



Public Health
England

Protecting and improving the nation's health

NHS Health Check programme: Annotated Bibliography: October 17th 2016 to January 31st 2017

About Public Health England

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

Public Health England
133-155 Waterloo Road
Wellington House
London SE1 8UG
Tel: 020 7654 8000
www.gov.uk/phe
Twitter: @PHE_uk
Facebook: www.facebook.com/PublicHealthEngland

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Contents

About Public Health England	2
Contents	3
Acknowledgements	3
A review of NHS Health Check literature	4
References on the NHS Health Check Programme	10
References relating to general health checks	14
References relating to diabetes/CVD screening or prevention	19

Acknowledgements

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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 October 17th 2016. This search identifies references **from October 17th 2016 to January 31st 2017**. The cut-off date for internet searches was **January 31st 2017**.

Table 1. Search strategies

Database	Search strategy
Ovid Medline	<ol style="list-style-type: none"> 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=20161017-20170131
PubMed	<ol style="list-style-type: none"> 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 2016/10/17 to 2017/01/31

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=20161017-20170131

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="2016-2017"

EBSCO CINAHL S10 S1 OR S2 OR S9 Limiters - Published Date: 20161017-20170131
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: 2016-2017
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 2016-2017]

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 NNSHC #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 2016 to 2017
NHS Evidence	<i>"health check"</i> OR <i>cardiovascular prevention primary care</i> Limited to 17/10/2016 to 31/01/2017
TRIP database	<i>"health check"</i> OR <i>cardiovascular prevention primary care</i> Since 2016
Google Scholar	<i>"nhs health check"</i> <i>cardiovascular "health check"</i> <i>cardiovascular prevention "primary care"</i> <i>nhs health check program</i> Since 2016, sorted by relevance.
Google	<i>"nhs health check"</i> <i>cardiovascular prevention "primary care"</i> <i>cardiovascular "health check"</i> <i>nhs health check program</i> Limited to past year, sorted by relevance
Clinical trials.gov and ISRCTN registry	<i>"health check"</i> , limited to 10/17/2016 to 01/31/2017

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 Service or [OpenAthens](#).

3. Results

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

Table 2. Citations published/entered between October 17th 2016 and 31st January 2017

Database	No. of hits	Exclusive
Medline (Oct 17 th – 31 st Jan 2017)	466	381
PubMed (Oct 17 th – 31 st Jan 2017)	464	452
Embase (Oct 17 th – 31 st Jan 2017)	933	766
HMIC (up to Nov 2016)	15	13
CINAHL (Oct 17 th – 31 st Jan 2017)	78	56
Global Health (2016-2017)	6	4
PsycInfo (2016-2017)	331	297
Cochrane Library (Issue 1/12, Jan 2017)	19	18
NICE Evidence search (17/10/2016 to 31/01/2017)	500	490
TRIP database (since 2016)	135	13
TOTAL		2490

Table 2a. Citations added to internet sources between Oct 17th 2016 and 31st Jan 2017

Internet sources	No. of hits
Google Scholar (31 st Jan 2017)	416
Google (31 st Jan 2017)	400
Trials registers (31 st Jan 2017)	8
TOTAL	824

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

From these 3314 results, 12 were identified as being relevant to the NHS Health Check programme, 17 to general health checks and 48 to diabetes/cardiovascular disease risk screening or prevention.

Total relevant references = 77

- **NHS Health Checks = 12**
- **general health checks = 17**
- **diabetes/cardiovascular disease screening or prevention = 48**

4. References on the NHS Health Check Programme (12)

Guidance

Public Health England 2017. **Health matters: combating high blood pressure** [Online]. [Accessed 31st January 2017].

AIM: This professional resource outlines how providers and commissioners can reduce the population average blood pressure through improved prevention, detection and management.

View [full text](#)

Systematic reviews

Lee, J. T., Lawson, K. D., Wan, Y., et al. 2017. **Are cardiovascular disease risk assessment and management programmes cost effective? A systematic review of the evidence.** *Prev Med.* 2017 Jan 10. pii: S0091-7435 (17) 30005-1.

AIM: to conduct a systematic review to evaluate whether the The World Health Organization recommendation that countries implement population-wide cardiovascular disease risk assessment and management programmes is supported by cost-effectiveness evidence

METHODS: Published economic evaluations were identified via electronic medical and social science databases (including Medline, Web of Science, and the NHS Economic Evaluation Database) from inception to March 2016.

RESULTS: Fourteen economic evaluations were included: five studies based on randomised controlled trials, seven studies based on observational studies and two studies using hypothetical modelling synthesizing secondary data. Most observational and hypothetical studies suggested programmes were likely to be cost-effective; however, study designs are subject to bias and subsequent empirical evidence has contradicted key assumptions.

View [abstract](#)

Public Health England 2017. **Emerging evidence on the NHS Health Check: findings and recommendations. A report from the Expert Scientific and Clinical Advisory Panel.** Feb 8th 2017.

AIM: ESCAP recommended undertaking periodic rapid syntheses of published evidence on NHS Health Checks. The aim of this review is to discuss the results from the first of these syntheses undertaken by the University of Cambridge and RAND Europe (see below).

RESULTS: The NHS Health Check is not just reaching the 'worried well', as people from poorer communities and high risk ethnic minority groups are more likely to have had a check. Even so, it seems that people from more affluent communities may be more likely to accept an NHS Health Check invitation, so going forward we need to ensure that tackling inequalities remains at the heart of the programme. The relationship between take-up age and gender may be more nuanced than we might think, with take up decreasing in women with increasing age and vice versa in men.

View [full text](#)

Usher-Smith, J. A, Mant, J. et al. 2017. **NHS Health Check Programme rapid evidence synthesis.** University of Cambridge and RAND Europe. 14th January 2017.

AIM: to perform an independent rapid evidence synthesis of the NHS Health Check programme. The remit defined by Public Health England had a particular focus on attendance, delivery and health outcomes and included six specific questions.

METHODS: a systematic review with descriptive synthesis of quantitative data and thematic synthesis of qualitative data.

RESULTS: Coverage varies substantially across regions and in different settings. It is consistently higher in older people, females and more deprived populations but this may reflect targeting. There is a lack of national level studies reporting the characteristics of those who take-up the invitation to an NHS Health Check. Regional studies report uptake between 27% and 53%, similar to national reported uptake (48.3%). Older people, women in younger age groups and men in older age groups, and those from least deprived areas are more likely to take up invitations. Promising methods to increase uptake are modifications to the invitation (3-4% increase), and text message invites or reminders (up to 9% increase). People do not take up the offer of an NHS Health Check due to lack of awareness or knowledge, competing priorities, misunderstanding the purpose, an aversion to preventive medicine, difficulty getting an appointment with a GP, and concerns about privacy and confidentiality of

pharmacies. Amongst attendees there are high levels of satisfaction (over 80%). There are wide variations in the process, delivery and content of NHS Health Checks across the country, in part due to different local implementation. NHS Health Checks are associated with small increases in disease detection. There is very little data on behaviour change or referrals to lifestyle services. NHS Health Checks are associated with a 3-4% increase in prescribing of statins.

View [full text](#)

Trials

McDermott, L., Wright, A. J. & Cornelius, V. 2017. **Enhanced invitation methods and uptake of health checks in primary care. Rapid randomised controlled trial using electronic health records** *Health Technology Assessment* 20 (84).

AIM: to evaluate the effectiveness of an enhanced invitation method using the Question-Behaviour Effect (QBE), with or without the offer of a financial incentive to return the QBE questionnaire, at increasing the uptake of health checks. Secondary objectives were to evaluate reasons for low uptake of invitations and to compare case-mix for invited and opportunistic health checks.

METHOD: Three-arm randomised trial. All participants invited for health checks from 18 general practices.

Individual participants were randomised. Interventions: i) standard health check invitation only, ii) QBE questionnaire followed by standard invitation; iii) QBE questionnaire with offer of a financial incentive to return the questionnaire, followed by standard invitation. Outcomes: The primary outcome was completion of health check within six months of randomisation.

RESULTS: There were 12,459 participants allocated and health check uptake was evaluated for 12,052 participants for whom outcome data were collected. Health check uptake was: standard invitation, 590 / 4,095 (14.4%); QBE questionnaire, 630 / 3,988 (15.8%); QBE questionnaire and financial incentive, 629 / 3,969 (15.9%). The increase in uptake associated with QBE questionnaire was 1.43% (95% confidence interval -0.12 to 2.97%, P=0.070) and for the QBE questionnaire and offer of financial incentive was 1.52% (-0.03 to 3.07%, P=0.054). The difference in uptake associated with the offer of an incentive to return the QBE questionnaire was -0.01% (-1.59 to 1.58%, P=0.995). During the study, 58% of health check cardiovascular risk assessments did not follow a trial invitation. People who received 'opportunistic' health checks had greater odds of ≥10% cardiovascular disease (CVD) risk; adjusted odds ratio 1.70, 95% confidence interval 1.45 to 1.99, P<0.001) compared with invited health checks.

View [full text](#)

Cohort studies

Robson, J., Dostal, I., Madurasinghe, V., et al. 2017. **NHS Health Check comorbidity and management: an observational matched study in primary care.** *Br J Gen Pract* 67(655) e86-e93.

AIM: to describe the coverage and impact of this programme on cardiovascular risk management and identification of new comorbidities.

METHOD: A matched analysis compared comorbidity in NHS Health Check attendees and non-attendees.

RESULTS: A total of 252 259 adults aged 40-74 years were eligible for an NHS Health Check and, of these, 85 122 attended in 5 years. Attendance increased from 7.3% (10 900/149 867) in 2009 to 17.0% (18 459/108 525) in 2013 to 2014, representing increasing coverage from 36.4% to 85.0%. Attendance was higher in the more deprived quintiles and among South Asians. Statins were prescribed to 11.5% of attendees and 8.2% of non-attendees. In a matched analysis, newly-diagnosed comorbidity was more likely in attendees than non-attendees, with odds ratios for new diabetes 1.30 (95% confidence interval [CI] = 1.21 to 1.39), hypertension 1.50 (95% CI = 1.43 to 1.57), and chronic kidney disease 1.83 (95% CI = 1.52 to 2.21).

View [abstract](#)

Coghill, N., Garside, L. & Chappell, A. 2016. **A Quantitative Quasi-experimental Approach to the Evaluation of a Telephone Outreach Service to Enhance Uptake of NHS Health Checks: a Service Evaluation.** University of Bath.

AIM: to evaluate the effectiveness of the telephone outreach service versus the standard invitation approach on uptake of NHS Health Checks in GP practices located in the lowest lower super output areas (LSOAs) in the city of Bristol

METHOD: We used a quantitative, quasi-experimental approach, to examine the relationship between attendance, or not for an NHS Health Check and age, gender, Index of Multiple Deprivation (IMD) score and ethnicity. We compared and contrasted the types of patients who attended for an NHS Health Check as a result of the telephone outreach initiative, with those who attended for an NHS Health Check as a result of the more traditional letter invite. We also compared and contrasted attendance for an NHS Health Check during the

intervention period, with a similar period, prior to the intervention.

RESULTS: the telephone outreach service was more successful at attracting ethnic minority patients to complete their NHS Health Check (26%) compared to non-telephone outreach practices (7%). All practices completed more NHS Health Checks on patients from IMD quartiles 3-4 (most deprived) compared to 1-2 (least deprived).

