Public Health England

Protecting and improving the nation's health

NHS Health Check programme:

Annotated Bibliography: April 27th 2017 – June 22nd 2017

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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 and diabetes/ cardiovascular disease risk screening in the population. 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 and ISRCTN registry 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 April 26th 2017. This search identifies references **from April 27th 2017 to June 22nd 2017**. The cut-off date for internet searches was **June 22nd 2017**.

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. limit 19 to ed=20170427-20170622
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 2017/04/27 to 2017/06/22

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 dd=20170427-20170622

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="2017"

EBSCO CINAHL	S10 S1 OR S2 OR S9 Limiters - Published Date: 20170427-20170622 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: 2017 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*
HDAS PsycInfo	1 "health check*".af. 2 PHYSICAL EXAMINATION/ 3 HEALTH SCREENING/ 4 "diabetes screen*".af 5 "cardiovascular screen*".af 6 "population screen*".af 7 ("opportunistic* screen*" OR "risk factor screen*").af 8 ("medical check*" OR "general check*" OR "periodic health exam*" OR "annual exam*" OR "annual review*" OR NHSHC).af 9 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 10 cardiovascular.ti,ab 11 prevention.ti,ab 12 10 AND 11 13 CARDIOVASCULAR DISORDERS/ 14 PREVENTIVE MEDICINE/ 15 13 AND 14 16 12 OR 15 17 9 OR 16 18 17 [Limit to: Publication Year 2017]

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 Publication Year from 2017 to 2017
NHS Evidence	"*health check"* OR *cardiovascular prevention primary care* Limited to 27/04/2017 to 22/06/2017
TRIP database	"*health check*"* OR *cardiovascular prevention primary care* Since 2017
Google Scholar	*"nhs health check"* *cardiovascular "health check"* *cardiovascular prevention "primary care"* *nhs health check program* Since 2017, sorted by relevance.
Google	"*nhs health check*" *cardiovascular prevention "primary care"* *cardiovascular "health check*" *nhs health check program* Limited to past year, sorted by relevance
Clinical trials.gov and ISRCDN registry	*"health check",* limited to 04/27/2017 to 06/22/2017

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 April 27th 2017 and June 22nd 2017

Database	No. of hits	Exclusive
Medline (April 27th –June 22nd 2017)	270	229
PubMed (April 27th –June 22nd 2017)	227	223
Embase (April 27th –June 22nd 2017)	637	516
HMIC (up to Jan 2017)	1	1
CINAHL (April 27th to June 22nd 2017)	137	99
Global Health (2017)	131	120
PsycInfo (2017)	125	104
Cochrane Library (Issue 6 of 12, June 2017)	5	5
NICE Evidence (April 27th – June 22nd 2017)	214	209
TRIP database (since 2017)	388	332
TOTAL		**1876**

Table 2a. Citations added to internet sources between April 27th 2017 and June 22nd 2017

Internet sources	No. of hits
Google Scholar (June 22nd 2017)	593
Google (June 22nd 2017)	800
Trials registers (June 22nd 2017)	15
TOTAL	

Note: it is not feasible to determine whether these internet hits are exclusive

From these 3284 results, 2 were identified as being relevant to the NHS Health Check programme, 9 to general health checks and 44 to diabetes/cardiovascular disease risk screening or prevention.

Total relevant references = 55

- **NHS Health Checks = 2**
- **general health checks = 9**
- **diabetes/cardiovascular disease screening or prevention = 44**

4. References on the NHS Health Check Programme (2)

Cohort

Gulliford, M. C., Khoshaba, B., McDermott, L., et al. 2017. **Cardiovascular risk at health checks performed opportunistically or following an invitation letter. Cohort study**. *J Public Health (Oxf)* 1-6.
AIM: to compare cardiovascular risk scores for 'invited' and 'opportunistic' health checks.
METHODS: Cohort study of all health checks completed at 18 general practices from July 2013 to June 2015. For each general practice, cardiovascular (CVD) risk scores were compared by source of check and pooled using meta-analysis. Effect estimates were compared by gender, age-group, ethnicity and fifths of deprivation.
RESULTS: There were 6184 health checks recorded (2280 invited and 3904 opportunistic) with CVD risk scores recorded for 5359 (87%) participants. There were 17.0% of invited checks and 22.2% of opportunistic health checks with CVD risk score >/=10%; a relative increment of 28% (95% confidence interval: 14-44%, P < 0.001). In the most deprived quintile, 15.3% of invited checks and 22.4% of opportunistic checks were associated with elevated CVD risk (adjusted odds ratio: 1.94, 1.37-2.74, P < 0.001)
View abstract

Cross-sectional

Woringer, M., Cecil, E., Watt, H., et al. 2017. **Evaluation of community provision of a preventive cardiovascular programme - the National Health Service Health Check in reaching the under-served groups by primary care in England: cross sectional observational study**. *BMC Health Serv Res* 17(1) 405.
AIM: to assess the effectiveness of community-based outreach providers in delivering England's National Health Services (NHS) Health Check programme, a CVD preventive programme to under-served groups.
METHODS: Between January 2008 and October 2013, community outreach providers delivered a preventive CVD programme to 50,573 individuals, in their local communities, in a single consultation without prescheduled appointments. Community outreach providers operated on evenings and weekends as well as during regular business hours in venues accessible to the general public. After exclusion criteria, we analysed and compared socio-demographic data of 43,177 Health Check attendees with the general population across 38 local authorities (LAs). We assessed variation between local authorities in terms of age, sex, deprivation and ethnicity structures using two sample t-tests and within local authority variation in terms of ethnicity and deprivation using Chi squared tests and two sample t-tests respectively.
RESULTS: Using Index of Multiple Deprivation, the mean deprivation score of the population reached by community outreach providers was 6.01 higher (p < 0.05) than the general population. Screened populations in 29 of 38 LAs were significantly more deprived (p < 0.05). No statistically significant difference among ethnic minority groups was observed between LAs. Nonetheless some LAs - namely Leicester, Thurrock, Sutton, South Tyneside, Portsmouth and Gateshead were very successful in recruiting ethnic minority groups. The mean proportion of men screened was 11.39% lower (p < 0.001) and mean proportion of 40-49 and 50-59 year olds was 9.98% and 3.58% higher (p < 0.0001 and p < 0.01 respectively) than the general population across 38 LAs.
View full text

References relating to general health checks (9)

Cohort studies

Earnest, C. P. & Church, T. S. 2017. **Retrospective Analysis of Annual Worksite Preventive Health Checkups on Hypertension and Metabolic Syndrome**. *J Occup Environ Med* 59(5) e74-e83.
AIM: to examine worksite preventive care checkups on the prevalence of hypertension and metabolic syndrome (MetS).
METHODS: Participants (N = 9269) participated in four annual checkups, counseled, and referred for physician follow-up. Hypertension and MetS prevalence were examined using general linear models or chi-squared analyses.
RESULTS: Significant reductions in the prevalence of hypertension in men (20 to 39 years [20% vs. Y2 9%], 40 to 65 years [38% vs. 20%], 65+ years [38% vs. 24%]) and women (20 to 39 years [8% vs. 4%], 40 to 65 years [23% vs. 11%], 65+ years [29% vs. 15%]), continuing through Y4. MetS followed a similar, yet attenuated pattern, with significance noted in men: (40 to 65 years; Y1 [48%] vs. Y2 [38%]; 65+ years [Y1 [42%] vs. Y3 [40%]]), and women (40 to 65 years group [Y1 [36%] vs. Y3 [32%]]; 65+ years [Y1 [41%] vs. Y3 [38%]]).
View abstract

Eom, H., Myong, J.-P., Kim, E.-A., et al. 2017. **Effectiveness of workers' general health examination in Korea by health examination period and compliance: retrospective cohort study using nationwide data**. *Annals of occupational and environmental medicine* 29(1) 2.
AIM: to evaluate the effectiveness of the Workers' General Health Examination by health examination period and compliance.
METHODS: a retrospective cohort of the health examination participants in 2006 (baseline year: N = 6,527,045) was used. We identified newly occurring cardio-cerebrovascular disease over 7 years (from 2007 to 2013). After stratification by age, sex, and national health insurance type, we identified 7 years' cumulative incidence of cardio-cerebrovascular disease by health examination compliance and estimated its relative risk by health examination period and compliance.
RESULTS: The compliant group presented a lower cumulative incidence of cardio-cerebrovascular disease than the non-compliant group; this result was consistent across sex, working age (40s and 50s), and workplace policyholder. Relative risk of cardio-cerebrovascular disease by health examination period (1 and 2 years) showed statistically significant results in ischemic heart disease for male participants. Of men in their 40s, office workers (over a 2-year period) presented statistically higher relative risk of ischemic heart disease than non-office workers (over a 1-year period: 1.03; 95% confidence interval, 1.02–1.03).
View full text

Fujita, M., Sato, Y., Nagashima, K., et al. 2017. **Impact of geographic accessibility on utilization of the annual health check-ups by income level in Japan: A multilevel analysis**. *PLoS One* 12(5) e0177091.
AIM: to reveal whether an income-dependent difference in the impact of geographic accessibility on the utilization of government-led annual health check-ups exists.
METHODS: Existing data collected and provided by Chiba City Hall were employed and analyzed as a retrospective cohort study. The subjects were 166,966 beneficiaries of National Health Insurance in Chiba City, Japan, aged 40 to 74 years. Of all subjects, 54,748 (32.8%) had an annual health check-up in fiscal year 2012. As an optimal index of geographic accessibility has not been established, five measures were calculated: travel time to the nearest health care facility, density of health care facilities (number facilities within a 30-min walking distance from the district of residence), and three indices based on the two-step floating catchment area method.
RESULTS: Both low density and low income were associated with decreased utilization of the health check-ups. Furthermore, a linear relationship was observed between the density of facilities and utilization of the health check-ups in all income groups and its slope was significantly steeper among subjects with an equivalent income of 0.00 yen than among those with equivalent income of 1.01-2.00 million yen ($p = 0.028$) or 2.01 million yen or more ($p = 0.040$).
View full text

Haruyama, Y., Yamazaki, T., Endo, M., et al. 2017. **Personal status of general health checkups and medical expenditure: A large-scale community-based retrospective cohort study**. *Journal of Epidemiology* 27(5) 209-214.
AIM: to clarify the association between the personal utilization of general health checkups (GHCs) and medical expenditures (MEs) in a middle-aged Japanese population.
METHODS: A retrospective cohort study was conducted. Subjects were 33,417 residents (15,819 males and 17,598 females) aged 48 years or older in 2010 who were invited to undergo GHCs every year. Official records on GHCs from 2002 to 2007 and MEs from 2008 to 2010 were provided by Soka City, Saitama Prefecture, Japan. The utilization of GHCs was divided into zero times (non-utilizers), 1-3 times (low-frequency utilizers), and 4-6 times (high-frequency utilizers).
RESULTS: Of the 33,417 subjects, 20,578 (61.6%) were non-utilizers, 5,777 (17.3%) were low-frequency utilizers, and 7,062 (21.1%) were high-frequency utilizers, based on the attendance to GHCs from 2002 to 2007. Compared with the non-utilizers, the high-frequency utilizers showed significantly higher outpatient MEs (JPY394,700 vs. JPY373,100). The low- and high-frequency utilizers showed significantly lower inpatient MEs (JPY224,000 and JPY181,500 vs. JPY309,300) and total MEs (JPY610,600 and JPY580,700 vs. JPY689,600) than the non-utilizers based on the pooled data from 2008 to 2010.
View full text

