

Exploring spatial planning and functional program impact on microbial diversity and distribution in two South African hospital microbiomes

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Abstract:

This paper presents a theoretical and experimental research approach on the impact of spatial planning and functional program on the microbial load, distribution and organism diversity in hospital environments. The investigation aims to identify design markers and define potential risk environments in design and planning of buildings to facilitate appropriate design and administrative interventions. The investigation studies two hospitals in the Western Cape (WC) South Africa (SA), born from the same design brief but with varied typologies and building systems. The study period considers two seasons, and will start in 2015 with four sampling days per season. A three tier experimental methodology is followed: 1) microbial sampling using air samplers, fluorescent particle counter (FPC), and settling plates. Analysis will be done by total count and molecular deoxyribonucleic acid (DNA) techniques, polymerase chain reaction (PCR) and pyrosequencing 2) observational analysis, using space syntactical methods; and 3) static environmental monitoring using data loggers and weather stations. Ethical approval is under way and the initial results are planned for publication in late 2015. The study anticipates conclusive baseline data towards developing a framework for an architectural design microbial risk model (ADMRRM) for hospitals.