Telephone outreach practices were more likely to complete an NHS Health Check on more deprived patients compared to non-telephone practices, women rather than men were most likely to attend, and older rather than younger patients were most likely to attend.

View [full text](#)

Cross-sectional studies

Lang, S. J., Abel, G. A., Mant, J., et al. 2016. **Impact of socioeconomic deprivation on screening for cardiovascular disease risk in a primary prevention population: a cross-sectional study.** *BMJ Open* 6(3) e009984.

AIM: to investigate the association between socioeconomic deprivation and completeness of cardiovascular disease (CVD) risk factor recording in primary care, uptake of screening in people with incomplete risk factor recording and with actual CVD risk within the screened subgroup.

METHOD: Cross-sectional study. Nine UK general practices. 7987 people aged 50-74 years with no CVD diagnosis. CVD risk was estimated using the Framingham equation from data extracted from primary care electronic health records. Where there was insufficient information to calculate risk, patients were invited to attend a screening assessment.

RESULTS: People who had lower Indices of Multiple Deprivation (IMD) scores (less deprived) had significantly worse routine CVD risk factor recording (adjusted OR 0.97 (0.95 to 1.00) per IMD decile; $p=0.042$). Screening attendance was poorer in those with more deprivation (adjusted OR 0.89 (0.86 to 0.91) per IMD decile; $p<0.001$). Among those who attended screening, the most deprived were more likely to have CVD risk $>20\%$ (OR 1.09 (1.03 to 1.15) per IMD decile; $p=0.004$).

View [full text](#)

Economic evaluation

Hinde, S., Bojke, L. & Richardson, G. 2016. **Have the NHS health checks been unfairly maligned?** *Value in Health* 19 (7) A613.

AIM: This study is the first to use observed data on the effectiveness of the Checks to consider whether they represent a cost-effective use of limited NHS resources.

METHOD: Using a publicly available evaluation tool (EConDA) we conducted an analysis of the Checks. The tool evaluates the long term cost and health related outcomes of an obese cohort of patients. The primary focus of the analysis was to establish if the impact of the checks on BMI was sufficient to justify their cost to the UK NHS. A difference in difference analysis was used to achieve this.

RESULTS: The results show that the Checks are associated with a reduction in mean BMI of 0.27 (95% CI 0.20 to 0.34), compared to no check. When applied to the EConDA tool, a small but positive QALY gain of 0.05 per participant was observed, coupled with a reduction in disease related costs to the NHS of 170. When the estimated cost per Check (179) is taken into account we estimate an incremental cost-effectiveness ratio of 900/QALY.

View [abstract](#)

Ongoing research

National Institutes of Health Research 2017. **Health Technology Assessment (HTA) Programme: Modelling the Potential for Health Gain and Cost Effectiveness of the NHS Health Check Programme.**

AIM: This commissioned call, under the NIHR Health Technology Assessment Programme, seeks proposals for a study to determine the potential for health gain and cost effectiveness of the NHS Health Check programme. Full proposals should be submitted by the deadline of 6 April 2017.

View [details](#)

Bunten, A. 2016. **A systematic literature review of effective interventions to increase uptake of NHS Health Checks in hard to reach groups including men.** *PROSPERO*.

AIM: To identify the most effective invitation method to optimise attendance at NHS Health Checks in hard to reach groups including men. A narrative synthesis is planned. This is a PhD, due for publication later this year.

View [details](#)

Mitchell, J., Hardeman, W., Pears, S., et al. 2016. **Effectiveness and cost-effectiveness of a very brief physical activity intervention delivered in NHS Health Checks (VBI Trial): study protocol for a randomised controlled trial.** *Trials* 17(1) 303.

AIM: This trial will test the effectiveness and cost-effectiveness of a very brief physical activity intervention when delivered as part of preventative health checks in primary care (National Health Service (NHS) Health Check).

METHOD: The Very Brief Intervention (VBI) Trial is a two parallel-group, randomised, controlled trial with 1:1 individual allocation and follow-up at 3 months. A total of 1,140 participants will be recruited from 23 primary care practices in the east of England. Participants eligible for an NHS Health Check and who are considered suitable to take part by their doctor and able to provide written informed consent are eligible for the trial.

Participants are randomly assigned at the beginning of the NHS Health Check to either 1) the control arm, in which they receive only the NHS Health Check, or 2) the intervention arm, in which they receive the NHS Health Check plus 'Step It Up' (a very brief intervention that can be delivered in 5 minutes by nurses and/or healthcare assistants at the end of the Health Check). 'Step It Up' includes (1) a face-to-face discussion, including feedback on current activity level, recommendations for physical activity, and information on how to use a pedometer, set step goals, and monitor progress; (2) written material supporting the discussion and tips and links to further resources to help increase physical activity; and (3) a pedometer to wear and a step chart for monitoring progress. The primary outcome is accelerometer counts per minute at 3-month follow-up. Secondary outcomes include the time spent in the different levels of physical activity, self-reported physical activity and economic measures.

View [details](#)

References relating to general health checks (17)

Meta-analysis

Ware, R. S. & Lennox, N. G. 2016. **Characteristics influencing attendance at a primary care health check for people with intellectual disability: An individual participant data meta-analysis.** *Research in Developmental Disabilities* 55 235-241.

AIM: to assess the characteristics of people with intellectual disability who, when offered a health check with their primary care physician at no cost, completed the health check.

METHOD: Data from three randomised controlled trials considering health checks in people with intellectual disability living in the community were included in an individual-patient data meta-analysis. The studies used the same health check and the participant characteristics investigated (age, sex, cause of disability, level of disability and socio-economic position) were defined identically, but participants were sourced from different settings: adults living in 24-h supported accommodation, adults living in private dwellings, and school-attending adolescents.

RESULTS: In total 715 participants were offered health checks. Compared to participants with Down syndrome, participants with other known causes of disability were more likely not to attend their health check (odds ratio;95%CI) = (2.5;1.4-4.7), as were participants with no known cause of disability (2.3;1.2-4.3). These associations remained significant after adjusting for potentially confounding variables.

View [abstract](#)

Trials

Lau, C. J., Pisinger, C., Husemoen, L. L. N., et al. 2016. **Effect of general health screening and lifestyle counselling on incidence of diabetes in general population: Inter99 randomised trial.** *Preventive Medicine* 91 172-179.

AIM: to examine the effect of a large population-based multifactorial screening and lifestyle intervention programme on 10-year incidence of diabetes.

METHOD: In a randomised trial of the general Danish population initiated in 1999-2001 59,616 men and women aged 30-60 years were assigned to a five year screening and lifestyle counselling programme (n=11,629) or control group (n=47,987) and followed for ten years in nationwide registers. Intention to treat was applied and risk of diabetes was modeled by Cox regression and expressed as hazard ratios (HRs).

RESULTS: 1692 individuals had diabetes at baseline. Among 57,924 individuals without diabetes at baseline, 1267 emigrated, 2593 died and 3369 (Intervention group=684, Control group=2685) developed diabetes. No significant difference in diabetes incidence between the groups after 10-year follow-up (Grey's test: p=0.22). In the first year of follow-up, incidence of diabetes was significantly higher in the intervention group than the control group (HR=1.68, 95%CI 1.29 to 2.29). We observed no difference in incidence of diabetes between the groups in the follow-up intervals from 1 to 6years or after 6-10years (HR=0.94, 0.83 to 1.06; HR=1.03, 0.91 to 1.17). Inviting the general population to participate in a repeated screening and lifestyle counselling programme over five years did not result in lower incidence of diabetes after 10years of follow-up.

View [abstract](#)

Skaaby, T., Jorgensen, T. & Linneberg, A. 2016. **Effects of invitation to participate in health surveys on the incidence of cardiovascular disease: a randomized general population study.** *Int J Epidemiol.* dyw311. 21 December 2016.

AIM: to study the effect of repeated general health checks on the 30-year incidence of ischaemic heart disease (IHD), stroke and all-cause mortality

METHOD: a cohort randomly selected from a general population was used in this randomized trial. The study included all persons (n = 17 845) aged 30, 40, 50 and 60 years living in 11 municipalities in Copenhagen, the capital of Denmark. An age- and gender-stratified random sample (n = 4789) was invited to up to three health checks, from 1982 to 1994 (intervention group). The remaining 12 994 persons were defined as the control group.

RESULTS: There were 3209 and 2190 incident cases of IHD and stroke, respectively, and a total of 6432 deaths during follow-up (mean = 25.2 years). The hazard ratios (HRs) (95% confidence intervals, CIs) for persons in the intervention group versus persons in the control group were as follows: IHD (HR: 0.99, 95% CI: 0.92, 1.07), stroke

(HR: 1.14, 95% CI: 1.04, 1.25) and all-cause mortality (HR: 1.03, 95% CI: 0.98, 1.09).

View [abstract](#)

Topic overview

Yamagishi, K. & Iso, H. 2017. **The criteria of metabolic syndrome and national health checkup and education system in Japan**. *Epidemiol Health*. e2017003. 6th January 2017.

AIM: to review topics on metabolic syndrome including (1) Japanese criteria of metabolic syndrome; (2) metabolic syndrome and universal health screening and education system; and (3) recent debates on problems of Japanese metabolic syndrome criteria

METHOD: review (*no details of methods*)

RESULTS: Japanese criteria of metabolic syndrome have several differences with international criteria, including waist circumference as an essential component and unique waist circumference cutpoints. Universal metabolic syndrome screening and education system were launched from 2008, but the epidemiological evidence was not sufficient at the start of metabolic syndrome measures. Third, revision of metabolic syndrome screening system is now under consideration, but is unlikely to be changed drastically. Fourth, considering the measures of metabolic syndrome in Asia, we should note that the etiology of arteriosclerosis differs between Asians and Westerners.

View [full text](#)

Cohort studies

Bjerregaard, A. L., Maindal, H. T., Bruun, N. H., et al. 2017. **Patterns of attendance to health checks in a municipality setting: the Danish 'Check Your Health Preventive Program'**. *Prev Med Rep* 5 175-182.

AIM: to investigate the determinants of attendance to a preventive health check program and to explore the homogeneity of the attenders.

METHOD: 4853 eligible persons living in the municipality of Randers, Denmark, from 2012 to 2013, aged 30–49 years, received an invitation to attend the 'Check Your Health Preventive Program'. Data was obtained from the Danish National Registers. Socio-demographic factors, use of preventive services, morbidity were examined as determinants of attendance by Poisson regression analyses.

RESULTS: In total, 55% of the invited population attended (49% men). Attenders were more likely to be: of higher age; immigrants; cohabiting; have: higher socio-economic status; higher use of preventive services and lower morbidity. Decision tree analysis revealed six groups, with the most important variable being income: 1) low income, low education (A = attendance rate: 38%; P = population size: 11%); 2) low income, education higher than 10 years, living alone (A: 41%; P: 5%); 3) low income, education higher than 10 years, cohabiting (A: 56%; P: 16%); 4) middle income (A: 60%; P: 34%); 5) high income, living alone (A: 56%; P: 4%); 6) high income, cohabiting (A: 69%; P: 30%).

View [full text](#)

Carey, I. M., Hosking, F. J., Harris, T., et al. 2017. **Do health checks for adults with intellectual disability reduce emergency hospital admissions? Evaluation of a natural experiment**. *J Epidemiol Community Health* 71(1) 52-58.