Ito, M. & Matsushima, E. 2017. **Presentation of Coping Strategies Associated with Physical and Mental Health During Health Check-ups**. *Community Mental Health Journal* 53(3) 297-305.
AIM: to identify coping behaviors during regular health check-ups and to examine whether they were related to physical and mental health.
METHODS: We assessed coping strategies with the Brief COPE scale in 201 people who underwent a regular health check-up in a clinic.
RESULTS: We found several significant relationships between coping and physical/psychological conditions presented in health check-up: Humor and systolic blood pressure, Substance use and high-density lipoprotein cholesterol, Venting and low-density lipoprotein cholesterol, Self-blame and depression, and Behavioral disengagement and sleep disorder.
View full text

Lee, D. H., Youn, H. J., Jung, H. O., et al. 2017. **The cardiovascular risk factors associated with the plaque pattern on coronary computed tomographic angiography in subjects for health check-up**. *Clinical Hypertension* 23 (1) (no pagination)(6).
AIM: to explore the difference of the plaque patterns on coronary computed tomographic angiography (CCTA) and to assess the cardiovascular risks in healthy subjects.
METHODS: A total of 3914 subjects (mean age: 55 +/- 10 years, M : F = 2649 : 1265) who underwent CCTA for health check-up between January 2009 and December 2012 were enrolled. According to coronary artery calcium score (CACS) and plaque pattern on CCTA, subjects were categorized into four groups (group 1: normal; group 2: "non-calcified" plaque; group 3: "calcified" plaque; group 4: mixed plaque). We analyzed cardiovascular risks and Framingham risk score (FRS) among the groups.
RESULTS: The incidence of each group was group 1 in 55.0% (2152/3914), group 2 in 5.1% (200/3914), group 3 in 8.2% (319/3914), and group 4 in 7.2% (280/3914), respectively. There was no difference of FRS among the groups (6.4 +/- 6.4%; 6.5 +/- 4.6%; 8.2 +/- 5.8%; 7.7 +/- 5.7% p = 0.086). In multivariate analysis, HbA1c (OR = 2.285; 95%CI = 1.029- 5.071; p = 0.042) in group 2; age (OR = 1.115; 95%CI = 1.034- 1.202; p = 0.005) and smoking status (OR = 3.386; 95%CI = 1.124- 10.202; p = 0.030) in group 3; and age (OR = 1.054; 95%CI = 1.011- 1.099; p = 0.014) and hypertension (OR = 3.087; 95%CI = 1.536- 6.202; p = 0.001) in group 4 were independent factors.:
View full text

Piha, K., Sumanen, H., Lahelma, E., et al. 2017. **Socioeconomic differences in health check-ups and medically certified sickness absence: a 10-year follow-up among middle-aged municipal employees in Finland**. *Journal of Epidemiology & Community Health* 71(4) 390-395.
AIM: to analyse if attendance to health check-ups are socioeconomically patterned and affect sickness absence over a 10-year follow-up.
METHODS: This register-based follow-up study included municipal employees of the City of Helsinki. 13 037 employees were invited to age-based health check-up during 2000-2002, with a 62% attendance rate. Education, occupational class and individual income were used to measure socioeconomic position. Medically certified sickness absence of 4 days or more was measured and controlled for at the baseline and used as an outcome over follow-up. The mean follow-up time was 7.5 years. Poisson regression was used.

RESULTS: Men and employees with lower socioeconomic position participated more actively in health check-ups. Among women, non-attendance to health check-up predicted higher sickness absence during follow-up (relative risk=1.26, 95% CI 1.17 to 1.37) in the fully adjusted model. Health check-ups were not effective in reducing socioeconomic differences in sickness absence.
View abstract

Veronesi, G., Gianfagna, F., Borchini, R., et al. 2017. **Cardiovascular disease risk estimation in the working population: The contribution of lifestyle and job-related risk factors**. *European Journal of Preventive Cardiology* 24 (2 Supplement 1) 16-17. Conference abstract: 7th International Commission on Occupational Health Conference on Work Environment and Cardiovascular Diseases, ICOH 2017. Italy.
AIM: to investigate the discrimination ability at 10 years of lifestyle and job-related (LS&JR) risk factors in a northern Italian working male population.
METHODS: The present analysis includes men who were 35-64 years old, free of CVD and employed at the time of recruitment in either the MONICA-Brianza and PAMELA (three population-based surveys) or the SEMM (one factory- based survey) studies. All participants underwent physical examination at baseline with standardised blood pressure measurement, and a blood sample was drawn for cholesterol measurement. Sport and work physical activity indices were derived from the Baecke questionnaire and dichotomised according to sample third quartile. Job strain was evaluated using the job content questionnaire and dichotomised as high versus non-high strain. Smoking (study variable: current vs. non-current smokers) and alcohol intake (abstainer, <50 g/day (reference), >50 g/day) were self-reported. The study endpoint was the first occurrence of a coronary event (including acute revascularisation) or ischaemic stroke, fatal and non-fatal, during follow-up (median time 15 years). A 10-risk estimation model was developed using lifestyle and job-related risk factors satisfying the Akaike information criterion for the selection of candidate predictors, and contrasted to a standard model including total and high-density lipoproteincholesterol, systolic blood pressure, smoking and diabetes. Model discrimination was estimated by the area under the receiver operating characteristic curve (AUC), in the overall sample.
RESULTS: The study sample comprises n=2215 men aged 45.3+/-7.2 years at baseline, 14% managers, 50% nonmanual, 27% manual workers and 9% proprietors; and n=145 cardiovascular events during follow-up (observed 10-year risk 4.0%). In age-adjusted Cox models, smoking (hazard ratio 2.71, 95% confidence interval (CI) 1.94- 3.78), elevated alcohol intake (1.41, 95% CI 0.92-2.15), job strain (1.38, 95% CI 0.95-1.99), high work (1.37, 95% CI 0.94-2.00) and sport physical activity (0.62, 95% CI 0.36-1.08), but not body mass index, satisfied the Akaike information criterion and entered into the model. In the overall sample, the discrimination ability of the LS&JR model (AUC 0.733, bootstrapped 95% CI 0.700- 0.775) did not differ from the standard model (AUC 0.743). Among the n=1613 workers (73% of the sample; n=59 events, observed 10-year cardiovascular risk 3.1%) at 'low' risk according to guidelines, the AUC for the LS&JR model was 0.727. Of these men, 38% could have been selected for preventive action based on their estimated LS&JR risk; one out of every 17 was a cardiovascular case.
No freely available abstract

Tominaga, T., Matsushima, M., Nagata, T., et al. 2015. **Psychological impact of lifestyle-related disease disclosure at general checkup: a prospective cohort study**. *BMC family practice* 16 60.
AIM: to clarify the psychological impact on anxiety state of patients when lifestyle-related diseases are disclosed at general checkups for local residents; to evaluate short-term impact on patients, and how notification of abnormal values and disclosure of disease at general checkups affect patients' subsequent behavioral changes.
METHODS: The study design was a prospective cohort study. We compared the anxiety state of participants using a self-administered anxiety assessment scale, State-Trait Anxiety Inventory (STAI), before and after Physician's explanation of abnormal values in markers of lifestyle-related diseases. The participants were those between the age of 40 and 75 years who underwent general checkups at two primary care facilities. In addition, we assessed the effects on lifestyle habits and the psychological impact caused by general checkup using STAI and a survey on behavioral changes one month after the checkup.
RESULTS: The valid response rate at the survey of the general checkup was 92% (534/578). Of those who showed abnormal levels in markers of lifestyle-related diseases, anxiety was augmented significantly among those who responded that the physician had told them of their diagnosis compared to those who responded that the physician had not told them of their diagnosis (Wilcoxon rank-sum test, P < 0.007). The percentage of patients whose state anxiety scale of STAI increased >=5 points was 30% in the disease disclosed group (33/111) and 17% in the disease undisclosed group (27/159), respectively. The risk ratio was 1.5 (95% CI: 1.1-2.0). One month after the general checkup, overall anxiety diminished regardless of whether diagnosis of lifestyle-related diseases was disclosed to patients notified of abnormal values. In addition, improvements in daily life behaviors as a result of notification of abnormalities or disclosure of diagnosis at general checkup were not observed
View full text

Cross-sectional studies

Rhee, E. J., Han, K., Ko, S. H., et al. 2017. **Increased risk for diabetes development in subjects with large variation in total cholesterol levels in 2,827,950 Koreans: A nationwide population-based study**. *PLoS One* 12(5) e0176615.

AIM: to analyze the relationship between variations of total cholesterol (TC) levels and the risk for type 2 diabetes development from a Korean nationwide population-based database.

METHODS: We examined the General Health Check-up sub-dataset of the Korean National Health Insurance Service (NHIS) of 2,827,950 participants who had at least three health check-ups between 2002 and 2007, and were not reported to have diabetes during that time. The variations of TC levels between the examinations were calculated. The examinees were divided into 10 groups according to TC variation, and the hazard ratio for diabetes development from 2007 to 2013, were analyzed.

RESULTS: During the follow-up period, 3.4% of the participants had developed diabetes. The hazard ratio (HR) for diabetes development relative to the overall risk in the whole study population started to be higher than 1.0 from eighth decile of TC variation. The highest decile group showed an increased HR for diabetes development after adjustment for confounding variables (1.139; 95% confidence interval 1.116~1.163). These results were similar regardless of the use of anti-hyperlipidemic medication and baseline TC levels.

View full text

Oshio, T., Tsutsumi, A. & Inoue, A. 2016. **Can leisure-time physical activity improve health checkup results? Evidence from Japanese occupational panel data**. *Journal of Occupational Health* 58(4) 354-64.

AIM: to examine the extent to which changes in worker health, as measured by health checkup items, were associated with increased intensity of leisure-time physical activity (LTPA) after controlling for individual time-invariant attributes.

METHODS: We used panel data from two to four waves of a Japanese occupational cohort survey, focusing on 30,206 observations of 10,106 individuals (7,669 men and 2,437 women) aged 18-76 years. We estimated first-difference and mean-centered fixed effects models to examine how changes in 10 health checkup items were associated with changes in LTPA intensity. We considered four LTPA intensity levels (none, low, moderate, and vigorous), based on self-reported assessments.

