Implications of Design on Infection Prevention and Control Practice in a Novel Hospital Unit: The Medical Ward of the 21\textsuperscript{st} Century

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Key Concepts/ Context

The design of a hospital has an important role to play in the prevention and control of infections in hospitals, as does healthcare worker compliance with preventive measures of infection control. Evidence has shown that single-patient rooms are more effective in the control of infection than multi-patient rooms. This study examined the relationship between the design of a hospital unit and the practice of infection control. The study concluded that the physical environment of the new unit was more favorable for the practice of infection prevention and control.

Methods

This was an ethnographic study involving interviews and observations of physicians, nurses, and other healthcare workers. A total of 22 observations and 16 interviews were conducted across day, evening, and night shifts in the old and new units. The two types of units had the same patient type, and the hospital staff being observed and interviewed had similar patient loads. The older unit(s) housed a ward with multiple beds and shared bathrooms, while the newer unit had single-patient rooms with dedicated bathrooms. Sinks and hand-sanitizer dispensers were abundantly located in the new unit, near the patient rooms and were immovable as compared to the older unit(s). This study was conducted in 2007. Data gathered were coded and themes and subthemes were analyzed using an ethnographic software, QSR’s NUD\textasciitilde IST Vivo 7.
**SYNOPSIS**

**Findings**

Data from the study indicated that there were three broad physical design themes complementing the practice of infection prevention and control in the new unit. The themes were:

- **Visual cues** – workers opined that when they saw sinks and hand-sanitizing dispensers at the point of providing care (as in the new unit), they were more inclined to practice hand hygiene than when they were not visible (as in the old unit, where hand-sanitizers and other infection control materials were placed on movable trolleys, which often got moved from their intended location).
- **‘Having a place’** – the staff found it easier to take precautions if spaces were designated for specific purposes. The three spaces that the staff referred to specifically were:
  - A wing dedicated entirely for isolation of patients with airborne infections
  - Designated storage areas (including storage for gloves, masks, and gowns inside the patient room)
  - Recessed doorways to patient rooms creating space for easier movement
- **Sharing/not sharing** – there were two design aspects that the hospital staff opined under this theme:
  - Private rooms with attached bathrooms prevented the spread of infections.
  - Patient rooms having dedicated equipment (which deterred the carrying of equipment from one room to another and hence preventing the potential transmission of infection)

Other findings that the authors presented:

- Infection prevention was easier when cognitively impaired patients were put in private rooms.
- The small spaces in the old unit resulted in unintentional contact with potentially contaminated surfaces and equipment.
- The small spaces in the old unit also were not suitable for the new gurneys that were large for the doorways and often required rearrangement of furniture and equipment to transfer patients from hospital beds to gurneys and vice versa, which aggravated the potential for touching contaminated surfaces.
- Healthcare workers tended to overlook infection control measures in the interest of time.
- Hand-hygiene measures were overlooked more in the old unit than in the new unit for both nurses and physicians.

**DESIGN IMPLICATIONS**

Hand-hygiene equipment should be located at/near point of care.

Hand-hygiene materials should be permanent fixtures so that they cannot be inadvertently moved from their required location.

Patient rooms should have adequate storage for infection control materials, like gowns, gloves, and masks.

Units should have an isolation room for patients with airborne infections.
Limitations

The authors identify that the small sample size in the study was a limitation.

Other limitations: One pertains to the lack of clarity on the description of the comparison units. While the study compared one (new) unit with several old units, the number of old units is not specified; it also did not specify if all older units had the same layout and the same design features. Further, the old unit(s) are not adequately described in terms of bed size and bathrooms per ward.