AIM: to determine what impact the annual health checks for adults with intellectual disability have had on important health outcomes such as emergency hospitalisation.

METHOD: An evaluation of a 'natural experiment', incorporating practice and individual-level designs, to assess the effectiveness of health checks for adults with ID in reducing emergency hospital admissions using a large English primary care database. For practices, changes in admission rates for adults with ID between 2009-2010 and 2011-2012 were compared in 126 fully participating versus 68 non-participating practices. For individuals, changes in admission rates before and after the first health check for 7487 adults with ID were compared with 46 408 age-sex-practice matched controls.

RESULTS: Practices with high health check participation showed no change in emergency admission rate among patients with ID over time compared with non-participating practices (IRR=0.97, 95% CI 0.78 to 1.19), but emergency admissions for ACSCs did fall (IRR=0.74, 0.58 to 0.95). Among individuals with ID, health checks had no effect on overall emergency admissions compared with controls (IRR=0.96, 0.87 to 1.07), although there was a relative reduction in emergency admissions for ACSCs (IRR=0.82, 0.69 to 0.99). Elective admissions showed no change with health checks in either analysis.

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* (8 January 2017).

AIM: to clarify the association between the personal utilization of general health checkups (GHCs) and medical expenditures (MEs) in a middle-aged Japanese population.

METHOD: 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 [abstract](#)

Schüle, S., Taylor, K. J., Schriefer, D., et al. 2017. **Participation in preventive health check-ups among 19,351 women in Germany.** *Preventive Medicine Reports* (26 January).

AIM: to investigate participation in preventive health check-ups among 19,351 women aged 35 to 74 in Germany in 2004.

METHOD: Logistic regression was performed to examine associations between participation and age, marital status, education, socio-economic status (SES) and region of residence.

RESULTS: In total, 53.4% of women attended at least every two years, 23.4% attended irregularly and 23.2% never attended. In adjusted models, single, divorced, separated or widowed women were less likely to have a preventive health check-up at least every two years compared to married women (OR 0.63, 95% CI 0.57–0.71), while women in eastern Germany were less likely to participate (OR 0.80, 95% CI 0.75–0.86) than women in western Germany. Education showed no association with having a preventive health check-up at least every two years; however, women with low SES were less likely to participate compared to those with high SES (OR 0.82, 95% CI 0.74–0.92). About half of eligible women reported participating in health check-ups at least every two years, with participation varying according to socio-demographic characteristics. Women who are less likely to participate may benefit from receiving invitation letters within the framework of an organised programme.

View [abstract](#)

Oikawa, J., Nakamura, K., Ukawa, S., et al. 2016. **Influence of different methods for measuring HbA1c on health checkups in a rural town in Hokkaido, Japan.** *Diabetology International* 7(4) 391–397.

AIM: to investigate the effect on health checkups of the methods used to measure hemoglobin A1c (HbA1c).

METHODS: The study included 337 participants undergoing health checkups at two facilities. At facility 1, HbA1c was measured by high-performance liquid chromatography (HPLC) in 2012 and by immunoassay (IA) in 2013, while at facility 2, HbA1c was measured by HPLC in both years.

RESULTS: At facility 1, the mean HbA1c was significantly decreased from 2012 to 2013 (5.83 vs 5.50 %, respectively; $P < 0.001$), although the mean fasting plasma glucose (FPG) was significantly increased from 2012 to 2013 (91.7 vs 95.2 mg/dL, respectively; $P = 0.02$). Of the 202 participants at facility 1, 97 who had an HbA1c of $>5.6\%$ in 2012 had an HbA1c of $<5.6\%$ in 2013. At facility 2, the mean HbA1c marginally increased, while there were similar FPG levels in both years. An additional study of single blood samples from 27 healthy participants who were tested at the same facility using both HPLC and IA found that the mean HbA1c was significantly lower for IA than for HPLC (5.19 vs 5.50 %, respectively; $P < 0.001$).

View [abstract](#)

Piha, K., Sumanen, H., Lahelma, E., et al. 2016. **Socioeconomic differences in health check-ups and medically certified sickness absence: a 10-year follow-up among middle-aged municipal employees in Finland.** *J Epidemiol Community Health*. 0: 1–6. Dec 2nd 2016.

AIM: to analyse if attendance to health check-ups are socioeconomically patterned and affect sickness absence over a 10-year follow-up.

METHOD: 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.

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 [full text](#)

Cross-sectional studies

Alhossan, A., Kennedy, A. & Leal, S. 2016. **Outcomes of annual wellness visits provided by pharmacists in an accountable care organization associated with a federally qualified health center.** *American Journal of Health-System Pharmacy* 73(4) 225-8.

AIM: to evaluate the clinical and financial outcomes of annual wellness visits (AWVs) conducted by clinical pharmacists working as part of an accountable care organization (ACO) in a federally qualified health center

METHOD: In this retrospective, single-center, chart review study, patients seen for AWVs at El Rio Health Center between October and December 2013 were eligible for study inclusion. Data collected from patient charts included patient demographics, preventive screenings ordered by clinical pharmacists during the AWV and completed within one month after the visit, other screenings completed by clinical pharmacists during the visit, medication changes by clinical pharmacists, and revenues collected from the AWV and preventive screenings.

RESULTS: Three hundred patient records were reviewed. Clinical pharmacists completed 1608 interventions, with a mean of 5.4 interventions per patient. A total of 272 referrals were made, 120 (45%) of which were completed within one month of the visit. Of the 183 laboratory tests ordered for diabetes and lipid screening, 152 (83%) were completed within one month of the AWV ($p < 0.001$). Of the 370 vaccinations offered during the visits, 182 (49%) were administered ($p < 0.001$). Twenty-four medication and dosage changes were made by clinical pharmacists during AWVs, and the total revenue for the AWVs conducted by pharmacists and services completed during the visits exceeded \$22,000.

View [abstract](#)

Brown, M., Jacobstein, D., Yoon, I. S., et al. 2016. **Systemwide initiative documents robust health screening for adults with intellectual disability.** *Intellectual and Developmental Disabilities* 54(5) 354-365.

AIM: to determine if the implementation of a health screening tool can substantially increase disease detection and clinical activities directed towards improved health outcomes for people with ID.

METHOD: data collected from the District of Columbia Developmental Disabilities Administration's (DC DDA's) health screening component of its Health and Wellness Standards was examined

RESULTS: Findings are presented, along with recommendations and implications for improving preventive health screening practices in the ID population (*no further details are given in the abstract*)

View [abstract](#)

Ito, M. & Matsushima, E. 2016. **Presentation of coping strategies associated with physical and mental health during health check-ups.** *Community Mental Health Journal* No Pagination Specified.

AIM: to identify coping behaviors during regular health check-ups and examine whether they were related to physical and mental health

METHOD: coping strategies were assessed with the Brief COPE scale in 201 people who underwent a regular health check-up in a clinic.

RESULTS: several significant relationships between coping and physical/psychological conditions presented in health check-up were found: 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 [abstract](#)

Qualitative

Bressington, D., Mui, J., Wells, H., et al. 2016. **Refocusing on physical health: Community psychiatric nurses' perceptions of using enhanced health checks for people with severe mental illness.** *International Journal of Mental Health Nursing* 25(3) 214-224.

AIM: to explore Hong Kong community psychiatric nurses' (CPN) perceptions of using comprehensive physical health checks for service users diagnosed with severe mental illness (SMI).

METHOD: Qualitative, descriptive study. Research interviews were conducted with a purposive sample of 11 CPN in order to explore their perceptions about the use of the Health Improvement Profile (HIP) over a 1-year period. Interview data were analysed using inductive thematic analysis.

RESULTS: the majority of CPN appreciated the comprehensive focus on the physical health of their clients and reported positive changes in their clinical practice. Many of them observed an increase in the motivation of their clients to improve their physical health, and also noted observable benefits in service users' well-being. The use of the HIP also helped the CPN identify implementation barriers, and highlighted areas of the tool that required modifications to suit the local cultural and clinical context.

View [abstract](#)

Durbin, J., Selick, A., Casson, I., et al. 2016. **Evaluating the Implementation of Health Checks for Adults With Intellectual and Developmental Disabilities in Primary Care: The Importance of Organizational Context.** *Intellectual & Developmental Disabilities* 54(2) 136-50.

AIM: to evaluate the implementation of the health check at two primary-care clinics in Ontario, Canada, and the influence of the clinic context on implementation decisions.

METHOD: Qualitative study.

RESULTS: Each clinic implemented the same core components; however, due to contextual differences, some components were operationalized differently. Adapting to the setting context is important to ensuring successful and sustainable implementation.

View [abstract](#)

Jones, M., Kruger, M. & Walsh, S. M. 2016. **Preparing non-government organization workers to conduct health checks for people with serious mental illness in regional Australia.** *Journal of Psychiatric and Mental Health Nursing* 23(5) 247-254.

AIM: to explore the regional non-government organization (NGO) workforce views of using a physical health care check list-the health improvement profile (HIP)-with people with a SMI.

METHOD: A focus group using a semi-structured interview was conducted with seven NGO employees who had been trained to use the HIP and subsequently used the HIP in their everyday work with patients. A mental health nurse (MHN) and a Psychology graduate conducted the focus group.

RESULTS: Using thematic analysis, the focus group discussion generated four main themes: taking control; accessing services; guiding my conversation; and working with others. The overall meta-theme was that lay workers can work effectively to address physical health problems in SMI patients.

View [abstract](#)

Modelling studies

Hatakeyama, Y., Miyano, I., Kataoka, H., et al. 2015. **Use of a Latent Topic Model for Characteristic Extraction from Health Checkup Questionnaire Data.** *Methods of Information in Medicine* 54(6) 515-21.

AIM: to develop a model capable of extracting appropriate topics from subjective data in questionnaires conducted during health checkups.

METHODS: a latent topic model to group the lifestyle habits of the study participants and represented their responses to items on health checkup questionnaires as a probability model. For the probability model, we used latent Dirichlet allocation to extract 30 topics from the questionnaires. According to the model parameters, a total of 4381 study participants were then divided into groups based on these topics. Results from laboratory tests, including blood glucose level, triglycerides, and estimated glomerular filtration rate, were compared between each group, and these results were then compared with those obtained by hierarchical clustering.

RESULTS: If a significant ($p < 0.05$) difference was observed in any of the laboratory measurements between groups, it was considered to indicate a questionnaire response pattern corresponding to the value of the test result. A comparison between the latent topic model and hierarchical clustering grouping revealed that, in the latent topic model method, a small group of participants who reported having subjective signs of urinary disorder were allocated to a single group.

View [full text](#)

References relating to diabetes and cardiovascular disease risk screening or prevention (48)

Guidance

NHS Right Care 2016. **The cardiovascular disease (CVD) prevention pathway**. [Online]. [Accessed 31st Jan 2017].
AIM: to provide local health economies with: a high-level overarching national case for change; a best practice pathway for individual conditions; and best practice case studies for elements of the pathway demonstrating what to change, how to change and a scale of improvement
METHOD: The cardiovascular disease (CVD) prevention pathway is the first in a series of optimal value pathways on a number of conditions. These evidence-based pathways are being developed in close collaboration with NHS England's National Clinical Directors, Public Health England, Royal Colleges, NICE and other non-statutory stakeholders including patient groups.
RESULTS: production of a Risk Detection and Management in Primary Care pathway
View [pathway](#)

Systematic reviews

Barry, E., Roberts, S., Oke, J., et al. 2017. **Efficacy and effectiveness of screen and treat policies in prevention of type 2 diabetes: systematic review and meta-analysis of screening tests and interventions**. *BMJ* 356. i6538.

