

# Ward Bed Slide Sheets – Antimicrobial or Disposable?

**Authors:** Carman, A., Kovathuparambil, S., A., Nyakudarika, P., and Chauhan, L.  
 Anglia Ruskin Peterborough: University House Bishops Road Peterborough PE1 5BW

**Key Words:** Slide Sheet, Ward Bed, Silver Nanoparticles, Disposable, COVID-19.



## Introduction:

Slide sheets are hospital apparatus used to reposition patients on ward beds without making direct contact. They play a critical role in facilitating patient care and add a layer of protection between the healthcare workers and patient.

There are different types of slide sheets, such as antimicrobial slide sheets, and disposable slide sheets. **Figure 1** refers to a standard antimicrobial slide sheet used in a hospital before the COVID-19 pandemic. Before the COVID-19 pandemic, antimicrobial slide sheets were used as they could be used from patient to patient, are biocompatible, and result in a significant reduction of microbial contamination and resulting infection. During the pandemic, regulations changed to recommend disposable sheets which can be disposed of after use, minimising the spread of microbes between patients and practitioners. With the pandemic's end, is it time to return to the reusable, antimicrobial sheets?

## Research:

Silver nanoparticles (or AgNPs) possess antibacterial, antiviral, and antifungal properties, associated with the dissolution of cell membranes, impaired oxidative phosphorylation, and impaired nucleic acid replication. AgNPs can be associated with fabrics via a template membrane. Common antimicrobial fabrics such as nylon are resistant and flexible, allowing them to sustain the weight of a human, making them suitable for use in patient mobility aids such as slide sheets. Antimicrobial fabrics can be both hand-washed and washed in standard wash cycles, retaining up to 88% of antimicrobial properties after 20 cycles (Hasan K.M. et al. 2012). Therefore, antimicrobial slide sheets do not require specific training or detergents to wash and do not need to be washed more frequently than other bed linens.

**Figure 1** refers to an antimicrobial slide sheet on a ward bed (Medical Supplies (2024))



**Table 1 – Comparison Between Disposable and Antimicrobial Sheets**

	Antimicrobial	Disposable
<b>Longevity</b>	<input type="checkbox"/> 3,000 – 5,000 uses per sheet.	<input type="checkbox"/> Single-use
<b>Antimicrobial Activity and Efficacy</b>	<input type="checkbox"/> Kills approximately 99.9% of microbes. <input type="checkbox"/> Dependent on the sheet, and brand. ▪ Truong, W. R., & Yamaki, J. (2018).	<input type="checkbox"/> Does not kill any microbes.
<b>Do they meet current standards and regulations?</b>	<input type="checkbox"/> No <input type="checkbox"/> However, before COVID-19 they were the standard.	<input type="checkbox"/> Yes
<b>Cost</b>	<input type="checkbox"/> Approximately £60 per sheet.	<input type="checkbox"/> Approximately £1.60 per sheet.
<b>Material/coating</b>	<input type="checkbox"/> The material is typically linen, cotton, or nylon. <input type="checkbox"/> Silver nanoparticle coating.	<input type="checkbox"/> Paper, no coating.
<b>Advantages</b>	▪ Keil, M., Viere, T., Helms, K., & Rogowski, W. (2023). <input checked="" type="checkbox"/> Multiple uses (more durable). <input checked="" type="checkbox"/> Inhibit microbes. <input checked="" type="checkbox"/> Results in the equipment being less prone to contamination. <input checked="" type="checkbox"/> Broad spectrum antibacterial activity. <input checked="" type="checkbox"/> Improved infection control. <input checked="" type="checkbox"/> Reduced healthcare associated infections. <input checked="" type="checkbox"/> Enhances surface hygiene. <input checked="" type="checkbox"/> More hygienic. <input checked="" type="checkbox"/> Safer and cleaner environment. <input checked="" type="checkbox"/> Less biocides are required	<input checked="" type="checkbox"/> Cheaper per sheet, <input checked="" type="checkbox"/> Less cross contamination. <input checked="" type="checkbox"/> Easy to use. <input checked="" type="checkbox"/> Reduced laundry requirements. <input checked="" type="checkbox"/> Convenient. <input checked="" type="checkbox"/> Easily accessible. <input checked="" type="checkbox"/> Meets current standards and regulations.
<b>Limitations</b>	▪ Keil, M., Viere, T., Helms, K., & Rogowski, W. (2023). <input type="checkbox"/> More expensive per sheet. <input type="checkbox"/> Does not meet current regulations and standards. <input type="checkbox"/> Required proper maintenance. <input type="checkbox"/> Prolonged use may lead to antibacterial resistance in the sheets. <input type="checkbox"/> False sense of security as they may appear clean but may not be under the surface. <input type="checkbox"/> May allow for cross-contamination as healthcare workers may not see they are dirty.	<input type="checkbox"/> Not durable. <input type="checkbox"/> Patient may lack comfort. <input type="checkbox"/> Reduced quality. <input type="checkbox"/> Rips very easily. <input type="checkbox"/> Contribute to plastic waste. <input type="checkbox"/> Not eco-friendly. <input type="checkbox"/> Needs lots of storage as a hospital will need large quantities. <input type="checkbox"/> Harmful to the environment. <input type="checkbox"/> May cost more in the big picture. <input type="checkbox"/> Do not have protective properties.
<b>Overall Outcome</b>	<input type="checkbox"/> More hygienic. <input type="checkbox"/> Safer environment. <input type="checkbox"/> Improved infection control. <input type="checkbox"/> Increased disinfection within hospitals.	<input type="checkbox"/> Less cleaning required. <input type="checkbox"/> Convenient for the healthcare workers. <input type="checkbox"/> Less cross contamination

