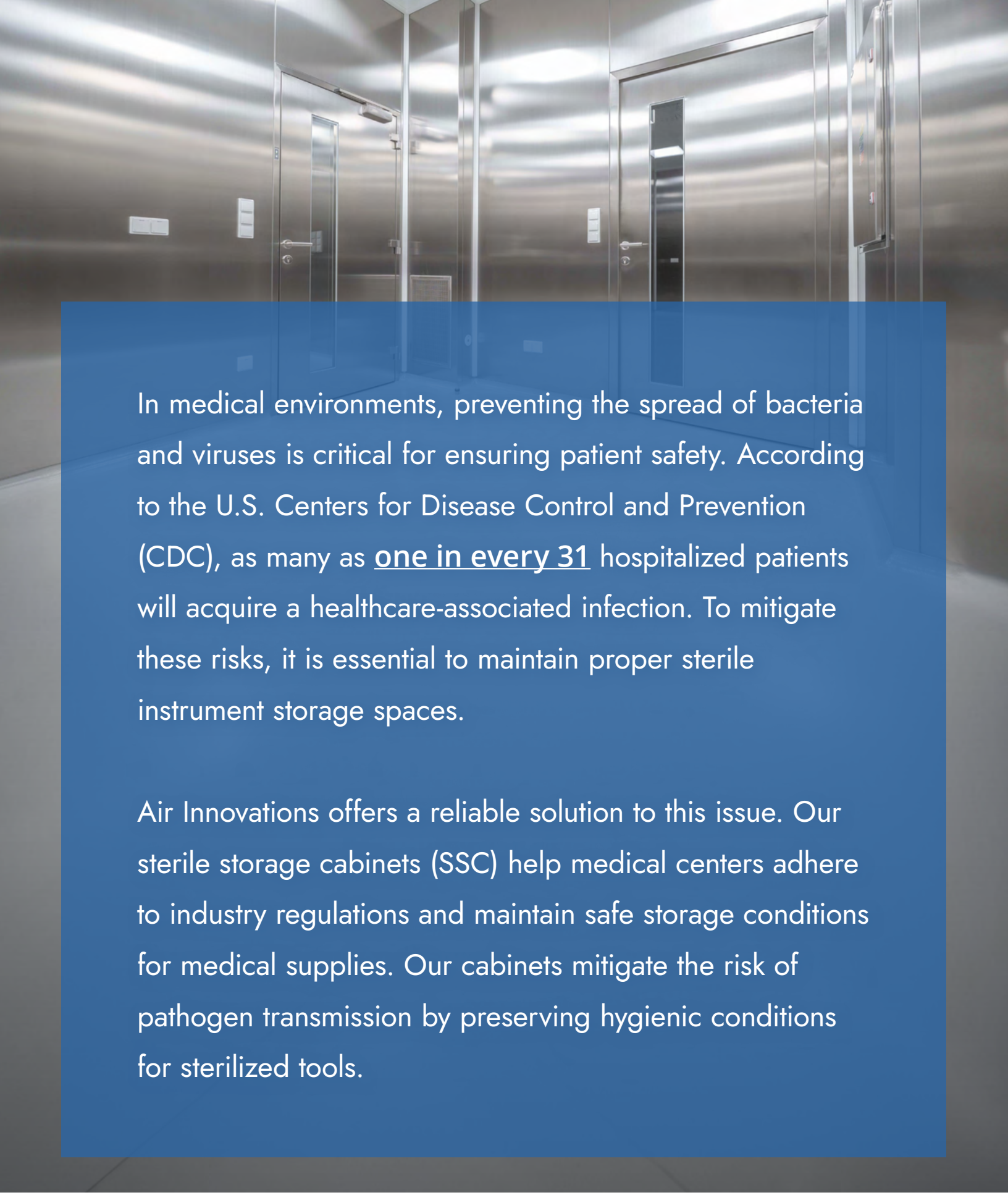
THE BENEFITS OF STERILE STORAGE CABINETS

AiR INNOVATIONS®



In medical environments, preventing the spread of bacteria and viruses is critical for ensuring patient safety. According to the U.S. Centers for Disease Control and Prevention (CDC), as many as **one in every 31** hospitalized patients will acquire a healthcare-associated infection. To mitigate these risks, it is essential to maintain proper sterile instrument storage spaces.

Air Innovations offers a reliable solution to this issue. Our sterile storage cabinets (SSC) help medical centers adhere to industry regulations and maintain safe storage conditions for medical supplies. Our cabinets mitigate the risk of pathogen transmission by preserving hygienic conditions for sterilized tools.

