



Public Health
England

Protecting and improving the nation's health

NHS Health Check programme: Annotated Bibliography: June 23rd 2017 –November 7th 2017

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

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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 June 22nd 2017. This search identifies references **from June 23rd 2017 to November 7th 2017**. The cut-off date for internet searches was **November 8th 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 dc=20170623-20171107
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 2017/06/23 to 2017/11/07

Ovid Embase

1. health check*.tw.
2. (diabetes adj3 screen*).tw.
3. (cardiovascular adj3 screen*).tw.
4. (population adj2 screen*).tw.
5. (risk factor adj3 screen*).tw.
6. (opportunistic adj3 screen*).tw.
7. medical check*.tw.
8. general check*.tw.
9. periodic health exam*.tw.
10. annual exam*.tw.
11. annual review*.tw.
12. NHSHC.tw.
13. periodic medical examination/
14. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13
15. cardiovascular adj3 prevention.tw.
16. (primary care or general practice or primary healthcare).tw
17. 15 and 16
18. cardiovascular disease/ AND primary prevention/
19. 17 or 18
20. 14 or 19
21. limit 20 to dc=20170623-20171107

Ovid HMIC

- 1 "health check*".af.
- 2 health checks/
- 3 (cardiovascular or vascular or heart or diabetes or stroke).af.
- 4 (screen* or risk).af.
- 5 3 AND 4
- 6 1 OR 2 or 5
- 7 cardiovascular adj3 prevention.tw.
- 8 (primary care or general practice or primary healthcare).tw
- 9 7 and 8
- 10 Cardiovascular diseases/ AND exp preventive medicine/
- 11 9 or 10
- 12 6 or 11
- 13 limit 12 to yr="2017"

- EBSCO CINAHL S10 S1 OR S2 OR S9 Limiters - Published Date: 20170623-20171107
S9 S5 OR S8
S8 S6 AND S7
S7 (MH "Preventive Health Care+")
S6 (MH "Cardiovascular Diseases+")
S5 S3 AND S4
S4 "primary care" or "general practice" or "primary healthcare"
S3 TX cardiovascular N3 prevention
S2 (diabetes N3 screen*) OR (cardiovascular N3 screen*) OR
(population N2 screen*) OR (risk factor N3 screen*) OR (opportunistic
N3 screen*) OR "medical check*" OR "general check*" OR "periodic
health exam*" OR "annual exam*" OR "annual review*" OR NHSHC
S1 health check*
- EBSCO Global Health S10 S6 OR S19 OR S3 Limiters - Publication Year: 2017
S9 S7 AND S8
S8 DE "preventive medicine"
S7 DE "cardiovascular diseases"
S6 S4 AND S5
S5 "primary care" or "general practice" or "primary healthcare"
S4 TX cardiovascular N3 prevention
S3 S1 OR S2
S2 (diabetes N3 screen*) OR (cardiovascular N3 screen*) OR
(population N2 screen*) OR (risk factor N3 screen*) OR (opportunistic
N3 screen*) OR "medical check*" OR "general check*" OR "periodic
health exam*" OR "annual exam*" OR "annual review*" OR NHSHC
S1 health check*
- Ovid PsycInfo
1. health check*.tw.
2. (diabetes adj3 screen*).tw.
3. (cardiovascular adj3 screen*).tw.
4. (population adj2 screen*).tw
5. (risk factor adj3 screen*).tw.
6. (opportunistic adj3 screen*).tw.
7. medical check*.tw.
8. general check*.tw.
9. periodic health exam*.tw.
10. annual exam*.tw.
11. annual review*.tw.
12. NHSHC.tw.
13. health screening/ or physical examination/
14. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13
15. (cardiovascular adj3 prevention).tw.
16. (primary care or general practice or primary healthcare).tw.
17. 15 and 16
18. CARDIOVASCULAR DISORDERS/ and PREVENTIVE
MEDICINE/
19. 17 or 18
20. 14 or 19
limit 20 to yr="2017"

Cochrane Library (Wiley)	<p>#1 "health check*"</p> <p>#2 (diabetes next/3 screen*) or (cardiovascular next/3 screen*) or (population next/2 screen*) or (opportunistic next/2 screen*) or ("risk factor" next/3 screen*) or "medical check*" or "general check*" or "periodic health exam*" or "annual exam*" or "annual review*" or NHSHC</p> <p>#3 cardiovascular adj3 prevention.tw</p> <p>#4 (primary care or general practice or primary healthcare).tw</p> <p>#5 #3 and #4</p> <p>#6 MeSH descriptor: [Cardiovascular Diseases] this term only</p> <p>#7 MeSH descriptor: [Primary Prevention] explode all trees</p> <p>#8 #6 and #7</p> <p>#9 #5 or #8</p> <p>#10 #1 or #2 or #9 Publication Year from 2017 to 2017</p>
NHS Evidence	<p><i>"health check" OR cardiovascular prevention primary</i> Limited to 23/06/2017 to 08/11/2017</p>
TRIP database	<p><i>"health check*" OR cardiovascular prevention primary</i> Since 2017</p>
Google Scholar	<p><i>"nhs health check"</i> <i>cardiovascular "health check"</i> <i>cardiovascular prevention primary care</i> <i>nhs health check program</i> Since 2017, sorted by date.</p>
Google	<p><i>"nhs health check"</i> <i>cardiovascular prevention "primary care"</i> <i>cardiovascular "health check"</i> <i>CVD risk prediction</i> <i>nhs health check program</i> Limited to 23/06/2017 - 08/11/2017</p>
Clinical trials.gov and ISRCTN registry	<p><i>"health check"</i>, Limited to 23/06/2017 - 08/11/2017</p>

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

3. Results

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

Table 2. Citations published/entered between June 23rd 2017 and November 7th 2017

Database	No. of hits	Exclusive
Ovid Medline (June 23 rd 2017 – Nov 7 th 2017)	682	666
PubMed (June 23 rd 2017 – Nov 7 th 2017)	599	181
Ovid Embase (June 23 rd 2017 – Nov 7 th 2017)	1152	809
Ovid HMIC (up to July 2017)	3	3
EBSCO CINAHL (June 23 rd 2017 – Nov 7 th 2017)	304	221
EBSCO Global Health (2017)	346	288
Ovid PsycInfo (June 23 rd 2017 – Nov 7 th 2017)	271	224
Cochrane Library (Wiley) (Issue 11 of 12, Nov 2017)	170	153
NICE Evidence (June 23 rd 2017 – Nov 7 th 2017)	809	691
TRIP database (June 23 rd 2017 – Nov 7 th 2017)	593	496
TOTAL		3729

Table 2a. Citations added to internet sources between June 23rd 2017 and November 8th 2017

Internet sources	No. of hits
Google Scholar (Nov 8th 2017)	78*
Google (Nov 8 th 2017)	400*
Trials registers (Nov 8th 2017)	1
TOTAL	479

**Note: it is not possible to know how many of these are unique citations. Only the potentially relevant hits from Google scholar were imported.*

From these results, 11 were identified as being relevant to the NHS Health Check programme, 13 to general health checks and 64 to diabetes/cardiovascular disease risk screening or prevention.

Total relevant references = 88

- NHS Health Checks = 11
- general health checks = 13
- diabetes/cardiovascular disease screening or prevention = 64

4. References on the NHS Health Check Programme (11)

Systematic reviews

Usher-Smith, J. A., Harte, E., MacLure, C., et al. 2017. **Patient experience of NHS health checks: a systematic review and qualitative synthesis.** *BMJ Open* 7(8) e017169.

AIM: to review the experiences of patients attending NHS Health Checks in England.

METHODS: A systematic review of quantitative and qualitative studies with a thematic synthesis of qualitative studies, involving an electronic literature search of Medline, Embase, Health Management Information Consortium, Cumulative Index of Nursing and Allied Health Literature, Global Health, PsycInfo, Web of Science, OpenGrey, the Cochrane Library, National Health Service (NHS) Evidence, Google Scholar, Google, Clinical Trials.gov and the ISRCTN registry to 09/11/16 with no language restriction and manual screening of reference lists of all included papers.

RESULTS: 20 studies met the inclusion criteria, 9 reporting quantitative data and 15 qualitative data. There were consistently high levels of reported satisfaction in surveys, with over 80% feeling that they had benefited from an NHS Health Check. Data from qualitative studies showed that the NHS Health Check had been perceived to act as a wake-up call for many who reported having gone on to make substantial lifestyle changes which they attributed to the NHS Health Check. However, some had been left with a feeling of unmet expectations, were confused about or unable to remember their risk scores, found the lifestyle advice too simplistic and non-personalised or were confused about follow-up.

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Cohort studies

Solutions Strategy Research Facilitaiton Ltd and Cornish and Grey Ltd April 2017. **NHS Health Check 40-64 Dementia Pilot: Research Report.** *Alzheimer's Research UK; Alzheimer's Society.*

AIM: to evaluate the pilot and assess the feasibility of extending the NHS Health Check for 40-64 year olds to include a dementia risk reduction component.

METHOD: This pilot was run in four areas – Birmingham, Bury, Manchester and Southampton. This research includes quantitative research with the general public (with both a control group and a test group immediately post NHS Health Check), qualitative research with the Post NHS Health Check sample more than three weeks after their NHS Health Check, and qualitative research with Health Care Professionals.

RESULTS: There was consistently positive feedback about the experience of the NHS Health Check. The post NHS Health Check respondents saw the NHS Health Check as a good introduction to talk about risk reduction overall. The majority (79%) of respondents recalled the dementia component, although the ethnic minority sample was statistically significantly less likely to recall the dementia component (65% vs 84% in mainstream sample). Overall the research suggest that the delivery of the dementia component is feasible and has a positive impact on the knowledge and awareness of the general public around dementia risk reduction.

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Alageel, S., Wright, A. & Gulliford, M. 2017. **Impact of the Health Check programme on the provision of smoking cessation interventions in England.** *European Journal of Public Health* 27(suppl_3).

AIM: to evaluate uptake of the health check programme by smokers and the effect of the health check programme on delivery of smoking cessation interventions

METHOD: Population-based matched cohort study using primary care electronic health records in the Clinical Practice Research Datalink. Case participants had records of NHS health checks between January 2010 and December 2013. A matched control cohort did not receive a health check. Compared smoking prevalence and smoking cessation interventions, including referral for smoking cessation and prescriptions for nicotine replacement therapy, for health check participants and controls.

RESULTS: 129,045 eligible participants received a health check, and 327,091 matched controls. Among men and women attending for the health check, smoking prevalence was 3.57% lower (95% CI 3.32% to 3.82%; $P < 0.001$) than in controls. Smoking cessation interventions were offered to a higher proportion of health check recipients (difference 24.1%, 95% CI 23.85% to 24.62%; $P < 0.001$), with 81% of smokers being offered a smoking cessation intervention within the first year following of the health check.

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Cross-sectional studies

Chang, K., Lee, J., Vamos, E., et al. 2017. **Socio-demographic inequalities in the effectiveness of England's NHS Health Check** *European Journal of Public Health* 27(suppl_3).

AIM: to compare NHS Health Check programme impact on: i) Early detection of hypertension, type 2 diabetes (T2D) and chronic kidney disease among population subgroups of age, sex and deprivation; and ii) Management of CVD risk among high-risk population subgroups of age, sex, and deprivation.

METHOD: Retrospective electronic medical records from the Clinical Practice Research Datalink were obtained for a randomly selected sample of 138,788 patients aged 40–74 years, without known CVD or diabetes, and were registered with 462 practices between 2009–2013. Programme impact for each subgroup was estimated using a difference-in-differences matching analysis that compared changes in outcome over time between attendees and non-attendees.

RESULTS: 21.4% of the study population attended a Health Check. A significantly greater number of hypertension and T2D incident cases were detected in male than female attendees (e.g. an additional 4.02%, 95% CI: 3.65% to 4.39%, and 2.08%, 1.81% to 2.35% male and female attendees were detected with hypertension respectively). A significantly greater number of T2D incident cases were detected among attendees living in the most deprived area (1.60%, 1.23% to 1.97%) compared with those living in the least deprived area (0.79%, 0.52% to 1.06%). No major differences in CVD risk management were observed between subgroups (e.g. programme impact on 10-year CVD risk score was -1.13%, -1.48% to -0.78% in male and -1.53%, -2.36% to -0.71% in female attendees).

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Wilkinson, K., Bryant, E. S. & Heal, K. 2017. **Obesity and cardiovascular risk factors: results of a unique approach to NHS health checks.** *Practice Nursing* 28(9) 390-397.

AIM: to evaluate health check data from an inner London borough.

METHOD: Haringey have taken a unique approach to NHS health checks, pairing up with the Tottenham Hotspur Foundation (THF) to offer the health checks outside of traditional GP surgeries. Between March 2014 and July 2015, 3000 health checks were carried out by the THF community health check practitioner at 25 locations in the east of the Borough.

RESULTS: The whole group data (n=2254) were analysed, comprising of 23.4% females (50.2±8.0 years) and 76.6% males (49.4±8.0 years). Alcohol consumption in males was significantly greater in the underweight compared to all other BMI groups. The underweight/normal BMI groups had significantly lower total cholesterol levels than the overweight/obese. Blood glucose levels were significantly lower in the underweight compared to overweight/obese. QRISK2 score was significantly lower in normal and underweight compared to overweight/obese males. Blood glucose levels and QRISK2 were significantly greater in the inactive/moderately inactive groups compared to the active groups.

View [abstract](#)

Qualitative

Woringer, M., Nielsen, J. J., Zibarras, L., et al. 2017. **Development of a questionnaire to evaluate patients' awareness of cardiovascular disease risk in England's National Health Service Health Check preventive cardiovascular programme.** *BMJ Open* 7(9) e014413.

AIM: to develop a questionnaire examining patients' CVD risk awareness for use in health service research evaluations of the NHS Health Check programme.

METHOD: An 85-item questionnaire was developed to determine patients' views of their risk of CVD. The questionnaire was based on a review of the relevant literature. After review by an expert panel and focus group discussion, 22 items were dropped and 2 new items were added. The resulting 65-item questionnaire with satisfactory content validity (content validity indices ≥ 0.80) and face validity was tested on 110 NHS Health Check attendees in primary care in a cross-sectional study between 21 May 2014 and 28 July 2014.

RESULTS: Following analyses of data, we reduced the questionnaire from 65 to 26 items. The 26-item questionnaire constitutes four scales: Knowledge of CVD Risk and Prevention, Perceived Risk of Heart Attack/Stroke, Perceived Benefits and Intention to Change Behaviour and Healthy Eating Intentions. Perceived Risk (Cronbach's alpha=0.85) and Perceived Benefits and Intention to Change Behaviour (Cronbach's alpha=0.82) have satisfactory reliability (Cronbach's alpha >= 0.70). Healthy Eating Intentions (Cronbach's alpha=0.56) is below minimum threshold for reliability but acceptable for a three-item scale.

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Economic

Collins, B., Kypridemos, C., Parvulescu, P., et al. 2017. **OP100 The cost-effectiveness and equity of the nhs health checks cardiovascular disease prevention programme: a microsimulation using real-world data from a deprived northern city.** *J Epidemiology and Community Health* September 2017 - Volume 71 - Suppl 1. *Society for Social Medicine*, 61st Annual Scientific Meeting, University of Manchester, 5–8 September 2017.

AIM: to determine whether Health Checks (HCs) are cost-effective and equitable in a city with high levels of deprivation and cardiovascular disease

METHOD: A previously validated microsimulation policy model was calibrated to Liverpool demographics, risk factor exposures and CVD epidemiology. The current implementation of HCs using local and national data was modelled on effectiveness, costs, and participant risk profiles. Disease costs and health state utilities were drawn from standard sources and discounted at 3.5% annually using a healthcare perspective. Three fifteen year scenarios from 2017 to 2031 were modelled A) continuing the current implementation of HCs; B) an optimal implementation of HCs assuming optimal coverage, uptake, treatment and lifestyle change; C) combining scenario A with structural policies targeting dietary consumption of salt, sugar, fruit and vegetables. All three scenarios were compared with a counterfactual of no HCs, and a rigorous sensitivity analysis conducted.

