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Healthcare-associated infections in adult intensive care unit patients: Changes in epidemiology, diagnosis, prevention and contributions of new technologies.

Abstract

Patients in intensive care units (ICUs) are at high risk for healthcare-acquired infections (HAI) due to the high prevalence of invasive procedures and devices, induced immunosuppression, comorbidity, frailty and increased age. Over the past decade we have seen a successful reduction in the incidence of HAI related to invasive procedures and devices. However, the rate of ICU-acquired infections remains high. Within this context, the ongoing emergence of new pathogens, further complicates treatment and threatens patient outcomes. Additionally, the SARS-CoV-2 (COVID-19) pandemic highlighted the challenge that an emerging pathogen provides in adapting prevention measures regarding both the risk of exposure to caregivers and the need to maintain quality of care. ICU nurses hold a special place in the prevention and management of HAI as they are involved in basic hygienic care, steering and implementing quality improvement initiatives, correct microbiological sampling, and aspects antibiotic stewardship. The emergence of more sensitive microbiological techniques and our increased knowledge about interactions between critically ill patients and their microbiota are leading us to rethink how we define HAIs and best strategies to diagnose, treat and prevent these infections in the ICU. This multidisciplinary expert review, focused on the ICU setting, will summarise the recent epidemiology of ICU-HAI, discuss the place of modern microbiological techniques in their diagnosis, review operational and epidemiological definitions and redefine the place of several controversial preventive measures including antimicrobial-impregnated medical devices, chlorhexidine-impregnated washcloths, catheter dressings and chlorhexidine-based mouthwashes. Finally, general guidance is suggested that may reduce HAI incidence and especially outbreaks in ICUs.

1. ICU patients are described as high-risk primarily because of:

- A. limited access to medical care
- B. multiple clinical and demographic factors

2. What trend is described regarding infections related to invasive procedures?

- A. They have increased over the past decade
- B. They have been successfully reduced

3. What contrast is highlighted in the text?

- A. Infection rates have decreased in all ICU settings
- B. Some infection rates have decreased, but overall ICU infections remain high

4. Why do new pathogens represent a problem according to the text?

- A. They simplify diagnosis
- B. They complicate treatment and affect outcomes

5. What specific challenge did the COVID-19 pandemic highlight?

- A. The lack of ICU staff
- B. The difficulty of adapting prevention measures while maintaining care quality

6. According to the text, why are ICU nurses particularly important in HAI management?

- A. They are responsible only for administering antibiotics
- B. They are involved in multiple aspects of care and prevention

Language Focus – Cause & Effect

Watch the video <https://www.youtube.com/watch?v=TkYO-uprqQQ>

Cause and Effect Words in English

Cause → Effect

- She made one big mistake, **as a result**, she lost her job.
- Mary studied hard for the chemistry exam. **Therefore**, she got an A+.
- It rained heavily, **consequently** the football game was called off.
- It is too late **so that** we cannot go to cinema.
- He didn't complain to the police, **accordingly** the police took no action.

Effect → Cause

- She was very tired **as a result of** working late.
- My father hasn't slept in 4 days **due to** his illness.
- They cannot go to cinema **because** it is too late.
- My success was largely **due to** luck.
- They have had to postpone the meeting, **owing to** the strike.
- **Due to** the bad weather, the match was cancelled.

Think carefully and choose the correct option.

1. ICU patients are at risk **because / due to** they undergo invasive procedures.
2. The high infection rate is **due to / because** the use of medical devices.
3. The emergence of new pathogens **leads to / because** more complex treatments.
4. Poor infection control **results in / because** higher transmission rates.
5. Increased monitoring is necessary **because / due to** the risk of complications.
6. Antibiotic misuse **leads to / due to** resistance.
7. The patient developed a resistant infection; **therefore / because**, antibiotic therapy had to be adjusted.
8. The patient was immunocompromised. **As a result / Due to**, the infection progressed rapidly.
9. The central line increased the risk of infection; **for that reason / because**, strict monitoring was required.
10. The initial treatment was ineffective. **That's why / Due to** we decided to change the antibiotic regimen.

💡 What is a case briefing?

A case briefing is a short, structured summary of a patient's situation, usually presented by a physician to colleagues or trainees. It includes key information such as patient background, diagnosis, treatment given, clinical reasoning and next steps.

Case briefings are commonly used during clinical rounds or handovers and focus on explaining what is happening and why, often using cause-and-effect language.

🎧 Listen carefully to this ICU Case Briefing and choose the correct options.



1. The patient in bed 2 was admitted after **abdominal surgery / respiratory failure**.
2. Mechanical ventilation was required **because of / despite** postoperative complications.
3. The infection developed **due to / instead of** the use of invasive devices.
4. The condition resulted in **ventilator-associated pneumonia / a urinary tract infection**.
5. The infection progressed rapidly **because / although** the patient is immunocompromised.
6. The response to **broad-spectrum / specific** antibiotics was limited due to a resistant organism.
7. Additional testing **led to / prevented** a change in antibiotic therapy.
8. The patient is improving **as a result of / despite** treatment adjustments.