CONTAMINATION RISKS IN HOSPITALS

When it comes to avoiding contamination, hospitals face many challenges. Cleanrooms and sterilized packaging alone do not provide a complete method of maintaining sanitary conditions for medical and surgical instruments. Here is an overview of the major contamination risks in hospitals.

INADEQUACY OF STERILIZED PACKAGING

Any medical tool that will come into direct contact with a patient requires more than sterilization alone to ensure cleanliness and safety. **After any sterilization procedure, medical instruments still require post-sterilization protection from contamination.** Hermetically sealed packages, also referred to as sterile packs or peel packs, are the instruments' first and sometimes only layer of protection. This means that even a microscopic tear can quickly result in bacterial or viral contamination. Rough handling or the weight of the instruments when stacked on top of each other can easily form tears in sterile packs and go unnoticed.

TEMPERATURE & HUMIDITY

For facilities without a cleanroom, it's common for sterilized tools to be kept in typical storage rooms, closets, and cabinets. Yet, these spaces offer limited temperature, humidity, and room pressure control. Even though instruments are initially sterilized before being placed in a sterilization pouch or peel pack, warm temperatures can break down packaging seals and compromise the storage material. Additionally, microorganism and fungi growth accelerates without temperature and humidity control in place.

Moisture buildup is another concern, as it creates a breeding ground for microorganisms and can quickly degrade fibrous materials.

RISKS ASSOCIATED WITH HOSPITAL-ACQUIRED INFECTIONS

Hospital-acquired infections (HAIs) are a major problem facing today's medical industry. The CDC reports that **over 1 million HAIs occur annually**, costing the U.S. healthcare system billions of dollars and resulting in tens of thousands of patient deaths.

Many infected patients go on to file insurance claims against their hospital for negligent care, and insurance companies are frequently unwilling to pay for costs associated with hospital-acquired infections. To avoid these challenges and to provide patients with the best possible care, minimizing the risk of instrument contamination is critical.

CLEANROOM CONSTRUCTION CHALLENGES

While some hospitals choose to construct cleanrooms for storage of their sterile instruments, undertaking this project comes with several challenges. Cleanrooms are subject to International Organization for Standardization (ISO) requirements and must be meticulously maintained to meet these standards.

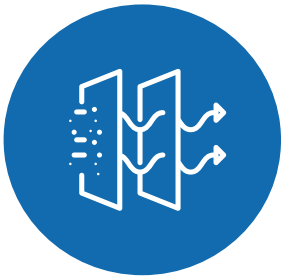
In addition, the cost of constructing a cleanroom is high. For an ISO 7 to ISO 8 cleanroom, construction costs range from $250 to $1,500 per square foot, primarily due to the significant amount of stainless steel required for corrosion resistance and easy cleaning. Funding these projects can be challenging, especially for smaller medical centers.

Despite all the planning and capital that goes into cleanroom construction, they are still not 100% immune to contamination. If the cleanroom experiences failure due to an unexpected power loss, all the hospital's surgical tools can be compromised at once. Then, the instruments being stored will need to undergo a lengthy resterilization process or they will constitute an infection risk.

HOW STERILE STORAGE CABINETS RESOLVE CONTAMINATION & TRANSPORTATION CHALLENGES

Sterile storage cabinets overcome the challenges associated with other instrument storage methods. They are not only more affordable than building a cleanroom, but they provide more efficient temperature, humidity, and air pressure controls in a self-contained unit that can be easily relocated.

AIR CIRCULATION

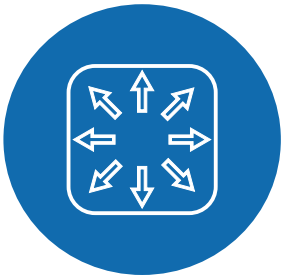


Sterile storage cabinets from Air Innovations capture airborne particles by filtering all the air inside the payload section once every 15 seconds through a 99.97% efficient HEPA filter. An optional UV-C light can be installed above the HEPA filter to neutralize any bacteria or viruses captured on the filter as well. Viruses travel through the air attached to larger particles. Those particles are easily captured by the HEPA filter and when the optimal UV light is installed, the captured viruses have plenty of exposure time to the UV light to be neutralized.

TEMPERATURE & HUMIDITY CONTROL

Our cabinets feature steam humidification using just demineralized water. As the water turns into steam, any present viruses or bacteria are killed. This environmental control system ensures temperature and humidity conditions are kept at optimal levels below 72°F (22°C) and 60% relative humidity.