RESULTS: The model suggested that over 15 years the CVD cases prevented or postponed would be approximately 310 (40–734) for scenario A, 870 (327–1,397) for scenario B, and 1740 (815–2,939) for scenario C. Cumulative discounted net costs and quality-adjusted life years (QALYs) gained for the three scenarios respectively would be +£2.1 m (£1.5 m – +£4.8 m) and +90 QALYs (-124 – +376) for A; +£1.4 m (£6.1 m – +£6.6 m) and +434 QALYs (-76 – +1,133) for B; or £16.9 m (£33.2 m – £5.9 m) and +2,871 QALYs (+1,355 – +4,830) for C. The probability of scenarios A and B being cost-effective by 2031 was estimated at 25% and 74% respectively, valuing each QALY at £20 000. Scenario C would become cost saving by 2030. Scenario A may increase existing health inequalities; B is likely to be neutral, while C would substantially decrease inequalities.

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El-Osta, A., Woringer, M., Pizzo, E., et al. 2017. **Does use of point-of-care testing improve cost-effectiveness of the NHS Health Check programme in the primary care setting? A cost-minimisation analysis.** *BMJ Open* 7(8) e015494.

AIM: to determine if use of point of care testing (POCT) is less costly than laboratory testing to the National Health Service (NHS) in delivering the NHS Health Check (NHSHC) programme in the primary care setting.

METHOD: Observational study and theoretical mathematical model with microcosting approach. Data on NHSHC delivered at nine general practices offering NHSHC and a pathology services laboratory in the same area was collected (seven using POCT; two not using POCT). Mathematical modelling was conducted with permutations in the following fields: provider type (healthcare assistant or nurse), type of test performed (total cholesterol with either lab fasting glucose or HbA1c), cost of consumables and variable uptake rates, including rate of non-response to invite letter and rate of missed [did not attend (DNA)] appointments. Total expected cost (TEC) per 100 invites, number of NHSHC conducted per 100 invites and costs for completed NHSHC for laboratory and POCT-based pathways was calculated.

RESULTS: TEC of using POCT to deliver a routine NHSHC is lower than the laboratory-led pathway with savings of 29 per 100 invited patients up the point of cardiovascular disease risk score presentation. Use of POCT can deliver NHSHC in one sitting, whereas the laboratory pathway offers patients several opportunities to DNA appointment.

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Needs assessment

Chappell, A. 2017. **Health Needs Assessment-NHS Health Checks.**

AIM: to examine NHS Health Checks in the context of national and local policy and identify population groups who have high premature mortality prevalence rates across Bristol city

METHODS: A needs assessment was conducted by the Adults and Older People's Strategic Public Health Team in Bristol City Council.

RESULTS: Evidence of gaps in current service provision, poor local intelligence and poor uptake of commissioned services for specific population groups were identified. Current commissioned services were not always delivered in a way in which risk identification and reduction is central.

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Ongoing research

Dubois, E. 2017. **A systematic review of evaluations of a national cardiovascular disease risk assessment programme (NHS Health Check) across England**. *PROSPERO*. 2017 CRD42017076451.

AIM: to determine whether the NHS Health Check has an impact on population health

METHOD: Systematic review. Electronic databases to be searched include: OVID Medline, EMBASE, HMIC (Health Management Information Consortium), CINAHL, Cochrane Library (Wiley), PsychINFO, SCOPUS and ProQuest Dissertation & Thesis Library.

Search for studies on adults between 40 and 74 years, dated between April 2009-October 2016 and published in English. Types of study to be included: Cohort and cross-sectional. Primary outcome(s): to identify and compare local and regional studies that have undertaken an evaluation on the NHS Health Check programme in England. Secondary outcome(s): to assess how general practice organises preventative cardiovascular risk programmes and the impact on delivery; to identify factors (demographic, social, cultural, behavioural) that impact patient outcomes/mortality and morbidity.

RESULTS: Quantitative papers will be pooled. Heterogeneity will be assessed statistically using the standard Chi-square and subgroup analyses based on different quantitative study designs included in this review. If relevant, a meta-analysis will be applied. Qualitative research findings will be pooled using thematic analysis. The aggregate of findings will be rated according to their quality. Anticipated completion date: 08 January 2018.

View [details](#)

Gidlow, C. 2017. **HEalth Check TRial (HECTR): Risk-tailored invitations to improve uptake of NHS Health Checks**. *ISRCTN15840751*. *ISRCTN registry* 2017.

AIM: to design and test a NHS Health Check invitation letter personalised to the patient's level of CVD risk, and to compare the likelihood of patients attending when invited with the personalised letter compared with the standard letter and telephone invitation.

METHOD: Three-arm randomised controlled trial; single-centred; 12-month data collection period. Participants (patients aged 40-74 who are eligible for and due to have a NHS Health Check at 10 general practices in North Staffordshire) re randomly allocated to be invited to attend a Health Check using one of the three methods: standard letter, telephone call, or personalised letter. Participants are invited up to three times before being classified as a non-responder (or if they responded and declined the invitations). Primary outcome measures: uptake of NHS Health Check, measured at 12 months from baseline or earlier if the practice had invited the entire cohort before 12 months. Secondary outcome measures: response to NHS Health Check invitation, measured at 12 months from baseline or earlier if the practice had invited the entire cohort before 12 months.

RESULTS: The study protocol has not been published, but can be requested from the study team. The main result paper should be submitted by December 2017. The trialists hope to present findings at conferences in 2018 (e.g., Annual NHS Health Check conference in February 2018, if accepted to present). Expected completion date: 31st Dec 2017.

View [details](#)

References relating to general health checks (13)

Guidance

Public Health England 2017. **Action plan for cardiovascular disease prevention: 2017-2018**. Sept 2017
 AIM: to set out some of the key CVD prevention initiatives that Public Health England (PHE) is delivering in the 2017 to 2018 financial year. It is aimed at a broad audience, including those involved in the commissioning and provision of services for cardiovascular disease and its prevention, for example, clinicians, local authorities, service commissioners, public health specialists, the third sector and PHE staff.

The initiatives described represent a diversity of actions taking place in the 2017 to 2018 tax year, including tools and resources for stakeholders and the public, population level interventions and measures to tackle some of the big CVD risk factors. With actions taking place across the agency and involving multiple stakeholders, this publication demonstrates the agency's continued commitment to CVD prevention.

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Cohort studies

Carey IM, Hosking FJ, Harris T et al. 2017. **An evaluation of the effectiveness of annual health checks and quality of health care for adults with intellectual disability: an observational study using a primary care database**. *NIHR Journals Library – Health Services and Delivery Research* Volume: 5, Issue:25, September 2017.

AIM: to evaluate whether or not annual health checks for adults with intellectual disability (ID) have reduced emergency hospitalisation, and to describe health, health care and mortality for adults with ID.

METHOD: A retrospective matched cohort study using primary care data linked to national hospital admissions and mortality data sets. A total of 21,859 adults with ID compared with 152,846 age-, gender- and practice-matched controls without ID registered during 2009–13 at a total of 451 English general practices. Main outcome measures: emergency hospital admissions. Other outcomes – preventable admissions for ambulatory care sensitive conditions, and mortality

RESULTS: Compared with the general population, adults with ID had higher levels of recorded comorbidity and were more likely to consult in primary care. However, they were less likely to have long doctor consultations, and had lower continuity of care. They had higher mortality rates [hazard ratio (HR) 3.6, 95% confidence interval (CI) 3.3 to 3.9], with 37.0% of deaths classified as being amenable to health-care intervention (HR 5.9, 95% CI 5.1 to 6.8). They were more likely to have emergency hospital admissions [incidence rate ratio (IRR) 2.82, 95% CI 2.66 to 2.98], with 33.7% deemed preventable compared with 17.3% in controls (IRR 5.62, 95% CI 5.14 to 6.13). Health checks for adults with ID had no effect on overall emergency admissions compared with controls (IRR 0.96, 95% CI 0.87 to 1.07), although there was a relative reduction in emergency admissions for ambulatory care-sensitive conditions (IRR 0.82, 95% CI 0.69 to 0.99). Practices with high health check participation also showed a relative fall in preventable emergency admissions for their patients with ID, compared with practices with minimal participation (IRR 0.73, 95% CI 0.57 to 0.95). There were large variations in the health check-related content that was recorded on electronic records.

View [full text](#)

Cross-sectional

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**. *Journal of Epidemiology & Community Health* 71(1) 52-58.

AIM: to determine the impact annual health checks for adults with intellectual disability (ID) 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. Incident rate ratios (IRRs) comparing changes in admission rates are

presented for: all emergency, preventable emergency (for ambulatory care sensitive conditions (ACSCs)) and elective emergency.

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](#)

Goto, E., Ishikawa, H., Okuhara, T., et al. 2017. **Factors associated with adherence to recommendations to visit a physician after annual health checkups among Japanese employees: a cross-sectional observational study.** *Industrial Health* 19 19.

AIM: to examine the factors related to adherence to recommendations (to undergo further medical examination after annual health checkups) among Japanese employees.

METHOD: Cross-sectional study of 219 employees who had ignored recommendations to visit a physician for the previous 3 years; we assessed their work- and life-related factors, health status, and health literacy. We analyzed the data of 103 employees who met the inclusion criteria.

RESULTS: Participants who lived alone and had a primary doctor, lower job demand, and lower self-rated health were significantly more likely to adhere to recommendations, suggesting that work- and life-related factors—rather than individual health literacy—may be more important.

View [full text](#)

Hajek, A. & Hans Helmut, K. 2017. **The role of self-efficacy, self-esteem and optimism for using routine health check-ups in a population-based sample. A longitudinal perspective.** *Preventive Medicine* 105 47-51.

AIM: to examine whether factors such as self-efficacy, self-esteem and optimism are associated with the use of routine health check-ups

METHOD: Data were retrieved from a population-based longitudinal study of individuals (>=40years of age) residing in private households in Germany (two waves: 2008 and 2011). Widely established scales were used to quantify self-efficacy, self-esteem, and optimism. Respondents reported whether they used a health check-up in the last two years. Conditional fixed-effects logistic regressions were used (n=1504), adjusting for socio-demographic, lifestyle and health-related variables.

RESULTS: After adjusting for various potential confounders, regression analysis revealed that the use of routine health check-ups increased with self-efficacy [OR: 1.71 (95%-CI: 1.14-2.55)], self-esteem [OR: 1.78 (1.16-2.73)], and optimism [OR: 1.37 (1.01-1.86)]. The use of routine health check-ups increased with changes from employment to retirement [OR: 2.60 (1.34-5.03)], whereas it was not associated with changes in age, marital status, smoking status, the number of physical illnesses, self-rated health and body-mass index. The current study stresses the importance of an association between screening behavior and self-efficacy, self-esteem and optimism longitudinally.

View [abstract](#)

Hajek, A., Bock, J.-O. & König, H.-H. 2017. **The use of routine health check-ups and psychological factors—a neglected link. Evidence from a population-based study.** *Journal of Public Health* 1-8.

AIM: to determine the psychological factors associated with routine health check-ups

METHOD: Cross-sectional data were obtained from a population-based study (German Aging Survey) of individuals ≥40 years of age and residing in private households in Germany in the year 2014 (n = 7708).

Screening data and data on psychological factors were collected in self-administered questionnaires. Multiple logistic regressions were used to identify psychological correlates of screening behavior, adjusted for socio-demographic, lifestyle and health-related variables.

RESULTS: Of the participants, 65.4% used routine health check-ups regularly. After adjusting for various potential confounders, multiple logistic regressions showed that the use of routine health check-ups was positively associated with life satisfaction, positive affect, optimism, self-efficacy, self-esteem and self-regulation, whereas the outcome measure was not significantly associated with loneliness, negative affect and perceived stress. The outcome measure was positively associated with age, being married and living together with a spouse or partner, body mass index, being a non-daily smoker, drinking alcohol less than once a day and exercising. However, it was not associated with gender, income, number of physical illnesses or region.

View [abstract](#)

Ichikawa, D., Saito, T. & Oyama, H. 2017. **Impact of predicting health-guidance candidates using massive health check-up data: A data-driven analysis.** *International Journal of Medical Informatics* 106 32-36.

AIM: to improve the attendance rate of health guidance appointments in Japan, by using a machine-learning model involving a restricted but massive amount of health checkup information.

METHOD: Using machine learning methods, we developed the following five prediction models for identifying health-guidance candidates: baseline: this model included sex and age; model 1: this model included variables that can be measured in person+information on whether the examinee was a candidate in the past year; model 2: model 1+systolic blood pressure+diastolic blood pressure; model 3: model 2+all health checkup results from the past year; and model 4: model 3 using the training dataset excluding cases with missing data.

RESULTS: The performance levels of the five prediction models (the AUC values of the models for the test dataset) were as follows: 0.592 [95% CI: 0.586-0.596] for the baseline model, 0.855 [95% CI: 0.851-0.858] for model 1, 0.985 [95% CI: 0.984-0.985] for model 2, 0.993 [95% CI: 0.993-0.993] for model 3, and 0.943 [95% CI: 0.941-0.945] for model 4.

View [abstract](#)

Iseki, K., Konta, T., Asahi, K., et al. 2017. **Association of dipstick proteinuria with all cause mortality in general population: Results from the specific health check and guidance program in Japan.** *Nephrology Dialysis Transplantation* 32 (Supplement 3) iii571.

AIM: to determine the effect of dipstick urine test for predicting end-stage renal disease and mortality rate.

METHOD: Subjects were those who participated at the 2008 Tokutei-Kenshin in six districts in Japan. We identified those who might have died after the screening by using National database of death certificate from 2008 to 2012 (total registered were about 6 million). Hazard ratio (95% confidence interval, CI) was calculated using Cox proportional hazard analysis. They were adjusted for age, sex, BMI, eGFR, proteinuria, and other pertinent variables.

RESULTS: Among the total of 295,297 subjects, we identified 3,764 fatal cases by end of 2012. Among the commonly measured variables, gender (vs. female), proteinuria (vs. dipstick negative), age (years), and body mass index (kg/m²) were significant; the hazard ratio (95% CI) was 2.596 (2.402-2.805), 1.996 (1.780-2.237), 1.061 (1.055- 1.067), and 0.976 (0.965-0.988), respectively. Urine sample was not available in 544 subjects. The crude mortality rates was 1.1% in proteinuria (-) (N=257,040), 1.6% in proteinuria (+/-) (N=21,981), 2.3% in proteinuria (1+) (N=10,802), 4.1% in proteinuria (2+) (N=3,753), and 4.7% in proteinuria (3+ and over) (N=1,177). The adjusted hazard ratio (95% confidence interval) was 1.301 (1.145-1.478), 1.474 (1.252-1.735), 2.030 (1.639-2.513), and 1.873 (1.301-2.696), respectively. The leading cause of death was neoplasm in both genders. It was 51.6% of the total, 50.4% in men and 53.7% in women. The second cause of death was circulatory; 20.4% of the total, 21.1% in men and 19.2% in women.

View [abstract](#)

Okura, M., Ogita, M., Yamamoto, M., et al. 2017. **Health checkup behavior and individual health beliefs in older adults.** *Geriatrics & gerontology international* Sept 7th.

AIM: to examine the individual health beliefs and personal recommendations that strongly influence health checkup attendance among community-dwelling older adults.

METHOD: In 2013, questionnaires were sent to 5401 community-dwelling older adults who were not receiving long-term institutionalized care. The response rate was 94.3%. We analyzed response data from 4984 older adults using multiple imputation to manage missing data. Participation in health checkups was defined as having undergone at least one checkup in the past 3 years, and non-participation as having attended no checkups in this period.

RESULTS: The participants' mean age was 75.8 years, and 57.9% were women. The adjusted odds ratio of health checkup participation ranged from 1.35 (95% confidence interval [CI] 1.13-1.61) to 1.62 (95% CI 1.34-1.95) for positive individual health beliefs about health checkups, and was 2.21 (95% CI: 1.51-3.24) and 1.28 (95% CI: 1.17-2.08) for recommendations to participate from family and neighbors, respectively. All odds ratios were adjusted for age, sex, driving by oneself to daily shopping or clinic, paid work, method of response, internal medical therapy, polypharmacy, serious disease, periodic blood test, frailty and neighborly relationships.

View [abstract](#)

Roman, A., Guindi, D., Puzhko, S., et al. 2015. **How do patients experience periodic health examinations?** *Canadian Family Physician* 61 (2 Supplement 1) S39.