RESULTS: For men, low-density lipoprotein cholesterol levels, glycated hemoglobin levels, body mass index, and waist circumference improved when LTPA intensity was increased even at a low level, whereas triglyceride, high-density lipoprotein cholesterol, and fasting blood glucose levels improved when LTPA intensity was increased to moderate or vigorous levels. Blood pressure (both systolic and diastolic) and total cholesterol levels were only modestly responsive to changes in LTPA intensity. For women, blood pressure (both systolic and diastolic) and waist circumference were negatively associated with LTPA intensity, whereas the other variables showed more modest effects.

View full text

References relating to diabetes and cardiovascular disease risk screening or prevention (44)

Guidance

Masana, L. S., Ros, E., Sudano, I., et al. 2017. **Is there a role for lifestyle changes in cardiovascular prevention? What, when and how?** *Atherosclerosis Supplements* 26 2-15.
AIM: to provide best practice approaches and support for healthcare professionals on the role of lifestyle changes in the prevention of CVD.
METHODS: A working group of experts discussed existing guidelines, clinical practice and evidence, and provided their recommendations on ten topics concerning the role of lifestyle in CVD prevention. These topics covered important lifestyle factors as well as tools/approaches to assess or encourage lifestyle changes.
RESULTS: The group of clinical experts collaborated to provide their opinion on the following topics: one diet versus customised diets; the role of alcohol consumption in a healthy diet; a diet based on nutrient composition or on whole foods; a Mediterranean versus low-fat diet; the role of dietary supplements; physical activity; smoking cessation; the role of a nutritionist/dietitian in a CVD risk multidisciplinary team; tools to be implemented to assess diet, physical activity and smoking status; and the most effective approaches to encourage lifestyle changes.
View abstract

The Sixth Joint Task Force of the European Society of Cardiology 2017. **2016 European Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts)**. *International Journal of Behavioral Medicine* 24(3) 321-419.
AIM: to provide an evidence-based consensus of the 6th European Joint Task Force involving 10 professional societies for the prevention of cardiovascular disease in clinical practice
METHODS: appraisal of current evidence and identification of remaining knowledge gaps in managing CVD prevention; the Task Force followed the quality criteria for development of guidelines
RESULTS: the Task Force have formulated recommendations to guide actions to prevent CVD in clinical practice.
View full text

van Buuren, S., Boshuizen, H., C. & Reijneveld, S., A. 2017. **Toward targeted hypertension screening guidelines**. *Medical Decision Making* 26(2) 145.
AIM: to assess the way in which hypertension guidelines should be targeted to the population of interest
METHODS: Simulation study on individual cardiovascular risk profiles, with drug treatment altering the 10-year cardiovascular risk. The analysis compares the consequences of various screening and treatment alternatives. The reference scenario consists of the Dutch hypertension guidelines for primary care. A representative sample of the Dutch population aged 20 years and older is taken as the target. Main outcome measures include incidence, quality-adjusted life years won, number needed to screen, and costs (prevention, morbidity, and mortality). The discount rate is 4%.
RESULTS: Strict adherence to the current hypertension guidelines saves costs (i.e., the total prevention costs are less than the costs of prevented morbidity and mortality). The following changes increase its cost-effectiveness: use of lower blood pressure levels for screening and treatment, reduction of the number of screens from 5 to 3, and active call-up of high-risk patients. The adherence to guidelines has a large influence on actual cost-effectiveness achieved in practice.
View abstract

Systematic reviews

Alageel, S., Gulliford, M. C., McDermott, L., et al. 2017. **Multiple health behaviour change interventions for primary prevention of cardiovascular disease in primary care: systematic review and meta-analysis**. *BMJ Open* 7(6) e015375.
AIM: to evaluate the effectiveness of multiple health behaviour change interventions (MHBC) interventions on CVD risk and CVD risk factors
METHODS: The search included randomised controlled trials of MHBC interventions aimed at reducing CVD risk in primary prevention population up to 2017. Theoretical frameworks and intervention components were evaluated using standardised methods. Meta-analysis with stratification and meta-regression were used to evaluate intervention effects.
RESULTS: We identified 31 trials (36 484 participants) with a minimum duration of 12 months follow-up. Pooled net change in systolic blood pressure (16 trials) was -1.86 (95% CI -3.17 to -0.55; p=0.01) mm Hg; diastolic blood pressure (15 trials), -1.53 (-2.43 to -0.62; p=0.001) mm Hg; body mass index (14 trials), -0.13 (-0.26 to -0.01; p=0.04) kg/m2; serum total cholesterol (14 trials), -0.13 (-0.19 to -0.07; p<0.001) mmol/L. There was no significant association between interventions with a reported theoretical basis and improved intervention outcomes. No association was observed between intervention intensity (number of sessions and intervention duration) and intervention outcomes. There was significant heterogeneity for some risk factor analyses, leading to uncertain validity of some pooled net changes.
View full text

Bundy, J. D., Li, C., Stuchlik, P., et al. 2017. **Systolic blood pressure reduction and risk of cardiovascular disease and mortality: A systematic review and network meta-analysis**. *JAMA Cardiology*.
AIM: to assess the association of mean achieved systolic blood pressure (SBP) levels with the risk of cardiovascular disease and all-cause mortality in adults with hypertension treated with antihypertensive therapy.
METHODS: MEDLINE and EMBASE were searched from inception to December 15, 2015, supplemented by manual searches of the bibliographies of retrieved articles. Studies included were clinical trials with random allocation to an antihypertensive medication, control, or treatment target. Studies had to have reported a difference in mean achieved SBP of 5 mm Hg or more between comparison groups.
RESULTS: Forty-two trials, including 144 220 patients, met the eligibility criteria. In general, there were linear associations between mean achieved SBP and risk of cardiovascular disease and mortality, with the lowest risk at 120 to 124 mm Hg. Randomized groups with a mean achieved SBP of 120 to 124 mm Hg had a hazard ratio (HR) for major cardiovascular disease of 0.71 (95% CI, 0.60-0.83) compared with randomized groups with a mean achieved SBP of 130 to 134 mm Hg, an HR of 0.58 (95% CI, 0.48-0.72) compared with those with a mean achieved SBP of 140 to 144 mm Hg, an HR of 0.46 (95% CI, 0.34-0.63) compared with those with a mean achieved SBP of 150 to 154 mm Hg, and an HR of 0.36 (95% CI, 0.26-0.51) compared with those with a mean achieved SBP of 160 mm Hg or more. Likewise, randomized groups with a mean achieved SBP of 120 to 124 mm Hg had an HR for all-cause mortality of 0.73 (95% CI, 0.58-0.93) compared with randomized groups with a mean achieved SBP of 130 to 134 mm Hg, an HR of 0.59 (95% CI, 0.45-0.77) compared with those with a mean achieved SBP of 140 to 144 mm Hg, an HR of 0.51 (95% CI, 0.36-0.71) compared with those with a mean achieved SBP of 150 to 154 mm Hg, and an HR of 0.47 (95% CI, 0.32-0.67) compared with those with a mean achieved SBP of 160 mm Hg or more.
View abstract

Leibowitz, M., Cohen-Stavi, C., Basu, S., et al. 2017. **Targeting LDL Cholesterol: Beyond Absolute Goals Toward Personalized Risk**. *Current Cardiology Reports* 19 (6) (no pagination)(52).
AIM: to review and assess the evidence for low-density lipoprotein cholesterol (LDL-C) treatment goals as presented in current guidelines for primary and secondary prevention of cardiovascular disease.
METHODS: unclear from abstract and full not freely available
RESULTS: Reviews of current population risk models for primary prevention show moderate ability to discriminate [with c-statistics ranging from 0.67 to 0.77 (95% CIs from 0.62 to 0.83) for men and women] with poor calibration and overestimation of risk. Individual clinical trial data are not compelling to support specific LDL-C targets and percent reductions in secondary prevention.
View abstract

Rozanski, A., Muhlestein, J., B. & Berman, D., S. 2017. **Primary Prevention of CVD: The Role of Imaging Trials**. *JACC. Cardiovascular imaging* 10(3) 304.
AIM: to review prospective randomised trials that have been conducted to compare outcomes based on imaging-guided screening and CVD prevention versus assignment to usual care in screening populations
METHODS: this review evaluates the rationale for screening; the application of global risk factor algorithms for

screening and their comparison versus screening based on coronary artery calcium (CAC) scanning; the rationale for developing preventive imaging trials and the lessons learned from these trials with respect to the future application of cardiac imaging for cardiac disease prevention.
RESULTS: To date, 5 prospective randomized trials have been conducted to compare outcomes based on imaging-guided screening and prevention versus assignment to usual care in screening populations. One trial involved cardiac stress imaging, 3 involved coronary artery calcium scanning, and 1 involved coronary computed tomography angiography. Due to the current very low event risk in asymptomatic populations, these trials have been substantially underpowered to assess the impact of imaging-guided prevention on hard cardiac events.
View full text

Stacey, D., Légaré, F., Lewis, K., et al. 2017. **Decision aids for people facing health treatment or screening decisions**. *Cochrane Database of Systematic Reviews*(4). Update.
AIM: To assess the effects of decision aids in people facing treatment or screening decisions.
METHODS: Updated search (2012 to April 2015) in CENTRAL; MEDLINE; Embase; PsycINFO; and grey literature; includes CINAHL to September 2008. We included published randomized controlled trials comparing decision aids to usual care and/or alternative interventions. For this update, we excluded studies comparing detailed versus simple decision aids.
RESULTS: We included 105 studies involving 31,043 participants. This update added 18 studies and removed 28 previously included studies comparing detailed versus simple decision aids. During the 'Risk of bias' assessment, we rated two items (selective reporting and blinding of participants/personnel) as mostly unclear due to inadequate reporting. Twelve of 105 studies were at high risk of bias.With regard to the attributes of the choice made, decision aids increased participants' knowledge (MD 13.27/100; 95% confidence interval (CI) 11.32 to 15.23; 52 studies; N = 13,316; high-quality evidence), accuracy of risk perceptions (RR 2.10; 95% CI 1.66 to 2.66; 17 studies; N = 5096; moderate-quality evidence), and congruency between informed values and care choices (RR 2.06; 95% CI 1.46 to 2.91; 10 studies; N = 4626; low-quality evidence) compared to usual care.Regarding attributes related to the decision-making process and compared to usual care, decision aids decreased decisional conflict related to feeling uninformed (MD ?9.28/100; 95% CI ?12.20 to ?6.36; 27 studies; N = 5707; high-quality evidence), indecision about personal values (MD ?8.81/100; 95% CI ?11.99 to ?5.63; 23 studies; N = 5068; high-quality evidence), and the proportion of people who were passive in decision making (RR 0.68; 95% CI 0.55 to 0.83; 16 studies; N = 3180; moderate-quality evidence). Decision aids reduced the proportion of undecided participants and appeared to have a positive effect on patient-clinician communication. Moreover, those exposed to a decision aid were either equally or more satisfied with their decision, the decision-making process, and/or the preparation for decision making compared to usual care. Compared to usual care, decision aids reduced the number of people choosing prostate-specific antigen screening (RR 0.88; 95% CI 0.80 to 0.98; 10 studies; N = 3996) and increased those choosing to start new medications for diabetes (RR 1.65; 95% CI 1.06 to 2.56; 4 studies; N = 447). For other testing and screening choices, mostly there were no differences between decision aids and usual care.The median effect of decision aids on length of consultation was 2.6 minutes longer (24 versus 21; 7.5% increase). The costs of the decision aid group were lower in two studies and similar to usual care in four s udies.
View full text

