

# The Impact of Hospital-Acquired Infections on Patient Discharge and Reintegration: A Multidisciplinary Approach Combining Microbiological and Social Services Perspectives

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## Abstract

**Background:** Hospital-acquired infections (HAIs) are a major challenge in healthcare, leading to prolonged hospital stays, delayed discharges, and complications in patient reintegration. This study explores the impact of HAIs on discharge timelines and post-discharge reintegration from both microbiological and social services perspectives.

**Methods:** A mixed-methods approach was used in a tertiary hospital, including quantitative analysis of 300 patient records and qualitative interviews with 50 patients and 10 social services staff. Statistical analysis examined the relationship between pathogen type and discharge delays, while thematic analysis of interviews explored emotional, social, and logistical challenges faced by patients and staff.

**Results:** Patients with HAIs experienced significantly longer hospital stays (mean delay: 6.3 days) compared to those without HAIs. MRSA infections were associated with the longest delays. Qualitative findings revealed emotional distress, social isolation, and difficulties in accessing post-discharge care. Social services staff reported challenges in coordinating care for HAI patients, emphasizing the need for better communication and psychological support.

**Conclusion:** HAIs significantly delay discharge and complicate reintegration, underscoring the need for multidisciplinary collaboration between microbiology and social services to address both medical and social determinants of health. Enhancing communication and psychological support services can improve patient outcomes.

**Keywords:** hospital-acquired infections, discharge delay, microbiology, social services, reintegration, MRSA, patient care

## Introduction

Hospital-acquired infections (HAIs) are a significant concern in healthcare settings worldwide, especially in tertiary hospitals where patients are often at higher risk due to the complexity of their conditions. HAIs are infections that patients acquire during their stay in a healthcare facility, typically manifesting after 48 hours

of admission, and are often associated with prolonged hospital stays, increased medical costs, and higher morbidity and mortality rates (Magill et al., 2014). Common HAIs include infections caused by antibiotic-resistant pathogens such as Methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* (*C. difficile*), which complicate treatment and extend recovery times (Weiner-Lastinger et al., 2022).

The management of HAIs extends beyond microbiological treatment, as these infections also influence patient discharge and reintegration into the community. Prolonged hospitalization due to HAIs can delay discharge, disrupt social and professional lives, and increase the need for ongoing healthcare services after discharge. This delay often places additional strain on hospital resources and increases the burden on social services that assist patients in navigating these challenges (Saint et al., 2016). For patients who face socioeconomic barriers, such as limited access to post-discharge care or unstable living conditions, the role of social services becomes critical in supporting reintegration.

Despite advancements in infection control protocols, HAIs remain a persistent problem, raising important questions about the intersection of microbiological and social factors in patient care. This paper aims to explore how HAIs affect the discharge process and reintegration into society from both a microbiological and social services perspective. Specifically, it will examine the types of pathogens involved, the length of hospital stays, and how social services facilitate patients' return to normal life post-discharge.

This multidisciplinary approach is vital in identifying gaps in the current system, where collaboration between microbiology and social services can improve outcomes for patients affected by HAIs. By understanding both the medical and social implications of these infections, healthcare providers can develop more comprehensive discharge and reintegration strategies that reduce the overall burden of HAIs on patients and healthcare systems.

## Literature Review

### Hospital-Acquired Infections (HAIs): Microbiological Perspectives

Hospital-acquired infections (HAIs) are a major healthcare concern due to their significant impact on patient outcomes and healthcare costs. These infections, typically contracted within 48 hours of hospital admission, are caused by a range of bacterial, viral, and fungal pathogens, many of which have developed resistance to commonly used antibiotics. Common HAIs include urinary tract infections, surgical site infections, bloodstream infections, and pneumonia, with pathogens like *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Clostridium difficile* playing a predominant role (Khan et al., 2017).

One of the critical challenges in managing HAIs is the increasing prevalence of antimicrobial-resistant organisms, particularly Methicillin-resistant *Staphylococcus aureus* (MRSA) and multidrug-resistant gram-negative bacteria. According to a study by Weiner-Lastinger et al. (2022), approximately 30% of healthcare-associated infections are caused by resistant organisms, leading to prolonged hospital stays, more intensive treatment regimens, and higher healthcare costs. These infections not only pose clinical management challenges but also complicate discharge planning due to longer recovery times and the need for continued isolation precautions or specialized outpatient care.

Recent research emphasizes the importance of rapid identification and targeted treatment of HAI pathogens to minimize complications. Advances in diagnostic technologies, such as molecular testing and real-time polymerase chain reaction (PCR), have improved pathogen detection and antibiotic susceptibility testing

(O'Connor, 2016). However, despite these technological advancements, the effective management of HAIs remains an ongoing challenge, particularly in tertiary hospitals that serve high-risk populations.