AIM: to explore patients' feelings about, and experience with, the periodic health examination (PHE).

METHOD: English- or French-speaking patients aged 18 or older, receiving at least 1 PHE within the previous 24 months. A random sample of patients of an urban, hospital-based academic family medicine centre was

approached by volunteers to self-administer a piloted, bilingual, anonymous 24-item survey on perceptions of and experiences with "an annual exam, complete checkup, or periodic health exam," as distinct from a visit for a new problem or follow-up of an existing one. Likert-style questions exploring patients' experiences with PHEs were predominantly derived from 4 validated tools: the National Survey Programme, the Patient Experience Questionnaire, the Recovery Self-Assessment Person in Recovery survey, and the Recovery Oriented Systems Indicators Consumer Survey 2005.

RESULTS; Of 196 patients agreeing to participate, 173 were retained in the final data set: 78.6% were female; the mean age was 48.4 years; mean years of care by the same doctor was 5.1; mean number of visits in the preceding 24 months was 4.9. More than 90% agreed or strongly agreed that their doctors respected them, listened, and informed them in a clear fashion. Overall 80% to 90% agreed or strongly agreed that their doctors were open to options for care, had concern about both medical and psychosocial issues, and recognized their rights to express worries and concerns, or refuse interventions. In total, 62.5% agreed or strongly agreed that a purpose of PHE visits was to help doctors know them better as people, while only 39.3% agreed that a purpose was for them to get to know the doctors better.

View [conference abstract](#)

Suh, Y., Lee, C. J., Cho, D. K., et al. 2017. **Impact of National Health Checkup Service on Hard Atherosclerotic Cardiovascular Disease Events and All-Cause Mortality in the General Population.** *American Journal of Cardiology* 120(10) 1804-1812.

AIM: to investigate if health checkups favorably impact the occurrence of atherosclerotic cardiovascular disease (ASCVD) and all-cause mortality in the general population

METHOD: We compared the occurrence of hard ASCVD events and all-cause deaths for 4 years starting in 2010 between participants who used the National Health Checkup Service (NHCS) more than twice and nonparticipants who never used the NHCS from 2006 to 2009. From the 342,594 survivors aged 40 to 69 years old in 2006 listed in the National Health Insurance Service-National Sample Cohort, a total of 55,275 pairs were selected by propensity matching. Hard ASCVD events were defined as the composite of myocardial infarction and stroke.

RESULTS: In the 55,275 matched pairs, we found a significant association between the use of the NHCS and the reduction in hard ASCVD events (adjusted hazard ratio=0.84, 95% confidence interval 0.76 to 0.92, $p < 0.001$) and all-cause deaths (adjusted hazard ratio=0.50, 95% confidence interval 0.45 to 0.55, $p < 0.001$). The participants had more medical care, including outpatient care and hospitalizations, and took more hypertension and dyslipidemia medications, whereas hospitalizations for more than 60 days were significantly more frequent in the nonparticipants. In the subgroup analysis, the reduction in hard ASCVD events for NHCS participants was significantly greater in patients without a previous history of dyslipidemia or who did not have outpatient care.

View [abstract](#)

Trzeciak, B. G., Siebert, J., Gutknecht, P., et al. 2017. **Cardiovascular risk factors determined via the Internet in 2 periods of time: 2004-2009 and 2010-2015 in Poland.** *International journal of occupational medicine and environmental health* 30(3) 499-510.

AIM: to compare cardiovascular risk factors and calculated fatal cardiovascular risk in 2 periods of time: 2004–2009 and 2010–2015 in Poland determined via the Internet.

METHOD: The "Rzyko program" ("Risk program") is an Internet system for gathering epidemiological data and is available on the website of the Medical University of Gdańsk. The following parameters were collected: age, sex, systolic blood pressure, total cholesterol concentration and smoking. To assess the cardiovascular death risk in a 10-year period, the algorithm of the SCORE (Systematic Coronary Risk Evaluation) project was used and 30 402 results of the algorithm have been analyzed.

RESULTS: Over 30 402 webpage visitors entered the required data and received the outcome. More than 78% of the Internet users who had entered the data, received a recommendation for medical check-up. Significant differences between the data collected in 2004–2009 and 2010–2015 were noticed. Hypercholesterolemia prevalence (67.3% vs. 70.8%; $p < 0.001$), mean total cholesterol concentration in blood (5.60+/-1.65 mmol/l vs. 5.66+/-1.35 mmol/l; $p < 0.001$), prevalence of hypertension (36.6% vs. 35.3%; $p = 0.039$), mean systolic blood pressure (131.5+/-20.3 mm Hg vs. 132.6+/-18.0 mm Hg; $p < 0.001$), prevalence of declared smoking (30.7% vs. 26.5%; $p < 0.001$), declared diabetes mellitus (DM) (6.4% vs. 9.7%; $p < 0.001$), and declared coronary artery disease (CAD) (7.2% vs. 14.1%; $p < 0.001$), respectively.

View [full text](#)

Qualitative

Stol, Y. H., Asscher, E. C. A. & Schermer, M. H. N. 2017. **What is a good health check? An interview study of health check providers' views and practices.** *BMC Medical Ethics* 18(1) 55.

AIM: to contribute to an ethical framework for responsible offers and use of personal health checks and to formulate context-sensitive yet general criteria that may be applied to all sorts of tests

METHODS: In 2015, we interviewed twenty Dutch health check providers on criteria for 'good' health checks, and the role these criteria play in their practices. Interviews were recorded, transcribed and coded.

RESULTS: Providers unanimously formulate a number of minimal criteria: Checks must focus on (risk factors for) treatable/preventable disease; Tests must be reliable and clinically valid; Participation must be informed and voluntary; Checks should provide more benefits than harms; Governmental screenings should be cost-effective. Aspirational criteria mentioned were: Follow-up care should be provided; Providers should be skilled and experienced professionals that put the benefit of (potential) users first; Providers should take time and attention. Some criteria were contested: People should be free to test on any (risk factor for) disease; Health checks should only be performed in people at high risk for disease that are likely to implement health advice; Follow up care of privately funded tests should not drain on collective resources.

View [full text](#)

References relating to diabetes and cardiovascular disease risk screening or prevention (64)

Guidance

SIGN 2017. **Guideline 149: Risk estimation and the prevention of cardiovascular disease. A national clinical guideline.** *Scottish Intercollegiate Guidelines Network (SIGN)*.

AIM: This guideline attempts to devise effective strategies for the reduction of CVD that take a combined approach using both 'high-risk' and population approaches, and to provide recommendations on estimation of CVD risk and interventions to reduce this risk in people with and without established CVD.

METHOD: A systematic review of the literature was carried out using an explicit search strategy devised by a SIGN Evidence and Information Scientist. Databases searched include CENTRAL, NIHR-HTA, Medline, Embase, CINAHL, PsycInfo and the Cochrane Library, from 2009-2015.

View [full text](#)

Evidence summaries

Bazian 2017. **NHS Choices 'Behind the Headlines' assessment of press reports that "Statins cut heart deaths in men by 28%"**. *NHS Choices*.

AIM: This summary aims to look at the science behind the news stories about a new analysis of a landmark study involving statin treatment that took place mainly in the 1990s.

METHOD: Behind the Headlines reports on where the story came from, what kind of research it was, what the research involved, what the basic results were and how the researchers interpreted the results.

RESULTS: The UK media missed the point that this isn't a new study, but a new analysis of an old study that took place in the 1990s; the analysis found that men without cardiovascular disease who were prescribed a statin were less likely to go on to develop heart disease or have a major cardiovascular event, but it is harder to draw conclusions from the longer-term results, as these were from a non-randomised observational period. The study provides evidence to back current recommendations that people at risk of heart disease benefit from taking statins, but it doesn't provide evidence that younger people should take them (as some papers reported) as everyone in the study was over the age of 45.

View [full text](#)

Coca, A., Agabiti-Rosei, E., Cifkova, R., et al. 2017. **The polypill in cardiovascular prevention: evidence, limitations and perspective—position paper of the European Society of Hypertension.** *Journal of hypertension* 35(8) 1546-1553.

AIM: to review the pros and cons of cardiovascular prevention by the polypill approach.

METHOD: unclear from abstract, full text not readily available

RESULTS: It is argued that the high prevalence of individuals with a multifactorial risk profile provides a strong rationale for a therapeutic strategy based on the combination in a single tablet of drugs against different risk factors. It is further argued that other important favourable arguments exist. First, in real-life adherence to all above treatments is very low, leading to a major increase in the incidence and risk of cardiovascular outcomes. Second, although a large number of factors are involved, adherence is adversely affected by the complexity of the prescribed treatment regimen and can be considerably improved by treatment simplification. Third, recent studies in patients with a history of manifest cardiovascular disease have documented that different cardiovascular drugs can be combined in a single tablet with no loss of their individual efficacy or unexpected inconveniences and this does favour adherence to treatment and multiple risk factor control, supporting use of the polypill in secondary cardiovascular prevention. It is finally also mentioned that the polypill may have some drawbacks and that at present no evidence is available that this approach reduces cardiovascular outcome to a greater degree than standard treatment strategies.

View [abstract](#)

Grundy, S. M. 2017. **Primary prevention of cardiovascular disease with statins: assessing the evidence base behind clinical guidance.** *Management* 12 17.

AIM: to examine different points of view and attempt to provide a reasonable approach for use of statins in primary prevention.

METHOD: A review of the literature in the following areas: four major primary prevention trials with statins; two meta-analyses of secondary prevention trials showing the relationship between LDL cholesterol and risk for atherosclerotic cardiovascular disease; comparing the meta-analysis results with population and genetic epidemiological studies on the relation between LDL cholesterol and risk for atherosclerotic disease; comparing four recent and extensive evidence-based guidelines on treatment of blood cholesterol levels in primary prevention and safety and efficacy of statins in various populations under review. In addition, the paper draws insights from three recent clinical trials showing the efficacy of statins combined with other cholesterol-lowering drugs.

RESULTS: Statins are indicated for most patients with established atherosclerotic cardiovascular disease (ASCVD) but their indications for primary prevention are much more nuanced. Most authorities agree that statin therapy is justified for individuals who are at high risk, or moderately high risk, of ASCVD. Risk status can be estimated by standard algorithms or based on the presence, or absence, of major risk factors. Standard algorithms are less robust in older people whose estimated risk is relatively high but whose actual risk may be low. Many older people have little atherosclerosis and will not benefit from statin treatment; this is particularly the case in older women.

View [full text](#)

Kazi, D. S., Penko, J. M. & Bibbins-Domingo, K. 2017. **Statins for Primary Prevention of Cardiovascular Disease: Review of Evidence and Recommendations for Clinical Practice.** *Med Clin North Am* 101(4) 689-699.

AIM: to present the current state of research on statin use in adults for primary prevention of incident atherosclerotic CVD and to provide practical advice for prescribing statins among patients without preexisting atherosclerotic CVD in general medicine practice.

METHOD: A non-systematic review of the evidence.

RESULTS: The weight of high-quality evidence argues in favor of using statin therapy for primary prevention of CVD among individuals who meet eligibility criteria proposed by the American College of Cardiology/American Heart Association or the US Preventive Services Task Force.

View [abstract](#)

Orkaby, A. R. & Rich, M. W. 2017. **Cardiovascular Screening and Primary Prevention in Older Adults.** *Clinics in Geriatric Medicine*. Volume 34, Issue 1, February 2018, Pages 81-93.

AIM: to review screening tests and prevention strategies that may be considered for primary prevention of cardiovascular disease (CVD) in older adults, with a focus on those >75 years of age, accounting for age, functional status, and medical conditions..

METHOD: a non-systematic review

RESULTS: Screening for CVD and application of primary prevention strategies in the very old should incorporate life expectancy, time to benefit, and individual goals. Additional factors to consider include physical and cognitive function, comorbidity and medication burden, and frailty. A shared decision-making process is essential to ensure that the approach to screening and prevention is well-aligned with each patient's goals and preferences. A summary of recommendations for screening and prevention strategies is provided.

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Systematic reviews

Lim, K. K., Lim, C., Kwan, Y. H., et al. 2017. **Factors of cardiovascular disease risk screening uptake among populations with low socioeconomic status: A systematic review.** *Value in Health* 20 (5) A381. Conference abstract.

AIM: to identify, classify and present factors associated with cardiovascular disease (CVD) risk screening uptake into appropriate themes.

METHOD: We systematically searched and screened articles from databases, complemented with hand-searching of references in included articles. We included full-text articles of studies which identified factors associated with CVD risk screening uptake among the adult population with low socioeconomic status (SES). We extracted study characteristics, classified the factors and recorded the magnitude and direction of association for each factor with screening uptake, as well as the strength of the evidence for the association.

RESULTS: Five out of 1363 articles were included which examined screening conducted in healthcare facilities,

participants' homes or nearby community centers, as well as screening conducted as an outreach program. We identified and categorized 33 factors positively or negatively associated with screening uptake into 6 themes. Besides lack of awareness and poor health beliefs, the factors influencing the screening uptake of low SES population include opportunity cost from missing work, concerns about judgmental screening staff and absence of companion to attend screening together.

No freely available abstract or full text

Nunes, J. P. 2017. **Statins in primary prevention: Impact on mortality. a meta-analysis study.** *Minerva Cardioangiologica* 65(5) 531-538.

AIM: to evaluate the effects of statins on total mortality in the context of primary prevention

METHOD: Published systematic reviews were used to identify relevant clinical trials, and data from the third Heart outcomes Prevention evaluation study were also used. Meta-analysis was carried out using overall mortality data.

RESULTS: a total of nine clinical trials were selected for further study, and in each of them patients had defined cardiovascular risk factors. Meta-analysis of the overall mortality results of the nine trials showed a significant reduction associated with statin therapy (odds ratio 0.886, 95% confidence limits 0.816-0.963), when compared to the control situation. At least one trial showed a numerical reduction of overall mortality with pravastatin, with atorvastatin and with rosuvastatin. Separate meta-analyses were carried out with clinical trials with each of these three drugs, yielding similar effects: pravastatin odds ratio 0.852, 95% confidence limits 0.688-1.054; atorvastatin odds ratio 0.853, 95% confidence limits 0.726-1.002; rosuvastatin odds ratio 0.870, 95% confidence limits 0.749-1.010.

View [abstract](#)

Park, T., Griggs, S., Henderson, E., et al. 2017. **PCV88 - Statin Cost Effectiveness: A Systematic Review Including The Recent Literature.** *Value in Health* 20(9) A616.

AIM: to conduct a systematic review of the literature on statin cost-effectiveness

METHOD: PubMed, Embase and Cochrane Database of Systematic Reviews were searched to identify studies published in English between May 2007 and April 2017. Studies were selected if they conducted economic evaluation of statins as first or second line treatment for patients with hypercholesterolemia and/or at risk for cardiovascular disease.

RESULTS: A total of 283 articles were identified. 16 articles met inclusion criteria. Nine studies compared statins with placebo or no treatment in their economic evaluations while seven studies evaluated cost-effectiveness between different statins. Statins were considered to be cost-effective compared with placebo in some countries; one study found pravastatin to be cost-ineffective. Mixed results were reported regarding the cost-effectiveness of rosuvastatin compared with atorvastatin.

View [conference abstract](#) (pA616)

Sun, D., Liu, J., Xiao, L., et al. 2017. **Recent development of risk-prediction models for incident hypertension: An updated systematic review.** *PLOS ONE* 12(10) e0187240.

AIM: to summarise the current development status and performance of hypertension prediction models

METHOD: Both PubMed and Embase databases were searched for eligible reports of either prediction models or risk scores of hypertension. The study data were collected, including risk factors, statistic methods, characteristics of study design and participants, performance measurement, etc.

RESULTS: From the searched literature, 26 studies reporting 48 prediction models were selected. Among them, 20 reports studied the established models using traditional risk factors, such as body mass index (BMI), age, smoking, blood pressure (BP) level, parental history of hypertension, and biochemical factors, whereas 6 reports used genetic risk score (GRS) as the prediction factor. Area under the curve (AUC) ranged from 0.64 to 0.97, and C-statistic ranged from 60% to 90%.

