

# **Modelling the urban neighbourhood food retail environment for policy analysis and intervention: online knowledge elicitation with population health experts.**

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**Extended Abstract:** Inequalities in exposure to an unhealthy food environment has been implicated in the generation and maintenance of inequalities in diet-related diseases such as obesity. Increasingly, poor diet and diet-related disease has been characterised as an emergent property of a complex system and, as such, the drivers of poor diet may be better understood by using a complex system perspective. However, as the generation of empirical evidence on the system drivers of poor diet is challenging, approaches such as systems modelling have been proposed to better characterise and understand these complex, dynamic processes.

In this study, we present a participatory modelling approach with population health experts. System dynamics (SD) was used to identify, understand, and visualise the mechanisms that produce the neighbourhood food retail environment and influence individuals' eating behaviour in a conceptual model. Group Model Building (GMB), undertaken online with stakeholders (n=11), was used to funnel existing knowledge and evidence on urban food environments. Using Vennix & Gubbels (1992, 1991) theoretical framework, the GMB was developed in an online environment and consisted of three stages: (i) development of a preliminary conceptual model, (ii) the knowledge elicitation process, and (iii) conceptual and policy elicitation.

The Group Model Building process generated a comprehensive causal loop diagram of the retail environment inclusive of the drivers that influence the decision to purchase meals that are high in fat, salt, sugar, and calories (HFSS food). Figure 1 shows the system map built from the knowledge elicitation process. From the preliminary conceptual model to the final conceptual model, nineteen variables were added through the knowledge elicitation process and several others were amended.

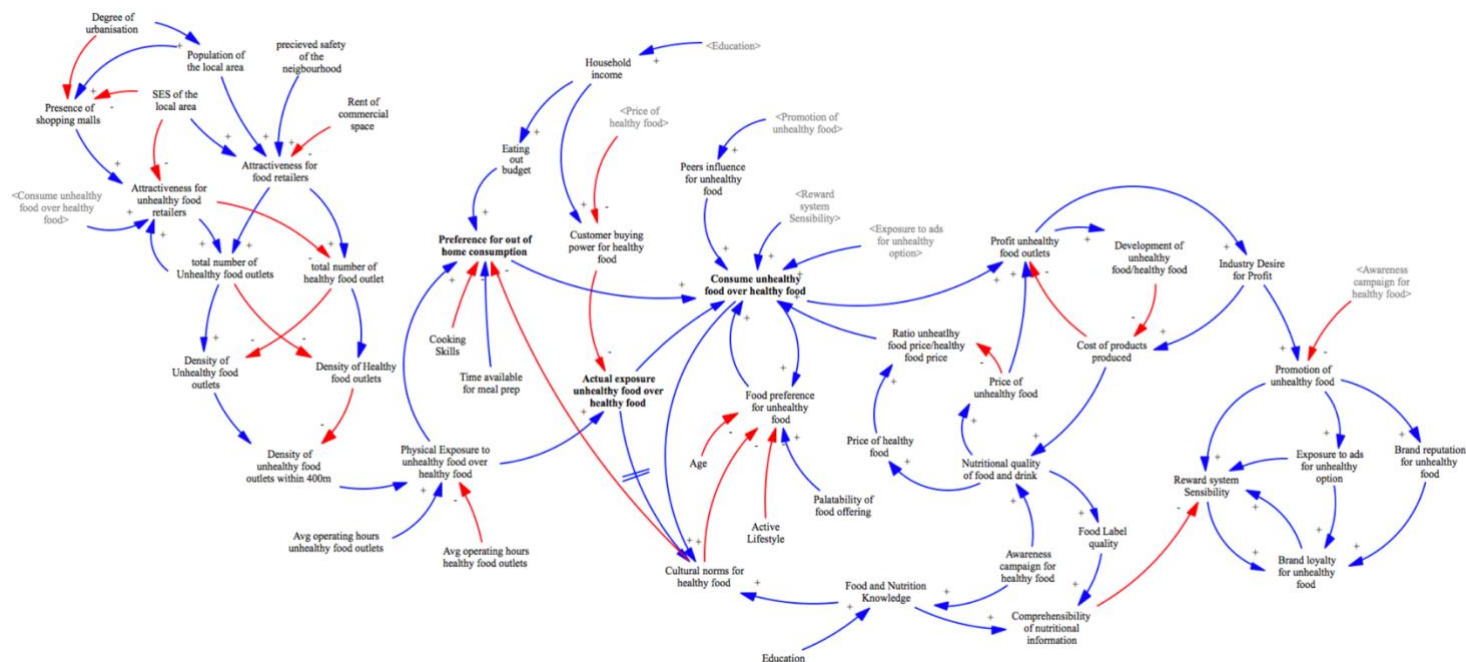


Figure 1 – Final model developed through the knowledge elicitation process

The conceptual model illustrates the complexity of risk factors and determinants responsible for inequalities in healthy eating in the neighbourhood food environment. The map allows the characterisation of the relationship between what we purchase and consume and the environmental context that drives our consumption choices. We considered how exposure to health-damaging environmental risks may drive dietary decisions. According to practitioners (n=5) and academics (n=6) working with food systems, exposure to an unhealthy food retail environment is positively linked with HFSS meals consumption in the neighbourhood.

Using participatory systems-science approaches with public health experts, we describe an innovative adaptation of the participatory process to a virtual environment, to help understand the neighbourhood food system. The process, finalised with a conceptual CLD of the urban food environment, will serve as a starting point for building a spatial agent-based model, where policies are going to be tested. By describing the followed process and by sharing our experience and insights in applying system approaches in the field of public health we hope to advocate more for its usefulness and encourage public health experts to benefit from the methodology.

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