Healthcare-Associated Infections (HAIs)

Why HAIs are a problem in healthcare and how we can work to prevent them



Why are HAIs Important?

Once a patient is admitted to the hospital, the main goal of the hospital staff is to provide rehabilitating care to treat and improve the condition they were admitted for, whether that be a stroke, a heart attack, a broken bone, or COVID-19. In the hospital, patients are prone to exposure to various HAIs (often depending on condition or treatment) that resist restorative care. HAIs cost facilities money, keep patients in hospitals for longer stays, and can even cause deaths. If a patient contracts a HAI, their upward momentum is stopped, as it becomes another challenge to recovery and another condition to recover from. Depending on the condition, HAIs can prolong healing and damage other sites. For example, infections of post-colon surgery sites can spread into deeper muscle and tissues, causing unwanted damage not related to their surgery. To take care of patients as best as they can, healthcare professionals need to take extra steps to reduce HAIs throughout their facilities in order to provide their patients with the most straightforward recovery possible.

Problem

Why the spread of HAIs is problematic

In 2023, one in 31 patients statewide was infected with at least one type of Healthcare-Associated infection. On average, 15-25% of hospitalized patients need catheters and 8% need central lines. HAIs increase mortality rates and account for tens of thousands of deaths each year. Surgical Site infections increase the length of hospital stays by 9.7 days and cost an additional \$20,000 on average.

Solution

How we can implement and strengthen safety measures to reduce reported cases

By taking extra precautions, we can decrease the number of reported HAI cases. Standard precautions and infection control protocols help keep case numbers low, however, implementing infection control policies specific to certain types of HAIs could further reduce these numbers.



Types of HAIs

Understanding the types of HAIs and how they're spread

Types of HAls

UNDERSTANDING HOW HAIS ARE CONTRACTED

LABORATORY-IDENTIFIED HAIS (LABID)

Pathogens spreading through the hospital via direct contact with skin or infected objects.

DEVICE-ASSOCIATED HAIS

Associated with various healthcare devices, including catheters, ventilators, and central lines



SURGICAL SITE INFECTIONS (SSIS)

Infections of operative sites (colon and uterus). Post-operative wound gets infected by bacteria and may spread to other tissues.

Laboratory-Identified Infections

METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

- Cause of MRSA: staph bacteria found on skin causes infection.
- MRSA can be spread through hand contact and touching dirty surfaces.

- to grow.
- diarrhea.



CLOSTRIDIODIDES DIFFICILE (CDI, C. DIFF)

• Cause of CDI: antibiotics destroy regular gut bacteria, allowing C. diff.

• CDI causes colon inflammation and

Device-Associated Infections

CATHETER-ASSOCIATED URINARY TRACT INFECTIONS (CAUTI)

- Cause of CAUTI: bacteria enters the urinary tract through an indwelling urinary catheter, causing infection.
- On average, 15-25% of hospital residents recieve catheter placement, making them susceptable to CAUTI.

CENTRAL LINE-ASSOCIATED **BLOODSTREAM INFECTIONS** (CLABSI)



• Cause of CLABSI: bateria enters the bloodstream through a central line (tube inserted into vein in neck, chest, arms, legs), causing infection

Surgical Site Infections

Colon Surgery SSI (SSI-COLO)

- Cause of SSI-COLO: area around operative site gets infected.
- More serious cases can spread deeper, infecting muscle, connective tissue, and the GI organs.



- the uterus.



Hysterectomy SSI (SSI-HYST)

• Cause of SSI-HYST: site of hysterectomy becomes infected post-operation.

• Hytesrectomy: surgical removal of

• More serious cases can spread to muscle and reproductive tract.



Preventative Measures

How healthcare workers can minimize the spread of HAIs

How HAIS are Recorded

UNDERSTANDING HOW HAIS ARE MEASURED

All hospitals in the state of Washington are required to report the following HAIS:

- MRSA
- CDI
- CLABSI
- CAUTI
- SSI-COLO
- SSI-HYST

Important Terms to Know • SIR: Standardized Infection Ratio (fraction): actual # of HAI cases divided by predicted #. \circ SIR >1: more observed infections than

- - predicted
 - - predicted amount
 - predicted

• SIR =1: observed infections are equal to

• SIR 1> less observed infections than

• 95% Confidence Interval (CI): a measure of reliability in probability. When repeated, 95% of the reported cases will fall within the predicted numbers

Changes in Case Numbers Over Time

According to this chart, most HAIs were under the National Healthcare Safety Network (NHSN) baseline of 1.00 SIR in 2023, with the exception of both surgical-site infections. Further, all device-associated and laboratory-identified infections showed a decrease in SIR from 2022-2023.



