The Impact of Cleaning Chemicals on Polyurethane Mattress Cover Materials and their Propensity for Physical Damage

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BACKGROUND

The recent MHRA Device Alert (MDA/2010/002) highlights concerns in the medical care industry over possible infection risks to patients caused by damaged mattress covers that are no longer an effective barrier to fluid ingress. The alert lists possible causes of damage as:

- Detergent
- Ecolab
- Hypochlorite
- IPA

Previously, many studies have examined these issues in isolation. This preliminary study investigates the relationship between the cleaning and disinfection methods and the increased vulnerability to physical damage of polyurethane coatings.

The investigation into the cause of failure for damaged covers tends to be performed once covers are dry and often after disinfection, the data does not necessarily represent the state of the cover at the point of failure. Over 85% of such covers examined by Dartex Coatings have been found to have some form of physical damage, but to date there has been little research into the performance of polyurethane coatings during and immediately after cleaning.

Rationale

This investigation was to study the cause of the high failure/failure rates, it is not aimed to validate any particular cleaning or disinfection routine, but to look at its impact.

All of the chemicals assessed are currently used in hospitals for cleaning and disinfection purposes. A range of different mattress cover materials were selected for assessment as the polymer type would be expected to have an impact upon cover performance. All of the cover materials examined have a transfer coated polyurethane coating on a synthetic textile substrate. Polyurethanes (PUs) comprise a vast group of polymers with literally thousands of different types commercially available, offering a wide range of performance including various levels of moisture vapour permeability, chemical resistance and hardness (higher moduluses).

This study includes four different coating systems manufactured by Dartex in addition to another readily available alternative, each has a different level of moisture vapour permeability (MVP), chemical resistance and hardness. One of the products tested was the “standard” Dartex material that has been used by the NHS for the past 25 years.

CONCLUSION

- This work demonstrates that when a polyurethane coating is swollen by the presence of cleaning agents it is more prone to damage.
- This suggests increased exposure to cleaning agents may lead to an increase in the risk of mattress failure.
- The chemical resistance of polymer coatings used today for mattress covers varies considerably. It is therefore critical to consider this when specifying cleaning requirements such as breathability, stretch, flame retardance, antimicrobial etc., when specifying your mattress cover requirements.
- Further research is planned to identify a clearer distinction in performance between the available polymer systems, cleaning reagents and their Propensity for Physical Damage.

REFERENCES

4. NaDCC was kindly supplied by Ecolab - http://www.ecolab.com
5. Protect, Rinse Dry. BHTA Guidance on care, cleaning and inspection of healthcare mattresses. www.dartexcoatings.com +44 (0)115 9837676

In order to maximise the life of your mattress cover we strongly recommend that you follow the ‘Protect, Rinse, Dry’ Procedure outlined by the BHTA Guidance on care, cleaning and inspection of Healthcare mattresses.”