

NPRI Phase 2
NATIONAL PREVENTION RESEARCH
INITIATIVE

Successful Applicant's Abstracts

Abstracts

Dr Jean Adams (Newcastle University)

The new TV diet - evaluating the effect of the UK 2007 OfCom restrictions on television food advertising to children

The prevalence of overweight and obesity in children in developed countries, including the UK, has increased substantially in recent years and is clearly socio-economically patterned. There is evidence that television food advertising influences children's diets and, therefore, the development of overweight, obesity and related conditions in otherwise healthy children. However, there is currently little detailed data available on the nutritional content of foods that are advertised on television – either overall or in terms of who is actually watching. Restrictions on the advertising of foods high in fat, salt and sugar during children's programmes began to be phased in the UK in April 2007. As the UK is the first country to introduce selective regulations on television food advertising to children, the effect of such regulations on the television advertising landscape are not known.

Using industry data on advertisements broadcast and associated viewing figures during four weeks between October 2006 and July 2009, and manufacturer's data on the nutritional content of foods advertised, we will answer four research questions: what was the nutritional content of foods advertised on UK television (the 'TV diet') before, during and after implementation of the 2007 regulations?; were there any changes in the TV diet across these time points?; were there differences in the TV diet according to age, sex and socio-economic position of viewers and, if so, did these vary across the time points?; were the 2007 regulations adhered to? Our analyses will provide a baseline against which future data can be compared, a platform for, and including the UK in international comparison studies, and necessary data for further development of informed public health nutrition policy.

The research team comprises of a high-calibre, multi-disciplinary, international collaboration of epidemiologists, public health specialists, nutritionists and obesity researchers. Previous research, conducted by the current team, has developed the methods to be used here.

This research will be conducted in tandem with similar work in Canada exploring the impact of new voluntary agreements on television food advertising to children there. Funding for the Canadian arm of the research is not being sought, but we will work closely with our collaborators to ensure comparability of methods and results throughout.

This research, based on existing data, is a high quality, low cost, evaluation of one aspect of recent UK public health policy with potential to influence the development of further policy in the UK and elsewhere.

Dr Anne Ellaway (MRC SPHSU Glasgow)

Availability of and access to physical activity opportunities and links with health behaviours and obesity among adults

Obesity levels are rising with a simultaneous decline in physical activity. Efforts to increase physical activity levels which focus upon changing individuals' behaviour have had limited success. Increasing attention has therefore been directed towards the potential of the local environment (e.g. the availability of physical activity amenities and resources) to influence physical activity levels and obesity. However, the precise mechanisms through which the UK environment can impact upon physical activity levels and obesity are not well understood. One potential contributory factor is the extent to which the availability of and access to facilities for physical activity is distributed equitably across different neighbourhoods. Most studies to date have been conducted in the USA or Australia, limiting their applicability to the UK. In this proposed study, we intend to examine firstly, the extent to which there is equitable distribution of the availability and access (by different modes of transport) to physical activity opportunities; secondly, to examine if the distribution of opportunity is associated with physical activity levels; and thirdly, to determine if this, in turn, is associated with obesity. We propose to examine these questions in relation to the Scottish population, with a particular focus on adults and fixed PA facilities such as sports centres, swimming pools and green space. Knowledge of the extent

to which access and use of physical activity facilities and associations with obesity is socially patterned is important for informing the direction and focus of public health and planning policy.

Prof Chris Riddoch (University of Bath)

Pooling of childrens' physical activity data

The importance of physical activity during childhood is now accepted, as obesity rates escalate and the onset of chronic disease appears at earlier stages of the lifecourse. Motion sensors, especially accelerometers, produce more precise data on levels (amounts), patterns (daily, weekly, seasonal) and dimensions (frequency, intensity, duration) of physical activity behaviour. Accelerometers are increasingly being used in larger studies of children and a high level of collaboration between research groups has resulted in comparable measurement and data reduction protocols being applied in such studies. We estimate that around 28,000 measurements of 3-7 days duration have now been made on children using identical accelerometers and similar protocols. The data have been collected in a range of countries, across diverse cultures and including both the childhood and adolescent periods.

