Public Health England

Protecting and improving the nation's health

NHS Health Check programme:

Annotated Bibliography: November 14th 2018 – 30th April 2019

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. It does this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. PHE is an operationally autonomous executive agency of the Department of Health.

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A review of NHS Health Check literature

1. Introduction

The NHS Health Check is a National programme that aims to prevent heart disease, stroke, diabetes and kidney disease, and raise awareness of dementia both across the population and within high risk and vulnerable groups.

A key part of the programme's governance structure is the expert scientific and clinical advisory group (ESCAP). The ESCAP provides an expert forum for the NHS Health Check policy, acting in an advisory capacity to support successful roll-out, maintenance, evaluation and continued improvement based on emerging and best evidence. In its first meeting ESCAP agreed to progress an initial, broad literature review to identify evidence relevant to the NHS Health Check programme. This remit was later expanded to include identification of evidence on general health checks, diabetes/ cardiovascular disease (CVD) risk screening in the population and CVD prevention in primary care . The methods and findings of that review are set out here.

2. Methods

Medline, PubMed, Embase, Health Management Information Consortium (HMIC), Cumulative Index of Nursing and Allied Health Literature (CINAHL), Global Health, PsycInfo, the Cochrane Library, NICE Evidence Search, TRIP database, Google Scholar, Google, Clinical Trials.gov, ISRCTN registry and Prospero were searched for references relevant to the NHS Health Check programme, general health checks, diabetes and cardiovascular screening and cardiovascular disease prevention.

Previous searches had identified references from between January 1996 and November 13th 2018. This search identifies references from November 14th 2018 to April 30th 2019. The cut-off date for internet searches was **May 1st 2019.**

Table 1. Search strategies

Database	Search strategy
Ovid Medline	1. health check*.tw. 2. (diabetes adj3 screen*).tw. 3. (cardiovascular adj3 screen*).tw. 4. (population adj2 screen*).tw. 5. (risk factor adj3 screen*).tw. 6. (opportunistic adj3 screen*).tw. 7. medical check*.tw. 8. general check*.tw. 9. periodic health exam*.tw. 10. annual exam*.tw. 11. annual review*.tw. 12. NHSHC.tw. 13. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 14. cardiovascular adj3 prevention.tw. 15. (primary care or general practice or primary healthcare).tw 16. 14 and 15 17. Cardiovascular Diseases/ AND Primary Prevention/ 18. 16 or 17 19. 13 or 18 20. 2018011*.dt. 21. 201812*.dt. 22. 2019*.dt. 23. 20 or 21 or 22 24. 19 and 23
PubMed	1. health check* 2. diabetes screen* 3. cardiovascular screen* 4. population screen* 5. risk factor screen* 6. opportunistic screen* 7. medical check* 8. general check* 9. periodic health exam* 10. annual exam* 11. annual review* 12. NHSHC 13. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 14. Cardiovascular Diseases AND Primary Prevention[MeSH Terms] 15. "primary care"[Text Word] OR "general practice"[Text Word] OR "primary healthcare"[Text Word]) 16. (cardiovascular[Text Word] AND prevention[Text Word]) 17. #15 and #16 18. #14 or #17 19. #13 or #18 Filters: Publication date from 2018/11/14 to 2019/04/30

Ovid Embase

1. health check*.tw.
2. (diabetes adj3 screen*).tw.
3. (cardiovascular adj3 screen*).tw.
4. (population adj2 screen*).tw.
5. (risk factor adj3 screen*).tw.
6. (opportunistic adj3 screen*).tw.
7. medical check*.tw.
8. general check*.tw.
9. periodic health exam*.tw.
10. annual exam*.tw.
11. annual review*.tw.
12. NHSHC.tw.
13. periodic medical examination/
14. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13
15. cardiovascular adj3 prevention.tw.
16. (primary care or general practice or primary healthcare).tw
17. 15 and 16
18. cardiovascular disease/ AND primary prevention/
19. 17 or 18
20. 14 or 19
21. limit 20 to dc=20181114-20190430

Ovid HMIC

1 "health check*".af.
2 health checks/
3 (cardiovascular or vascular or heart or diabetes or stroke).af.
4 (screen* or risk).af.
5 3 AND 4
6 1 OR 2 or 5
7 cardiovascular adj3 prevention.tw.
8 (primary care or general practice or primary healthcare).tw
9 7 and 8
10 Cardiovascular diseases/ AND exp preventive medicine/
11 9 or 10
12 6 or 11
13 limit 12 to yr="2018-2019"

EBSCO CINAHL	S12 S10 AND S11 S11 S1 OR S2 OR S9 S10 EM 20181114-20190430 S9 S5 OR S8 S8 S6 AND S7 S7 (MH "Preventive Health Care+") S6 (MH "Cardiovascular Diseases+") S5 S3 AND S4 S4 "primary care" or "general practice" or "primary healthcare" S3 TX cardiovascular N3 prevention S2 (diabetes N3 screen*) OR (cardiovascular N3 screen*) OR (population N2 screen*) OR (risk factor N3 screen*) OR (opportunistic N3 screen*) OR “medical check*” OR “general check*” OR “periodic health exam*” OR “annual exam*” OR "annual review*" OR NHSHC S1 health check*
EBSCO Global Health	S10 S6 OR S19 OR S3 Limiters - Publication Year: 2018-2019 S9 S7 AND S8 S8 DE "preventive medicine" S7 DE "cardiovascular diseases" S6 S4 AND S5 S5 "primary care" or "general practice" or "primary healthcare" S4 TX cardiovascular N3 prevention S3 S1 OR S2 S2 (diabetes N3 screen*) OR (cardiovascular N3 screen*) OR (population N2 screen*) OR (risk factor N3 screen*) OR (opportunistic N3 screen*) OR “medical check*” OR “general check*” OR “periodic health exam*” OR “annual exam*” OR "annual review*" OR NHSHC S1 health check*
Ovid PsycInfo	1. health check*.tw. 2. (diabetes adj3 screen*).tw. 3. (cardiovascular adj3 screen*).tw. 4. (population adj2 screen*).tw 5. (risk factor adj3 screen*).tw. 6. (opportunistic adj3 screen*).tw. 7. medical check*.tw. 8. general check*.tw. 9. periodic health exam*.tw. 10. annual exam*.tw. 11. annual review*.tw. 12. NHSHC.tw. 13. health screening/ or physical examination/ 14. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 15. (cardiovascular adj3 prevention).tw. 16. (primary care or general practice or primary healthcare).tw. 17. 15 and 16 18. CARDIOVASCULAR DISORDERS/ and PREVENTIVE MEDICINE/ 19. 17 or 18 20. 14 or 19 21. limit 20 to up=20181114-20190430

Cochrane Library (Wiley)	#1 "health check*" #2 (diabetes next/3 screen*) or (cardiovascular next/3 screen*) or (population next/2 screen*) or (opportunistic next/2 screen*) or ("risk factor" next/3 screen*) or "medical check*" or "general check*" or "periodic health exam*" or "annual exam*" or "annual review*" or NHSHC #3 cardiovascular adj3 prevention.tw. #4 (primary care or general practice or primary healthcare).tw #5 #3 and #4 #6 MeSH descriptor: [Cardiovascular Diseases] this term only #7 MeSH descriptor: [Primary Prevention] explode all trees #8 #6 and #7 #9 #5 or #8 #10 #1 or #2 or #9 with Cochrane Library publication date in The last 6 months
NHS Evidence	"*health check"* OR *cardiovascular prevention primary* Limited to 14/11/2018 to 30/04/2019
TRIP database	*title:cardiovascular prevention primary from:2018* *"nhs health check" from:2018*
Google Scholar	*"nhs health check"* *cardiovascular "health check"* *cardiovascular prevention primary care* *nhs health check program* Since 2018, sorted by date.
Google	"*nhs health check*" *cardiovascular prevention "primary care"* *cardiovascular "health check*" *CVD risk prediction* *nhs health check program* Limited to 14/11/2018 to 30/04/2019
Clinical trials.gov, ISRCTN, Prospero	*"health check",* Limited to 14/11/2018 to 30/04/2019

Citation titles and abstracts were then screened in order to determine whether or not they were relevant. Those citations considered relevant were categorised using the PHE Types of Information, and are listed below in section 4. Categorisation has been based on information provided by authors/indexers and has not been independently verified. No appraisal of individual resources has been undertaken. A summary of the main aim, methods and results of each citation is provided, as well as a link to the abstract or full text, if available. If the full text of an article is not freely available online, it may be available via the PHE Knowledge & Library Services or OpenAthens.

3. Results

The number of references identified are shown in table 2 and 2a.

Table 2. Citations published/entered between November 14th 2018 and April 30th 2019

Database	No. of hits	Exclusive (non duplicates)
Ovid Medline (Nov 14th 2018 – Apr 29th 2019)	1109	1102
PubMed (Nov 14th 2018 – Apr 30th 2019)	848	206
Ovid Embase (Nov 14th 2018 – Apr 29th 2019)	1857	1023
Ovid HMIC (up to latest edition Jan 2019)	42	40
EBSCO Global Health (Nov 2018- Apr 2019)	97	46
EBSCO CINAHL (Nov 14th 2018 – Apr 29th 2019)	758	619
Ovid PsycInfo (Nov 14th 2018 – Apr week 4 2019)	145	114
Cochrane Library (Issue 4 of 12, April 2019)	419	350
NICE Evidence (Nov 14th 2018 – Apr 30th 2019)	58	45
TRIP database (2018-2019)	105	68
TOTAL		

Table 2a. Citations added to internet sources between Nov 14th 2018 and Apr 30th 2019

Internet sources	No. of hits
Google Scholar (2018-2019)	32
Google (Nov 14th 2018 –1st May 2019)	23*
Trials registers, Prospero (2018-2019)	1*
TOTAL	

**Note: it is not possible to know how many of these are unique citations.*

From these results, 10 were identified as being relevant to the NHS Health Check programme, 9 to general health checks and 99 to diabetes/cardiovascular disease risk screening or CVD prevention.

Total relevant references = 118

- **NHS Health Checks = 10**
- **general health checks = 9**
- **diabetes/cardiovascular disease screening or CVD prevention = 99**

4. References on the NHS Health Check Programme (10)

Systematic reviews

Baart, S. J., Dam, V., Scheres, L. J. J., et al. 2019. **Cardiovascular risk prediction models for women in the general population: A systematic review**. PLoS One 14(1) e0210329.
AIM: To provide a comprehensive overview of cardiovascular disease (CVD) risk prediction models for women and models that include female-specific predictors.
METHOD: We performed a systematic review of CVD risk prediction models for women in the general population by updating a previous review. We searched Medline and Embase up to July 2017 and included studies in which; (a) a new model was developed, (b) an existing model was validated, or (c) a predictor was added to an existing model.
RESULTS: A total of 285 prediction models for women have been developed, of these 160 (56%) were female-specific models, in which a separate model was developed solely in women and 125 (44%) were sex-predictor models. Out of the 160 female-specific models, 2 (1.3%) included one or more female-specific predictors (mostly reproductive risk factors). A total of 591 validations of sex-predictor or female-specific models were identified in 206 papers. Of these, 333 (56%) validations concerned nine models (five versions of Framingham, SCORE, Pooled Cohort Equations and QRISK). The median and pooled C statistics were comparable for sex-predictor and female-specific models. In 260 articles the added value of new predictors to an existing model was described, however in only 3 of these female-specific predictors (reproductive risk factors) were added.
CONCLUSION: There is an abundance of models for women in the general population. Female-specific and sex-predictor models have similar predictors and performance. Female-specific predictors are rarely included. Further research is needed to assess the added value of female-specific predictors to CVD models for women and provide physicians with a well-performing prediction model for women.
View full text

Collins, R., Silarova, B. & Clare, L. 2018. **Dementia Primary Prevention Policies and Strategies and Their Local Implementation: A Scoping Review Using England as a Case Study**. Journal of Alzheimer's Disease 28 28.
AIM: Using England as a case study, we review policies and strategies relevant to dementia prevention from the national to local level and how these are translated into primary healthcare services, including NHS Health Check.
METHOD: We conducted a scoping review covering: 1) identification of national, regional, and local policies and strategies that include dementia prevention; 2) identification of national guidelines for implementing dementia prevention at the clinical level; and 3) evaluation of the implementation of these at the clinical level.
RESULTS: Dementia prevention is addressed in national policy, and this filters through to regional and local levels. Focus on dementia prevention is limited and variable. Reference to modifiable risk factors is associated with other non-communicable diseases, placing less emphasis on factors more dementia specific. Evidence of implementation of dementia prevention policies at the clinical level is limited and inconsistent. Available evidence suggests messages about dementia prevention may best be delivered through primary healthcare services such as the National Health Service (NHS) Health Check.
CONCLUSION: The limitations identified in this review could be addressed through development of a national policy focused specifically on dementia prevention. This could provide a platform for increasing knowledge and understanding among the general population and healthcare professionals. It would be important for such a policy to cover the full range of modifiable risk factors relevant to dementia.
View full text

Trials

Gidlow, C. J., Ellis, N. J., Riley, V., et al. 2019. **Randomised controlled trial comparing uptake of NHS Health Check in response to standard letters, risk-personalised letters and telephone invitations**. BMC Public Health 19(1) 224.
AIM: to explore the potential to improve NHS Health Check uptake through personalising letters to patient's CVD risk, and to compare this with generic letters and telephone invitations.
METHOD: HEalth Check TRial (HECTR) was a three-arm randomised controlled trial in nine general practices in Staffordshire (UK). Eligible patients were randomised to be invited to a NHS Health Check using one of three methods: standard letter (control); telephone invitation; letter personalised to the patient's CVD risk. The primary

outcome was attendance/non-attendance. Data were collected on a range of patient- and practice-level factors (e.g., patient socio-demographics, CVD risk, practice size, Health Checks outside usual working hours).
RESULTS: In total, 4614 patients were included in analysis (mean age 50.2 +/- 8.0 yr.; 52.4% female). Compared with patients invited by standard letter (30.9%), uptake was significantly higher in those invited by telephone (47.6%, P < .001), but not personalised letter (31.3%, p = .812). In multi-level analysis, compared with the standard letter arm, likelihood of attendance was 18 percentage points higher in the telephone arm and 4 percentage points higher in the personalised letter arm. The effect of telephone calls appeared strongest in patients who were younger and had lower CVD risk. We estimated per 1000 patients invited, risk-personalised letters could result in 40 additional attended Health Checks (at no extra cost) and telephone invitations could result in 180 additional Health Checks at an additional cost of 240.
CONCLUSION: Telephone invitations should be advocated to address the substantial deficit between current and required levels of NHS uptake, and could be targeted at younger and lower CVD risk adults. Risk-personalised letters should be explored further in a larger sample of high risk individuals.
View full text

Cohort studies

Lindbohm, J. V., Sipila, P. N., Mars, N. J., et al. 2019. **5-year versus risk-category-specific screening intervals for cardiovascular disease prevention: a cohort study**. The Lancet. Public Health 4(4) e189-e199.
AIM: to compare different screening intervals in terms of timely detection of high-risk individuals, cardiovascular events prevented, and health-care costs.
METHOD: We used data from participants in the British Whitehall II study (aged 40-64 years at baseline) who had repeated biomedical screenings at 5-year intervals and linked these data to electronic health records between baseline (Aug 7, 1991, to May 10, 1993) and June 30, 2015. We estimated participants' 10-year risk of a major cardiovascular event (myocardial infarction, cardiac death, and fatal or non-fatal stroke) using the revised Atherosclerotic Cardiovascular Disease (ASCVD) calculator. We used multistate Markov modelling to estimate optimum screening intervals on the basis of progression rates from low-risk and intermediate-risk categories to the high-risk category (ie, >=7.5% 10-year risk of a major cardiovascular event). Our assessment criteria included person-years spent in a high-risk category before detection, the number of major cardiovascular events prevented and quality-adjusted life-years (QALYs) gained, and screening costs.
RESULTS: Of 6964 participants (mean age 50.0 years [SD 6.0] at baseline) with 152 700 person-years of follow-up (mean follow-up 22.0 years [SD 5.0]), 1686 participants progressed to the high-risk category and 617 had a major cardiovascular event. With the 5-year screening intervals, participants spent 7866 (95% CI 7130-8658) person-years unrecognised in the high-risk group. For individuals in the low, intermediate-low, and intermediate-high risk categories, 21 alternative risk category-based screening intervals outperformed the 5-yearly screening protocol. Screening intervals at 7 years, 4 years, and 1 year for those in the low, intermediate-low, and intermediate-high-risk category would reduce the number of person-years spent unrecognised in the high-risk group by 62% (95% CI 57-66; 4894 person-years), reduce the number of major cardiovascular events by 8% (7-9; 49 events), and raise 44 QALYs (40-49) for the study population.
CONCLUSION: In terms of timely preventive interventions, the 5-year screening intervals were unnecessarily frequent for low-risk individuals and insufficiently frequent for intermediate-risk individuals. Screening intervals based on risk-category-specific progression rates would perform better in terms of preventing major cardiovascular disease events and improving cost-effectiveness
View full text

Alageel, S. & Gulliford, M. C. 2018. **Effect of the NHS Health Check programme on cardiovascular disease risk factors during 6 years' follow-up: matched cohort study**. The Lancet 392 S17.
AIM: to evaluate the effect of the NHSHC programme up to 6 years after its implementation on risk factors and provision of risk management interventions.
METHOD: We conducted a population-based matched cohort study using primary care electronichealth records from the Clinical Practice Research Datalink. Case participants had received the NHSHC in England between April 1, 2010, and Dec 31, 2013. A control cohortmatched for age, sex, and general practice did not receive a health check. All participants with matched controls were included in the analysis. An interrupted time-series analysis was conducted to evaluate changes in body-mass index, blood pressure, total cholesterol,and smoking. The association between the NHSHC and risk management interventions was evaluated using time-to-event analysis. All models were adjusted for age, sex, and fifth of deprivation.
RESULTS: There were 127 891 NHSHC participants and 322 910 matched controls. After 6 years'follow-up, men and women who had received a health check had lower body-mass index(by 0·30 kg/m 2 [95% CI 0·16–0·44] and

0·30 [0·14–0·46], respectively) and lower systolic blood pressure(by 1.20 mm Hg [95% CI 0·81–1·59] and 1·58 [1·21–1·95], respectively) than controls.The NHSHC was not associated with observable effects on total cholesterol. Althoughsmoking was initially less frequent among NHSHC participants, men and women in thehealth check group were more likely to be non-smokers than controls at the end offollow-up (men, odds ratio 0·89 [95% CI 0·84–0·94]; women, 0·91 [0·86–0·97]). TheNHSHC was associated with an increase in the prescribing of statins (hazard ratio1·24, 95% CI 1·21–1·27) and provision of smoking cessation interventions (3·20, 3·13–3·27). CONCLUSION: The largest benefit of the NHSHC programme was observed in relation to reductions in smoking prevalence up to 6 years after implementation of the NHSHC. There were minor reductions in other risk factors that might not have public health relevance.
View abstract

Cross-sectional studies

Rawlinson, G. 2019. **Health promotion in physiotherapy services using NHS health and diabetes checks**. British Journal of Healthcare Management 25(1) 22-31.
AIM: to show how physiotherapists have a role to play in increasing uptake in NHS Health Check and the National Diabetes Prevention Programme
METHOD: An enhanced health promotion service, using support staff, was implemented into a physiotherapy-led musculoskeletal service including the provision of NHS Health Checks and diabetes checks. Evaluation included descriptive statistical analysis, documentary analysis and qualitative review.
RESULTS: In total, 1550 health assessments were completed with 43% eligible for a HbA1c test and 17% were eligible for an NHS Health Check. Service evaluation feedback from patients and GPs was wholly positive and social prescribing increased.
CONCLUSION: This service describes a successful model for embedding NHS Health Checks and diabetes checks into a musculoskeletal service, providing opportunistic health promotion and behaviour change interventions and reducing the duplication of different public health initiatives. This service uses an untapped allied health professional public health workforce to support an identification of disease, behaviour change, self-care and social prescribing within the holistic management of musculoskeletal conditions.
View abstract

Qualitative

Brangan, E., Stone, T. J., Chappell, A., et al. 2018. **Patient experiences of telephone outreach to enhance uptake of NHS Health Checks in more deprived communities and minority ethnic groups: A qualitative interview study**. Health Expectations 25 25.
AIM: to explore the experiences of patients who received an outreach call to engage them with NHS Health Checks
METHOD: Thematic analysis of semi-structured interviews with 24 patients (15 female), from seven primary care practices, who had received an outreach call.
RESULTS: The call increased participants' understanding of NHS Health Checks and overcame anticipated difficulties with making an appointment. Half reported that they would not have booked if only invited by letter. The cultural identity/language skills of the caller were important in facilitating the interaction for some who might otherwise encounter language or cultural barriers. The inclusion of lifestyle questions and signposting prompted a minority to make lifestyle changes.
CONCLUSION: Participants valued easily generalizable aspects of the intervention-a telephone invitation with ability to book during the call-and reported that it prompted acceptance of an NHS Health Check. A caller who shared their main language/cultural background was important for a minority of participants, and improved targeting of this would be beneficial.
View abstract

Cupit, C. S. 2018. **An ethnographic study of cardiovascular disease prevention: the social organisation of measures, knowledge, interventions and tensions in English general practice**. phD thesis, University of Leicester.
AIM: This thesis explores the tensions between an institutional knowledge of prevention and a local, experienced knowledge of what is required to improve health, their impact, and how both HCPs' and patients' activities are coordinated remotely from the frontline of general practice
METHOD: Uses institutional ethnography to explore how patients' (and healthcare professionals') knowledge and practices are socially organised.

