

Modelling the Complexities of Built Environment and Health: A Bayesian Network Approach with Expert Knowledge

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The built environment and health literature has rapidly grown over the last two decades resulting in a well-established evidence base on what built environment features can help support better health outcomes and behaviours. However, multiple environmental features interact in complex ways, and the relative salience of each feature and the nature of their interactions with health and wellbeing are likely to be different from one locality to another. We propose a modelling framework that incorporates Bayesian Networks (BNs) with expert (planning and design professionals) knowledge to model and visualise this complexity and for local framing. We piloted this approach using data on 4,056 adults from a study in Adelaide Australia. We modelled glycosylated haemoglobin as a function of various individual and contextual factors. These contextual factors included geographic access measures to various built environment features. Contextual factors were combined with expert information to generate various indices. These indices were included in a BN predicting glycosylated haemoglobin in addition to being individually mapped for expert consultation. The final model was developed after incorporating extensive expert feedback. Following completion of the pilot phase, the final phase is to adapt and apply the model to a new study area with consideration of local policy, public health, and clinical practices.

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