The aim of this project is to pool these data to provide new opportunities for analysis. This will provide greatly increased analytical power for more in depth sub-group analyses e.g. minorities, and greater cultural diversity to conduct new analyses of a broader range of variables including social, cultural, ethnic and geographical dimensions.

Data sets have been identified through personal contacts and scrutiny of published literature. Both cross-sectional and longitudinal datasets are available. Research questions include:

1. What are the determinants of physical activity by age, gender, social, cultural, ethnic and geographical groups?
2. What are the dose-response relationships between physical activity and a range of health outcomes (obesity, CVD risk, etc.) by age, gender, social, cultural, ethnic and geographical groups? The resource will be valuable to researchers, policy makers, health practitioners and students who will have access to the data for future analyses.

Prof Andrew Steptoe (UCL)

Sociodemographic, economic and biomedical determinants of multiple health behaviours in older adults

Cigarette smoking, physical activity, alcohol misuse and diet are related to risk of chronic illness, and understanding their determinants will help identify better methods of encouraging the maintenance of healthy lifestyles. These activities are often studied in isolation, but there are strong arguments for investigating the patterns of multiple health behaviours, and the incidence of combinations of risk behaviours in different sectors of society. This application is for analysis of data on multiple health behaviours collected over a 10 year period in the English Longitudinal Study of Ageing (ELSA). Existing research on multiple behaviours has primarily focussed on younger and middle-aged populations in cross-sectional surveys, but older adults are at high risk for the chronic conditions that prudent lifestyles help to prevent, while longitudinal studies allow changes in multiple behaviours to be mapped in relation to the significant life transitions. We plan to study three broad issues. First, whether important health behaviours (smoking, alcohol consumption, physical activity, and fruit and vegetable intake) cluster together in middle-aged and older adults, and how behaviour clustering varies with socioeconomic circumstances and geographical location across in England. Second, how individual activities and clusters of health behaviours change over an 8 to 10 year period among older people, and what role is played by economic, social and personal factors such as changing wealth, work and family situation, social support and physical and mental health. Third, how these health behaviours are related to biomarkers (C-reactive protein, fibrinogen, and metabolic variables) and functional health in older adults. ELSA, a longitudinal study of 5,111 men and 6,121 women ranging in age from 50 to 100 years, is uniquely suited to addressing the determinants of multiple health behaviours, since it includes a wide range of information on social and economic circumstances, labour market activity, social networks and support, family and household structure, chronic illness, and biomarkers. Information collected across four waves of data collection will be analysed. The study will be carried out by an interdisciplinary team with expertise in health behaviour, economics, epidemiology, clinical medicine and medical sociology. Members of the team have been involved in the design of ELSA, data collection and processing, so are very familiar with the data set. The results will provide vital knowledge about the barriers and levers on multiple health behaviours, paving the way for innovative methods of encouraging lifestyle changes that will promote health and reduce inequalities in older populations.

Dr Alison Stephen (MRC Collaborative Centre for HNR in Cambridge)

Eating behaviours: tracking through the lifecourse and impact on chronic disease
Nutrients, foods and dietary patterns are regularly investigated in relation to disease, but much less is known about eating behaviours like meal frequency, meal skipping, night eating, regularity of dietary intake, and distribution of energy, nutrients and foods through the day. The proposed study will investigate eating behaviours in two longitudinal cohorts: and the MRC National Survey of Health and Development (NSHD) and the Avon Longitudinal Study of Parents and Children (ALSPAC), both with dietary data at several timepoints. Diet diaries for several days enable proposed behaviours to be assessed. Tracking of behaviours will be determined using conditional agreement analysis. Eating behaviours and their maintenance will be studied in relation to diet quality, and to body mass index and cardiovascular and diabetes risk factors, thus informing healthy eating advice.