RESULTS: A suite of 'lifestyle' and pharmaceutical interventions are promoted by policymakers as evidence-based approaches to preventing cardiovascular disease (including heart attacks and strokes) within the population. The flagship Health Check programme aims to prompt people to make changes to their diet and exercise habits, and identify some who will benefit from additional interventions to reduce their risk. However, interviews with patients, observation of preventive care in practice, and the concerns of some general practitioners suggest that cardiovascular disease prevention is not as simple or unproblematic as it first appears; patients' knowledge of their own health needs is often at odds with the preventive care provided. Patients look for a discussion with healthcare professionals about how they can best implement preventive approaches, but find that they are given standardised 'automated' responses which do not take account of their own individual circumstances or preferences.
CONCLUSION: Despite prominent notions of 'shared decision-making' and patient involvement written into clinical guidelines, and despite healthcare professionals striving to provide 'patient centred care', tensions persist between an institutional knowledge of prevention and a local, experienced knowledge of what is required to improve health.
View full text

Hyseni, L., Guzman-Castillo, M., Kypridemos, C., et al. 2018. **Engaging with stakeholders to inform the development of a computer model for the NHS Health Check programme: a qualitative study**. The Lancet 392 (Supplement 2) S45.
AIM: to facilitate engagement with stakeholders; develop a shared understanding of current implementation of NHSHC; identify what is working well, less well, and future hopes; and explore features and specifications to include in the modelling tool (workHORSE)
METHOD: This qualitative study identified key stakeholders across the UK via networking and snowball techniques. The stakeholders spanned local (NHS commissioners, general practitioners, academics), third sector, and national (including Public Health England and the National Institute for Health and Care Excellence) organisations. 15 stakeholders participated in the workshop. Using the Hovmand group model-building approach we engaged participants in a series of pre-piloted, structured, small group exercises, so that stakeholders could share experiences and expertise, had the opportunity for an iterative process to achieve consensus, and could experience first-hand how their knowledge and expertise is informing and directing the project. Framework Analysis was used to analyse responses.
RESULTS: Issues discussed reflected stakeholders' perspectives (local, regional, and national) and themes emerged accordingly (ie, in the context of the local or national perspective, or both). There was continued financial and political support for the NHSHC. However, many stakeholders highlighted issues concerning lack of data on processes and outcomes, variability in quality of delivery, and suboptimal public engagement. Stakeholders' hopes included maximising coverage, uptake, and referrals, and producing additional evidence on population health, equity, and economic impacts. Key model suggestions focused on developing good-practice template scenarios, analysis of broader prevention activities at local level, accessible local data, broader economic perspectives, and fit-for-purpose outputs.
CONCLUSION: A shared understanding of the current implementations of the NHSHC was developed. Suggestions for improvement are informing upcoming workHORSE workshops and model development. Ensuring diverse stakeholder inclusion was a challenge. Although this study centres on the NHSHC provided in England, the findings are transferable and will be of interest to the Health Check programme in the rest of the UK because of the cross-section of stakeholders involved
View abstract

Ongoing research

Gidlow, C. J., Ellis, N. J., Cowap, L., et al. 2019. **A qualitative study of cardiovascular disease risk communication in NHS Health Check using different risk calculators: protocol for the RIsk COmmunication in NHS Health Check (RICO) study**. BMC Family Practice 20(1) 11.
AIM: to explore practitioner and patient CVD risk perceptions when using QRISK2 or JBS3, the associated advice or treatment offered by the practitioner, and patients' responses.
METHOD: RIsk COmmunication in NHS Health Check (RICO) is a qualitative study with quantitative process evaluation. Twelve general practices in the West Midlands of England will be randomised to one of two groups: usual practice, in which practitioners use QRISK2 to assess and communicate CVD risk; intervention, in which practitioners use JBS3. Twenty Health Checks per practice will be video-recorded (n = 240, 120 per group), with patients stratified by age, gender and ethnicity. Post-Health Check, video-stimulated recall (VSR) interviews will be conducted with 48 patients (n = 24 per group) and all practitioners (n = 12-18), using video excerpts to enhance

participant recall/reflection. Patient medical record reviews will detect health-protective actions in the first 12-weeks following a Health Check (e.g., lifestyle referrals, statin prescription). Risk communication, patient response and intentions for health-protective behaviours in each group will be explored through thematic analysis of video-recorded Health Checks (using Protection Motivation Theory as a framework) and VSR interviews. Process evaluation will include between-group comparisons of quantitatively coded Health Check content and post-Health Check patient outcomes. Finally, 10 patients with the most positive intentions or behaviours will be selected for case study analysis (using all data sources).
RESULTS/CONCLUSION: This study will produce novel insights about the utility of QRISK2 and JBS3 to promote patient and practitioner understanding and perception of CVD risk and associated implications for patient intentions with respect to health-protective behaviours (and underlying mechanisms). Recommendations for practice will be developed.
Note: this is the published protocol from a trial registered in Feb 2017.
View full text

References relating to general health checks (9)

Evidence summaries

Burch, J. & Eisenhut, M. 2019. **Question: What are the effects of general health checks for reducing morbidity and mortality from disease in adults?** Cochrane Clinical Answers (3rd April).
AIM: Cochrane Clinical Answers (CCAs) provide a readable, digestible, clinically-focused entry point to rigorous research from Cochrane Reviews. They are designed to be actionable and to inform point-of-care decision-making.
METHOD: each answer contains a clinical question, a short answer, and data for the outcomes from a relevant Cochrane Review
RESULTS: High- to moderate-certainty evidence shows that screening for more than one disease or risk factor through health checks does not impact all-cause, cardiovascular, or cancer mortality, nor rates of ischemic heart disease or stroke, over a 4 to 30-year period of follow-up. Regular health checks had no apparent impact on hospitalizations (five trials; 22,651 participants). One large trial (10,713 participants) showed that more people who had health checks rather than no health checks reported that they had a chronic condition (61% vs 54% of people).
CONCLUSION: Effects of health checks on specific types of morbidity (cardiovascular, respiratory, endocrine, cancer-related) were inconsistent across trials and often were self-reported. Therefore, it is difficult to determine the benefits of health screening.
View full text

Systematic reviews

Krogsboll, L. T., Jorgensen, K. J. & Gotzsche, P. C. 2019. **General health checks in adults for reducing morbidity and mortality from disease**. Cochrane Database of Systematic Reviews 1 CD009009. 31st Jan.
Note: This is the first update of the review published in 2012 - one new trial was identified and mortality data included from one exisiting trial.
AIM: To quantify the benefits and harms of general health checks.
METHODS: A Cochrane Systematic Review, searching CENTRAL, MEDLINE, Embase, two other databases and two trials registers on 31 January 2018. Two review authors independently screened titles and abstracts, assessed papers for eligibility and read reference lists. One review author used citation tracking (Web of Knowledge) and asked trial authors about additional studies. We included randomised trials comparing health checks with no health checks in adults unselected for disease or risk factors.
RESULTS: We included 17 trials, 15 of which reported outcome data (251,891 participants). Risk of bias was generally low for our primary outcomes. Health checks have little or no effect on total mortality (risk ratio (RR) 1.00, 95% confidence interval (CI) 0.97 to 1.03; 11 trials; 233,298 participants and 21,535 deaths; high-certainty evidence, I² = 0%), or cancer mortality (RR 1.01, 95% CI 0.92 to 1.12; 8 trials; 139,290 participants and 3663 deaths; high-certainty evidence, I² = 33%), and probably have little or no effect on cardiovascular mortality (RR 1.05, 95% CI 0.94 to 1.16; 9 trials; 170,227 participants and 6237 deaths; moderate-certainty evidence; I² = 65%). Health checks have little or no effect on fatal and non-fatal ischaemic heart disease (RR 0.98, 95% CI 0.94 to 1.03; 4 trials; 164,881 persons, 10,325 events; high-certainty evidence; I² = 11%), and probably have little or no effect on fatal and non-fatal stroke (RR 1.05 95% CI 0.95 to 1.17; 3 trials; 107,421 persons, 4543 events; moderate-certainty evidence, I² = 53%).
CONCLUSION: General health checks are unlikely to be beneficial
View full text

Kwee, R. M. & Kwee, T. C. 2019. **Whole-Body MRI for Preventive Health Screening: A Systematic Review of the Literature**. Journal of Magnetic Resonance Imaging 01 01.
AIM: to systematically review the prevalence of whole-body MRI findings, including cardiovascular MRI, in asymptomatic subjects.
METHODS: Systematic review and meta-analysis. MEDLINE and Embase were searched for original studies reporting whole-body MRI findings in asymptomatic adults without known disease, syndrome, or genetic mutation. Twelve studies, comprising 5373 asymptomatic subjects, were included. The whole-body MRI literature

findings were extracted and reviewed by two radiologists in consensus for designation as either critical or indeterminate incidental finding
RESULTS: Pooled prevalences of critical and indeterminate incidental findings together and separately were 32.1% (95% confidence interval [CI]: 18.3%, 50.1%), 13.4% (95% CI: 9.0%, 19.5%), and 13.9% (95% CI: 5.4%, 31.3%), respectively. There was substantial between-study heterogeneity (I² = 95.6-99.1). Pooled prevalence of critical and indeterminate incidental findings together was significantly higher in studies that included (cardio)vascular and/or colon MRI compared with studies that did not (49.7% [95% CI, 26.7%, 72.9%] vs. 23.0% [95% CI, 5.5%, 60.3%], P < 0.001). Pooled proportion of reported verified critical and indeterminate incidental findings was 12.6% (95% CI: 3.2%, 38.8%). Six studies reported false-positive findings, yielding a pooled proportion of 16.0% (95% CI: 1.9%, 65.8%). None of the included studies reported long-term (>5-year) verification of negative findings. Only one study reported false-negative findings, with a proportion of 2.0%.
CONCLUSION: Prevalence of critical and indeterminate incidental whole-body MRI findings in asymptomatic subjects is overall substantial and with variability dependent to some degree on the protocol. Verification data are lacking. The proportion of false-positive findings appears to be substantial.
View full text

Cohort studies

Nishi, T., Babazono, A. & Maeda, T. 2019. **Association between income levels and irregular physician visits after a health checkup, and its consequent effect on glycemic control among employees: A retrospective propensity score-matched cohort study**. Journal of Diabetes Investigation 13 13.
AIM: to evaluate the effects of income levels on physician visit patterns and quantify the consequent impact of irregular physician visits on glycemic control among employees' health insurance beneficiaries in Japan.
METHOD: We obtained specific health checkup data of untreated diabetes patients from the Fukuoka branch of the Japanese Health Insurance Association. We selected 2,981 insurance beneficiaries and classified 650 and 2,331 patients into, respectively, the regular visit and irregular visit group. We implemented propensity score matching to select an adequate control group.
RESULTS: Compared with those with a standard monthly income <$2,000 (US$1 = 100), those with a higher monthly income were less likely to have irregular visits; $2,000-2,999: odds ratio 0.74 (95% confidence interval 0.56-0.98), $3,000-3,999: odds ratio 0.63 (95% confidence interval 0.46-0.87) and >=$5,000: odds ratio 0.58 (95% confidence interval 0.39-0.86). After propensity score matching and adjusting for covariates, the irregular visit group tended to have poor glycemic control; increased glycated hemoglobin >=0.5: odds ratio 1.90 (95% confidence interval 1.30-2.77), >=1.0: odds ratio 2.75 (95% confidence interval 1.56-4.82) and >=20% relatively: odds ratio 3.18 (95% confidence interval 1.46-6.92).
CONCLUSION: We clarified that there was a significant relationship between income and irregular visits, and this consequently resulted in poor glycemic control. These findings would be useful for more effective disease management.
View full text

Cross-sectional studies

Gawlik, K., Melnyk, B. M., Tan, A., et al. 2019. **Heart checks in college-aged students link poor sleep to cardiovascular risk**. Journal of American College Health 67(2) 113-122.
AIM: to describe the relationships between the cardiovascular health, lifestyle behaviors, and lifestyle beliefs among college-aged students.
METHODS: Seven hundred and twenty-nine college-aged students participated between October 2016 and April 2017. Heart checks, consisting of a cross-sectional survey and biometric screening, were conducted on a large Midwestern university campus.
RESULTS: A small proportion of students (24.5%) engaged in the recommended 150+ minutes of physical activity per week and 7.9% consumed 5+ servings of fruit/vegetables daily. Half (49.6%) slept 7 hours or less per night. Biometric screenings found that 26.4% of the students had high stress, 31.9% were overweight or obese, and 17.3% had prehypertension or hypertension. Less sleep was significantly associated with higher risks of being stressed, being overweight/obese, and having elevated blood pressure.
CONCLUSION: Early detection, treatment, and education is critical to identify individuals at risk for cardiovascular disease and to promote healthy lifestyle changes before heart disease develops or progresses.
View full text

Noguchi, R. & Shen, J. 2019. **Factors affecting participation in health checkups: Evidence from Japanese survey data**. Health Policy 123(4) 360-366.
AIM: to investigate key determinants of the health checkup decision by using 2696 Japanese respondents' data from a questionnaire survey entitled "Preference Parameters Study" that was conducted in four countries by the Global Centers of Excellence program at Osaka University.
METHOD: In the Probit and OLS regressions, other than relevant personal attributes being identified, the hyperbolic discounter dummy and its interaction terms with respondents' health behaviors were also included as independent variables.
RESULTS: The results suggest that some socio-demographic variables such as gender, age, income, household size, occupational status, educational level are significant.
CONCLUSION: Hyperbolic discounters are found to be more likely than non-hyperbolic discounters to seek health checkups, which indicates that the effect of time preference on health checkup behavior differs significantly among the different types of time discount structures.
View full text

Saunders, N. R., Guan, J., Fu, L., et al. 2019. **Periodic health visits by primary care practice model, a population-based study using health administrative data**. BMC Family Practice 20(1) 42.
AIM: to determine how use of the periodic health visit for healthy individuals without comorbidities, despite evidence against its use, differed by primary care model.
METHODS: Population-based cross-sectional study using linked health and administrative datasets in Ontario, Canada, where most residents are insured for physician services through Ontario's single payer, provincially funded Ontario Health Insurance Plan. Participants included all living adults (> 19 years) in Ontario on January 1st, 2014, eligible for the Ontario Health Insurance Plan. Primary care enrollment model was the main exposure and included traditional fee-for-service, enhanced fee-for-service, capitation, team-based care, other (including salaried), and unenrolled. The main outcome measure was receipt of a periodic health visit during 2014. Age-sex standardized rates of periodic health visits performed during the one-year study period were analyzed by number of comorbid conditions.
RESULTS: Of 10,712,804 adults in Ontario, 2,350,386 (21.9%) had a periodic health visit in 2014. The age-sex standardized rate was 6.1% (95% confidence interval [CI] 6.0, 6.1%) for healthy individuals. In the traditional fee-for-service model, the periodic health visit was performed for 55.3% (95% CI 54.4, 56.3%) of healthy individuals versus 10.2% (95% CI 10.0, 10.3%) in team-based care. Periodic health visit rates varied by primary care provider models. Traditional and enhanced fee-for-service models had higher rates across all comorbidity groups.
CONCLUSION: Patients whose primary care physicians are funded exclusively through fee-for-service had the highest rates of periodic health visits in healthy individuals. Primary care reform initiatives must consider the influence of remuneration on providing evidence-based primary care.
View full text

Qualitative

Broholm-Jorgensen, M., Kamstrup-Larsen, N., Guassora, A. D., et al. 2019. **'It can't do any harm': A qualitative exploration of accounts of participation in preventive health checks**. Health, Risk & Society, 21 (1–2), 57–73.
AIM: to explore why people without formal education participate in preventive health checks and discuss how this is related to their understandings of risk and health.
METHOD: We conducted semi-structured qualitative interviews with people without formal education who participated in the intervention study Check-in. Check-in evaluated the effect of an invitation of people aged 45-64 without formal education beyond lower secondary school (grades 7-9) to a prescheduled preventive health check in general practice. In this way, Check-in provided the empirical context of this study.
RESULTS: Within our analysis we identified four participation styles representing different ways of participating in preventive health checks: 1) selective participation, 2) participation to control uncertainty, 3) feeling an obligation to participate and 4) participation to change the healthcare system. Across the participation styles, we found that participants attended the preventive health check for reasons other than getting help to change their health behaviour and that the accounts of participation were socially embedded. Participants ascribed and assessed risk and health in relation to their immediate network and everyday lives and thereby presented risk perceptions differently from the general preventive messages.
CONCLUSION: From these findings we suggest that preventive health checks should be based on participants' context-dependent needs.
View full text

Ongoing research

Richardson, N. 2018. **The 'Farmers Have Hearts' Study: Can a workplace cardiovascular health check followed by health promotion texts and/or health coaching by phone improve behaviours affecting heart and circulatory system health in livestock farmers?** ISRCTN26792329

AIM: to investigate whether a tailored intervention is effective in prompting Irish farmers to adopt sustainable behaviour change to improve their health.

METHOD: The recruitment of the farmers will take place in marts and Glanbia Ireland co-ops in the South-East, Midland, Mid-East and South-West regions of Ireland. The farmers take part in the health checks based on self-referral, meaning it is completely up to them whether they take up the offer of the health check.

RESULTS/CONCLUSION: The findings from this study will provide insight into the cardiovascular health status of Irish farmers and a better understanding of ways to encourage this group to improve their cardiovascular health by making changes to their lifestyle and health behaviours. The learnings will also inform decision-making on health behaviour change support systems for farmers using different approaches such as Teagasc knowledge transfer and extension workers, mart workers and Glanbia advisors.

View details

References relating to diabetes and cardiovascular disease risk screening or CVD prevention (99)

Guidance

Arnett,D, Blumenthal R et al. **2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease**. American Heart Association.
METHOD: This guideline continues the ACC and AHA effort to design a comprehensive yet succinct compilation of practical guidance for the primary prevention of ASCVD and to promote optimal dissemination of information by using concise language and formatting. The recommendations listed in this guideline are evidence based and supported by an extensive evidence review. A search for literature derived from research involving human subjects, published in English, and indexed in Ovid MEDLINE, PubMed, Cochrane Library, National Institute for Health and Care Excellence (NICE), and other selected databases relevant to this guideline, was conducted between May and July 2018.
RESULTS: Recommendations and supportive text relevant to cardiovascular risk, blood cholesterol, and high BP were taken directly from 2 recently released ACC/AHA guidelines, the 2017 Hypertension Clinical Practice Guidelines (S1.1-1) and the 2018 Cholesterol Clinical Practice Guideline (S1.1-2), and were adapted for the present guideline, which aims to provide an overview of the primary prevention of ASCVD among adults. The results of the evidence reviews were evaluated by the writing committee for incorporation into the present guideline.
CONCLUSION: This primary-prevention guideline strives to provide clinicians with the information they need to help their patients reduce their risk of ASCVD and encourage them to make healthier lifestyle changes when needed.
View full text

Tobe SW, Stone JA, Anderso T et al. 2018. **Canadian Cardiovascular Harmonized National Guidelines Endeavour (C-CHANGE) guideline for the prevention and management of cardiovascular disease in primary care**. CMAJ October 09, 2018 190 (40) E1192-E1206.
AIM: C-CHANGE promotes patient care by bringing nine guideline groups together, to provide a composite set of recommendations to help clinicians formulate a comprehensive treatment plan directed toward patient priorities.
METHOD: This C-CHANGE guideline update was developed by a volunteer guideline panel, which is a scientific committee that reflects the authors of this paper and draws representation from each of the guideline partner organizations involved in the C-CHANGE process, along with primary care physicians with expertise in guideline dissemination.
RESULTS: The 2018 update to the C-CHANGE guideline includes a total of 77 recommendations and 52 recommendations that are newly added or updated. A new category for hypertension for high-risk individuals has been developed with a new lower threshold for treatment (130 mm Hg systolic) and target blood pressure (< 120 mm Hg systolic). Multifaceted care for patients with cardiovascular risks includes the cornerstones of health behaviour change, such as healthy eating and regular physical activity.
CONCLUSION: The C-CHANGE Initiative has resulted in a comprehensive set of recommendations that provide a single national authoritative source for the primary care management of cardiovascular disease. C-CHANGE shows that Canada's national cardiovascular-focused guideline groups can produce rigorous harmonized recommendations that allow interprofessional teams to manage, collaboratively and confidently, Canadians who have and are at risk for cardiovascular disease. This set of recommendations can be implemented and disseminated to meet the regional needs of Canadians
View full text

Evidence summaries

Cardoso, R., Blumenthal, R. S., Kopecky, S., et al. 2019. **How Low to Go With Lipid-Lowering Therapies in a Cost-effective and Prudent Manner**. Mayo Clinic Proceedings 94(4) 660-669.
AIM: to discuss the relationship between LDL-C lowering and cardiovascular risk reduction, the efficacy, safety, and cost-effectiveness of high-intensity lipid-lowering therapies, and the recommendations from the most recent lipid guidelines

METHOD: evidence summary, non-systematic review
RESULTS: Epidemiological and clinical trial data have consistently shown a linear association between low-density lipoprotein cholesterol (LDL-C) levels and cardiovascular (CV) risk. Each reduction of LDL-C by 38.6 mg/dL (to convert to mmol/L, multiply by 0.0259) is associated with approximately 20% to 25% relative reduction in global CV risk in patients treated with statin therapy, ezetimibe, or proprotein convertase subtilisin/kexin type 9 inhibitors. The absolute reduction in CV risk with lipid-lowering therapies is determined by baseline LDL-C level, potency and dose of the lipid-lowering agent, and particularly the baseline CV risk.
CONCLUSION: In order to reduce patients' CV risks in a cost-conscientious manner, health care professionals should (1) advocate for aggressive implementation of healthy lifestyle changes, (2) advise maximally tolerated statin therapy for all patients meeting indications, and (3) reserve the newer lipid-lowering agents for the highest-risk patients with persistently elevated LDL-C levels.
View full text

NIHR 2019. **NIHR Signal: A high omega-6 fatty acid diet is unlikely to prevent cardiovascular disease or deaths**. National Institute for Health Research Signal. 19th February.
AIM: NIHR Signals explain why the study was needed, what the researchers did, what the study found, how this relates to current guidelines and what the implications are of the findings. They are accompanied by commentary from experts in their field, researchers and those working in practice.
METHOD: This updated Cochrane review found 19 randomised controlled trials that compared interventions to increase omega-6 fatty acids in diets to usual or lower omega-6 fatty acids diets for at least 12 months. Overall, 6,461 adults were included. Participants included people without cardiovascular disease (primary prevention) and people already diagnosed with cardiovascular disease (secondary prevention). The trials took place in North America, Europe, Australia and Asia, with nine from the UK.
RESULTS: Higher omega-6 fatty acids intake showed no effect on overall risk of death (risk ratio [RR] 1.00, 95% confidence interval [CI] 0.88 to 1.12; 10 trials with 4,506 participants,). In both groups about 17% of people died, during follow-up of up to eight years and some studies included only people older than 65 years. The lack of effect was consistent across trials. Higher omega-6 fatty acids intake had no effect on deaths from cardiovascular disease (RR 1.09, 95% CI 0.76 to 1.55; 7 trials with 4,019 participants. About 13% of people on a higher omega-6 fatty acids diet and about 11% of people on lower omega-6 fatty acid diets died from cardiovascular diseases. Higher omega-6 fatty acids intake had no effect on cardiovascular events (RR 0.97, 95% CI 0.81 to 1.15; 7 trials with 4,962 participants). About 30% of people on each diet had a cardiovascular event such as myocardial infarction or stroke. There was no effect on weight, and inconsistent effects on cholesterol, with total blood cholesterol lower with high omega-6 fatty acid intake in 10 trials but no effect on blood levels of high-density lipoprotein ('good' cholesterol) or low-density lipoprotein ('bad' cholesterol).
CONCLUSION: These findings highlight the limited benefits of modifying one dietary component at a time. A balanced diet includes a variety of foods, any or all of which can affect health, meaning that studying the effects of diet on health is complex. The results of this review are unlikely to change guideline recommendations.
View full text

Navarese, E. P., Andreotti, F., Raggi, P., et al. 2019. **Baseline low-density lipoprotein cholesterol to predict the extent of cardiovascular benefit from lipid-lowering therapies: A review**. European Heart Journal - Cardiovascular Pharmacotherapy 5(1) 47-54.
AIM: to show how the baseline LDL-C level may provide a means to better understand the results of recent cardiovascular outcome trials and the expected benefits of lipid-lowering therapies
METHOD: summary of evidence, non-systematic review
RESULTS/CONCLUSION: Recent findings from a meta-analysis of numerous randomized trials suggest that more attention should be given to the baseline LDL-C of an individual patient. The exact quantification of the clinical benefit associate with an intensified lipid-lowering therapy depends on the baseline LDL-C. Mortality is reduced in a log-linear fashion only when LDL-C > 100 mg/dL.
View abstract

Nelson, M. 2019. **Management of "Hypertension" Based on Blood Pressure Level Versus an Absolute Cardiovascular Risk Approach**. Current Hypertension Reports 21 (1).
AIM: to address the tension between guideline recommendations and the evidence from clinical trials supporting them and clinician concerns of overtreatment of elevated blood pressure.
METHOD: evidence summary, no methods given
RESULTS: Systolic Blood Pressure Intervention trial (SPRINT) demonstrated lower blood pressure targets provided robust clinical benefit (reduced all-cause mortality) but also expected adverse events due to hypotension.