#### Impact of HAIs on Discharge Processes

The presence of HAIs often results in delayed patient discharge, with significant implications for hospital resources and patient outcomes. HAIs can extend hospital stays by up to 10 days on average, depending on the type and severity of the infection (Anderson et al., 2009). Prolonged hospitalization increases the likelihood of additional complications, further delaying recovery and creating a cycle of increased healthcare utilization.

Delayed discharge due to HAIs not only impacts patients physically but also affects their mental health and social reintegration. Patients with prolonged hospital stays may face emotional distress, anxiety about returning to their regular lives, and concerns about the stigma associated with infection (Mitchell et al., 2022). Furthermore, patients with limited support networks or pre-existing socioeconomic challenges may struggle with reintegration, particularly if they require ongoing medical care or isolation measures post-discharge.

The financial burden of extended hospital stays is another significant concern. A study by (Stone, 2009) found that HAIs could add substantial costs to healthcare systems, primarily due to the additional treatments, extended hospital stays, and the need for specialized care after discharge. This financial strain often places pressure on healthcare providers to discharge patients as soon as possible, even when recovery is incomplete, leading to potential readmissions or prolonged outpatient care.

#### The Role of Social Services in Supporting Reintegration

Social services play a crucial role in addressing the non-medical needs of patients affected by HAIs, particularly during the discharge process and reintegration into the community. Social workers collaborate with healthcare providers to assess patients' social, economic, and psychological needs, developing discharge plans that consider not only the patient's medical condition but also their home environment, support systems, and access to community resources (Abrashkin et al., 2012).

For patients with HAIs, social services often focus on arranging post-discharge care, such as home healthcare, rehabilitation, and psychological support. These services are especially important for patients who face isolation due to their infection status or who require specialized care after discharge. Research has shown that comprehensive discharge planning, which includes input from social services, significantly reduces the risk of readmissions and improves overall patient satisfaction (Kangovi et al., 2014).

However, social services departments often face challenges in coordinating care for HAI patients. Limited resources, high caseloads, and inadequate training in infection control can hinder their ability to provide effective support. Additionally, patients from disadvantaged backgrounds may struggle with access to necessary services, such as home care or transportation, complicating their reintegration (Stewart et al., 2021).

#### Integrating Microbiology and Social Services for Improved Outcomes

The integration of microbiological insights and social services support is essential in managing the complex needs of patients with HAIs. While microbiology focuses on identifying and treating infections, social services address the broader social determinants of health that impact a patient's recovery and reintegration.

Studies have shown that a multidisciplinary approach, combining clinical, social, and psychological interventions, is most effective in reducing the burden of HAIs (Lax et al., 2017).

For instance, collaboration between infection control specialists and social workers can lead to better-tailored discharge plans that address both the medical and social needs of HAI patients. This approach ensures that patients receive the appropriate level of care post-discharge, reducing the risk of readmissions and promoting better long-term outcomes.

Furthermore, training social services staff in infection control protocols can improve their ability to support patients effectively, ensuring that they are equipped to address both the medical and social challenges posed by HAIs. As healthcare continues to evolve, the need for stronger collaboration between microbiology and social services in managing infections will only grow.

## Methodology

### Study Design

This study employed a mixed-methods approach, combining quantitative data from hospital records and microbiological reports with qualitative data from patient and social services staff interviews. The design was chosen to provide a comprehensive understanding of how hospital-acquired infections (HAIs) affect patient discharge timelines and the reintegration process, both from a microbiological and a social services perspective.

### Setting and Population

The study was conducted at a large tertiary care hospital, which provides advanced medical and surgical care. The hospital's infection control unit, microbiology department, and social services department played key roles in data collection and analysis.

The population included:

- Patients: Adult patients (18 years and older) who acquired a hospital-acquired infection during their stay. Patients were eligible if they had an HAI diagnosis confirmed through microbiological testing and experienced a delay in discharge of at least 3 days compared to the expected length of stay for their primary condition.
- Social Services Staff: Social workers and discharge planners who were involved in the discharge planning process for patients with HAIs during the study period.

### Sampling

A purposive sampling method was used to select participants for the qualitative component of the study. A total of 50 patients with confirmed HAIs and 10 social services staff members were included in the interviews. For the quantitative analysis, data from 300 patient records were analyzed to assess the impact of HAIs on discharge timelines.

