SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

This paper describes the design, planning, and construction processes that were involved in the completion of a U.S.-based BCU that was created in response to the EVD crisis.

DESIGN IMPLICATIONS

Multidisciplinary teams including designers, engineers, and healthcare professionals could collaborate during planning and design stages to help ensure that the physical design of particular healthcare spaces like BCUs safely and functionally incorporates the best practices in infection control and biocontainment.

The creation of a biocontainment unit at a tertiary care hospital

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Key Concepts/Context

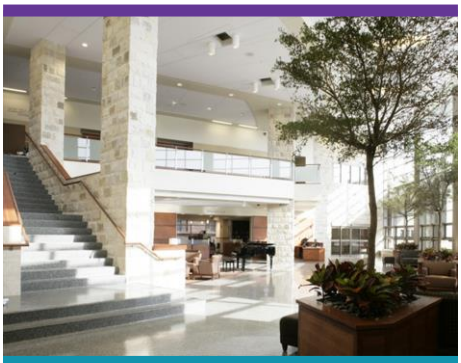
Prior to the 2014 Ebola virus disease (EVD) outbreak in West Africa, the United States had only one to three specialized biocontainment units. Once the EVD crisis began, a group of reputable American healthcare institutions worked together to renovate a deactivated clinical space into a functioning biocontainment unit (BCU).

Methods

Experts in hospital epidemiology, pulmonary and critical care, hospital design, clinical engineering, infectious disease, nursing, and education were assembled to act as a leadership team for the project. An advisory council from the health system in which the BCU would be created was also assembled to ensure the inclusion of key stakeholders. The team visited two other U.S.-based BCUs and attended a seminar in order to gather structural design plans and knowledge concerning EVD. Given the urgency of the outbreak, a fast-track model was used for the project, resulting in close collaboration with a single design contractor. A 7,000-square-foot deactivated clinical unit was chosen as the location due to its distance from other units. Design and construction lasted a total of seven months and cost approximately $5 million ($3.64 million for construction and renovation, $895,000 for capital equipment, $226,000 for staff training, and $226,000 for leadership team salary support).

Findings

The end result of the project was a state-of-the-art BCU that utilized features from the previously observed BCUs while also incorporating unique features. Features in common with the previously existing BCUs included secure entry and exit points, an onsite laboratory, an advanced air-handling system for droplet and airborne transmission, a team of highly trained clinicians and nurses, critical care capabilities



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in all rooms, portable ultrasound and radiology onsite, pass-through autoclaves for waste, and telecommunication capabilities. Features unique to the present BCU included dedicated doffing and donning rooms for all patient care areas, a unidirectional flow of staff through patient care areas, enough physical space to accommodate various obstetrics procedures as well as onsite sterile procedures, and a main patient care room with two ICU headwalls for family care.

Limitations

This description of a BCU planning, design, and construction process is intended to offer guidance for teams embarking on similar projects in the future. Its guidance may therefore be limited to very rare situations that would require large amounts of funding and coordination to achieve.

The Knowledge Repository is provided with the funding support of:

AIA Academy of Architecture for Health of the American Institute of Architects

ASHE American Society for Healthcare Engineering, A personal membership group of the American Hospital Association

AAHF Academy of Architecture for Health Foundation

FGI

Additional key point summaries provided by:

NIHD Nursing Institute for Healthcare Design — LEADERSHIP · EDUCATION · ADVOCACY

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