Treatment thresholds for systolic blood pressure in the latest US guidelines have been lowered to 130 mmHg, although this has not been adopted elsewhere. These guidelines specify that treatment in the 130 s should be considered in the setting of absolute risk, i.e. treatment should be directed to those at high risk. This review argues that this hybrid approach, treatment thresholds in the 130 s based on absolute risk and above 140 mmHg on blood pressure level alone is a compromise, and that risk stratification should be the basis of drug treatment decision-making unless blood pressure is very high.
CONCLUSION: Who receives blood pressure lowering medication is best determined by who is most likely to have a heart attack or stroke in the intermediate period rather than medicalising individuals who have a mildly elevated blood pressure
View full text

Systematic reviews

Cholesterol Treatment Trialists' Collaboration 2019. **Efficacy and safety of statin therapy in older people: a meta-analysis of individual participant data from 28 randomised controlled trials**. The Lancet, 393 (10170), p407-415.
AIM: to compare the effects of statin therapy at different ages.
METHOD: In this meta-analysis, randomised trials of statin therapy were eligible if they aimed to recruit at least 1000 participants with a scheduled treatment duration of at least 2 years. We analysed individual participant data from 22 trials (n=134 537) and detailed summary data from one trial (n=12 705) of statin therapy versus control, plus individual participant data from five trials of more intensive versus less intensive statin therapy (n=39 612). We subdivided participants into six age groups (55 years or younger, 56–60 years, 61–65 years, 66–70 years, 71–75 years, and older than 75 years). We estimated effects on major vascular events (ie, major coronary events, strokes, and coronary revascularisations), cause-specific mortality, and cancer incidence as the rate ratio (RR) per 1·0 mmol/L reduction in LDL cholesterol.
RESULTS: 14 483 (8%) of 186 854 participants in the 28 trials were older than 75 years at randomisation, and the median follow-up duration was 4·9 years. Overall, statin therapy or a more intensive statin regimen produced a 21% (RR 0·79, 95% CI 0·77–0·81) proportional reduction in major vascular events per 1·0 mmol/L reduction in LDL cholesterol. We observed a significant reduction in major vascular events in all age groups. Although proportional reductions in major vascular events diminished slightly with age, this trend was not statistically significant (ptrend=0·06). Overall, statin or more intensive therapy yielded a 24% (RR 0·76, 95% CI 0·73–0·79) proportional reduction in major coronary events per 1·0 mmol/L reduction in LDL cholesterol, and with increasing age, we observed a trend towards smaller proportional risk reductions in major coronary events (ptrend=0·009). We observed a 25% (RR 0·75, 95% CI 0·73–0·78) proportional reduction in the risk of coronary revascularisation procedures with statin therapy or a more intensive statin regimen per 1·0 mmol/L lower LDL cholesterol, which did not differ significantly across age groups (ptrend=0·6). Similarly, the proportional reductions in stroke of any type (RR 0·84, 95% CI 0·80–0·89) did not differ significantly across age groups (ptrend=0·7). After exclusion of four trials which enrolled only patients with heart failure or undergoing renal dialysis (among whom statin therapy has not been shown to be effective), the trend to smaller proportional risk reductions with increasing age persisted for major coronary events (ptrend=0·01), and remained non-significant for major vascular events (ptrend=0·3). The proportional reduction in major vascular events was similar, irrespective of age, among patients with pre-existing vascular disease (ptrend=0·2), but appeared smaller among older than among younger individuals not known to have vascular disease (ptrend=0·05). We found a 12% (RR 0·88, 95% CI 0·85–0·91) proportional reduction in vascular mortality per 1·0 mmol/L reduction in LDL cholesterol, with a trend towards smaller proportional reductions with older age (ptrend=0·004), but this trend did not persist after exclusion of the heart failure or dialysis trials (ptrend=0·2). Statin therapy had no effect at any age on non-vascular mortality, cancer death, or cancer incidence.
CONCLUSION: Statin therapy produces significant reductions in major vascular events irrespective of age, but there is less direct evidence of benefit among patients older than 75 years who do not already have evidence of occlusive vascular disease. This limitation is now being addressed by further trials.
View full text

Byrne P, Cullinan J, Smith A et al. 2019. **Statins for the primary prevention of cardiovascular disease: an overview of systematic reviews**. BMJ Open 9 (4).
AIM: to synthesise evidence from exclusively primary prevention data on the effectiveness of statins for prevention of cardiovascular disease (CVD), including stroke, and outcomes stratified by baseline risk and gender
METHOD: Overview of systematic reviews. Databases searched: Cochrane Database of Systematic Reviews, MEDLINE, Embase, PubMed, Scopus and PROSPERO to June 2017. Eligibility criteria for selecting studies SRs of

randomised control trials (RCTs) or individual patient data (IPD) from RCTs, examining the effectiveness of statins versus placebo or no treatment on all-cause mortality, coronary heart disease, CVD (including stroke) and composite endpoints, with stratification by baseline risk and gender
RESULTS: Three SRs were included. Quality of included SRs was mixed, and none reported on the risk of bias of included trials. We found trends towards reduced all-cause mortality in all SRs (RR 0.91 [95% CI 0.85 to 0.97]), (RR 0.91 [95% CI 0.83 to 1.01]) and (RR 0.78 [95% CI 0.53 to 1.15]) though it was not statistically significant in two SRs. When stratified by baseline risk, the effect on all-cause mortality was no longer statistically significant except in one medium risk category. One review reported significant reductions (RR 0.85 [95% CI 0.77 to 0.95]) in vascular deaths and non-significant reductions in non-vascular deaths (RR 0.97 [95% CI 0.88 to 1.07]). There were significant reductions in composite outcomes overall, but mixed results were reported in these when stratified by baseline risk. These reviews included studies with participants considered risk equivalent to those with established CVD.
CONCLUSION: There is limited evidence on the effectiveness of statins for primary prevention with mixed findings from studies including participants with widely ranging baseline risks. Decision making for the use of statins should consider individual baseline risk, absolute risk reduction and whether risk reduction justifies potential harms and taking a daily medicine for life.
View full text

Bonner, C., Patel, P., Fajardo, M. A., et al. 2019. **Online decision aids for primary cardiovascular disease prevention: Systematic search, evaluation of quality and suitability for low health literacy patients**. BMJ Open 9 (3).
AIM: to identify and evaluate all English language, publicly available online CVD prevention decision aids.
METHOD: Systematic review of public websites in August to November 2016 using an environmental scan methodology, with updated evaluation in April 2018. The decision aids were evaluated based on: (1) suitability for low health literacy populations (understandability, actionability and readability); and (2) International Patient Decision Aids Standards (IPDAS). Primary outcome measures Understandability and actionability using the validated Patient Education Materials Assessment Tool for Printed Materials (PEMAT-P scale), readability using Gunning-Fog and Flesch-Kincaid indices and quality using IPDAS V.3 and V.4.
RESULTS: A total of 25 unique decision aids were identified. On the PEMAT-P scale, the decision aids scored well on understandability (mean 87%) but not on actionability (mean 61%). Readability was also higher than recommended levels (mean Gunning-Fog index=10.1; suitable for grade 10 students). Four decision aids met criteria to be considered a decision aid (ie, met IPDAS qualifying criteria) and one sufficiently minimised major bias (ie, met IPDAS certification criteria).
CONCLUSION: Publicly available CVD prevention decision aids are not suitable for low literacy populations and only one met international standards for certification. Given that patients with lower health literacy are at increased risk of CVD, this urgently needs to be addressed
View full text

Gao, L., Nguyen, P., Dunstan, D., et al. 2019. **Are office-based workplace interventions designed to reduce sitting time cost-effective primary prevention measures for cardiovascular disease? A systematic review and modelled economic evaluation**. International Journal of Environmental Research and Public Health 16 (5).
AIM: to assess the cost-effectiveness of workplace-delivered interventions designed to reduce sitting time as primary prevention measures for cardiovascular disease (CVD) in Australia.
METHOD: A Markov model was developed to simulate the lifetime cost-effectiveness of a workplace intervention for the primary prevention of CVD amongst office-based workers. An updated systematic review and a meta-analysis of workplace interventions that aim to reduce sitting time was conducted to inform the intervention effect. The primary outcome was workplace standing time. An incremental cost-effectiveness ratio (ICER) was calculated for this intervention measured against current practice. Costs (in Australia dollars) and benefits were discounted at 3% annually. Both deterministic (DSA) and probabilistic (PSA) sensitivity analyses were performed.
RESULTS: The updated systematic review identified only one new study. Only the multicomponent intervention that included a sit-and-stand workstation showed statistically significant changes in the standing time compared to the control. The intervention was associated with both higher costs ($6820 versus $6524) and benefits (23.28 versus 23.27, quality-adjusted life year, QALYs), generating an ICER of $43,825/QALY. The DSA showed that target age group for the intervention, relative risk of CVD relative to the control and intervention cost were the key determinants of the ICER. The base case results were within the range of the 95% confidence interval and the intervention had a 85.2% probability of being cost-effective.

CONCLUSION: A workplace-delivered intervention in the office-based setting including a sit-and-stand desk component is a cost-effective strategy for the primary prevention of CVD. It offers a new option and location when considering interventions to target the growing CVD burden.
View full text

Hope, H. F., Binkley, G. M., Fenton, S., et al. 2019. **Systematic review of the predictors of statin adherence for the primary prevention of cardiovascular disease**. PLoS ONE 14 (1).
AIM: to review predictors of statin adherence for the primary prevention of CVD.
METHODS: A systematic search of papers published between Jan 1984 and May 2017 was conducted in PubMed, PsycINFO, EMbase and CINAHL databases. A study was eligible for inclusion if; 1) it was a study of the general population or of patients with familial hypercholesterolemia, hypertension, diabetes or arthritis; 2) statins were prescribed; 3) adherence was defined and measured as the extent to which patients followed their statin regimen during the period of prescription, and 4) it was an original trial or observational study (excluding case reports). A study was subsequently excluded if 1) results were not presented separately for primary prevention; 2) it was a trial of an intervention (for example patient education). Papers were reviewed by two researchers and consensus agreed with a third. A quality assessment (QA) tool was used to formally assess each included article. To evaluate the effect of predictors, data were quantitatively and qualitatively synthesised.
RESULTS: In total 19 studies met the inclusion criteria and nine were evaluated as high quality using the QA tool. The proportion of patients classed as "adherent" ranged from 17.8% to 79.2%. Potential predictors of statin adherence included traditional risk factors for CVD such as age, being male, diabetes and hypertension. Income associated with adherence more strongly in men than women, and highly educated men were more likely and highly educated women less likely to be adherent. Alcohol misuse and high BMI associated with non-adherence. There was no association between polypharmacy and statin adherence. The evidence base for the effect of other lifestyle factors and health beliefs on statin adherence was limited.
CONCLUSION: Current evidence suggests that patients with more traditional risk factors for CVD are more likely to be adherent to statins. The implications for future research are discussed.
View full text

Munday, D., Leaman, J., O'Moore, É., et al. 2019. **The prevalence of non-communicable disease in older people in prison: a systematic review and meta-analysis**. Age & Ageing 48(2) 204-212.
AIM: to estimate the prevalence of NCDs in people in prison aged 50 and over.
METHODS: PubMed, Medline, CINAHL, EMBASE and Global Health databases were searched to identify original research papers that met our pre-defined inclusion criteria. No date or language restrictions were applied. Two authors undertook full-text screening as well as quality assessment and data extraction for all included studies. A random effects model was used to calculate pooled prevalence of any disease that was reported in two or more articles.
RESULTS: the initial search identified 2,712 articles. 119 underwent full-text screening with 26 meeting the inclusion criteria. This provided prevalence data on 28 NCDs in 93,862 individuals from prisons in 11 countries. Pooled prevalence for the most significant NCDs was a follows; cancer 8% (95% CI 6–10%), cardiovascular disease 38% (95% CI 33–42%), hypertension 39% (95% CI 32–47%), diabetes 14% (95% CI 12–16%), COPD prevalence estimates ranged from 4% to 18%. Heterogeneity across studies was high. Those in prison over 50 years of age experience a high burden of NCDs which is often higher than younger prison and age-matched community peers. Prison services should be adapted to serve the needs of this growing population.
CONCLUSION: Those in prison over 50 years of age experience a high burden of NCDs which is often higher than younger prison and age-matched community peers. This health inequality is influenced by lifestyle, environmental and societal factors. Prison services should be adapted to serve the needs of this growing population
View abstract

Ruiz-Pérez, I., Bastos, Á., Serrano-Ripoll, M. J., et al. 2019. **Effectiveness of interventions to improve cardiovascular healthcare in rural areas: a systematic literature review of clinical trials**. Preventive Medicine 119 132-144.
AIM: to examine the impact of interventions to improve cardiovascular disease healthcare provided to people living in rural areas.
METHOD: Systematic literature review. Systematic electronic searches were conducted in Medline, CINAHL, Embase, Scopus, and Web of Knowledge in July 2018. We included clinical trials assessing the effectiveness of interventions to improve cardiovascular disease healthcare in rural areas. Study eligibility assessment, data extraction, and critical appraisal were undertaken by two reviewers independently.

RESULTS: We identified 18 trials (18 interventions). They targeted myocardial infarction (five interventions), stroke (eight), and heart failure (five). All the interventions for myocardial infarction were based on organizational changes (e.g. implementation of mobile coronary units). They consistently reduced time to treatment and decreased mortality. All the interventions for heart failure were based on the provision of patient education. They consistently improved patient knowledge and self-care behaviour, but mortality reductions were reported in only some of the trials. Among the interventions for stroke, those based on the implementation of telemedicine (tele-stroke systems or tele-consultations) improved monitoring of stroke survivors; those based on new or enhanced rehabilitation services did not consistently improve mortality or physical function; whereas educational interventions effectively improved patient knowledge and behavioural outcomes.
CONCLUSION: A number of different strategies (based on enhancing structures and providing patient education) have been proposed to improve cardiovascular disease healthcare in rural areas. Although available evidence show that these interventions can improve healthcare processes, their impact on mortality and other important health outcomes still remains to be established.
View abstract

Studzinski, K., Tomasik, T., Krzyszton, J., et al. 2019. **Effect of using cardiovascular risk scoring in routine risk assessment in primary prevention of cardiovascular disease: an overview of systematic reviews**. BMC Cardiovascular Disorders 19(1) 11.
AIM: to critically appraise and summarise the current evidence for the effectiveness of using cardiovascular disease (CVD) risk scoring (total risk assessment - TRA) in routine risk assessment in primary prevention of CVD compared with standard care with regards to patients outcomes, clinical risk factor levels, medication prescribing, and adverse effects.
METHOD: We carried out an overview of existing systematic reviews (SRs). Presentation of the results aligned guidelines from the PRISMA statement. The data is presented as a narrative synthesis. We searched MEDLINE (Ovid), EMBASE, CENTRAL and SCOPUS databases from January 1990 to March 2017, reviewed the reference lists of all included SRs and searched for ongoing SRs in PROSPERO database. We encompassed SRs and meta-analyses which took into account RCTs, quasi-RCTs, and observational studies investigating the effect of using CVD risk scoring. Only studies performed in a primary care setting, with adult participants free of clinical CVD were eligible. Intervention was CVD risk assessment with use of the total CVD risk scoring compared with standard care with no use of TRA .
RESULTS: We identified 2157 records, we then recognised and analysed 10 relevant SRs. One SR reported statistically insignificant reduction of CVD death, when using TRA, the second SR presented meta-analysis which reported no effect on fatal and non-fatal CV events compared with conventional care (5.4% vs 5.3%; RR 1.01, 95% CI 0.95 to 1.08; I² = 25%). Three SRs have shown that using TRA causes no adverse events. The impact of TRA on global CVD risk as well as individual risk factors is ambiguous, but a tendency towards slight reduction of blood pressure, total cholesterol and smoking levels, especially in high risk patient groups was observed. TRA had no influence on lifestyle behaviour.
CONCLUSION: There is limited evidence, of low overall quality, suggesting a possible lack of effectiveness of TRA in reducing CVD events and mortality, as well as a clinically insignificant influence on individual risk factor levels. Using TRA does not cause harm to patients
View full text

Yebyo, H. G., Aschmann, H. E., Kaufmann, M., et al. 2019. **Comparative effectiveness and safety of statins as a class and of specific statins for primary prevention of cardiovascular disease: A systematic review, meta-analysis, and network meta-analysis of randomized trials with 94,283 participants**. American Heart Journal 210 18-28.
AIM: to determine the effectiveness and safety of statins as a class and of specific statins for primary prevention of cardiovascular disease
METHOD: We searched in PubMed for existing systematic reviews and individual open-label or double-blinded randomized controlled trials that compared a statin with a placebo or another, which were published in English until January 01, 2018. We performed a random-effect pairwise meta-analysis of all statins as a class and network meta-analysis for the specific statins on different benefit and harm outcomes.
RESULTS: In the pairwise meta-analyses, statins as a class showed statistically significant risk reductions on non-fatal MI (risk ratio [RR] 0.62, 95% CI 0.53-0.72), CVD mortality (RR 0.80, 0.71-0.91), all-cause mortality (RR 0.89, 0.85-0.93), non-fatal stroke (RR 0.83, 0.75-0.92), unstable angina (RR 0.75, 0.63-0.91), and composite major cardiovascular events (RR 0.74, 0.67-0.81). Statins increased statistically significantly relative and absolute risks of myopathy (RR 1.08, 1.01-1.15; Risk difference [RD] 13, 2-24 per 10,000 person-years); renal dysfunction (RR 1.12, 1.00-1.26; RD 16, 0-36 per 10,000 person-years); and hepatic dysfunction (RR 1.16, 1.02-1.31; RD 8, 1-16 per

10,000 person-years). The drug-level network meta-analyses showed that atorvastatin and rosuvastatin were most effective in reducing CVD events while atorvastatin appeared to have the best safety profile. All statins showed statistically significant risk reduction of CVD and all-cause mortality in primary prevention populations while increasing the risk for some harm risks.
CONCLUSION: All statins showed statistically significant risk reduction of CVD and all-cause mortality in primary prevention populations while increasing the risk for some harm risks. However, the benefit-harm profile differed by statin type. A quantitative assessment of the benefit-harm balance is thus needed since meta-analyses alone are insufficient to inform whether statins provide net benefit.
View abstract

Martin-Ruiz E, Olry-de-Labry-Lima A, Ocaña-Riola R et al. 2018. **Systematic Review of the Effect of Adherence to Statin Treatment on Critical Cardiovascular Events and Mortality in Primary Prevention**. Journal of cardiovascular pharmacology and therapeutics. May;23(3):200-215.
AIM: to analyse the relative risks of critical cardiovascular outcomes and mortality associated with adherence to statin treatment in a clinical setting in people with no history of prior cardiovascular disease (CVD).
METHOD: A systematic review of the literature was conducted up to December 2016. The outcomes of interest were cardiovascular fatal or nonfatal events and all-cause mortality.
RESULTS: A total of 17 articles were included in a qualitative synthesis. Four were case-control nested in a retrospective cohort design and the other 11 were a cohort design. Seven studies compared the best adherer patients with the worst adherers. In the 3 studies (317 603 participants) that considered ischemic heart disease in this group, the pooled reduction in risk was 18% (95% confidence interval [CI]: 14%-22%, I2 = 0%); for the CVD outcome, 2 studies (131 477 participants) showed a pooled reduction in risk of 47% (95% CI: 36%-56%, I2 = 84.7%) with 1 included study showing a much larger reduction than the others; for the cerebrovascular event (CeVD) outcome, 2 studies (155 726 participants) showed a pooled reduction in risk of 26% (95% CI: 18%-34%, I2 = 0%); and for mortality, the reduction in risk was 49% (95% CI: 39%-57%, I2 = 62.4%). The other 4 studies (147 859 participants) compared the most adherent group with the rest. These showed a pooled risk reduction of CVD of 22% (95% CI: 6%-27%, I2 = 0).
CONCLUSION: Adherence to statins treatment is shown as a key element for primary prevention, although these are observational data and the risk of bias from confounding cannot be ruled out. Standardization of measures of adherence to treatment would improve comparability between studies. Further research is warranted to design effective interventions to improve patients' adherence
View abstract

Abdelhamid, A. S., Brown, T. J., Brainard, J. S., et al. 2018. **Omega-3 fatty acids for the primary and secondary prevention of cardiovascular disease**. Cochrane Database of Systematic Reviews 11 CD003177. 30th November.
AIM: to assess effects of increased intake of fish- and plant-based omega-3 for all-cause mortality, cardiovascular (CVD) events, adiposity and lipids.
METHOD: We searched CENTRAL, MEDLINE and Embase to April 2017, plus ClinicalTrials.gov and World Health Organization International Clinical Trials Registry to September 2016, with no language restrictions. We handsearched systematic review references and bibliographies and contacted authors. We included randomised controlled trials (RCTs) that lasted at least 12 months and compared supplementation and/or advice to increase LCn3 or ALA intake versus usual or lower intake.
RESULTS: We included 79 RCTs (112,059 participants) in this review update and found that 25 were at low summary risk of bias. Trials were of 12 to 72 months' duration and included adults at varying cardiovascular risk, mainly in high-income countries. Most studies assessed LCn3 supplementation with capsules, but some used LCn3- or ALA-rich or enriched foods or dietary advice compared to placebo or usual diet. LCn3 doses ranged from 0.5g/d LCn3 to > 5 g/d (16 RCTs gave at least 3g/d LCn3).Meta-analysis and sensitivity analyses suggested little or no effect of increasing LCn3 on all-cause mortality (RR 0.98, 95% CI 0.90 to 1.03, 92,653 participants; 8189 deaths in 39 trials, high-quality evidence), cardiovascular mortality (RR 0.95, 95% CI 0.87 to 1.03, 67,772 participants; 4544 CVD deaths in 25 RCTs), cardiovascular events (RR 0.99, 95% CI 0.94 to 1.04, 90,378 participants; 14,737 people experienced events in 38 trials, high-quality evidence), coronary heart disease (CHD) mortality (RR 0.93, 95% CI 0.79 to 1.09, 73,491 participants; 1596 CHD deaths in 21 RCTs), stroke (RR 1.06, 95% CI 0.96 to 1.16, 89,358 participants; 1822 strokes in 28 trials) or arrhythmia (RR 0.97, 95% CI 0.90 to 1.05, 53,796 participants; 3788 people experienced arrhythmia in 28 RCTs). Moderate- and high-quality evidence suggests that increasing EPA and DHA has little or no effect on mortality or cardiovascular health (evidence mainly from supplement trials). Previous suggestions of benefits from EPA and DHA supplements appear to spring from trials with higher risk of bias. Low-quality evidence suggests ALA may slightly reduce CVD event and arrhythmia risk.

CONCLUSION: This is the most extensive systematic assessment of effects of omega-3 fats on cardiovascular health to date. Moderate- and high-quality evidence suggests that increasing EPA and DHA has little or no effect on mortality or cardiovascular health (evidence mainly from supplement trials). Previous suggestions of benefits from EPA and DHA supplements appear to spring from trials with higher risk of bias. Low-quality evidence suggests ALA may slightly reduce CVD event and arrhythmia risk.
View full text

Abdelhamid, A. S., Martin, N., Bridges, C., et al. 2018. **Polyunsaturated fatty acids for the primary and secondary prevention of cardiovascular disease**. Cochrane Database of Systematic Reviews 11 CD012345. 27th November.
AIM: to assess effects of increasing total PUFA intake on cardiovascular disease and all-cause mortality, lipids and adiposity in adults.
METHOD: We searched CENTRAL, MEDLINE and Embase to April 2017 and clinicaltrials.gov and the World Health Organization International Clinical Trials Registry Platform to September 2016, without language restrictions. We checked trials included in relevant systematic reviews.We included randomised controlled trials (RCTs) comparing higher with lower PUFA intakes in adults with or without cardiovascular disease that assessed effects over 12 months or longer. We included full texts, abstracts, trials registry entries and unpublished data. Outcomes were all-cause mortality, cardiovascular disease mortality and events, risk factors (blood lipids, adiposity, blood pressure), and adverse events. We excluded trials where we could not separate effects of PUFA intake from other dietary, lifestyle or medication interventions.
RESULTS: We included 49 RCTs randomising 24,272 participants, with duration of one to eight years. Eleven included trials were at low summary risk of bias, 33 recruited participants without cardiovascular disease. Baseline PUFA intake was unclear in most trials, but 3.9% to 8% of total energy intake where reported. Most trials gave supplemental capsules, but eight gave dietary advice, eight gave supplemental foods such as nuts or margarine, and three used a combination of methods to increase PUFA.Increasing PUFA intake probably has little or no effect on all-cause mortality (risk 7.8% vs 7.6%, risk ratio (RR) 0.98, 95% confidence interval (CI) 0.89 to 1.07, 19,290 participants in 24 trials), but probably slightly reduces risk of coronary heart disease events from 14.2% to 12.3% (RR 0.87, 95% CI 0.72 to 1.06, 15 trials, 10,076 participants) and cardiovascular disease events from 14.6% to 13.0% (RR 0.89, 95% CI 0.79 to 1.01, 17,799 participants in 21 trials), all moderate-quality evidence. Increasing PUFA may slightly reduce risk of coronary heart disease death (6.6% to 6.1%, RR 0.91, 95% CI 0.78 to 1.06, 9 trials, 8810 participants) andstroke (1.2% to 1.1%, RR 0.91, 95% CI 0.58 to 1.44, 11 trials, 14,742 participants, though confidence intervals include important harms), but has little or no effect on cardiovascular mortality (RR 1.02, 95% CI 0.82 to 1.26, 16 trials, 15,107 participants) all low-quality evidence. Increasing PUFA intake probably slightly reduces risk of coronary heart disease and cardiovascular disease events, may slightly reduce risk of coronary heart disease mortality and stroke (though not ruling out harms), but has little or no effect on all-cause or cardiovascular disease mortality. The mechanism may be via TG reduction.
CONCLUSION: This is the most extensive systematic review of RCTs conducted to date to assess effects of increasing PUFA on cardiovascular disease, mortality, lipids or adiposity. Increasing PUFA intake probably slightly reduces risk of coronary heart disease and cardiovascular disease events, may slightly reduce risk of coronary heart disease mortality and stroke (though not ruling out harms), but has little or no effect on all-cause or cardiovascular disease mortality. The mechanism may be via TG reduction
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Hooper, L., Al-Khudairy, L., Abdelhamid, A. S., et al. 2018. **Omega-6 fats for the primary and secondary prevention of cardiovascular disease**. Cochrane Database of Systematic Reviews (11). 29th November
AIM: to assess effects of increasing omega 6 fats (linoleic acid (LA), gamma linolenic acid (GLA), dihomo gamma linolenic acid (DGLA) and arachidonic acid (AA)) on CVD and all cause mortality.
METHOD: We searched CENTRAL, MEDLINE and Embase to May 2017 and clinicaltrials.gov and the World Health Organization International Clinical Trials Registry Platform to September 2016, without language restrictions. We checked trials included in relevant systematic reviews. Selection criteria We included randomised controlled trials (RCTs) comparing higher versus lower omegaâ€6 fat intake in adults with or without CVD, assessing effects over at least 12 months. We included full texts, abstracts, trials registry entries and unpublished studies. Outcomes were all cause mortality, CVD mortality, CVD events, risk factors (blood lipids, adiposity, blood pressure), and potential adverse events.
RESULTS: We found 19 studies recruiting 6461 adults. These studies assessed the effects of higher compared to lower omega 6 fat intake on heart and circulatory diseases as well as deaths. We found that three trials were highly trustworthy (with good designs that produce reliable evidence). We found that increasing omega 6 fats may make little or no difference to deaths or cardiovascular events but may reduce risk of heart attacks (low

quality evidence). Evidence was weakened by study design problems, small numbers of events, low numbers of participants from developing countries, and few women.
CONCLUSION: Evidence suggests that increasing omega 6 fats reduces blood cholesterol (high quality evidence), probably has little or no effect on body weight adjusted for height (all moderate quality evidence), and may make little or no difference to triglycerides, high density lipoprotein or low density lipoprotein (low quality evidence).
View full text