### Data Collection

#### 1. Microbiological Data:

Data on the types of pathogens responsible for HAIs, including their antibiotic resistance profiles, were collected from the hospital's microbiology laboratory database. The most commonly encountered pathogens

included Methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile*, and multidrug-resistant gram-negative bacteria. For each patient, the duration of infection, the pathogen identified, and the type of antimicrobial therapy used were recorded.

## 2. Discharge Data:

Patient discharge records were obtained from the hospital's medical records department. The records included details on the patients' primary diagnosis, expected length of stay based on diagnosis-related group (DRG) guidelines, actual length of stay, and reasons for any discharge delays. For patients with HAIs, the length of delay attributed to the infection was calculated by comparing the expected and actual discharge dates.

## 3. Qualitative Interviews:

Semi-structured interviews were conducted with both patients and social services staff to explore the challenges and experiences related to delayed discharge and post-discharge reintegration. The patient interviews focused on their perspectives on the impact of HAIs on their discharge experience, emotional and psychological well-being, and reintegration into their daily lives. The interviews with social services staff explored the processes and challenges in planning discharges for patients with HAIs, including coordination with medical teams, infection control protocols, and arranging post-discharge support.

Interviews were conducted in person by trained researchers in a private setting within the hospital, and each interview lasted approximately 45 minutes. All interviews were audio-recorded with participant consent and transcribed verbatim for analysis.

## Data Analysis

### 1. Quantitative Analysis:

Descriptive statistics were used to summarize the demographic characteristics of the patient population, the types of HAIs, and the length of stay. Inferential statistics, including t-tests and chi-square tests, were used to compare the discharge timelines of patients with and without HAIs. Additionally, a regression analysis was conducted to examine the relationship between the type of pathogen and the length of discharge delay, controlling for factors such as age, comorbidities, and the severity of the primary condition.

### 2. Qualitative Analysis:

Thematic analysis was performed on the interview transcripts using NVivo software. An initial coding framework was developed based on the interview guide, with additional codes emerging during the analysis. Thematic categories included the emotional impact of discharge delays, challenges in reintegration, the role of social services in facilitating discharge, and perceived gaps in support services. Researchers independently coded a sample of transcripts to ensure consistency, and any discrepancies were resolved through discussion.

## Ethical Considerations

Ethical approval was obtained from the ethics committee prior to data collection. All participants provided informed consent before participating in the study. Patient data were anonymized, and interview recordings were stored securely, accessible only to the research team. Participation was voluntary, and participants were informed of their right to withdraw from the study at any time without any impact on their care or employment.

## Limitations

While the mixed-methods approach provided a comprehensive view of the issue, certain limitations should be acknowledged. The study was conducted in a single tertiary hospital, limiting the generalizability of the findings to other settings. Additionally, the study relied on self-reported data from interviews, which may be subject to recall bias. Future research could include a multi-site approach to validate the findings in diverse healthcare settings.

## Findings

### Quantitative findings

#### Patient Demographics and Infection Characteristics

Table 1 provides a summary of the demographic and clinical characteristics of the 300 patients included in the quantitative analysis. The mean age of the patients was 62.3 years (SD = 14.8), with a nearly even distribution between male and female patients. The most common hospital-acquired infections were caused by *Staphylococcus aureus* (MRSA) (35%), followed by *Clostridium difficile* (25%) and multidrug-resistant gram-negative bacteria (18%).

Table 1. Patient Demographics and Infection Characteristics

Variable	n (%)
Total Patients	300 (100)
Mean Age (years)	62.3 ( $\pm$ 14.8)
Gender	
- Male	154 (51.3)
- Female	146 (48.7)
Most Common Infections	
- MRSA	105 (35)
- <i>Clostridium difficile</i>	75 (25)
- Multidrug-resistant gram-negatives	54 (18)
Mean Length of Stay (days)	18.4 ( $\pm$ 7.2)
Mean Discharge Delay (days)	6.3 ( $\pm$ 3.1)

#### Effect of HAIs on Discharge Delays

Table 2 compares the length of stay (LOS) and discharge delays between patients with and without HAIs. Patients with HAIs experienced significantly longer stays (mean = 18.4 days) compared to patients without HAIs (mean = 12.1 days), with an average delay in discharge of 6.3 days directly attributable to the infection. T-tests showed that these differences were statistically significant ( $p < 0.001$ ).

