

Understanding Nosocomial Infections

Understanding Nosocomial (Hospital/Acquired) Infections

Prepared as concise, study-ready notes

1. Definition & Scope

Term	Meaning
Nosocomial infection (NI)	An infection that develops ≥48h after hospital admission or within 30 days after discharge (or up to 1 year after an implant) and was not present or incubating at the time of admission .
Healthcare-Associated Infection (HAI)	Modern, broader term that includes infections acquired in any healthcare setting (hospital, long-term care, dialysis, outpatient clinics).
Incidence	~5–10% of hospitalized patients in high-income countries; higher in ICUs (10–20%).
Impact	↑ morbidity, mortality, length of stay, and healthcare costs (≈\$30–\$45 billion/yr in the U.S.).

2. Common Types of Nosocomial Infections

Infection	Typical Pathogens	Key Clinical Features
Urinary Tract Infection (UTI)	<i>E. coli</i> , <i>Klebsiella</i> , <i>Enterococcus</i> , <i>Pseudomonas</i>	Dysuria, flank pain, fever; often catheter-associated.
Surgical Site Infection (SSI)	<i>Staphylococcus aureus</i> (including MRSA), <i>Streptococcus</i> , <i>Enterobacteriaceae</i>	Redness, purulent drainage, wound dehiscence; can be superficial or deep.
Bloodstream Infection (BSI) / Central Line-Associated BSI (CLABSI)	<i>Coagulase-negative Staphylococci</i> , <i>S. aureus</i> , <i>Candida</i> , <i>Gram-negative rods</i>	Fever, chills, hypotension; source often intravascular catheters.
Pneumonia (Ventilator-Associated Pneumonia, VAP)	<i>Pseudomonas aeruginosa</i> , <i>Acinetobacter</i> , MRSA, <i>Enterobacteriaceae</i>	New infiltrate on CXR + fever, purulent sputum, worsening oxygenation.

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Clostridioides difficile infection (CDI)	<i>C. difficile</i> (toxin-producing strains)	Watery diarrhea, abdominal cramping; often after broad-spectrum antibiotics.
Other	<i>Mycobacterium tuberculosis</i> (nosocomial TB), fungal infections (e.g., <i>Candida</i> , <i>Aspergillus</i>)	Occur in immunocompromised hosts or after prolonged antimicrobial use.

3. Pathogenesis & Risk Factors

3.1. Mechanisms

1. **Endogenous flora** – patient's own microbes translocate (e.g., gut → bloodstream).
2. **Exogenous sources** – contaminated devices, hands of health-care workers, environment.
3. **Biofilm formation** – on catheters, prosthetic devices, endotracheal tubes → protects microbes from antibiotics and host defenses.

3.2. Patient-Related Risk Factors

Category	Examples
Age	Neonates, elderly
Comorbidities	Diabetes, chronic lung disease, renal failure
Immune status	Chemotherapy, steroids, HIV
Invasive devices	Urinary catheters, central lines, endotracheal tubes
Surgical procedures	Large incisions, prosthetic implants
Antibiotic exposure	Broad-spectrum