AIM: to assess diagnostic accuracy of screening tests for pre-diabetes and efficacy of interventions (lifestyle or metformin) in preventing onset of type 2 diabetes in people with pre-diabetes.

METHOD: Systematic review and meta-analysis. Medline, PreMedline, Embase and Google Scholar searched. Two meta-analyses were performed, one summarising accuracy of screening tests (with the oral glucose tolerance test as the standard) for identification of pre-diabetes, and the other assessing relative risk of progression to type 2 diabetes after either lifestyle intervention or treatment with metformin.

RESULTS: 2874 titles were scanned and 148 papers (covering 138 studies) reviewed in full. The final analysis included 49 studies of screening tests (five of which were prevalence studies) and 50 intervention trials. HbA1c had a mean sensitivity of 0.49 (95% confidence interval 0.40 to 0.58) and specificity of 0.79 (0.73 to 0.84), for identification of pre-diabetes, though different studies used different cut-off values. Fasting plasma glucose had a mean sensitivity of 0.25 (0.19 to 0.32) and specificity of 0.94 (0.92 to 0.96). Different measures of glycaemic abnormality identified different subpopulations (for example, 47% of people with abnormal HbA1c had no other glycaemic abnormality). Lifestyle interventions were associated with a 36% (28% to 43%) reduction in relative risk of type 2 diabetes over six months to six years, attenuating to 20% (8% to 31%) at follow-up in the period after the trials.

View [full text](#)

Cheong, A., Liew, S., Khoo, E., et al. 2017. **Are interventions to increase the uptake of screening for cardiovascular disease risk factors effective? A systematic review and meta-analysis**. *BMC Family Practice* 18(1) 4.

AIM: to determine the effectiveness of existing intervention strategies to increase uptake of CVD risk factors screening.

METHODS: A systematic search was conducted through Pubmed, CINAHL, EMBASE and Cochrane Central Register of Controlled Trials. Additional articles were located through cross-checking of the references list and bibliography citations of the included studies and previous review papers. Intervention studies with controlled or baseline comparison groups that were conducted in primary care practices or the community, targeted at adult populations were included. The interventions were targeted either at individuals, communities, health care professionals or the health-care system. The main outcome of interest was the relative risk (RR) of screening uptake rates due to the intervention.

RESULTS: 21 studies included in the meta-analysis. The risk of bias for randomization was low to medium in the randomized controlled trials, except for one, and high in the non-randomized trials. Two analyses were performed; optimistic (using the highest effect sizes) and pessimistic (using the lowest effect sizes). Overall,

interventions were shown to increase the uptake of screening for CVD risk factors (RR 1.443; 95% CI 1.264 to 1.648 for pessimistic analysis and RR 1.680; 95% CI 1.420 to 1.988 for optimistic analysis). Effective interventions that increased screening participation included: use of physician reminders (RR ranged between 1.392; 95% CI 1.192 to 1.625, and 1.471; 95% CI 1.304 to 1.660), use of dedicated personnel (RR ranged between 1.510; 95% CI 1.014 to 2.247, and 2.536; 95% CI 1.297 to 4.960) and provision of financial incentives for screening (RR 1.462; 95% CI 1.068 to 2.000).

[View full text](#)

Einarson, T. R., Bereza, B. G., Acs, A., et al. 2017. **Systematic literature review of the health economic implications of early detection by screening populations at risk for type 2 diabetes.** *Current Medical Research and Opinion* 33(2) 331-358.

AIM: to determine the economic impact of screening for type 2 diabetes (T2DM).

METHOD: A systematic review of health economic analyses of screening programs for T2DM/pre-diabetes. Study eligibility criteria: Published between 2000 and 2015 in any language. Articles must have reported costs of screening, test/patient outcomes and cost-effectiveness. Data were extracted from Scopus/Medline/Embase, then tabulated.

RESULTS: There were 137 studies identified, 108 rejected; 29 were analyzed. Screening types included 18 universal, 8 targeted and 8 opportunistic. One study screened for pre-diabetes, 16 for T2DM and 12 examined both. Fourteen (48%) reported costs of screening only, 9 (31%) costs of screening combined with interventions and 6 (21%) presented all costs separately. Screening was compared to no screening in 13 studies (45%); screening was cost-effective in 8 (62%), not cost-effective in 4 (31%) and neither in 1 (8%). When comparing different screening methods, 6 found targeted screening was cost-effective compared with universal screening (none found the opposite), 2 found opportunistic superior to universal. Sensitivity analyses generally confirmed primary findings. Cost drivers included prevalence of T2DM/pre-diabetes, type of blood test used and uptake of testing.

[View abstract](#)

Hoffmann, T. & Del Mar, C. 2017. **Clinicians' Expectations of the Benefits and Harms of Treatments, Screening, and Tests: A Systematic Review.** *JAMA Internal Medicine.* Jan 9th 2017.

AIM: To systematically review all studies that have quantitatively assessed clinicians' expectations of the benefits and/or harms of any treatment, test, or screening test.

METHOD: A comprehensive search strategy of 4 databases (MEDLINE, EMBASE, Cumulative Index of Nursing and Allied Health Literature, and PsycINFO) from the start years to March 17-20, 2015, with no language or study type restriction, was performed.

RESULTS: Of the 8166 records screened, 48 articles (13 011 clinicians) were eligible. Twenty studies focused on treatment, 20 on medical imaging, and 8 on screening. Of the 48 studies, 30 (67%) assessed only harm expectations, 9 (20%) evaluated only benefit expectations, and 6 (13%) assessed both benefit and harm expectations. Among the studies comparing benefit expectations with a correct answer (total of 28 outcomes), most participants provided correct estimation for only 3 outcomes (11%). Of the studies comparing expectations of harm with a correct answer (total of 69 outcomes), a majority of participants correctly estimated harm for 9 outcomes (13%). Where overestimation or underestimation data were provided, most participants overestimated benefit for 7 (32%) and underestimated benefit for 2 (9%) of the 22 outcomes, and underestimated harm for 20 (34%) and overestimated harm for 3 (5%) of the 58 outcomes

[View abstract](#)

Jacob, V., Thota, A. B., Chattopadhyay, S. K., et al. 2017. **Cost and economic benefit of clinical decision support systems for cardiovascular disease prevention: a community guide systematic review.** *Journal of the American Medical Informatics Association* ocw160.

AIM: to evaluate costs and benefits associated with acquiring, implementing, and operating clinical decision support systems (CDSSs) to prevent cardiovascular disease (CVD).

METHOD: review of CDSS literature covering the period from January 1976 to October 2015. Twenty-one studies were identified for inclusion.

RESULTS: It was difficult to draw a meaningful estimate for the cost of acquiring and operating CDSSs to prevent CVD from the available studies (n = 12) due to considerable heterogeneity. Several studies (n = 11) indicated that health care costs were averted by using CDSSs but many were partial assessments that did not consider all components of health care. Four cost-benefit studies reached conflicting conclusions about the net benefit of CDSSs based on incomplete assessments of costs and benefits. Three cost-utility studies indicated inconsistent conclusions regarding cost-effectiveness based on a conservative \$50,000 threshold.

[View abstract](#)

Hilgsmann, M., Wyers, C. E., Mayer, S., et al. 2016. **A systematic review of economic evaluations of screening programmes for cardiometabolic diseases.** *Eur J Public Health.* Dec 31st 2016.

AIM: to systematically review the economic evaluations of screening programmes for the early detection of persons at risk for CMD.

METHODS: A systematic review was conducted using MEDLINE, Web of Science, NHSEED and the CEA registry to identify relevant articles published between 1 January 2005 and 1 May 2015. Two reviewers independently selected articles, systematically extracted data and critically appraised the study quality.

RESULTS: From the initial 2820 studies identified, 17 were included. Six studies assessed whether screening would be cost-effective, seven aimed to determine the most efficient screening programme and four assessed the cost-effectiveness of existing programmes. There were 11 cost-utility analyses using quality-adjusted life years (QALYs) or disability-adjusted life years. Decision-analytic modelling (e.g. Markov model) was most frequently used (n = 10), followed by simulation models (n = 4), observational (n = 2) and trial-based (n = 1) studies. All studies assessing the cost per QALY gained of screening for cardiovascular diseases and diabetes mellitus (n = 8) were below a threshold of pound30 000, while those assessing chronic kidney diseases (n = 2) were above the threshold. In view of the heterogeneity in study objectives, country setting, screening programmes, comparators, methodology and outcomes, it is not possible to make clear recommendations about the economic value of screening programmes for CMD

[View full text](#)

Weiss, J., Freeman, M. & Low, A. 2017. **Benefits and Harms of Intensive Blood Pressure Treatment in Adults Aged 60 Years or Older: A Systematic Review and Meta-analysis.** *Annals of Internal Medicine.* 17th Jan 2017.

AIM: to systematically review the effects of more versus less intensive BP control in older adults.

METHOD: Multiple databases through January 2015 and MEDLINE to September 2016. 21 randomized, controlled trials comparing BP targets or treatment intensity, and 3 observational studies that assessed harms were selected.

RESULTS: Nine trials provided high-strength evidence that BP control to less than 150/90 mm Hg reduces mortality (relative risk [RR], 0.90 [95% CI, 0.83 to 0.98]), cardiac events (RR, 0.77 [CI, 0.68 to 0.89]), and stroke (RR, 0.74 [CI, 0.65 to 0.84]). Six trials yielded low- to moderate-strength evidence that lower targets (\leq 140/85 mm Hg) are associated with marginally significant decreases in cardiac events (RR, 0.82 [CI, 0.64 to 1.00]) and stroke (RR, 0.79 [CI, 0.59 to 0.99]) and nonsignificantly fewer deaths (RR, 0.86 [CI, 0.69 to 1.06]). Low- to moderate-strength evidence showed that lower BP targets do not increase falls or cognitive impairment.

[View full text](#)

Asthana, S., Moon, G., Gibson, A., et al. 2016. **Inequity in cardiovascular care in the English National Health Service (NHS): a scoping review of the literature.** *Health & Social Care in the Community.* Oct 16th 2016.

AIM: to synthesise and evaluate evidence relating to access to and/or use of English NHS services around (i) different points on the care pathway (i.e. presentation, primary management and specialist management) and (ii) different dimensions of inequality (socioeconomic, age- and gender-related, ethnic or geographical).

METHOD: Restricting our search period from 2004 to 2016, we were concerned to examine whether, compared to earlier research, there has been a change in the focus of research examining inequalities in cardiac care and whether the pro-rich bias reported in the late 1990s and early 2000s still applies today. We conducted a scoping study drawing on Arksey & O'Malley's framework. A total of 174 studies were included in the review and appraised for methodological quality.

