" Sustainable Hospitals Project



Ergonomic Analysis

Tasks	String Mopping	Flat Mopping
Mopping the floor	Trunk flexion	Trunk flexion
Mopping the floor	Place mop in bucket of water, wring, and continue mopping. Same risks as previous steps	Turn mop head downside up and replace cloth at mop head

"Case Study: Are Microfiber Mops Beneficial for Hospitals?" Sustainable Hospitals Project



Microfiber Considerations

- Cannot be used in areas contaminated with blood or body fluid
- Some products ineffective in greasy, high traffic kitchen areas
- Sticky floors?



Non-industrial washing machines must be used to wash microfiber mop heads



CA DHS - Licensing and Certification March 2002 Memo:

"...acceptable to install household washing machines to launder microfiber mops..." provided:

- ✓ Water Temp between 130 and 140 degrees F
- ✓ Separately from other textiles
- ✓ No bleach/fabric softener

"...as long as (these conditions) are met, there should be no infection control related issues."



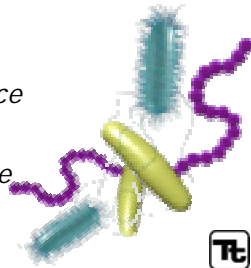
Not All Mopping Systems are Created Equal...

- No governing body or industry definition of "microfiber"
- Density of fibers per square inch can affect pricing and cleaning ability
- ...vs denier (diameter of fiber)
- Some are pretreated with antimicrobials



Should I Use Disinfectants for Cleaning Floors?

- Some microfiber products are treated with triclosan or other antimicrobials
- Concerns about general use of antimicrobials
 - Potential for causing antimicrobial resistance
 - Unknown long term consequences of its use



How many mops handles/heads?

Mop Handles = Number of Janitors

Mops Heads =

- + twice the number of rooms cleaned daily
- + "shrinkage"
- + special circumstance - large rooms, extra dirty rooms



University of California Davis Medical Center

- Reasons for change...
 - Increase in worker's compensation claims
 - Frequent "light duty" ergonomic requirements
 - Reduce cleaning time for patient rooms
 - Reduce chemical use and disposal



Cost Analysis: Lifetime Mop Costs

Conventional Wet Loop Mops

- \$5 each
- 55 to 200 washing lifetime
- 22 rooms cleaned per washing
- \$0.11 to \$0.41 per 100 rooms

Microfiber Mops

- \$17.40 each
- 500 to 1,000 washing lifetime
- 1 room cleaned per washing
- \$1.74 to \$3.48 per 100 rooms



Cost Analysis: Chemical Costs

Conventional Wet Loop Mops

- 10.5 ounces per day
- \$0.22 per ounce
- 20 rooms cleaned per day
- \$11.55 in chemicals per 100 rooms

Microfiber Mops

- 0.5 ounces per day
- \$0.22 per ounce
- 22 rooms cleaned per day
- \$0.50 in chemicals per 100 rooms



Cost Analysis: Water Use

Conventional Wet Loop Mops

- 21 gallons per day
- 20 rooms cleaned per day
- 105 gallons of water used per 100 rooms

Microfiber Mops

- 1 gallon per day
- 22 rooms cleaned per day
- 5 gallons of water used per 100 rooms



Cost Analysis: Electricity Use

(washing)

Conventional Wet Loop Mops

- \$1.00 per mop
- Washed once per day
- \$5.00 per 100 rooms

Microfiber Mops

- \$0.30 per mop
- Washed once per room
- \$30 per 100 rooms



Cost Analysis: Labor Costs

Conventional Wet Loop Mops

- 20 rooms cleaned per 8 hour shift
- \$12 per hour
- \$480 per 100 rooms

Microfiber Mops

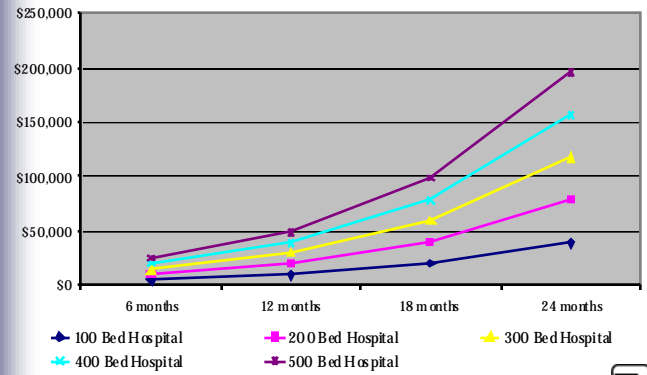
- 22 rooms cleaned per 8 hour shift
- \$12 per hour
- \$436 per 100 rooms



Facility Specific Cost Benefit Analysis Tool

Input Data	Unit	Required Data
Hospital-Specific Data		
150	[patient rooms]	Number of patient care rooms in hospital
\$11.00	[\$/hour]	Labor cost for custodial staff (including benefits)
\$0.22	[\$/ounce]	Cost of floor cleaning chemical
0.5	[gallon of water]	Dilution ratio - amount of chemical used per gallon of water
Conventional Wet Mop Data		
\$5.00	[\$/mop]	Conventional mop cost
20	[minutes/employee/hr shift]	Cleaning rate

Project Flat Mop



Flat Mopping Systems Performance Summary

- Microfiber last 5 to 10 times longer
- Up-front capital cost - about 3 times as much
- Increase production by 10%
- Use 95% less chemical
 - (2.5 vs. 53 ounces per 100 rooms cleaned)
- Use 95% less water
 - (5 gals vs. 105 gals per 100 rooms cleaned)
- Overall costs about 5-10% less

Costs/Benefits Not Quantified

- Reduced risk of cross-contamination related to mopping
- Reduced worker's compensation claims
- Reduced water use
- Patients: "quieter, quicker, less disruptive"

Discussion

1. Who's currently using microfiber mops?
2. How satisfied are you with them in patient care areas?
3. What hurdles did you have to overcome?
4. What have you seen as the greatest benefit to using microfiber mops?



Take Home Message

1. Practical, common-sense approach for patient care areas, but **WILL NOT** meet all mopping needs.
2. Immediate water and chemical savings, but most cost savings are a result of reduced labor.
3. Improved ergonomics and cross-contamination infection control
4. Proactively address potential hurdles to implementation.