Dr Lucy Cooke (UCL)

The influence of incentives on children's consumption of vegetables

The negative effect of poor nutrition on children's health is well established. On average, children consume an excess of saturated fat and sugars and only half the quantity of fruit and vegetables recommended for good health. There is considerable concern amongst parents about their children's diets and in particular, about intake of vegetables which, surveys indicate, are widely disliked. Parents employ a variety of strategies to encourage their children to 'eat their greens', but the research evidence suggests that many are ineffective and some actually counter-productive.

One time-honoured and widely-employed tactic is the use of incentives or rewards. It is a central tenet of economics that 'incentives promote effort and performance' and positive reinforcement is used extensively in clinical and educational settings. Nevertheless, the longer-term value of extrinsic rewards remains controversial. Although rewards may increase the likelihood of behaviour in the short term, performance of that behaviour may be impaired over the long term extrinsic motivation undermines intrinsic motivation, resulting in a net decline in motivation on withdrawal of the reward. Experimental studies in the food domain have given some support for this idea and have often shown even if rewards increase consumption while they are being administered, underlying liking actually decreases. Our own research found that rewarding consumption of a vegetable increased liking for vegetables, but less than when we used simple tasting or 'exposure' alone. However, inconsistencies predominate in the literature, and establishing the true benefit of rewards in child feeding is overdue.

We propose to carry out two studies to investigate the impact of incentives on liking and consumption of vegetables in 4-6 year-old children. The first of these will be a school-based experimental study with four conditions, to compare the effects of immediate reward, token reinforcement and 'mere exposure' with a no treatment control. A second study will extend the paradigm to a naturalistic setting by investigating the impact of these same strategies when carried out by parents in the home. The aim of these studies will be to establish the type and timing of reward that is most effective and assess how its impact compares with that of tasting without reinforcement.

An important long term contribution of this research will be to improve the child feeding advice given to parents. Scientifically-based guidance in this area is in great demand from both health professionals and parents themselves.

Dr Martyn Standage (University of Bath)

The use of incentives in the formation of healthy lifestyle habits following the school to work transition

The prevalence of obesity in the UK has increased rapidly in recent decades. As obese individuals are at greater risk of a number of chronic diseases (e.g., coronary heart disease, type-2 diabetes), this increase in obesity has become a major public health problem. Dietary and physical activity patterns are central to obesity and it is understandable that many primary prevention attempts have been aimed at children and adolescents. However, no intervention has targeted these behaviours during the transition from school to employment. As the risk for future ill-health from non-communicable diseases is greater in manual workers, those with lower educational attainment, and fewer years of academic study, it is surprising that past work

has overlooked this segment of the population. Indeed, the “school to work” transition appears to be advantageous from a public health promotion perspective as the developing adolescent forms new physical activity and dietary habits on leaving school. This study, therefore, aims to test the added value of incentives in promoting healthy-lifestyle habits to school-leavers in addition to the provision of behavioural support. Significant user engagement will be incorporated at all stages. Phase-1 will involve focus groups with the target population to gain a better understanding of their views and preferences as they relate to issues such as diet, physical activity, and priorities at this life-stage. Informed by the focus group data, using a subgroup of users and providers, phase-2 will seek to refine delivery mechanisms, pilot an intervention grounded in empirically supported theories of behaviour change, and address/resolve issues such as participant burden, user engagement, and ease of delivery. Following this consultation, the intervention (phase-3) will be tested via a cluster randomised controlled trial (CRCT) aligned with the CONSORT guidelines. The CRCT will consist of three treatment arms; (i) behavioural support group, (ii) a behavioural support plus incentives group, and (iii) an information only control group. Primary outcome measures will be change in diet and objectively-assessed physical activity. Secondary outcome measures will include self-report psychological measures and anthropometric indices (e.g., BMI, waist-circumference). Data will be analysed using multilevel analysis controlling for cluster effects on an intention-to-treat basis. A 12-month follow-up will be conducted, and the cost-effectiveness of the intervention calculated. Findings from this work will provide valuable information pertaining to physical activity and diet promotion during a significant life transition, inform policy, and yield much needed data on a population of “at risk” adolescents.

