



HEALTHCARE-ASSOCIATED INFECTIONS (HAIs)

Nosocomial infection



- **Hospital acquired infections (HAIs) is also called Nosocomial infection**
 - Defined as
- **The person may be a patient, members of the hospital staff and/ or visitors**
- **Iatrogenic infection**
- **Community-acquired infections**

Types of HAIs



- **Catheter-associated Urinary Tract Infection (CAUTI)**



- **Surgical Site Infection (SSI)**



- **Ventilator-associated Pneumonia (VAP)**



- **Central line-associated bloodstream infection (CLABSI)**

Baby was born prematurely



She was progressing in the neonatal intensive care unit until she developed a bloodstream infection related to her umbilical catheter

A mother is being treated for cancer

- **And now has to fight two diseases because she got Hepatitis C from an unsafe injection**

Morbidity and Mortality Weekly Report

Weekly

September 26, 2003 / Vol. 52 / No. 38

**Transmission of Hepatitis B and C Viruses in Outpatient Settings —
New York, Oklahoma, and Nebraska, 2000–2002**

A father has open heart surgery



**The surgery goes well
but he later dies in a
nursing home of a
MRSA wound infection
that developed after
surgery**

Healthcare epidemiology

The study of the occurrence, determinants, and distribution of health and disease within healthcare settings

- About **1 in 25** hospital patients has at least one HAI
- In 2011, an estimated **722,000** HAIs in U.S acute care hospitals
- About **75,000** hospital patients with HAIs died during their hospitalizations
- More than half of all HAIs occurred outside of the intensive care unit.

Contributing factors to HAIs

- Crowded conditions
- Hospitalized patients are often immunocompromised (age, illness, treatment)
- Increasing variety of medical procedures and invasive techniques creating potential routes of infection
- Increased variety of drug-resistant pathogens
- The failure of following infection control guidelines

Factors affecting HAIs



1. The microbial agent
2. Pathogen resistance
3. Transmission
4. Patient susceptibility
5. Environment

Pathogens Most Often Involved in HAIs

- **Gram-positive cocci:**

- *Staphylococcus aureus* (including methicillin-resistant *S. aureus* [MRSA])
- Coagulase-negative staphylococci
- *Enterococcus* spp. (including vancomycin-resistant enterococci [VRE])

- **Gram-negative bacilli:**

- *Escherichia coli*
- *Pseudomonas aeruginosa*
- *Enterobacter* spp.
- *Klebsiella* spp.

Pathogens Most Often Involved in HAIs

- **Viruses**

- Hepatitis B and C viruses
- Respiratory syncytial virus (RSV)
- Rotaviruses and enteroviruses
- Cytomegalovirus

- **Parasites**

- Cryptosporidium
- Sarcoptes scabies

- **Fungi**

- Candida albicans
- Aspergillus



Factors affecting HAIs

Pathogen resistance

- Overuse of antibiotics
- Antimicrobial agents are becoming less effective
- Normal flora that are sensitive to antibiotics are suppressed
- Expensive/ hard to obtain 2nd line drugs

Factors affecting HAIs

The background of the slide is a collage of three images. The top image shows an elderly patient lying in a hospital bed, surrounded by medical staff in scrubs and masks. The bottom-left image shows a close-up of a hand being examined or treated by a medical professional. The bottom-right image shows a hand with a white bandage wrapped around the index and middle fingers.

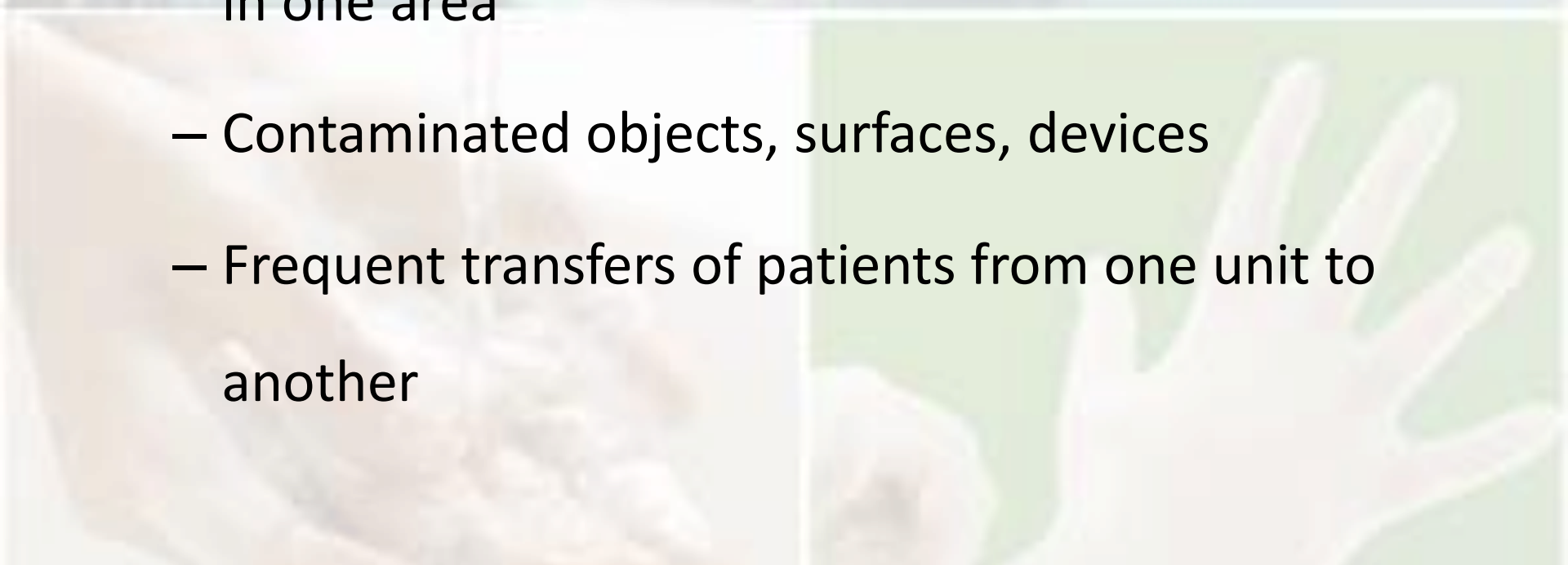
Patient susceptibility

- Age
- Malnutrition
- Injuries
- Immune status

Factors affecting HAIs



Environment

- Gathering highly susceptible patients to infections in one area
 - Contaminated objects, surfaces, devices
 - Frequent transfers of patients from one unit to another
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Reduction the Number of HAIs

- The primary way to reduce the number of HAIs is strict compliance with **infection control guidelines**

