the association is explained by smoking, chronic bronchitis or allergy as these conditions commonly occur in asthma individuals. The aim of this prospective cohort study was therefore to explore the association between asthma, levels of asthma control and lung cancer incidence, taking into account the commonly occurring conditions.

Methods We followed 63,103 adults who participated in the second survey of the HUNT Study in Norway from 1995–97 to 2017. None of the participants had known cancer at the time of inclusion. Ever asthma (9.0%), doctor-diagnosed asthma (5.5%) and doctor-diagnosed active asthma (3.7%) were defined based on self-reported information at baseline. Among individuals with doctor-diagnosed active asthma, levels of asthma control were categorized into well controlled and poorly controlled. Incident lung cancer cases were ascertained from the Cancer Registry of Norway. Cox regression models were used to estimate adjusted hazard ratios (HRs) with 95% confidence intervals (CIs) for incident lung cancer in relation to asthma status.

Results In total, 1,013 participants developed lung cancer during a median follow-up of 21.1 years. After adjustment for smoking (classified into detailed categories based on information of smoking status and pack-years), chronic bronchitis, allergy and other confounders, increased overall incidence of lung cancer was associated with ever asthma (HR 1.32, 95% CI 1.09–1.61), doctor-diagnosed asthma (HR 1.32, 95% CI 1.04–1.67) and doctor-diagnosed active asthma (HR 1.40, 95% CI 1.08–1.82). Individuals with ever asthma only and without current smoking, chronic bronchitis or allergy appeared to have an increased incidence of lung cancer compared with those with no ever asthma and no such common condition. Poorly controlled doctor-diagnosed active asthma was associated with an increased incidence of lung cancer (HR 1.57, 95% CI 1.14–2.16), whereas no clear association between well-controlled doctor-diagnosed active asthma and lung cancer was observed (HR 1.16, 95% CI 0.65–2.06).

Conclusion Our study suggested that asthma, in particular poorly controlled asthma, was associated with an increased lung cancer incidence. Smoking, chronic bronchitis and allergy did not seem to explain the association.

OP04 TIME-TRENDS IN INCIDENCE OF GASTRIC CANCER BY SITE AND HISTOTYPE IN THE COMMUNITY IN ITALY

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Background The incidence of gastric cancer is decreasing worldwide, but little is known about how the incidence of different types of gastric adenocarcinoma (GAC), such as non-cardia and cardia subsites, or intestinal and diffuse histotypes, have been changing over time. This study explores the incidence of GAC stratified by anatomic site and histotype in the community in Italy.

Methods A multicentre, retrospective, observational study was performed to identify all cases of GAC diagnosed in the community of Bologna and province over a twelve year period from 2001 to 2012. All histological reports of new cases of GAC diagnosed in the study period in the four hospitals of Bologna and province were identified. First histological diagnoses only were included, based on endoscopic biopsies or surgical specimens. Patients resident outside of the region were excluded. The anatomic site (non-cardia or cardia) and the histotype (intestinal or diffuse) were identified. Directly age-standardised incidence rates per year per 100,000 adults were calculated for males and females using the European standard population.

Results A total of 2,895 cases of GAC were identified. The majority were non-cardia (2,510; 87%), and were either intestinal (1,409; 49%) or diffuse (972; 34%) histotypes. More cases were seen in males (1,673; 58%) than in females (1,222; 42%). For all GAC, incidence rates decreased from 2001 to 2012 in both males [from 50.0 (95% CI 42.6–57.3) to 28.8 (95% CI 23.5–34.0)] and females [from 24.3 (95% CI 19.9–28.7) to 16.6 (95% CI 13.1–20.1)]. A similar pattern was seen for non-cardia GAC, but not for cardia GAC, whose incidence rates remained stable over time. Incidence rates of intestinal type GAC decreased substantially in males [from 26.8 (95% CI 21.4–32.2) to 16.2 (95% CI 12.3–20.1)] and, to a lesser extent, in females [from 9.1 (95% CI 6.5–11.8) to 5.2 (95% CI 3.3–7.1)]. Incidence rates of diffuse type GAC also decreased in males [from 14.8 (95% CI 10.7–18.8) to 6.9 (95% CI 4.4–9.5)], but less so in females [from 10.4 (95% CI 7.3–13.4) to 8.1 (95% CI 5.6–10.7)].

Conclusion Incidence rates of GAC are decreasing over time in this community in Italy for both males and females. The decline seems to be limited to non-cardia GAC, the intestinal histotype and predominantly to males for the diffuse histotype. Unmeasured risk factors such as *H. pylori* infection and diet may contribute to the differences. These data yield important information to aid healthcare planning in the region.

OP05 SIMULATION OF THE IMPACT OF TOBACCO CONTROL POLICIES ON FUTURE CANCER INCIDENCE IN GERMANY (2020–2050)

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Background Despite reductions in smoking prevalence over the past decades, smoking remains the most important preventable cancer risk factor in Germany. In contrast to a considerable attributable disease burden, Germany continues to be ranked among the most inactive countries in Europe in terms of implementing evidence-based tobacco control policies. The aim of this study is to provide projections of potentially avoidable cancer cases under different policy intervention scenarios.

Methods In order to estimate the proportion of potentially avoidable cancer cases under different policy intervention scenarios (tobacco tax increases, comprehensive marketing ban, plain packaging), we calculated cancer site-specific potential impact fractions (PIFs) stratified according to age and sex, for each year of study period (2020–2050), considering latency periods between the reduction in smoking prevalence and the manifestation in declining cancer excess risks. For the baseline scenario we assumed a continuation of recent smoking trends, and combined data of the German cancer registries with forecasted population sizes, published effect sizes, and national

daily smoking prevalence data to obtain estimates of future incident case numbers. By applying the calculated PIFs to the projected cancer cases for each policy intervention, we estimated the number of future cancer cases that would be expected under the corresponding scenario.