Prof William Bruce Traill (University of Reading)

The effectiveness of fat taxes and thin subsidies in improving diets

Foresight (charged by Government to create challenging visions of the future to ensure effective strategies now) has called for a system-wide approach to tackling obesity and other nutrition-related ill-health; fiscal interventions could be an important element of the system. Past proposals for taxes on unhealthy foods have been dismissed as regressive and ineffective, but there is potential for tax/subsidy combinations that overcome these problems. Models will be developed to simulate the impact of different combinations of taxes and subsidies on foods and nutrients, on nutrient demand and the fiscal burden, by socio-economic group, age, Government Office Region and income. Demand modelling, will use the Quadratic Almost Ideal Demand System (QAIDS) and, in order to examine the distributional impacts of taxes and subsidies, it will follow an approach which enables the parameters of the model to vary according to demographic characteristics of the households. The model will be estimated using data from the Expenditure and Food Survey (EFS). Prices will be derived from unit values by assuming all households surveyed in the same week in the same Government Office Region (GOR) face the same prices. The impacts of a given tax or subsidy on food choice and expenditure will be computed and the impacts of the policy on nutrient and calorie intake will be obtained by converting changes in food demand to changes in nutrient and calorie demand using a matrix of food composition coefficients. The distribution of these effects will be examined across, income levels, regions, ages and social class.

Prof Sarah Lewis (University of Nottingham)

A comprehensive evaluation of the impact of English tobacco control policy on smoking cessation activities

Increasing smoking cessation is probably the single most important means of reducing the burden of lung cancer, heart disease and stroke in the UK in the next 20 years. In the last decade, in England, a wide range of policies aimed at both motivating smokers to make attempts to quit and at increasing the success within these have been introduced to try to achieve this. Since 2002, approaches have included introducing larger health warnings on cigarette packs, broadening the indications on NRTs, the launch of varenicline, reducing taxation on OTC NRTs and a new, and subsequently revised, GP contract to encourage GPs to identify, advise and refer smokers to NHS Stop Smoking Services. None of the above policies have been comprehensively evaluated to determine their effects on a full spectrum of relevant outcomes and their relative impact for different populations, such as the more socio-economically disadvantaged. We therefore propose to combine existing sources of data to comprehensively evaluate the success of tobacco policies listed above. The datasets that we propose to use are: Smokers Toolkit, a series of panel surveys of smokers; The Health Improvement Network (THIN), a large Primary Care dataset; data on all dispensed prescriptions

and NRT OTC sales; the Omnibus and General Household Surveys, and Hospital Episode Statistics. These datasets encompass smoker's potential responses, like their smoking behaviour and attitudes, population-based data with information on relevant demographic and social contextual variables to determine differential impacts in different population groups, and data that captures other relevant outcomes, such as smoking-related disease and broader influences on smoking in the population. We will use these datasets to derive monthly, quarterly and annual indices of smoking cessation activity, overall and in specific groups defined by race/ethnicity, age, gender, social class and regional factors. We will assess their external validity and sensitivity to change, and will link these comprehensive aggregate measures into a single database, updating this regularly as new data becomes available. We will use these data to estimate the impact of individual tobacco control initiatives upon these outcomes using time series analysis in Stata. We will assess the feasibility of a sustainable and accessible database resource linking aggregate measures of smoking cessation activity in the English population, creating the framework and data for evaluating future policy and doing this more cost effectively than previous efforts.