Karmali, K. N., Lloyd-Jones, D. M., van der Leeuw, J., et al. 2018. **Blood pressure-lowering treatment strategies based on cardiovascular risk versus blood pressure: A meta-analysis of individual participant data**. PLoS Medicine 15(3) 1-20.
AIM: to compare outcomes from a blood pressure-lowering treatment strategy based on predicted cardiovascular risk with one based on systolic blood pressure (SBP) level.
METHOD: We used individual participant data from the Blood Pressure Lowering Treatment Trialists' Collaboration (BPLTTC) from 1995 to 2013. Trials randomly assigned participants to either blood pressure-lowering drugs versus placebo or more intensive versus less intensive blood pressure-lowering regimens. We estimated 5-y risk of CVD events using a multivariable Weibull model previously developed in this dataset. We compared the two strategies at specific SBP thresholds and across the spectrum of risk and blood pressure levels studied in BPLTTC trials. The primary outcome was number of CVD events avoided per persons treated.
RESULTS: We included data from 11 trials (47,872 participants). During a median of 4.0 y of follow-up, 3,566 participants (7.5%) experienced a major cardiovascular event. Areas under the curve comparing the two treatment strategies throughout the range of possible thresholds for CVD risk and SBP demonstrated that, on average, a greater number of CVD events would be avoided for a given number of persons treated with the CVD risk strategy compared with the SBP strategy (area under the curve 0.71 [95% confidence interval (CI) 0.70-0.72] for the CVD risk strategy versus 0.54 [95% CI 0.53-0.55] for the SBP strategy). Compared with treating everyone with SBP ≥ 150 mmHg, a CVD risk strategy would require treatment of 29% (95% CI 26%-31%) fewer persons to prevent the same number of events or would prevent 16% (95% CI 14%-18%) more events for the same number of persons treated. Compared with treating everyone with SBP ≥ 140 mmHg, a CVD risk strategy would require treatment of 3.8% (95% CI 12.5% fewer to 7.2% more) fewer persons to prevent the same number of events or would prevent 3.1% (95% CI 1.5%-5.0%) more events for the same number of persons treated, although the former estimate was not statistically significant. In subgroup analyses, the CVD risk strategy did not appear to be more beneficial than the SBP strategy in patients with diabetes mellitus or established CVD.
CONCLUSION: A blood pressure-lowering treatment strategy based on predicted cardiovascular risk is more effective than one based on blood pressure levels alone across a range of thresholds. These results support using cardiovascular risk assessment to guide blood pressure treatment decision-making in moderate- to high-risk individuals, particularly for primary prevention.
View full text

Lawlor, E. R., Bradley, D. T., Cupples, M. E., et al. 2018. **The effect of community-based interventions for cardiovascular disease secondary prevention on behavioural risk factors**. Preventive Medicine: An International Journal Devoted to Practice and Theory 114 24-38.
AIM: to assess the effectiveness of secondary prevention cardiovascular risk reduction programmes delivered in venues situated within the community on modification of behavioural risk factors.
METHOD: We searched five databases (MEDLINE, EMBASE, CINAHL, PsycINFO, Cochrane library) to identify trials of health behaviour interventions for adults with CVD in community-based venues. Primary outcomes were changes in physical activity, diet, smoking and/or alcohol consumption. Two reviewers independently assessed articles for eligibility and risk of bias; statistical analysis used Revman v5.3. Of 5905 articles identified, 41 articles (38 studies) (n = 7970) were included.
RESULTS: Interventions were mainly multifactorial, educational, psychological and physical activity-based. Meta-analyses identified increased steps/week (Mean Difference (MD): 7480; 95% CI 1,940, 13,020) and minutes of physical activity/week (MD: 59.96; 95% CI 15.67, 104.25) associated with interventions. There was some evidence for beneficial effects on peak VO2, blood pressure, total cholesterol and mental health. Variation in outcome measurements reported for other behavioural risk factors limited our ability to perform meta-analyses. Effective interventions were based in homes, general practices or outpatient settings, individually tailored and often multicomponent with a theoretical framework.
CONCLUSION: Our review identified evidence that interventions for secondary CVD prevention, delivered in various community-based venues, have positive effects on physical activity; such opportunities should be promoted by health professionals.
View abstract

Trials

Bender, A. M., Jorgensen, T. & Pisinger, C. 2019. **Higher mortality in women living in high-participation areas of a population-based health check and lifestyle intervention study**. International Journal of Public Health 64(1) 107-114.
AIM: to study whether the effects of a population-based health check and lifestyle intervention differed according to study participation rate.
METHOD: All persons living in 73 areas of Copenhagen County, Denmark, were included in the Inter99 randomized trial in 1999 (intervention group n = 11,483; control group n = 47,122). All persons in the intervention group were invited for health checks and were offered lifestyle counseling if they were at high risk of ischemic heart disease. Areas were divided into low 35-49%, middle 50-54% and high >= 55% health check participation. All persons were followed in registers for 10-year cause-specific mortality.
RESULTS: In high-participation areas, there was a significantly higher risk of lifestyle-(HR 1.37 [1.04, 1.79]) and cancer-related deaths (HR 1.47 [1.08, 2.02]) among women in the intervention group than control group. Regarding smoking-related cancer deaths, differences were even more pronounced. Among men, no significant difference in mortality was seen between control and intervention groups.
CONCLUSION: The results of this paper suggest that among women, the health check and lifestyle intervention may increase the risk of lifestyle and cancer-related deaths
View full text

Denissen, S. J., van der Aalst, C. M., Vonder, M., et al. 2019. **Impact of a cardiovascular disease risk screening result on preventive behaviour in asymptomatic participants of the ROBINSCA trial**. European Journal of Preventive Cardiology 2047487319843396. April 9th.
AIM: to investigate prevention-seeking behaviour and compliance with preventive treatment of participants of the population-based Risk Or Benefit IN Screening for CArdiovascular disease (ROBINSCA) trial after receiving a screening result.
METHOD: Asymptomatic Dutch individuals (n = 43,447) were randomly assigned (1:1:1) to screening for cardiovascular disease by either traditional risk assessment (intervention arm A), or determining the amount of coronary artery calcification (intervention arm B), or to usual care (control arm). A random sample (n = 600) of ROBINSCA participants with a screening result (arms A and B) received an online questionnaire (in 2017) to measure the impact of a cardiovascular disease screening result in low and increased (arm A: risk > 10%; arm B: Agatston >= 100) risk groups.
RESULTS: Of all respondents (438/600; 73%) 63.5% were men and the mean age (+/- standard deviation) was 63.8 +/- 6.9 years. Individuals with an increased coronary artery calcification score consulted their general practitioner more often compared to increased risk individuals from arm A: 140/149 (94%) and 86/137 (62.8%), respectively (P < 0.001). Current use of blood pressure and cholesterol-lowering drugs was significantly higher in the increased coronary artery calcification score group (108/140; 77.1%), compared to the group with an increased traditional risk (35/80, 43.8%; P < 0.001). Self-reported compliance was high (98.1-100%).
CONCLUSION: Receiving the screening result might be a teachable moment that can enhance cardiovascular disease prevention-seeking behaviour through consulting a general practitioner and high compliance with preventive treatment. The impact of the screening result was more profound in the increased coronary artery calcification score group.
View abstract

Goel, R., Kessler, D., Nandi, V., et al. 2019. **Donor incentives improve cardiovascular disease risk profile and donation rates**. Transfusion 59(1) 250-258.
AIM: to study combining point-based reward systems or cardiovascular disease (CVD) screening incentives to improve CVD risk and blood donation rates.
METHOD: Study was a three-arm prospective controlled trial: Group 1, control (routine points, no CVD screening); Group 2, CVD screening with routine points; and Group 3, CVD screening plus incentive double points. The primary objective was to determine if double versus routine incentive points led to improvement or maintenance of CVD risk profile assessed using self-reported changes in 1) reading food labels for calorie and fat content, 2) exercising daily, 3) reduced fat intake, and 4) increase in eating fruits and vegetables. Outcomes were compared at first and final (2-year) follow-up visits. As secondary outcome, median blood donation rates before enrollment and during study were compared.
RESULTS: A total of 570 donors (290 in Group 1, 134 in Group 2, 146 Group 3) were selected. At first follow-up visit, 71.4% in Group 3 versus 62.0% in Group 2 subjects reported at least one of four positive behavioral changes (p < 0.001). Increase in reading food labels for calorie and fat content was the most common change and higher in Group 3 (Group 3 from 60.9% to 79.1%; Group 2 from 67.6% to 77.5%; p < 0.001). Final evaluation showed

significant increase in self-reported exercise in Group 3 only (from baseline 52.9% to 68.3%; p < 0.05). Group 3 reported higher increase in median number of donations/year during study enrollment (6.8 [IQR, 4.3-12] vs. baseline 4.6 [IQR, 3.2-7.1] donations/year) than Group 2 (5.6 [IQR, 4.2-10.5] vs. baseline 4.9 [IQR, 3.5-10.2]) and Group 1 (4.4 [IQR, 2.7-8.0] vs. baseline 4.4 [IQR, 2.5-6.0] donations/year; p < 0.001).
CONCLUSION: Positive donor reinforcement (double vs. routine points) resulted in better self-reported health maintenance behavior and increased donation rates.
View full text

Lindholt, J. S., Rasmussen, L. M., Sogaard, R., et al. 2019. **Baseline findings of the population-based, randomized, multifaceted Danish cardiovascular screening trial (DANCAVAS) of men aged 65-74 years**. British Journal of Surgery 27 27.
AIM: to reduce cardiovascular mortality by advanced population-based cardiovascular screening
METHODS: Danish men aged 65-74 years were invited randomly (1 : 2) to a cardiovascular screening examination using low-dose non-contrast CT, ankle and brachial BP measurements, and blood tests.
RESULTS: In all, 16 768 of 47 322 men aged 65-74 years were invited and 10 471 attended (uptake 62.4 per cent). Of these, 3481 (33.2 per cent) had a coronary artery calcium score above 400 units. Thoracic aortic aneurysm was diagnosed in the ascending aorta (diameter 45 mm or greater) in 468 men (4.5 per cent), in the arch (at least 40 mm) in 48 (0.5 per cent) and in the descending aorta (35 mm or more) in 233 (2.2 per cent). Abdominal aortic aneurysm (at least 30 mm) and iliac aneurysm (20 mm or greater) were diagnosed in 533 (5.1 per cent) and 239 (2.3 per cent) men respectively. Peripheral artery disease was diagnosed in 1147 men (11.0 per cent), potentially uncontrolled hypertension (at least 160/100 mmHg) in 835 (8.0 per cent), previously unknown atrial fibrillation confirmed by ECG in 50 (0.5 per cent), previously unknown diabetes mellitus in 180 (1.7 per cent) and isolated severe hyperlipidaemia in 48 men (0.5 per cent). In all, 4387 men (41.9 per cent), excluding those with potentially uncontrolled hypertension, were referred for additional cardiovascular prevention. Of these, 3712 (35.5 per cent of all screened men, but 84.6 per cent of those referred) consented and were started on medication.
CONCLUSION: Multifaceted cardiovascular screening is feasible and may optimize cardiovascular disease prevention in men aged 65-74 years. Uptake is lower than in aortic aneurysm screening.
View full text

Webb, D., Dales, J., Zaccardi, F., et al. 2019. **Intensive versus standard multifactorial cardiovascular risk factor control in screen-detected type 2 diabetes: 5-year and longer-term modelled outcomes of the ADDITION-Leicester study**. Diabetes/Metabolism Research Reviews 35(3) e3111.
AIM: to estimate the effects of diabetes treatment algorithms on modelled risk of diabetes-related complications in screen-detected patients, using data from the ADDITION-Leicester study.
METHODS: A total of 345 (41% South Asian) people with screen-detected type 2 diabetes were cluster randomised to receive 5 years of (1) intensive multifactorial risk factor intervention or (2) standard treatment according to national guidance. Estimated 10 to 20-year risk of ischaemic heart disease, stroke, congestive cardiac failure, and death was calculated using UK-PDS risk equations.
RESULTS: Compared with standard care, mean treatment differences for intensive management at 5 years were -11.7(95%CI: -15.0, -8.4) and -6.6(-8.8, -4.4) mmHg for systolic and diastolic blood pressure, respectively; -0.27 (-0.66, -0.26) % for HbA1c; and -0.46(-0.66; -0.26), -0.34 (-0.51; -0.18), and -0.19 (-0.28; -0.10) mmol/L for total cholesterol, LDL-cholesterol, and triglycerides, respectively. There was no significant weight gain in the intensive group despite additional medication use. Modelled risks were consistently lower for intensively managed patients. Absolute risk reduction associated with intensive treatment at 10 and 20 years were 3.5% and 6.2% for ischaemic heart disease and 6.3% and 8.8% for stroke. Risk reduction for congestive heart failure plateaued after 15 years at 5.3%. No differences were observed for blindness and all-cause death.
CONCLUSION: Intensive multifactorial intervention in a multi-ethnic population with screen-detected type 2 diabetes results in sustained improvements in modelled ischaemic heart disease, stroke, and congestive cardiac failure.
View full text

Wu, M.-P., Wu, S.-F. V., Lee, M.-C., et al. 2019. **Health-promotion interventions enhance and maintain self-efficacy for adults at cardiometabolic risk: A randomized controlled trial**. Archives of Gerontology & Geriatrics 82 61-66.
AIM: to investigate whether a community-based intervention program, based on self-efficacy theory, might improve older adults' self-care behaviors as well as health outcomes related to hypertension and dyslipidemia.
METHOD: This randomized controlled trial was conducted in Taipei, Taiwan, From October 16, 2011 to July 31, 2014. Residents identified during community screening for the over 50 s were invited to participate if their blood

pressure was 120–139/80–89 mmHg, high-density lipoprotein cholesterol was <40 mg/dL (men) or <50 mg/dL (women), or low-density lipoprotein cholesterol was 130–159 mg/dL. The intervention group participated in a special health promotion program; the control group received conventional health education. Participants' demographic and anthropometric data were recorded, and each completed semi-structured questionnaires about hypertension and cholesterol management, and gave blood samples for biochemical analyses before the intervention and 6 months after it ended.
RESULTS: From 90/98 eligible subjects who enrolled, 84 completed the study: 41/43 and 43/47 respectively in intervention and control groups. Body mass index, blood pressure, hyperglycemia, and high-density lipoprotein cholesterol in the intervention group improved significantly from baseline. The Self-Efficacy Scale (P = 0.020), Self-Care Activities Questionnaire (P = 0.014) and Perceived Therapeutic Efficacy Scale (P = 0.023) scores improved significantly. This health promotion intervention program enhanced self-efficacy among older adults, with sustained effect through 6-months' follow-up.
CONCLUSION: This health promotion intervention program enhanced self-efficacy among older adults, with sustained effect through 6-months' follow-up. These findings are consistent with studies that evaluated the effect of a diabetes education program on self-efficacy. The beneficial effect on a population at high-risk for hypertension and hypercholesterolemia, may serve as a model for developing and implementing such interventions.
View abstract

Baldeón, M. E., Fornasini, M., Flores, N., et al. 2018. **Impact of training primary care physicians in behavioral counseling to reduce cardiovascular disease risk factors in Ecuador**. Revista Panamericana de Salud Publica 42 1-9.
AIM: to assess the feasibility of implementing a physician-based, patient-centered counseling intervention model in Ecuador to improve the ability of primary care physicians (PCPs) to reduce cardiovascular disease (CVD) risk factors among patients.
METHOD: This was a randomized clinical trial conducted in primary care clinics in Quito in 2014 - 2016. Participants included 15 PCPs and their adult patients at high risk of developing type-2 diabetes. A physician-based and patient-centered counseling program was delivered to eight PCPs. Seven PCPs who did not receive the training comprised the control group. The patient experience was assessed by a patient exit interview (PEI). Assessment of the patient's anthropometrics, blood pressure, and blood biochemistry parameters were conducted. Changes within and between groups were estimated utilizing chisquare, ANOVA, paired t-tests, and coefficient with intervention.
RESULTS: A total of 197 patients participated, 113 in the intervention care group (ICG) and 84 in the usual care group (UCG); 99 patients (87.6%) in the ICG and 63 (75%) in the UCG completed the study. Counseling steps, measured by the PEI, were significantly higher in the ICG (8.9±1.6 versus 6.6±2.3; P = 0.001). Comparison of the estimated difference between the ICG and the UCG showed greater decreases in HbA1c and total cholesterol in the ICG. Within the ICG, there were significant improvements in weight, BMI, HbA1C, total cholesterol, and LDL-cholesterol.
CONCLUSION: Training PCPs in a patient-centered behavioral intervention for CVD risk factor reduction is feasible and efficacious for reducing CVD risk factors in Ecuador. Developed and developing countries alike could benefit from such an intervention.
View full text

Detlef Bernd, G., Stefanie, M., Christian, A., et al. 2018. **Substantial improvement of primary cardiovascular prevention by a systematic score-based multimodal approach: A randomized trial: The PreFord-Study**. European journal of preventive cardiology 24(14) 1544.
AIM: to evaluate the long-term effects of a risk-adjusted multimodal intervention in high-risk subjects.
METHOD: Prospective randomized multicentre interventional study. Individual cardiovascular risk assessment in Ford Company, Germany employees (n = 4.196), using the European Society of Cardiology-Systematic Coronary Risk Evaluation (ESC-SCORE) for classification into three risk groups. Subjects assigned to ESC high-risk group (ESC-SCORE ≥ 5%), without a history of cardiovascular disease were eligible for randomization to a multimodal 15-week intervention programme (INT) or to usual care and followed up for 36 months. Primary endpoint: reduction of ESC-SCORE in INT versus usual care. Secondary endpoints: composite of fatal and non-fatal cardiovascular events and time to first cardiovascular event
RESULTS: Four hundred and forty-seven subjects were randomized to INT (n = 224) or to usual care (n = 223). After 36 months ESC-SCORE development favouring INT was observed (INT: 8.70% to 10.03% vs. usual care: 8.49% to 12.09%; p = 0.005; net difference: 18.50%). Moreover, a significant reduction in the composite cardiovascular events was observed: (INT: n = 11 vs. usual care: n = 27). Hazard ratio of intervention versus control

was 0.51 (95% confidence interval 0.25-1.03; p = 0.062) in the intention-to-treat analysis and 0.41 (95% confidence interval 0.18-0.90; p = 0.026) in the per-protocol analysis, respectively. No intervention-related adverse events or side-effects were observed.
CONCLUSION: We demonstrated the efficiency of identifying cardiovascular high-risk subjects by the ESC-SCORE in order to enrol them to a risk adjusted primary prevention programme. This strategy resulted in a significant improvement of ESC-SCORE, as well as a reduction in predefined cardiovascular endpoints in the INT.
View abstract

Naslund, U., Ng, N., Lundgren, A., et al. 2019. **Visualization of asymptomatic atherosclerotic disease for optimum cardiovascular prevention (VIPVIZA): a pragmatic, open-label, randomised controlled trial**. Lancet 393(10167) 133-142.
AIM: to investigate whether ultrasound-based pictorial information about subclinical carotid atherosclerosis, targeting both primary care physicians and individuals, improves prevention.
METHODS: Visualization of asymptomatic atherosclerotic disease for optimum cardiovascular prevention (VIPVIZA) is a pragmatic, open-label, randomised controlled trial that was integrated within the Vasterbotten Intervention Programme, an ongoing population-based cardiovascular disease prevention programme in northern Sweden. Individuals aged 40, 50, or 60 years with one or more conventional risk factors were eligible to participate. Participants underwent clinical examination, blood sampling, and ultrasound assessment of carotid intima media wall thickness and plaque formation. Participants were randomly assigned 1:1 with a computer-generated randomisation list to an intervention group (pictorial representation of carotid ultrasound plus a nurse phone call to confirm understanding) or a control group (not informed). The primary outcomes, Framingham risk score (FRS) and European systematic coronary risk evaluation (SCORE), were assessed after 1 year among participants who were followed up. This study is registered with ClinicalTrials.gov, number NCT01849575.
RESULTS: 3532 individuals were enrolled between April 29, 2013, and June 7, 2016, of which 1783 were randomly assigned to the control group and 1749 were assigned to the intervention group. 3175 participants completed the 1-year follow-up. At the 1-year follow-up, FRS and SCORE differed significantly between groups (FRS 1.07 [95% CI 0.11 to 2.03, p=0.0017] and SCORE 0.16 [0.02 to 0.30, p=0.0010]). FRS decreased from baseline to the 1-year follow-up in the intervention group and increased in the control group (-0.58 [95% CI -0.86 to -0.30] vs 0.35 [0.08 to 0.63]). SCORE increased in both groups (0.13 [95% CI 0.09 to 0.18] vs 0.27 [0.23 to 0.30]). This study provides evidence of the contributory role of pictorial presentation of silent atherosclerosis for prevention of cardiovascular disease.
CONCLUSION: This study provides evidence of the contributory role of pictorial presentation of silent atherosclerosis for prevention of cardiovascular disease. It supports further development of methods to reduce the major problem of low adherence to medication and lifestyle modification.
View abstract

Cohort studies

Akyea RK, Kai J, Qureshi N et al. 2019. **Sub-optimal cholesterol response to initiation of statins and future risk of cardiovascular disease**. Heart, May 4th. Online first.
AIM: to assess low-density lipoprotein cholesterol (LDL-C) response in patients after initiation of statins, and future risk of cardiovascular disease (CVD).
METHOD: Prospective cohort study of 165 411 primary care patients, from the UK Clinical Practice Research Datalink, who were free of CVD before statin initiation, and had at least one pre-treatment LDL-C within 12 months before, and one post-treatment LDL-C within 24 months after, statin initiation. Based on current national guidelines, <40% reduction in baseline LDL-C within 24 months was classified as a sub-optimal statin response. Cox proportional regression and competing-risks survival regression models were used to determine adjusted hazard ratios (HRs) and sub-HRs for incident CVD outcomes for LDL-C response to statins.
RESULTS: 84 609 (51.2%) patients had a sub-optimal LDL-C response to initiated statin therapy within 24 months. During 1 077 299 person-years of follow-up (median follow-up 6.2 years), there were 22 798 CVD events (12 142 in sub-optimal responders and 10 656 in optimal responders). In sub-optimal responders, compared with optimal responders, the HR for incident CVD was 1.17 (95% CI 1.13 to 1.20) and 1.22 (95% CI 1.19 to 1.25) after adjusting for age and baseline untreated LDL-C. Considering competing risks resulted in lower but similar sub-HRs for both unadjusted (1.13, 95% CI 1.10 to 1.16) and adjusted (1.19, 95% CI 1.16 to 1.23) cumulative incidence function of CVD.
CONCLUSION: Optimal lowering of LDL-C is not achieved within 2 years in over half of patients in the general population initiated on statin therapy, and these patients will experience significantly increased risk of future CVD.
View abstract

Albarqouni, L., Doust, J., Magliano, D., et al. 2019. **External validation and comparison of four cardiovascular risk prediction models with data from the Australian Diabetes, Obesity and Lifestyle study**. Med J Aust 210(4) 161-167.
AIM: To evaluate the performance of the 2013 Pooled Cohort Risk Equation (PCE-ASCVD) for predicting cardiovascular disease (CVD) in an Australian population; to compare this performance with that of three frequently used Framingham-based CVD risk prediction models.
METHOD: Prospective national population-based cohort study. 42 randomly selected urban and non-urban areas in six Australian states and the Northern Territory. 5453 adults aged 40–74 years enrolled in the Australian Diabetes, Obesity and Lifestyle study and followed until November 2011. We excluded participants who had CVD at baseline or for whom data required for risk model calculations were missing. Main outcome measures: Predicted and observed 10-year CVD risks (adjusted for treatment drop-in); performance (calibration and discrimination) of four CVD risk prediction models: 1991 Framingham, 2008 Framingham, 2008 office-based Framingham, 2013 PCE-ASCVD.
RESULTS: The performance of the 2013 PCE-ASCVD model was slightly better than 1991 Framingham, and each was better the two 2008 Framingham risk models, both in men and women. However, all four models overestimated 10-year CVD risk, particularly for patients in higher deciles of predicted risk. The 2013 PCE-ASCVD (7.5% high risk threshold) identified 46% of men and 18% of women as being at high risk; the 1991 Framingham model (20% threshold) identified 17% of men and 2% of women as being at high risk. Only 16% of men and 11% of women identified as being at high risk by the 2013 PCE-ASCVD experienced a CV event within 10 years.
CONCLUSION: The 2013 PCE-ASCVD or 1991 Framingham should be used as CVD risk models in Australian. However, the CVD high risk threshold for initiating CVD primary preventive therapy requires reconsideration.
View full text

