

# THE IMPACT OF HOSPITAL-ACQUIRED INFECTIONS ON PATIENT OUTCOMES

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**Abstract**– Hospital-acquired infections (HAIs), also known as healthcare-associated infections, are infections that patients acquire while they are in the hospital. They are typically not present or might be incubating at the time of admission. HAIs usually manifest 48 hours after admission to the hospital. The National Healthcare Safety Network (NHSN) of the Center for Disease Control and Prevention (CDC) closely monitors HAIs to prevent them and improve patient safety. HAIs include central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), surgical site infections (SSI), and Hospital-acquired Pneumonia (HAP), Ventilator-associated Pneumonia (VAP), and *Clostridium difficile* infections (CDI). For the last few decades, hospitals have taken HAIs seriously. Several hospitals have established infection tracking and surveillance systems in place, along with robust prevention strategies to reduce the rate of HAIs. HAIs can have a significant impact on patients, both at an individual level and at the community level. They can lead to longer hospital stays, increased costs of care, and even death. HAIs can also be linked to the spread of multidrug-resistant infections. In recent years, the definitions of pneumonia have been changed to better identify patients at risk for multidrug-resistant (MDR) pathogens. This change was made to avoid the overuse of antibiotics. The term Healthcare-acquired Pneumonia (HCAP) has been made obsolete, and the term Hospital-acquired Pneumonia (HAP) has replaced it. HAP is defined as pneumonia that occurs 48 hours or more after admission to the hospital and did not appear to be incubating at the time of admission. Ventilator-associated pneumonia (VAP) is defined as pneumonia that develops more than 48 to 72 hours after endo-tracheal intubation. Both HAP and VAP are associated with poorer outcomes and significant morbidity and mortality worldwide.

## INTRODUCTION

Hospital-acquired infections (HAIs), also known as healthcare-associated infections (HCAIs), are infections that patients acquire while they are in the hospital. HAIs are typically not present or might be incubating at the time of admission. They usually manifest 48 hours after admission to the hospital (Boev C, 2017)

HAIs are a serious problem, and they can have a significant impact on patients, both at an individual level and at the community level (Anshu K.S, 2022). They can lead to longer hospital stays, increased costs of care, and even death. HAIs can also be linked to the spread of multidrug-resistant infections (Babcock HM, 2003).

There are a number of factors that can increase a patient's risk of developing an HAI, including:

1. Age
2. Underlying health conditions
3. The type of surgery or procedure the patient is having
4. The length of time the patient is in the hospital
5. The use of invasive medical devices, such as catheters and ventilators
6. The cleanliness of the hospital environment

### Types of Hospital acquired infection

There are many different types of hospital-acquired infections (HAIs), but some of the most common include:

1. Central line-associated bloodstream infections (CLABSI). CLABSIs are infections that occur when bacteria enter the bloodstream through a central line, which is a catheter that is inserted into a large vein (Bell T, 2017).

2. Catheter-associated urinary tract infections (CAUTI). CAUTIs are infections that occur when bacteria enter the urinary tract through a catheter, which is a tube that is inserted into the bladder.
3. Surgical site infections (SSI). SSIs are infections that occur at the site of a surgical incision.
4. Hospital-acquired pneumonia (HAP). HAP is pneumonia that occurs 48 hours or more after admission to the hospital (Cillóniz C, 2019).
5. Ventilator-associated pneumonia (VAP). VAP is pneumonia that develops more than 48 to 72 hours after endotracheal intubation, which is a procedure in which a tube is inserted into the trachea to help a patient breathe.
6. *Clostridium difficile* infections (CDI). CDI is an infection caused by the bacterium *Clostridium difficile*. CDI can occur in people who have been taking antibiotics, which can disrupt the balance of bacteria in the gut (C, López-Casasnovas G., 2020).

### Microbes that can leads the HAI

The microbes that can cause HAIs can vary depending on the type of infection. However, some of the most common microbes that cause HAIs include:

1. **Bacteria:** Bacteria are single-celled organisms that can cause a variety of infections, including pneumonia, bloodstream infections, and urinary tract infections. Some of the most common bacteria that cause HAIs include *Staphylococcus aureus*, *Escherichia coli*, and *Klebsiella pneumoniae*.
2. **Viruses:** Viruses are tiny infectious agents that can cause a variety of diseases, including respiratory infections, diarrhea, and meningitis. Some of the most common viruses that cause HAIs include the influenza virus, the respiratory syncytial virus, and the norovirus.
3. **Fungi:** Fungi are multicellular organisms that can cause a variety of infections, including candidiasis, aspergillosis, and cryptococcosis (Del Pozo JL, 2007). Some of the most common fungi that cause HAIs include *Candida albicans*, *Aspergillus fumigatus*, and *Cryptococcus neoformans*.
4. **Parasites:** Parasites are organisms that live in or on another organism and derive nutrients from it. Some of the most common parasites that cause HAIs include the protozoan *Cryptosporidium*, the helminth *Ascaris*

*lumbricoides*, and the bacterium *Legionella pneumophila* (Eze P, 2017).