Prof Laurence A Moore (Cardiff University)

Free School Breakfast Initiative Data Augmentation and Analysis

The recently completed cluster randomised trial of the Welsh Assembly Government's Free School Breakfast Initiative (FSBI) collected data at baseline, 4-6 month and 12 month follow-up, from approximately 4350 Year 5 and 6 children in 111 schools across Wales. A nested cohort of 1975 children completed measures at baseline and at least one other round of data collection. Outcome measures included assessments of cognitive function, attitudes towards breakfast and dietary behaviour. Further data were also collected from sub-samples of participants using comprehensive measures of dietary intake. The proposed study will augment the existing study dataset through nutrient intake coding of dietary intake data, linkage with education databases to obtain free school meal entitlement, SAT and GCSE performance data, postcode, and via linkage with census and health databases to output area socioeconomic indicators and future health outcome data. This data augmentation will then allow the following research questions to be addressed in a series of statistical analyses:

- a) What is the impact of the FSBI in terms of cognitive outcomes, attitudes towards breakfast and dietary intake?
- b) What is the impact of the intervention upon social gradients in diet, cognitive outcomes and attitudes?
- c) Is the impact of the intervention moderated by socio-economic status and/or other contextual ecological factors, such as school policies, health promoting school status, etc.?
- d) Analysis of response bias in parent questionnaires, by response time (first mailing or after reminder(s)), gender of pupil, dietary intake, socio-economic status.
- e) Comparison of parental report and pupil self-report data.
- f) Does the FSBI improve levels of consumption of adequate breakfasts amongst 9-11 year olds? (i.e. over 20% of daily energy intake).
- g) Does the FSBI improve the balance of macronutrients within the diets of 9-11 year olds?
- h) Does the FSBI improve intake of micronutrients within the diets of 9-11 year olds? (e.g., calcium, iron, vitamin C).
- i) How do variations in breakfast composition (e.g. glycemic load) influence cognitive performance?
- j) Are (i) breakfast and (ii) all day dietary behaviour at baseline associated with subsequent cognitive measures and school performance? Is this relationship confounded with or moderated by socio-economic status and/or other contextual ecological factors?
- k) Are attitudes towards breakfast at baseline predictive of subsequent breakfast eating behaviour?
- l) Are changes in breakfast and all day dietary behaviour associated with changes in cognitive outcomes?

Dr Andrew Russell (University of Durham)

Contraband and Counterfeit Tobacco – exploring an economic disincentive to the denormalization of tobacco

Contraband and counterfeit tobacco represents a major stumbling block to efforts to control tobacco use through taxation and other legislative means. Little is known about the organization of the trade in smuggled tobacco. This project draws on a rich data set collected for an earlier, EU-funded project into the operation of organized crime in tobacco. It will focus

on the trade in smuggled tobacco in the north east of England, a region where this sort of tobacco is widely used, particularly in deprived communities. The research will have implications for policy and practice of Smoke Free North East and the Revenue and Customs services, who are collaborators in the project.

Dr Murray Smith (University of Aberdeen)

Economic Appraisal of the Choice and Targeting of Lifestyle Interventions to Prevent Disease in Deprived Populations

