effectiveness of the intervention prior to knowing the quantitative outcomes of the trial, focusing on case study schools.

Methods The process evaluation design was guided by the UK Medical Research Council framework for the evaluation of complex interventions. Mixed methods included semi-structured interviews with head/depute head teachers and educational psychologists, ethnographic notes from reflexive discussion sessions, focus groups with pupils and staff, pupil and parent questionnaires. The preliminary analysis was carried out on ten case study schools.

Results SEED was delivered largely as intended, the main exception being fewer reflexive discussion and action cycles than intended. Participants cited restrictions on time and resources and a lack of embeddedness in local authority structures as barriers to implementation.

There was evidence that SEED was valued for providing time and structure to reflect on SEW and foster a collective commitment to tackle and prevent problems, although actions often reinforced existing priorities rather than encouraged the adoption of innovative initiatives. There was limited evidence of an improvement in pupils' SEW but there was evidence that SEED improved relationships between staff. The school's pre-existing climate, strength of leadership and readiness for change appeared important in determining engagement with SEED.

Conclusion Based on this preliminary case study analysis we were not confident that enough schools implemented the intervention in sufficient depth to demonstrate an effect on pupils' Strengths and Difficulties Questionnaire scores (primary outcome). However, the RCT subsequently found a significant improvement in pupil SEW across the life of the trial, particularly for older pupils. Ongoing process evaluation analyses aim to explain this and revisit key questions of implementation and mechanisms for change. These analyses will be available by September 2018.

OP36   INDIVIDUAL, FAMILY AND SCHOOL-BASED INTERVENTIONS TO PREVENT MULTIPLE RISK BEHAVIOURS IN YOUNG PEOPLE AGED 8–25 YEARS: A COCHRANE SYSTEMATIC REVIEW AND META-ANALYSIS

[1]GJ MacArthur, [1]DM Caldwell, [2]J Redmore, [1]S Watkins, [1]R Kipping, [3]J White, [4]C Chittleborough, [1]R Langford, [1]V Er*, [5]R Lingam, [6]K Pasch, [1]DJ Gunnell, [1]M Hickman, [1]R Campbell. [1]Department of Population Health Sciences, University of Bristol, Bristol, UK; [2]Medical School, University of Aberdeen School of Medicine and Dentistry, Aberdeen, UK; [3]Centre for Trials Research, Cardiff University, Cardiff, UK; [4]School of Public Health, Robinson Research Institute University of Adelaide, Adelaide, Australia; [5]Institute of Health and Society, Newcastle University, Newcastle upon Tyne, UK; [6]Department of Kinesiology and Health Education, University of Texas, Austin, USA

Background We aimed to undertake a Cochrane systematic review to quantify the effect of multiple risk behaviour interventions on prevention of substance use, antisocial behaviour, sexual risk, vehicle risk, self-harm, gambling, physical inactivity and unhealthy diet among individuals aged 8–25 years as little is known about their effectiveness (CD009927).

Methods Eleven databases were searched to 14 November 2016. Randomised controlled trials were included that addressed two or more risk behaviours in individuals aged 0–18 years. Data were pooled in a random-effects meta-analysis in Revman 5.3. For each outcome, we included subgroups relating to study type (individual, family or school-level and

universal or targeted in approach). The quality of evidence was assessed using the GRADE approach.

Results We identified 34 680 titles, screened 27 691 articles and included seventy studies. We found moderate quality evidence indicating that universal school-level interventions were beneficial in relation to tobacco use (odds ratio [OR] 0.77, 95% confidence interval [CI] 0.60–0.97, n=15 354, I^2 57%), alcohol use (OR 0.72, 95% CI 0.56 to 0.92, n=8,751, I^2 58%), and physical activity (OR 1.32, 95% CI 1.16 to 1.50, n=6 441, I^2 0%) compared to a comparator. Lower quality evidence indicated possible benefit for drug use (OR 0.74, 95% CI 0.55 to 1.00, n=11 058, I^2 69%) and antisocial behaviour (OR 0.81, 95% CI 0.66 to 0.98, n=20 756, I^2 66%), while findings were less certain for sexual risk behaviour (OR 0.80, 95% CI 0.60 to 1.08, n=13 351, I^2 80%; low quality evidence) and unhealthy diet (OR 0.82, 95% CI 0.64 to 1.06, n=6441, I^2 49%, moderate quality evidence). Analyses indicated that family- and individual-level interventions probably have little or no effect on these outcomes, although fewer such studies were identified. The quality of studies was judged to be of moderate or low quality for most outcomes, primarily owing to concerns around selection, performance and detection bias, and heterogeneity between studies.