RESULTS: Evidence that deprived people are less likely to access and use cardiovascular care is very contradictory. Patterns of use appear to vary by ethnicity; South Asian populations enjoying higher access, black populations lower. By contrast, female gender and older age are consistently associated with inequity in cardiovascular care. The degree of geographical variation in access/use is also striking. Finally, evidence of inequality increases with stage on the care pathway, which may indicate that barriers to access arise from the way in which health professionals are adjudicating health needs rather than a failure to seek help in the first place.

[View abstract](#)

Epstein, D., Garcia-Mochon, L., Kaptoge, S., et al. 2016. **Modeling the costs and long-term health benefits of screening the general population for risks of cardiovascular disease: a review of methods used in the literature.** *Eur J Health Econ* 17(8) 1041-1053.

AIM: to investigate the methodologies used in screening and intervening to reduce the risk of cardiovascular disease (CVD) in primary care settings

METHOD: Literature review

RESULTS: 7 key modeling issues were identified, and we reviewed papers published between 2000 and 2013 to assess how they were addressed. 13 relevant health-economic modeling studies of screening to prevent CVD in primary care were found. The models varied in their degree of complexity, with between two and 33 health states. Programmes that screen the whole population by a fixed cut-off (e.g., predicted 10-year CVD risk >20 %) identify predominantly elderly people, who may not be those most likely to benefit from long-term treatment. Uncertainty and model validation were generally poorly addressed. Few studies considered the disutility of taking drugs in otherwise healthy individuals or the budget impact of the programme.

[View full text](#)

Huang, Y. 2016. **Association between prediabetes and risk of cardiovascular disease and all cause mortality: systematic review and meta-analysis.** *British Medical Journal* 355 i5953.

AIM: to evaluate associations between different definitions of prediabetes and the risk of cardiovascular disease and all cause mortality

METHOD: Meta-analysis of prospective cohort studies. Electronic databases used (PubMed, Embase, and Google Scholar).

RESULTS: 53 prospective cohort studies with 1 611 339 individuals were included for analysis. The median follow-up duration was 9.5 years. Compared with normoglycaemia, prediabetes was associated with an increased risk of composite cardiovascular disease (relative risk 1.13, 1.26, and 1.30 for IFG-ADA, IFG-WHO, and impaired glucose tolerance, respectively), coronary heart disease (1.10, 1.18, and 1.20, respectively), stroke (1.06, 1.17, and 1.20, respectively), and all cause mortality (1.13, 1.13 and 1.32, respectively). Increases in HBA1c to 39-47 mmol/mol or 42-47 mmol/mol were both associated with an increased risk of composite cardiovascular disease (1.21 and 1.25, respectively) and coronary heart disease (1.15 and 1.28, respectively), but not with an increased risk of stroke and all cause mortality.

[View full text](#)

Lancarotte, I. & Nobre, M. 2016. **Primordial and primary prevention programs for cardiovascular diseases: from risk assessment through risk communication to risk reduction. A review of the literature.** *Clinics (sao Paulo, Brazil)* 71(11) 667-678.

AIM: to identify and reflect on the methods employed by studies focusing on intervention programs for the primordial and primary prevention of cardiovascular diseases.

METHOD: The PubMed, EMBASE, SciVerse Hub-Scopus, and Cochrane Library electronic databases were searched using the terms 'effectiveness AND primary prevention AND risk factors AND cardiovascular diseases' for systematic reviews, meta-analyses, randomized clinical trials, and controlled clinical trials in the English language. A descriptive analysis of the employed strategies, theories, frameworks, applied activities, and measurement of the variables was conducted.

RESULTS: Nineteen primary studies were analyzed. Heterogeneity was observed in the outcome evaluations, not only in the selected domains but also in the indicators used to measure the variables. There was also a predominance of repeated cross-sectional survey design, differences in community settings, and variability related to the randomization unit when randomization was implemented as part of the sample selection criteria; furthermore, particularities related to measures, limitations, and confounding factors were observed. The employed strategies, including their advantages and limitations, and the employed theories and frameworks are discussed, and risk communication, as the key element of the interventions, is emphasized.

[View full text](#)

Smith, A., Crippa, A. & Woodcock, J. 2016. **Physical activity and incident type 2 diabetes mellitus: a systematic review and dose-response meta-analysis of prospective cohort studies.** *Diabetologia* 59(12) 2527-2545.

AIM: to synthesise results from longitudinal studies in general populations and use non-linear models of the association between PA and incident type 2 diabetes

METHOD: A systematic literature search identified 28 prospective studies on leisure-time PA (LTPA) or total PA and risk of type 2 diabetes.

RESULTS: Results suggest an overall non-linear relationship; using the cubic spline model we found a risk reduction of 26% (95% CI 20%, 31%) for type 2 diabetes among those who achieved 11.25 MET h/week (equivalent to 150 min/week of moderate activity) relative to inactive individuals. Achieving twice this amount of PA was associated with a risk reduction of 36% (95% CI 27%, 46%), with further reductions at higher doses (60 MET h/week, risk reduction of 53%). Results for the MMET h/week dose-response curve were similar for moderate intensity PA, but benefits were greater for higher intensity PA and smaller for lower intensity activity.

[View full text](#)

Thapa, B. 2016. **How does systematic assessment compare with opportunistic/no risk assessment for the primary prevention of cardiovascular disease?** Cochrane Clinical Answers. Dec 2016.

Cochrane Clinical Answers (CCAs) provide a readable, digestible, clinically focused entry point to rigorous research from Cochrane systematic reviews. Each Cochrane Clinical Answer contains a clinical question, a short answer, and an opportunity to 'drill down' to the evidence from relevant Cochrane reviews.

QUESTION: How does systematic assessment compare with opportunistic/no risk assessment for the primary prevention of cardiovascular disease?

ANSWER: Based on only low-quality evidence, there is no apparent benefit of systematic risk assessment for the primary prevention of cardiovascular disease compared with opportunistic/no risk assessment.

View [full text](#)

Topic overview

Salmi, L. R., Coureau, G., Bailhache, M., et al. 2016. **To Screen or Not to Screen: Reconciling Individual and Population Perspectives on Screening.** *Mayo Clinic Proceedings* 91(11) 1594-1605.

AIM: In this article, we try to reconcile the individual and population perspectives on screening. The individual perspective is based on the clinical experience of a better prognosis at early stages and patients with missed opportunities. In the population perspective, screening is based on a population-oriented, evidence-based model and addresses the acceptability and possible negative effects, including for people without the disorder.

METHOD AND RESULTS: *this information is not available in the abstract*

View [abstract](#)

Trials

National Institutes of Health Research 2016. **Signal: Intensive management of diabetes detected early at screening shows similar results to standard care.** Nov 2016.

AIM: this trial aimed to test whether early detection of type 2 diabetes through screening and intensive treatment would significantly improve the long-term health or prevent deaths in those who develop the condition.

METHOD: Between 2001 and 2006 this cluster randomised control trial asked 343 general practices in England, Denmark and The Netherlands to screen adults aged 40 to 69 for type 2 diabetes. Around half the 3,057 newly diagnosed patients were assigned an intensive intervention while the other half received standard diabetes care according to their respective national guidelines. The intensive intervention practices received education, more time and a small financial incentive to manage medications, diet and physical activity advice more aggressively, to achieve specific targets for blood glucose, blood pressure and cholesterol.

RESULTS: Prescription of medications to manage glucose, blood pressure and lipids increased in both groups, but was more common in the intensive treatment group. After an average of 5.3 years there were no significant differences between the groups in the number of first cardiovascular events including heart attack, stroke or revascularisation procedures. The combined rate of these events was about 14 per 1000 per year in the intensive treatment group compared with 16 per 1000 in the standard care group. There was also no difference in the rate of death from any cause (HR 0.91, 95% CI 0.69 to 1.21). There were 12 deaths per 1000 per year in the intensive group compared with 13 per 1000 in the standard care group. Using just the UK data, intensive treatment cost around £981 per patient, including costs for materials, preparatory meetings, extra patient consultations and extra treatments. Screening plus intensive treatment was not found to be good value for NHS money in either short (up to five years) or long-term (up to 30 years) analyses.

View [full text](#)

Persell, S. D., Brown, T., Lee, J. Y., et al. 2016. **Mailed outreach and facilitated test ordering to promote cholesterol screening in community health centers: A randomized trial.** *J Eval Clin Pract.*

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.

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

Bossart, M., Calley, K. & Gurenlian, J. 2017. **Diabetes screening in periodontal offices.** *Dental Abstracts* 62(1) 42-43.

AIM: to evaluate the effectiveness, feasibility, and cost of diabetes screenings performed by a dental hygienist
 MeTHOD: the dental hygienist working in a periodontist's office screened patients using a diabetes risk questionnaire, periodontal findings, and a chairside HbA1c test. The 50 patients had generalized severe chronic periodontitis, had not previously been diagnosed with diabetes, and had at least one diabetes risk factor.

RESULTS: Mean HbA1c value for all patients was 5.6%, which is the highest point in the normal range. Mean test risk score was 9.0, which indicates a high risk. Mean number of missing teeth was 3.0, and mean percentage of deep pockets was 50.6. The HbA1c analyzer identified 16 patients (32%) with potential prediabetes and 1 patient (2%) with potential type 2 diabetes. No significant relationships were found between HbA1c scores and diabetes risk test scores; between diabetes risk test scores and numbers of missing teeth, percentage of deep pockets, or percentage of BOP sites; or between HbA1c values and number of missing teeth, percentage of deep pockets, or percentage of BOP sites. Significant associations were noted between percentage of BOP and missing teeth and between percentage of BOP and percentage of deep pockets. The cost for each test was \$9, although study participants were not charged. Mean time to complete the screening process and provide patient education regarding the process was 14 minutes.

View [full text](#)

Avanzini, F., Marzona, I., Baviera, M., et al. 2016. **Improving cardiovascular prevention in general practice: Results of a comprehensive personalized strategy in subjects at high risk.** *European journal of preventive cardiology* 23(9) 947-955.

AIM: to assess feasibility and results of a comprehensive personalized method for cardiovascular prevention in high risk patients followed by their general practitioner.

METHOD: Between 2004 and 2007, 12,513 patients (mean age 64.0 ± 9.5 years; 61.5% males) with multiple cardiovascular risk factors or history of atherosclerotic disease were identified and followed for five years. If control of major modifiable cardiovascular risk factors (hypertension, hypercholesterolaemia, diabetes, obesity, smoking, unhealthy diet, physical inactivity) was sub-optimal, at baseline and yearly thereafter general practitioners planned with patients, with the help of a brief checklist, preventive interventions to improve the global risk profile. Main outcome was the control of the seven major modifiable cardiovascular risk factors during follow-up.

RESULTS: Control of all major modifiable risk factors except physical inactivity improved gradually and significantly ($p < 0.0001$) during follow-up. The improvement in the global cardiovascular risk profile during the first year was independently and significantly associated with a lower rate of major cardiovascular events in the following years (hazard ratio 0.939; 95% confidence interval 0.887–0.994, $p = 0.03$).

View [full text](#)

Bromley, L. & Bharaj, H. S. 2016. **Screening for diabetes and cardiovascular disease outcomes in people of South Asian ethnicity in Bolton.** *Diabetes & Primary Care* 18(6) 279-282.

AIM: to improve awareness and self-management of diabetes and cardiovascular disease in a small population of people of South Asian ethnicity in Bolton, Greater Manchester.