The aim of the research is to provide information for policy makers, NHS professionals and individuals about the relative costs and benefits of interventions to change unhealthy behaviours, which will assist in making choices about the targeting of scarce resources for health improvement. The hypothesis underlying this study is that the consequences of adverse lifestyles and, hence, the costs and benefits of preventive interventions, are mediated (positively or negatively) by personal and environmental factors, which either promote or provide barriers to change, and that there is an inverse relationship between the efficiency of targeting interventions and the impact on health inequalities. This hypothesis is investigated using existing secondary data sets which can be linked together to combine information on health behaviours, deprivation relating to individual and area based characteristics and health outcomes. The research builds on an existing study being carried out under the NPRI programme to conduct an economic evaluation of interventions in adults to prevent obesity and hence reduce coronary heart disease, cancer and diabetes. The analysis is extended by giving explicit consideration to other lifestyle factors (smoking and alcohol), by identifying where there are concentrations of preventable ill-health, within particular locations (as clusters of particularly good or bad behaviours) or population subgroups, and by considering the efficiency and effect on health inequalities of targeting preventive interventions. The main research questions to be addressed are: the contribution of different lifestyle factors to the excess burden of ill-health and mortality from CHD, cancer, stroke and diabetes; how this excess burden varies across geographic areas and different social groups in relation to deprivation factors; and the relative costs and benefits of alternative approaches to targeting interventions and the impacts on health inequalities. The study will proceed by first estimating relationships between single health behaviours and health impacts for each disease of interest and then considering combinations of health behaviours and interrelationships between the disease areas. The research will then focus on the role of individual and geographic deprivation factors, and will test alternative approaches to estimating these associations. Finally, the modelling results will be combined with information on interventions drawn from the literature in a cost-benefit framework. The results will inform decisions about priorities: which health behaviours to target, whether to tackle multiple behaviours together, which population groups to prioritise and the trade off between total health gain and the impact on health inequalities.

Dr Mark Hamer (UCL)

Physical activity behaviours and mortality risk among South Asian communities living in England

South Asians living in the UK have higher rates of cardiovascular disease (CVD) and markedly lower physical activity levels. Physical activity plays a crucial role in primary prevention strategies. However, detailed information on patterns, amounts, and types of activity in South Asian communities living in the UK is lacking, as well as how physical activity patterns relate to mortality risk in these ethnic groups. Such information is crucial for accurately defining the optimal and minimal physical activity levels for cardiovascular prevention in South Asian groups. The aim of the present proposal is to use 1994-2004 Health Survey for England (HSfE) data and the linked mortality records to examine physical activity patterns, and associations between physical activity, other risk factors, and mortality among South Asian ethnic communities living in England. This research will inform future policy and interventions for reducing cardiovascular disease in South Asians and enable the delivery of tailored programmes to targeted groups.

Ms Seeromanie Harding (University of Glasgow)

Do neighbourhood environments contribute to ethnic differences in obesity, physical activity and diets?

Background: Halting the rise in obesity is a policy priority as reflected in a range of government initiatives on diet and physical activity in schools and the community, and on legislation to promote a food classification system to make choosing healthy food easy. This study will

enhance these initiatives by developing the evidence base about the extent to which ethnic minorities are exposed to obesogenic (obesity promoting) environments. In adulthood, Black Caribbean, Black African and Pakistani women are more likely to be obese than women in the general population. South Asians are more prone to abdominal adiposity. In adolescence, Black African origin girls are already more likely to be obese. In contrast to the US, there is very little research on the effect of neighbourhood environments on ethnic differences in health in the UK. Ethnic minority groups are spatially concentrated in relatively deprived urbanised areas and worry more about crime than their White peers. Physical characteristics of the neighbourhood such as the presence of grocery stores that sell healthy foods, safe parks, and recreational facilities, may promote healthy eating and exercise through increased availability and accessibility. Deprived areas may be less well served with these facilities. Perceptions of safety in neighbourhoods also influence the likelihood of taking physical activity. Aim: The overall aim of this study is to examine whether ethnic differences in physical activity and dietary patterns, BMI and obesity status are related to exposures in the neighbourhoods they live in. Method: The Health Surveys for England (HSE) (1999 and 2004) holds a range of data on individuals (e.g. including physical activity, diet, body size) from the major ethnic minority groups. Area measures of ethnic density, deprivation, food retail environment and physical activity opportunities will be obtained from a range of data sources (e.g. Neighbourhood Statistics, SportEngland). These ecologic data will be merged to the individual records on the HSE. The distribution of resources and the mean distance from to the nearest resource will be explored in relation to deprivation and ethnic density. Different measures of ethnic density will be used to reflect concentration and clustering in particular areas. Multilevel models will be used to examine how individual characteristics (compositional factors) and area-level variables (contextual factors) relate to ethnic differences in outcomes.