# Potential changes in cardiovascular and gastric cancer disease burdens under different salt policies in England: an IMPACTNCD microsimulation study

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# Abstract

## Background

Dietary salt intake generates a substantial burden of cardiovascular disease (CVD) and gastric cancer. Since 2003, the United Kingdom has implemented a series of policies to reduce dietary salt by 15%. The aim of this study was to estimate the overall disease impact and equity of existing and potential national salt reduction policies on CVD and gastric cancer in England.

## Methods

We used a validated discrete-time, dynamic, stochastic, microsimulation model (IMPACT**NCD**) to explore the life courses of a close-to-reality synthetic population under counterfactual salt policy scenarios. The Health Survey for England and the Sodium Survey series data, with findings from high quality meta-analyses primed the model.

We estimated current and future cardiovascular and gastric cancer disease incidence and mortality stratified by Index of Multiple Deprivation quintile groups. In the first period, 2003-2015, we compared the impact of the current policy against a counterfactual ‘no intervention’ scenario, which assumed salt consumption persisted at 2003 levels. For 2015–2025, we assumed additional legislative policies could achieve a steeper decline in salt consumption. We compared this against the counterfactual scenario that the downward trend in salt consumption, observed between 2001 and 2011, would continue to 2025.

We incorporated probabilistic sensitivity analysis in our estimates, summarised as medians and interquartile ranges (IQR) of the model output distributions (IMPACT**NCD** implements a second order Monte Carlo design that propagated the estimated uncertainty of model inputs to the outputs).

## Results

Since 2003, current salt policies have prevented or postponed approximately 59,000 (IQR: 42,000 to 78,000) CVD cases and 11,000 (IQR: -3,000 to 24,000) CVD deaths. In addition, the current policies have prevented around 9,000 (IQR: 4,000 to 13,000) new cases of gastric cancer resulting in 4,000 (IQR: 1,000 to 7,000) fewer deaths. This policy had no impact on socioeconomic inequalities in CVD but increased inequalities in gastric cancer.

Additional legislative policies from 2015 could further prevent or postpone approximately 18,000 (IQR: 3,000 to 33,000) CVD cases and 3,000 (IQR: -6,000 to 12,000) deaths by 2025, while reducing inequalities. Similarly for gastric cancer 3,000 (IQR: -1,000 to 7,000) cases and 1,000 (IQR: -1,000 to 4,000) deaths could be prevented or postponed with neutral impact on inequalities.

## Conclusions

Current salt reduction policies are powerfully effective in reducing the cardiovascular and gastric cancer disease burdens overall but fail to reduce the inequalities involved. However, additional structural policies could achieve further reduction in disease incidence and more equitable health benefits.