

**Hillrom™**

## FOR QUALITY CARE AND PATIENT SAFETY, THE MATTRESS MATTERS

### A Comparative Study of Surgical Table Mattress Pads

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## INTRODUCTION

Surgical table mattress pads are key contributors to patient safety and quality care. So when the manufacturer of Hillrom surgical table mattress pads changed, we kicked off a clinical study to ensure the new pads would live up to our high standards — and yours.

The study's aims were two-fold:

- Validate that the newly manufactured mattress pad will outperform the old mattress pad
- Ensure that the newly manufactured mattress pad will meet industry quality and safety standards for antibacterial properties and preventing fluid ingress



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### OLD VS. NEW

For the purposes of this white paper, the newly manufactured mattress pad will be referred to as the “new” mattress pad, while the formerly manufactured mattress pad will be referred to as the “old” mattress pad. To create a baseline comparative, both pad styles tested had never been used prior to this study. The differences between the two are as follows:

NEW MATTRESS PAD	OLD MATTRESS PAD
Seams are heat welded, which protects against fluid ingress, viruses, allergens, microbes and mold	Seams are ultrasonic welded
Air exchange membrane allows clean air in and keeps pathogens out	Flap venting

## METHODOLOGY

With this study, we set out to learn:

### WILL THE NEW MATTRESS PAD OUTPERFORM THE OLD PAD WHILE MEETING INDUSTRY AND SAFETY STANDARDS?

To answer this question, we embarked upon a five-facility comparative study over the course of 10 weeks. At the end of the ten weeks, comparative lab analysis tested the mattresses for fluid ingress, internal aerobic bacteria, mold and yeast counts.

## STUDY PLAN

To be included in the study, a facility needed at least two surgical suites with similar surgical cases and caseload usage over a ten-week period. We identified facility candidates based their high-volume and reoccurring needs for replacement mattress pads. Five facilities participated in the study, which began with a clinical assessment.

## CLINICAL ASSESSMENT

During the assessment, we gathered baseline data on current cleaning practices, mattress storage practices and clinical workflows (including mattress removal and replacement techniques). During the visit, we outlined the following study criteria to help decrease variability and increase the validity of the study’s outcome data:

- Ensure mattress pads remain in the same room for the full 10 weeks
- Clean according to current practices
- Use new and old mattress pad sets in similar surgical rooms:
  - High-use rooms (at least one case/day)\*
  - General/Ortho/URO/GYN rooms preferred
- Use mattress throughout entire 10-week period
- Conduct weekly check-ins with Hillrom
- Sign field test agreement



## KEY FINDINGS

### 1. BASELINE ASSESSMENT TRENDS

During the clinical baseline assessment, we observed the facilities' turnover cleaning practices (i.e., the cleaning done between surgical cases). In all five facilities, high-touch areas were wiped down according to the Association of Perioperative Registered Nurses (AORN) guidelines<sup>1</sup>. Cleaning was done by the operating room staff, environmental services and/or operating room assistants. The teams wiped down all horizontal surfaces, along with the surgical table and mattress pads, and allowed for the cleaning manufacturers' recommended dwell time.

### CLEANING CONSIDERATIONS

The COVID-19 pandemic has increased attention to cleaning protocols and standards in hospitals everywhere. Unfortunately, misconceptions have led many hospitals to deviate from evidence-based operating room cleaning protocols — resulting in excessive cleaning and mattress pad degradation.

AORN states that the cleaning protocols listed in manufacturers' Instructions for Use (IFU) should be followed<sup>1</sup>. The COVID-19 virus is not easily transferred from surfaces. Quantitative microbial risk assessment (QMRA) studies have been conducted to understand the relative risk of SARS-CoV-2 fomite transmission and evaluate prevention measures to reduce risk. Findings suggest that the risk of SARS-CoV-2 infection via fomite transmission is low — generally less than 1 in 10,000. And the risk is even lower in operating rooms, since surgical teams treat each turnover as a high-risk, blood-borne pathogen situation (so precautions are heightened)<sup>2</sup>.

Within study sites, improper use of cleaning solutions appeared to directly correlate with mattress degradation and seam-splitting. To extend the life of your surgical mattresses, always follow manufacturer recommendations for cleaning agents.

**Dwell time** is the contact time required for disinfection. It varies by type of disinfectant used and microorganism targeted. It is listed on disinfectant product labels. If the disinfectant does not remain in contact with the microorganism for the full contact time, disinfection may not be achieved.<sup>3</sup>

### WHAT ABOUT C. DIFF?

*C. difficile* (*C. diff*) is the only bacteria that presents challenges to the cleaning process. A *C. diff* spore can live for up to five months, and it is resistant to several cleaning chemicals (e.g., alcohols, phenols and quaternary ammonium compounds).<sup>2</sup>

Chlorine-based cleaning agents are imperative for *C. diff* disinfection. However, McDonald et al found only minimal evidence to support the use of sporicidal disinfectants in non-outbreak settings. Therefore, IDSA and SHEA recommend daily and terminal OR cleaning with sporicidal disinfectant only when known cases are present.<sup>4</sup>

## STORAGE CONSIDERATIONS

Many mattresses in the study were found to still be wet in the morning following terminal cleaning. The assumed cause is that the mattresses were not allowed to dry completely before being placed back on the surgical tables.

Approved storage racks were almost always used throughout the study, although there were some instances of mattresses being stored in a pile in equipment rooms. This can cause undue wear and decrease the mattress' useful life.

