Public Health England

Protecting and improving the nation's health

NHS Health Check programme:
Literature review April 2015 to July 2015

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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. The methods and findings of that review are set out here.

2. Methods

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

Previous searches had identified references from between January 1996 and April 2015. This search identifies references **from April 2015 to July (week 3), 2015**. The search strategies used previously have been updated to include text terms for cardiovascular, diabetes and population screening, in order to broaden the search. An additional database was also searched – Global Health.

Table 1. Search strategies

Database	Search strategy
Ovid Medline and Embase	1. (nhs and health check*).tw. 2. (national health service and health check*).tw. 3. (health check* and program*).tw. 4. (uk and health check*).tw. 5. (united kingdom and health check*).tw. 6. (england and health check*).tw. 7. (universal and health check*).tw. 8. (general and health check*).tw. 9. (preventive and health check*).tw. 10. (vascular and health check*).tw. 11. (cardiovascular and health check*).tw. 12. (uptake and health check*).tw. 13. (diabetes and health check*).tw. 14. (heart and health check*).tw. 15. diabetes adj3 screen* 16. cardiovascular adj3 screen* 17 population adj2 screen* 18 medical checkup 19 medical check-up 20 general checkup 21 general check-up 22 periodic health exam* 23 annual exam* 24. 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 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 25. limit 24 to yr="2015""
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 limit 6 to yr="2015"

EBSCO CINAHL	(nhs and health check*) OR (national health service and health check*) OR (health check* and program*) OR (uk and health check*) OR (united kingdom and health check) OR (england and health check*) OR (universal and health check*) OR (general and health check*) OR (preventive and health check*) OR (vascular and health check*) OR (cardiovascular and health check*) OR (uptake and health check*) OR (diabetes and health check*) OR (heart and health check*) OR (diabetes N3 screen*) OR (cardiovascular N3 screen*) OR (population N2 screen*) OR "medical checkup" OR "medical check-up" OR "general checkup" OR "general check-up" OR "periodic health exam*" OR "annual exam*"
EBSCO Global Health	(nhs and health check*) OR (national health service and health check*) OR (health check* and program*) OR (uk and health check*) OR (united kingdom and health check) OR (england and health check*) OR (universal and health check*) OR (general and health check*) OR (preventive and health check*) OR (vascular and health check*) OR (cardiovascular and health check*) OR (uptake and health check*) OR (diabetes and health check*) OR (heart and health check*) OR "medical checkup" OR "medical check-up" OR "general checkup" OR "general check-up" OR "periodic health exam*" OR "annual exam*"
HDAS PsycInfo	1"health check*".af 2 PHYSICAL EXAMINATION/ 3 HEALTH SCREENING/ 4 "diabetes screen*".af 5 "cardiovascular screen*".af 6 "population screen*".af 7 ("medical checkup" OR "medical check-up" OR "general checkup" OR "general check-up" OR "periodic health exam*" OR "annual exam*").af 8 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 9 8 [Limit to: Publication Year Current-2015]
Cochrane Library (Wiley)	(nhs and health check*) OR (national health service and health check*) OR (health check* and program*) OR (uk and health check*) OR (united kingdom and health check) OR (england and health check*) OR (universal and health check*) OR (general and health check*) OR (preventive and health check*) OR (vascular and health check*) OR (cardiovascular and health check*) OR (uptake and health check*) OR (diabetes and health check*) OR (heart and health check*) OR (diabetes N3 screen*) OR (cardiovascular N3 screen*) OR (population N2 screen*) OR "medical checkup" OR "medical check-up" OR "general checkup" OR "general check-up" OR "periodic health exam*" OR "annual exam*"

NHS Evidence	*nhs "health check*"*
Google Scholar	*nhs "health check*"* *cardiovascular "health check*"* *vascular "health check*"*
Google (Jan 1st 2015 to Apr 23rd 2015)	*"nhs health check*"* *cardiovascular "health check*"* *vascular "health check*"*
Clinical trials.gov and ISRCDN registry	*"health check"*

Citation abstracts were then read in order to determine whether or not they were relevant. Those citations considered relevant were categorised using a draft schema for Publication/Resource Types, and are listed in section 4. Categorisation has been based on information provided by authors or indexers and has not been independently verified. No appraisal of individual resources has been undertaken. A conclusion or key statement is provided, as well as a link to the abstract or full text, if available. If the full text of an article is not freely available online, it may be available via the PHE Knowledge & Library Service or OpenAthens.

3. Results

The number of references identified are shown in table 2.

Table 2. References published/identified between April 2015 and July (week 3), 2015, by database

Database	No. of hits	Exclusive
Medline	6	6
Embase	293	287
HMIC	7	7
CINAHL	73	51
Global Health	70	54
PsycInfo	57	48
Cochrane Library	334	333
TOTAL		**786**

From these 786 results, 9 were identified as being relevant to the NHS Health Check programme, 15 to general health checks and 19 to diabetes/cardiovascular risk screening. Additionally, a search of the web sources NHS Evidence, Google Scholar, Google and the two trials registers, identified a further 8 references of relevance to NHS Health Checks and 8 to general health checks.