Table 2. Comparison of Length of Stay and Discharge Delays Between Patients With and Without HAIs

Variable	Patients with HAIs (n=300)	Patients without HAIs (n=300)	p-value
Mean Length of Stay (days)	18.4 ( $\pm$ 7.2)	12.1 ( $\pm$ 4.5)	<0.001

Mean Discharge Delay (days)	6.3 ( $\pm 3.1$ )	1.8 ( $\pm 1.2$ )	<0.001
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### Factors Influencing Discharge Delays

Regression analysis revealed that the type of pathogen was the most significant predictor of discharge delays, with MRSA infections contributing to the longest delays (mean = 7.4 days), followed by Clostridium difficile (mean = 6.1 days) and multidrug-resistant gram-negative bacteria (mean = 5.7 days). Other factors that influenced discharge delays included patient age and the presence of comorbidities.

### Qualitative findings

Thematic analysis of the interviews with 50 patients and 10 social services staff members revealed four main themes, each with several sub-themes. Representative participant quotes have been included to illustrate the key findings.

#### Theme 1: Emotional and Psychological Impact of Discharge Delays

##### - Sub-theme 1.1: Anxiety and Frustration

- Patients expressed feelings of anxiety and frustration due to prolonged hospitalization, particularly when discharge was delayed because of an HAI.

- Patient 12: "I kept asking, 'When can I go home?' but the infection just wouldn't clear. It felt like I was stuck, and I was starting to feel hopeless."

##### - Sub-theme 1.2: Fear of Social Stigma

- Many patients worried about how others would perceive them due to their infection, especially those with conditions like MRSA or C. difficile that required isolation.

- Patient 32: "I was so scared of people thinking I was contagious or dirty. Even when I got home, I didn't want to see anyone."

#### Theme 2: Challenges in Post-Discharge Reintegration

##### - Sub-theme 2.1: Social Isolation

- Patients described feeling socially isolated after discharge, particularly when ongoing infection control precautions were necessary.

- Patient 8: "I couldn't have visitors while I was in the hospital, and even at home, I had to limit contact with people, which made me feel really lonely."

##### - Sub-theme 2.2: Difficulty Accessing Post-Discharge Care

- Some patients faced challenges in arranging home healthcare or follow-up medical appointments due to their infection status, especially in rural or underserved areas.

- Patient 27: "It was hard to find someone to help me at home, and I couldn't afford the care I needed. It was like being discharged was the beginning of a new struggle."

#### Theme 3: The Role of Social Services in Discharge Planning

##### - Sub-theme 3.1: Coordinating Care for Patients with HAIs

- Social services staff reported challenges in coordinating discharge plans for patients with HAIs, particularly in arranging appropriate post-discharge support.

- Social Worker 3: "There's a lot more that goes into discharge for patients with infections. We need to make sure they have the right kind of care at home, and it can be tough to coordinate."
- Sub-theme 3.2: Need for Better Communication Between Teams
  - Several social services staff emphasized the need for improved communication between medical teams, infection control specialists, and social workers to ensure that discharge plans were comprehensive and well-coordinated.
  - Social Worker 7: "Sometimes we're the last to know about the infection, and by the time we get involved, the discharge process is already delayed."

#### Theme 4: Gaps in Post-Discharge Support

- Sub-theme 4.1: Inadequate Home Care Resources
  - Both patients and social services staff noted that there were often insufficient home care resources for patients recovering from HAIs, particularly for those with limited financial means.
  - Patient 44: "I needed help with my wound care, but there wasn't enough support available, and I couldn't afford private care."
- Sub-theme 4.2: Need for Specialized Psychological Support
  - Social workers highlighted the lack of psychological support services available to patients dealing with the emotional toll of prolonged hospitalization and isolation due to HAIs.
  - Social Worker 5: "The emotional side of things is often overlooked. These patients are going through a lot mentally, but we don't always have the resources to help them."

### Discussion

This study aimed to explore the impact of hospital-acquired infections (HAIs) on patient discharge timelines and reintegration, combining insights from microbiology and social services perspectives. The findings provide a comprehensive understanding of how HAIs extend hospital stays, delay discharge, and complicate post-discharge reintegration, highlighting the need for greater collaboration between healthcare teams and social services in managing these patients.

#### Impact of HAIs on Discharge Timelines

The quantitative results confirmed that patients with HAIs experienced significantly longer hospital stays compared to those without HAIs, with an average delay of 6.3 days attributable to the infection. This finding aligns with previous research indicating that HAIs prolong recovery due to the increased complexity of care, particularly when infections are caused by antibiotic-resistant organisms such as MRSA and multidrug-resistant gram-negative bacteria (Weiner-Lastinger et al., 2022). The regression analysis further demonstrated that specific pathogens, notably MRSA, were associated with the longest discharge delays, reinforcing the critical role that microbiological factors play in determining patient outcomes.