View [full text](#)

Tan, M. M., Lee, J. T. & Lorenc, T. 2017. **Does routine screening for cardiovascular risk factors widen socioeconomic inequalities in health? : A systematic review.** *Value in Health* 20 (5) A370.

AIM: to investigate the uptake rates of health checks for multifactorial cardiovascular disease (CVD) risk factors to understand their impact on socioeconomic inequalities in health.

METHOD: We searched Medline, Cochrane Database of Systematic Reviews; Cochrane Central Register of Controlled Trials (CENTRAL); Cochrane Methodology Register; Database of Abstracts of Reviews of Effects (DARE); NHS Economic Evaluation Database (EED); Health Technology Assessments Database (HTA); and Econlit. We selected all studies conducted at primary/community care level, which screens for CVD multifactorial risk factors with uptake and risk factors as outcomes for all population and geographical location, published between 1985

and 2016.

RESULTS: The included studies evaluated CVD health checks in various screening sites, including those conducted in General Practitioners' clinics. There was a higher likelihood of women attending health checks when compared to men. Uptake of health checks was less likely in men from low socioeconomic status. Higher uptake rates in health checks were detected in the less deprived and older age groups. Some evidence also observed higher prescription and uptake rates of health checks in south Asian patients.

View [conference abstract](#) (pA370)

Trials

Gysan, D. B., Millentrup, S., Albus, C., et al. 2017. **Substantial improvement of primary cardiovascular prevention by a systematic score-based multimodal approach: A randomized trial: The PreFord-Study.** *Eur J Prev Cardiol* 24(14) 1544-1554.

AIM: to evaluate the long-term effects of a risk-adjusted multimodal intervention in high-risk subjects.

METHOD: Prospective randomized multicentre interventional study. Individual cardiovascular risk assessment in Ford Company, Germany employees (n = 4.196), using the European Society of Cardiology-Systematic Coronary Risk Evaluation (ESC-SCORE) for classification into three risk groups. Subjects assigned to ESC high-risk group (ESC-SCORE \geq 5%), without a history of cardiovascular disease were eligible for randomization to a multimodal 15-week intervention programme (INT) or to usual care and followed up for 36 months.

RESULTS: Four hundred and forty-seven subjects were randomized to INT (n = 224) or to usual care (n = 223). After 36 months ESC-SCORE development favouring INT was observed (INT: 8.70% to 10.03% vs. usual care: 8.49% to 12.09%; p = 0.005; net difference: 18.50%). Moreover, a significant reduction in the composite cardiovascular events was observed: (INT: n = 11 vs. usual care: n = 27). Hazard ratio of intervention versus control was 0.51 (95% confidence interval 0.25-1.03; p = 0.062) in the intention-to-treat analysis and 0.41 (95% confidence interval 0.18-0.90; p = 0.026) in the per-protocol analysis, respectively. No intervention-related adverse events or side-effects were observed.

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Han, B. H., Sutin, D., Williamson, J. D., et al. 2017. **Effect of Statin Treatment vs Usual Care on Primary Cardiovascular Prevention Among Older Adults: The ALLHAT-LLT Randomized Clinical Trial.** *JAMA Intern Med* 177(7) 955-965.

AIM: to examine statin treatment among adults aged 65 to 74 years and 75 years and older when used for primary prevention in the Lipid-Lowering Trial (LLT) component of the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT-LLT).

METHOD: Post hoc secondary data analyses were conducted of participants 65 years and older without evidence of atherosclerotic cardiovascular disease; 2867 ambulatory adults with hypertension and without baseline atherosclerotic cardiovascular disease were included. The ALLHAT-LLT was conducted from February 1994 to March 2002 at 513 clinical sites. Interventions: Pravastatin sodium (40 mg/d) vs usual care (UC). Main Outcomes and Measures: The primary outcome in the ALLHAT-LLT was all-cause mortality. Secondary outcomes included cause-specific mortality and nonfatal myocardial infarction or fatal coronary heart disease combined (coronary heart disease events).

RESULTS: There were 1467 participants (mean [SD] age, 71.3 [5.2] years) in the pravastatin group (48.0% [n = 704] female) and 1400 participants (mean [SD] age, 71.2 [5.2] years) in the UC group (50.8% [n = 711] female). The baseline mean (SD) low-density lipoprotein cholesterol levels were 147.7 (19.8) mg/dL in the pravastatin group and 147.6 (19.4) mg/dL in the UC group; by year 6, the mean (SD) low-density lipoprotein cholesterol levels were 109.1 (35.4) mg/dL in the pravastatin group and 128.8 (27.5) mg/dL in the UC group. At year 6, of the participants assigned to pravastatin, 42 of 253 (16.6%) were not taking any statin; 71.0% in the UC group were not taking any statin. The hazard ratios for all-cause mortality in the pravastatin group vs the UC group were 1.18 (95% CI, 0.97-1.42; P = .09) for all adults 65 years and older, 1.08 (95% CI, 0.85-1.37; P = .55) for adults aged 65 to 74 years, and 1.34 (95% CI, 0.98-1.84; P = .07) for adults 75 years and older. Coronary heart disease event rates were not significantly different among the groups. In multivariable regression, the results remained nonsignificant, and there was no significant interaction between treatment group and age.

View [full text](#)

Hellstrand, M., Simonsson, B., Engstrom, S., et al. 2017. **A health dialogue intervention reduces cardiovascular risk factor levels: a population based randomised controlled trial in Swedish primary care setting with 1-year follow-up.** *BMC Public Health* 17(1) 669.

AIM: to evaluate the effects of a health dialogue intervention in a primary care setting offered to a population at

the age of 55 years, focusing on CVD risk factors.

METHOD: The study was performed in five primary health care centres in the county of Vastmanland, Sweden between April 2011 and December 2012. Men and women were randomly assigned to intervention (n = 440) and control groups (n = 440). At baseline, both groups filled in a health questionnaire and serum cholesterol, fasting plasma glucose, glycated haemoglobin (HbA1c), weight, height, waist (WC) and hip circumference, waist hip ratio (WHR) and systolic/diastolic blood pressure were measured. Intervention group attended a health dialogue, supported by a visualised health profile, with a possibility for further activities. Participation rates at baseline were 53% and 52% respectively. A 1-year follow-up was carried out.

RESULTS: The intervention group (n = 165) showed reductions compared to the control group (n = 177) concerning body mass index (BMI) (0.3 kg/m², p = .031), WC (2.1 cm, p </= .001) and WHR (.002, p </= .001) at the 1-year follow-up. No differences between the intervention and control groups were found in other variables. Intervention group, compared to baseline, had reduced weight, BMI, WC, WHR, HbA1c, and diet, while the men in the control group had reduced their alcohol consumption.

View [full text](#)

Lindholt J.S. and Sogaard R. 2017. **Population screening and intervention for vascular disease in Danish men (VIVA): a randomised controlled trial.** *The Lancet*, 28 August 2017.

AIM: to test the effect of screening and subsequent intervention for abdominal aortic aneurysm, peripheral arterial disease, and hypertension combined

METHOD: In this randomised controlled trial, we randomly allocated (1:1) all men aged 65–74 years living in the Central Denmark Region to screening for abdominal aortic aneurysm, peripheral arterial disease, and hypertension, or to no screening. We invited participants who were found to have abdominal aortic aneurysm or peripheral arterial disease back for confirmation and eventual initiation of relevant pharmacological therapy.. The primary outcome was all-cause mortality, assessed 5 years after randomisation, analysed in all randomly allocated participants except for those who had incorrect person identification numbers

RESULTS: Between Oct 8, 2008, and Jan 11, 2011, we randomly allocated 50 156 participants, with 25 078 (50%) each in the screening and non-screening groups. Four (<1%) participants in the screening group were lost to follow-up. After a median follow-up of 4.4 years (IQR 3.9–4.8), 2566 (10.2%) of 25 074 participants in the screening group and 2715 (10.8%) of 25 078 in the non-screening group had died. This finding resulted in a significant hazard ratio of 0.93 (95% CI 0.88–0.98; p=0.01), an absolute risk reduction of 0.006 (0.001–0.011), and a number needed to invite of 169 (89–1811). Incidences of diabetes (3995 per 100 000 person-years in the screening group vs 4129 per 100 000 person-years in the non-screening group), intracerebral haemorrhage (146 vs 140), renal failure (612 vs 649), cancer (3578 vs 3719), or 30 day mortality after cardiovascular surgery (44.57 vs 39.33) did not differ between groups

View [abstract](#). See also: [Comment. Population-based screening for vascular disease.](#) *The Lancet* 28 August 2017.

Simmons, R. K., Griffin, S. J., Lauritzen, T., et al. 2017. **Effect of screening for type 2 diabetes on risk of cardiovascular disease and mortality: a controlled trial among 139,075 individuals diagnosed with diabetes in Denmark between 2001 and 2009.** *Diabetologia* 23 23.

AIM: to compare the risk of cardiovascular disease (CVD) and mortality among incident cases of type 2 diabetes in a screened group with those in an unscreened group.

METHOD: In this register-based non-randomised controlled trial, eligible individuals were all men and women aged 40–69 years without known diabetes, registered with a general practice in Denmark (n = 1,912,392). Between 2001 and 2006, 153,107 individuals registered with 181 practices participating in the Anglo-Danish-Dutch Study of Intensive Treatment in People with Screen-Detected Diabetes in Primary Care (ADDITION)-Denmark study were sent a diabetes-risk-score questionnaire. Individuals at moderate-to-high risk were invited to visit their family doctor for assessment of diabetes status and cardiovascular risk (screening group). The 1,759,285 individuals registered with all other practices in Denmark constituted the retrospectively constructed no-screening (control) group. In this post hoc analysis, we identified individuals from the screening and no-screening groups who were diagnosed with diabetes between 2001 and 2009 (n = 139,075), and compared risk of CVD and mortality in these groups between 2001 and 2012.

RESULTS: In the screening group, 27,177/153,107 (18%) individuals attended for screening, of whom 1533 were diagnosed with diabetes. Between 2001 and 2009, 13,992 people were newly diagnosed with diabetes in the screening group (including those diagnosed by screening) and 125,083 in the no-screening group. Between 2001 and 2012, the risks of CVD and mortality were lower among individuals with diabetes in the screening group compared with individuals with diabetes in the no-screening (control) group (CVD HR 0.84, 95% CI 0.80, 0.89; mortality HR 0.79, 95% CI 0.74, 0.84).

View [abstract](#)

Cohort studies

Dalton, J. E., Perzynski, A. T., Zidar, D. A., et al. 2017. **Accuracy of Cardiovascular Risk Prediction Varies by Neighborhood Socioeconomic Position: A Retrospective Cohort Study.** *Annals of Internal Medicine* 167(7) 456-464.

AIM: to evaluate the spatial relationship between neighborhood disadvantage and major atherosclerotic cardiovascular disease (ASCVD)-related events; to evaluate the relative extent to which neighborhood disadvantage and physiologic risk account for neighborhood-level variation in ASCVD event rates.

METHOD: Observational cohort analysis of geocoded longitudinal electronic health records from a single academic health center and surrounding neighborhoods in northeastern Ohio. 109 793 patients from the Cleveland Clinic Health System (CCHS) who had an outpatient lipid panel drawn between 2007 and 2010. Time from baseline to the first occurrence of a major ASCVD event (myocardial infarction, stroke, or cardiovascular death) within 5 years, modeled as a function of a locally derived neighborhood disadvantage index (NDI) and the predicted 5-year ASCVD event rate from the Pooled Cohort Equations Risk Model (PCERM) of the American College of Cardiology and American Heart Association.

RESULTS: The PCERM systematically underpredicted ASCVD event risk among patients from disadvantaged communities. Model discrimination was poorer among these patients (concordance index [C], 0.70 [95% CI, 0.67 to 0.74]) than those from the most affluent communities (C, 0.80 [CI, 0.78 to 0.81]). The NDI alone accounted for 32.0% of census tract-level variation in ASCVD event rates, compared with 10.0% accounted for by the PCERM.

View [abstract](#)

Feldman, A. L., Griffin, S. J., Fharm, E., et al. 2017. **Screening for type 2 diabetes: do screen-detected cases fare better?** *Diabetologia* 23 23.

AIM: to investigate whether diabetes cases detected through screening have better health outcomes than clinically detected cases in a population-based cohort of adults who were eligible to be screened for diabetes at 10 year intervals.

METHOD: The Vasterbotten Intervention Programme is a community- and individual-based public health programme in Vasterbotten County, Sweden. Residents are invited to clinical examinations that include screening for diabetes by OGTTs at age 30, 40, 50 and 60 years (individuals eligible for screening, n = 142,037). Between 1992 and 2013, we identified 1024 screen-detected cases and 8642 clinically detected cases of diabetes using registry data. Clinically detected individuals were either prior screening participants (n = 4506) or people who did not participate in screening (non-participants, n = 4136). Study individuals with diabetes were followed from date of detection until end of follow-up, emigration, death or incident cardiovascular disease (CVD), renal disease or retinopathy event, and compared using Cox proportional hazard regression adjusted for calendar time, age at detection, year of detection, sex and socioeconomic status.

RESULTS: The average age at diabetes diagnosis was 4.6 years lower for screen-detected individuals compared with clinically detected individuals. Overall, those who were clinically detected had worse health outcomes than those who were screen-detected (HR for all-cause mortality 2.07 [95% CI 1.63, 2.62]). Compared with screen-detected study individuals, all-cause mortality was higher for clinically detected individuals who were screening non-participants (HR 2.31 [95% CI 1.82, 2.94]) than for those clinically detected who were prior screening participants (HR 1.70 [95% CI 1.32, 2.18]). Estimates followed a similar pattern for CVD, renal disease & retinopathy

View [abstract](#)

Finnikin, S., Ryan, R. & Marshall, T. 2017. **Statin initiations and QRISK2 scoring in UK general practice: a THIN database study.** *Br J Gen Pract*.

AIM: to investigate the relationship between CVD risk scoring in primary care and initiation of statins for the primary prevention of CVD, and the effect of changes to the National Institute for Health and Care Excellence (NICE) guidance in 2014.

METHOD: Historical cohort study using UK electronic primary care records. A cohort was created of statin-naive patients without CVD between 1 January 2000 and 31 December 2015. CVD risk scores (calculated using QRISK2 available from 2012) and statin initiations were identified. Rates of CVD risk score recording were calculated and relationships between CVD risk category (low-, intermediate-, and high-risk: <10%, 10-19.9%, and >=20% 10-year CVD risk) and statin initiation were analysed.

RESULTS: A total of 1.4 million patients were identified from 248 practices. Of these, 151 788 had a recorded CVD risk score since 2012 (10.67%) and 217 860 were initiated on a statin (15.31%). Among patients initiated on a statin after 2012, 27.1% had a documented QRISK2 score: 2.7% of low-risk, 13.8% of intermediate-risk, and 35.0% of high-risk patients were initiated on statins. Statin initiation rates halved from a peak in 2006. After the 2014 NICE guidelines, statin initiation rates declined in high-risk patients but increased in intermediate-risk patients..

View [abstract](#)

Kanegae, H., Oikawa, T., Okawara, Y., et al. 2017. **Which blood pressure measurement, systolic or diastolic, better predicts future hypertension in normotensive young adults?** *Journal of Clinical Hypertension* 19(6) 603-610.

AIM: to determine the impact of age-related differences in blood pressure (BP) components on new-onset hypertension

METHOD: A follow-up examination of 93 303 normotensive individuals (mean age 41.1 years) who underwent a health checkup in 2005 was conducted every year for 8 years. The primary end point was new-onset hypertension (systolic BP [SBP]/diastolic BP [DBP] \geq 140/90 mm Hg and/or the initiation of antihypertensive medications with self-reported hypertension).

RESULTS: During the mean 4.9 years of follow-up, 14 590 subjects developed hypertension. The impact of DBP on the risk of developing hypertension compared with optimal BP (SBP $<$ 120 mm Hg and DBP $<$ 80 mm Hg) was significantly greater than that of SBP in subjects younger than 50 years (hazard ratios, 17.5 for isolated diastolic high-normal vs 10.5 for isolated systolic high-normal [$P<.001$]; 8.0 for isolated diastolic normal vs 4.1 for isolated systolic normal [$P<.001$]). Among the subjects 50 years and older, the corresponding effects of DBP and SBP were similar.