Yunjun, X., Chaoqiong, P., Wei, H., et al. 2017. **Circulating Proprotein Convertase Subtilisin/Kexin Type 9 (PCSK9) Concentration and Risk of Cardiovascular Events- Systematic Review and Meta-Analysis of Prospective Studies**. *Circulation journal : official journal of the Japanese Circulation Society*.
AIM: to evaluate this association in prospective studies.
METHODS: A systematic search of prospective studies published through October 2016 was carried out in order to identify studies that met pre-specified inclusion criteria. After independent data extraction, summary relative risks were calculated using random-effects models.
RESULTS: On meta-analysis of 6 cohort and 1 nested case-control study, circulating PCSK9 concentration as a continuous variable was not significantly associated with the risk of cardiovascular events (overall RR, 1.12; 95% CI: 0.98-1.29; P=0.09), with significant heterogeneity (I(2)=55.1%, Pheterogeneity=0.038). The highest but not middle categories of circulating PCSK9 was significantly associated with the risk of cardiovascular events. On subgroup analysis of study design, mean age at baseline, sample size, follow-up time, and pre-existing disease, there was no significant association between PCSK9 and cardiovascular events. Sensitivity analysis with various exclusion and inclusion criteria did not materially change the results.:
View full text

Zhang, X., Devlin, H. M., Smith, B., et al. 2017. **Effect of lifestyle interventions on cardiovascular risk factors among adults without impaired glucose tolerance or diabetes: A systematic review and metaanalysis**. *PLoS ONE* 12 (5) (no pagination)(e0176436).
AIM: to assess the effectiveness of lifestyle interventions on CVD risk among adults without impaired glucose tolerance (IGT) or diabetes.
METHODS: We systematically searched MEDLINE, EMBASE, CINAHL, Web of Science, the Cochrane Library, and PsychInfo databases, from inception to May 4, 2016. We selected randomized controlled trials of lifestyle interventions, involving physical activity (PA), dietary (D), or combined strategies (PA+D) with follow-up duration 12 months. We excluded all studies that included individuals with IGT, confirmed by 2- hours oral glucose tolerance test (75g), but included all other studies recruiting populations with different glycemic levels. We stratified studies by baseline glycemic levels: (1) lowrange group with mean fasting plasma glucose (FPG) <5.5mmol/L or glycated hemoglobin (A1C) <5.5%, and (2) high-range group with FPG 5.5mmol/L or A1C 5.5%, and synthesized data using random-effects models. Primary outcomes in this review included systolic blood pressure (SBP), diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C), and triglycerides (TG).
RESULTS: 79 studies met inclusion criteria. Compared to usual care (UC), lifestyle interventions achieved significant improvements in SBP (-2.16mmHg[95%CI, -2.93, -1.39]), DBP (-1.83mmHg[-2.34, -1.31]), TC (-0.10mmol/L[-0.15, -0.05]), LDL-C (-0.09mmol/L [-0.13, -0.04]), HDL-C (0.03mmol/L[0.01, 0.04]), and TG (-0.08mmol/L[-0.14, -0.03]). Similar effects were observed among both low-and high-range study groups except for TC and TG. Similar effects also appeared in SBP and DBP categories regardless of follow-up duration. PA+D interventions had larger improvement effects on CVD risk factors than PA alone interventions.
View full text

Khanji, M. Y., Bicalho, V. V., van Waardhuizen, C. N., et al. 2016. **Cardiovascular Risk Assessment: A Systematic Review of Guidelines**. *Annals of Internal Medicine* 165(10) 713-722.
AIM: to systematically review current primary prevention guidelines on adult cardiovascular risk assessment and highlight the similarities and differences to aid clinician decision making.
METHODS: Publications in MEDLINE and CINAHL between 3 May 2009 and 30 June 2016 were identified. On 30 June 2016, the Guidelines International Network International Guideline Library, National Guideline Clearinghouse, National Library for Health Guidelines Finder, Canadian Medical Association Clinical Practice Guidelines Infobase, and Web sites of organizations responsible for guideline development were searched. 2 reviewers screened titles and abstracts to identify guidelines from Western countries containing recommendations for cardiovascular risk assessment for healthy adults.
RESULTS: Of the 21 guidelines, 17 showed considerable rigor of development. These recommendations address assessment of total cardiovascular risk (5 guidelines), dysglycemia (7 guidelines), dyslipidemia (2 guidelines), and hypertension (3 guidelines). All but 1 recommendation advocates for screening, and most include prediction models integrating several relatively simple risk factors for either deciding on further screening or guiding subsequent management. No consensus on the strategy for screening, recommended target population, screening tests, or treatment thresholds exists.
View abstract

Trials

Arija, V., Villalobos, F., Pedret, R., et al. 2017. **Effectiveness of a physical activity program on cardiovascular disease risk in adult primary health-care users: the "Pas-a-Pas" community intervention trial**. *BMC Public Health* 17(1) 576.
AIM: to assess the short- and medium-term effectiveness of 9 months of a supervised physical activity program, including sociocultural activities, on CVD risk in adults.
METHODS: Multicentered, randomized, controlled community intervention involving 364 patients in four primary care centers. The participants were randomly assigned to a Control Group (CG = 104) or Intervention Group (IG = 260); mean age 65.19 years; 76.8% women. The intervention consisted of 120 min/week walking (396 METs/min/week) and sociocultural gathering once a month. Clinical history, physical activity, dietary intake, CVD risk factors (smoking, systolic and diastolic blood pressure, weight, waist circumference, BMI, total cholesterol, LDL- and HDL-cholesterol, triglycerides, glycosylated hemoglobin and glucose) and global CVD risk were assessed at baseline and at the end of the intervention and multivariate models were applied to the data. Incidence of adverse cardiovascular events and continued adherence to the physical activity were assessed 2 years after intervention.
RESULTS: At the end of the intervention period, in the IG relative to the CG group, there was a significant increase

in physical activity (774.81 METs/min/week), a significant change during the intervention period in systolic blood pressure (-6.63 mmHg), total cholesterol (-10.12 mg/dL) and LDL-cholesterol (-9.05 mg/dL) even after adjustment for potential confounders. At 2 years after the intervention, in the IG, compared with the CG, tthe incidence of adverse cardiovascular events was significantly lower (2.5% vs. 10.5%) and the adherence to regular physical activity was higher (72.8% vs 27.2%) in IG compared to CG.
View full text

Bender, A. M., Jorgensen, T. & Pisinger, C. 2017. **Do high participation rates improve effects of population-based general health checks?** *Prev Med* 100 269-274.
AIM: to investigate if the effect of a health check differs between areas with different participation rates.
METHODS: The Inter99 population-based randomized lifestyle intervention study covered 73 areas within the suburbs of Copenhagen, Denmark. Adults aged 30-60years were randomly drawn from a population and were randomized to intervention group (n=11,483) or control group (n=47,122).
RESULTS: Participation rates in the health check varied considerably between areas (mean 52%; range 35-85%). In separate survival analyses, area participation rate was included both as a continuous exposure variable and as a categorical variable (tertiles; low: 35-49%, meddle: 50-54%, high: 55-84%). All persons in the intervention and control group were followed in registers for 10-year total mortality and combined events (ischemic heart disease, stroke, or both). In adjusted models (including sociodemographic variables, ethnicity, number of children and comorbidity), among men, there was no difference in risk of death between areas with varying participation rates. Surprisingly, among women living in high-participation areas a significantly higher risk of all-cause mortality (HR: 1.32 [1.03-1.69]) was found in the intervention group (ref=controls). For both men and women, in no areas there was any difference between intervention and control group in incident IHD/stroke.
View abstract

Persell, S. D., Brown, T., Lee, J. Y., et al. 2017. **Mailed outreach and facilitated test ordering to promote cholesterol screening in community health centers: A randomized trial**. *J Eval Clin Pract* 23(3) 620-624.
AIM: to determine whether a simple mailed outreach message and facilitated test ordering increase cholesterol screening among federally qualified community health center patients with no recent cholesterol screening test performed.
METHODS: Using a patient-randomized controlled trial, we examined the effects of delivering a simple mailed outreach intervention promoting cholesterol testing and facilitated test ordering (without requiring an office visit). Participants were adult patients 50 to 75 years old, with no diagnosed cardiovascular disease or diabetes, and no cholesterol test within 5 years who had received care from community health centers in Illinois and Arizona. The intervention took place in 2014 and was powered to detect a 10% increase in screening due to the intervention.
RESULTS: Participants' (n = 480) mean age was 57.5 years, 51.0% were male, and 43.8% were smokers. There was no significant difference between groups in the primary study outcome-completion of total cholesterol and high-density lipoprotein cholesterol tests or complete lipid panel within 3 months; 32 participants (13.3%) in intervention group versus 26 (10.8%) in control group met the primary outcome, with absolute difference of 2.5 percentage points (95% confidence interval -6.6 to 11.6).
View abstract

Cohort studies

Danese, M. D., Gleeson, M. & Kutikova, L. 2017. **Management of lipid-lowering therapy in patients with cardiovascular events in the UK: a retrospective cohort study**. *BMJ Open* 7(5).
AIM: to describe low-density lipoprotein (LDL) cholesterol management and lipid-lowering treatment patterns in patients with a cardiovascular (CV) event.
METHODS: Retrospective cohort study using Clinical Practice Research Datalink records linked with Hospital Episode Statistics data. Individuals ≥18 years were selected at their first CV-related hospitalisation (first event cohort) if they had received ≥2 lipid-lowering therapy prescriptions within 180 days beforehand. Patients were stratified into four mutually exclusive subgroups based on the presence or absence of vascular disease and of diabetes. Those with a second CV hospitalisation within 36 months were included in a separate cohort (second event cohort). Primary and secondary outcome measures LDL levels in the year prior to the CV event and 12 months later as well as measures of adherence to lipid-lowering therapy during the 12 months after the CV hospitalisation.
RESULTS: There were 24 093 patients in the first event cohort, of whom 5274 were included in the second event cohort. Most received moderate intensity statins at baseline and 12 months. Among the four first event cohort

subgroups at baseline, the proportions with an LDL of <1.8 mmol/L was similar between the two diabetic cohorts (36% to 38%) and were higher than those in the two non-diabetic cohorts (17% to 22%) and in the second event cohort (31%). An incremental 5% to 9% had an LDL below 1.8 mmol/L at 12 months, suggesting intensification of therapy. The proportion of adherent patients (medication possession ratio of≥0.8) was highest for statins, ranging from 68% to 72%. For ezetimibe, the range was 65% to 70%, and for fibrates, it was 48% to 62%.
View full text

