



KEY POINT SUMMARY

OBJECTIVES

To assess whether computer-simulated visibility and global traffic flow scores influence how frequently hand sanitizing stations are used.

The influence of spatial configuration on the frequency of use of hand sanitizing stations in health care environments

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Key Concepts/Context

Healthcare-associated infections (HAIs) affect over 1.7 million people each year, and subsequently cost the U.S. economy approximately \$8.2 billion each year. Hand hygiene compliance (HHC), which involves washing hands thoroughly with alcohol-based rubs or soap and water, is widely regarded as a major prevention measure against the transmission of pathogens that cause HAIs. Even small increases in HHC have been found to reduce HAI rates in healthcare facilities. Hand sanitizing stations (HSSs) are spaces outfitted with hand hygiene resources for hospital staff and, in some cases, visitors. There is no general consensus on where HSSs should be located, since each facility has different designs and staff workflows. Since poorly located HSSs can result in reduced HHC, the authors of this study propose the development of an automated approach to choosing optimal HSS placement through the use of quantitative data.

Methods

The researchers developed computer-simulated layouts of three units (medical-palliative care, neonatology, and cardiac intensive care units) within a community hospital. Over the course of two weeks, instances of HSS usage in each of the units (71 HSSs total – evenly divided between the units less one in the medical-palliative care unit) were recorded via electronic devices. Behavioral observations were then conducted at 77 different HSSs for 20 hours each. Space syntax was used to assign “visibility scores” to each HSS and other room features, which were used to calculate “global traffic flow” throughout the studied areas.



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Findings

The results supported the authors' hypothesis that higher visibility scores were related to increased HSS use, while lower visibility scores were correlated with less HSS use. Similarly, higher global traffic floor scores were related to increased HSS use. This indicates that using space syntax analysis, visibility scores, and global traffic flow scores may help designers accurately predict which areas may receive increased foot traffic and subsequently allocate resources such as HSSs within the ideal areas.

Limitations

The authors note the following limitations in this study. Other variables that may influence HSS use beyond spatial configurations alone, such as unpredictable environmental, social, and psychological decisions and factors, were not considered. Facility policies, protocols, and educational regimens regarding hand hygiene were not considered. The two weeks during which all data were gathered may not accurately reflect HSS use over longer periods of time.

Design Implications

Strategically locating hand sanitization stations so that they might be more frequently used may result in higher rates of proper hand hygiene compliance by both hospital staff and visitors alike. Designers could benefit from the use of the spatial mapping and traffic flow measurement techniques employed in this study when trying to accurately identify the ideal locations for hand sanitization stations.

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