View [abstract](#)

Okada, R., Tsushita, K., Wakai, K., et al. 2017. **Lower risk of progression from prediabetes to diabetes with health checkup with lifestyle education: Japan Ningen Dock study.** *Nutrition Metabolism & Cardiovascular Diseases* 27(8) 679-687.

AIM: to investigate whether the progression from prediabetes to diabetes is lower among those who undertake Ningen Dock (comprehensive health checkups with lifestyle education and doctor's consultation) than those who undertake basic mandatory occupational health checkups.

METHOD: Subjects aged 30-69 years with complete annual data from 2008 to 2012 for either Ningen Dock or basic health checkups were enrolled. Subjects with prediabetes (fasting plasma glucose 100-125 mg/dl or HbA1c 5.7-6.4%) at baseline were selected (14,928 in the comprehensive group and 10,433 in the basic group). The incidence of diabetes (fasting plasma glucose \geq 126 mg/dl, HbA1c \geq 6.5% or taking glucose-lowering drugs) and the reduction of risk factors were compared. After 4 years, 3226 cases of diabetes occurred among 25,361 subjects with prediabetes. The incidence of diabetes was lower in the comprehensive group than the basic group (2.9 vs. 3.8 cases/100 person-years, hazard ratio 0.75, 95% confidence interval 0.68-0.81 after adjustment).

Moreover, more overweight subjects controlled their body mass index (16.2% vs. 13.2%) and more began a daily exercise habit (11.8% vs. 8.5%) in the comprehensive group than in the basic group. The incidence of diabetes was lower in subjects who could control their weight or start daily exercise at year 1 in the comprehensive group.

View [abstract](#)

Padwal, R., Rashead, M., Snider, J., et al. 2017. **Worksite-based cardiovascular risk screening and management: a feasibility study.** *Vascular Health & Risk Management* 13 209-213.

AIM: to examine the feasibility and usefulness of using embedded health care providers to perform cardiovascular risk factor screening and management onsite in the workplace

METHOD: In a 2-phase collaborative demonstration project between Alberta Health Services (AHS) and the Alberta Newsprint Company (ANC), ANC employees were offered cardiovascular risk factor screening and management. Screening was performed at the worksite by AHS nurses, who collected baseline history, performed automated blood pressure measurement and point-of-care testing for lipids and A1c, and calculated 10-year Framingham risk. Employees with a Framingham risk score of \geq 10% and uncontrolled blood pressure, dyslipidemia, or smoking were offered 6 months of pharmacist case management to optimize their risk factor control.

RESULTS: In total, 87 of 190 (46%) employees volunteered to undergo cardiovascular risk factor screening. Mean age was 44.5 \pm 11.9 years, 73 (83.9%) were male, 14 (16.1%) had hypertension, 4 (4.6%) had diabetes, 12 (13.8%) were current smokers, and 9 (10%) had dyslipidemia. Of 36 employees with an estimated Framingham risk score of \geq 10%, 21 (58%) agreed to receive case management and 15 (42%) attended baseline and 6-month follow-up case management visits. Statistically significant reductions in left arm systolic blood pressure (-8.0 \pm 12.4 mmHg; $p=0.03$) and triglyceride levels (-0.8 \pm 1.4 mmol/L; $p=0.04$) occurred following case management.

View [full text](#)

Paige, E., Barrett, J., Pennells, L., et al. 2017. **Use of Repeated Blood Pressure and Cholesterol Measurements to Improve Cardiovascular Disease Risk Prediction: An Individual-Participant-Data Meta-Analysis.** *American Journal of Epidemiology* 186(8) 899-907.

AIM: to quantify the change in risk discrimination and stratification of people according to their predicted 5-year

CVD risk when the information from repeated measurements of risk predictors was added to the assessment of single measurements of risk factor levels used in standard risk scores

METHOD: We used data on 191,445 adults from the Emerging Risk Factors Collaboration (38 cohorts from 17 countries with data encompassing 1962–2014) with more than 1 million measurements of systolic blood pressure, total cholesterol, and high-density lipoprotein cholesterol. Over a median 12 years of follow-up, 21,170 CVD events occurred. Risk prediction models using cumulative mean values of repeated measurements and summary measures from longitudinal modeling of the repeated measurements were compared with models using measurements from a single time point. Risk discrimination (C-index) and net reclassification were calculated, and changes in C-indices were meta-analyzed across studies.

RESULTS: Compared with the single-time-point model, the cumulative means and longitudinal models increased the C-index by 0.0040 (95% confidence interval (CI): 0.0023, 0.0057) and 0.0023 (95% CI: 0.0005, 0.0042), respectively. Reclassification was also improved in both models; compared with the single-time-point model, overall net reclassification improvements were 0.0369 (95% CI: 0.0303, 0.0436) for the cumulative-means model and 0.0177 (95% CI: 0.0110, 0.0243) for the longitudinal model.

View [full text](#)

Ribeiro, A., Baptista, S. B., Faustino, M., et al. 2017. **Diabetes Screening in Patients with Macrovascular Coronary Disease: Are the New European Guidelines a Step Backwards?** *Acta Medica Portuguesa* 30(6) 434-442.

AIM: to evaluate the new strategy (proposed by the new European guidelines on diabetes mellitus and cardiovascular diseases) that the FINnish Diabetes RiSk SCore should be used to evaluate the risk of diabetes mellitus, that diabetes mellitus screening in coronary artery disease patients should be based on fasting glucose and HbA1c and that the 2 hour oral glucose tolerance test is now only recommended for 'inconclusive' cases.

METHOD: Fasting glucose, HbA1c and glucose tolerance test (75 g, 2h) were prospectively evaluated in a consecutive group of pts with coronary artery disease. ADA criteria (both glucose tolerance test and HbA1c) were used to define diabetes mellitus and pre-diabetes mellitus. Diabetes mellitus risk was evaluated according to the FINnish Diabetes RiSk SCore.

RESULTS: A total of 135 patients were included (mean age 62.3 +/- 13.1 years, 99 males). Glucose tolerance test and HbA1c together diagnosed 18 (13.3%) new cases of diabetes mellitus and 77 (57.0%) patients with pre-diabetes mellitus. Fasting glucose + HbA1c (guidelines strategy) identified 12/18 patients with diabetes mellitus (Sens 66.7%; negative predictive value 95.1%; Kappa 0.78; p < 0.0001) and 83/95 patients with glucose anomalies (pre-diabetes mellitus + diabetes mellitus) (Sens 87.4%; negative predictive value 76.9%). Performing glucose tolerance test in the 29 patients with an elevated FINnish Diabetes RiSk SCore would allow identifying 15/18 patients with diabetes mellitus (Sens 83.3%; negative predictive value 97.5%; Kappa 0.85; p < 0.0001) and 86/95 patients with glucose anomalies (Sens 90.5%; negative predictive value 81.6%).

View [full text](#)

Robinson, T., Jackson, R., Wells, S., et al. 2017. **An observational study of how clinicians use cardiovascular risk assessment to inform statin prescribing decisions.** *The New Zealand Medical Journal*(1463).

AIM: to understand how New Zealand primary care clinicians use CVD risk assessment estimates to inform new statin prescribing.

METHOD: We used a cohort of patients seen in primary care who have had a CVD risk estimated on the basis of a New Zealand modified Framingham risk equation. These patients were linked to national pharmaceutical dispensing records to determine new statin use in the following six months. Regression discontinuity and logistic regression analysis, and graphical approaches, were used to explore associations between estimated CVD risk and primary clinicians' decisions to initiate statin treatment.

RESULTS: There were 76,571 patients aged 35 to 75 who were not on a statin, had a first recorded CVD risk assessment between July 2007 and June 2011, and for whom national guidelines recommended management on the basis of estimated CVD risk. Statin dispensing increased with increasing CVD risk. There was no evidence of sudden jumps in the proportions of patients dispensed statins at guideline recommended treatment threshold values of 15% and 20% CVD risk (P=0.314 and 0.731). A logistic regression model using the CVD risk score predicted statin initiation better than models using lipid measures (Area Under the Curve 0.725 versus 0.682). However, further modelling and graphical analysis suggested clinicians were using a range of other information to inform the initiation.

View [abstract](#)

Senmaru, T., Majima, S., Fukuda, T., et al. 2017. **HOMA-IR/1,5-AG ratio is a novel parameter for predicting the incidence of type 2 diabetes: The Ayabe study.** *Diabetes* 66 A415.

AIM: to determine whether the HOMA-IR/1,5-AG ratio (HOMA-IR value/1,5- AG value x 100) was a useful parameter for predicting the incidence of type 2 diabetes.

METHOD: We performed a population-based cohort study in a medical checkup center in Japan.

RESULTS: Of the 1,052 participants (575 males and 477 females, 55.2 +/- 11.2 years), 76 participants (7.2%) were diagnosed with type 2 diabetes after 5 years of follow-up. The cut-off value for HOMAIR/ 1,5-AG ratio associated with the incidence of type 2 diabetes was 7.4. The incidence rate of type 2 diabetes was 3.6% (26/729) in participants with a HOMA-IR/1,5-AG ratio < 7.4 and 15.5% (50/323) in those with a ratio >= 7.4. The adjusted odds ratio of HOMA-IR/1,5-AG ratio >= 7.4 for the progression of type 2 diabetes was 3.85 (95% CI, 2.18-6.92). We also found a very highrisk group for type 2 diabetes by introducing the HOMA-IR/1,5-AG ratio criterion (>= 7.4) into the diagnosis of prediabetes using the HbA1c criterion (5.7- 6.4%). The adjusted odds ratio of the highest-risk group (HbA1c >= 5.7% and HOMA-IR/1,5-AG ratio >= 7.4) compared with the lowest-risk group (HbA1c < 5.7% and HOMA-IR/1,5-AG ratio < 7.4) was 50.09 (95% CI, 14.29-318.76). Furthermore, even participants with a low HbA1c level (< 5.7%), high HOMAIR/ 1,5-AG ratio group (>= 7.4) had an increased risk for the future development of type 2 diabetes (odds ratio, 7.69; 95% CI, 1.75-53.17).

View [conference abstract](#) (pA415)

Skurka, I. & Mauk, K. L. 2017. **Best Practice for Assessing Cardiovascular Risk in Asymptomatic Women Ages 35-54 Years.** *Journal of Cardiovascular Nursing* 32(5) 422-422.

AIM: to determine the effect of cardiovascular screening after implementing and evaluating cardiovascular risk stratification and lifestyle modification.

METHOD: A single cohort preintervention and postintervention design. This implementation was compared with current practice for women who were asymptomatic for coronary artery disease and between the ages of 35 and 54 years. The American College of Cardiology (ACC)/American Heart Association (AHA) Atherosclerotic Cardiovascular (ASCVD) Risk Estimator score was calculated on a single cohort of women between the ages of 35 and 54 years at a medical clinic for the underserved in Midwest. The 2013 ACC/AHA Lifestyle Guideline was used to educate the participants regarding therapeutic lifestyle changes. Paired sample t tests were run to analyze the means of prescale data compared with postscale data on each participant in the cohort (N = 34).

RESULTS: The results were statistically significant in modifiable risk factors including triglycerides (P = .043), weight (P = .006), and body mass index (P = .004). There was a marginally significant difference from pre-ASCVD lifetime risk score to post-ASCVD lifetime risk score (P = 0.05). This evidence-based project supports the best practice recommendation for assessing cardiovascular risk using the ACC/AHA ASCVD Risk Estimator.

View [abstract](#)

Stulc, T., Lanska, V., Snejdrlova, M., et al. 2017. **A comprehensive guidelines-based approach reduces cardiovascular risk in everyday practice: the VARO study.** *Archives of Medical Science* 13(4) 705-710.

AIM: to investigate the possibility of cardiovascular risk improvement through systematic identification of high-risk individuals and treatment in accordance with current guidelines using modern therapy in daily clinical practice.

METHOD: Two hundred and sixty-three physicians participated in the study. The physicians were asked to screen for cardiovascular risk factors in patients presenting with unrelated problems and to re-evaluate the attainment of treatment goals in those with already known risk factors. Each physician enrolled up to 20 consecutive patients with hypertension and/or hyperlipidemia. A total of 3015 patients were included. Cardiovascular risk was assessed using the SCORE system. Risk factors were treated in accordance with current national guidelines. Patients were examined at baseline and after 3 and 6 months.

RESULTS: The principal result is that global cardiovascular risk decreased by 35% (from 8.9 +/-6.4 to 5.9 +/-4.4, p < 0.001). Systolic and diastolic blood pressure decreased by 12.5% (from 152 +/-18 to 133 +/-11, p < 0.001) and 11.4% (from 88 +/-11 to 78 +/-7, p < 0.001). The level of total cholesterol decreased 21% (from 6.3 +/-1.2 to 5.0 +/-0.9, p < 0.001) and the concentration of LDL-C decreased 28% (from 3.9 +/-1.1 to 2.8 +/-0.8, p < 0.001). HDL-C increased by 7% (from 1.43 +/-0.58 to 1.53 +/-0.56, p < 0.001) and triglycerides decreased by 25% (from 2.4 +/-1.3 to 1.8 +/-0.9, p < 0.001). Blood pressure and LDL-C target values were reached in 68% and 34%of patients, respectively.

View [full text](#)

Tao, L. X., Yang, K., Huang, F. F., et al. 2017. **Association of Waist Circumference Gain and Incident Prediabetes Defined by Fasting Glucose: A Seven-Year Longitudinal Study in Beijing, China.** *International Journal of Environmental Research & Public Health [Electronic Resource]* 14(10) 10.

AIM: to assess the risk of prediabetes with seven-year changes in abdominal obesity as measured by waist circumference (WC) in Chinese adults and whether the relationship differs by gender

METHOD: A total of 7951 participants who underwent health check-ups at the Beijing Physical Examination Center and Beijing Xiaotangshan hospital were recruited in 2009 and followed up in 2016. Participants were classified into four groups according to categories of percent WC gain: $\leq -2.5\%$, $-2.5-2.5\%$, $2.5-5\%$, and $>5\%$. The effect of WC gain on prediabetes was evaluated using modified Poisson regression models.

RESULTS: Over seven years of follow-up, we identified 1034 prediabetes cases (413 women). Compared with a WC gain of $\leq -2.5\%$, participants with a WC gain of $>5\%$ have a higher risk of prediabetes, be they male (non-abdominal obesity at baseline group: RR = 1.57, 95% CI: 1.10-2.24, abdominal obesity at baseline group: RR = 1.66, 95% CI: 1.20-2.30) or female (non-abdominal obesity at baseline group: RR = 1.74, 95% CI: 1.14-2.64, abdominal obesity at baseline group: RR = 2.47, 95% CI: 1.43-4.28).

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Tiffe, T., Wagner, M., Rucker, V., et al. 2017. **Control of cardiovascular risk factors and its determinants in the general population- findings from the STAAB cohort study.** *BMC Cardiovasc Disord* 17(1) 276.

AIM: to investigate the adoption of adequate risk factor control and its determinants in the general population free of cardiovascular disease (CVD).

METHOD: Data from the Characteristics and Course of Heart Failure Stages A-B and Determinants of Progression (STAAB) Cohort Study, a population-based study of inhabitants aged 30 to 79 years from the general population of Wurzburg (Germany), were used. Proportions of participants without established CVD meeting targets for risk factor control recommended by 2016 ESC guideline were identified. Determinants of the accumulation of insufficiently controlled vascular risk factors (three or more) were assessed.

RESULTS: Between December 2013 and April 2015, 1379 participants without CVD were included; mean age was 53.1 +/- 11.9 years and 52.9% were female; 30.8% were physically inactive, 55.2% overweight, 19.3% current smokers. Hypertension, dyslipidemia, and diabetes mellitus were prevalent in 31.8%, 57.6%, and 3.9%, respectively. Treatment goals were not reached despite medication in 52.7% of hypertensive, in 37.3% of hyperlipidemic and in 44.0% of diabetic subjects. Insufficiently controlled risk was associated with male sex (OR 1.94, 95%CI 1.44-2.61), higher age (OR for 30-39 years vs. 70-79 years 4.01, 95%CI 1.94-8.31) and lower level of education (OR for primary vs. tertiary 2.15, 95%CI 1.48-3.11).