Ding, X., Ye, P., Wang, X., et al. 2017. **The predictive value of baseline LDL-TG level on major adverse cardiovascular events in a followed up cohort population**. *European review for medical and pharmacological sciences* 21(5) 1060-1064.
AIM: to identify the predictive roles of Low-Density Lipoprotein Triglycerides (LDL-TG) for major adverse cardiovascular events (MACEs).
METHODS: A longitudinal study in a routine health check-up population was performed with an average follow-up of 4.8 years. The participants involved in this study were 1680, from 2007 to 2009, and all had followed-up for all-cause mortality, cardiovascular disease mortality, and the development of MACEs. The demographic information and anthropometric parameters at baseline were recorded. The baseline and follow-up conventional lipid parameters were measured. We also examined the level LDL-TG, as well as the relationship between its level and MACEs.
RESULTS: MACEs individuals were characterized by statistically higher baseline LDL-TG (17.22 ± 8.05 vs. 16.39 ±7.35 nmol/l, p = 0.017). The univariate regression for MACEs group indicated that the LDL-TG (b = 0.813, HR = 2.254, 95% CI: 1.454-3.494, p < 0.001), older age, sex and other factors were a significant risk for MACEs. Furthermore, in the adjusted Cox model showed that only higher baseline LDL-TG (b =0.512, HR = 1.669, 95% CI: 1.013-2.748, p = 0.044) and older age (b = 0.062, HR = 1.064, 95% CI: 1.034-1.094, p < 0.001, Table IV) were still predictors for MACEs.
View full text

Hippisley-Cox, J., Coupland, C. & Brindle, P. 2017. **Development and validation of QRISK3 risk prediction algorithms to estimate future risk of cardiovascular disease: prospective cohort study**. *BMJ* 357 j2099.
AIM: to develop and validate updated QRISK3 prediction algorithms to estimate the 10 year risk of cardiovascular disease in women and men accounting for potential new risk factors.
METHODS: Prospective open cohort study. General practices in England providing data for the QResearch database. 1309 QResearch general practices in England: 981 practices were used to develop the scores and a separate set of 328 practices were used to validate the scores. 7.89 million patients aged 25-84 years were in the derivation cohort and 2.67 million patients in the validation cohort. Patients were free of cardiovascular disease and not prescribed statins at baseline. Risk factors considered included those already in QRISK2 (age, ethnicity, deprivation, systolic blood pressure, body mass index, total cholesterol: high density lipoprotein cholesterol ratio, smoking, family history of coronary heart disease in a first degree relative aged less than 60 years, type 1 diabetes, type 2 diabetes, treated hypertension, rheumatoid arthritis, atrial fibrillation, chronic kidney disease (stage 4 or 5)) and new risk factors (chronic kidney disease (stage 3, 4, or 5), a measure of systolic blood pressure variability (standard deviation of repeated measures), migraine, corticosteroids, systemic lupus erythematosus (SLE), atypical antipsychotics, severe mental illness, and HIV/AIDs).
RESULTS: 363 565 incident cases of cardiovascular disease were identified in the derivation cohort during follow-up arising from 50.8 million person years of observation. All new risk factors considered met the model inclusion criteria except for HIV/AIDS, which was not statistically significant. The models had good calibration and high levels of explained variation and discrimination. In women, the algorithm explained 59.6% of the variation in time to diagnosis of cardiovascular disease (R2, with higher values indicating more variation), and the D statistic was 2.48 and Harrell's C statistic was 0.88 (both measures of discrimination, with higher values indicating better discrimination). The corresponding values for men were 54.8%, 2.26, and 0.86. Overall performance of the updated QRISK3 algorithms was similar to the QRISK2 algorithms.
View abstract

Karmali, K. N., Brown, T., Sanchez, T., et al. 2017. **Point-of-care testing to promote cardiovascular disease risk assessment: A proof of concept study**. *Preventive Medicine Reports* 7(September) 136–139.
AIM: to test the preliminary feasibility, acceptability and efficacy of point-of-care testing (POCT) and quantitative CVD risk assessment in high-risk adults to increase guideline-recommended statin use in primary prevention.
METHODS: Participants were aged 40–75 years, without CVD or diabetes mellitus, and potentially-eligible for consideration of statins based on estimated 10-year CVD risk from last-measured risk factor levels in the electronic health record. We performed POCT to facilitate quantitative CVD risk assessment with the Pooled

Cohort Equations immediately before a scheduled primary care provider (PCP) visit. Outcomes were: physician documentation of a CVD risk discussion and statin prescription on the study date. We also assessed acceptability of the intervention through structured questionnaire.
RESULTS: We recruited 18 participants (8 from an academic practice and 10 from a federally-qualified health clinic). After the intervention, 83% of participants discussed CVD risk with their PCP, 47% received a statin recommendation from their PCP, and 29% received a new statin prescription during the PCP visit. Participants reported high levels of satisfaction with the intervention.
View abstract

Kivimaki, M., Kuosma, E., Ferrie, J. E., et al. 2017. **Overweight, obesity, and risk of cardiometabolic multimorbidity: pooled analysis of individual-level data for 120 813 adults from 16 cohort studies from the USA and Europe**. *The Lancet Public Health* 2(6) e277-e285.
AIM: to establish the risk of incident cardiometabolic multimorbidity (ie, at least two from: type 2 diabetes, coronary heart disease, and stroke) in adults who are overweight and obese compared with those who are a healthy weight.
METHODS: We pooled individual-participant data for BMI and incident cardiometabolic multimorbidity from 16 prospective cohort studies from the USA and Europe. Participants included in the analyses were 35 years or older and had data available for BMI at baseline and for type 2 diabetes, coronary heart disease, and stroke at baseline and follow-up. We excluded participants with a diagnosis of diabetes, coronary heart disease, or stroke at or before study baseline. According to WHO recommendations, we classified BMI into categories of healthy (20.0-24.9 kg/m²), overweight (25.0-29.9 kg/m²), class I (mild) obesity (30.0-34.9 kg/m²), and class II and III (severe) obesity (>=35.0 kg/m²). We used an inclusive definition of underweight (<20 kg/m²) to achieve sufficient case numbers for analysis. The main outcome was cardiometabolic multimorbidity (ie, developing at least two from: type 2 diabetes, coronary heart disease, and stroke).
RESULTS: Participants were 120 813 adults (mean age 51.4 years, range 35-103; 71 445 women) who did not have diabetes, coronary heart disease, or stroke at study baseline (1973-2012). During a mean follow-up of 10.7 years (1995-2014), we identified 1627 cases of multimorbidity. After adjustment for sociodemographic and lifestyle factors, compared with individuals with a healthy weight, the risk of developing cardiometabolic multimorbidity in overweight individuals was twice as high (odds ratio [OR] 2.0, 95% CI 1.7-2.4; p<0.0001), almost five times higher for individuals with class I obesity (4.5, 3.5-5.8; p<0.0001), and almost 15 times higher for individuals with classes II and III obesity combined (14.5, 10.1-21.0; p<0.0001). This association was noted in men and women, young and old, and white and non-white participants, and was not dependent on the method of exposure assessment or outcome ascertainment. In analyses of different combinations of cardiometabolic conditions, odds ratios associated with classes II and III obesity were 2.2 (95% CI 1.9-2.6) for vascular disease only (coronary heart disease or stroke), 12.0 (8.1-17.9) for vascular disease followed by diabetes, 18.6 (16.6-20.9) for diabetes only, and 29.8 (21.7-40.8) for diabetes followed by vascular disease.
View full text

Koster-Rasmussen, R. 2017. **Weight Changes in General Practice**. *Dan Med J* 64(6). PhD thesis.
AIM: to i) determine the long-term weight changes in the adult general population and to assess if weight loss may not always be healthy
METHODS: The back-bone of the thesis is constituted by three scientific articles based on three different population based cohort studies. Multivariable modeling and other epidemiological methods were used.
RESULTS: Article 1 examined weight changes in the general population in relation to smoking status, and proposed a graphical 'smoking cessation weight change model', demonstrating the importance of time, age and smoking status in relation to long-term weight changes. Article 2 suggested new methods to improve the processing of dietary data. It was demonstrated how median imputation for missing values and assumptions about standard portion sizes were inferior to stochastic methods conditioning on information about physiology of the individual. Article 3 evaluated the influence of prospectively planned intentional weight loss on long-term morbidity and mortality in patients with type 2 diabetes. Therapeutic intentional weight loss supervised by a medical doctor was not associated with reduced morbidity or mortality. In the general population the dietary intake of fructose and soft drinks sweetened with sugar was not associated with weight change over 9 years. Weight gain rates were large in young adults and incrementally smaller in middle aged adults. Subjects more than 60 years lost weight on average. Historical weight data suggest that the body weight increases throughout life to the age of 60-65years. A study with simulated data indicates that bias in baseline BMI may misleadingly have favored weight loss in earlier cohort studies of intentional weight loss and mortality.
View full text

Kulkarni, M., Foraker, R. E., McNeill, A. M., et al. 2017. **Evaluation of the modified FINDRISC to identify individuals at high risk for diabetes among middle-aged white and black ARIC study participants**. *Diabetes, Obesity and Metabolism.*(March 21st).
AIM: to evaluate a modified Finnish Diabetes Risk Score (FINDRISC) for predicting the risk of incident diabetes among white and black middle-aged participants from the Atherosclerosis Risk in Communities (ARIC) study.
METHODS: We assessed 9754 ARIC cohort participants who were free of diabetes at baseline. Logistic regression and receiver operator characteristic (ROC) curves were used to evaluate a modified FINDRISC for predicting incident diabetes after 9years of follow-up, overall and by race/gender group. The modified FINDRISC used comprised age, body mass index, waist circumference, blood pressure medication and family history.
RESULTS: The mean FINDRISC (range, 2 [lowest risk] to 17 [highest risk]) for black women was higher (9.9+/-3.6) than that for black men (7.6+/-3.9), white women (8.0+/-3.6) and white men (7.6+/-3.5). The incidence of diabetes increased generally across deciles of FINDRISC for all 4 race/gender groups. ROC curve statistics for the FINDRISC showed the highest area under the curve for white women (0.77) and the lowest for black men (0.70). View abstract