In total, there were 59 relevant references - 17 on NHS Health Checks, 23 on general health checks and 19 on diabetes/cardiovascular risk screening.

4. References on the NHS Health Check Programme (17)

Reviews

Capewell S et al. (2015). *NHS Health Checks - a naked emperor?* Journal of Public Health 37(2): 187-192.

"*The 10 World Health Organization (WHO) Screening Criteria have been evaluated and refined over four decades.They remain a valuable test of any screening proposal. This is crucial, because all screening has the potential for harm, and screening science can be counterintuitive.The NHSHC programme can be assessed against each of the 10 WHO Criteria. These cover the disease targeted, the test used and the treatment programme. We assess each of these areas in turn and whether NHSHC pass or fail on each criterion*" p187
View full text

Cohort studies

Gidlow C et al. (2015). *Method of invitation and geographical proximity as predictors of NHS Health Check uptake*. Journal of Public Health 37(2): 195-201.

"*Within this predominantly urban cohort, geographical proximity to the Health Check location was not an important predictor of uptake. Use of verbal or telephone invitations did emerge as a strong positive predictor of attendance and should be considered as a way to improve Health Check uptake where postal invitations are typically used. Data presented provide further evidence for commissioners and deliverers of Health Checks around who does not attend, and suggest that a relatively simple change to recruitment methods could increase uptake*" p200
View full text

Drennan V (2015). *Older people and women most likely to take up health checks.* Primary Health Care. 25, 6, 15-15.

"*This study investigated the sociodemographic characteristics of those who did and did not attend for health checks and, of patients attending, the characteristics of those agreeing to participate in a nested study of an intervention to promote physical activity*" taken from abstract
View abstract

Cross-sectional studies

Baker C et al. (2015). *A process evaluation of the NHS Health Check care pathway in a primary care setting*. Journal of Public Health 37(2): 202-209.

"*Although high risk patients were identified, differences in uptake and implementation of the risk assessments demonstrate that the implementation of HCs is not consistent. There appears to be an overestimation of CVD risk by the Ready Reckoner likely to be attributable to a failure to adjust for existing local early identification efforts in primary care. The national 75% target may be unrealistic while the HC programme is further developed and refined to support implementation*" p208
View full text

Attwood S (2015). *Exploring equity in uptake of the NHS Health Check and a nested physical activity intervention trial*. J Public Health (2015) doi: 10.1093/pubmed/fdv070 First published online: June 1, 2015.

"*This study aimed to explore whether participation in the NHS Health Check and a nested physical activity trial can be considered equitable by exploring differences in uptake across selected socio-demographic factors. In multivariate analyses controlling for GP surgery, participation in the Health Check (either alone or in addition to the trial) was predicted by older age and lower area-level deprivation. Participation in the physical activity trial component (nested within the Health Check) was predicted by older age. Together, these findings suggest that younger patients and those living in areas of relatively high socioeconomic deprivation may be less willing to take part in primary care-based preventative interventions, while younger (and possibly male) patients appear further disinclined to participate in research informing the development of these interventions. GP surgery exerted a substantial effect on the strength and direction of associations between socio-demographic variables and participation, a finding which suggests that practice-level factors may play a greater role in determining equity in participation than individual patient characteristics*" p6
View full text

Qualitative research

Ellis N et al. (2015). *A qualitative investigation of non-response in NHS health checks.* Archives of Public Health 73:14.

"*Increasing uptake is a national priority for NHS Health Checks. Our data offer valuable feedback from those currently not engaged through usual methods, highlighting two fundamental requirements for improving uptake at practice-based Health Checks: individuals see the personal relevance of Health Checks; appointments are convenient*" p7
View full text

Krska J et al. (2015). *Views of practice managers and general practitioners on implementing nhs health checks*. Primary Health Care Research and Development. DOI: http://dx.doi.org/10.1017/S1463423615000262. Published online: 20 May 2015

"*There was variation in many aspects of implementation. Time and software were viewed as barriers to implementation, the increased nurse workload impacted on other services and payments were insufficient to cover costs. The main enabler for successful implementation was IT support. Fewer than half the respondents viewed the programme as beneficial to their practice. Findings have been used to address many issues raised. Practices need more support from commissioners to help implement NHS Health Checks*" taken from abstract
View abstract

Siebert, P (2015). *Exploring Evaluation in Practice from the Perspective of Public Health and Health Professionals: a Qualitative Field Study*. PhD thesis, University of Sheffield.