Conclusion Available evidence is strongest for universal school-level interventions that target multiple risk behaviours demonstrating that they may be effective in preventing certain risk behaviours. However, concerns around poor reporting and study quality highlight the need to strengthen the evidence base in this field.

This abstract is based on preliminary findings from a Cochrane review currently underway. Upon completion and approval, the final version is expected to be published in the Cochrane Database of Systematic Reviews.

OP37   DO INTERVENTIONS INTEGRATING HEALTH AND ACADEMIC EDUCATION IN SCHOOLS PREVENT SUBSTANCE MISUSE AND VIOLENCE? SYSTEMATIC REVIEW AND INTERVENTION COMPONENTS ANALYSIS

[1]GJ Melendez-Torres*, [2]T Tancred, [2]CP Bonell. [1]DECIPHer, Cardiff University, Cardiff, UK; [2]Department of Social and Environmental Health Research, London School of Hygiene and Tropical Medicine, London, UK

Background Increasingly constrained school timetables mean that there is often little space for specifically timetabled health education lessons. Interventions that integrate health education into academic lessons may prove more appealing to schools, and may be a promising means of addressing outcomes such as violence and substance use while also promoting academic attainment. This evidence has not yet been systematically reviewed. We synthesised evidence for these interventions' effectiveness and analysed their components.

Methods We searched 19 bibliographic databases and 32 websites. References were extracted from the reference lists of included studies and authors were contacted. We included reports with no restrictions on language or date. References were screened on title/abstract and those passing this screening were then screened on full report. Data extraction and appraisal were informed by the Cochrane risk of bias tool. Outcome evaluations were synthesised by key stage (KS) using multilevel meta-analysis where possible; otherwise, evidence was narratively synthesised. Components were analysed

inductively. This study is registered as PROSPERO 2015: CRD42015026464.

Results 78 451 unique references were identified, of which 35 (13 studies) evaluated outcomes. Quality of evidence was highly variable, and often related to whether meta-analysis was possible. The strongest evidence for the effectiveness of interventions integrating academic and health education was found in the reduction of substance use in KS2 and KS3, and a meta-analysis for the effectiveness of these interventions in reducing violence victimisation in KS2 did not find an effect. We described intervention components in terms of a) the number of domains (school, classroom, family) targeted, b) the planned duration of the intervention, c) how integration was specified (using literature, teaching study skills, supporting teachers to integrate in their own classrooms).

Discussion There is under-theorisation and understanding of characteristics affecting implementation of integrated academic and health curricula as well as appreciation of how academic attainment and reduced risk-taking may be linked. However, available data suggest that multi-level interventions that aim to erode boundaries—or rather, strengthen pro-social relationships—between academic and health curricula, teachers and students, classrooms and schools and schools and families are likely to have the greatest impact on reducing risk-taking and improving academic outcomes. These programmes may be effective in reducing substance use but do not appear to reduce outcomes related to violence.

Diet and nutrition

DIETARY PATTERN ASSOCIATIONS WITH AGE AT NATURAL MENOPAUSE IN THE UK WOMEN'S COHORT STUDY

[1]Y Dunneram, [2]DC Greenwood, [1]JE Cade*. [1]*Nutritional Epidemiology Group, School of Food Science and Nutrition, University of Leeds, Leeds, UK*; [2]*Division of Epidemiology and Biostatistics, University of Leeds, Leeds, UK*

Background British women spend around one third of their life post-menopausally. The timing of menopause has been linked to several chronic diseases. Evidence shows an association between a later menopause and reduced risk of cardiovascular diseases and osteoporosis, and a higher risk for endometrial, ovarian and breast cancer. It is hypothesized that diet can influence the timing of natural menopause. However, studies reporting this association are limited and contradictory. This study aimed to investigate the prospective association between dietary patterns derived from two different methods and age at natural menopause.