Hasegawa, Y., Nakagami, T., Oya, J., et al. 2019. **Body Weight Reduction of 5% Improved Blood Pressure and Lipid Profiles in Obese Men and Blood Glucose in Obese Women: A Four-Year Follow-up Observational Study**. Metabolic Syndrome & Related Disorders 06 06.
AIM: to assess the relation between body weight change (BWC) and CVD risk change and to identify lifestyle improvement related to BWR in obese Japanese individuals.
METHOD: Subjects were 2579 health checkup examinees without medicated diabetes, hypertension or dyslipidemia, and a body mass index >=25 kg/m² who completed lifestyle questionnaires in 2008 and 2012. The 4-year changes in fasting plasma glucose (FPG), glycated hemoglobin (HbA1c), lipids, and blood pressure (BP) levels were compared across the five groups based on the 4-year BWC, and presented as <-5%, -5% to -3%, -3% to -1%, -1% to 1%, and >=1%. Multivariable logistic regression models were used to calculate odds ratios (ORs) and 95% confidence intervals (CI) for lifestyle improvement related to BWR.
RESULTS: Comparing the groups to the reference group (BWC ranging from -1% to +1%), we observed that FPG and HbA1c levels were lower in women in the <-5% group; BP levels were also lower in the <-5% group; triglyceride levels had improved in the <-3% group, and low-density lipoprotein cholesterol levels in the <-5% group; high-density lipoprotein cholesterol levels had improved in men in the <-5% group. In men, the adjusted OR (95% CI) for BWR related to lifestyle improvement pertaining to "over 30 min exercise" was 2.6 (2.0-3.6). In women, the adjusted ORs for BWR related to "walking or physical activity," "drinking alcohol," and "drinking more than a glass of sake" were 1.7 (1.1-2.7), 1.9 (1.1-3.5), and 1.8 (1.1-3.0), respectively.
CONCLUSION: A 5% BWR improved FPG and HbA1c levels in obese women, and BP and lipid levels in obese men. Improvements in exercise and alcohol consumption habits were associated with BWR in this population.
View abstract

Kim, K., Lee, C. J., Shim, C. Y., et al. 2019. **Statin and clinical outcomes of primary prevention in individuals aged >75years: The SCOPE-75 study**. Atherosclerosis 284 31-36.
AIM: to investigate whether statin for primary prevention is effective in lowering the cardiovascular risk and all-cause death in individuals aged >75 years.
METHOD: This was a retrospective, propensity score-matched study and data were acquired between 2005 and 2016 in a tertiary university hospital. Of the 6414 patients screened, 1559 statin-naive patients without a history of atherosclerotic cardiovascular disease before the index visit were included. After propensity score matching, 1278 patients (639 statin users, 639 statin non-users) were finally analyzed. Primary outcome variables included major adverse cardiovascular and cerebrovascular events (MACCE) and all-cause death. MACCE included cardiovascular death, nonfatal myocardial infarction, coronary revascularization, and nonfatal stroke or transient ischemic attack.
RESULTS: At a median follow-up of 5.2 years, statin users had lower rates of MACCE (2.15 vs. 1.25 events/100 person-years; hazard ratio, 0.59; p = 0.005) and all-cause death (1.19 vs. 0.65 events/100 person-years; hazard ratio, 0.56; p = 0.02), as well as lower levels of low-density lipoprotein-cholesterol than did non-users. The

Kaplan-Meier curves revealed lower event rates in statin users (hazard ratio: 0.59 for MACCE and 0.56 for all-cause death). The incidence of myocardial infarction and coronary revascularization were lower in statin users.
CONCLUSION: Statin therapy for primary prevention was clearly associated with lower risk of cardiovascular events and all-cause death in individuals aged >75 years. These results support more active statin use in this population.
View abstract

Mavrogianni, C., Lambrinou, C. P., Androutsos, O., et al. 2019. **Evaluation of the Finnish Diabetes Risk Score as a screening tool for undiagnosed type 2 diabetes and dysglycaemia among early middle-aged adults in a large-scale European cohort. The Feel4Diabetes-study**. Diabetes Res Clin Pract 150 99-110.
AIM: To assess the diagnostic accuracy of the FINDRISC for undiagnosed type 2 diabetes mellitus (T2DM) and dysglycaemia (i.e. the presence of prediabetes or T2DM) among early middle-aged adults from vulnerable groups in a large-scale European cohort.
METHOD: Participants were recruited from low-socioeconomic areas in high-income countries (HICs) (Belgium-Finland) and in HICs under austerity measures (Greece-Spain) and from the overall population in low/middle-income countries (LMICs) (Bulgaria-Hungary). Study population comprised of 2116 parents of primary-school children from families identified at increased risk of T2DM, based on parental self-reported FINDRISC. Sensitivity (Se), specificity (Sp), area under the receiver operating characteristic curves (AUC-ROC) and the optimal cut-offs of FINDRISC that indicate an increased probability for undiagnosed T2DM or dysglycaemia were calculated.
RESULTS: The AUC-ROC for undiagnosed T2DM was 0.824 with optimal cut-off >/=14 (Se=68%, Sp=81.7%) for the total sample, 0.839 with optimal cut-off >/=15 (Se=83.3%, Sp=86.9%) for HICs, 0.794 with optimal cut-off >/=12 (Se=83.3%, Sp=61.1%) for HICs under austerity measures and 0.882 with optimal cut-off >/=14 (Se=71.4%, Sp=87.8%) for LMICs. The AUC-ROC for dysglycaemia was 0.663 with optimal cut-off >/=12 (Se=58.3%, Sp=65.7%) for the total sample, 0.656 with optimal cut-off >/=12 (Se=54.5%, Sp=64.8%) for HICs, 0.631 with optimal cut-off >/=12 (Se=59.7%, Sp=62.0%) for HICs under austerity measures and 0.735 with optimal cut-off >/=11 (Se=72.7%, Sp=70.2%) for LMICs.
CONCLUSION: FINDRISC can be applied for screening primarily undiagnosed T2DM but also dysglycaemia among vulnerable groups across Europe, considering the use of different cut-offs for each subpopulation.
View abstract

Rosengren, A., Smyth, A., Rangarajan, S., et al. 2019. **Socioeconomic status and risk of cardiovascular disease in 20 low-income, middle-income, and high-income countries: the Prospective Urban Rural Epidemiologic (PURE) study**.
AIM: to explore the association between education and household wealth and cardiovascular disease and mortality to assess which marker is the stronger predictor of outcomes, and examine whether any differences in cardiovascular disease by socioeconomic status parallel differences in risk factor levels or differences in management.
METHOD: In this large-scale prospective cohort study, we recruited adults aged between 35 years and 70 years from 367 urban and 302 rural communities in 20 countries. We collected data on families and households in two questionnaires, and data on cardiovascular risk factors in a third questionnaire, which was supplemented with physical examination. We assessed socioeconomic status using education and a household wealth index. Education was categorised as no or primary school education only, secondary school education, or higher education, defined as completion of trade school, college, or university. Household wealth, calculated at the household level and with household data, was defined by an index on the basis of ownership of assets and housing characteristics. Primary outcomes were major cardiovascular disease (a composite of cardiovascular deaths, strokes, myocardial infarction, and heart failure), cardiovascular mortality, and all-cause mortality. Information on specific events was obtained from participants or their family.
RESULTS: Recruitment to the study began on Jan 12, 2001, with most participants enrolled between Jan 6, 2005, and Dec 4, 2014. 160 299 (87·9%) of 182 375 participants with baseline data had available follow-up event data and were eligible for inclusion. After exclusion of 6130 (3·8%) participants without complete baseline or follow-up data, 154 169 individuals remained for analysis, from five low-income, 11 middle-income, and four high-income countries. Participants were followed-up for a mean of 7·5 years. Major cardiovascular events were more common among those with low levels of education in all types of country studied, but much more so in low-income countries. After adjustment for wealth and other factors, the HR (low level of education vs high level of education) was 1·23 (95% CI 0·96–1·58) for high-income countries, 1·59 (1·42–1·78) in middle-income countries, and 2·23 (1·79–2·77) in low-income countries (pinteraction<0·0001). We observed similar results for all-cause mortality, with HRs of 1·50 (1·14–1·98) for high-income countries, 1·80 (1·58–2·06) in middle-income countries, and 2·76 (2·29–3·31) in low-income countries (pinteraction<0·0001). By contrast, we found no or weak associations

between wealth and these two outcomes. Differences in outcomes between educational groups were not explained by differences in risk factors, which decreased as the level of education increased in high-income countries, but increased as the level of education increased in low-income countries (pinteraction<0·0001). Medical care (eg, management of hypertension, diabetes, and secondary prevention) seemed to play an important part in adverse cardiovascular disease outcomes because such care is likely to be poorer in people with the lowest levels of education compared to those with higher levels of education in low-income countries; however, we observed less marked differences in care based on level of education in middle-income countries and no or minor differences in high-income countries.
CONCLUSION: Although people with a lower level of education in low-income and middle-income countries have higher incidence of and mortality from cardiovascular disease, they have better overall risk factor profiles. However, these individuals have markedly poorer health care. Policies to reduce health inequities globally must include strategies to overcome barriers to care, especially for those with lower levels of education.
View full text

Egan, B. M., Sutherland, S. E., Rakotz, M., et al. 2018. **Improving Hypertension Control in Primary Care With the Measure Accurately, Act Rapidly, and Partner With Patients Protocol**. Hypertension 72(6) 1320-1327
AIM: to evaluate the 6-month Measure accurately, Act rapidly, and Partner with patients (MAP) framework in 16 Family Medicine Clinics, and then to determine whether better hypertension control persisted at 12 months when practice facilitation was withdrawn.
METHOD: Measure accurately included staff training in attended (intake) BP measurement and unattended automated office BP when intake BP was >=140/>=90 mm Hg. Act rapidly (therapeutic inertia) included protocol-guided escalation of antihypertensive medications when office BP was >=140/>=90 mm Hg. Partner with patients (systolic BP decline/therapeutic intensification) included shared decision making, BP self-monitoring, and affordable medications. Study data were obtained from electronic records.
RESULTS: In 16 787 hypertensive adults (mean, 61.2 years; 54.1% women; 46.0% Medicare) with visits at baseline and first 6 months, BP control improved from 64.4% at baseline to 74.3% (P<0.001) at 6 and 73.6% (P<0.001) at 12 months. At the first MAP visit, among adults with uncontrolled baseline BP and no medication changes (n=3654), measure accurately resulted in 11.1/5.1 mm Hg lower BP. During the first 6 months of MAP, therapeutic inertia fell (52.0% versus 49.5%; P=0.01), and systolic BP decreased more per therapeutic intensification (-5.4 to -12.7; P<0.001).
CONCLUSION: MAP supports a key national strategy for cardiovascular disease prevention through rapid and sustained improvement in hypertension control, largely reflecting measuring accurately and partnering with patients.
View full text

Hu, X., Zhang, Q., Zeng, T., et al. 2018. **Not performing an OGTT results in underdiagnosis, inadequate risk assessment and probable cost increases of (pre)diabetes in Han Chinese over 40 years: a population based prospective cohort study**. Endocrine Connections 01 01.
AIM: to explore the impact on prediabetes of not performing an OGTT in Han Chinese over 40 years.
METHOD: 6682 participants were included in the prospective cohort study followed up for 3 years. Fasting plasma glucose (FPG), 2-h post-load plasma glucose (2h-PG), FPG and 2h-PG (in OGTT), and HbA1c testing using WHO or ADA Criteria were employed for strategy analysis.
RESULTS: The prevalence of diabetes is 12.4% (95% CI: 11.6-13.3), while the prevalence of prediabetes is 34.1% (95% CI: 32.9-35.3) and 56.5% (95% CI: 55.2-57.8) using WHO and ADA Criteria respectively. 2h-PG determined more diabetes individuals than FPG and HbA1c. The testing cost per true positive case of OGTT is close to FPG and less than 2h-PG or HbA1c. FPG, 2h-PG and HbA1c strategies would increase costs from complications for FP or FN results compared with OGTT. Moreover, the least individuals identified as normal by OGTT at baseline developed (pre)diabetes, and the most prediabetes individuals identified by HbA1c or FPG using ADA criteria developed diabetes.
CONCLUSION: The prevalence of isolated IGT and isolated 2h post-load diabetes were high and the majority of individuals with (pre)diabetes were undetected in Chinese Han population. Additionally, not performing an OGTT results in underdiagnosis, inadequate developing risk assessment and probable cost increases of (pre)diabetes in Han Chinese over 40 years and great consideration should be given to OGTT in detecting (pre)diabetes in this population. Further population-based prospective cohort study of longer-term effects is necessary to investigate the risk assessment and cost of (pre)diabetes.
View full text

Lidin, M. 2018. **Effects of a structured lifestyle program for individuals with high cardiovascular risk**.
AIM: To evaluate a structured lifestyle program in individuals with high cardiovascular risk by investigating effects on lifestyle habits, cardiovascular risk factors and participants' experiences, and the influence of educational level and living in different socio-economic areas
METHOD: Patients with increased cardiovascular risk, with or without pre-existing CVD, were referred to the program by physicians in primary health care or at hospitals. The program had a multidisciplinary approach with three individual visits to a nurse at baseline, after six months and one year, for a health check-up (physical examination and blood sampling) and person-centred lifestyle counselling. The program also comprised five group educational sessions with a physician and a nurse covering: nicotine, alcohol, physical activity, food habits, stress, sleeping habits, and behavioural change. Lifestyle habits and quality of life were assessed by questionnaires, the changes in cardiovascular risk factors and cardiovascular risk were measured at each of the three health check-ups, and participants' experiences were investigated through structured interviews.
RESULTS: One hundred participants (64 women, age 58+11 years) were enrolled between 2008 and 2014. Significant and favourable changes in lifestyle habits were observed after one year. Exercise levels increased, and sedentary time decreased. The participants' food habits improved and the number with a high consumption of alcohol decreased. Significant improvements in quality of life were noted after one year. Favourable changes in cardiovascular risk factors, such as waist circumference, systolic and diastolic blood pressure and total cholesterol were noted. In parallel, cardiovascular risk, according to the cardiovascular risk profile based on the Framingham 10-year risk prediction model, decreased by 15%. The risk reduction was seen in both men and women, and in participants with or without previous cardiovascular disease. Educational level based on univeristy degree or not and the socioeconomic area of residence, were not barriers for the capability to change lifestyle habits and decrease cardiovascular risk over one year.
CONCLUSION: It was possible to launch a structured, multidisciplinary lifestyle program at a cardiology unit for individuals at high cardiovascular risk. Improvements in several lifestyle habits, quality of life, multiple CVD risk factors, reduced cardiovascular risk in both men and women as well as in participants with or without CVD, were observed after one year. Educational level and living in different socioeconomic areas did not seem to have any major influence on the capability to change lifestyle habits and decrease cardiovascular risk. Also, they did not influence the changes in quality of life following the lifestyle intervention program. Three different categories about the structure, staff and feed-back based on experiences of the lifestyle program were noted among the participants.
View full text

Garcia-Gil M, Comas-CufÃ M, Blanch, J. et al. 2018. **Effectiveness of Statins as Primary Prevention in People With Different Cardiovascular Risk: A Population-Based Cohort Study**. Clinical pharmacology and therapeutics 104(4) 719.
AIM: to analyse statin effectiveness in a general population with differing levels of coronary heart disease (CHD) risk.
METHOD: Patients (35-74 years) without previous cardiovascular disease were included and stratified according to 10-year CHD risk (<5%, 5-7.4%, 7.5-9.9%, and 10-19.9%). New users were categorized according to their medical possession ratio (MPR). The main outcome was atherosclerotic cardiovascular disease (ASCVD) (myocardial infarction and ischemic stroke).
RESULTS: In adherent patients (MPR 70%), statin treatment decreased ASCVD risk across the range of coronary risk (from 16-30%). The 5-year number needed to treat (NNT) was 470 and 204 in the risk categories <5% and 5-7.4%, respectively, and 75 and 62 in the 7.5-9.9% category than in the 10-19.9% category, respectively. Statin therapy should remain a priority in patients at high 10-year CHD risk (10-19.9%).
CONCLUSION: Most patients with intermediate risk could benefit from statin treatment, but the treatment decision should focus on the net benefit, safety, and patient preference, given the higher NNT.
View full text

Cross-sectional

Berry, S. 2019. **Identifying Patients at Risk for Cardiovascular Disease.** Dissertation, University of Arkansas.
AIM: to address the needs of reducing CVD among Oklahoma residents
METHOD: The Health Belief Model was used to design a screening for CVD within the Electronic Health Record (EHR) using secondary data according to evidence-based guidelines. A retrospective chart review identified patients at risk for developing CVD. Patients were identified based upon current guidelines and statistics in Oklahoma (OK) for those at risk of developing heart disease.

RESULTS: Appropriate screening for risk factors did not occur within the EHR. The top two documented risk factors were obesity and hypertension. Physicians had better documentation rates of risk factors and behavior modification techniques; although individual PCP documentation varied greatly. The results demonstrate an inconsistency of documentation among patient demographics and primary care providers (PCPs). Obesity, smoking, and hypertension were the top three documented risk factors present among patients at clinic A whereas obesity, physical inactivity, and hypertension were the top three risk factors at clinic B. More effective ways of documentation would increase identification of patients at-risk for CVD.
CONCLUSION: The results demonstrate an inconsistency of documentation among patient demographics and primary care providers (PCPs). Obesity, smoking, and hypertension were the top three documented risk factors present among patients at clinic A whereas obesity, physical inactivity, and hypertension were the top three risk factors at clinic B. More effective ways of documentation would increase identification of patients at-risk for CVD. For example, the development of a template in the future may increase documentation and lead to earlier identification of patients at-risk of developing CVD and may decrease the development of CVD through primary prevention.
View full text

Castellano, J. M., Verdejo, J., Ocampo, S., et al. 2019. **Clinical Effectiveness of the Cardiovascular Polypill in a Real-Life Setting in Patients With Cardiovascular Risk in Mexico: The SORS Study**. Archives of Medical Research 50(1) 31-40.
AIM: to conduct a multicentre, observational and prospective registry of a polypill-based treatment strategy
METHOD: A total of 1193 patients in Mexico were included. Patient demographics, clinical history, blood pressure, analysis of blood lipids and the Framingham risk score were measured at baseline and after 12 months of treatment with the CNIC-Ferrer polypill.
RESULTS: At one year with the polypill, systolic blood pressure (SBP) and diastolic blood pressure (DBP) levels changed from mean 146.9 mmHg to 128 mmHg ($p < 0.001$), and from 89.1 mmHg to 80.4 mmHg ($p < 0.001$) respectively. LDLc levels were significantly reduced 132.5-107.6 mg/dL ($p < 0.001$). The 10 year Framingham cardiovascular disease risk was also reduced in the high-risk group (33.7 + 22.0 vs. 21.2 + 14.8; $p < 0.001$) and in the intermediate risk group (23.7 + 14.8 vs. 12.7 + 11.4; $p < 0.001$).
CONCLUSION: To our knowledge, the results of the current study constitute the first real life data on the impact of a polypill therapy on cardiovascular risk factor control. The results show major improvements on the primary outcome, above and beyond those presented previously in the setting of randomized clinical trials
View abstract

Chandrupatla, S. G., Ramachandra, R., Dantala, S., et al. 2019. **Importance and Potential of Dentists in Identifying Patients at High Risk of Diabetes**. Current diabetes reviews 15(1) 67-73.
AIM: to assess the utilization of medical and dental services by dental patients at two dental school hospitals and to approximate the number of patients having no known previous diagnosis of type 2 diabetes but are at high risk of acquiring it.
METHOD: A cross-sectional study was conducted at two dental school hospitals in India. A 20-item questionnaire was administered as interviews among the dental patients aged 35 to 55 years. Data was collected on past dental and medical visits, medical history, family history relevant to diabetes, cardiovascular health, BMI and waist circumference (measured). RESULTS: A total of 413 adult patients (males 61.26%, females 38.74%) participated in the surveys. The mean age was 43.06 years. Results revealed that nearly 50% did not have a medical or a dental visit in the last 1 year, 33% had Cardiovascular Diseases (CVD). Among those who did not have medical visit in last one year 45% had BMI >25 kg, 55% had waist circumference above the normal range and 38% were at high risk of diabetes.
CONCLUSION: The high number of patients without a medical visit in the past year or more, as well as the high levels of diabetes risk indicators, affirms the need for dentists to perform chair-side screenings for diabetes. These results suggest the need for additional training among dental students to improve early detection and identification of high-risk patients to minimize potential morbidity due to diabetes.
View abstract

Chen, J., Guo, H., Yuan, S., et al. 2019. **Efficacy of urinary glucose for diabetes screening: a reconsideration**. Acta Diabetol 56(1) 45-53.
AIM: to re-evaluate the efficacy of urinary glucose for diabetes screening, taking into consideration the collection method of urine and the measurement approach for UG among Chinese adults.
METHOD: This cross-sectional study enrolled a total of 7689 participants without known diabetes, who were fasted and asked to empty bladders before a 75 g glucose loading. Urine was collected 2 h post glucose loading,

and UG was measured using quantitative and qualitative approaches. The efficacy of UG in detecting diabetes was assessed by the receiver operating characteristic (ROC) curve.
RESULTS: The area under the ROC curve was 0.89 for quantitative UG and 0.87 for qualitative UG. Quantitative UG was positively correlated with fasting plasma glucose (FPG) and 2 h plasma glucose (2 h PG) (r = 0.55 and 0.56, respectively, both P < 0.001). Quantitative UG displayed a sensitivity of 82.9% and a specificity of 84.7% in detecting diabetes at the corresponding optimal cutoff of 130 mg. Qualitative UG exhibited a sensitivity of 80.2% and a specificity of 85.6% at the optimal cutoff of glycosuria + 1. In addition, the sensitivity of both quantitative and qualitative UG was significantly higher than that of HbA1c (>/= 6.5%) (P < 0.001) and had a comparable sensitivity to 2 h PG (>/= 11.1 mmol/L) (P = 0.493). UG, either quantitatively or qualitatively measured at 2 h post glucose loading, was effective in diabetes screening.
CONCLUSION: UG, either quantitatively or qualitatively measured at 2 h post glucose loading, was effective in diabetes screening. This indicates that UG is a feasible approach for diabetes screening.
View full text

Clough, J. D., Martin, S. S., Navar, A. M., et al. 2019. **Association of Primary Care Providers' Beliefs of Statins for Primary Prevention and Statin Prescription**. J Am Heart Assoc 8(3) e010241.
AIM: to assess how primary care provider (PCP) beliefs influence statin prescription.
METHOD: We surveyed 164 PCP s from a community-based North Carolina network in 2017 about statin therapy. We evaluated statin initiation among the PCP s' statin-eligible patients between 2014 and 2015 without a previous prescription. Seventy-two PCP s (43.9%) completed the survey.
RESULTS: The median estimate of the relative risk reduction for high-intensity statins was 45% (interquartile range, 25%-50%). A minority of providers (27.8%) believed statins caused diabetes mellitus, and only 16.7% reported always/very often discussing this with patients. Most PCPs (97.2%) believed that statins cause myopathy, and 72.3% reported always/very often discussing this with patients. Most (77.7%) reported always/very often using the 10-year atherosclerotic cardiovascular disease risk calculator, although many reported that in most cases other risk factors or patient preferences influenced prescribing (59.8% and 43.1%, respectively). Of 6172 statin-eligible patients, 22.3% received a prescription for a moderate- or high-intensity statin at follow-up. Providers reporting greater reliance on risk factors beyond atherosclerotic cardiovascular disease risk were less likely to prescribe statins.
CONCLUSION: Although beliefs and approaches to statin discussions vary among community PCP s, new prescription rates are low and minimally associated with those beliefs. These results highlight the complexity of increasing statin prescriptions for primary prevention and suggest that strategies to facilitate standardized discussions and to address external influences on patient beliefs warrant future study.
View full text

Coomes, E. A., Haghbayan, H., Finken, L. R., et al. 2019. **Information on Cardiovascular Disease in the Digital Era: Results from a Cross-Sectional Patient Survey.**
AIM: to determine the contemporary patterns of CVD information source usage in a primary care center in Ontario, Canada.
METHOD: A prospective, cross-sectional survey study of CVD information sources. Primary source(s) used for CVD information were defined as: traditional media (television or print media), internet-based sources, or community resources (community agencies and healthcare providers).
RESULTS: 3189 (68%) of 4682 consecutively screened patients aged >18 years of age participated in the survey. The mean age of the survey respondents was 37±14 years and 54.4% were female. Traditional media (71%) were used more frequently than internet-based sources (45%) or community health services (23%). Only 20% of respondents identified health care providers as the source of information for CVD. Compared to respondents aged ≥55, the adjusted odds of internet-based source utilization were significantly higher amongst younger age groups, whereas the adjusted odds of print media and health services usage was lowest amongst ages 25-34.
CONCLUSION: Although traditional print and electronic media remain the primary resource for CVD-related information, younger individuals increasingly rely on internet-based sources. These findings have important implications for public health policy and resource allocation, highlighting the importance of maintaining traditional media presence in addition to the development of high-quality internet-based sources of CVD information.
View abstract