Trzeciak, B. G., Siebert, J., Gutknecht, P., et al. 2017. **Cardiovascular risk factors determined via the Internet in 2 periods of time: 2004-2009 and 2010-2015 in Poland**. *Int J Occup Med Environ Health* 30(3) 499-510.
AIM: to compare cardiovascular risk factors and calculated fatal cardiovascular risk in 2 periods of time: 2004-2009 and 2010-2015 in Poland, as determined via the Internet.
METHODS: The "Ryzyko program" ("Risk program") is available on the website of the Medical University of Gdansk. To assess the cardiovascular death risk in a 10-year period, the algorithm of the SCORE (Systematic Coronary Risk Evaluation) project was used and 30 402 results of the algorithm have been analyzed.
RESULTS: Over 30 402 webpage visitors entered the required data and received the outcome. More than 78% of the Internet users who had entered the data, received a recommendation for medical check-up. Significant differences between the data collected in 2004- 2009 and 2010-2015 were noticed. Hypercholesterolemia prevalence (67.3% vs. 70.8%; p < 0.001), mean total cholesterol concentration in blood (5.60+/-1.65 mml/l vs. 5.66+/-1.35 mml/l; p < 0.001), prevalence of hypertension (36.6% vs. 35.3%; p = 0.039), mean systolic blood pressure (131.5+/-20.3 mm Hg vs. 132.6+/-18.0 mm Hg; p < 0.001), prevalence of declared smoking (30.7% vs. 26.5%; p < 0.001), declared diabetes mellitus (DM) (6.4% vs. 9.7%; p < 0.001), and declared coronary artery disease (CAD) (7.2% vs. 14.1%; p < 0.001), respectively.
View full text

van den Berg, M., Bhatt, D. & Kappelle, L. 2017. **Identification of vascular patients at very high risk for recurrent cardiovascular events: validation of the current ACC/AHA very high risk criteria**. *Eur Heart J*(Mar 28).
AIM: to validate and assess performance of the current ACC/AHA very high risk (VHR) criteria in patients with clinically manifest arterial disease.
METHODS: Data were used from the SMART study (n = 7216) and REACH Registry (n = 48 322), two prospective cohorts of patients with manifest atherosclerotic arterial disease. Prevalence and incidence rates of recurrent major adverse cardiovascular events (MACE) were calculated, according to the ACC/AHA VHR criteria (cardiovascular disease combined with diabetes, smoking, dyslipidaemia, and/or recent recurrent coronary events). Performance of the ACC/AHA criteria was compared with single very high risk factors in terms of C-statistics and Net Reclassification Index.
RESULTS: All patients were at VHR according to the ESC guidelines (incidence of recurrent MACE in SMART was 2.4/100PY, with 95% CI 2.3-2.5/100PY and in REACH 5.1/100PY with 95% CI 5.0-5.3/100PY). In SMART 57% of the patients were at VHR according to the ACC/AHA criteria (incidence of recurrent MACE 2.7/100PY, 95% CI 2.5-2.9/100PY) and in REACH this was 64% (5.9/100PY, 95% CI 5.7-6.1/100PY). The C-statistic for the ACC/AHA VHR criteria was 0.53 in REACH and 0.54 in SMART. Very high risk factors with comparable or slightly better performance were eGFR < 45, polyvascular disease and age >70 years. Around two third of the patients meeting the ACC/AHA VHR criteria had a predicted 10-year risk of recurrent MACE <30%.
View abstract

Zhao, M. X., Kan, F. F., Fang, F. S., et al. 2016. **A cohort study on the association between fasting plasma glucose level over 5.3 mmol/L and risks of abnormal glucose metabolism and cardiovascular diseases in the elderly. [Chinese]**. *Zhonghua nei ke za zhi* 55(5) 340-344.
AIM: to evaluate the association of fasting plasma glucose (FPG) level over 5.3 mmol/L to the development of abnormal glucose metabolism and cardiovascular diseases (CVD).
METHODS: This was a retrospective cohort study with 1 064 non-diabetic subjects(980 males; 84 females) aged 60

or over, who carried out annual health check-up in Chinese PLA General Hospital from May, 1996 to May, 2015. Based on the average FPG level of 3 years before enrollment, the subjects were divided into four groups: <5.3 mmol/L, 5.3-<5.6 mmol/L, 5.6-<6.1 mmol/L and 6.1-<7.0 mmol/L. Glucose metabolic changes, complications and mortality were follow-up until May, 2015.
RESULTS: (1)The initial 3-year average FPG levels were (4.9+/-0.4) mmol/L in the total 1 064 subjects. Among them, 126 subjects developed diabetes mellitus (DM) and 144 subjects developed impaired glucose regulation (IGR) during the follow-up visits. The proportions of IGR and diabetes increased with the FPG levels (P<0.05). The risk for developing IGR was significantly higher in subjects with FPG>=5.3 mmol/L than in those with FPG <5.3 mmol/L (RR=3.08, 95%CI 2.02-4.81, P<0.01). The risk for incident DM was markedly increased in subjects with FPG >= 5.6 mmol/L than in those with FPG <5.6 mmol/L (RR=6.73, 95%CI 3.90-11.52, P<0.01); (2)The risk for CVD was eight folds higher in subjects with FPG >=5.3 mmol/L than in subjects with FPG <5.3 mmol/L (RR=8.42, 95%CI 5.11-13.82, P<0.05); (3)Survival analysis showed that the risk of death was 1.47 times higher in subjects with FPG >=5.3 mmol/L than in subjects with FPG <5.3 mmol/L after years of followed-up (RR=1.47, 95%CI 1.09-1.98, P=0.0127).
View abstract

Cross-sectional studies

George, J., Mathur, R., Shah, A. D., et al. 2017. **Ethnicity and the first diagnosis of a wide range of cardiovascular diseases: Associations in a linked electronic health record cohort of 1 million patients**. *PLOS ONE* 12(6) e0178945.
AIM: to study the ethnic differences in the initial lifetime presentation of clinical cardiovascular disease in contemporary populations.
METHODS: We studied 1,068,318 people, aged ≥30 years and free from diagnosed CVD at baseline (90.9% White, 3.6% South Asian and 2.9% Black), using English linked electronic health records covering primary care, hospital admissions, acute coronary syndrome registry and mortality registry (CALIBER platform).
RESULTS: During 5.7 years median follow-up between 1997–2010, 95,224 people experienced an incident cardiovascular diagnosis. 69.9% (67.2%-72.4%) of initial presentation in South Asian <60 yrs were coronary heart disease presentations compared to 47.8% (47.3%-48.3%) in White and 40.1% (36.3%-43.9%) in Black patients. Compared to White patients, Black patients had significantly lower age-sex adjusted hazard ratios (HRs) for initial lifetime presentation of all the coronary disease diagnoses (stable angina HR 0.80 (95% CI 0.68–0.93); unstable angina– 0.75 (0.59–0.97); myocardial infarction 0.49 (0.40–0.62)) while South Asian patients had significantly higher HRs (stable angina– 1.67 (1.52–1.84); unstable angina 1.82 (1.56–2.13); myocardial infarction– 1.67 (1.49–1.87). We found no ethnic differences in initial presentation with heart failure (Black 0.97 (0.79–1.20); S Asian 1.04(0.87–1.26)). Compared to White patients, Black patients were more likely to present with ischaemic stroke (1.24 (0.97–1.58)) and intracerebral haemorrhage (1.44 (0.97–2.12)). Presentation with peripheral arterial disease was less likely for Black (0.63 (0.50–0.80)) and South Asian patients (0.70 (0.57–0.86)) compared with White patients.
View full text

González-Chica, D. A., Dal Grande, E., Bowden, J., et al. 2017. **Are we reducing the risk of cardiovascular disease and improving the quality of life through preventive health care? Results of a population-based study in South Australia**. *Preventive Medicine* 99 164-170.
AIM: to investigate the achievement of lifestyle recommendations and use of preventive medication in people who 1) are obese, 2) or have metabolic risk factors (hypertension, dyslipidaemia, and/or diabetes), 3) or have cardiovascular disease (CVD), 4) or are healthy, and the impact this preventive health care had on their 'Health-Related Quality of Life' (HRQoL).
METHODS: Cross-sectional survey conducted in 2015 with 2379 South Australian adults (57.1 ± 14 years; 51.7% females). Physical (PCS) and mental components scores (MCS) of HRQoL were assessed using the SF-12 questionnaire.
RESULTS: Although adequate fruit/vegetable intake was lower among individuals with CVD (29.8%; p = 0.049), this behaviour was associated with a better MCS. Adequate physical activity level was lower among those with metabolic risk factors (29.5%) or CVD (31.0%; p = 0.008), but independent of their clinical condition, this behaviour was associated with a higher PCS. Individuals with CVD were less likely to have adequate alcohol consumption (63.4%; p = 0.026), but those achieving this recommendation had poorer PCS. Non-smoking was similar in all groups (85%; p = 0.768) and was associated with a better MCS only among healthy individuals and those with CVD. In all the groups, individuals achieving all the lifestyle recommendations had a better PCS. Only 48.2% of individuals with CVD reported combined use of antithrombotic, antihypertensive, and antilipidemic

drugs, but the use of these medications was not associated with HRQoL.
View abstract

Institute of Applied Health Research. 2017. **'Healthy obesity' is a myth, study suggests**". Institute of Applied Health Research, University of Birmingham. 19th May. Presented at the European Congress on Obesity in Porto, Portugal.
AIM: to test the concept of 'healthy obesity' – a condition characterised by having normal markers of metabolic health despite a body mass index (BMI) of 30 or more.
METHODS: The study, which was the largest of its kind to date, involved analysis of the GP records of 3.5 million people from across the UK from 1995 to 2015, to look for markers of being metabolically healthy, having normal blood pressure and cholesterol and no diabetes, while also being obese. The study then tracked how many people suffered one of four cardiovascular conditions: coronary heart disease (CHD), cerebrovascular disease (including stroke), heart failure and peripheral vascular disease (a disorder of blood circulation).
RESULTS: The results showed that, compared to healthy people of a normal weight, those regarded as healthy and obese had a 49% increased risk of coronary heart disease, a 7% higher risk of stroke, and a 96% increased risk of heart failure.
View details

McNamara, K. P., Peterson, G. M., Hughes, J., et al. 2017. **Cardiovascular Disease Risk Assessment in Australian Community Pharmacy**. *Heart Lung and Circulation* 26(7) 667-676.
AIM: to explore the nature of community pharmacy-based screening models in Australia, capacity to increase delivery of pharmacy screening, and barriers and enablers to increasing capacity.
METHODS: An online survey weblink was emailed to pharmacy managers at every quality-accredited pharmacy in Australia by the Quality Pharmacy Care Program. The 122-item survey explored the nature of screening services, pharmacy capacity to deliver services, and barriers and enablers to service delivery in considerable detail. Adaptive questioning was used extensively to reduce the participant burden. Pharmacy location details were requested to facilitate geo-coding and removal of duplicate entries. A descriptive analysis of responses was undertaken.
RESULTS: There were 294 valid responses from 4890 emails, a 6% response rate. Most pharmacies (79%) had private counselling areas. Blood pressure assessment was nearly universal (96%), but other common risk factor assessments were offered by a minority. Most did not charge for assessments, and 59% indicated capacity to provide multiple risk factor assessments. Fewer than one in five (19%) reported any formal arrangements with general practice for care coordination. Financial viability was perceived as a key barrier to service expansion, amid concerns of patient willingness to pay. Support from government and non-governmental organisations for their role was seen as necessary.
View abstract