Methods Menopausal status was reported at two time points 4 years apart in the UK Women's Cohort Study. Natural menopause was defined as the permanent cessation of menstrual periods for at least 12 consecutive months. A 217-item food frequency questionnaire was used to measure diet of participants at baseline. Principal component analysis (PCA) and reduced ranked regression (RRR) were used to identify dietary patterns for 13 916 women. Cox proportional hazards regressions were used to estimate hazard ratios (HR) and 95% confidence intervals (CIs) for each pattern in relation to age at natural menopause, adjusting for potential confounders (smoking status, ethanol intake, education level, social class, physical activity level and age at baseline). All analyses were conducted using Stata 14.

Results Five patterns were identified from the PCA which accounted for 16% of variance in dietary intake. These were labelled: 'vegetables and legumes', 'animal proteins', 'fruits', 'fats and sweets' and 'low-fat products'. Three patterns were derived from RRR (29% of the total variance): 'sweets, pastries and puddings', 'low-fat dairy and meat', and 'red meat and processed meat'. Women who scored higher on the 'animal proteins' pattern were 6% less likely to have gone through a natural menopause (HR: 0.94, 95% CI 0.90 to 0.97) compared to those who scored lower. The 'red meat and processed meat' pattern predicted a 7% higher risk for a later natural menopause (HR: 0.93, 95% CI 0.87 to 1.00). No evidence of an association was observed between the other dietary patterns and incidence of being naturally menopausal.

Conclusion This is the first study demonstrating a link between dietary patterns and age at natural menopause. Both PCA and RRR are useful in deriving dietary patterns which can influence the onset of natural menopause. RRR provided a more useful insight for the association between dietary patterns and the timing of menopause in comparison to PCA. These findings will contribute to an improved understanding of the timing of natural menopause in relation to diet, which may also have implications associated with longer term health outcomes in post-menopausal women.

THE ASSOCIATION BETWEEN AN UNHEALTHY CHILDHOOD DIET AND BODY COMPOSITION DEPENDS ON PRENATAL EXPERIENCE: DATA FROM THE SOUTHAMPTON WOMEN'S SURVEY

[1]SR Crozier*, [1]J Baird, [1]HM Inskip, [1,2]NC Harvey, [1,2]SM Robinson, [1,2]C Cooper, [3]M Hanson, [1,2]KM Godfrey. [1]*MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK*; [2]*NIHR Biomedical Research Centre, University of Southampton and University Hospital Southampton, Southampton, UK*; [3]*Institute of Developmental Sciences, University of Southampton, Southampton, UK*

Background The developmental mismatch hypothesis proposes that risk of diseases such as obesity is increased when impaired prenatal nutrition and growth, is followed by an unhealthy childhood diet. We used data from the Southampton Women's Survey (SWS) to investigate whether there was an interaction between conditional growth in fetal abdominal circumference (AC) in late pregnancy and diet at age 6 years on body composition at age 9 years.

Methods 3158 SWS women had live singleton births. AC was measured at 11, 19 and 34 weeks' gestation, birth, and ages 6 months and 1, 2, 3 and 6 years. At age 9 years a subset had dual-energy X-ray absorptiometry (DXA) scans. Among mothers with a reliable menstrual history, enabling precise gestation determination, 582 children had DXA measurements. Fat, lean and bone mass at age 9 years were transformed to z-scores.

AC z-scores for age were created and conditional AC growth between each pair of consecutive time points calculated. At age 6 years a 'prudent' dietary pattern was identified using principal component analysis, characterized by frequent consumption of fruit, vegetables and fish. Linear regression models were fitted to assess effects of AC growth on 9-year