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Surgical infections: reducing air contamination is possible

Romano Alberto Basso defines the specifications of controlled-contamination ventilation systems for operating rooms. "It is fundamental that air comes in, performs its task and comes out with the utmost ventilation efficiency"

Hospital infections in Europe amount to over two millions and a half every year. This is what emerges from an epidemiological survey published on Plos medicine according to the analysis of the European Centre for Disease Prevention and Control data by the researchers of the German Robert Koch Institute, of the Dutch National Institute for Public Health and the Environment and of the ECDC. About 20% of them is attributable to the so-called Surgical Site Infections (SSI), which cause a prolongation of the post-operative hospital stay of approximately 7/11 days and an increase in the risk of patient mortality of up to 11 times.

These significant figures heavily affect health conditions. However, reducing nosocomial infections is not impossible. Guidelines suggest particular care to hygiene, the definition and compliance with adequate behavioural procedures and the supervision of airborne contamination, especially in operating theatres. The Milan-based SagiCofim Spa has been dealing with this matter for several years and is specialised in air quality ecoefficiency, as its Export Manager Romano Alberto Basso explains.

What does controlled-contamination environment mean?

"In order to understand what this means and how to obtain it, it is necessary to understand how pathogens can reach and penetrate inside incisions and therefore infect the patient. Contaminants, being them inert or biologically active, may reach the operating theatre by three main ways: from the ventilation system, from access doors and mostly generated, carried and released by the surgical team members. Once inside the operating room, they may come in contact with the surgical wound both directly and indirectly, by depositing on the surgical instruments.

Therefore, the ventilation system has a primary role in the contamination level control inside any critical environment."

How can ventilation systems be used to reduce contamination risks in operating theatres?

"It is fundamental that air comes into the environment, performs its task and comes out with the utmost ventilation efficiency in order to ensure the highest protection level to patients. For this reason, an operating theatre should be divided into three spaces, each of them with its own characteristics and specifications: the first, the most critical one, is where the operating table, the surgical instrument cart and, above all, the patient are placed; the second space is normally destined to the surgical staff and hosts the major sources of contamination; the third one, bordering the most external area, is destined to the transit of the surgical staff."

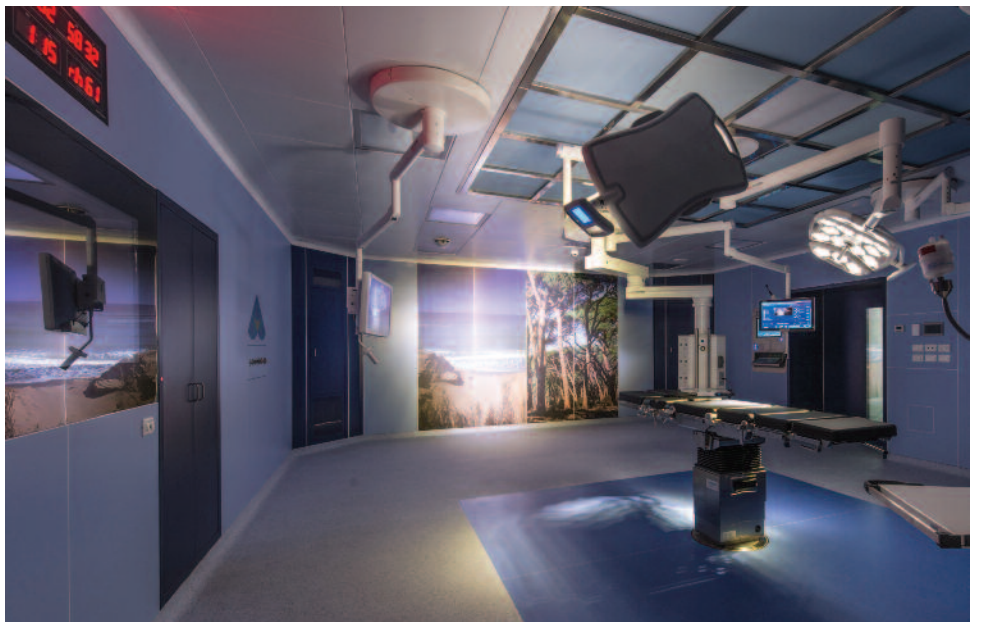
Currently, what are the best possible solutions?

"On the market there are solutions which have been purposely designed to maximise the ventilation system performance by introducing clean air at three different speeds.

In particular, SagiCofim's class ISO 5 DIF-OT ceiling filter systems with different speeds for highly critical operating theatres (Cardiac Surgery, Orthopaedic Surgery, Hybrid Operating Rooms, Prosthetic Surgery, Vascular Surgery, Ophthalmic Surgery and Neurosurgery) are the result of a 30-year know how that the enterprise has developed in air filtration and diffusion techniques in surgical facilities. Once filtered to avoid the introduction of external pollutants, air is directly blown over the patient at a suitable speed to reach and protect the wound; in combination with the other two lower speeds, it keeps contaminants away from the operating table, directing them towards the perimeter of the room to be expelled.

Besides the proper design and construction of the system, the validation of the latter and of the operating theatre as controlled-contamination environment is of fundamental importance, as well as constant monitoring and maintenance activities."

■ **Alessia Cotroneo**



Engineer Romano Alberto Basso, export Manager at SagiCofim Spa. The enterprise is based in Cernusco Sul Naviglio (Milan) **www.sagicofim.com**

PROTECTION

The patient has to be kept away from any type of pollutant as fast as possible and in the most efficient way by means of different-speed ventilation systems

Too many different regulations

Although airborne contamination in operating theatres is a common risk for any world hospital, there are no international standard regulations that define aeration system characteristics in surgical rooms.

"Strangely, the reference regulations of each country have sometimes very different planning parameters – explains Romano Alberto Basso, Export Manager at SagiCofim Spa -. The best choice is to design each operating theatre as a true "clean room" to be validated in "operational" conditions and build different-speed systems while keeping in mind that regulations only define minimum requirements without limiting improvement possibilities. Every effort aimed at progress can lead to important results in terms of greater patient protection."