[View full text](#)

Gitsels, L. A., Kulinskaya, E. & Steel, N. 2016. **Survival Benefits of Statins for Primary Prevention: A Cohort Study.** *PloS one* 11(11) e0166847.

AIM: to estimate the effect of statin prescription on mortality in the population of England and Wales with no previous history of cardiovascular disease.

METHOD: Primary care records from The Health Improvement Network 1987-2011 were used. Four cohorts of participants aged 60, 65, 70, or 75 years at baseline included 118,700, 199,574, 247,149, and 194,085 participants; and 1.4, 1.9, 1.8, and 1.1 million person-years of data, respectively. The exposure was any statin prescription at any time before the participant reached the baseline age (60, 65, 70 or 75) and the outcome was all-cause mortality at any age above the baseline age. The hazard of mortality associated with statin prescription was calculated by Cox's proportional hazard regressions, adjusted for sex, year of birth, socioeconomic status, diabetes, antihypertensive medication, hypercholesterolaemia, body mass index, smoking status, and general practice. Participants were grouped by QRISK2 baseline risk of a first cardiovascular event in the next ten years of $<10\%$, $10-19\%$, or $\geq 20\%$.

RESULTS: There was no reduction in all-cause mortality for statin prescription initiated in participants with a QRISK2 score $<10\%$ at any baseline age, or in participants aged 60 at baseline in any risk group. Mortality was lower in participants with a QRISK2 score $\geq 20\%$ if statin prescription had been initiated by age 65 (adjusted hazard ratio (HR) 0.86 (0.79-0.94)), 70 (HR 0.83 (0.79-0.88)), or 75 (HR 0.82 (0.79-0.86)). Mortality reduction was uncertain with a QRISK2 score of $10-19\%$: the HR was 1.00 (0.91-1.11) for statin prescription by age 65, 0.89 (0.81-0.99) by age 70, or 0.79 (0.52-1.19) by age 75.

[View full text](#)

Cross-sectional studies

Hadlaq, E. M., Faraj, Z. T., Al Gamdi, F. M., et al. 2017. **Early Screening of Diabetes and Hypertension in Primary Care Dental Clinics at King Saud University in Riyadh, Kingdom of Saudi Arabia.** *Journal of Contemporary Dental Practice [Electronic Resource]* 18(8) 652-659.

AIM: to determine the effectiveness of screening of diabetes and hypertension in dental clinics.

METHOD: This cross-sectional study was carried out in the primary care dental clinics at the Dental College in King Saud University in Riyadh, Saudi Arabia. Before starting any treatment, a face-to-face interview was administered to collect a brief medical history and personal data followed by measurement of body mass index (BMI). Blood pressure level reading was obtained using electrical sphygmomanometer. Finally, a glucose level reading was obtained from capillary blood from the patient's third fingertip using glucose reader.

RESULTS: Our study included 283 participants, 118 of whom were females (41.7%). Our study showed that a significant amount of the participants are at risk of having hypertension (44.8%). In addition, a significant number (10.2%) of the participants are at risk of having diabetes. Furthermore, 35.7% of the sample had obesity as a risk factor for diabetes and hypertension.

View [full text](#)

Jahangard-Rafsanjani, Z., Hakimzadeh, N., Sarayani, A., et al. 2017. **A community pharmacy-based cardiovascular risk screening service implemented in Iran.** *Pharmacy Practice* 15(2) 919.

AIM: to assess the outcomes and feasibility of a pharmacy-based cardiovascular screening in an urban referral community pharmacy in Iran.

METHOD: A cross sectional study was conducted in a referral community pharmacy. Subjects aged between 30-75 years without previous diagnose of cardiovascular disease or diabetes were screened. Measurement of all major cardiovascular risk factors, exercise habits, medical conditions, medications, and family history were investigated. Framingham risk score was calculated and high risk individuals were given a clinical summary sheet signed by a clinical pharmacist and were encouraged to follow up with their physician. Subjects were contacted one month after the recruitment period and their adherence to the follow up recommendation was recorded.

RESULTS: Data from 287 participants were analyzed and 146 were referred due to at least one abnormal laboratory test. The results showed 26 patients with cardiovascular disease risk greater than 20%, 32 high systolic blood pressure, 22 high diastolic blood pressures, 50 high total cholesterol levels, 108 low HDL-C levels, and 22 abnormal blood glucose levels. Approximately half of the individuals who received a follow up recommendation had made an appointment with their physician. Overall, 15.9% of the individuals received medications and 15.9% received appropriate advice for risk factor modification. Moreover, 7.5% were under evaluation by a physician.

View [full text](#)

Labeit, A., Kadir, A. & Peinemann, F. 2017. **Blood pressure and cholesterol level checks as dynamic interrelated screening examinations.** *Scientific Reports* 7(1) 13235.

AIM: to analyse the determinants of screening uptake for blood pressure and cholesterol level checks; also to investigate the presence of possible spillover effects from one type of cardiovascular screening to another type of cardiovascular screening.

METHOD: A dynamic random effects bivariate panel probit model with initial conditions (Wooldridge-type estimator) was adopted for the estimation. The outcome variables were the participation in blood pressure and cholesterol level checks by individuals in a given year. The balanced panel sample of 21,138 observations was constructed from 1,626 individuals from the British Household Panel Survey (BHPS) between 1996 and 2008.

RESULTS: The analysis showed the significance of past screening behaviour for both cardiovascular screening examinations. For both cardiovascular screening examinations state dependence exist. The study also shows a significant spillover effect of the cholesterol level check on the blood pressure check and vice versa. Also a poorer health status led to a higher uptake for both types of screening examinations. Changes in recommendations have to consider the fact that taking part in one type of cardiovascular screening examination can influence the decision to take part in the other type of cardiovascular screening examination.

View [full text](#)

Li, Y., Yatsuya, H., Hirakawa, Y., et al. 2017. **A point-based prediction model for predicting 10-year risk of developing type 2 diabetes mellitus in Japanese men: Aichi workers' cohort study.** *Circulation. Conference: American Heart Association's Epidemiology and Prevention/Lifestyle and Cardiometabolic Health* 135(no pagination).

AIM: to develop a point-based prediction model for 10-year risk of developing T2DM incidence in middle-aged Japanese men.

METHOD: We followed 3,540 males in a worksite in Japan who were aged 35-64 years and free of diabetes in

2002 until March 31, 2015. Relationships of baseline age (continuous), BMI (<23, 23-<25 [reference category (Ref)], 25-<27.5, >=27.5 kg/m²), current smoking status (yes, no [Ref]), alcohol consumption (0 [Ref], <23, 23-<46, >=46 g/day), regular exercise of a moderate or higher intensity, an interval of >=3 days per week, and a duration of >=30 minutes per time (yes [Ref], no), medication use for dyslipidemia (yes, no [Ref]), family history of diabetes (having the first degree's relatives with diabetes, not having [Ref]), serum triglycerides (<150 [Ref], >=150 mg/dl), high density lipoprotein cholesterol (>=40 [Ref], <40 mg/dl), and fasting blood glucose (<100 [Ref], 100-<110, 110-<126 mg/dl) with incidence of T2DM were examined by Cox proportional hazard model.

RESULTS: During the median follow-up of 12.2 years, 342 males developed T2DM. The point-based model employing BMI, current smoking status, family history of diabetes, and blood levels of triglycerides and fasting blood glucose showed reasonable discrimination (c-statistics: 0.73) and goodness of fit (Hosmer-Lemeshow p=0.22).

View [conference abstract](#)

Lim, K. K., Lim, C., Kwan, Y. H., et al. 2017. **Association between access to health-promoting facilities and participation in cardiovascular disease (CVD) risk screening among populations with low socioeconomic status (SES) in Singapore.** *Value in Health* 20 (5) A381-A382.

AIM: to examine associations between minimum distances (proxy of access) to health-promoting facilities and door-to-door, cardiovascular disease risk screening participation, among populations with low socioeconomic status (SES) residing in public rental flats in Singapore.

METHOD: We obtained corresponding block screening participation rates from 66 blocks housing a total of 2619 residents, from Health Mapping Exercises conducted from 2013-2015. Uni- and multi-variate negative binomial regression were used to test associations between minimum distances to facilities (private subsidized clinics, certified healthy eateries, polyclinics and parks) and block screening participation rate, adjusting for age, ethnicity, gender and planning region. We also repeated the multi-variate analyses, to test if the associations varied according to regions.

RESULTS: Uni-variate analyses showed an association between block screening participation rate and minimum distance to polyclinics - which disappeared in multi-variate analyses. After adjusting for interaction, 3 independent variables, minimum distance to subsidized private clinics (IRR 1.52, 95% CI 1.12-2.05) in the East region, as well as polyclinics (IRR 0.92, 95% CI 0.88-0.96) and parks (IRR 1.42, 95% CI 1.11-1.81) in the North/Northeast regions were shown to be significant. No association was observed for healthy eateries for all 3 regions.

View [conference abstract](#) (pA381-A382)

Nawata, K., Matsumoto, A., Kajihara, R., et al. 2017. **Evaluation of the distribution and factors affecting blood pressure using medical checkup data in Japan.** *Health* 9(1) 124-137.

AIM: to evaluate the distribution of blood pressure (BP) using medical check-up data

METHOD: A dataset containing 113,979 measurements in 48,022 individuals was used, with the cooperation of one health insurance society in Japan from April, 2013 to March, 2016.

RESULTS: The means of the systolic BP (SBP) and diastolic BP (DBP) were 125.4 and 77.6 mmHg with standard deviations of 16.5 and 11.7 mmHg, respectively. Under the 140/90 criterion, 21.6% of the measurements showed hypertension. According to the World Health Organization/International Society of Hypertension criterion, 16.4%, 4.2% and 0.96% were classified as grades 1, 2 and 3, respectively. The factors affecting BP were evaluated by a regression analysis and were found to include age, gender, some eating habits, daily activities, smoking, drinking alcohol, sleeping and wages. Age was a very important factor, and the age cohorts from the previous study might be revised based on these findings. Among factors that individuals can control, the influence of drinking alcohol is very large. Comparing to an individual who does not drink, SBP and DBP of a heavy drinker are more than 5.0 mmHg higher on the average.

View [full text](#)

Pannu, J., Poole, S., Shah, N., et al. 2017. **Assessing Screening Guidelines for Cardiovascular Disease Risk Factors using Routinely Collected Data.** *Scientific Reports* 7(1) 6488.

AIM: to investigate if laboratory data can be used to assess whether physician-retesting patterns are in line with established guidelines, and if these guidelines identify deteriorating patients in a timely manner.

METHOD: A total of 7594 patients with high cholesterol were studied, along with 2764 patients with diabetes.

RESULTS: More than 90% of borderline high cholesterol patients are retested within the 3 year recommended period, however less than 75% of pre-diabetic patients have repeated tests within the suggested 1-year time frame. Patients with borderline high cholesterol typically progress to full high cholesterol in 2-3 years, and pre-

diabetic patients progress to full diabetes in 1-2 years. Established guidelines for testing of total serum cholesterol for hypercholesterolemia are appropriate and are well-adhered to, whereas guidelines for glycated hemoglobin A1c testing for type 2 diabetes mellitus could be improved to bring them in line with current practice and avoid unnecessary testing.

View [full text](#)

Santos, K. G. D., Monteiro, A. S., Paiva, C. C. J., et al. 2017. **SUN-P125: Application of the Findrisc Questionnaire to Screening the Risk of Diabetes Mellitus in Patients with Cardiovascular Disease.** *Clinical Nutrition* 36 S100-S100.

AIM: to verify the risk of developing DM in patients referred for nutritional follow-up through the Finnish Diabetes Risk Score (Findrisc).

METHOD: Cross-sectional study at an Institute of Cardiology with patients aged ≥ 18 years, without diagnosis of DM or hypoglycemic drugs. Data were collected from the medical record: age, gender, body mass index (BMI), abdominal circumference (CA), fasting glucose (FG) and glycated haemoglobin (HbA1c), physical activity, fruit and vegetable consumption, antihypertensive drugs and family history of DM.

RESULTS: Among the 95 patients evaluated, there was a predominance of the female gender (64.2%), with a mean age of 57.9 ± 13.1 years. According to Findrisc's classification, 57.90% had a high or very high risk of developing DM (47.37% and 10.53%, respectively). Among the analyzed variables, the most important to the elevation of the score were BMI (32.63% between 25 and 30 kg/m² and 48.42% ≥ 30 kg/m²), CA (16.84% equivalent to high risk and 66.32% very high risk), sedentary lifestyle (55,79%), use of antihypertensive drugs (73%) and family history of DM (56.84%). The FG was altered in 33.68%, with a mean of 95 ± 12.37 mg/dL and the HbA1c with a mean of $6.1 \pm 3.81\%$, a value that also corresponds to the high risk for the development of DM.

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Satman, I., Kalaca, S., Idiz, C., et al. 2017. **A cross-sectional evaluation of the findrisc questionnaire: A tool to identify undiagnosed diabetes and prediabetes in Turkey.** *Diabetes* 66 A426.

AIM: to assess the performance of the Diabetes Risk Score (FINDRISC) as a screening tool for undetected diabetes and prediabetes in the general population in Turkey.

METHOD: In the cross-sectional, population-based TURDEP-II survey, a total of 20,005 subjects (64% W) aged 20+ were evaluated including OGTT and A1c, lifestyle habits and anthropometrics.

RESULTS: The (Area Under the Curve) AUC-ROC for diabetes was 0.67 in W and M ($p < 0.001$). The best cutoff was 9.5 in W and 8.5 in M. The sensitivity and specificity at cutoff 10.5 for diabetes were 50.2% and 62.9% in W, and 37.3% and 82.9% in M. The AUC for A1c-based diabetes was 0.73 in both genders with a best cutoff at 10.5 in W, and 9.5 in M. The sensitivity and specificity at cutoff 10.5 in W and M were: 60.5% and 71.8%, and 46.3% and 81.4%, respectively. The AUC for prediabetes (IFG and/or IGT) was 0.66 in W and 0.65 in M with a best cutoff at 8.5 in W and 7.5 in M. The situation was similar for high risk A1c (AUC: 0.66 for both genders, best cutoff 8.5 in W and 7.5 in M).

View [conference abstract](#) (pA426)

Ueda, P., Lung, T. W., Clarke, P., et al. 2017. **Application of the 2014 NICE cholesterol guidelines in the English population: a cross-sectional analysis.** *Br J Gen Pract* 67(662) e598-e608.

AIM: to determine risk factor levels required to exceed the risk threshold for statin therapy, and to estimate the number of adults in England who would require statin therapy under the guidelines.

METHOD: Cross-sectional study using a sample representative of the English population aged 30-84 years. To estimate 10-year CVD risk different combinations of risk factor levels were entered into the QRISK2 algorithm. The NICE guidelines were applied to the sample using data from the Health Survey for England 2011.

RESULTS: Even with optimal risk factor levels, males of different ethnicities would exceed the 10% risk threshold between the ages of 60 and 70 years, and females would exceed the threshold between 65 and 75 years. Under the NICE guidelines, 11.8 million males and females (37% of the adults aged 30-84 years) would require statin therapy, most of them (9.8 million) for primary prevention. When analysed by age, 95% of males and 66% of females without CVD in ages 60-74 years, including all males and females in ages 75-84 years, would require statin therapy.

View [abstract](#)

Vinther, J. L., Jacobsen, R. K. & Jorgensen, T. 2017. **Current European guidelines for management of cardiovascular disease: Is medical treatment in nearly half a population realistic?** *European Journal of Preventive Cardiology* 2047487317738826.

AIM: to estimate the proportion of the general Danish population fulfilling the criteria for medical treatment and

lifestyle intervention preventing CVD as per the current 2016 European guidelines on CVD prevention
METHOD: A cross-sectional, population-based study of 978 men and women aged 40–65 years examined in 2010–2011 was used to estimate the proportion of the general Danish population fulfilling the criteria from the clinical guidelines from the ESC on medical treatment and lifestyle intervention to prevent cardiovascular disease. The ESC criteria for medical treatment and lifestyle intervention were applied to a general population using information on previous cardiovascular diseases, known diabetes, urinalbumin, smoking, total cholesterol, systolic and diastolic blood pressure, low-density lipoprotein cholesterol and a multifactor risk score (SCORE).
RESULTS: A total of 12.5% fulfilled the criteria for immediate medical treatment to prevent cardiovascular diseases. Furthermore, 30.4% are recommended for medical treatment if an initial lifestyle intervention fails summing to 42.9% eligible for medical treatment. The majority (79%) of persons aged 60–65 years are eligible for medical treatment, while close to half (44.9%) of all persons aged 50–59 years are recommended for medical treatment.