Meysamie, A., Ghodsi, S., Ghalehtaki, R., et al. 2017. **Distributions of high-sensitivity C-reactive protein, total cholesterol-HDL ratio and 10-year cardiovascular risk: National population-based study**. *Acta Medica Iranica* 55(4) 218-227.
AIM: to evaluate the distributions of High-Sensitivity C-reactive protein, TC-HDL ratio and 10-year risk of cardiovascular diseases among Iranian adult population.
METHODS: We conducted a cross-sectional study on a total of 2125 adults aged 25 to 65. Data of the Third National Surveillance of Risk Factors of Non-Communicable Diseases (SuRFNCD-2007) was used. Anthropometric indices, blood pressure and biochemical measurements had been obtained. Ten-year risk of cardiovascular events was also calculated using different models.
RESULTS: Median (interquartile range) and geometric means (95% CI) of hs-CRP were 5.1(3.9) and 4.1(4.38-4.85), respectively. Mean TC-HDL ratio+/-(SD) was 5.94+/-2.84 in men and 5.37+/-1.97 in women (P<0.001). In spite of risk scores (FRS and SCORE), no significant gender and age-related differences were observed in hs-CRP levels. Exclusion of CRP levels>=10 did not change the results. The proportion of high-risk categories using SCORE and FRS models were 3.6 % and 8.8 %, respectively. In comparison with other published data, greater means and median values of High-Sensitivity C-reactive protein were observed. Higher TC-HDL ratio and cardiovascular risk in men than in women were also demonstrated.
View full text

Oda, E. 2017. **LDL cholesterol was more strongly associated with percent body fat than body mass index and waist circumference in a health screening population**. *Obesity Research and Clinical Practice*. 22.
AIM: to compare correlations between changes in cardiovascular risk factors and those in obesity indices and to compare associations with incident hyper-LDL cholesterolemia among obesity indices.
METHODS: Correlation coefficients were calculated between 7-year changes in cardiovascular risk factors and those in body mass index (BMI), waist circumference (WC) and percent body fat (PBF) in 634 men and 396 women who used no antihypertensive, antidiabetic or antihyperlipidemic drugs. Odds ratios of incident hyper-LDL cholesterolemia after 7 years were calculated for BMI, WC and PBF in 738 men and 388 women.
RESULTS: There were no significant differences in the correlations with 7-year changes in cardiovascular risk factors between 7-year changes in BMI and WC. The correlation with 7-year change in LDL cholesterol was stronger for that in PBF than that in BMI or WC (p = 0.021 or 0.089, respectively in men and 0.022 or 0.020, respectively in women). The correlations with 7-year changes in log triglycerides, HDL cholesterol and log high-sensitivity CRP were stronger for those in BMI and WC than that in PBF in men. Incident hyper-LDL cholesterolemia after 7 years was significantly associated with PBF, but not BMI or WC, in men after adjusted for age and other covariates. However, the association was not significant after further adjusted for LDL cholesterol.
View full text

Rodriguez-Perez, M. C., Orozco-Beltran, D., Gil-Guillen, V., et al. 2017. **Clinical applicability and cost-effectiveness of DIABSCORE in screening for type 2 diabetes in primary care**. *Diabetes Res Clin Pract* 130 15-23.
AIM: to evaluate the applicability and cost-effectiveness of a clinical risk score (DIABSCORE) to screen for type 2 diabetes in primary care patients.
METHODS: Multicenter cross-sectional study of 10,508 adult no previously diagnosed with diabetes, in 2 Spanish regions (Canary Islands and Valencian Community). The variables comprising DIABSCORE were age, waist to height ratio, family history of diabetes and gestational diabetes. ROC curves were obtained; the diabetes prevalences odds ratios (HbA1c >/=6.5%) between patients exposed and not exposed to DIABSCORE >/=100, and to fasting blood glucose >/=126mg/dL were calculated.
RESULTS: In both regions, the valid cut-off point for diabetes (DIABSCORE=100), showed an area under the curve >0.80. The prevalences odds ratio of diabetes for DIABSCORE >/=100 was 9.5 (3.7-31.5) in Canarian and 18.3 (8.0-51.1) in Valencian; and for glucose >/=126mg/dL it was, respectively, 123.0 (58.8-259.2) and 303.1 (162.5-583.8). However, glucose >/=126mg/dL showed a low sensitivity (below 48% in both communities) as opposed to DIABSCORE >/=100 (above 90% in both regions). Professionals (100%) and patients (75%) satisfaction was greater when using DIABSCORE rather than glucose measurement for diabetes screening. The cost of each case of diabetes identified was lower with DIABSCORE >/=100 (7.6 euro in Canarian and 8.3 euro in Valencian) than glucose >/=126mg/dL (10.8 euro and 10.5 euro, respectively).
View full text

von Bibra, H., Saha, S., Hapfelmeier, A., et al. 2017. **Impact of the Triglyceride/High-Density Lipoprotein Cholesterol Ratio and the Hypertriglyceremic-Waist Phenotype to Predict the Metabolic Syndrome and Insulin Resistance**. *Hormone and Metabolic Research*. 21.
AIM: This observational, retrospective study aimed to evaluate lipid ratios and the hypertriglyceremic-waist phenotype (HTW) for predicting the metabolic syndrome/insulin resistance in non-diabetic individuals from Germany in the fasting state and during a glucose tolerance test.
METHODS: The relations of triglyceride/HDL-C, total-cholesterol/HDL-C, and low-density lipoprotein cholesterol/HDL-C with 5 surrogate estimates of insulin resistance/sensitivity and metabolic syndrome were analysed by linear regression analysis and receiver operating characteristics (ROC) in 1932 non-diabetic participants with normal (n=1 333) or impaired fasting glucose (n=599).
RESULTS: Within the lipid ratios, triglyceride/HDL-C had the strongest associations with insulin resistance/sensitivity markers. In the prediction of metabolic syndrome, diagnostic accuracy was good for triglyceride/HDL-C (area under the ROC curve 0.817) with optimal cut-off points (in mg/dl units) of 2.8 for men (80% sensitivity, 71% specificity) and 1.9 for women (80% sensitivity, 75% specificity) and fair for HTW and HOMA-IR (area under the curve 0.773 and 0.761).
View abstract

Yamamoto-Honda, R., Takahashi, Y., Mori, Y., et al. 2017. **A positive family history of hypertension might be associated with an accelerated onset of type 2 diabetes: Results from the National Center Diabetes Database (NCDD-02)**. *Endocr J* 64(5) 515-520.
AIM: to examine the effect of a family history of hypertension on the onset of type 2 diabetes
METHODS: This retrospective study examined patient age at the time of the diagnosis of type 2 diabetes by analyzing a dataset of 1,299 patients (1,021 men and 278 women) who had been diagnosed as having type 2 diabetes during a health checkup.
RESULTS: The mean +/- standard deviation of the patient age at the time of the diagnosis of diabetes was 49.1 +/- 10.4 years for patients with a family history of hypertension and 51.8 +/- 11.4 years for patients without a family history of hypertension ($p < 0.001$). A multivariate linear regression analysis showed a significant association between a family history of hypertension and a younger age at the time of the diagnosis of type 2 diabetes, independent of a family history of diabetes mellitus and a male sex, suggesting that a positive family history of hypertension might be associated with the accelerated onset of type 2 diabetes.
View full text

Saramunee, K., Dewsbury, C., Cutler, S., et al. 2016. **Public attitudes towards community pharmacy attributes and preferences for methods for promotion of public health services**. *Public Health* 140 186-195.
AIM: to identify attitudes towards pharmacy characteristics and promotional methods for selected pharmacy public health services (lifestyle advice and screening for cardiovascular risk factors) among different sectors of the general public.
METHODS: Cross-sectional survey, using a previously validated questionnaire. Three survey methods were used, across 15 areas of England, to maximize diversity: face-to-face; telephone; and self-completion of paper questionnaires. Responses to closed questions regarding characteristics and promotion were quantified and differences among sub-groups explored by univariate and multivariate analysis.
RESULTS: In total, 2661 responses were available for analysis: 2047 face-to-face; 301 telephone; and 313 paper. There were strong preferences for a pharmacy near to home or doctor's surgery and for long opening hours, particularly among employed people and non-whites. Fifty percent preferred not to use a pharmacy in a supermarket, particularly older people, the retired, those of lower education and frequent pharmacy users. Personal recommendation by health professionals or family/friends was reported as most likely to encourage uptake of pharmacy public health services, with older people and males being less likely and frequent pharmacy users more likely to perceive any promotional method as influential. Posters/leaflets were preferred over mass-media methods, with fewer than 30% perceiving the latter as potentially influential.
View abstract

Schmiedel, K., Friedland, K. & Schlager, H. 2016. **Evaluation of the Activities of Community Pharmacies during the Annual Campaign with Focus on Diabetes Prevention**. *Gesundheitswesen* 78(10) 678-680.
AIM: to evaluate the extent to which Bavarian Pharmacies might be able to contribute towards diabetes prevention, by initiating a diabetes prevention network and conducting additional training of pharmaceutical staff.
METHODS: Pharmacies that were members of the network had the opportunity to order a campaign package including an evaluation questionnaire and to register their activity in the calendar of events of the campaign.
RESULTS: A total of 215 pharmacies signed up for the diabetes prevention network and registered 103 events. 67 completed evaluation questionnaires were received overall. Most often (86.6%) the pharmacies conducted a blood glucose screening; 76.1% carried out screening with the diabetes risk questionnaire FINDRISC of the German Diabetes Foundation and 22.4% gave a information lecture on diabetes. During the screening 2,502 persons had their blood sugar checked and 1,765 persons filled in the FINDRISC questionnaire. Overall, 190 persons were advised to visit their physician because of a very high blood glucose level. On the basis of the FINDRISC, 80.2% were advised to change their lifestyle to prevent type 2 diabetes.
View abstract

Service Evaluation

Prince, S. A., Reid, R. D., Pipe, A. L., et al. 2017. **An evaluation of CardioPrevent: a technology-enabled, health-behavior change program for the global reduction of cardiovascular risk**. *Current Opinion in Cardiology*(July 20th).
AIM: to evaluate CardioPrevent, a global cardiovascular risk reduction program.
METHODS: not specified in the abstract
RESULTS: Of the 478 participants enrolled in the CardioPrevent program, 308 and 236 had complete 6-month and

12-month data, respectively at the time of evaluation. At 6 months, the average reduction in the Framingham risk score was -19.5% (median = -26.5%). Women experienced a greater reduction in risk than men (-23.1 vs. -11.4%, P = 0.013). Significant improvements were observed in body composition, blood pressure, low-density lipoproteins, triglycerides, total cholesterol-to-high-density lipoprotein ratio, HbA1c, perceived stress, anxiety, depression, quality of life, physical activity, sitting time, fruit and vegetable consumption, and medication adherence. Improvements seen at 6 months were maintained at 12 months. The majority (98%) of participants were very satisfied with the program and would recommend it to others.
View abstract