Cuschieri, S. & Grech, S. 2019. **Closing the gap - Is type 2 diabetes awareness enough to prevent the growing epidemic?** Diabetes and Metabolic Syndrome: Clinical Research and Reviews 13(3) 1739-1744.
AIM: to determine the level of diabetes awareness among a high-risk dysglycaemic population in relation to socio-demographic, lifestyle and family history of diabetes as well as to body mass index (BMI) and blood pressure measurements. METHOD: Participants obtaining impaired fasting blood glucose in a representative health examination survey were invited to undergo an oral glucose tolerance test (OGTT). During the OGTT session, participants were invited to take part in a diabetes awareness questionnaire as well as have their weight, height and blood pressure measured. Association between awareness scores and different parameters (age, gender, education, residential district, smoking, alcohol habit, family history, BMI and blood pressure) were explored.
RESULTS: Being a female, ageing, non-smoker and having a family history of diabetes had a positive association with adequate diabetes awareness. Even though generally good awareness was present, the majority of the participants were obese, with an elevated blood pressure and obtained a dysglycaemic status post OGTT.
CONCLUSION: Diabetes awareness solely does not appear to engage individuals in preventive initiatives. Behavioural changes are required but these are only established after the motivational action gap has been overcome. Empowering community diabetes mellitus screening programs targeting the environment, social gradients and cultural norms while engaging in preventive interventions are recommended.
View abstract

de Waard, A. M., Hollander, M., Korevaar, J. C., et al. 2019. **Selective prevention of cardiometabolic diseases: activities and attitudes of general practitioners across Europe**. Eur J Public Health 29(1) 88-93
AIM: to provide information on the current status of the implementation of health checks for cardiometabolic diseases (CMD) across Europe, to give more insight into the barriers and facilitators for GPs to invite their patients for a CMD health check, and to examine the willingness of the target population to participate in a health check for CMD.
METHODS: A survey among 575 GPs from the Czech Republic, Denmark, Greece, the Netherlands and Sweden was conducted between September 2016 and January 2017, within the framework of the SPIMEU-project.
RESULTS: On average, 71% of GPs invited their patients to attend for CMD risk assessment. Some used an active approach (47%) while others used an opportunistic approach (53%), but these values differed between countries. Most GPs considered selective CMD prevention as useful (82%) and saw it as part of their normal duties (84%). GPs who did find selective prevention useful were more likely to actively invite individuals compared with their counterparts who did not find prevention useful. Most GPs had a disease management programme for individuals with risk factor(s) for cardiovascular disease (71%) or diabetes (86%).
CONCLUSION: Although most GPs considered selective CMD prevention as useful, it was not universally implemented. The biggest challenge was the process of inviting individuals for risk assessment. It is important to tailor the implementation of selective CMD prevention in primary care to the national context, involving stakeholders at different levels.
View full text
Note: a thesis on the same topic by the same author has also been published: de Waard, A. 2018. **Towards successful selective prevention of cardiometabolic diseases in primary care: Challenges across Europe.** University Utrecht (thesis). View full text

Edwards, L. A., Campbell, P., Taylor, D. J., et al. 2019. **Healthy shopper? Blood pressure testing in a shopping centre Pop-Up in England**. BMC Public Health 19(1) 42.
AIM: to conduct a Pop-Up health check in shopping centres in England and assess if the rate of case detection is related to measurable 'unhealthiness' of the shopping centres.
METHOD: A Pop-Up health check was sited in four and three shopping centres sampled from the top ten unhealthiest and top 15 healthiest shopping regions respectively, following a report ranking towns/cities based on their unhealthy and healthy retail outlets. On one day in each shopping centre, people were approached and consented to BP testing. Outcome measure was people flagged with BP >= 140/90 mmHg (cases).
RESULTS: We detected 45 (22.6%) and 20 (13.1%) cases from testing 199 and 152 adults in the unhealthy and healthy locations respectively (relative risk 1.72; 95% confidence interval: 1.06 to 2.78). A measure of unhealthy retail outlets (e.g. fast-food outlets) within each shopping centre was associated with detection rate (R² = 0.61; p = 0.04).
CONCLUSION: An association exists between cases of suspect hypertension found in a health check Pop-Up and measured 'unhealthiness' of the shopping centre site. Results hint at strategies for public testing of BP, potentially in the context of reducing health inequalities.
View full text

Fukasawa, T., Tanemura, N., Kimura, S., et al. 2019. **Utility of a Specific Health Checkup Database Containing Lifestyle Behaviors and Lifestyle Diseases for Employee Health Insurance in Japan**. Journal of Epidemiology 02 02.
AIM: to describe the specific health checkup (SHC) database developed by the Japan Medical Data Center Co., Ltd. (JMDC) as a means of exploring lifestyle behaviors and lifestyle diseases among working generations.
METHOD: We conducted a retrospective, cross-sectional study of employees and their families using the JMDC-SHC database to describe the prevalence of lifestyle behaviors (smoking, exercise, dietary habits, drinking habits, and sleeping) and lifestyle diseases (MS, hypertension, dyslipidemia, and diabetes mellitus). Results were compared with data from the 2015 National Health and Nutrition Survey (NHNS) in Japan as a benchmark.
RESULTS: All 646,869 enrollees in the JMDC-SHC database were included, of whom 66.5% were men. Age ranged from 40-74 years. Compared with the results of the NHNS, the JMDC-SHC subjects were younger and had fewer MS components and a lower prevalence of diabetes and hypertension. Subjects in their 40s were most likely to have unhealthy lifestyle behaviors in all age groups (eg, smoking: 41.0% in men and 10.2% in women). The SHC group had more favorable behaviors overall, but underweight was more prevalent in the SHC females.
CONCLUSION: The JMDC-SHC population showed different lifestyle and lifestyle disease profiles to the NHNS population, probably due to its different age, gender, and employment distributions. Development of healthcare policies and plans for working generations would benefit from the selection of an age- and employment-appropriate database.
View full text

Gomez-Sanchez, L., Gomez-Marcos, M. A., Patino-Alonso, M. C., et al. 2019. **Reclassification by applying the Framingham equation 30 years to subjects with intermediate cardiovascular risk. MARK study**. Med Clin (Barc).
AIM: to analyse what percentage of patients with intermediate CVR included in the MARK study is reclassified by applying the 30-year Framingham score (FS30), and the degree of agreement between the two equations to classify high risk subjects. METHOD: Cross-sectional study of 966 subjects included in the MARK study. The CVR was calculated with the two versions of the FS30 (based on lipids and body mass index) for "hard" cardiovascular events in subjects with intermediate CVR.
RESULTS: The 59% and 61% of the subjects with intermediate CVR would be classified as if they had high CVR to undergo a hard event if we used the FS30 in both versions. 70% of men and 35% of women would be classified as high CVR ($p<0.01$). The agreement percentage, measured with the Kappa index, between the equations FS30L and FS30BMI to classify the high-risk subjects was 67.9% (in men 67.4% and in women 68.7%).
CONCLUSION: In subjects with intermediate CVR the FS30 reclassifies more than the half as high RCV, 2 out of 3 men and 1 out of 3 women.
View abstract

Gooding, H. C., Brown, C. A., Liu, J., et al. 2019. **Will Teens Go Red? Low Cardiovascular Disease Awareness Among Young Women**. Journal of the American Heart Association 8 (6) (no pagination)(e011195)
AIM: to assess awareness of CVD and prevention efforts among 331 young women aged 15 to 24 years using the American Heart Association National Women's Health Study survey.
METHOD: We compared responses from this cohort to the 2012 American Heart Association online survey of 1227 women aged 25 years and older. Only 33 (10.0%) young women correctly identified CVD as the leading cause of death in women. This was significantly lower than awareness among all adult women in 2012 (785 [64.0%]) and among women aged 25 to 34 years (90 of 168 [53.6%]) ($P<0.01$ for both). Many young women in the current study (144 [43.5%]) said they were not at all informed about CVD; most worried little (130 [39.2%]) or not at all (126 [38%]) about CVD. Young women did report engaging in behaviors known to reduce risk of CVD, although not considering oneself at risk was cited as the number one barrier to engaging in prevention behaviors.
CONCLUSION: Young women are largely unaware of CVD as the leading cause of death for women. Given that most young women are not worried about CVD and their 10-year risk for CVD events is low, campaigns to promote heart-healthy behaviors among younger women should underscore the benefits of these preventive behaviors to current health in addition to reductions in lifetime risk of CVD.
View full text

Hansen, T. B., Lindholt, J. S., Diederichsen, A. C. P., et al. 2019. **Individual preferences on the balancing of good and harm of cardiovascular disease screening**. Heart 105(10) 761-767.
AIM: to elicit individual preferences for cardiovascular disease screening with respect to the difficult balancing of good and harm as well as mode of delivery.

METHOD: A discrete choice experiment was conducted as a cross-sectional survey among 1231 male screening participants at three Danish hospitals between June and December 2017. Participants chose between hypothetical screening programmes characterised by varying levels of mortality risk reduction, avoidance of overtreatment, avoidance of regretting participation, screening duration and location. A multinomial mixed logit model was used to model the preferences and the willingness to trade mortality risk reduction for improvements on other characteristics.
RESULTS: Respondents expressed preferences for improvements on all programme characteristics. They were willing to give up 0.09 (95% CI 0.08 to 0.09) lives saved per 1000 screened to avoid one individual being over treated. Similarly, respondents were willing to give up 1.22 (95% CI 0.90 to 1.55) or 5.21 (95% CI 4.78 to 5.67) lives saved per 1000 screened to upgrade the location from general practice to a hospital or to a high-tech hospital, respectively. Subgroup analysis revealed important preference heterogeneity with respect to smoking status, level of health literacy and self-perceived risk of cardiovascular disease.
CONCLUSION: Individuals are able to express clear preferences about what makes value to them. Not only health benefit but also time with health professionals and access to specialised facilities were important. This information could guide the optimal programme design in search of value-based healthcare.
View full text

Harrington, D. M., O'Connell, S., Akroyd, C., et al. 2019. **Professional sports club and workplace type 2 diabetes screening using the Leicester diabetes risk score: Six-monthly results from the Leicester changing diabetes programme**. Diabetic Medicine 36 (Supplement 1) 100.
AIM: to present results from Type 2 diabetes screening events requested by professional sports clubs and employers in Leicester City.
METHOD: Stakeholder meetings held between October 2017 and May 2018 included representatives from the four City professional sports clubs (football, rugby, basketball and cricket) and City employers. They requested Type 2 diabetes risk identification (screening) at their events. Trained staff from Leicester Diabetes Centre and the Centre for Black and Minority Health administered the Leicester Diabetes Risk Score (seven self-report questions). The validated scoring system assigns a low, medium, high and very high risk score to screeners. Events were promoted by the sports clubs (e.g. matchday programme, Twitter).
RESULTS: Between May and October 2018, 303 adults completed a risk score and received their result at six events including a Leicester City FC Premier League game, a senior league football game, a test cricket match, a large call-centres and the City Council. Overall, 43% were at high or very high risk. The workplace gave the largest number of screeners (46%) and proportion of at risk people (44%). These are novel settings for screening events and are allowing new audiences to engage in Type 2 diabetes risk identification.
CONCLUSION: Professional sports clubs and employers are increasingly aware of the health of their fans, employees and the wider community. These are novel settings for screening events and are allowing new audiences to engage in Type 2 diabetes risk identification.
View abstract

Higuchi, R., Iwane, T., Suwa, K., et al. 2019. **Adjustment for Waist Circumference Reveals a U-Shaped Association Between Glycated Hemoglobin Levels and Body Mass Index in Young Adults**. Canadian Journal of Diabetes 43(3) 201-206.
AIM: to investigate the relationship between glycated hemoglobin (A1C) and BMI in young adults, adjusting for waist circumference (WC).
METHOD: We reviewed A1C, BMI, WC and other clinical data in a cross-sectional study of 26,475 apparently healthy Japanese people 20 to 39 years of age who were undergoing health check-ups.
RESULTS: Although the values of most serum parameters were high in subjects with a high BMI in both younger (20 to 29 years of age, n=10,810) and older subjects (30 to 39 years of age, n=15,665), A1C had a J-shaped relationship with BMI category in younger subjects, regardless of sex. A traditional linear model via a generalized linear model showed that in younger subjects, an inverse association of A1C level with BMI category (19 to 26.9 kg/m² vs. <=18.9 kg/m²) was identified after adjustment for WC. This indicates positive associations between A1C and BMI categories of <=18.9 (beta=0.06; p<0.0001), 19.0 to 20.9 (beta=0.03; p<0.01) and >=27.0 kg/m² (beta=0.08; p<0.0001), in contrast to individuals with BMIs of 23.0 to 24.9 kg/m². Similarly, in older subjects, BMIs <=18.9 kg/m² were associated with A1C levels but to a lesser extent (beta=0.04; p<0.05) than in younger subjects.
CONCLUSION: Additional adjustment of BMI for WC revealed a latent U-shaped association between A1C concentration and BMI, particularly in young adults; this deserves further investigation.
View abstract

Katulanda, G. W., Katulanda, P., Dematapitiya, C., et al. 2019. **Plasma glucose in screening for diabetes and pre-diabetes: how much is too much? Analysis of fasting plasma glucose and oral glucose tolerance test in Sri Lankans**. BMC Endocrine Disorders 19(1) 11.
AIM: to establish FPG cut offs for Sri Lankans to screen for diabetes and pre-diabetes.
METHOD: Data on FPG and diabetes/pre-diabetes status were obtained from Sri Lanka Diabetes and Cardiovascular Study (SLDCS), a community based island wide observational study conducted in 2005-6. Sensitivity specificity and area under the ROC curve were calculated for different FPG values.
RESULTS: Study included 4014 community dwelling people after excluding people already on treatment for diabetes or pre-diabetes. Mean age was 45.3 (+/- 15) years and 60.4% were females. FPG cut off of 5.3 mmol/L showed better sensitivity and specificity than 5.6 mmol/L in detecting diabetes (87.8% and 84.4% Vs 80.8% and 92.1%) and pre-diabetes (54.7% and 87.0% Vs 43.8% and 94.2%).
CONCLUSION: A lower FPG cut off of 5.3 mmol/L has a better sensitivity and acceptable specificity in screening for diabetes and pre-diabetes in Sri Lankan adults
View full text

Kouvari, M., Panagiotakos, D. B., Yannakoulia, M., et al. 2019. **Transition from metabolically benign to metabolically unhealthy obesity and 10-year cardiovascular disease incidence: The ATTICA cohort study**. Metabolism: Clinical and Experimental 93 18-24.
AIM: to evaluate whether metabolically healthy obese (MHO) status is a transient condition which propagates 10-year cardiovascular disease (CVD) onset.
METHOD: A prospective longitudinal study was conducted during 2001-2012, the ATTICA study studying 1514 (49.8%) men and 1528 (50.2%) women (aged >18 years old) free of CVD and residing in the greater Athens area, Greece. Follow-up assessment of first combined CVD event (2011-2012) was achieved in n = 2020 participants; of them, 317 (15.7%) incident cases were identified. Obesity was defined as body mass index >=30 kg/m² and healthy metabolic status as absence of all NCEP ATP III (2005) metabolic syndrome components (excluding waist circumference).
RESULTS: The MHO prevalence was 4.8% (n = 146) with 28.2% of obese participants presenting metabolically healthy status at baseline. Within this group, 52% developed unhealthy metabolic status during the 10-year follow up. MHO vs. metabolically healthy non-obese participants had a higher likelihood of presenting with 10-year CVD events, yet only the subset of them who lost their baseline status reached the level of significance (Hazard Ratio (HR) = 1.43, 95% Confidence Interval (95% CI) 1.02, 2.01). Sensitivity analyses revealed that MHO status was independently associated with elevated CVD risk in women and participants with low adherence to the Mediterranean diet, low grade inflammation, and insulin resistance.
CONCLUSION: MHO status is a transient condition where weight management is demanded to prevent the establishment of unhealthy cardiometabolic features. The existence of obese persons who remain "longitudinally" resilient to metabolic abnormalities is an emerging area of future research.
View abstract

Larsen, L. B., Sondergaard, J., Thomsen, J. L., et al. 2019. **Digital Recruitment and Acceptance of a Stepwise Model to Prevent Chronic Disease in the Danish Primary Care Sector: Cross-Sectional Study**. Journal of Medical Internet Research 21(1) e11658.
AIM: to analyse the association between the rates of acceptance of 2 digital invitations sent to a personal digital mailbox and the sociodemographic determinants, medical treatment, and health care usage in a stepwise primary care model for the prevention of chronic diseases.
METHOD: We conducted a cross-sectional analysis of the rates of acceptance of 2 digital invitations sent to randomly selected residents born between 1957 and 1986 and residing in 2 Danish municipalities. The outcome was acceptance of the 2 digital invitations. Statistical associations were determined by Poisson regression. Data-driven chi-square automatic interaction detection method was used to generate a decision tree analysis, predicting acceptance of the digital invitations.
RESULTS: A total of 8814 patients received an invitation in their digital mailbox from 47 general practitioners. A total of 40.22% (3545/8814) accepted the first digital invitation, and 30.19 % (2661/8814) accepted both digital invitations. The rates of acceptance of both digital invitations were higher among women, older patients, patients of higher socioeconomic status, and patients not diagnosed with or being treated for diabetes mellitus, chronic obstructive pulmonary disease, or cardiovascular disease.
CONCLUSION: To our knowledge, this is the first study to report on the rates of acceptance of digital invitations to participate in a stepwise model for prevention of chronic diseases. More studies of digital invitations are needed to determine if the acceptance rates seen in this study should be expected from future studies as well. Similarly, more research is needed to determine whether a multimodal recruitment approach, including digital

invitations to personal digital mailboxes will reach hard-to-reach subpopulations more effectively than digital invitations only
View full text

Milla Perseguer, M., Guadalajara Olmeda, N. & Vivas Consuelo, D. 2019. **Impact of cardiovascular risk factors on the consumption of resources in Primary Care according to Clinical Risk Groups**. Aten Primaria 51(4) 218-229.
AIM: To analyse the prevalence of Cardiovascular Risk Factors (CVRF) in the context of a Basic Health Area and the impact they generate on morbidity and consumption of healthcare resources in the stratified population according to the Clinical System Risk Groups (CRG) in Primary Care, with the purpose of identifying the population with multimorbidity to apply preventive measures, as well as the one that generates the highest care burden and social needs.
METHOD: Observational, cross-sectional and population-based study for a basic health area during 2013. Department of Health 2 (Castellon), Comunidad Valenciana (CV). All citizens registered in the Population Information System, N=32,667. From the computerized system Abucasis we obtained the demographic, clinical and consumption variables of health resources. We consider the prevalence of CVRF based on the presence or absence of the ICD.9.MC diagnostic codes. The relationship of the CVRF with the 9 CRG health states was analyzed and a predictive analysis was performed with the logistic regression model to evaluate the explanatory capacity of each variable. In addition, an explanatory model of ambulatory pharmaceutical expenditure was obtained through multivariate regression.
RESULTS: The population of health status CRG4 and above had multimorbidity. The CRG7 and 6 health states have a higher prevalence of CVRF; it was predictive that the higher the morbidity, the greater the consumption of resources through OR above the mean, p<0.05 and the 95% confidence intervals. It was observed that 59.8% of ambulatory pharmaceutical expenditure was explained by the CRG system and all the CVRF (p<0.05 and R(2) corrected=0.598). Regarding the effect of the CVRF on the CRG health states, there was a significant association (p<0.05) for the alteration of blood glucose, dyslipidemia and HBP in all the CRG states.
CONCLUSION: The study of CVRF in a stratified population using the CRG system identifies and predicts where the greatest impact on morbidity and consumption of healthcare resources is generated. It allows us to know the groups of patients where to develop prevention and chronicity strategies.
View abstract [full text in Spanish]

Mostaza, J. M., Lahoz, C., Salinero-Fort, M. A., et al. 2019. **Cardiovascular disease in nonagenarians: Prevalence and utilization of preventive therapies**. Eur J Prev Cardiol 26(4) 356-364.
AIM: to evaluate the prevalence of cardiovascular diseases and the patterns of use of cardiovascular treatments in subjects >/=90 years old.
METHOD: Population-based, cross-sectional study, in all nonagenarians residing in the Community of Madrid (Spain). Data were obtained from their electronic clinical records in primary care.
RESULTS: Data were available from 59,423 subjects (mean age 93.3 years, 74.2% female, 13.5% with dementia). Prevalence of cardiovascular disease was 24.1% (10.9% with coronary artery disease (CAD), 13.1% with cerebrovascular disease (CVD) and 2.7% with peripheral artery disease(PAD)). In primary prevention, the use of statins and antiplatelet agents was 21.9% and 26.7%, respectively. Of subjects with vascular disease 27.7% were receiving a combined preventive strategy (use of antithrombotics, plus statins, plus blood pressure below 140/90 mmHg). Factors favourably associated with a combined preventive strategy were: female sex (odds ratio (OR) 1.29; 95% confidence interval (CI): 1.11-1.49), being independent versus totally dependent (OR 1.94; 95% CI: 1.43-2.65), diabetes (OR 1.42; 95% CI: 1.20-1.68), and negatively, age (OR 0.87; 95% CI: 0.85-0.90), CVD versus CAD (OR 0.41; 95% CI: 0.35-0.47), PAD versus CAD (OR 0.23; 95% CI: 0.18-0.30), dementia (OR 0.61; 95% CI: 0.49-0.76) and nursing home residency (OR 0.73; 95% CI: 0.57-0.93).
CONCLUSION: Nonagenarians have a great burden of cardiovascular diseases and receive a great number of preventive therapies, even in primary prevention, despite their unproven efficacy at these ages.
View abstract

Ödesjö, H., Adamsson Eryd, S., Franzén, S., et al. 2019. **Visit patterns at primary care centres and individual blood pressure level - a cross-sectional study**. Scandinavian Journal of Primary Health Care 37(1) 53-59.
AIM: to study visit patterns at primary health care centres (PHCCs) and their relation to individual BP control.
METHOD: Cross-sectional register-based study on all patients with hypertension who visited 188 PHCCs in a Swedish region. A total of 88,945 patients with uncomplicated hypertension age 40-79. Main outcome measures: Odds ratio (OR) for the individual patient to achieve the BP target of ≤140/90 mmHg.

