

# Quantifying the impact of the Public Health Responsibility Deal on salt intake, cardiovascular disease and gastric cancer burdens: interrupted time series and microsimulation study

**Authors: Anthony A Lavery, PhD; Christ Kypridemos; Paraskevi Seferidi; Eszter Vamos; Jonathan Pearson-Stuttard; Brendan Collins; Simon Capewell; Modi Mwatsama; Paul Cairney; Kate Fleming; Martin O'Flaherty; Christopher Millett.**

Corresponding Author: Dr. Anthony A Lavery, PhD

Public Health Policy Evaluation Unit, Imperial College, London.

## **Abstract:**

### **Background**

Public-Private Partnerships (PPPs) are increasingly promoted as a key mechanism to improve population health, including addressing dietary risk factors for non-communicable disease. In 2011, England introduced the Public Health Responsibility Deal (RD), a PPP which gave greater freedom to the food industry to set and monitor targets for sodium intakes, and replaced an internationally recognised scheme involving more independent scrutiny. We estimated the impact of the RD on trends in population level sodium intake and associated changes in cardiovascular disease (CVD) and gastric cancer (GCa) incidence and mortality and their economic costs in England from 2011-2025.

### **Methods**

We used interrupted time series models with 24-hour urine sample data to assess trends in sodium intake both before and after the implementation of the RD. We used the IMPACTNCD microsimulation model to estimate impacts of these changes in sodium consumption on CVD and Gastric Cancer incidence, mortality and economic impacts, as well as equity impacts. We modelled a baseline scenario of sodium intake continuing as it had pre-RD and compared observed intakes with this.

### **Results**

Between 2003 and 2010 mean sodium intake was falling annually by 0.20 grams/day among men and 0.12g/d among women (p value for trend both <0.001). After RD implementation in 2011, annual declines in sodium intake slowed statistically significantly to 0.11g/d among men and 0.07g/d among women (p values for differences in trend both p <0.001).

We estimated that the RD has been responsible for approximately 9,900 (Interquartile Quartile Range: 6,700 to 13,000) additional cases of CVD and 1,500 (IQR: 510 to 2,300) additional cases of GCa between 2011 and 2018. If the RD continues unchanged between 2019 and 2025, approximately 26,000 (IQR: 20,000 to 31,000) additional cases of CVD and 3,800 (IQR: 2,200 to 5,300) cases of GCa may occur. The economic costs of the RD have been approximately £160 million (IQR: £88 to £230 million) to date, and approximately £970 million (IQR: £760 to £1,200 million) if the RD is continued unchanged until 2025.

### **Conclusions**

These findings suggest that declines in sodium intake slowed after implementation of the RD in England and this likely generated excess CVD and cancer burdens, plus additional healthcare, and societal costs.

Public private partnerships such as the RD which lack robust and independent target setting, monitoring and enforcement are unlikely to produce optimal health gains.