METHOD: Screening, education and awareness sessions were carried out, using point-of-care testing, with the aim of improving diabetes awareness and patient engagement with health services, in partnership with the Bolton Council of Mosques.

RESULTS: *no further information was available from the abstract*

View [abstract](#)

Hessler, J. B., Ander, K.-H., Brönnner, M., et al. 2016. **Predicting dementia in primary care patients with a cardiovascular health metric: a prospective population-based study.** *BMC neurology* 16(1) 116.

AIM: to examine the association of a cardiovascular health metric including six behaviors and blood parameters with the risk of dementia in primary care patients.

METHODS: Participants (N = 3547) were insured aged ≥55 of the largest German statutory health insurance

company, who were enrolled in a six-year prospective population-based study. Smoking, physical activity, body mass index, blood pressure, total cholesterol, and fasting glucose were assessed by general practitioners at routine examinations. Using recommended cut-offs for each factor, the patients' cardiovascular health was classified as ideal, moderate, or poor. Behaviors and blood parameters sub-scores, as well as a total score, were calculated. Dementia diagnoses were retrieved from health insurance claims data.

RESULTS: Over the course of the study 296 new cases of dementia occurred. Adjusted for age, sex, and education, current smoking (HR = 1.77, 95 % CI 1.09–2.85), moderate (1.38, 1.05–1.81) or poor (1.81, 1.32–2.47) levels of physical activity, and poor fasting glucose levels (1.43, 1.02–2.02) were associated with an increased risk of dementia. Body mass index, blood pressure, and cholesterol were not associated with dementia. Separate summary scores for behaviors and blood values, as well as a total score showed no association with dementia.

View [full text](#)

Jackson, S. L., Safo, S. E., Staimez, L. R., et al. 2016. **Glucose challenge test screening for prediabetes and early diabetes.** *Diabetic Medicine.*

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.

METHOD: 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 HbA_{1c} 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 30.3kg/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 HbA_{1c} 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](#)

Rasmussen, S. S., Johansen, N. B., Witte, D. R., et al. 2016. **Incidence of register-based diabetes 10 years after a stepwise diabetes screening programme: the ADDITION-Denmark study.** *Diabetologia* 59(5) 989–97.

AIM: to describe the incidence of diabetes for risk groups according to advancement in a screening process.

METHOD: In 2001–2006, a diabetes screening programme based on the Danish diabetes risk score and measures of HbA_{1c} and glucose was carried out in Danish general practices. The present study includes 13,249 individuals with low diabetes risk scores and 22,726 with high diabetes risk scores but no diabetes according to WHO 1999 criteria.

RESULTS: After 10 years of follow-up 1,164 new diabetes cases were registered. Incidence rates were 1.0, 4.2, 14.5, 28.8 and 52.6 per 1,000 person-years in individuals at low risk and in those with normal glucose tolerance, impaired fasting glucose, impaired glucose tolerance and one diabetic glucose value, respectively. For each step in the screening algorithm, the risk of developing diabetes was higher than in the previous step.

View [full text](#)

Ravangard, S. F., Scott, A. E., Mastrogiannis, D., et al. 2016. **Early diabetes screening in obese women.** *J Matern Fetal Neonatal Med* 1–13.

AIM: to describe maternal characteristics related to early screening for diabetes in obese women, and evaluate the benefits of early diabetes screening and diagnosis.

METHODS: Retrospective cohort of obese women (BMI \geq 30kg/m²) without pregestational diabetes who delivered a singleton gestation between 2011–2012. Maternal characteristics/demographics and maternal and neonatal outcomes were compared between women with early diabetes screening (<20 weeks) vs. traditional screening. We additionally compared maternal and neonatal outcomes for women with an early vs. traditional diabetes diagnosis.

RESULTS: Of the 504 eligible women, 135 (26.8%) had early diabetes screening. Obese women with early screening were older, had a higher BMI, were more likely to have hypertension, and neonates admitted to the NICU. Of women with early screening, 31 (23%) were diagnosed early. Women with an early diagnosis of diabetes

were more likely to require treatment with insulin (36% vs. 23%, $p = 0.003$). Women with an early diagnosis of diabetes were more likely to have neonates in the NICU (48% vs. 26%, $p = 0.03$).

[View abstract](#)

Willis, A., Roshan, M., Patel, N., et al. 2016. **A community faith centre based screening and educational intervention to reduce the risk of type 2 diabetes: A feasibility study.** *Diabetes Research & Clinical Practice* 120 73-80.

AIM: to assess the feasibility of delivering a faith centre based pathway for screening and referral to group education for high risk individuals to increase screening uptake and reduce diabetes risk.

METHOD: Opportunistic screening and early intervention strategy for people at risk of diabetes and cardiovascular disease in local faith centres. The screening consisted of a diabetes risk assessment tool and a near patient test for HbA1c. Participants found to be at high risk of diabetes (HbA1c 6-6.4%/42-46mmol/mol) were offered a 'Walking Away from Diabetes' group educational intervention aimed at increasing exercise levels and reducing diabetes risk.

RESULTS: 252 participants were screened during four screening events. 202 participants (80.2%) gave consent for their data to be included in the analysis. 72.4% of participants were found to have a high diabetes risk score. 32 participants (15.8%) had a HbA1c result (6-6.4%/42-46mmol/mol). Eight participants (4.0%) had a (HbA1c 6.5%/47mmol/mol). Of those eligible for the diabetes prevention education programme, 18 participants (56.3%) attended.

[View abstract](#)

Cross-sectional studies

Desgraz, B., Collet, T.-H., Rodondi, N., et al. 2017. **Comparison of self-perceived cardiovascular disease risk among smokers with Framingham and PROCAM scores: a cross-sectional analysis of baseline data from a randomised controlled trial.** *BMJ Open* 7(1).

AIM: to compare 10-year cardiovascular risk self-perception and calculated risk among smokers willing to quit and assess the determinants of a possible misperception.

METHOD: Cross-sectional secondary analysis of baseline data from a randomised controlled trial of smoking cessation. 514 participants, mean age 51.1 years, 46% women, 98% Caucasian. Eligible participants were regular smokers, aged between 40 and 70 years, with a consumption of at least 10 cigarettes per day for at least a year. None of them had experienced cardiovascular disease before. Participants were asked to estimate their 10-year cardiovascular risk using a 3-item scale corresponding to high-risk, moderate-risk and low-risk categories

RESULTS: Between 38% and 42% of smokers correctly perceived their 10-year cardiovascular risk, and 39-50% overestimated their 10-year cardiovascular risk while 12-19% underestimated it compared with their calculated 10-year cardiovascular risk depending on the score used. Underestimation of 10-year cardiovascular risk was associated with male gender (OR 8.16; CI 3.83 to 17.36), older age (OR 1.06; CI 1.02 to 1.09), and the presence of hyperlipidaemia (OR 2.71; CI 1.47 to 5.01) and diabetes mellitus (OR 13.93; CI 3.83 to 50.66).

[View full text](#)

Guertler, D., Meyer, C., Dorr, M., et al. 2016. **Reach of individuals at risk for cardiovascular disease by proactive recruitment strategies in general practices, job centers, and health insurance.** *International Journal of Behavioral Medicine* No Pagination Specified.

AIM: to compare three proactive recruitment strategies regarding their reach of individuals with CVD risk factors.

METHOD: Individuals aged 40-65 years were invited to a two-stage cardio-preventive program including an on-site health screening and a cardiovascular examination program (CEP) using face-to-face recruitment in general practices ($n = 671$), job centers ($n = 1049$), and mail invitations from health insurance ($n = 894$). The recruitment strategies were compared regarding the following: (1) participation rate; (2) participants' characteristics, i.e., socio-demographics, self-reported health, and CVD risk factors (smoking, physical activity, fruit/vegetable consumption, body mass index, blood pressure, high-density lipoprotein, triglycerides, and glycated hemoglobin); and (3) participation factors, i.e., differences between participants and non-participants.

RESULTS: Screening participation rates were 56.0, 32.8, and 23.5 % for the general practices, the job centers, and the health insurance, respectively. Among eligible individuals for the CEP, respectively, 80.3, 65.5, and 96.1 % participated in the CEP. Job center clients showed the lowest socio-economic status and the most adverse CVD risk pattern. Being female predicted screening participation across all strategies (OR = 1.45, 95 % CI 1.07-1.98; OR = 1.34, 95 % CI 1.04-1.74; OR = 1.62, 95 % CI 1.16-2.27). Age predicted screening participation only within health insurance (OR = 1.04, 95 % CI 1.01-1.06). Within the general practices and the job centers, CEP participants were less likely to be smokers than non-participants (OR = 0.49, 95 % CI 0.26-0.94; OR = 0.42, 95 % CI 0.20-0.89).

[View abstract](#)

Oertelt-Prigione, S., Ruecke, M., Seeland, U., et al. 2017. **Gynecological Practice Represents the Ideal Setting for Early Opportunistic Cardiovascular Prevention: A Cross-Sectional Survey in an Urban Female Population.** *J Womens Health (Larchmt)* 26(1) 29-35.

AIM: to identify options for opportunistic counseling on cardiovascular risk by analysing access patterns to other healthcare specialists and population screening.

METHOD: 1062 randomly selected German urban women aged 25-74 years in 2012-2013, divided into 5 age bands were enrolled. Women were asked about sociodemographic characteristics, clinical and gynecological history, physician attendance patterns, screening behavior and primary sources of health and preventative information, and clinical examination attendance.

RESULTS: Obstetrician/gynecologists (OBGYN) were the most frequently consulted physicians within the last 12 months (75.3%), more than general practitioners (GP; 74%). Attendance rates to OBGYNs were not affected by education or income, solely a body mass index (BMI) >30 associated with significantly reduced rates of attendance (OR = 0.4, CI 95% = 0.17-0.78, p = 0.009). Women with low to medium Framingham risk scores were more likely to attend an OBGYN than a GP if they attended only one specialist. Attendance of population screening measures is limited (<60% for all offers) and hence unsuitable for systematic cardiovascular counseling.

[View abstract](#)

Vrca Botica, M., Carkaxhiu, L., Kern, J., et al. 2017. **How to improve opportunistic screening by using EMRs and other data. The prevalence of undetected diabetes mellitus in target population in Croatia.** *Public Health* 145 30-38.

AIM: to investigate the yield of opportunistic target screening for T2D in Croatia and to evaluate the process of screening by using data from electronic medical record.

METHOD: opportunistic screening was conducted in 23 general practitioners (GPs) in a population of 13,344 patients aged 45-70 years. Patients with risk factors for T2D were derived from the electronic medical record and GP's assessment during the preconsultation phase. Patients started the consultation phase during their usual visit, when they were offered capillary fasting plasma glucose testing in the next consultation.

RESULTS: Prevalence of T2D was 10.9% (new 1.4%). A total of 5568 (46.1%) patients had risks and 2849 (51.2%) had data about normoglycemia in the last three years. Using those data, number needed to invite to screening (NNI) was reduced to half: from 46.1% to 22.5%. One hundred eighty-four patients were screened positive for T2D in two capillary fasting plasma glucose tests (yield 9.8%). Number needed to screen (NNS) in order to detect one T2D was 10.3 patients. Among risks for T2D, overweight was the best predictive factor for undiagnosed T2D (odds ratio [OR]: 2.11, confidence interval [CI]:1.41-3.15, P < .001). Logistic regression showed that in targeted population, overweight patients with a family history in fold were 2.5 times more likely to have T2D (OR: 2.54, CI 1.78-.61, P < .001).