## REMOVAL CONSIDERATIONS

Knowledge gaps related to proper mattress pad removal were noted across all study sites. Improper mattress pad removal can increase the stress on the mattress' seams, which can create undue strain within the euro cut-out and other areas of the mattress. It is important to grasp the mattress pad from the top and bottom when removing it and pull the Velcro® fastener back gently. Incorrect removal techniques, harsh chemicals and extreme positions like deep Trendelenburg can increase the risk of premature seam-splitting and mattress damage.

### KEY TAKEAWAYS FROM BASELINE ASSESSMENT:

- Always follow manufacturer cleaning instructions, and minimize the use of harsh, non-evidence-based cleaning protocols
- Allow mattresses to dry completely before placing them on surgical tables
- Remove mattresses carefully by grasping the pad from the top and bottom, and peeling back the Velcro® fastener gently
- Store mattresses properly to prolong their lives

**667** surgical cases were performed on new mattress pads

**444** surgical cases were performed on old mattress pads



Microboes or fluid ingress found within the new mattress pads were below testable limit, or less than 3 CFU/g, meeting approval criteria

## 2. COMPARISON AND LAB RESULTS

When comparing durability and performance, the study showed that the new pads outperformed the old pads in all areas, even though more cases were performed on the new pads.

Following the 10-week study, both sets of mattresses were sent to the lab for fluid ingress and microbial testing.

Our study set out to determine:

**WILL THE NEW MATTRESS PAD  
OUTPERFORM THE OLD PAD  
WHILE MEETING INDUSTRY  
AND SAFETY STANDARDS?**

The comparative study showed the answer is **a resounding yes.**

## MEETING OTHER RECOMMENDED CRITERIA

### PRESSURE INJURY PREVENTION

As the National Pressure Injury Advisory Panel (NPIAP) identified in its 2019 Guidelines, support surfaces are important elements in pressure injury prevention and treatment<sup>5</sup>. A well-designed support surface can prevent damaging tissue deformation and provide an environment that enhances perfusion of at-risk or injured tissue.<sup>5</sup>

Perioperative patients are all at risk for pressure injuries because they are:

- Immobile during the procedure
- Placed on a relatively hard surface
- Unable to feel pain caused by pressure, friction and shear forces
- Unable to change position to relieve pressure<sup>5</sup>

Poor patient outcomes and hospital-incurred costs — many of which are not reimbursed — keep pressure injuries front of mind for many preoperative leaders.

Pressure injury risk increases with every hour the patient is on the surgical table. With the average surgery lasting at least three hours, the likelihood of a pressure injury forming is increased by 8.5%<sup>6</sup>.

Mattress pads can play important roles in mitigating perioperative pressure injuries, but mattress pad quality is often overlooked when hospitals select surgical tables and accessories.

### Choosing the Right Surface to Help Prevent Pressure Injuries

When selecting a support surface, it's important to consider features affecting pressure redistribution, friction, shear force management and microclimate.<sup>5</sup>

AORN and the NPIAP have both issued guidance related to surgical mattress pad specifications, and Hillrom surgical table mattress pads meet these criteria<sup>1,5</sup>. The standard surgical table mattress pad is a 3-1/2" pad constructed with 3/4" of viscoelastic foam and 2-3/4" urethane foam. This design is specifically engineered for patients at risk of pressure injuries (as all surgical patients are).

- The viscoelastic foam helps maintain patients' positions while protecting their bony prominences with its enveloping properties
- The urethane foam layer supports the mass area and prevents patients from bottoming out
- The surgical mattress cover works synergistically with the foam layers to decrease friction and shear
- The table pad comes standard with an integrated occiput cut-out that strategically protects the occiput from pressure injury
- The OR table mattress cover is antimicrobial, radiolucent and non-staining



## UP TO \$40,000

Pressure injury treatment can cost costing between \$14,000 and \$40,000 per patient<sup>6</sup>

## UP TO \$1.5 BILLION

The average estimated cost of treatment is \$750 million to \$1.5 billion per year<sup>6</sup>

## UP TO 54.8%

Surgery-related pressure injuries may account for as much as 45% of all hospital-acquired pressure injuries — and the highest incidence reported is 54.8%.<sup>6</sup>

When we compare interface pressure on our new surgical table mattress pad to the other standard operating room mattress, the difference is startling:

## INTERFACE PRESSURE TEST

Sensor Location	2" Poly Foam Pad	2" Improved Pad	3-1/2" Hillrom Mattress Pad with Contoured Head
<b>HEAD (Back of the Head)</b>			
Maximum Pressure	172.54	46.25	40.38
Average Pressure	52.12	31.23	27.06
<b>SCAPULA (Shoulder Blades)</b>			
Maximum Pressure	60.78	42.01	34.35
Average Pressure	34.94	28.77	25.54
<b>SACRAL PROMINENCE (Base of Spine)</b>			
Maximum Pressure	46.60	39.95	34.52
Average Pressure	40.95	32.21	29.75
<b>Heel (Back of the Heel)</b>			
Maximum Pressure	92.33	48.64	59.64
Average Pressure	41.05	31.41	33.04
<b>Overall Results</b>			
Maximum Pressure	172.54	48.64	59.64
<b>Average Pressure</b>	<b>27.80</b>	<b>23.79</b>	<b>20.63</b>



## CONCLUSION

When it comes to patient safety and quality surgical care, the mattress matters. Our study showed that Hillrom's newly manufactured mattress pad not only outperforms the former model, but also outperforms others on the market today. And with proper cleaning, storage, handling and attention to pressure injury prevention, it can help your surgical team save and sustain lives for years to come.



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