Qualitative

Nerida, V., Lauren, T. W., Rachel, C. D., et al. 2017. **Implementation of cardiovascular disease prevention in primary health care: enhancing understanding using normalisation process theory**. *BMC Family Practice* 18(1) 28.
AIM: to determine the feasibility of translating intervention outcomes into real world practice, implementation work done by stakeholders on cardiovascular disease prevention was examined using Normalisation Process Theory as a framework.
METHODS: The Model for Prevention study was a whole-of-system cardiovascular disease prevention intervention, with one component being enhanced lifestyle modification support and addition of a health coaching service in the general practice setting. Data was collected through interviews with 40 intervention participants and included general practitioners, practice nurses, practice managers, lifestyle advisors and participants. Data analysis was informed by normalisation process theory constructs.
RESULTS: Stakeholders were in agreement that, while prevention is a key function of general practice, it was not their usual work. There were varying levels of engagement with the intervention by practice staff due to staff interest, capacity and turnover, but most staff reconfigured their work for required activities. The Lifestyle Advisors believed staff had varied levels of interest in and understanding of, their service, but most staff felt their role was useful. Patients expanded their existing relationships with their general practice, and most achieved their lifestyle modification goals. While the study highlighted the complex nature of the change required, many of the new or enhanced processes implemented as part of the intervention could be scaled up to improve the systems approach to prevention. Overcoming the barriers to change, such as the perception of CVD prevention as a 'hard sell', is going to rely on improving the value proposition for all stakeholders.
View full text

Tompson, A. C., Grant, S. & Greenfield, S. M. 2017. **Patient use of blood pressure self-screening facilities in general practice waiting rooms: a qualitative study in the UK**. *British Journal of General Practice*(May).
AIM: to investigate the reasons why people do or do not use blood pressure (BP) self-screening facilities.
METHODS: A cross-sectional, qualitative study in Oxfordshire, UK. Semi-structured interviews with members of the general public recruited using posters in GP surgeries and community locations were recorded, transcribed, and coded thematically.
RESULTS: Of the 30 interviewees, 20% were hypertensive and almost half had self-screened. Those with no history of elevated readings had limited concern over their BP: self-screening filled the time waiting for their appointment or was done to help their doctor. Patients with hypertension self-screened to avoid the feelings they associated with ‘white coat syndrome’ and to introduce more control into the measurement process. Barriers to self-screening included a lack of awareness, uncertainty about technique, and worries over measuring BP in a public place. An unanticipated finding was that several interviewees preferred monitoring their BP in the waiting room than at home.
View full text

Diagnostic studies

Jackson, S. L., Safo, S. E., Staimez, L. R., et al. 2017. **Glucose challenge test screening for prediabetes and early diabetes**. *Diabet Med* 34(5) 716-724.
AIM: to test the hypothesis that a 50-g oral glucose challenge test with 1-h glucose measurement would have superior performance compared with other opportunistic screening methods.
METHODS: In this prospective study in a Veterans Health Administration primary care clinic, the following test performances, measured by area under receiver-operating characteristic curves, were compared: 50-g oral glucose challenge test; random glucose; and HbA1c level, using a 75-g oral glucose tolerance test as the 'gold standard'.
RESULTS: The study population was comprised of 1535 people (mean age 56 years, BMI 30.3 kg/m2 , 94% men,

74% black). By oral glucose tolerance test criteria, diabetes was present in 10% and high-risk prediabetes was present in 22% of participants. The plasma glucose challenge test provided area under receiver-operating characteristic curves of 0.85 (95% CI 0.78-0.91) to detect diabetes and 0.76 (95% CI 0.72-0.80) to detect high-risk dysglycaemia (diabetes or high-risk prediabetes), while area under receiver-operating characteristic curves for the capillary glucose challenge test were 0.82 (95% CI 0.75-0.89) and 0.73 (95% CI 0.69-0.77) for diabetes and high-risk dysglycaemia, respectively. Random glucose performed less well [plasma: 0.76 (95% CI 0.69-0.82) and 0.66 (95% CI 0.62-0.71), respectively; capillary: 0.72 (95% CI 0.65-0.80) and 0.64 (95% CI 0.59-0.68), respectively], and HbA1c performed even less well [0.67 (95% CI 0.57-0.76) and 0.63 (95% CI 0.58-0.68), respectively]. The cost of identifying one case of high-risk dysglycaemia with a plasma glucose challenge test would be $42 from a Veterans Health Administration perspective, and $55 from a US Medicare perspective.
View abstract

Wang, Y., Yuan, Y., Zhang, Y., et al. 2017. **Serum 1,5-anhydroglucitol level as a screening tool for diabetes mellitus in a community-based population at high risk of diabetes**. *Acta Diabetologica* 54(5) 425-431.
AIM: to assess the value of serum 1,5-anhydroglucitol (1,5-AG) for the diagnosis and screening of diabetes mellitus in a community-based population at high risk of diabetes.
METHODS: In this diagnostic test, 1170 participants underwent a 75-g oral glucose tolerance test. Venous blood samples were collected for fasting blood glucose (FBG), 2-h postprandial blood glucose (PBG), and glycosylated hemoglobin A1c (HbA1c) measurements. Serum 1,5-AG levels were detected by the GlycoMark assay, and a receiver operating characteristic (ROC) curve was generated to assess their diagnostic value for diabetes.
RESULTS: A total of 298 adults were diagnosed with diabetes, indicating a prevalence of 25.47%. Partial Pearson correlation analysis adjusted for age and body mass index showed that serum 1,5-AG level was negatively correlated with FBG, PBG, and HbA1c (all $P < 0.01$). Areas under the curves (AUCs) for serum 1,5-AG, FBG, PBG, and HbA1c in identifying diabetes were 0.920, 0.874, 0.933, and 0.887, respectively. According to the ROC curve, the optimal cutoff value of serum 1,5-AG for diagnosing diabetes was 11.18 mug/ml, which yielded a sensitivity of 92.6% and a specificity of 82.3%, respectively. Comparisons between 1,5-AG and HbA1c showed that both the AUC and sensitivity of 1,5-AG were higher than those of HbA1c (both $P < 0.01$).
View abstract

Ongoing research

Bazian 2017. **NHS Choices assessment of press reports suggesting that cholesterol-lowering jab 'shows promise' for heart disease**. *NHS Choices*.
AIM: to review several media reports of pre-clinical studies for a vaccine to lower cholesterol that was published in the European Heart Journal
METHODS: This NHS Choices report looked at where the story came from, what the research involved and what the results were
RESULTS: The research showed that the AT04A vaccine was able to induce a successful and long-lasting immune response. The results look promising, and the vaccine will now be investigated in a phase 1 trial, however research is still in very early stages and this vaccine will not be coming onto the market soon as some of the media coverage implied.
View full text

Gheewala, P., Peterson, G. & Zaidi, T. 2017. **Effectiveness of targeted screening for early detection of chronic kidney disease in the community setting: a systematic review**. *PROSPERO*. Protocol for a systematic review.
AIM: to examine whether targeted screening effectively identifies undiagnosed patients with early stages of chronic kidney disease in the community-setting; and to identify what study characteristics and screening tests should be used to ensure feasibility of a targeted screening program for chronic kidney disease.
METHODS: First, an electronic search of four databases: EMBASE, PubMed, Cochrane Central Register of Controlled Trials (CENTRAL) and Scopus will be conducted. Three layers of search terms (chronic kidney disease, screening and community) will be developed using the thesaurus (Emtree and Medical Subject Headings [MeSH] of EMBASE and PubMed, respectively). Wherever possible, the terms will be exploded to broaden the search or searched as a keyword in titles and abstracts of articles. Text word searching will also be conducted in order to identify any articles that may not have been indexed appropriately. For the second search strategy, reference lists of included studies or relevant reviews identified through the electronic search will be further scanned to identify any potential articles. Articles in language other than English will not be included in this review due to the lack of resources for translation services. Inclusion criteria: Adults (18 years or above) with one or more of the following medical history: diabetes, hypertension, CVD and family history of kidney disease. Exclusion criteria: Adolescents

(under 18 years of age). Outcomes: 1. Percentage of participants with positive screening test results 2. Participant referral rate 3. Percentage of participants consequently diagnosed with CKD 4. Screening tests used to detect evidence of CKD including: predictive algorithm, risk assessment tool, estimated glomerular filtration rate (eGFR), serum creatinine (SCr), proteinuria, albuminuria, albumin creatinine ratio (ACR), haematuria or blood pressure measurement.
View details

Hartley, J. & Kaltenthaler, E. 2017. **Do community-based hypertension interventions reduce the prevalence of hypertension in low- and middle-income countries?** *PROSPERO*. Protocol for a systematic review.
AIM: to systematically review the literature on the effectiveness of community-based hypertension interventions in low- and middle-income countries (LMICs).
METHODS: to best identify all relevant studies, there will be a comprehensive search of all relevant electronic databases including: The Cochrane Central Register of Controlled Trials (CENTRAL), The WHO International Clinical Trials Registry Platform (ICTRP), MEDLINE via OvidSP, EMBASE, CINAHL and Web of Science. Reference and citation lists of included studies and reviews or meta-analyses identified by the search will be checked for additional papers. Due to available resources, papers will be limited to those in English language. There will be no restriction on date of publication. Studies that recruited adults or children with or without a diagnosis of hypertension will be included. Studies that include individuals with behavioural risk factors for CVD (obesity, smoking, physical inactivity etc.) will be included. Studies of participants with a diagnosed health condition other than hypertension or CVD (diabetes mellitus, HIV/AIDS, respiratory conditions etc.) will not be included as the intervention may be more focused towards the diagnosed health condition than hypertension.
View details

Krzysztof, S. s., Tomasz, T., Janusz, K., et al. 2017. **Effect of using cardiovascular risk scoring in routine risk assessment in primary prevention of cardiovascular disease: protocol for an overview of systematic reviews**. *BMJ open* 7(3) 014206.
AIM: to assess the effect of using cardiovascular risk scoring in routine risk assessment in primary prevention of CVD compared with standard care.
METHODS: An overview of existing systematic reviews (SRs). We will include SRs and meta-analyses which take into account RCTs and quasi-RCTs investigating the effect of using cardiovascular risk scoring in routine risk assessment in primary prevention of CVD. SRs will be retrieved from 4 bibliographical databases and reference lists of identified reviews. Additionally, the PROSPERO database will be searched for unpublished, ongoing or recently completed SRs. 2 reviewers will assess the SRs independently for eligibility and bias. The data will be extracted to a special form. Any disagreement will be resolved by discussion. In case of lack of consensus, a third author will arbitrate. The overview of SRs will be reported according to the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement
RESULTS: We will submit the results of our study for peer-review publication in a journal indexed in the international bibliographic database of biomedical information
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