

# Understanding the Basic of Nosocomial Infections



Roy Nasnas MD-PhD  
Infectious diseases department  
Hotel Dieu de France

**Nosocomial infections** are contracted in a health facility such as a hospital or a clinic when they are developed more than 48 hours after admission. It is an inevitable risk that health facilities cannot reduce to zero. This fact is largely misunderstood by the general public allowing misinterpretations and prejudices against hospitals and clinics around their hygiene, medical practice, quality and other similar elements. In fact, the challenge of every hospital lies in its ability to maintain the occurrence of such infections at a very low rate. The international standards set this rate between 3 and 5%. In other terms, out of 100 hospitalized patients, 3 to 5 will inevitably be infected.

The nosocomial infection results from the presence of a germ (the environment naturally holds all sorts of virulent and saprophytic bacteria) and a diminished defense mechanism of a given patient making him more receptive to infections.

The main and most important clarification that should be brought to the attention of the general public concerning this subject revolves around the origins of these infections.

On one hand, the infection could come from the patient himself. To clarify, the patient carries his own germs and gets infected when subjected to certain health care procedures, such as surgery, urinary catheterization, artificial respiration and others. In such cases, it is called

self-infection or endogenous infection.

The exogenous infection on the other hand, is caused by germs that are not carried by the patient and have external origins such as the environment, the staff, the roommate patients, or even the visitors.

**What most people ignore** is that infections are mostly endogenous rather than exogenous.

## What are the Contributing Factors

- 1- Age: with age, the immune system responsible for the body's defense becomes less efficient.
- 2- The duration of stay in the hospital: the longer the duration of stay, the more the patient is exposed to exogenous germs.
- 3- Patient's state:
  - a- The intersection between a large surgical procedure and a chronic pathology which affects the patient such as visceral cancer, malignant homeopathies, diabetes, kidney failure, or autoimmune diseases for example, will alter his defense mechanisms.
  - b- Patients will become more vulnerable while undergoing special treatments such as immuno suppressant or immunomodulatory, anti-neoplastic, chemotherapy, radiotherapy, and new biological modulators.
  - c- Finally, the long term use of antibiotic cure of broad spectrum will destroy endogenous protective bacterial flora and enable the implantation of multi-resistant hospital germs.
- 4- Specific care units where infection risk is high, such as in Oncology Departments, Intensive Care Units (the frequency of infection is proportional to the number of beds), and General Surgery with expertise in big and long surgeries.
- We mustn't forget the significant number of patients who declared getting infected after being transferred to a primary care hospital or a university center from where they were incubated (meaning they got infected elsewhere).



- 5- For Oncology, Intensive Care and heavy surgery patients, the risk is high with the insertion-sites for central venous catheters, arterial catheters, urinary catheters, tracheal intubation, surgical drains, etc.
- 6- Hygiene mistakes.
- 7- Lack of medical and paramedical staff training.
- 8- Underestimation of the infection risks.
- 9- Excessive work load.

## What are the Preventive Measures

Several measures can be applied and are divided into two categories of factors. Factors that can be controlled and ones that are less likely to be controlled.

### The Controllable Factors

- 1- The strict application of hygiene measures, especially hand washing with an alcoholic solution before and after applying patient care.
- 2- The correct use of antibiotics, both in the choice of molecules and in the treatment duration in order to avoid multi-resistant bacteria. For example, a study by the staphylococcus reference center at the Pasteur Institute showed an isolated rate of MRSA (Methicillin-resistant Staphylococcus) in hospitals reaching 35%, one of the highest in Europe.
- 3- Gathering all the infected patients with the same germ in the same unit (cohorting) to avoid cross-infection.
- 4- The meticulous care of insertion-sites for urinary

catheters, arterial catheters or venous catheters, like strict hygiene measures upon their insertion and maintenance, and their removal as quick as possible when the patient's state allows it.

- 5- The regular auditing and surveillance of the application of different procedures in the matter.

### Less Controllable Factors

- 1-Age: if the risk increases with age, elderly people must be accorded additional attention.
- 2- Sex: women are more frequently infected.
- 3- Duration of stay at the hospital: try to shorten the stay as much as possible, and continue the treatment at home or in mid-stay centers as soon as the patient's clinical condition allows it.

- 4- Patient's state: additional precautions must be taken when it comes to diabetics, chemotherapy, radiotherapy, or immunosuppressant patients.

To conclude, when a hospital follows stern hygiene measures, more often than not, nosocomial infections will result from external factors. And even with a strict hygiene protocol, there is no escaping even a low chance of infection seeing that anyone walking into the hospital can and will spread bacteria. However, it remains of the hospital's responsibilities to control the rate of infection and keep it within the international standards rate and to help inform the public about these infections and about the best ways to prevent them.