View [full text](#)

Xu, S., Ming, J., Xing, Y., et al. 2016. **Diabetes awareness and screening in high-risk populations in China: A nationwide, population-based survey.** *The Lancet Diabetes and Endocrinology* ISSUE 3) S27.

AIM: to investigate among people recommended for screening and those not recommended—the prevalence of diabetes, the frequency and the determinants of diabetes awareness, and the rate of regular check-ups in those diagnosed with diabetes.

METHOD: We analysed data from the 2007 and 2008 China National Diabetes and Metabolic Disorders Survey, in which a nationally representative sample of 46 239 people aged 20 years or older were included using a multi-stage stratified sampling method. The participants included in the screening-recommended group were all high-risk adults, and low-risk older adults. High-risk was defined as a person who was overweight with additional risk factors such as family history of diabetes, physical inactivity, hypertension, dyslipidaemia, or history of cardiovascular disease. Awareness of diabetes was defined as a self-report of any previous diagnosis of diabetes by a health-care professional among the population defined as having diabetes. Diabetes was diagnosed by an oral glucose tolerance test according to WHO diagnostic criteria.

RESULTS: 30 735 (66.5%) of 46 239 participants were included in the screening recommended group. Of these, 10 787 (35.1%) were designated as high-risk older adults, 12 329 (40.1%) as low-risk older adults, and 7619 (24.8%) as high-risk younger adults. The prevalence of diabetes was 20.5% (2211 of 10 787) in the high-risk older adults, 12.6% (1553 of 12 329) in low-risk older adults, and in 8.3% (632 of 7619) high-risk younger adults, as compared with 2.7% (419 of 15 504) in people not recommended for screening ($p < 0.0001$). Awareness of diabetes in those with diabetes was 971 (43.9%) of 2211 high-risk older adults, 753 (48.5%) of 1553 low-risk older adults, and 173 (27.3%) of 632 high-risk younger adults, as compared with 143 (34.2%) of 419 people not recommended for screening ($p < 0.0001$). Multivariate analysis showed that those recommended for screening had significantly increased diabetes awareness (odds ratio [OR] 1.24, 95% CI 1.16–1.32, $p < 0.0001$) compared with those who were not recommended for screening. However, high-risk younger people did not show a significantly increased awareness of diabetes (OR 0.87, 95% CI 0.66–1.15, $p = 0.43$). Additionally, the proportion of those attending regular health check-ups for the diagnosis of diabetes among those recommended for screening was 11 310 (36.8%) of 30 735, similar to that among those not recommended for screening (5954 [38.4%] of 15 504; $p = 0.24$).

View [abstract](#)

Law, T. K., Yan, A. T., Gupta, A., et al. 2015. **Primary prevention of cardiovascular disease: Global cardiovascular risk assessment and management in clinical practice.** *European Heart Journal - Quality of Care and Clinical Outcomes* 1(1) 31–36.

AIM: to examine primary care physician assessment of cardiovascular risk in patients without known cardiovascular disease; (ii) evaluate the level of agreement of risk assessment between treating physicians and the FRS; and (iii) compare actual practice with established guidelines.

METHOD: In the PARADIGM (Primary cARe AuDIt of Global risk Management) study (March 2009–10), 105 primary care physicians across Canada prospectively collected data for 3015 patients (mean age 56 years, 59% men) without known cardiovascular disease, diabetes, or lipid-lowering medications at baseline. For each patient, the treating physician determined their cardiovascular risk, and reported the risk stratification method and subsequent treatment decisions. Kappa statistics assessed the agreement between the study-calculated FRS and the treating physician's reported risk assessment.

RESULTS: The FRS was the most commonly reported risk assessment method, but was used in only 34.0% of patients. Regardless of the method used (even if the FRS was reportedly used), there was only fair agreement between the risk stratification as reported by the physician and the study-calculated FRS. Moreover, physicians recommended statin initiation in 92% of all patients that they identified as high risk; however, according to the

study-calculated FRS, only 56% of the truly high-risk patients were recommended statin therapy.

[View full text](#)

Qualitative

Dahl, M., Lindholt, J., Sogaard, R., et al. 2017. **An interview-based study of non-attendance at screening for cardiovascular diseases and diabetes in older women: Non-attendees' perspectives.** *Journal of Clinical Nursing* 17 17.

AIM: to explore non-attendees' perspectives on a screening program for cardiovascular disease (CVD) and diabetes mellitus (DM) among women aged 60-77 years.

METHOD: The data were obtained through semi-structured interviews with 10 women sampled from a population who declined to participate in a women's screening program for CVD and DM. Additionally, reflective notes on the interview context were documented. The data were collected in 2013. Kvale and Brinkmann's method for data analysis was applied.

RESULTS: All informants found the screening offer personally irrelevant, but this belief was changeable. The informants' perceptions of screening were based on subjective health and risk beliefs, personal knowledge of diseases and the screening program, and distrust in the healthcare system.

[View abstract](#)

Greenberg, B. L., Kantor, M. L. & Bednarsh, H. 2017. **American dental hygienists' attitudes towards chairside medical screening in a dental setting.** *International Journal of Dental Hygiene* 15(4) e61-e68.

AIM: to report on the attitudes of American dental hygienists (DHs) towards chairside medical screening.

METHOD: A 5-point Likert scale (1 = very important/willing, 5 = very unimportant/unwilling) survey was mailed to a nationwide random sample of US practicing DHs. Descriptive statistics were used for all questions, and the Friedman nonparametric analysis of variance was used for multi-element questions.

RESULTS: A total of 3133 respondents returned the completed questionnaires for an effective response rate of 49.2% and a margin of error 1.8%. The majority of respondents felt it was important to perform/conduct chairside screening for hypertension (94%), diabetes mellitus (89%), cardiovascular disease (85%), HIV (79%) and hepatitis infection (78%); were willing to refer a patient for medical consult (94%), conduct screening that yields immediate results (85%); and were willing to collect the data/samples needed (57-95%). The most important considerations were dentist/owner support (98%), training (97%), patient willingness (98%) and time (98%).

[View abstract](#)

Greenblatt, A. P., Estrada, I., Schrimshaw, E. W., et al. 2017. **Acceptability of Chairside Screening for Racial/Ethnic Minority Older Adults: A Qualitative Study.** *Jdr Clinical & Translational Research* 2(4) 343-352.

AIM: to examine the acceptability of screening for hypertension and diabetes in the dental setting for African American, Puerto Rican, and Dominican older adults who attend senior centers in northern Manhattan, New York City.

METHOD: Focus groups were conducted with 194 racial/ethnic minority men and women aged 50 y and older living in northern Manhattan who participated in 1 of 24 focus group sessions about improving oral health for older adults. All groups were digitally audio-recorded and transcribed for analysis. Groups that were conducted in Spanish were transcribed first in Spanish and then translated into English. Analysis of the transcripts was conducted using thematic content analysis.

RESULTS: Five themes were manifest in the data regarding the willingness of racial/ethnic minority older adults to receive hypertension and diabetes screening as part of routine dental visits: 1) chairside screening is acceptable, 2) screening is routine for older adults, 3) the interrelationship between oral and general health is appreciated, 4) chairside screening has perceived benefits, and 5) chairside screening may reduce dental anxiety. Reservations centered on 4 major themes: 1) dental fear may limit the acceptability of chairside screening, 2) there is a perceived lack of need for dental care and chairside screening, 3) screening is available elsewhere, and 4) mistrust of dental providers as primary care providers.

[View abstract](#)

Hafez, D., Nelson, D. B., Martin, E. G., et al. 2017. **Understanding type 2 diabetes mellitus screening practices among primary care physicians: a qualitative chart-stimulated recall study.** *BMC family practice* 18(1) 50.

AIM: to identify factors that influence primary care physicians (PCPs) decisions to screen patients for T2DM and to characterize their interpretation and communication of screening test results to patients.

METHOD: We conducted semi-structured chart-stimulated recall interviews with 20 University of Michigan Health System (UMHS) primary care physicians. PCPs were asked about their recent decisions to screen or not screen 134

purposively sampled non-diabetic patients who met American Diabetes Association criteria for screening for T2DM. Interviews were audio-recorded, transcribed, and analyzed using qualitative directed content analysis. Data on patient demographic characteristics and comorbidities were abstracted from the electronic health record. RESULTS: The most common reasons PCPs gave for not screening 63 patients for T2DM were knowledge of a previously normal screening test (49%) and a visit for reasons other than a health maintenance examination (48%). The most common reasons PCPs gave for screening 71 patients for T2DM were knowledge of a previously abnormal screening test (49%), and patients' weight (42%) and age (38%). PCPs correctly interpreted 89% of screening test results and communicated 95% of test results to patients. Among 24 patients found to have prediabetes, PCPs usually (58%) recommended weight loss and increased physical activity but never recommended participation in a Diabetes Prevention Program or use of metformin.

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Economic

Heller, D. J., Coxson, P. G., Penko, J., et al. 2017. **Evaluating the impact and cost-effectiveness of statin use guidelines for primary prevention of coronary heart disease and stroke.** *Circulation* 136(12) 1087-1098. AIM: to compare the 2013 American College of Cardiology/American Heart Association (ACC/AHA) guideline recommendations on statin use with other guidelines, in order to assess the cost-effectiveness of the ACC/AHA. METHOD: We used the Cardiovascular Disease Policy Model to estimate the cost-effectiveness of the ACC/AHA guideline relative to current use, Adult Treatment Panel III guidelines, and universal statin use in all men 45 to 74 years of age and women 55 to 74 years of age over a 10-year horizon from 2016 to 2025. Sensitivity analyses varied costs, risks, and benefits. Main outcomes were incremental cost-effectiveness ratios and numbers needed to treat for 10 years per quality-adjusted life-year gained.

RESULTS: Each approach produces substantial benefits and net cost savings relative to the status quo. Full adherence to the Adult Treatment Panel III guideline would result in 8.8 million more statin users than the status quo, at a number needed to treat for 10 years per quality-adjusted life-year gained of 35. The ACC/AHA guideline would potentially result in up to 12.3 million more statin users than the Adult Treatment Panel III guideline, with a marginal number needed to treat for 10 years per quality-adjusted life-year gained of 68. Moderate-intensity statin use in all men 45 to 74 years of age and women 55 to 74 years of age would result in 28.9 million more statin users than the ACC/AHA guideline, with a marginal number needed to treat for 10 years per quality-adjusted life-year gained of 108. In all cases, benefits would be greater in men than women. Results vary moderately with different risk thresholds for instituting statins and statin toxicity estimates but depend greatly on the disutility caused by daily medication use (pill burden).

View [abstract](#)

Jowett, S., Barton, P., Roalfe, A., et al. 2017. **Cost-effectiveness analysis of use of a polypill versus usual care or best practice for primary prevention in people at high risk of cardiovascular disease.** *PLoS ONE [Electronic Resource]* 12(9) e0182625.

AIM: to determine whether a polypill is cost-effective compared to usual care and optimal guideline-recommended treatment for primary prevention in people already on statins and/or blood pressure lowering therapy.

METHOD: A Markov model was developed to perform a cost-utility analysis with a one year time cycle and a 10 year time horizon to compare the polypill with usual care and optimal implementation of NICE Guidelines, using patient level data from a retrospective cross-sectional study. The model was run for ten age (40 years+) and gender-specific sub-groups on treatment for raised CVD risk with no history of CVD. Published sources were used to estimate impact of different treatment strategies on risk of CVD events.

RESULTS: A polypill strategy was potentially cost-effective compared to other strategies for most sub-groups ranging from dominance to up to 18,811 per QALY depending on patient sub-group. Optimal implementation of guidelines was most cost-effective for women aged 40-49 and men aged 75+. Results were sensitive to polypill cost, and if the annual cost was less than 150, this approach was cost-effective compared to the other strategies.

View [full text](#)

Laxy, M., Wilson, E. C. F., Boothby, C. E., et al. 2017. **Incremental Costs and Cost-Effectiveness of Intensive Treatment in Individuals with Type 2 Diabetes Detected by Screening in the ADDITION-UK Trial: An Update with Empirical Trial-Based Cost Data.** *Value in Health.*

AIM: to derive a trial-informed estimate of the incremental costs of intensive treatment as delivered in the Anglo-Danish-Dutch Study of Intensive Treatment in People with Screen-Detected Diabetes in Primary Care-Europe (ADDITION) trial and to revisit the long-term cost-effectiveness analysis from the perspective of the UK NHS.

METHOD: We analyzed the electronic primary care records of a subsample of the ADDITION-Cambridge trial cohort (n = 173). Unit costs of used primary care services were taken from the published literature. Incremental annual costs of intensive treatment versus routine care in years 1 to 5 after diagnosis were calculated using multilevel generalized linear models. We revisited the long-term cost-utility analyses for the ADDITION-UK trial cohort and reported results for ADDITION-Cambridge using the UK Prospective Diabetes Study Outcomes Model and the trial-informed cost estimates according to a previously developed evaluation framework.

RESULTS: Incremental annual costs of intensive treatment over years 1 to 5 averaged 29.10 (standard error = 33.00) for consultations with general practitioners and nurses and 54.60 (standard error = 28.50) for metabolic and cardioprotective medication. For ADDITION-UK, over the 10-, 20-, and 30-year time horizon, adjusted incremental quality-adjusted life-years (QALYs) were 0.014, 0.043, and 0.048, and adjusted incremental costs were 1,021, 1,217, and 1,311, resulting in incremental cost-effectiveness ratios of 71,232/QALY, 28,444/QALY, and 27,549/QALY, respectively. Respective incremental cost-effectiveness ratios for ADDITION-Cambridge were slightly higher.

View [abstract](#)

Milev, S., Blieden, M., Jung, H., et al. 2017. **Comparison of the use of cardiovascular risk equations by health technology assessment bodies and clinical guidelines.** *Journal of the American College of Cardiology* 69 (11 Supplement 1) 1874.

AIM: to a) identify CV risk equations that are most commonly used in health economic evaluations for primary and secondary prevention submitted to HTA bodies and b) assess their alignment with the clinical guidelines (CG) recommendations.

METHOD: A search of HTA body websites and CG databases in the past 10 years was conducted for Australia, Canada, Europe, and US. Articles referring to CV risk equations in primary and secondary prevention settings were identified and relevant commentary documented. Any relevant publications referenced by these articles were further considered for review.

RESULTS: The searches identified 17 primary and 11 secondary prevention equations, with more risk equations referred to in CG (22) than in HTA reports (6). Framingham, ASSIGN, and QRISK2 were the preferred equations in primary prevention settings cited by HTA agencies in Australia, Scotland, and England respectively, while SCORE was preferred for Norway and Sweden HTA groups. The CG recommendations for these countries align with the HTA recommendations, although additional equations in CG have been referred as available options. US CG recommended Pooled Cohort, Framingham (2008), and Reynolds risk equations, in addition to listing more options. HTA bodies identified various reasons for inappropriate use of risk equations to inform reimbursement decision-making in the population of interest, including risk over- and under-estimation, outdated evidence and absence of relevant predictors. Only US CG identified risk equations for secondary prevention, except REACH generating negative comments in the Swedish and no comments in the Scottish HTA.

View [conference abstract](#)

Mujica-Mota, R. E. & Hughes, P. 2017. **The cost-effectiveness of statins for secondary prevention of cardiovascular disease: Observational study using data from routine electronic medical records.** *Value in Health* 20 (5) A259-A260.

AIM: to evaluate the cost-effectiveness of statins for secondary prevention of cardiovascular disease in routine practice from the perspective of the English NHS.

METHOD: Electronic English NHS health records of 6,078 previously untreated patients of age 60+ receiving statins following the occurrence of a myocardial infarction (MI) and a one-to-one propensity score matched control of untreated patients after a MI, resulted in n=12,156 patients. Costs of primary care service use and referrals were calculated from CPRD data and inpatient hospitalisations from HES and HRG codes. QALYs were calculated from ONS mortality records and utilities from the literature applied to MI or ischemic stroke events recorded in HES.

