60–64 had increased to 11.0–19.3%. At age 60–64 a strong hierarchical order to the loss of function was observed (Loevinger Scalability Coefficient H=0.56); gripping was the first task participants reported difficulty with and feeding oneself the last. Participants who reported difficulty gripping, walking and/or stair-climbing at 43 were 3.34 (95% CI: 1.71–6.50) times more likely to report difficulty feeding, washing and/or toileting at 60–64 than people who reported no difficulty at 43.

Conclusion These findings demonstrate that the hierarchy of loss in functional ability is observed in younger populations. This suggests that targeted interventions to prevent mobility disability should not be delayed until old age as high risk individuals can be identified in midlife, with substantial declines in functional ability already occurring in some people by this age.

Alcohol

OP05 THE LONGITUDINAL ASSOCIATION BETWEEN ALCOHOL CONSUMPTION AND ADIPONECTIN: A PROSPECTIVE COHORT STUDY USING WHITEHALL II DATA

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Background Studies have shown that moderate alcohol consumption is associated with enhanced insulin sensitivity and a reduced incidence of type 2 diabetes. One suggested pathway is through alcohol-induced increases in the hormone adiponectin. Lower levels of adiponectin have also been linked to coronary heart disease, cancer, hypertension and metabolic syndrome. The majority of studies linking alcohol intake to adiponectin rely on only one measure of alcohol consumption at baseline and adiponectin level ascertained at a single follow-up occasion. It is important to consider the longitudinal development of both processes to determine how, if at all, the two are related. However, studies with repeat measures of alcohol consumption and adiponectin are scarce, so few studies have been able to examine the relationship simultaneously. The purpose of this study was to investigate how prospectively measured alcohol consumption is related to changes in adiponectin levels over time.

Methods This study uses data from the Whitehall II cohort. Prospective data on alcohol consumption (UK units per week; 1 unit = 8 g ethanol) and serum adiponectin (ng/ml) were collected at phase 3 (1991–94), phase 5 (1997–99) and phase 7 (2003–04). Adiponectin data were log-transformed. Those with known type 2 diabetes at phase 3 were excluded from the analytic sample, as were those who abstained from alcohol throughout follow-up. A dynamic structural equation model was estimated whereby lagged alcohol consumption predicted upcoming change in (log) adiponectin (the model included longitudinal trajectories for both processes as well as covariances between the intercepts and slopes of both trajectories). Age, gender and ethnicity were entered as time-invariant predictors whilst body mass index, waist circumference, fasting serum insulin and smoking status were entered as time-varying covariates. Models were fit in Mplus 7.11. The final sample size was 2098.

Results Increased alcohol consumption was associated with increases in (log) adiponectin (Beta=0.005, CI 0.004, 0.006; $p < 0.001$) after adjustment for confounding factors. Both the alcohol intercept (Rho=-0.543) and slope (Rho=-1.051) were significantly associated with the adiponectin slope ($p < 0.01$ in both instances) indicating that both the initial level as well as change in alcohol intake impact the rate of change in adiponectin levels.

Conclusion Our findings support the hypothesis that the reduced risk of type 2 diabetes (and coronary heart disease) among moderate alcohol consumers may be partly mediated through increases in adiponectin levels. Understanding mechanisms is important in establishing whether associations are causally linked.

OP06 PREVALENCE AND PREDICTORS OF ALCOHOL USE DURING PREGNANCY: FINDINGS FROM INTERNATIONAL MULTI-CENTRE COHORT STUDIES

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Background International guidelines have not reached consensus on safe alcohol recommendations for pregnant women. Accurately measuring exposure to alcohol use during pregnancy is important in estimating the fetal effects of gestational alcohol consumption to inform alcohol policy. However, the prevalence of alcohol use during pregnancy is often conflicting. We aimed to compare the prevalence and predictors of alcohol consumption during pregnancy in three contemporary studies.

Methods We used log linear binomial regression in STATA to compare the prevalence and predictors of alcohol use in two Irish retrospective studies and one multi-centre prospective cohort study (Ireland, UK, New Zealand, Australia). Growing up in Ireland (GUI) is a population based cohort study which sampled women from the national state child benefit register and collected data on alcohol consumption through face to face interviews 9 months after birth. SCOPE is a prospective multicentre cohort study which used convenience sampling to interview 5628 nulliparous women on their alcohol consumption at 15 and 20 weeks gestation. PRAMS is a cross sectional study which used random sampling of delivery records at a large urban obstetric unit in the South of Ireland to administer postal surveys to 718 women 2–6 months after birth.

Results SCOPE and PRAMS participants were more advantaged than GUI participants (89% had tertiary education in SCOPE compared to 82% in PRAMS and 56% in GUI) though GUI participants were more representative of the Irish pregnant population. Alcohol consumption during pregnancy in Ireland ranged from 20% in GUI to 80% in SCOPE and from 40% to 80% in the UK, Australia and New Zealand. Levels of exposure among drinkers also varied substantially ranging from 70% consuming more than 1–2 units per week in the first trimester in SCOPE

Ireland to 46% and 15% in the retrospective cohorts. Smoking during pregnancy was the most consistent predictor of gestational alcohol use in all three cohorts RR (95% Confidence Interval): GUI 1.50 (95% CI 1.36, 1.65), SCOPE 1.17 (95% CI 1.12, 1.22), PRAMS 1.42 (95% CI 1.18, 1.70) while other characteristics including age were inconsistently related to alcohol use in each cohort.