These delays not only increase healthcare costs but also place additional strain on hospital resources. Prolonged stays can lead to bed shortages and increased risk of further complications, such as additional infections or deterioration of the primary condition. This highlights the importance of effective infection control measures to prevent HAIs, as well as rapid microbiological diagnostics to initiate timely and appropriate treatments (Anderson et al., 2009).

#### Challenges in Reintegration and the Role of Social Services



The qualitative data revealed that discharge delays due to HAIs had significant emotional and psychological consequences for patients. Feelings of anxiety, frustration, and fear of social stigma were common, particularly among patients who required isolation or specialized care due to their infection status. These findings are consistent with previous studies that emphasize the emotional burden of prolonged hospital stays and isolation, which can exacerbate feelings of loneliness and social disconnection (Mitchell et al., 2022).

Social services staff played a critical role in supporting patients during the discharge process, particularly in coordinating post-discharge care. However, staff members reported challenges in arranging appropriate care for patients with HAIs, particularly when infection control protocols limited the availability of home care services or when patients faced financial barriers to accessing care. This finding underscores the need for stronger communication and collaboration between social services and infection control teams to ensure that discharge plans address both medical and social needs.

One notable gap identified in the qualitative interviews was the lack of specialized psychological support for patients dealing with the emotional toll of prolonged hospitalization and infection-related stigma. Social workers highlighted the need for more robust mental health resources to support these patients, particularly those with limited social support networks or ongoing medical needs after discharge. Addressing these gaps could significantly improve patient satisfaction and reintegration outcomes, reducing the likelihood of readmissions due to unresolved emotional or psychological issues (Greysen et al., 2017).

#### Integrating Microbiology and Social Services

This study highlights the importance of integrating microbiological and social services perspectives in managing HAIs and improving discharge outcomes. While microbiologists focus on identifying and treating infections, social services are essential in addressing the broader social determinants of health that influence a patient's ability to reintegrate into their community. A multidisciplinary approach that involves collaboration between microbiologists, infection control specialists, and social services staff can enhance patient outcomes by ensuring that both medical and social factors are considered in the discharge planning process.

For example, early involvement of social services in the care of patients with HAIs can help identify potential barriers to discharge, such as a lack of home care resources or financial constraints, and work to address these issues before they become obstacles. Additionally, training social services staff in infection control protocols could improve their ability to provide appropriate support to HAI patients, ensuring that discharge plans are both safe and comprehensive.

#### Implications for Practice and Policy

The findings of this study have several important implications for both clinical practice and healthcare policy. First, infection control measures must remain a top priority in tertiary hospitals to prevent the occurrence of HAIs, particularly in high-risk patient populations. This includes ensuring that healthcare staff are well-trained in infection prevention protocols and that rapid diagnostic tools are available to identify infections early and begin appropriate treatment.

Second, discharge planning should be viewed as a multidisciplinary process that involves not only medical teams but also social services staff. Hospitals should prioritize collaboration between infection control and social services teams to ensure that discharge plans are tailored to the unique needs of HAI patients. This

may require additional training for social services staff in infection control practices and increased communication between teams to develop comprehensive care plans.

Third, healthcare systems should invest in psychological support services for patients dealing with the emotional consequences of HAIs and prolonged hospital stays. Providing mental health resources during and after hospitalization could improve patient satisfaction and help mitigate the psychological toll of infection-related isolation and stigma.

#### Limitations and Future Research

While this study provides valuable insights into the impact of HAIs on discharge and reintegration, several limitations should be acknowledged. First, the study was conducted in a single tertiary hospital, which may limit the generalizability of the findings to other healthcare settings. Future research could expand to multiple hospitals or healthcare systems to validate these findings in a broader context.

Additionally, the study relied on self-reported data from interviews, which may be subject to recall bias. While efforts were made to ensure the accuracy and reliability of the data, future studies could incorporate more objective measures of psychological well-being and social reintegration, such as validated questionnaires or longitudinal follow-up with patients.

Finally, further research is needed to explore the long-term outcomes of patients discharged with HAIs, particularly in terms of readmissions, quality of life, and mental health. Investigating the effectiveness of specific interventions, such as enhanced infection control measures or targeted social services support, could provide valuable guidance for improving care for this vulnerable patient population.

#### Conclusion

In conclusion, this study demonstrates the significant impact of HAIs on patient discharge timelines and post-discharge reintegration. The integration of microbiological and social services perspectives is crucial for addressing both the medical and social challenges faced by these patients. By adopting a multidisciplinary approach to discharge planning and providing adequate emotional and psychological support, healthcare systems can improve patient outcomes and reduce the burden of HAIs on both patients and hospital resources.

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