

Easy to clean equipment is ally in hospitals' surface contamination battle

Philips Sparq ultrasound system is designed for easy cleaning featuring a sealed touch interface

Hospital-acquired infections (HAIs) are a hidden danger in hospitals

According to a study cited by the WHO (World Health Organization) in their practical guide, "Prevention of hospital-acquired infections," over 1.4 million people worldwide suffer from HAI at any given time.¹ WHO estimates that of every 100 hospitalized patients, 7 in developed and 10 in developing countries will acquire at least one healthcare-associated infection during their hospital stay.² In England, more than 300,000 hospitalized patients acquire an HAI every year.³ In the United States, the Centers for Disease Control (CDC) estimates that each year, one out of every 20 hospitalized patients in the US will contract an HAI.⁴

Concern continues to grow – along with antibiotic-resistant "superbugs"

As hospitals evolve and establish procedures to reduce contamination, bacteria also continue to evolve. In the United States, the CDC recently issued a call to action regarding carbapenem-resistant enterobacteriaceae (CRE). Not only has this bacteria become resistant to carbapenem antibiotics, but it can transfer that resistance to other bacteria within the enterobacteriaceae family. CREs are deadly, killing up to half of the patients who develop CRE bloodstream infections. They are just one example of the increasing threat posed by antibiotic-resistant "superbugs."⁶



Typical hospital contamination levels

- **75%** of patient rooms are contaminated with methicillin-resistant staphylococcus aureus (MRSA)
- **69%** of patients are contaminated with vancomycin-resistant enterococcus (VRE)
- **42%** of hospital personnel who touched contaminated surfaces became contaminated themselves, even in the absence of patient contact.⁵

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The economic burden of HAIs

- A CDC-sponsored study estimates that the annual cost of HSAs in American hospitals is between 35.7 billion and 45 billion dollars.⁷
- The annual cost of HAIs in Europe is estimated to be between 13 and 24 billion euros.⁸
- The British Parliament estimates that HAIs cost the British healthcare system 1 billion pounds a year.⁹
- Hospital-acquired infections cost Australia around \$1 billion a year.¹⁰

Hands-on transmission from contaminated surfaces

Scientific evidence indicates that contamination of surfaces in hospital rooms plays an important role in the transmission of methicillin-resistant staphylococcus aureus (MRSA) and vancomycin-resistant enterococcus (VRE). Recent evidence also strongly suggests that contaminated surfaces are involved in the spread of the emerging healthcare-associated pathogens norovirus, C difficile, and MDR-Acinetobacter. According to a 2010 study that focused on the role of hospital surfaces in the transmission of emerging healthcare-associated pathogens, an estimated 20-40% of HAIs can be attributed to cross infection via the hands of healthcare personnel who have been contaminated either by touching infected patients or contaminated surfaces. Hand and surface contamination create a dangerous loop.

This study found the following relationship between hand and environmental contamination:

- 0% hand contamination when environmental contamination was 0 to 25%
- 8% hand contamination when environmental contamination was 26 to 50%
- 36% hand contamination when environmental contamination was greater than 50%¹¹

One often-overlooked factor in the transmission of HAIs is equipment that is used at the patient's bedside (also referred to as point-of-care equipment), as is the case in emergency medicine, critical care, and regional anesthesia. According to Associate Professor Andrew Hilton, Senior Intensivist and Supervisor of Intensive Care Training at the Austin Hospital Intensive Care Unit

in Melbourne, "A pencil, a pen, devices such as the ultrasound machine, and the radiologist going from bed-to-bed. All of these are potential sources to spread HAIs to patients."

Equipment that is wheeled from room-to-room can be an ideal vehicle for pathogens. A study published in the British Journal of Infection Control sampled five ultrasound machines over a period of three months. Three machines were used for non-invasive procedures and two for invasive procedures. Samples were taken from the transducer, transducer holder, keyboard, and gel. 64% of samples were contaminated with environmental organisms, 7.7% of the contaminated samples contained pathogens, and 27.8% of samples showed no growth.¹² The most significant contamination was on the non-invasive equipment, likely due to a lower level of decontamination. While thorough cleaning and decontamination remains the first line of defense against HAIs, it is likely that in the future the danger of contamination will be factored into the design of point-of-care equipment to make it easier to clean and less likely to be contaminated in the first place.

Thoroughly cleaning ultrasound equipment can be challenging, especially in the pressured ICU environment. As Associate Professor Hilton explains, "I've spent a lot of time over the years cleaning big machines with all the crevices and cables. It's a real pain to clean. So is the keyboard and the screen. Anything can splash on the screen. Leads, transducers, cables, etc. have to be cleaned and wiped down between patients. You may have other patients waiting. Everyone is well-meaning and understands the importance of cleaning, but the pressure gets in the way. People are busy."



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Sparq: A mobile ultrasound system designed for point-of-care environments

As the adoption of ultrasound in point-of-care practice continues to grow, so does the need for equipment that meets the hygiene requirements of the hospital, today and in the future. Philips Sparq point-of-care ultrasound system was designed with those requirements in mind.

1. Sparq's sealed, tempered glass control panel was designed to facilitate easy cleaning and protect the electronics from being damaged. The standard raised button interface has been replaced with an easy-to-clean, flat-surfaced control panel.
2. The Lock Feature allows for easy and efficient cleaning of the system between patients without requiring the system to be powered down. The user can easily return to the same settings and resume the study after cleaning the system.
3. The storage area is designed for easy cleaning, with no deep crevices.
4. Sparq features multiple transducer connectors and a fast switch so no manual switching between transducers is required.
5. Sparq provides an option to display ECG and respiratory signals from an external patient monitor on the Sparq monitor. This reduces the need to connect separate, ultrasound-specific ECG leads onto the patient, thus reducing the equipment that comes in contact with the patient.

Sparq point-of-care ultrasound systems are currently in use at hospitals around the world. According to Dr. Phil Hopkins, Consultant and Hon. Senior Lecturer in Intensive Care Medicine, Anesthesia and Trauma at Kings Health Partners (Kings College Hospital) in London, Sparq is proving to be as effective as it is efficient. "The Sparq system provides a robust, high quality ultrasound platform that lends itself to imaging in the critical care setting. The combination of advantageous ergonomics, simplicity of use, screen quality and high image resolution have provided an invaluable tool for assessing complex ICU patients in a busy and challenging setting."

The Austin Hospital, where Associate Professor Hilton works, also has a Sparq mobile ultrasound system, and its design features are consistent with the hospital's goals of infection control. As he explains, "The major thing is the touch interface.



Prevalence of HAIs in developed countries¹³

Canada 11.6%	Greece 9.3%	Scotland 9.5%
Cyprus 7.9%	Italy 8.3%	Switzerland 10.1%
Finland 9.1%	Korea 3.7%	UK and Ireland 7.6%
France 6.7%	Norway 5.1%	USA 4.5%

"I can turn on the machine and type patient details on the keyboard and set it up the way I want prior to seeing the patient. Then I push the keyboard out of the way before I go into the patient bay. Everything else, particularly the touch interface that I use in the patient bay in place of the keyboard, is easily cleaned."

It is likely that in the near future it will become increasingly important for hospitals to consider the ultrasound system design in supporting the hospital's mission to reduce the risk of HAIs. This makes the easy-to-clean Sparq point-of-care ultrasound system a wise and forward-thinking investment.

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