RESULTS: The distribution of baseline characteristics was balanced across the two treatment groups, and 43% initially untreated patients crossed-over to statins treatment. For 60-74 year olds, we found an increase in QALY with statins of 0.66 (95% CI: 0.44-0.87) and, in the 75+ group, a gain of 0.81 (95% CI: 0.72-0.88) per patient. Excluding the CV-unrelated costs of inpatient hospitalisations, the total incremental costs were respectively 1,616 (95% CI: 1347-2095) and 2,644 (95% CI: 2034-2963) per patient. Statins had an ICER of 2456 (95% CI: 1814, 2759) in the younger patient group and of 3250 (95% CI: 2843, 3531) in the older group. In contrast, when inpatient hospitalisation costs ICD-10 codes for non-CV events were included, statins resulted in cost savings (95% CI: -1165, 2782), and was consequently dominant, in the younger group, and had incremental costs of 5562 (95% CI: 4356, 6436) for an ICER of 7200 (6221, 8587) in patients aged 75+.

View [conference abstract](#)

Thomas, C., Sadler, S. & Breeze, P. 2017. **Assessing the potential return on investment of the proposed UK NHS diabetes prevention programme in different population subgroups: an economic evaluation.**

AIM: to evaluate potential return on investment of the National Health Service Diabetes Prevention Programme (NHS DPP) in England and estimate which population subgroups are likely to benefit most in terms of cost-effectiveness, cost-savings and health benefits.

METHOD: Economic analysis using the School for Public Health Research Diabetes Prevention Model. Adults aged ≥ 16 with high risk of type 2 diabetes (HbA1c 6%–6.4%). Population subgroups defined by age, sex, ethnicity, socioeconomic deprivation, baseline body mass index, baseline HbA1c and working status. Interventions: the proposed NHS DPP: an intensive lifestyle intervention focusing on dietary advice, physical activity and weight loss. Comparator: no diabetes prevention intervention. Main outcome measures: incremental costs, savings and return on investment, quality-adjusted life-years (QALYs), diabetes cases, cardiovascular cases and net monetary benefit from an NHS perspective.

RESULTS: Intervention costs will be recouped through NHS savings within 12 years, with net NHS saving of £1.28 over 20 years for each £1 invested. Per 100 000 DPP interventions given, 3552 QALYs are gained. The DPP is most cost-effective and cost-saving in obese individuals, those with baseline HbA1c 6.2%–6.4% and those aged 40–74. QALY gains are lower in minority ethnic and low socioeconomic status subgroups. Probabilistic sensitivity analysis suggests that there is 97% probability that the DPP will be cost-effective within 20 years. NHS savings are highly sensitive to intervention cost, effectiveness and duration of effect.

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Diagnostic studies

Nah, E., Cho, S., Kim, S., et al. 2017. **Comparison of urine albumin-to-creatinine ratio (ACR) between ACR strip test and quantitative test in prediabetes and diabetes.** *Annals of Laboratory Medicine* 37(1) 28-33.

AIM: to evaluate the clinical value of a strip test for measuring the urinary albumin-to-creatinine ratio (ACR) in prediabetes and diabetes.

METHOD: Spot urine samples were obtained from 226 prediabetic and 275 diabetic subjects during regular health checkups. Urinary ACR was measured by using strip and laboratory quantitative tests.

RESULTS: The positive rates of albuminuria measured by using the ACR strip test were 15.5% (microalbuminuria, 14.6%; macroalbuminuria, 0.9%) and 30.5% (microalbuminuria, 25.1%; macroalbuminuria, 5.5%) in prediabetes and diabetes, respectively. In the prediabetic population, the sensitivity, specificity, positive predictive value, negative predictive value, and overall accuracy of the ACR strip method were 92.0%, 94.0%, 65.7%, 99.0%, and 93.8%, respectively; the corresponding values in the diabetic population were 80.0%, 91.6%, 81.0%, 91.1%, and 88.0%, respectively. The median [interquartile range] ACR values in the strip tests for measurement ranges of < 30 , 30-300, and ≥ 300 mg/g were 9.4 [6.3-15.4], 46.9 [26.5-87.7], and 368.8 [296.2-575.2] mg/g, respectively, using the laboratory method.

View [full text](#)

Woo, Y. C., Lee, C. H., Fong, C. H. Y., et al. 2017. **Validation of the diabetes screening tools proposed by the American Diabetes Association in an aging Chinese population.** *PLoS ONE [Electronic Resource]* 12(9) e0184840.

AIM: to investigate the performance of the latest American Diabetes Association diabetes screening methods in our aging Chinese population.

METHOD: Subjects without diabetes who returned for the 4th Hong Kong Cardiovascular Risk Factors Prevalence Study in 2010-2012 were evaluated for the probability of having diabetes with reference to the age- and body mass index-based screening criteria (screening criteria) and the diabetes risk test (risk test), and the conclusion drawn was compared to their measured glycaemic status. Diabetes was defined by fasting glucose ≥ 7 mmol/L or 2-hour post oral glucose tolerance test glucose ≥ 11.1 mmol/L.

RESULTS: 1415 subjects, aged 58.1 \pm 10.2, were evaluated. 95 (6.7%) had diabetes. The risk test showed good accuracy (area under the receiver operating curve 0.725) in screening for diabetes with an optimal cut-off score of five. Compared to the screening criteria, the risk test had significantly better specificity (0.57 vs. 0.41, $p < 0.001$), positive predictive value (0.12 vs. 0.09, $p < 0.001$) and positive diagnostic likelihood ratio (1.85 vs. 1.37, $p < 0.001$). To diagnose one case of diabetes, fewer subjects (11 vs. 18) needed to be tested for blood glucose if the risk test was adopted.

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Yap, C. W., Ang, Y. G., Quek, T. P. L., et al. 2017. **Re-examining the sensitivity of glycated hemoglobin to screen for diabetes mellitus.** *Journal Of Diabetes* 14 14.

AIM: to determine if HbA1c would be a useful tool to screen for DM in a real world setting if ADA guidelines for repeat testing to confirm the diagnosis of DM are strictly adhered to.

METHOD: We carried out a retrospective database study by extracting demographic and laboratory data from a chronic disease registry which collects data on adults from three tertiary hospitals and nine large primary care clinics in Singapore. Data from adults not previously known to have DM whose data was captured in the registry between 2005 to 2016 with HbA1c and at least two diagnostic tests for DM (FPG or 2-h PG) done within 4 weeks after HbA1c was extracted and analyzed.

RESULTS: 3,928 adults were included in this study. The sensitivity, specificity and AUROC of HbA1c at a threshold of 6.5% were 85.2%, 82.3% and 0.914, respectively. A higher sensitivity was found in female adults, younger adults as well as those of non-Chinese ethnicity.

View [abstract](#)

Ying, L., He, X., Ma, X., et al. 2017. **Serum 1,5-anhydroglucitol when used with fasting plasma glucose improves the efficiency of diabetes screening in a Chinese population.** *Scientific Reports* 7(1) 11968.

AIM: to evaluate the clinical significance of serum 1,5-anhydroglucitol (1,5-AG) in diabetes screening, especially when combined with FPG, with respect to its ability to facilitate early diagnosis and intervention in diabetes

METHOD: A total of 3098 participants at high risk for diabetes (1467 men, 1631 women) were enrolled.

RESULTS: A total of 1471 (47.5%) participants were diagnosed with diabetes, and the mean 1,5-AG level in the diabetic group was significantly lower than that in non-diabetic group [12.5 (7.8-17.5) mug/mL vs. 20.5 (15.3-26.4) mug/mL, $P < 0.001$]. The optimal cut-off point was 15.9 mug/mL, for which the sensitivity, specificity, and area under the curve (AUC) were 69.2%, 72.3%, and 0.781, respectively. For the combination of FPG and 1,5-AG, the sensitivity, specificity, and AUC improved to 82.5%, 83.5%, and 0.912, respectively. This method helped 75.8% of the participants avoid an oral glucose tolerance test (OGTT), reducing the need to carry out the OGTT by 43.9% compared to the use of the FPG criterion only.

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Ongoing research

Hyun, K. and Millett, E. 2017. **The assessment of cardiovascular risk factors differ between women and men in primary healthcare service.** *PROSPERO*.

AIM: to determine if the assessment of cardiovascular risk factors differ between women and men in primary healthcare service.

METHOD: Systematic review. MEDLINE and EMBASE databases will be searched. We will exclude studies with sample size less than 1000, but will not restrict languages. Types of study to be included: Cohort studies. Primary outcome(s): Assessment of cardiovascular risk factors (total cholesterol, HDL, smoking status and systolic blood pressure, which are the components of Framingham Risk Score).

RESULTS: A quantitative synthesis of the aggregate patient data will be presented. The pooled rate of cardiovascular risk screening for women and men will be compared using meta-analysis, where risk ratios and corresponding 95% confidence intervals will be presented.

View [details](#)

Gheewala, P., Peterson, G. et al. 2017. **Effectiveness of targeted screening for early detection of chronic kidney disease in the community setting: a systematic review.** *PROSPERO*.

AIM: to discover whether targeted screening can effectively identify undiagnosed patients with early stages of chronic kidney disease in the community-setting; to determine which characteristics and screening tests should be used to ensure feasibility of a targeted screening program for chronic kidney disease

METHOD: Two search strategies will be used for this systematic review. First, an electronic search of four databases: EMBASE, PubMed, Cochrane Central Register of Controlled Trials (CENTRAL) and Scopus will be conducted. For the second search strategy, reference lists of included studies or relevant reviews identified through the electronic search will be further scanned to identify any potential articles. Inclusion criteria:

Observational analytical studies (cross-sectional, case-control and prospective cohort) reporting the quantitative data and results of the screening tests. Primary outcome(s); Percentage of participants with positive screening test results, participant referral rate, percentage of participants consequently diagnosed with CKD, screening tests used to detect evidence of CKD including: predictive algorithm, risk assessment tool, estimated glomerular filtration rate (eGFR), serum creatinine (SCr), proteinuria, albuminuria, albumin creatinine ratio (ACR), haematuria or blood pressure measurement.

RESULTS: Dichotomous data (CKD evidence as indicated by positive screening test results, participant referral rate and CKD) will be evaluated using risk ratio (RR) with 95 % confidence interval (CI). Where continuous scales of measurement are used, the effects of intervention (tests such as eGFR, SCr, proteinuria, albuminuria, ACR etc.) will be analysed using weighted mean difference (with 95% CI) or standardised mean difference (with 95% CI) if different measurement scales have been used. Data will be pooled only if the studies are of sufficient quality and contain methodologically and clinically comparable data. If quantitative data synthesis is not appropriate, then a systematic narrative synthesis will be provided.

[View details](#)

Hayek, A., Liu, H., et al. 2017. **General practitioner and pharmacist collaboration: does this improve risk factors for cardiovascular and associated diseases? A systematic review (+/- meta-analysis).** *PROSPERO*.

AIM: to determine if inter-professional collaboration between general practitioners and pharmacists causes a reduction of patient cardiovascular risk and/or improvement in cardiovascular disease management in the primary care setting

METHOD: This systematic review will involve a search of MEDLINE, Embase, Cochrane, CINAHL and International Pharmaceutical Abstracts (IPA) databases. Further studies will also be obtained from scanning reference lists of relevant studies, hand-searching of key journals and citation searching of key papers identified for inclusion. Any study published prior to 31 December 2016 will be included in the review. Types of study to be included: Only randomised controlled trials. Primary outcomes: blood pressure, cholesterol (total cholesterol, LDL, HDL, triglyceride), HbA1c, and weight changes, cost-effectiveness analysis, QALYs, depression severity, and changes in smoking cessation, medication adherence, achievement of clinical guidelines, and assessment of lifestyle changes (nutritional, exercise, alcohol consumption).

RESULTS: A narrative synthesis will be reported based on the data extraction from included studies. If studies include adequate quantitative data that is sufficiently homogenous a meta-analysis will be conducted to further analyse the data.

[View details](#)

Boreskie, K. F., Kehler, D. S., Costa, E. C., et al. 2017. **Protocol for the HAPPY Hearts study: cardiovascular screening for the early detection of future adverse cardiovascular outcomes in middle-aged and older women: a prospective, observational cohort study.** *BMJ Open* 7(11) e018249.

AIM: to examine the ability of the Heart Attack Prevention Program for You (HAPPY) Hearts screening protocol, a series of non-invasive procedures to identify middle-aged and older women who are at an elevated risk for experiencing an adverse cardiovascular event in the 5-year period after screening; to compare the predictive value of the HAPPY Hearts protocol with the Framingham Risk Score to determine the sensitivity for estimating risk for an adverse cardiovascular outcome.

METHOD: Prospective, observational cohort study. One thousand women 55 years of age or older will be recruited to be screened by the HAPPY Hearts protocol. This involves the cardiovascular assessment of resting blood pressure, blood pressure response to 3min of moderate intensity exercise and large and small arterial elasticity. The participants will be classified into risk categories based on these measures. The incidence of the following adverse cardiovascular outcomes will be assessed in the 5-year period after screening in both groups: ischaemic heart disease, acute myocardial infarction, stroke, percutaneous coronary intervention, coronary bypass surgery, congestive heart failure and new hypertension.

Trial registration number: nct02863211.

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Green, B. B., Anderson, M. L., Cook, A. J., et al. 2017. **Abstract P366: Blood Pressure Checks for Diagnosing Hypertension (BP-CHECK).** *Hypertension*. 2017;70:AP366.

AIM: to compare the accuracy and acceptability of clinic, home, and kiosk-based blood pressure (BP) monitoring compared to ambulatory BP monitoring (ABPM) for diagnosing hypertension

METHODS: Randomized controlled diagnostic study (the BP Check). Adults ages 18-85 will be recruited and randomized to routine screening via clinic screening, home BP monitoring over 5 days, or kiosk-based monitoring on 3 separate days. After completion all participants will complete ABPM. Mean BP assessed via each screening method (clinic, home, and kiosk) will be compared with 24 hour APBM to assess the accuracy of each method. We will also assess the acceptability of each method from the patients' perspective and the impact of the tests longer-term. Finally, a mixed method analysis is planned to explore physician knowledge and beliefs about BP measurement, diagnosing hypertension, and the perceived feasibility of using each of the tested BP strategies in routine clinical practice.

RESULTS: Enrollment began in May of 2017 with a target of randomizing 510 participants. BP-CHECK will inform

which hypertension diagnostic methods are most accurate, acceptable to patients, and feasible to implement in primary care.

View [conference abstract](#)

Kullgren, J., Youles, B., Shetty, S., et al. 2017. **Forging New paths in DIabetes PrevenTion (FINDIT): study protocol for a randomized controlled trial.** *Trials* 18(1) (no pagination).

AIM: to determine the effects of a prediabetes diagnosis and brief counseling on weight change and on engagement in behaviors to prevent T2DM and mediators of these behaviors

METHOD: In this parallel-design randomized controlled trial we will recruit 315 non-diabetic patients from the Ann Arbor VA Medical Center (AAVA) who have one or major risk factors for T2DM and an upcoming primary care appointment at the AAVA, but have not had a hemoglobin A1c (HbA1c) test to screen for T2DM in the previous 12 months. After informed consent, participants will complete a baseline survey and be randomly assigned to, at the time of their next primary care appointment, one of two arms: (1) to have a hemoglobin A1c (HbA1c) test to screen for T2DM and receive brief, standardized counseling about these results or (2) to review a brochure about clinical preventive services. Participants will complete surveys 2 weeks, 3 months, and 12 months after their primary care appointment, and a weight measurement 12 months after their primary care appointment. The primary outcome is weight change after 12 months. The secondary outcomes are changes in perception of risk for T2DM; knowledge of T2DM prevention; self-efficacy and motivation to prevent T2DM; use of pharmacotherapy for T2DM prevention; physical activity; participation in weight management programs; and mental health.

RESULTS: Quantitative analyses will compare outcomes among participants in the HbA1c test arm found to have prediabetes with participants in the brochure arm. Among participants in the HbA1c test arm found to have prediabetes we will conduct semi-structured interviews about their understanding of and reactions to receiving a prediabetes diagnosis.

Trial registration: ClinicalTrials.gov, NCT02747108. Registered on 18 April 2016.

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