## Conclusion:

Considering that the count of Covid-19 patients coming and leaving the hospital has reduced alongside the COVID-19 pandemic, the benefits of antimicrobial slide sheets are becoming more important to consider. Their reusable nature causes them to have a significant impact on both the economy and sustainability of the hospital, reducing costs by a wide margin whilst also reducing waste- and in turn, reducing costs of waste storage and disposal. Furthermore, the additional protection against a variety of microbial infections and increased patient comfort has a notable benefit on the efficiency of the slide sheets as well. Therefore, it is recommended that hospitals return to reusable, antimicrobial slide sheets into standard use. Any remaining disposable sheets from the COVID-19 era should be used during this transition to ease the immediate costs, as well as to prevent the waste that would be caused if they were simply discarded.

## Discussion:

As displayed in **Table 1**, both antimicrobial and disposable slide sheets have benefits and issues with their use. Antimicrobial sheets inhibit microbes, which is their main advantage over their disposable counterparts- however, it should be noted that due to their single-use nature, disposable sheets are at less risk of cross-contamination between patients. Antimicrobial sheets do need washing, unlike disposable sheets, but they can be washed alongside other bed linens, reducing laundry load - and alternatively, if they have not been visibly soiled, they can be hand washed to save time. Due to their single-use nature, disposable sheets are currently not washed and are instead discarded, having a significant impact on the sustainability of the hospital in terms of waste. This also results in a greater overall cost than disposable sheets- antimicrobial slide sheets have 3,000-5,000 uses (Škrlová K. et al. 2019) with a cost of approximately £60 per sheet, whilst an equal number of disposable sheets would cost £4,800-£8,000. This leads to antimicrobial sheets having a significant impact on the sustainability and economy of the hospital. However, antimicrobial sheets need continued maintenance, whilst disposable sheets are guaranteed to be clean and ready use, resulting in more convenience. From a humanitarian perspective, it should be noted that antimicrobial fabric will be more comfortable for patients than paper. However, the use of antimicrobials in the long term may lead to antimicrobial resistance.

## FAQs:

- Do antimicrobial sheets work with all mattress types ?
- What if someone is allergic to the antimicrobial sheets ?
- When not in use where will antimicrobial sheets be kept to limit microbes ?
- If the bacteria builds a resistance against the antimicrobial sheets what will the next step be ?
  - Will staff members be trained to wash antimicrobial sheets ?