It is important to note that the list of microbes that can cause HAIs is not exhaustive. There are many other microbes that can cause HAIs, depending on the patient's underlying health conditions and the type of surgery or procedure the patient is having.

### List of Hospital Acquired Infections

**Central line-associated bloodstream infections (CLABSI):** CLABSIs are infections that occur when bacteria enter the bloodstream through a central line, which is a catheter that is inserted into a large vein (Flores-Mireles A, 2019). Central lines are often used in hospitals to deliver fluids, medications, and blood products. CLABSIs can be serious and can lead to sepsis, organ failure, and death.

**Catheter-associated urinary tract infections (CAUTI):** CAUTIs are infections that occur when bacteria enter the urinary tract through a catheter, which is a tube that is inserted into the bladder. Catheters are often used in hospitals to drain urine from the bladder. CAUTIs can be serious and can lead to sepsis, kidney failure, and death (Habboush Y, 2023).

**Surgical site infections (SSI):** SSIs are infections that occur at the site of a surgical incision. SSIs can be superficial, deep, or organ/space infections. Superficial SSIs involve the skin and subcutaneous tissue (Hughes JM, 1988). Deep SSIs involves the deeper tissues, such as muscle and fascia. Organ/space SSIs involve an organ or space within the body, such as the liver or the abdomen. SSIs can be serious and can lead to sepsis, wound dehiscence, and death (Kalil A, 2016).

**Hospital-acquired pneumonia (HAP):** HAP is pneumonia that occurs 48 hours or more after admission to the hospital. HAP can be caused by a variety of bacteria, including *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Escherichia coli*. HAP can be serious and can lead to sepsis, respiratory failure, and death.

**Ventilator-associated pneumonia (VAP):** VAP is pneumonia that develops more than 48 to 72 hours after endotracheal intubation, which is a procedure in which a tube is inserted into the trachea to help a patient breathe (Stiller A. 2017). VAP can be caused by a variety of bacteria, including *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Pseudomonas aeruginosa* (Singh AK, 2022 and Young PY 2044) (

VAP can be serious and can lead to sepsis, respiratory failure, and death.

***Clostridium difficile* infections (CDI):** CDI is an infection caused by the bacterium *Clostridium difficile* (Sydnor ER, 2011). CDI can occur in people who have been taking antibiotics, which can disrupt the balance of bacteria in the gut. CDI can cause diarrhea, fever, and abdominal pain. In severe cases, CDI can lead to sepsis, organ failure, and death (Singh AK, 2022).

These are just a few of the many types of HAIs that can occur. The type of HAI that a patient develops depends on a number of factors, including the patient's underlying health conditions, the type of surgery or procedure the patient is having, and the length of time the patient is in the hospital.

### Prevention from Hospital Acquired Infection

HAIs can be serious and can lead to complications, such as sepsis, organ failure, and death. However, there are a number of things that can be done to prevent HAIs, including:

**Hand washing:** Hand washing is the single most important way to prevent the spread of infection. Healthcare workers should wash their hands thoroughly with soap and water before and after coming into contact with each patient (Metersky ML, 2017). They should also wash their hands after using the restroom, handling contaminated materials, and before eating.

**Using sterile techniques:** When inserting medical devices, such as catheters and central lines, healthcare workers should use sterile techniques to prevent the introduction of bacteria into the patient's bloodstream (Patel AR, 2019). This means using new, sterile equipment and following strict procedures (Magill SS, 2014).

**Cleaning and disinfecting the hospital environment:** The hospital environment should be cleaned and disinfected regularly to remove bacteria that could cause infection. This includes cleaning and disinfecting surfaces, equipment, and rooms.

**Using antibiotic stewardship:** Antibiotics should be used judiciously to prevent the development of antibiotic resistance. This means only using antibiotics when they are necessary and using the lowest effective dose for the shortest possible duration (Magiorakos AP, 2012).

**Educating patients and their families:** Patients and their families should be educated about the importance of infection control (Nickel JC, 1992).

This includes hand washing, covering coughs and sneezes, and disposing of waste properly.

**Monitoring HAI rates:** Hospitals should monitor their HAI rates to track their progress and identify areas where improvement is needed. This information can be used to develop and implement infection control interventions (Novosad, 2020).

By following these infection control measures, hospitals can help to keep their patients safe from HAIs.

Here are some additional tips for preventing HAIs:

1. Ask healthcare workers to wash their hands before touching you.
2. Inspect your IV sites and catheter insertion sites for signs of infection, such as redness, swelling, or drainage.
3. Report any concerns about your health to your healthcare provider.
4. Take all of your antibiotics as prescribed.

### CONCLUSION

Hospital-acquired infections (HAIs) are a serious problem that can have a significant impact on patients, both at an individual level and at the community level. HAIs can lead to longer hospital stays, increased costs of care, and even death. However, there are a number of things that can be done to prevent HAIs, including hand washing, using sterile techniques, cleaning and disinfecting the hospital environment, using antibiotic stewardship, and educating patients and their families. By following these infection control measures, hospitals can help to keep their patients safe from HAIs.

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### Conflict of Interest

None

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