[View abstract](#)

Dall, T. M., Yang, W., Halder, P., et al. 2016. **Type 2 diabetes detection and management among insured adults.** *Popul Health Metr* 14 43.

AIM: to provide US national and state estimates of insured adults with type 2 diabetes who are diagnosed, receiving exams and medication, managing glycemic levels, with diabetes complications, and their health expenditures.

METHODS: The study combines analysis of survey data with medical claims analysis for the commercially insured, Medicare, and Medicaid populations to estimate the number of adults with diagnosed type 2 diabetes and undiagnosed diabetes by insurance type, age, and sex. Medical claims analysis used the 2012 de-identified Normative Health Information database covering a nationally representative commercially insured population, the 2011 Medicare 5% Sample, and the 2008 Medicaid Mini-Max.

RESULTS: Among insured adults in 2012, approximately 16.9 million had diagnosed type 2 diabetes, 1.45 million had diagnosed type 1 diabetes, and 6.9 million had undiagnosed diabetes. Of those with diagnosed type 2, approximately 13.0 million (77%) received diabetes medication-ranging from 70% in New Jersey to 82% in Utah. Suboptimal percentages had claims indicating recommended exams were performed. Of those receiving diabetes medication, 43% (5.6 million) had medical claims indicating poorly controlled diabetes-ranging from 29% with poor control in Minnesota and Iowa to 53% in Texas. Poor control was correlated with higher prevalence of neurological complications (+14%), renal complications (+14%), and peripheral vascular disease (+11%). Patients with poor control averaged \$4,860 higher average annual health care expenditures-ranging from \$6,680 for commercially insured patients to \$4,360 for Medicaid and \$3,430 for Medicare patients.

[View full text](#)

Delpech, R., Ringa, V., Falcoff, H., et al. 2016. **Primary prevention of cardiovascular disease: More patient gender-based differences in risk evaluation among male general practitioners.** *European Journal of Preventive Cardiology* 23(17) 1831-1838.

AIM: to analyse general practitioner (GP) cardiovascular risk assessment of patients for primary prevention while considering the gender of both the GP and the patient.

METHOD: This study consisted of an observational survey of GPs who were internship supervisors in the Paris metropolitan area. Each of 52 volunteer GPs completed a self-administered questionnaire regarding their own characteristics and randomly selected 70 patients from their patient list. Dependent variables from the patient files included the presence of information about risk factors necessary to assess the patient's cardiovascular risk according to the French scale and the Systematic COronary Risk Evaluation (SCORE) scale.

RESULTS: Both cardiovascular risk scales could be assessed less frequently in women than in men (odds ratio (OR) = 0.64 (95% confidence interval (CI): 0.5-0.8) for the French scale and OR = 0.63 (95% CI: 0.5-0.8) for the SCORE scale). These gender differences were less substantial when the patients were seen by female (for the SCORE scale OR = 0.72 (95% CI: 0.5-1.01)) compared with male physicians (OR = 0.56 (95% CI: 0.4-0.7)). The patients who were least well assessed for cardiovascular risk were women seen by male physicians.

View [abstract](#)

Katulanda, P., Hill, N. R., Stratton, I., et al. 2016. **Development and validation of a Diabetes Risk Score for screening undiagnosed diabetes in Sri Lanka (SLDRISK).** *BMC Endocrine Disorders* 16(1) 42.

AIM: to develop and validate a risk score for screening undiagnosed diabetes among Sri Lankan adults and to compare its performance with the Cambridge Risk Score (CRS), the Indian Diabetes Risk Score (IDRS) and three other Asian risk scores.

METHOD: Data were available from a representative sample of 4276 adults without diagnosed diabetes. In a jack-knife approach two thirds of the sample was used for the development of the risk score and the remainder for the validation. Age, waist circumference, BMI, hypertension, balanitis or vulvitis, family history of diabetes, gestational diabetes, physical activity and osmotic symptoms were significantly associated with undiagnosed diabetes (age most to osmotic symptoms least).

RESULTS: The area under the ROC curve of the risk score for prevalent diabetes was 0.78 (CI 0.73-0.82). In the sample 36.3 % were above the cut-off of 31. A risk score above 31 gave a sensitivity, specificity, positive predictive value and negative predictive value of 77.9, 65.6, 9.4 and 98.3 % respectively. For Sri Lankans the AUC for the CRS and IDRS were 0.72 and 0.66 respectively.

View [full text](#)

Mainous, A. G., Tanner, R. J., Scuderi, C. B., et al. 2016. **Prediabetes screening and treatment in diabetes prevention: The impact of physician attitudes.** *Journal of the American Board of Family Medicine* 29(6) 663-671.

AIM: to evaluate the relationship between attitudes toward prediabetes as a clinical construct and screening/treatment behaviors for diabetes prevention among US family physicians.

METHODS: An electronic survey of a national sample of academic family physicians (n 1248) was conducted in 2016. Attitude toward prediabetes was calculated using a summated scale assessing agreement with statements regarding prediabetes as a clinical construct. Perceived barriers to diabetes prevention, current strategies for diabetes prevention, and perceptions of peers were also examined.

RESULTS: Physicians who have a positive attitude toward prediabetes as a clinical construct are more likely to follow national guidelines for screening (58.4% vs 44.4; P < .0001) and recommend metformin to their patients for prediabetes (36.4% vs 20.9%; P < .0001). Physicians perceived a number of barriers to treatment, including a patient's economic resources (71.9%), sustaining patient motivation (83.2%), a patient's ability to modify his or her lifestyle (75.3%), and time to educate patient (75.3%) as barriers to diabetes prevention.

View [full text](#)

McNamara, K. P., Peterson, G. M., Hughes, J., et al. 2016. **Cardiovascular Disease Risk Assessment in Australian Community Pharmacy.** *Heart Lung Circ.*

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.

METHOD: 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 [full text](#)

Qualitative

Jansen, J., McKinn, S., Bonner, C., et al. 2017. **General practitioners' decision making about primary prevention of cardiovascular disease in older adults: A qualitative study.** *PLoS ONE* 12 (1) (no pagination)(e0170228).

AIM: to explore GPs' decision making about primary CVD prevention in patients aged 75 years and older.

METHOD: 25 GPs participated in semi-structured interviews in New South Wales, Australia. Transcribed audio-recordings were thematically coded and Framework Analysis was used.

RESULTS: Analysis identified factors that are likely to contribute to variation in the management of CVD risk in older people. Some GPs based CVD prevention on guidelines regardless of patient age. Others tailored management based on factors such as perceptions of prevention in older age, knowledge of limited evidence, comorbidities, polypharmacy, frailty, and life expectancy. GPs were more confident about: 1) medication and lifestyle change for fit/healthy older patients, and 2) stopping or avoiding medication for frail/nursing home patients. Decision making for older patients outside of these categories was less clear.

View [full text](#)

Aliki Peletidi, A. P., Shereen Nabhani-Gebara, S. N. & Reem Kayyali, R. K. 2016. **Do Greek pharmacists have a role in cardiovascular disease prevention? A study to establish their views.** *European Journal of Preventive Cardiology* 23 S22.

AIM: to explore Greek pharmacists' views on their role in CVD prevention and the facilitators and barriers for such a role.

METHOD: Semi-structured interviews were conducted with 20 pharmacists in 3 different Greek cities (Athens, Thessaloniki and Patras). The interview schedule consisted of 28 questions exploring pharmacists' views and current and future role and services for CVD prevention. All interviews were recorded and then transcribed. The transcripts were analysed thematically.

RESULTS: Three main themes were identified; role recognition, priority services and barriers. Pharmacists agreed that it is essential to initiate pharmacy-led CVD prevention services. The interviewees identified weight management and exercise service as the most essential, as many people visit their pharmacies in order to measure their body weight and because obesity and lack of exercise are precursors of various risk conditions such as diabetes. The barriers preventing Greek pharmacists having an active role in screening and monitoring patients with CVD risk factors were described as lack of training, lack of proper tools for identifying patients with CVD risk factors/conditions and lack of patients' awareness and acceptance.

View [full text](#)

Andersson, S., Karlsson, V., Bennet, L., et al. 2016. **Attitudes Regarding Participation in a Diabetes Screening Test among an Assyrian Immigrant Population in Sweden.** *Nurs Res Pract* 2016 1504530.

AIM: to describe and understand health beliefs in relation to T2D as well as attitudes regarding participation in a screening process in a local group of Assyrian immigrants living in Sweden.

METHOD: A qualitative and quantitative method was chosen in which 43 individuals participated in a health check-up and 13 agreed to be interviewed. Interviews were conducted, anthropometric measurements and blood tests were collected, and an oral glucose tolerance test was performed.

RESULTS: In total, 13 of the 43 participants were diagnosed with impaired glucose metabolism, 4 of these 13 had TD2. The interviewed participants perceived that screening was an opportunity to discover more about their health and to care for themselves and their families. Nevertheless, they were not necessarily committed to taking action as a consequence of the screening. Instead, they professed that their health was not solely in their own hands and that they felt safe that God would provide for them. Assyrians' background and religion affect their health beliefs and willingness to participate in screening for TD2.

View [full text](#)

Kinsman, L., Tham, R., Symons, J., et al. 2016. **Prevention of cardiovascular disease in rural Australian primary care: An exploratory study of the perspectives of clinicians and high-risk men.** *Australian Journal of Primary Health* 22(6) 510-516.

AIM: to explore the self-reported behaviours and satisfaction with their general practice/practitioner of men at high risk of CVD, and attitudes of rural primary care clinicians regarding the role of primary care in CVD prevention.

METHOD: This observational research was addressed through survey questionnaires with rural men at high risk of CVD and semi-structured interviews with rural primary care clinicians. Fourteen rural primary care practices from towns with populations less than 25000 participated.

RESULTS: One hundred and fifty-eight high-risk men completed the questionnaire. Their responses demonstrated poorly controlled risk factors despite a willingness to change. Alternatively, rural primary care clinicians (n<20) reported that patients were unlikely to change and that illness-based funding models inhibited cardiovascular preventive activities.

View [abstract](#)

Sopczak, N., Aguilar, C., O'Brien, M. A., et al. 2016. **Implementation of the BETTER 2 program: a qualitative study exploring barriers and facilitators of a novel way to improve chronic disease prevention and screening in primary care.** *Implement Sci* 11(1) 158.

AIM: to understand facilitators and barriers of the implementation of the BETTER 2 program among clinicians, patients, and stakeholders in three (urban, rural, and remote) primary care settings in Newfoundland and Labrador, Canada.

METHOD: We collected and analyzed responses from 20 key informant interviews and 5 focus groups, as well as memos and field notes. Data were organized using Nvivo 10 software and coded using constant comparison methods. We then employed the Consolidated Framework for Implementation Research (CFIR) to focus our analysis on the domains most relevant for program implementation.

RESULTS: The following key elements, within the five CFIR domains, were identified as impacting the implementation of BETTER 2: (1) intervention characteristics-complexity and cost of the intervention; (2) outer setting-perception of fit including lack of remuneration, lack of resources, and duplication of services, as well as patients' needs as perceived by physicians and patients; (3) characteristics of prevention practitioners-interest in prevention and ability to support and motivate patients; (4) inner setting-the availability of a local champion and working in a team versus working as a team; and (5) process-planning and engaging, collaboration, and teamwork.