Healthcare-Associated Infection SIRs (2019-2023)



Data compares predicted and actual infection ratios

How Washington Healthcare Facilities Performed in Comparison to their Predicted Case Numbers

Infection Statistics: Device-Associated Infections

Based on 95% Confidence Level (Cl)



Data compares predicted and actual infection ratios

How Washington Healthcare Facilities Performed in Comparison to their Predicted Case Numbers



Infection Statistics: Surgical Site Infections

Based on 95% Confidence Level (Cl)



How Washington Healthcare Facilities Performed in Comparison to their Predicted Case Numbers

Equity

As displayed on the given maps, different people in Washington have different levels of access to healthcare and private transportation based on income. Many of the counties ranked lower for poverty have access to private transportation and can transport themselves to hospitals and pay for care. Those below the poverty line struggle with access to healthcare because of its costs and need for transportation. Rural citizens in the East coast are higher ranked for inaccesibility to private vehicles and poverty, making it difficult to receive healthcare when needed. Without access to healthcare, rural communities won't be as able to get treatments like hysterectomies or catheterization.

In order to make it easier for rural communities to access hospitals, hospitals could be built in strategic locations aiming to give rural people cheaper access to healthcare.

Additionally, more people and more healthcare facilities are in Western Washington than Eastern Washington, resulting in higher case numbers in the West. Western facilities should emphasize the importance of creating HAI prevention protocols to control case numbers.





*Dots represent healthcare facilities

Percent of Population Without Access to a Private Vehicle



Percent of Population Living in Poverty

Hand Hygiene

WASHING HANDS KILLS BACTERIA

Frequent hand washing helps to reduce the spread of HAIs by killing bacteria present on the hands with soap or alcohol-based hand sanitizer.

Standard Precautions

INCLUDING:

Use of PPE when handling bodily fluids, cleaning surfaces, not recapping sharps, and disposing of biowaste where it was used. Standard Precautions prevent and stop the spread of bacteria to reduce infection cases.

Existing Methods of HAI Prevention

How healthcare facilities are already working to prevent HAIs

> With exisiting methods of prevention, 70% of HAI cases are preventable

PROPOSING SOLUTIONS

In order to decrease case numbers for HAIs, they need to be met with specific solutions for each infection. C. Diff is spread in a different way from SSI-HYST, so it's important to consider how each one is acquired to control cases. Although general approaches like standard precautions are helpful for eradication, the issue also needs to be met with specific solutions. If implemented, my solutions (see next slide) could decrease reported HAI case numbers and potentially help create facilitiy-specific solutions and/or a new statewide approach to HAIs.

Proposing Solutions

- To reduce reported cases for MRSA, healthcare facilities could require regular hand washing for patients as well as staff. Washing hands before entering common areas, having visitors, and leaving your room disinfects them to prevent the spread of bacteria. MRSA is primarily spread by skinto-skin contact, so disinfecting skin before it's exposed to outside areas could help reduce case numbers.
- To decrease C. Diff cases, healthcare facilities could start including a skin-safe antiseptic in the solution used for bedbaths. Bedbaths are often done for patients who aren't able to get out of bed to take a real shower. Bedridden patients live around the same place they using the bathroom, making them more susceptible to C. Diff, as it's spread by contaminated fecal matter. Using antibacterials to disinfect the patient's body could help reduce MRSA as well.
- To reduce the number of reported CAUTI and CLABSI cases, healthcare facilities could require more intense sterilization procedures during device implantation. More frequent handwashing, stronger antiseptics, and sterilization when handling the site of device use could decrease the number of reported cases for both CAUTI and CLABSI.
- Healthcare providers can be sure to take care of the site of the device with caution. Using surgical aseptic care, including use of sterile gloves and equipment when handling devices could possibly reduce the risk for developing a HAI.

• To reduce SSI-COLO and SSI-HYST cases, healthcare facilities could place patients in rooms without roommates after colon surgeries and hysterectomies, as well as limit the amount of people entering the room for a given period of time. Less people in the room allows for less spread of bacteria, potentially leading to decreased cases.

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