RESULTS: Overall, 63% of patients had BP ≤ 140/90 mmHg (48% BP < 140/90). The PHCC that the patient was enrolled at and, as part of that, more nurse visits at PHCC level was associated with BP control, adjusted OR 1,10 (95% CI 1.01 to 1.21). Patients visiting PHCCs with the highest proportion of visits with nurses had an even higher chance of achieving the BP target, OR 1.19 (95% CI 1.07 to 1.32).
CONCLUSION: In a Swedish population of patients with hypertension, about half do not achieve recommended treatment goals. Organisation of PHCC and team care are known as factors influencing BP control. Our results suggests that a larger focus on PHCC organisation including nurse based care could improve hypertension care.
View full text

Oriol Toron, P. A., Badia Farre, T. & Romaguera Lliso, A. 2019. **Lipid control and associated risk factors, before suffering from the first cardiovascular event**. Clin Investig Arterioscler. Feb 12.
AIM: To ascertain the degree of lipidic control before the first cardiovascular accident in population attended during 2013 at Primary Care, and to analyze the distribution of these events depending on control intervals of cholesterol LDL (LDL-chol), cholesterol HDL (HDL-chol) and triglycerides (TG).
METHOD: A multicentric cross-sectional, descriptive study on above 18-year-old people attended at the centres of the Primari Care Service (PCS) Baix Llobregat Nord, who had suffered a first cardiac or cerebral ischemic attack from 01/01/2013 to 31/12/2013. Variables collected included age,sex, smoking, high blood preassure,diabetes, dyslipidemia (DLP), obesity, total cholesterol (chol-tot), LDL-chol, HDL-chol, TG, systolic and diastolic blood preassure (SBP,DBP), IMC, HbA1c, atherogenic indices, REGICOR, drugs. RESULTS: 379 affected people, among them 197 (52%) heart attack and 182 (48%) stroke (ictus). Two hundred and twenty-five (54.4%) males, diagnosis median age 68.9 years (DS 13.7), 71.2 (DS 14.4) in CV (p: .001). High blood preassure 214 (56.5%), diabetes 113 (29.8%), DLP 193 (50.9%). Cases in LDL<100-159: 88%, HDL>/=40/50: 72.8%, TG<150: 71.3%. chol-tot average: 198.3 mg/dl (DS 40.2), LDL-chol:121 (DS 33.8), LDL-chol<130:170 (58.6%). HDL-chol average: 52.5 mg/dl (DS 15.4) and TG: 130.9 mg/dl (DS 73.2) (CI:139.5 [DS 84.2] vs. CV: 120.9 [DS 55.9] [p: .003]). Optimal chol-tot/HDL-chol 67%, optimal TG/HDL-chol 39.8%. CI:optimal chol-tot/HDL-chol male vs. female: 51.2% vs. 76.9% (p: .002); optimal TG/HDL-chol male vs. female: 28% vs. 53.8% (p: .004).
CONCLUSION: The quantity of events was similar in both cardiac and cerebral territories, whereas the median age in the diagnosis was a little higher in CV. High blood preassure, DLP and obesity are the most prevalent FRCV, and its control at primary prevention is improvable. Most of the cases were grouped in the LDL lipid ranges <100-159mg/dl, HDL >/= 40/50mg/dl and TG <150mg/dl.
View abstract

Perini, W., Kunst, A. E., Snijder, M. B., et al. 2019. **Ethnic differences in metabolic cardiovascular risk among normal weight individuals: Implications for cardiovascular risk screening. The HELIUS study**. Nutrition Metabolism & Cardiovascular Diseases 29(1) 15-22.
AIM: to determine cardiovascular risk and eligibility for cardiovascular risk screening among normal weight individuals of different ethnic backgrounds.
METHOD: Using the HELIUS study (Amsterdam, The Netherlands), we determined cardiovascular risk among 6910 normal weight individuals of Dutch, South-Asian Surinamese, African Surinamese, Ghanaian, Moroccan and Turkish background. High cardiovascular risk was approximated by high metabolic risk based on blood pressure, HDL, triglycerides and fasting glucose. Eligibility criteria for screening were derived from Dutch CVD prevention guidelines and include age >= 50 y, family history of CVD, or current smoking. Ethnic group comparisons were made using logistic regression.
RESULTS: Age-adjusted proportions of high metabolic risk ranged from 12.6% to 38.4% (men) and from 2.7% to 11.5% (women). This prevalence was higher among most ethnic minorities than the Dutch, especially among women. For most ethnic groups, 79.9%-86.7% of individuals with high metabolic risk were eligible for cardiovascular risk screening. Exceptions were Ghanaian women (58.8%), Moroccan men (70.9%) and Moroccan women (45.0%), although age-adjusted proportions did not differ between groups. Even among normal weight individuals, high cardiovascular metabolic risk is more common among ethnic minorities than among the majority population.
CONCLUSION: Even among normal weight individuals, high cardiovascular metabolic risk is more common among ethnic minorities than among the majority population. Regardless of ethnicity, most normal weight individuals with increased risk are eligible for cardiovascular risk screening.
View full text

Shealy, K. M., Wu, J., Waites, J., et al. 2019. **Patterns of Diabetes Screening and Prediabetes Treatment during Office Visits in the US**. Journal of the American Board of Family Medicine: JABFM 32(2) 209-217.
AIM: to review the prevalence of screening and treatment of prediabetes in the United States by using the National Ambulatory Medical Care Survey, as well as identify any factors associated with screenings and treatment.
METHOD: The National Ambulatory Medical Care Survey was used to examine a study sample of office visits between 2012 and 2015, reviewing the prevalence of screenings and lab services ordered or provided at each patient visit. Inclusion criteria consisted of the recommendations given by the American Diabetes Association including any patient >=45 years or adult patient <45 years with a body mass index of >=25 kg/m² and an additional risk factor. Patients with a previous diagnosis of diabetes were excluded from the sample.
RESULTS: A total of 105,721 office visits (2012 to 2015) were included in the analysis. The diabetes screening prevalence increased from 10% in 2012 to 13.4% in 2015. Metformin (n = 140, 76.1%) was the most common antidiabetic medication prescribed to treat prediabetes.
CONCLUSION: The prevalence of diabetes screening during office visits remained lower than 15% between 2012 and 2015 in the United States. Physicians primarily prescribe lifestyle modifications, including a healthy diet and exercise, with metformin being used in some cases for the prevention of diabetes.
View full text

Singer, R. H., Feaster, D. J., Stoutenberg, M., et al. 2019. **Dentists' willingness to screen for cardiovascular disease in the dental care setting: Findings from a nationally representative survey**. Community Dentistry & Oral Epidemiology 25 25.
AIM: to examine the correlates of dentists' willingness to provide CVD screening in the dental care setting.
METHOD: Private practice and public health general dentists in the U.S. participated in a nationally representative survey from 2010 to 2011. The survey examined dentists' willingness to provide a finger stick test to support CVD screening and agreement that their professional role should include CVD screening.
RESULTS: Data analysed from 1802 respondents indicated that 46.6% of dentists were willing to provide CVD screening. The adjusted odds ratio (AOR) of dentists' willingness to screen for CVD was associated with currently screening for hypertension (AOR = 1.49, 95% CI 1.01, 2.20), screening for obesity (AOR = 1.66, 95% CI 1.17, 2.36) and agreement that their role as health care professionals includes CVD screening (AOR = 3.03, 95% CI 2.15, 4.29). Dentists' agreement that their role includes CVD screening was associated with self-rated knowledge of CVD (good vs none or limited) and CVD training during their professional education (5 to 8 hours of training vs none or limited), (AOR = 5.75, 95% CI 2.26, 14.62) and (AOR = 3.84, 95% CI 2.17, 6.80), respectively.
CONCLUSION: Our study highlights strategies that may be employed to expand future access to early detection of CVD risk. Including CVD screening instruction and clinical screening experiences in dental school curriculum may serve as catalysts to reshape the future scope of dental practice
View abstract

Svendsen, K., Jr, D. R. J., Røyseth, I. T., et al. 2019. **Community pharmacies offer a potential high-yield and convenient arena for total cholesterol and CVD risk screening**. European Journal of Public Health 29(1) 17-23.
AIM: to study the yield of an in-pharmacy screening for identifying undetected high TC and strategies to reach those with absence of prior measurement of total cholesterol (TC), blood glucose (BG) and blood pressure (BP).
METHOD: A cross-sectional TC screening study with complementary TC measurements and self-administered questionnaire was conducted for 1 week in each of 2012 and 2014 in 148 and 149 BootsTM Norge AS community pharmacies nationwide in Norway.
RESULTS: Non-medicated adults (n = 21 090) with mean age 54.5 ± 16.0 were included. The study population resembled the Norwegian population in regards to body mass index, educational level, smokers and physical inactivity level, but with an overrepresentation of middle-aged women. Of 20 743 with available data, 11% (n = 2337) were unaware of their high TC ≥7.0 mmol/L, and an additional 8% were unaware of TC ≥6.2 mmol/L. More than 40% of the study sample had not measured TC or BG before. In order for future screenings to reach those who are less likely to have previously measured TC and BG, our results suggest that young, low-educated, overweight men and women should be targeted for TC measurement, whereas normal weight men in all ages should be targeted for BG measurement.
CONCLUSION: In total 19% in an in-pharmacy screening were unaware of their elevated TC of ≥6.2 mmol/L. We also identified characteristics that could be used reach those who are less likely to have measured TC and BG.
View abstract

Ziebolz, D., Bauwe, I., Schmidt, J., et al. 2019. **Diabetes Screening in Dental Practice Using the Find-Risk Questionnaire - A Practice-based Pilot Study**. Oral Health & Preventive Dentistry 17(2) 147-156.
AIM: to investigate the efficacy of diabetes mellitus (DM) screening based on questionnaire replies.
METHOD: 116 patients were screened in a private dental practice when visiting the dentist for a regular check-up. The Find-Risk (FR) questionnaire was used for diabetes screening. FR-positive (FR+) patients were referred to a diabetologist for further diagnostics (blood glucose, HbA1c); FR-negative patients (FR-) did not receive a diabetological examination. Furthermore, dental findings (DMFT) were obtained and periodontal condition was classified into no, mild, moderate or severe periodontitis, based upon periodontal pocket depth and clinical attachment loss. Sensitivity and specificity of the FR questionnaire and a modified FR questionnaire (additional inquiry if severe periodontitis had been ever diagnosed) were determined in a statistical model.
RESULTS: 102 patients with a mean age of 56.31 years were included. Seven patients had known DM. A total of 36 patients were FR+, including the seven patients with known DM. Only 16 of the 29 participants (55%) followed the recommendation to see the diabetologist. Nine of these 16 patients showed conspicuous blood glucose findings. Both with and without modification of the FR questionnaire, a sensitivity of 100% was achieved. With the modified FR questionnaire, a higher specificity was shown in a statistical model compared to the FR questionnaire without modification (80% vs 69.5%).
CONCLUSION: FR-based DM screening in dental practice is possible and could help to identify patients with (pre) diabetes. However, these results must be validated in a large patient cohort.
View abstract

Zolezzi, M., Abdallah, O., Kheir, N., et al. 2019. **Evaluation of community pharmacists' preparedness for the provision of cardiovascular disease risk assessment and management services: A study with simulated patients**. Res Social Adm Pharm 15(3) 252-259.
AIM: To evaluate the preparedness of community pharmacists in Qatar for the provision of CVD risk assessment and management services; and to explore the pharmacists' views on the provision of these services.
METHOD: A cross-sectional study using simulated-client methodology. Using standardized scenarios, community pharmacists were approached for consultation on two medicines (Aspirin((R)) and Crestor((R))) used for managing specific CVD risk factors. Pharmacists' competency to assess CVD risk was the primary outcome evaluated. Scores for each outcome were obtained based on the number of predefined statements addressed during the consultation.
RESULTS: The mean cumulative score for all the competency outcomes assessed was 11.7 (SD 3.7) out of a possible score of 31. There were no differences for the majority of the competencies tested between the two scenarios used. Significantly more pharmacists exposed to the Aspirin((R)) scenario than to the Crestor((R)) scenario addressed hypertension as one of the risk factors needed to assess CVD risk (22% versus 11%, p=0.03); whereas significantly more pharmacists in the Crestor((R)) scenario compared to the Aspirin((R)) scenario, addressed dyslipidemia as one of the risk factors needed to assess CVD risk (30% versus 7%, p=0.02). Significantly more pharmacists exposed to the Aspirin((R)) scenario provided explanation about CVD risk than those exposed to the Crestor((R)) scenario (36% versus 8%, p<0.01).
CONCLUSION: The results suggest that many community pharmacists in Qatar are not displaying competencies that are necessary for the provision of CVD prevention services
View abstract

Johns, I., Moschonas, K. E., Medina, J., et al. 2018. **Risk classification in primary prevention of CVD according to QRISK2 and JBS3 - - heart age', and prevalence of elevated high-sensitivity C reactive protein in the UK cohort of the EURIKA study**. Open Heart 5 (2) (no pagination)(e000849).
AIM: to assess cardiovascular disease (CVD) risk classification according to QRISK2, JBS3 - - heart age' and the prevalence of elevated high-sensitivity C reactive protein (hsCRP) in UK primary prevention patients.
METHOD: The European Study on Cardiovascular Prevention and Management in Usual Daily Practice (EURIKA) (NCT00882336) was a cross-sectional study conducted in 12 European countries. 673 UK outpatients aged >=50 years, without clinical CVD but with at least one conventional CVD risk factor, were recruited. 10-year CVD risk was calculated using QRISK2. JBS3 - - heart age' and hsCRP level were assessed according to risk category.
RESULTS: QRISK2 and JBS3 heart age was calculated for 285 of the 305 patients free from diabetes mellitus and not receiving a statin. QRISK2 classified 28%, 39% and 33% of patients as low (<10%), intermediate (10% to <20%) and high (>=20%) risk, respectively. Two-thirds of low-risk patients and half of intermediate-risk patients had a heart age >=5 years and >=10 years higher than their chronological age, respectively. Half of low-risk patients had hsCRP levels >=2 mg/L and approximately 40% had levels >=3 mg/L. Approximately 80% of low-risk patients had both elevated hsCRP and heart age relative to their chronological age.

CONCLUSION: Almost 40% more patients in this - - at risk' group would be eligible for statin therapy following the lowering of the National Institute for Health and Care Excellence treatment threshold to >=10% 10-year risk. Of patients falling below this treatment threshold, almost all were at increased lifetime risk as measured by JBS3, and of these, the majority had elevated hsCRP levels. These patients with high absolute risk may benefit from early primary CVD prevention.
View full text

Simmons, D., Glenister, K., Magliano, D. J., et al. 2018. **The prevalence of undiagnosed diabetes has not decreased in spite of increased screening in an Australian rural area**. Diabetes 67 A406-.
AIM: to test whether diabetes screening in people aged 40+ has increased, and the prevalence of undiagnosed diabetes has decreased, since the introduction of national guidelines in the mid-2000s in Australia.
METHODS: 'Crossroads' is a repeat cross-sectional study conducted between 2000-2003 (Crossroads- I) and then 2016-2018 (Crossroads-II) in rural Australia (the Goulburn Valley, Victoria). Households visited were randomly selected, and the same households were then revisited in Crossroads-II, alongside proportionately randomly selected new houses. All adult residents are interviewed face to face by trained research assistants. Questions enquire about diabetes status, occurrence of diabetes screening in last 2 years and primary care utilisation. Randomly selected participants are invited to attend a 'clinic' including a glucose tolerance test.
RESULTS: The Crossroads-I cohort (n=3787) was younger and had a higher proportion of male participants than the Crossroads-II cohort (n=1733) (44 ± 17 vs. 53 ± 19 years p<0.0001, 46% vs. 42% male, p<0.0001). The age standardised prevalence of self-reported diabetes (7.0% vs. 5.4%, p<0.05), and age standardised screening rates (56.5% vs. 49.7%, p<0.05) were higher in Crossroads-II than Crossroads-I. Crude undiagnosed diabetes prevalence was also higher in Crossroads-II than Crossroads-I (17/430 (3.9%) vs. 15/814 (1.8%) p<0.05). Primary care utilisation was higher in Crossroads- II than I (6.4 vs. 4.7 visits in past 12 months, p<0.0001) and waiting times were shorter (3.0 vs. 3.9 days, p<0.0001).
CONCLUSION: We conclude that diabetes screening has increased in this area in association with improved access to primary care, and guideline changes. Despite this, rates of undiagnosed diabetes have also increased in line with the overall prevalence of diabetes. Additional strategies are required to reduce undiagnosed diabetes rates further
View abstract

Gore, M. O., Boyer, B. P., Ayers, C. R., et al. 2018. **Low awareness and treatment rates for hypertension and hypercholesterolemia among participants in a blood donor cardiovascular risk screening program**. Circulation. Conference 138(Supplement 1).
AIM: to demonstrate that undiagnosed and untreated CV risk factors are prevalent among blood donors, thus supporting the public health benefit of screening blood donors for CV risk.
METHOD: All consenting adults who donated blood between Jan 2017 and Feb 2018 at 11 Carter BloodCare centers in North Texas, and who completed a survey-based assessment of CV risk awareness and treatment for hypertension and hypercholesterolemia, were included in the study. Measurements included blood pressure (BP), nonfasting total cholesterol (TC), and survey results.
RESULTS: A total of 3058 individual donors (38.4% female, mean age 48 +/- 15.4 years) were evaluated. The overall prevalence of abnormal BP (systolic PB>=120 mm Hg and/or diastolic BP>80 mm Hg) was 50.9%, and the prevalence of stage 2 hypertension was 11.4%. Among donors with stage 2 hypertension, 60.2% responded "no" or "not sure" to the question "Has a health professional ever told you that you have high blood pressure?" , and 63.3% responded "no" or "not sure" to the question "Has a doctor ever prescribed you medicine for high blood pressure?" . The prevalence of hypercholesterolemia (TC >= 240 mg/dL) and borderline high cholesterol (TC 200-239 mg/dL) were 9.5% and 27.1% respectively. One in three donors with cholesterol > 240 mg/dL, and more than half of donors with cholesterol >= 200 mg/dL, responded "no" or "not sure" to the question "Has a health professional ever told you that you have high cholesterol?" , and 70% of those with TC > 240 mg/dL responded "no" or "not sure" to the question "Has a doctor ever prescribed you medicine to help lower your cholesterol?" ..
CONCLUSION: Although blood donors are generally younger and have lower prevalence of CV risk factors than the general population, hypercholesterolemia and hypertension among blood donors are often undiagnosed and untreated. Blood donor CV risk screening and targeted intervention programs may be an effective instrument for community-based CV disease prevention.
View abstract

Halim, N., Noor, N. M., Gani, M. A., et al. 2018. **Community screening for diabetes in a diabetes awareness event**. Journal of Diabetes Investigation 9 (Supplement 1) 69. PP76.
AIM: To observe the participants that were involved in health screening in conjunction with World Diabetes Day 2017.
METHOD: Participants were screened by performing Capillary Blood Glucose (CBG) testing. As in Clinical Practice Guideline, Type 2 Diabetes 2015. CBG more than 5.6 mmol/L needs further assessment. Other information regarding the weight, waist circumference, physical activity and other comorbidities were also taken.
RESULT: There were 376 subjects mostly female (57.7%). The highest subjects by races were Malay (90.42%). There were 26 +/- 80 years old where most of them were between 26 +/- 36 years old. The screening has shown that 41.8% subjects were with Capillary Blood Glucose (CBG) more than 5.6 mmol/L and 42.67% subjects was referred to Public Health for further assessment. More than half of the subjects (56.11%) has Blood Pressure (BP) more than 135/75 mmHg and 10.4% has been diagnosed with diabetes and hypertension. In female, there were 49.3% with Waist Circumference (WC) more than 80 cm. In Male, there were 47.16% with WC more than 90 cm. Diabetes is associated with an increased waist-to-hip ratio despite normal Body Mass Index (BMI). 76.32% has BMI more than 23 kg/m2 and only 13% of them were active in physical activities. Factors such as overweight, obesity and lack of activity will lead to increase the risk of Type 2 Diabetes T2DM). Total of 376 subjects, 86.17% were non-smoker.
CONCLUSION: More research needs to be conducted for better understanding.
View abstract

Kobayashi, D., Asai, K., Noto, H., et al. 2018. **CARDIOVASCULAR DISEASE RISKS AMONG EXTREMELY HIGH HIGH-DENSITY LIPOPROTEIN CHOLESTEROL: LONGITUDINAL STUDY**. 2(suppl_1) 895-895.
AIM: to evaluate cardiovascular disease incidence among those who had extremely high HDL cholesterol compared to those who had normal HDL cholesterol by evaluating time-dependent HDL levels among elderly people in a longitudinal study.
METHOD: We conducted a retrospective longitudinal study at large academic hospital, Tokyo, Japan, from 2005 to 2016. We included all elderly patients who underwent health check-ups at the center for preventive medicine. Those patients with a prior history of cardiovascular disease were excluded. We categorized patients into 5 groups on the basis of HDL measurements: <40, 40–59, 60–79, 80–89, >90mg/dl. Our primary outcome was the development of cardiovascular disease. Longitudinal analyses by a mixed effect model with time-dependent HDL levels were applied to consider fluctuations in HDL levels within the same patients.
RESULTS: 83,125 participants were included in this study. Median follow-up was 1,746(Interquartile range (IQR): 2,375) days, and 1,896(2.2%) developed cardiovascular diseases. The odds ratios for developing cardiovascular disease was higher among low HDL patients (1.24, 95%CI:1.01–1.54), whereas those were lower among high (0.80, 95%CI:0.71–0.91) or very high HDL (0.71, 95%CI:0.57–0.88) compared to normal HDL population. However, that among extremely high HDL was similar to normal HDL group (OR: 0.95, 95%CI:0.74–1.20).
CONCLUSION: In our longitudinal study, those with extremely high HDL cholesterol had similar risk for cardiovascular diseases compared to those with normal HLD level.
View abstract

Li, W., Xie, B., Qiu, S., et al. 2018. **Non-lab and semi-lab algorithms for screening undiagnosed diabetes: a cross-sectional study**. Ebiomedicine (no pagination).
AIM: to generate innovative, user-friendly nomograms that can be applied for diabetes screening in different ethnic groups in China using the non-lab or noninvasive semi-lab data.
METHOD: This multicenter, multi-ethnic, population-based, cross-sectional study was conducted in eight sites in China by enrolling subjects aged 20-70. Sociodemographic and anthropometric characteristics were collected. Blood and urine samples were obtained 2 h following a standard 75 g glucose solution. In the final analysis, 10,794 participants were included and randomized into model development (n = 8096) and model validation (n = 2698) group with a ratio of 3:1. Nomograms were developed by the stepwise binary logistic regression. The nomograms were validated internally by a bootstrap sampling method in the model development set and externally in the model validation set. The area under the receiver operating characteristic curve (AUC) was used to assess the screening performance of the nomograms. Decision curve analysis was applied to calculate the net benefit of the screening model.
RESULTS: The overall prevalence of undiagnosed diabetes was 9.8% (1059/10794) according to ADA criteria. The non-lab model revealed that gender, age, body mass index, waist circumference, hypertension, ethnicities, vegetable daily consumption and family history of diabetes were independent risk factors for diabetes. By adding 2 h post meal glycosuria qualitative to the non-lab model, the semi-lab model showed an improved Akaike information criterion (AIC: 4506 to 3580). The AUC of the semi-lab model was statistically larger than the non-lab

model (0.868 vs 0.763, P < 0.001). The optimal cutoff probability in semi-lab and non-lab nomograms were 0.088 and 0.098, respectively. The sensitivity and specificity were 76.3% and 81.6%, respectively in semi-lab nomogram, and 72.1% and 67.3% in non-lab nomogram at the optimal cut off point. The decision curve analysis also revealed a bigger decrease of avoidable OGTT test (52 per 100 subjects) in the semi-lab model compared to the non-lab model (36 per 100 subjects) and the existed New Chinese Diabetes Risk Score (NCDRS, 35 per 100 subjects).
CONCLUSION: The non-lab and semi-lab nomograms appear to be reliable tools for diabetes screening, especially in developing countries. However, the semi-lab model outperformed the non-lab model and NCDRS prediction systems and might be worth being adopted as decision support in diabetes screening in China.
View abstract

Tschaftary, A., Hess, N., Hiltner, S., et al. 2018. **The association between sex, age and health literacy and the uptake of cardiovascular prevention: A cross-sectional analysis in a primary care setting**. Journal of Public Health 26(5) 551-558.
AIM: to identify social determinants associated with the willingness to engage in prevention and healthy lifestyle choices.
METHODS: A total of 1,056 (70% response rate) of the patients attending a cardiology/primary care practice in the urban area of Berlin, Germany, were recruited to fill out a questionnaire for this cross-sectional survey. Patients provided sociodemographic and health literacy information, described their attitude towards prevention and lifestyle choices, as well as hurdles and requests towards measure design.
RESULTS: Sex, age and health literacy emerged as prime influencers of preventative choices. Sex differences affected the attendance of screening measures and lifestyle choices, although no differences emerged in attitude towards prevention between women and men. Low health literacy consistently associated with consideration of healthy lifestyle changes, but not with active engagement in them. Men more frequently reported a need for clear explanation of the utility of prevention by their physicians (44% vs 37%) and low health literacy correlated with an increased request for free or subsidized offers (56% vs 44%). Time constraint was the most frequently mentioned hurdle (32%) for attendance, followed by costs (19%).
CONCLUSION: Sex, age and health literacy affect engagement in healthy lifestyle choices and expectations towards preventative measure design. Consideration of these differences will allow better tailoring of preventative offers to the users' needs to increase their uptake
View full text

Case-control studies

Jun, J. E., Cho, I. J., Han, K., et al. 2019. **Statins for primary prevention in adults aged 75 years and older: A nationwide population-based case-control study**. Atherosclerosis 283 28-34.
AIM: to evaluate whether statins are beneficial for primary prevention of cardiovascular disease (CVD) and all-cause death in adults aged >= 75 years.
METHOD: A nationwide, nested case-control study was conducted in Korea. Individuals who developed CVD, including myocardial infarction (MI), stroke, or death from all causes, were matched to controls based on duration of follow-up, age, and sex at the index date. The statin administration data from both groups were retrospectively collected from the index date to five years before. Odds ratios (ORs) and 95% confidence intervals (CIs) for composite and individual outcomes associated with statin treatment were estimated by conditional logistic regression analyses.
RESULTS: In total, 11,017 cases were matched to 55,085 control subjects. Current use of statins was significantly associated with a reduced risk of composite outcome (adjusted OR [AOR] 0.77; 95% CI 0.71-0.84), compared with non-users. Current use of statin also reduced the risk of stroke (AOR 0.74; 95% CI 0.61-0.89) and of all-cause death (AOR 0.73; 95% CI 0.66-0.81), but not of MI. However, former use of statins had no effect on CVD or all-cause death. There were significant decreasing trends in the incidence of composite outcomes and individual stroke or all-cause death with longer duration of statin treatment.
CONCLUSION: Current statin treatment has a beneficial effect as primary prevention for composite outcomes and individual event of stroke or all-cause death in Koreans aged >=75 years.
View abstract

Kutkiene, S., Petrulioniene, Z., Laucevicius, A., et al. 2019. **Achilles tendon ultrasonography - A useful screening tool for cardiovascular risk estimation in patients with severe hypercholesterolemia**. Atherosclerosis Supplements 36 6-11.
AIM: to evaluate the usefulness of Achilles tendon ultrasonography in identifying people at greater risk among subjects with severe hypercholesterolemia (SH) in a high-risk population.