Conclusion Alcohol use during pregnancy may be as common as 80% but methods to improve exposure measurement are required due to conflicting estimates. The observed social patterns of gestational alcohol use may also vary across studies depending on data collection methods. Future research should address both under-reporting and reporting biases which reduce both their internal validity and policy translation.

OP07 ADJUSTING SURVEY-BASED ESTIMATES OF ALCOHOL CONSUMPTION IN SCOTLAND FOR NON-RESPONSE BIAS: RECORD-LINKAGE STUDY

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Background Surveys commonly form the bases of population estimation of health measures and health-related determinants. The validity of such inference depends on study generalisability which can be threatened by low participation levels. Classically, efforts to reduce resultant selection bias are limited to weights based on socio-demographic characteristics which typically do not capture health differences within population sub-groups. We propose the use of administrative record-linkage and novel methodology to overcome non-response bias, and illustrate this using the 2003 Scottish Health Survey measures of alcohol consumption.

Methods Of the 54% of individuals who responded to the survey, 91% consented to record linkage of their responses to routine data; this study used data on alcohol-related harms (hospital admission or mortality) to the end of 2011. Contemporaneous census information and (unlinked) admission/mortality data on the general population were also available. We compared directly age-standardised survey-weighted estimates of alcohol-related harm rates in the 2353 male and 3028 female participants aged 20–65 years at interview with rates for the whole population. These differences and inferred characteristics of those missing from the survey were used to derive probabilities of alcohol-related harm in non-responders by age, sex, area deprivation and health board region. Observations were simulated for non-responders with corresponding alcohol-related harm probabilities and their unknown alcohol consumption estimates were multiply-imputed. Corrected results were obtained from the proxy representative sample comprising responders and simulated non-responders.

Results Overall mean weekly unit alcohol consumption estimates were 10.4% higher among men [uncorrected = 21.8 (95% CI: 20.8–22.8), corrected = 24.0 (21.8–26.3)] and 5.0% higher among women [uncorrected = 10.5 (9.6–11.4), corrected = 11.0 (9.9–12.1)]. For those living in the most deprived quintile areas, the uncorrected means were corrected from 23.1 (19.9–26.4) to 27.4 (19.9–34.9) units (18.6% increase) among men, and from 9.0 (7.5–10.4) to 10.1 (8.5–11.8) units (12.8% increase) among women. These compared with rises in the least deprived quintile areas from 22.9 (20.0–25.7) to 24.6 (20.0–29.2) units (7.5% increase) among men, and from 12.2 (10.9–13.6) to 13.0 (11.3–14.7) units (6.1% increase) among women.

Conclusion Corrected estimates suggest non-response bias leads to an underestimation of overall alcohol consumption as well as of disparities between men living in deprived and non-deprived areas. There is potential for wider application to other survey-derived estimates (including behaviours like smoking) and to other studies which have capacity to record-link to administrative health records. This methodology offers a promising route for advancing efforts to resolve non-response bias.

OP08 ASSESSING ACCURACY OF PERSONAL BREATHALYSERS AND SELF-ESTIMATED ALCOHOL CONSUMPTION FOR DRIVING DECISIONS

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Background Driving accidents cause 1.2 million deaths each year worldwide, with alcohol a causative factor in at least one fifth. Breath alcohol is a well-established surrogate measure for blood alcohol and the portable breathalyser technology available to police forces has evidential force in some jurisdictions. However, in recent years cheap breathalysers have been marketed directly to the UK public, potentially allowing users to assess their own fitness to drive. We aimed to determine the accuracy of three selected breathalysers marketed to the UK public.

Methods Diagnostic accuracy study of three personal breathalysers (two single-use and one digital multi-use) available to UK consumers, using as reference test an evidential standard breathalyser used by police. We recruited 208 participants aged 18 or over who had consumed alcohol in participating licensed bars in Oxford, United Kingdom. Participants answered a short questionnaire including self-reported recollection of alcohol consumption during the preceding 12 h, and used the breathalysers in a random order. We calculated sensitivity and specificity of each index device for detection of alcohol levels at or over the UK/US driving limit (35 μg/100ml breath alcohol concentration), using the police breathalyser as reference standard. We also calculated diagnostic accuracy of self-reported alcohol consumption.

Results 38/208 (18.3%) of participants were at or over the driving limit according to the police breathalyser. The digital multi-use breathalyser had a sensitivity of 89.5% (95% CI 75.9–95.8%) and a specificity of 64.1% (95% CI 56.6–71.0%). The single-use breathalysers had a sensitivity of 94.7% (95% CI 75.4–99.1%) and 26.3% (95% CI 11.8–48.8%), and a specificity of 50.6% (95% CI 40.4–60.7%) and 97.5% (95% CI 91.4–99.3%) respectively. Self-reported alcohol consumption threshold of 5 UK units or fewer had a higher sensitivity than all personal breathalysers.

Conclusion While two of the breathalysers tested had good sensitivity, one had very poor sensitivity. None were superior to estimation of self-reported alcohol consumption. Limitations of our study include the surrogate reference standard. The value, and safety, of marketing insensitive breathalysers to the public is open to question.