Results Our preliminary results suggest that over a 30-year period, an estimated 11.5% (men 12.0%, women 10.5%) of smoking-related cancer cases could be prevented, if a combination of the observed tobacco control policy interventions were to be implemented in Germany. The most effective single intervention was found to be annual 10% price increases in cigarettes over 10 years, which may prevent about 6.8% of cancer cases (men 7.2%, women 6.3%), followed by plain packaging (men 3.8%, women 3.3%), a comprehensive marketing ban (men 2.0%, women 1.7%), and a single 10% price increase (men 1.0%, women 0.9%). The highest PIFs for all interventions combined were observed for lung cancer (men 16.8%, women 16.4%), cancer of the larynx (men 15.9%, women 15.6%), and the oral cavity (men 15.3%, women 13.8%).

Conclusion Although our simulation model relies on several assumptions, this modelling approach allows a comparison of the impact of different policy intervention scenarios on future cancer incidence. Our results suggest that the expected cancer incidence in Germany could be considerably reduced by implementing tobacco control policies as part of a primary cancer prevention strategy.

Food Policy

OP06 THE IMPACT OF THE ANNOUNCEMENT OF THE UK SOFT DRINKS INDUSTRY LEVY ON HOUSEHOLD SOFT DRINKS PURCHASES

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Rationale The UK Soft Drinks Industry Levy (SDIL) was introduced in response to evidence on the role of sugary drinks in obesity, diabetes and tooth decay. The levy is two-tiered: £0.24/L for drinks containing >8 g/100 ml of added sugar and £0.18/L for drinks containing 5–8 g sugar/100 ml, and directed at manufacturers and importers of soft drinks, in order to encourage reformulation. The levy came into effect in April 2018, but was announced two years before to allow industry time to adapt. The announcement may represent a public health intervention itself.

Aim To examine change in the volume of, and amount of sugar from, household purchases of soft drinks from two years before announcement of the SDIL to two years after.

Methods An interrupted time series design was used. Kantar WorldPanel data from ~43,000 UK households recorded all food and drink purchases brought home, covering April 2014 to March 2018 (208 weeks). Outcomes were purchased volume of, and sugar from, liable soft drinks in each levy tier as well as non-liable soft drinks and confectionery (a potential high sugar substitute category) per household per week, modelled against the counterfactual of no announcement. Household purchases of toiletries (shampoo, conditioner and liquid soap) were included as a comparator. Regression analyses were weighted to reflect UK purchasing patterns.

Results Immediately after the announcement there was an increase in the volume of (73 ml per household per week, 95%CI: 29,119), and amount of sugar from (11.0 g per household per week, 95%CI: 3.7, 18.4), higher tier drinks and a decrease in the amount of sugar from confectionery (-24.6 g per household per week, 95% CI: -47.1,-2.15). In the period following the announcement there was a significant downward trend in the volume of (0.01 ml per household per week^2, 95%CI: -0.02,-0.01), and amount of sugar (-0.0008 g per household per week^2, 95%CI: -0.0012, -0.0004) from, drinks in the lower tier. During the same period sugar from non-liable soft drinks increased (0.0003 g per household per week^2, 95%CI: 0.00001, 0.00064)

Conclusion The announcement of the SDIL was associated with sustained reductions in the volume of, and amount of sugar from, drinks in the lower levy tier purchased by UK households; and a sustained increase in the amount of sugar from non-liable soft drinks. This likely reflects reformulation by manufacturers so that many drinks previously in the lower tier are now non-liable but still contain sugar. There was no evidence of substitution to confectionary.

OP07 CHANGES IN THE SUGAR CONTENT OF FOOD PURCHASES AND SOCIO-ECONOMIC INEQUALITIES: A LONGITUDINAL STUDY OF BRITISH HOUSEHOLDS, 2014–2017

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Background The majority of the UK population fall short of meeting dietary recommendations. This has led to a recent policy focus on improving population diet through reducing sugar consumption. This study aims to explore whether there have been recent changes in the sugar content of take-home food and beverage purchases. We assess whether these changes differ by socio-economic position (SEP).

Methods We used 2014 to 2017 data from the Kantar Worldpanel UK, a nationally representative panel study of food and beverages bought by British households and brought into the home (n≈32,000 per year). Households used hand-held barcode scanners to report purchases of over 151 million food and beverage products, for which total sugar content was obtained. We used linear mixed models to estimate annual changes in the average sugar content of daily purchases by occupational social grade (high-SEP: A/B, mid-SEP: C1/C2 and low-SEP: D/E) from 24 healthier and less healthy food groups defined using the UK Department of Health nutrient profiling model. Results were adjusted for potential socio-demographic confounders. Final sample included 282,712 quarter-observations from 28,037 households.

Results Preliminary results show that in 2014, predicted average sugar content of daily purchases was 86.2 g per person (95%CI 85.3–87.0 g) in high-SEP, 87.3 g (95%CI 68.8–87.9 g) in mid-SEP, and 89.4 g (95%CI 88.7–90.2 g) in low-SEP households. By 2017, this had decreased by an average of 7.1 g per person (95%CI 6.8–7.4 g) with a greater decrease observed in low-SEP households (8.2 g, 95%CI 7.6–8.7 g) compared to mid-SEP (6.9 g, 95%CI 6.5–7.2 g) and high-SEP (6.5 g, 95%CI 5.9–7.0 g) households. This decrease is largely