METHOD: During the period of 2016-2017 a total of 213 participants were enrolled in this case-control study. Data of 110 patients with SH and 103 age and sex matched controls without dyslipidaeplemia and established CVD was collected.
RESULTS: Achilles tendinopathy (AT) was present in 42.7% of subjects with SH and in 29.1% of controls (p=0.039). Stronger association between SH and AT was seen in women - 24.1% vs 2.0% (p=0.001). SH increased odds of AT by 1.815 (95% CI, 1.028-3.206). Prevalence of AT was higher in males despite presence (SH⁺) or absence (SH⁻) of severe hypercholesterolemia (SH⁺ 60.7% vs 24.1%, SH⁻ 55.8% vs 2.0%, p<0.001). AT was associated with higher proportion of subjects exceeding normal mean values of TC (80.5% vs 52.9%, p=0.001), LDL-C (76.6% vs 52.2%), TG (54.5% vs. 22.1%), ApoB (57.1% vs 22.2%), ApoE (44.0% vs 22.4%) levels and ApoB/ApoA ratio (46.1% vs 21.5%) (p=0.001) and family history of premature coronary heart disease (CHD).
CONCLUSION: AT is more prevalent among subjects with SH and is associated with higher levels of TC, TG, LDL-C, ApoB, ApoE, ApoB/ApoA ratio, family history of premature CHD. SH increases the odds of developing AT.
View abstract

Economic

Wright, D., Little, R., Turner, D., et al. 2019. **Diabetes Screening Through Community Pharmacies in England: A Cost-Effectiveness Study**. Pharmacy : A Journal Of Pharmacy Education And Practice 7(1) 22.
AIM: to estimate the cost per diabetes screening test and cost per appropriately referred patient from a pharmacy perspective using a one-year decision tree model.
METHOD: One-way sensitivity analysis was performed to estimate the effect of geographical location and patient self-referral rate. Data was used from 164 patients screened and located in an area with average social deprivation and largely white European inhabitants and 172 patients in an area with higher social deprivation (lower than average ability to access society's resources) and a mixed ethnicity population in England. The diabetes screening consisted of initial risk assessment via questionnaire followed by HbA1c test for those identified as high risk.
RESULTS: The cost per person screened was estimated as 28.65. The cost per appropriately referred patient with type 2 diabetes was estimated to range from 7638 to 11,297 in deprived mixed ethnicity and non-deprived areas respectively. This increased to 12,730 and 18,828, respectively, if only 60% of patients referred chose to inform their general practitioner (GP). The cost per test and identification rates through community pharmacies was similar to that reported through medical practices.
CONCLUSION: Locating services in areas of suspected greater diabetes prevalence and increasing the proportion of patients who follow pharmacist advice to attend their medical practice improves cost-effectiveness.
View full text

Qualitative

Almansour, H. A., Mekonnen, A. B., Aloudah, N. M., et al. 2019. **Cardiovascular disease risk screening by pharmacists: a behavior change wheel guided qualitative analysis**. Research In Social & Administrative Pharmacy 16 16.
AIM: to explore the perspectives of hospital and community pharmacists in Saudi Arabia about potential roles in CVD risk screening.
METHOD: A qualitative study was conducted using semi-structured in-depth interviews and focus group discussions with a purposive convenience sample of hospital and community pharmacists in Saudi Arabia. Data collection continued until saturation was achieved. All interviews were audio recorded, transcribed verbatim and thematically analyzed.
RESULTS: A total of 50 pharmacists (26 hospital and 24 community pharmacists) participated in this study. Twenty hospital and eight community pharmacists were interviewed individually, while the remaining participants contributed to three focus groups discussions. Currently, it appears that CVD risk prevention services are rarely provided, and when offered involved provision of discrete elements only such as blood pressure measurement, rather than a consolidated evidence based approach to risk assessment. Participating pharmacists did not appear to have a clear understanding of how to assess CVD risk. Four key themes were identified: pharmacists' perception about their current roles in CVD, proposed future clinical and service roles, impeding factors and enabling factors. Subthemes were mainly related to determinants likely to influence future CVD services. These subthemes included public perception of pharmacists' roles, pharmacist-physician collaboration, legislative restrictions, systemic issues, sociocultural barriers, organizational pharmacy issues, lack of professional motivation, government and organizational support and professional pharmacy support frameworks. These influencing

factors need to be addressed at micro, meso and macro systems level in order to facilitate development of new pharmacist delivered cognitive services in Saudi Arabia.
CONCLUSION: Pharmacists in Saudi Arabia are willing to expand their role and offer pharmacy-based services, but influencing determinants have to be addressed at the individual, professional and health system levels. Further work is needed to clarify and develop practical and appropriate protocols for pharmacist CVD prevention and management services within the Saudi public and health care system. Such work should be guided by implementation science frameworks rather than embarking on conventional research trial pipelines where public benefit of generated evidence is delayed or limited.
View abstract

Di Battista, E. M., Bracken, R. M., Stephens, J. W., et al. 2019. **Cardiovascular risk assessments at occupational health services: employee experiences**. Occupational Medicine (Oxford) 69(2) 106-112.BACKGROUND: Across England in the UK, population screening for cardiovascular disease (CVD) primarily takes place within general practice in the form of the National Health Service Health Check. Additional screening sites such as occupational health are advocated to improve the population impact.
AIM: To investigate participant experiences with cardiovascular and type 2 diabetes risk assessment (RA) at occupational health and subsequent support-seeking at general practice.
METHOD: Face-to-face interviews were conducted for this qualitative study. Participants were recruited at three workplaces; a steel works and two hospital sites. Using interpretive phenomenological analyses, themes were drawn from salient narratives and categorically organized.
RESULTS: There were 29 participants. Themes (n = 16) were organized into two domains; factors that facilitated (n = 9) or thwarted (n = 7) participant engagement with the RA and general practice. All participants described the RA as worthwhile and strongly valued RA at occupational health. Those with obesity and high CVD risk highlighted their difficulties in making lifestyle changes. Participants reported confusion and anxiety when GP advice about medication appeared to contradict what participants had interpreted during RA at occupational health.
CONCLUSION: This study highlights factors that facilitate or thwart engagement in cardiovascular RA at occupational health services and general practice follow-up. Stakeholders can integrate these factors into standard operating procedures to enhance participant engagement and enable safeguards that minimize potential harm to participants.
View abstract

Jansen, J., McKinn, S., Bonner, C., et al. 2019. **Shared decision-making about cardiovascular disease medication in older people: a qualitative study of patient experiences in general practice**. BMJ Open 9(3) e026342.
AIM: To explore older people's perspectives and experiences with shared decision-making (SDM) about medication for cardiovascular disease (CVD) prevention.
METHOD: Semi-structured interviews with 30 general practice patients aged 75 years and older in New South Wales, Australia, who had elevated CVD risk factors (blood pressure, cholesterol) or had received CVD-related lifestyle advice. Data were analysed by multiple researchers using Framework analysis.
RESULTS: Twenty eight participants out of 30 were on CVD prevention medication, half with established CVD. We outlined patient experiences using the four steps of the SDM process, identifying key barriers and challenges: Step 1. Choice awareness: taking medication for CVD prevention was generally not recognised as a decision requiring patient input; Step 2. Discuss benefits/harms options: CVD prevention poorly understood with emphasis on benefits; Step 3. Explore preferences: goals, values and preferences (eg, length of life vs quality of life, reducing disease burden vs risk reduction) varied widely but generally not discussed with the general practitioner; Step 4. Making the decision: overall preference for directive approach, but some patients wanted more active involvement. Themes were similar across primary and secondary CVD prevention, different levels of self-reported health and people on and off medication.
CONCLUSION: Results demonstrate how older participants vary widely in their health goals and preferences for treatment outcomes, suggesting that CVD prevention decisions are preference sensitive. Combined with the fact that the vast majority of participants were taking medications, and few understood the aims and potential benefits and harms of CVD prevention, it seems that older patients are not always making an informed decision. Our findings highlight potentially modifiable barriers to greater participation of older people in SDM about CVD prevention medication and prevention in general.
View full text

Johansson, P., Schober, D., Tutsch, S. F., et al. 2019. **Adapting an Evidence-based Cardiovascular Disease Risk Reduction Intervention to Rural Communities**. Journal of Rural Health 35(1) 87-96.
AIM: to assess focus group data to generate information on the applicability of an evidence-based cardiovascular disease (CVD) risk intervention developed for an urban setting for rural areas in Nebraska.
METHOD: The CVD risk reduction intervention is based on the Community Outreach and Cardiovascular Health (COACH) program, which included nurse practitioner/community health worker teams. This qualitative study involved conducting 3 focus groups with patients with CVD risk factors to assess community readiness for participating in the intervention, the mode of the delivery of the intervention, the setting of the intervention, program content, and raising awareness of the intervention.
RESULTS: Findings from the focus groups indicate acceptability toward a CVD risk reduction program modeled after the COACH. Participants favored initial in-person face-to-face interactions with a nurse practitioner that could transition to phone-based meetings and Skype. In addition, participants underscored that confidentiality can be a concern in small communities and therefore community health workers need to be trusted individuals. Calls for additions to COACH materials were very specific and participants underscored the need for social support.
CONCLUSION: With minor adaptations, the COACH program can be pilot tested in rural settings to address key health concerns and behaviors that affect risk for cardiovascular health.
View full text

Patomella, A.-H., Mickols, G., Asaba, E., et al. 2018. **General practitioners' reasoning on risk screening and primary prevention of stroke – a focus group study**. BMC Family Practice 19(1).
AIM: to explore and describe what characterizes GPs' reasoning around risk screening and primary prevention among persons at risk for stroke in primary health care.
METHOD: A qualitative design based in a grounded theory approach was chosen in order to investigate this unexplored research area. Data collection was done using focus group interviews and data was analysed using a constant comparative method. Twenty-two GPs were interviewed in four focus groups.
RESULTS: Findings showed that GPs perceived difficulties in prioritizing patients with an unhealthy lifestyle and described a lack of systematicity in their procedures, which complicated their clinical decisions concerning patients with stroke risk factors. The results showed a lack of systematic risk screening methods. Time constraints and the reimbursement system were described as hindering the preventive work.
CONCLUSION: There is a need for a more proactive, transparent and systematic approach in the distribution of GPs' time and reimbursement of prevention in primary health care. The findings suggest, by developing new methods and approaches such as digital clinical decision-making tools and by implementing inter-professional team-work, the quality of the primary prevention of stroke could be improved.
View full text

Diagnostic studies

Grammer, T. B., Dressel, A., Gergei, I., et al. 2019. **Cardiovascular risk algorithms in primary care: Results from the DETECT study**. Scientific Reports 9(1) 1101.
AIM: to evaluate the correlation, discrimination and calibration of ten commonly used risk equations in primary care
METHOD: We studied ten commonly used risk equations in 4044 participants from the DETECT (Diabetes and Cardiovascular Risk Evaluation: Targets and Essential Data for Commitment of Treatment) study
RESULTS: The risk equations correlate well with each other. All risk equations have a similar discriminatory power. Absolute risks differ widely, in part due to the components of clinical endpoints predicted: The risk equations produced median risks between 8.4% and 2.0%. With three out of 10 risk scores calculated and observed risks well coincided. At a risk threshold of 10 percent in 10 years, the ACC/AHA atherosclerotic cardiovascular disease (ASCVD) equation has a sensitivity to identify future CVD events of approximately 80%, with the highest specificity (69%) and positive predictive value (17%) among all the equations.
CONCLUSION: Due to the most precise calibration over a wide range of risks, the large age range covered and the combined endpoint including non-fatal and fatal events, the ASCVD equation provides valid risk prediction for primary prevention in Germany.
View full text

Kenealy, T., Herd, G., Musaad, S., et al. 2019. **HbA1c screening in the community: Lessons for safety and quality management of a point of care programme**. Primary care diabetes 13(2) 170-175.
AIM: To describe quality management processes and appropriate interpretation with respect to HbA1c point-of-care (POC) testing in a national diabetes and cardiovascular risk screening programme.
METHODS: We compared HbA1c results from capillary blood, measured by the cobas b 101 (Roche Diagnostics) POC testing system, with results from venous blood measured by accredited laboratory analysers to inform national screening practice and a (separately-reported) randomised controlled trial. Difference plots and regressions were used to aid interpretation around 40 and 50mmol/mol, the cut-offs used to identify "pre-diabetes" and diabetes in New Zealand.
RESULTS: After initial acceptable tests, subsequent batches delivered POC results that varied from laboratory HbA1c by +6 to -14mmol/mol around the clinical cut-offs. Ten faulty batches of discs were recalled worldwide. POC testing was suspended in one region, as was the planned trial. The manufacturing defect was rectified, accuracy of the new batches was confirmed, and testing resumed.
CONCLUSION: POC testing must be conducted within stringent quality assurance processes prior to and while in use. Within such a system, POC testing for HbA1c can be sufficiently accurate for screening and diagnosis of diabetes.
View abstract

Dimopoulos, A. C., Nikolaidou, M., Caballero, F. F., et al. 2018. **Machine learning methodologies versus cardiovascular risk scores, in predicting disease risk**. 18(1) 179.
AIM: to explore the potential of using ML methodologies on CVD prediction, especially compared to established risk tool, the HellenicSCORE.
METHOD: Data from the ATTICA prospective study (n = 2020 adults), enrolled during 2001–02 and followed-up in 2011–12 were used. Three different machine-learning classifiers (k-NN, random forest, and decision tree) were trained and evaluated against 10-year CVD incidence, in comparison with the HellenicSCORE tool (a calibration of the ESC SCORE). Training datasets, consisting from 16 variables to only 5 variables, were chosen, with or without bootstrapping, in an attempt to achieve the best overall performance for the machine learning classifiers.
RESULTS: Depending on the classifier and the training dataset the outcome varied in efficiency but was comparable between the two methodological approaches. In particular, the HellenicSCORE showed accuracy 85%, specificity 20%, sensitivity 97%, positive predictive value 87%, and negative predictive value 58%, whereas for the machine learning methodologies, accuracy ranged from 65 to 84%, specificity from 46 to 56%, sensitivity from 67 to 89%, positive predictive value from 89 to 91%, and negative predictive value from 24 to 45%; random forest gave the best results, while the k-NN gave the poorest results.
CONCLUSION: The alternative approach of machine learning classification produced results comparable to that of risk prediction scores and, thus, it can be used as a method of CVD prediction, taking into consideration the advantages that machine learning methodologies may offer.
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Emerging Risk Factors Collaboration 2018. **Equalization of four cardiovascular risk algorithms after systematic recalibration: individual-participant meta-analysis of 86 prospective studies**. European heart journal.
AIMS: toc onduct head-to-head comparisons of four algorithms recommended by primary prevention guidelines, before and after 'recalibration', a method that adapts risk algorithms to take account of differences in the risk characteristics of the populations being studied.
METHODS: Using individual-participant data on 360 737 participants without CVD at baseline in 86 prospective studies from 22 countries, we compared the Framingham risk score (FRS), Systematic COronary Risk Evaluation (SCORE), pooled cohort equations (PCE), and Reynolds risk score (RRS). We calculated measures of risk discrimination and calibration, and modelled clinical implications of initiating statin therapy in people judged to be at 'high' 10 year CVD risk. Original risk algorithms were recalibrated using the risk factor profile and CVD incidence of target populations.
RESULTS: The four algorithms had similar risk discrimination. Before recalibration, FRS, SCORE, and PCE over-predicted CVD risk on average by 10%, 52%, and 41%, respectively, whereas RRS under-predicted by 10%. Original versions of algorithms classified 29-39% of individuals aged ≥40 years as high risk. By contrast, recalibration reduced this proportion to 22-24% for every algorithm. We estimated that to prevent one CVD event, it would be necessary to initiate statin therapy in 44-51 such individuals using original algorithms, in contrast to 37-39 individuals with recalibrated algorithms.

CONCLUSION: Before recalibration, the clinical performance of four widely used CVD risk algorithms varied substantially. By contrast, simple recalibration nearly equalized their performance and improved modelled targeting of preventive action to clinical need..
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Modelling studies

Byrne P, Cullinan J, Gillespie P et al. 2019. **Statins for primary prevention of cardiovascular disease: modelling guidelines and patient preferences based on an Irish cohort**. British Journal of General Practice. 23rd April.
AIM: To illustrate the potential impacts of changes in clinical guidelines.
METHOD: A modelling study. The eligibility for statin therapy of a sample of people without a history of CVD was established, according to changing guideline recommendations and modelled associated potential costs. The authors calculated the numbers needed to treat (NNT) to prevent one major vascular event in patients at the lowest baseline risk for which each of the seven guidelines recommended treatment, and for those at low, medium, high, and very-high risk according to 2016 guidelines. These were compared with the NNT that patients reported as required to justify taking a daily medicine.
RESULTS: The proportion of patients eligible for statins increased from approximately 8% in 1987 to 61% in 2016; associated costs rose from €13.9 million to €107.1 million per annum. The NNT for those at the lowest risk for which each guideline recommended treatment rose from 40 to 400. By 2016, the NNT for low-risk patients was 400 compared to ≤25 very-high risk patients. The proportion of patients eligible for statins achieving NNT levels that patients regarded as justified to taking a daily medicine fell as guidelines changed over time.
CONCLUSION: Increased eligibility for statin therapy impacts large proportions of the present population and healthcare budgets. Decisions to take and reimburse statins should be considered on the basis of expected cost-effectiveness and acceptability to patients.
View abstract

Yebyo, H. G., Aschmann, H. E. & Puhan, M. A. 2019. **Finding the balance between benefits and harms when using statins for primary prevention of cardiovascular disease: A modeling study**. Annals of Internal Medicine 170(1) 1-10.
AIM: To identify the expected risk above which statins provide net benefit.
METHOD: Quantitative benefit-harm balance modeling study. Network meta-analysis of primary prevention trials, a preference survey, and selected observational studies. Persons aged 40 to 75 years with no history of CVD. Time Horizon: 10 years. Low-or moderate-dose statin versus no statin. Outcome Measures: The 10-year risk for CVD at which statins provide at least a 60% probability of net benefit, with baseline risk, frequencies of and preferences for statin benefits and harms, and competing risk for non-CVD death taken into account.
RESULTS: Younger men had net benefit at a lower 10-year risk for CVD than older men (14% for ages 40 to 44 years vs. 21% for ages 70 to 75 years). In women, the risk required for net benefit was higher (17% for ages 40 to 44 years vs. 22% for ages 70 to 75 years). Atorvastatin and rosuvastatin provided net benefit at lower 10-year risks than simvastatin and pravastatin. Most alternative assumptions led to similar findings.
CONCLUSION: Statins provide net benefits at higher 10-year risks for CVD than are reflected in most current guidelines. In addition, the level of risk at which net benefit occurs varies considerably by age, sex, and statin type.
View abstract

Ongoing research

Uthman O, Al-Khudairy L, Nduka C et al. 2019. **Determining optimal strategies for primary prevention of cardiovascular disease: systematic review, cost-effectiveness review and network meta-analysis**. PROSPERO. 01 February.
AIM: to synthesise evidence for the comparative effectiveness of different interventions for the primary prevention of cardiovascular disease (CVD), comprehensively using network meta-analysis.
METHOD: We will utilise a variety of sources and search techniques to identify relevant literature. A comprehensive and efficient literature search will be undertaken in the major medical and health-related electronic bibliographic databases including MEDLINE, Embase, Web of Science, Cochrane Heart Group specialist register, and the Cochrane Library. Main outcome(s): Major cardiovascular disease events (defined as myocardial infarction, sudden cardiac death, revascularisation, stroke, and heart failure).
RESULTS/CONCLUSION: We will conduct network meta-analyses to compare effectiveness of the different types of dietary and physical activity interventions for primary prevention of CVD.
View protocol

Direito, A Rawstorn J and Mair J. 2019. **E- and mHealth for cardiovascular disease primary prevention: a systematic review and meta-analysis of randomised controlled trials**. PROSPERO. 01 March.
AIM: to determine the effectiveness of multifactorial e- and mHealth interventions aimed at modifying self-care behaviours and cardiometabolic risk factors among adults without cardiovascular disease
METHOD: MEDLINE, CINAHL, Embase, PsycINFO, Web of Science, the Cochrane Public Health Group Specialised Register, and the Cochrane Central Register of Controlled Trials (CENTRAL) electronic databases will be searched from 6 August 1991 (World Wide Web live/onset) through 31 March 2019. Main outcome(s): Multivariable CVD summary scores of risk (e.g. Framingham, QRISK).
RESULTS/CONCLUSION: We anticipate that the effects of e/mHealth interventions will be analysed using a series of random-effects model meta-analyses for different modifiable CVD risk factors and behaviours.
View protocol

Piernas, C., Tsiountsioura, M., Astbury, N. M., et al. 2019. **Primary Care SHOPping intervention for cardiovascular disease prevention (PC-SHOP): protocol for a randomised controlled trial to reduce saturated fat intake**. BMJ Open 9(4) e027035.
AIM: to test the effect of an intervention for people with raised low-density lipoprotein (LDL) cholesterol involving health professional (HP) advice alone, or in combination with personalised feedback based on nutritional analysis of grocery store loyalty card data, on SFA intake and blood lipids in comparison with no intervention.
METHOD: PC-SHOP is a three-arm parallel randomised controlled trial with an allocation ratio of 1:3:3 ('no intervention': n=16, 'brief support': n=48, 'brief support plus shopping feedback': n=48, respectively). Participants with raised LDL will be recruited from general practitioner (GP) practices for a 3-month intervention period. In brief support, an HP will deliver a behaviourally informed 10 min consultation and provide a written self-help guide to inform and motivate people to reduce their SFA intake. In brief support plus shopping feedback, the participants will receive the same HP-led behavioural support and, based on data from their grocery store loyalty card, personalised feedback on the SFA content of their grocery shopping, identifying high SFA purchases and suggesting swaps to similar but lower SFA items.Measurements for the primary and secondary outcomes will be collected at baseline and at follow-up (3 months). The primary outcome measure will be the between-group difference in the reduction of SFA intake between baseline and follow-up. Secondary outcomes include changes in blood lipids and SFA content of food purchases, with process measures to consider the feasibility and acceptability of the intervention.
RESULTS/CONCLUSION: The trial findings will be disseminated to academic and HPs through presentations at meetings and peer-reviewed journals and to the public through the media
View protocol

Schmidt, B. M., Durao, S., Toews, I., et al. 2019. **Screening strategies for hypertension: a systematic review protocol**. BMJ Open 9(1) e025043.
AIM: to assess the comparative effectiveness of different screening strategies (mass, targeted or opportunistic) for hypertension to reduce morbidity and mortality associated with hypertension.
METHOD: We will primarily search Cochrane Central Register of Controlled Trials, Medline, Embase and Latin American and Caribbean Health Sciences Literature (LILACS). Relevant randomised controlled trials, controlled before and after, interrupted time series and prospective analytic cohort studies regardless of publication date, language and geographic location, will be included. We are interested in clinical, adverse event and health system outcomes.
RESULTS/CONCLUSION: Two reviewers will independently screen titles, abstracts and full-text articles against inclusion criteria; perform data extraction and assess risk of bias in included studies. We will assess the certainty of the overall evidence using the Grading of Recommendations Assessment, Development and Evaluation approach and report findings accordingly.
View protocol

Muhlestein JB. 2018. **Effectiveness of a Proactive Cardiovascular Primary Prevention Strategy, With or Without the Use of Coronary Calcium Screening, in Preventing Future Major Adverse Cardiac Events**. Clinical Trials.
AIM: to test the effectiveness of a proactive cardiovascular primary prevention strategy, with or without the use of coronary calcium screening, compared to present standard care, in preventing future major adverse cardiac events (MACE), including all-cause death, non-fatal myocardial infarction (MI), stroke, or any arterial revascularization among a moderate risk population with no present evidence of cardiovascular disease

METHOD: This is a randomized, open-label study designed to assess the effectiveness of coronary calcium screening. Patients who provide consent, and are eligible, will be randomized 1:1 to receive statin treatment based on coronary calcium screening results or standard risk assessment results using the American Heart Association/American College of Cardiology (AHA/ACC)-recommended pooled cohort equation. Management of all participants will be done through their primary care physicians/clinicians who will receive education and training from the Principal Investigator and/or his delegate about the two treatment strategies. The pooled cohort group will be managed following the AHA/ACC guidelines for statin initiation and follow-up.
View details

Parker, S. M., Stocks, N., Nutbeam, D., et al. 2018. **Preventing chronic disease in patients with low health literacy using eHealth and teamwork in primary healthcare: protocol for a cluster randomised controlled trial**. BMJ open 8(6).
AIM: to evaluate the impacts and outcomes of a mobile health-enhanced preventive intervention in primary care for people who are overweight or obese.
METHOD: A two-arm pragmatic practice-level cluster randomised trial will be conducted in 40 practices in low socioeconomic areas in Sydney and Adelaide, Australia. Forty patients aged 40-70 years with a body mass index ≥28 kg/m 2 will be enrolled per practice. The HeLP-general practitioner (GP) intervention includes a practice-level quality improvement intervention (medical record audit and feedback, staff training and practice facilitation visits) to support practices to implement the clinical intervention for patients. The clinical intervention involves a health check visit with a practice nurse based on the 5As framework (assess, advise, agree, assist and arrange), the use of a purpose-built patient-facing app, my snapp, and referral for telephone coaching. The primary outcomes are change in health literacy, lifestyle behaviours, weight, waist circumference and blood pressure. The study will also evaluate changes in quality of life and health service use to determine the cost-effectiveness of the intervention and examine the experiences of practices in implementing the programme.
RESULTS/CONCLUSION: There are no restrictions on publication, and findings of the study will be made available to the public via the Centre for Primary Health Care and Equity website and through conference presentations and research publications. Deidentified data and meta-data will be stored in a repository at UNSW and made available subject to ethics committee approval.
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