POSITIVE PRESSURE



Air pressure is another important variable to control in sterile spaces. When neutral or negative pressure is present inside a storage area, outside particles are sucked in and can easily contaminate the space. However, when positive pressure is present, as with sterile storage cabinets, air presses outward like a balloon against the cabinet's walls. This prevents particles surrounding the cabinet from getting inside through any cracks.

SECURE DECENTRALIZED STORAGE OF CONTENTS

Having surgical instruments nearby is vitally important for reducing contamination risks. According to the Canadian Journal of Surgery, nearly 25% of observed surgeries experienced a contamination error.

Our sterile cabinets offer a secure, decentralized solution for instrument storage. With lockable caster wheels, the cabinets can be positioned in any location for as long as necessary and then moved when needs change. Once it is plugged into a power source, the cabinet returns to cleanroom conditions in less than five minutes. This allows sterilized instruments to be nearby for any type of procedure and virtually eliminates delays caused by location. A lockable door ensures access only to permitted employees, despite proximity to the point of use.

THE BENEFITS OF STERILE STORAGE CABINETS OVER CENTRAL CLEANROOMS

A sterile storage cabinet (SSC) offers all the benefits and main functions of a cleanroom in a more compact, efficient, modular, and movable form. While people and other items can easily introduce outside contaminant particles when entering a cleanroom, there is no particle generation in an SSC after the cabinet doors are shut. SSCs exceed ISO 4 cleanliness conditions while being significantly more affordable and quicker to deploy than building a cleanroom of the same caliber.

Additionally, the SSC's compact size and affordable price point allow healthcare centers to easily install multiple cabinets to provide more widespread access to sterilized tools. The cabinets' power consumption is low enough for them to be plugged into hospital red-plate outlets. Since these outlets are connected to emergency generators, **if a power outage occurs in a facility, the items stored in the cabinets will remain safe and sterile**. Comparatively, if the power goes out in a cleanroom, any instruments stored are no longer sterile and are fully at risk of contamination. SSCs allow vital surgeries and other life-saving procedures to continue even in emergency situations.

In addition to being expensive to build, cleanrooms must also change the air enough times per hour to be effective. A low number of air changes means dangerous particles are not being removed efficiently. Most cleanrooms have only 30 to 50 changes per hour, depending on their ISO class. Increasing the number of air changes within cleanrooms is costly due to their size. **Sterile storage cabinets, on the other hand, can perform over 250 air changes per hour due to their small size. This is six times more than a standard cleanroom.**

STERILE STORAGE CABINETS FROM AIR INNOVATIONS

Sterile storage cabinets from Air Innovations offer all the capabilities required to keep medical tools sterile and protected. They offer over 200 air changes per hour and keep internal temperatures stable between 66-72°F (19-22°C). Adjustable stainless-steel shelves are capable of withstanding even the most heavy-duty hospital-grade cleaners for maximum cleanliness without material degradation. Other features include the following:

- Locking wheels
- HEPA filtration
- Positive pressure control
- 10 ft. medical grade power cord
- Humidifier control between 20-60% RH
- Visual control panel
- Lockable door
- Optional transmitters for remote monitoring
- Optional UV-C light for additional protection
- Optional ceiling heat exhaust

Our sterile storage cabinets adhere to the following industry standards:

- ANSI/AAMI ST79-2006
- ANSI/ASHRAE/ASHE 170-2017
- CSA Z314.15-10
- UL 60601-1
- VHA Directive 1116(2)

HOSPITAL STERILIZATION SOLUTIONS FROM AIR INNOVATIONS

Keeping medical tools sterilized is important for protecting patients as well as maintaining compliance with The Joint Commission's guidelines. When kept in an uncontrolled storage closet, sterile packs offer limited protection against viruses and bacteria. At the same time, cleanrooms are often inconveniently located and expensive to build and maintain, with very long construction schedules.

At Air Innovations, our sterile storage cabinets provide a cost-effective solution to all these challenges. Our **SSC 4500 series sterile storage cabinet** provides exceptional convenience and performance for healthcare post-sterilization applications. To learn more, **contact us** with any questions.

ABOUT AIR INNOVATIONS

Have you ever needed a solution you couldn't just buy off a shelf in a store or easily order online? We can relate. If the custom solution you need involves environmental control – temperature or humidity control, filtration, or pressurization – we can help you achieve your goals.

Air Innovations is a world leader in designing and building environmental process control systems for applications that can't be addressed with standard HVAC equipment. We customize packaged solutions for temperature, humidity, filtration, pressurization, and with direct-expansion, chilledwater, or thermoelectric capabilities. If you want to learn more about our environmental control capabilities visit **Our Environmental Control Capabilities.**

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