

inequality over this period and four measures of individual health: Objectively measured grip strength and lung function, and subjectively reported physical limitation and depressive symptoms.

**Results** We found that, after adjusting for individual and country-level covariates, exposure to higher average levels of inequality over the long-term was significantly negatively related to objectively measured grip strength and lung function, but unrelated to self-reported physical limitations or depressive symptoms.

**Conclusion** Our results show that long-term exposure to income inequality may indeed be detrimental to the physical health of older people. However, we found no evidence of an effect of inequality on subjectively reported limitations or depressive symptoms. This may be an effect of unmeasured covariates, or it may be due to the greater accuracy afforded by the objective health measures. To our knowledge this study represents the first direct evidence linking experience of inequality to the health of older people which has made use of either objective measures of health at the individual level, or a measure of inequality exposure over the long term.

## Public Health Interventions: Smoking

### OP53 DEFINING THE LONG-TERM TREND IN A PUBLIC HEALTH INTERVENTION STUDY: A CAUTIONARY TALE

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**Background** Numerous studies have reported on the impact of comprehensive smoke-free laws on population health. Many early studies have ignored the potential effect of the long-term trend of the health outcome, and when included, subsequent studies have focused on either linear or non-linear trends. However, the choice of appropriate trend is not always straightforward. We illustrate this by investigating the short-term impact of smoke-free legislation in England, introduced on 1st July 2007, on myocardial infarction mortality.

**Methods** We investigate the impact of the legislation using weekly counts of all cases aged 18 years or older residing in England with a primary cause of death of a myocardial infarction (ICD-10 I21) between July 2002 to December 2010 (providing 5 years pre-legislative and 3 years and 6 months post-legislative data). We compare a number of models based on an interrupted time series design with a quasi-Poisson generalised additive model that adjusts for seasonality and long-term trends.

**Results** Myocardial infarction mortality shows a marked decline over the study period. We identify two competing models. The first shows evidence of a complex interaction between the introduction of smoke-free legislation and the long-term trend. We observe an initial statistically significant reduction in mortality (−8.5%, 95% CI −11.1% to −5.8%) coupled with a change in the long-term trend from a reduction of 4% over a six month period to a reduction of 3.5%. The second model fits a nonlinear trend and shows no significant smoke-free effect. Both models offer an almost identical fit.

**Conclusion** Investigating small effects in the presence of a pronounced long-term trend is complicated by the limitations of the available data. In particular, it is not clear whether we observe a gradual change in the long term trend or a discrete effect directly attributable to the legislation. The two models have near-identical fitted values and GCV scores, but have very different interpretation. We conclude that the data alone are insufficient to distinguish between the two models and warn that overly-simplistic analyses in such situations may result in misleading conclusions.

### OP54 SHORT-TERM IMPACT OF THE SMOKEFREE LEGISLATION IN ENGLAND ON HOSPITAL ADMISSIONS FOR ASTHMA AMONG ADULTS

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**Background** Comprehensive smokefree laws prohibiting smoking in enclosed public places and workplaces have now been introduced in several jurisdictions and there is a growing body of evidence documenting the immediate health benefits to adults, focusing primarily on hospital admissions for heart attacks. A few studies have examined the association between smokefree laws and asthma in adults, but these have limitations such as lacking appropriate adjustment for long-term trends, or having limited statistical power due to a small study population. In this study we investigated the short-term impact of the introduction of smokefree legislation in England on 1st July 2007 on hospital admissions for asthma in adults.

**Methods** The immediate effect of the legislation was investigated using monthly numbers of emergency admissions for asthma (primary diagnosis, ICD-10 code J45 and J46) in the nine Government Office Regions from April 1997 to December 2010, in the population aged 16 and over. The analysis was conducted using a quasi-Poisson generalised additive model that adjusted for seasonality and region-specific, non-linear, long-term trends.

**Results** After adjusting for the long-term trend in admissions, we observed a 4.9% (95% CI: 0.6, 9.0) reduction in admissions for asthma immediately after introduction of smokefree legislation in the population as a whole. This implies that almost 1900 emergency admissions for asthma were prevented during the first year of the legislation. The reduction in admissions did not vary significantly across regions.

**Conclusion** Our finding, based on the largest study to date, adds to the expanding body of evidence that smokefree legislation is associated with positive health outcomes. Further research evaluating the impact of legislation on asthma admissions in other jurisdictions is needed in order to support these findings.

### OP55 SOCIOECONOMIC INEQUALITIES IN CHILDHOOD EXPOSURE TO SECONDHAND SMOKE BEFORE AND AFTER SMOKE-FREE LEGISLATION IN THREE UK COUNTRIES

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**Background** Secondhand smoke (SHS) exposure is higher among children from lower socioeconomic status (SES) families, contributing to the intergenerational reproduction of health inequalities. Legislation prohibiting smoking in enclosed public places was introduced in all UK countries between 2006 and 2007. Although opponents argued that it would displace smoking into the home, legislation has been associated with reduced childhood SHS exposure and increased prevalence of smoke-free homes. In some UK countries however, trends towards widening inequality in childhood SHS exposure have been reported following legislation. This paper combines datasets from 3 UK countries to examine socioeconomic patterning in childhood SHS exposure and smoking restrictions in homes and cars pre- and post-legislation.

**Methods** We conducted a repeat cross-sectional survey of 10,867 schoolchildren in 304 primary schools in Scotland, Wales and Northern Ireland. Children provided saliva for cotinine assay, completing questionnaires before and 12-months after legislation, including the Family Affluence Scale (a measure of socioeconomic status), and reports of smoking restrictions in homes and cars. Multinomial regression analyses assessed differences between survey years in SHS exposure and private smoking restrictions, with interaction terms to assess SES patterning in changes.

**Results** SHS exposure was highest, and private smoking restrictions least frequent, among lower SES children pre- and