View [full text](#)

Ligthart, S. A., van den Eerenbeemt, K. D., Pols, J., et al. 2015. **Perspectives of older people engaging in nurse-led cardiovascular prevention programmes: a qualitative study in primary care in the Netherlands.** *British Journal of General Practice* 65(630) e41-8.

AIM: to gain insight into what motivates older people living in the community to partake in a cardiovascular prevention programme, and reasons for subsequent continuation or withdrawal.

METHOD: Qualitative study of current and former participants of the ongoing >6 year PreDIVA (prevention of dementia by intensive vascular care) trial in primary care practices in suburban areas in the Netherlands. Semi-structured interviews were conducted with a purposive sample of 15 participants (aged 76-82 years). Interviews were audiorecorded and analysed by two independent researchers using a thematic approach. Participants were asked about their motivation for participating in the programme, along with the facilitators and barriers to continue doing so.

RESULTS: Responders reported that regular check-ups offered a feeling of safety, control, or being looked after, and were an important motivator for participation. For successful continuation, a personal relationship with the nurse and a coaching approach were both essential; the lack of these, along with frequent changes of nursing staff, were considered to be barriers. Participants considered general preventive advice unnecessary or patronising, but practical support was appreciated.

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Modelling studies

Dehmer, S. P., Maciosek, M. V., LaFrance, A. B., et al. 2017. **Health Benefits and Cost-Effectiveness of Asymptomatic Screening for Hypertension and High Cholesterol and Aspirin Counseling for Primary Prevention.** *The Annals of Family Medicine* 15(1) 23-36.

AIM: to update estimates of the health and economic impact of clinical services recommended for the primary

prevention of cardiovascular disease (CVD) for the comparative rankings of the National Commission on Prevention Priorities, and to explore differences in outcomes by sex and race/ethnicity.

METHOD: We used a single, integrated, microsimulation model to generate comparable results for 3 services recommended by the US Preventive Services Task Force: aspirin counseling for the primary prevention of CVD and colorectal cancer, screening and treatment for lipid disorders (usually high cholesterol), and screening and treatment for hypertension. Analyses compare lifetime outcomes from the societal perspective for a US-representative birth cohort of 100,000 persons with and without access to each clinical preventive service. Primary outcomes are health impact, measured by the net difference in lifetime quality-adjusted life years (QALYs), and cost-effectiveness, measured in incremental cost per QALY or cost savings per person in 2012 dollars.

RESULTS: Health impact is highest for hypertension screening and treatment (15,600 QALYs), but is closely followed by cholesterol screening and treatment (14,300 QALYs). Aspirin counseling has a lower health impact (2,200 QALYs) but is found to be cost saving (\$31 saved per person). Cost-effectiveness for cholesterol and hypertension screening and treatment is \$33,800 per QALY and \$48,500 per QALY, respectively. Findings favor hypertension over cholesterol screening and treatment for women, and opportunities to reduce disease burden across all services are greatest for the non-Hispanic black population.

View [abstract](#)

Sacco, R. L., Roth, G. A., Reddy, K. S., et al. 2016. **The Heart of 25 by 25: Achieving the Goal of Reducing Global and Regional Premature Deaths From Cardiovascular Diseases and Stroke: A Modeling Study From the American Heart Association and World Heart Federation.** *Global Heart* 11(2) 251-264.

AIM: to model cardiovascular mortality in 2025

METHOD: The Institute for Health Metrics and Evaluation, University of Washington, were engaged to develop region-specific estimates of premature cardiovascular mortality in 2025 based on various scenarios.

RESULTS: >5 million premature CVD deaths among men and 2.8 million among women are projected worldwide by 2025, which can be reduced to 3.5 million and 2.2 million, respectively, if risk factor targets for blood pressure, tobacco use, diabetes mellitus, and obesity are achieved. However, global risk factor targets have various effects, depending on region. For most regions, United Nations targets for reducing systolic blood pressure and tobacco use have more substantial effects on future scenarios compared with maintaining current levels of body mass index and fasting plasma glucose. However, preventing increases in body mass index has the largest effect in some high-income countries. An approach achieving reductions in multiple risk factors has the largest impact for almost all regions.

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Economic evaluation

Crossan, C., Lord, J., Ryan, R., et al. 2017. **Cost effectiveness of case-finding strategies for primary prevention of cardiovascular disease: a modelling study.** *Br J Gen Pract* 67(654) e67-e77.

AIM: to assess the cost effectiveness of targeted case finding for CVD prevention.

METHOD: Cost-effectiveness modelling in an English primary care population. A cohort of 10 000 individuals aged 30-74 years and without existing CVD or diabetes was sampled from The Health Improvement Network database, a large primary care database. A discrete-event simulation was used to model the process of inviting people for assessment, assessing cardiovascular risk, and initiation and persistence with drug treatment. The researchers determined the lifetime costs and quality-adjusted life years (QALYs) with opportunistic case finding, and strategies prioritising and targeting patients by age or prior estimate of cardiovascular risk.

RESULTS: Compared with no case finding, inviting all adults aged 30-74 years in a population of 10 000 yields 30.32 QALYs at a total cost of £705 732. The optimum strategy is to rank patients by prior risk estimate and invite 8% of those who are assessed as being at highest risk (those at $\geq 12.76\%$ predicted 10-year CVD risk), yielding 17.53 QALYs at a cost of £162 280. There is an 89.4% probability that the optimum strategy is to invite <35% of patients for assessment.

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Nagarajan, M. & Padula, W. V. 2016. **Societal impact of one-time screening for diabetes at age 30 in the Indian population: A cost-effectiveness analysis.** *Value in Health* 19 (7) A606.

AIM: to analyze the cost-effectiveness of one-time diabetes screening at age of 30 in India compared to no screening, and the budget impact, from the Indian societal perspective.

METHOD: We created a Markov model comparing cost and utility of one-time screening of persons at age 30 against current practice, which is diagnosis when patients become symptomatic or present with complications of diabetes. The modeling was done from the Indian societal perspective. The cycle length was set at one year, and

the model run for 43 cycles, the calculated Indian life expectancy at age 30. The costs were drawn from studies done in India, and were inflation-adjusted to 2016 INR (Indian Rupee) values.

RESULTS: One-time screening at age 30 (160,537 INR, 20.36 QALYs) is dominant compared to current practice (208,717 INR, 20.01 QALYs) at an incremental cost-effectiveness ratio of 132,839 INR /QALY, with probabilistic estimates showing dominance in all of the 10,000 simulations. Additional screening every five years is also dominant over current practice in all PSA simulations. The budget impact of one-time screening would be 24 billion INR, 0.4% of Indian public healthcare expenditure.

View [abstract](#)

Ongoing research

Aminde, L. & Veerman, L. 2016. **Interventions for the prevention of cardiovascular diseases: a protocol for systematic review of economic evaluations in low and middle income countries.** *PROSPERO*.

AIM: to identify the costs and costs relative to the outcome measure (cost-effectiveness, cost-utility) of interventions for CVD prevention in LMICs from various perspectives (individual patients and their families, health care providers, and society) and to determine the contexts that are conducive to lower cost and increased effectiveness of interventions for CVD prevention

METHOD: We plan to search the following databases; PubMed/MEDLINE, EMBASE, SCOPUS, Web of Science, EconLit, NHS Economic Evaluations Database (NHS EED), and Cochrane Library, WHO AFROLIB, Africa Index Medicus (AIM).

RESULTS: Due to considerable variation in economic evaluation studies in terms of derivation of effectiveness and cost estimates, we believe it may not be appropriate to combine cost-effectiveness results from trial based economic evaluations or decision modeling based cost-effectiveness results. However, a structured narrative synthesis is planned to answer our review questions.

View [details](#)

Cohen, D. J., Balasubramanian, B. A., Gordon, L., et al. 2016. **A national evaluation of a dissemination and implementation initiative to enhance primary care practice capacity and improve cardiovascular disease care: the ESCALATES study protocol.** *Implementation Science* 11(1) 86.

This is the study protocol for the EvidenceNOW national evaluation, which is called Evaluating System Change to Advance Learning and Take Evidence to Scale (ESCALATES).

METHODS: This prospective observational study will examine the portfolio of EvidenceNOW Cooperatives using both qualitative and quantitative data. Qualitative data include: online implementation diaries, observation and interviews at Cooperatives and practices, and systematic assessment of context from the perspective of Cooperative team members. Quantitative data include: practice-level performance on clinical quality measures (aspirin prescribing, blood pressure and cholesterol control, and smoking cessation; ABCS) collected by Cooperatives from electronic health records (EHRs); practice and practice member surveys to assess practice capacity and other organizational and structural characteristics; and systematic tracking of intervention delivery. Quantitative, qualitative, and mixed methods analyses will be conducted to examine how Cooperatives organize to provide external support to practices, to compare effectiveness of the dissemination and implementation approaches they implement, and to examine how regional variations and other organization and contextual factors influence implementation and effectiveness.

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Osborn, D. Burton, A. Walters, K., et al. 2016. **Evaluating the clinical and cost effectiveness of a behaviour change intervention for lowering cardiovascular disease risk for people with severe mental illnesses in primary care (PRIMROSE study): study protocol for a cluster randomised controlled trial.** *Trials* 17 80.

AIM: to test the effectiveness of a behavioural intervention to lower cardiovascular disease risk in people with severe mental illnesses in United Kingdom General Practices.

METHOD: The study is a cluster randomised controlled trial in 70 GP practices for people with severe mental illnesses, aged 30 to 75 years old, with elevated cardiovascular disease risk factors. The trial will compare the effectiveness of a behavioural intervention designed to lower cardiovascular disease risk and delivered by a practice nurse or healthcare assistant, with standard care offered in General Practice. A total of 350 people will be recruited and followed up at 6 and 12 months. The primary outcome is total cholesterol level at the 12-month follow-up and secondary outcomes include blood pressure, body mass index, waist circumference, smoking status, quality of life, adherence to treatments and services and behavioural measures for diet, physical activity and alcohol use. An economic evaluation will be carried out to determine the cost effectiveness of the intervention compared with standard care.

RESULTS: The results of this pragmatic trial will provide evidence on the clinical and cost effectiveness of the intervention on lowering total cholesterol and addressing multiple cardiovascular disease risk factors in people with severe mental illnesses in GP Practices.

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Studzinski, K., Tomasik, T. & Janus, K. 2016. **Effect of using cardiovascular risk scoring in routine risk assessment in primary prevention of cardiovascular disease: protocol of overview of systematic reviews. PROSPERO.**

AIM: To analyse and summarise all published reviews which assess the effect of using cardiovascular risk scoring in routine risk assessment in primary prevention of cardiovascular disease compared with standard care.

METHOD: The following databases will be searched: MEDLINE (Ovid), EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), SCOPUS. All databases will be searched from 1990 to the present. The search will be limited to the English language literature

RESULTS: Presentation of results of overview will align guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and the Cochrane Handbook of Systematic Reviews of Interventions. A PRISMA flow diagram will be used to summarise search results. Data will be presented as a narrative synthesis and will be supplemented by series of summary tables and figures. Meta-analysis of meta-analyses will not be conducted.

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