Application number/Title: 36623 - Health economics of obesity

Applicant PI: Dr Seamus Kent

Applicant institution: Oxford University

Collaborator: Dr Carlos Wong, University of Hong Kong

Keywords provided by the Applicant PI to describe the research project: costs, health, modelling, obesity, policy

Application Lay Summary:

Clinical trials are used to reliably estimate weight loss from weight management treatments. Decisions about whether to provide such treatments on the NHS require decision models to estimate the long-term health impacts and value for money (i.e. cost-effectiveness) of such treatments. These models have limitations. First, their predictive accuracy has not been well tested. Second, the models are not typically appropriate for evaluating treatments targeted at people with long-term conditions. Third, evidence on the costs of obesity-related conditions is limited. Better and well-tested models would allow for better and more transparent decision-making, which could ultimately improve population health.

This project consists of three phases, with a total duration of three years.

Phase 1 (2018-2019, duration 2 years)
We will use UK Biobank data to estimate the relationship of measures of body size and fat with the use and costs of hospital admissions, primary care consultations, prescription medications, and diagnostic and monitoring tests, overall and for different health conditions. We will explore how this relationship differs by gender, age, ethnicity, deprivation, and health-related behaviours like smoking and physical activity. Such information is useful to healthcare policy makers, planners, and commissioners.

Phase 2 (2019, duration 1 year)
The PRIMEtime model is a widely used chronic disease policy model that estimates the long-term effectiveness and cost-effectiveness of weight
management treatments. It predicts the occurrence of weight-related conditions like type-2 diabetes, heart disease, stroke, and several cancers, as well as mortality and healthcare costs over time in the UK population. These predictions, and potentially those from other models, will be compared to data from the UK Biobank to assess their accuracy and usefulness.

Phase 3 (2019 onwards, duration 2 years)

Based on the results of the first two phases we will first update and extend the PRIMEdem model. This could include updating evidence on disease occurrence and mortality or costs, or adding additional weight-related health conditions like osteoarthritis. This work will also inform the value of developing a new model based on Biobank data which would allow estimation of cost-effectiveness in different populations including those with long-term conditions like type-2 diabetes, in line with the research priorities of the NHS.

Chronic disease models simulate the long-term health and cost implications of changes in weight. Although widely used to inform healthcare decisions, they have not been appropriately validated, and there is limited evidence on many inputs including healthcare costs. This study proposes to use UK Biobank data to:

(1) Conduct exploratory descriptive analyses of anthropometric and impedance measures at recruitment and in early life, and healthcare utilisation and costs during study follow-up.

(2) Estimate the relationship between anthropometric and impedance measures and healthcare utilisation and costs. Estimates will be derived for different healthcare services including hospital admissions, primary care consultations, and prescription medications, overall and for specific health conditions, and in different populations.

(3) Compare predictions of disease incidence, mortality, and healthcare costs from the PRIMEdem and potentially other leading disease models to corresponding estimates derived from UK Biobank over 10 years, in order to understand the predictive validity of the models.

(4) Use these results to update and extend the PRIMEtime model, and develop a new modelling framework based on individual-participant data, allowing for a more in depth exploration of patient heterogeneity, and the evaluation of weight management interventions targeted at individuals with chronic diseases like type-2 diabetes.

(5) Estimate the excess healthcare costs associated with bariatric surgery