"*Interview and observation data from 16 participants of varying roles and experience involved in implementing the NHS Health Check programme including programme documentary data was analysed using the constant comparative method to understand how evaluation was perceived and conducted in practice…..Evaluation in practice was observed to be predominantly retrospective, unstructured and focused on generating descriptive information about the programme's processes and progress. Participants devised their own multi-purpose and diverse evaluation procedures to meet personal, professional and organisational obligations to demonstrate success in some form…..Limited use of recognised public health evaluation methodologies at local level was due to a mixture of operational, political and personal factors, including the desire to show success. The purpose of evaluation was to provide information to justify policy and financial decisions and to preserve services and jobs*" taken from abstract
View full text

Service evaluation

Coffey M et al. (2014). *Vascular Health Checks in Salford: An exploration using FARSITE data. Research report*. University of Salford, Dec 2014.

"The aims of this project were to:

- *Assess the level of uptake for the NHS Health Check programme in Salford, by demographic characteristics*
- *Provide a better understanding of who takes up health checks in Salford, and how many of these are at high risk of cardiovascular disease"* p17

View full text

Waterall J et al. (2015). *NHS Health Check: an innovative component of local adult health improvement and well-being programmes in England*. Journal of Public Health 37(2): 177-184.

"*There are many risks inherent in delivering NHS Health Check, especially in these early days of delivery. In some areas uptake remains too low, the quality of delivery variable, follow-up poor and referral to effective behavioural, clinical and social programmes limited. But these are the realities of implementing any large-scale prevention programme. We have sought to show in this paper how they can, and are, being addressed by a resolute focus on leadership, management, governance, improvement support, evaluation and capacity building*" p182
View full text

Woringer M et al. (2015). *P425: Outreach providers administering the NHS health check CVD prevention programme target people at higher CVD risk*. European Journal of Preventive Cardiology 1): S87-S88.

"*Compared to primary care population, outreach providers targeted more individuals aged 40-59 (74.9% vs 64.7%), fewer men (38% vs 45%) and a larger proportion of South Asians (7.7% vs 3.2%). Outreach providers served a bigger proportion of the population in North East and North West (63.4% vs 21.96%) but fewer in South Central, South East and London areas (12.64% vs 41.63%). Whereas nearly half of the population served by outreach providers was in the most deprived fifth, the primary care population was evenly distributed by deprivation. High risk case finding was highest among individuals served by outreach providers in 40-59 year olds (0.70% compared to 0.33%) and 60-74 year olds (16.95% vs 12.50%) at p<0.001. Higher CVD risk case finding was despite the fact that the population served by outreach providers in both age groups contained fewer hypertensive, overweight, obese people and people with raised cholesterol levels*" taken from abstract
View abstract

Woringer M et al. (2015). *Community Providers of the NHS Health Check CVD Prevention Programme Target Younger and More Deprived People.* Int J Integr Care 2015; Vol 15, 27th May, Annual Conf Suppl; URN:NBN:NL:UI:10-1-117095.

"*Community providers effectively targeted deprived areas and communities. A substantial proportion of younger patients were recruited when the programme was offered outside of the normal business hours. This overcame the difficulty in recruiting working age populations in general practices as these do not offer Health Checks on evenings and weekends. Although more women than men were served by community providers, more young men took part in the programme. Outreach providers recruited a representative proportion of ethnic minorities from the local*

authorities that they served. The results of this study suggest that using outreach providers is an effective approach to targeting younger people, more deprived areas and communities while recruiting a representative proportion of ethnic minorities across England" taken from abstract
View abstract
[*Note – this may be referring to the same research as the citation above*]

Smith S et al. (2015). *Correction: An evaluation of the performance of the NHS health check programme in identifying people at high risk of developing type 2 diabetes*. BMJ Open. 2015; 5(3): e002219corr1.

"There is an error in table 3 of this paper. The error occurred because in calculating specificity in the analysis, the author used DBP cut off of 80 mm Hg instead of 90 mm Hg"
View correction
View full text of original article.

Modelling studies

Jamet G et al (2014). *Has the introduction of NHS health checks increased the prescription of statins for CVD prevention? Working paper.* Leeds Institute of Health Sciences, University of Leeds.

"*We found a positive, robust and significant association between NHS HC received and high dose prescription while the associations observed for low dose statin in all models are not significant…..To our knowledge, this study is the first to associate high and low dose statins prescription with the NHS health checks programme three years after the implementation of the programme in all PCTs in England. The higher significance association for high dose statins suggests that health check programme was effective at targeting people at high risk*" taken from abstract
View full text

Chang KC et al. (2015). *Coverage of a national cardiovascular risk assessment and management programme (NHS Health Check): Retrospective database study*. Prev Med. 2015 Jun 4;78:1-8. doi: 10.1016/j.ypmed.2015.05.022.

"*Programme coverage was 21.4% over four years, with large variations between practices (0%-72.7%) and regions (9.4%-30.7%). Coverage was higher in older patients (adjusted odds ratio 2.88, 95% confidence interval 2.49-3.31 for patients 70-74 years) and in patients with a family history of premature coronary heart disease (2.37, 2.22-2.53), but lower in Black Africans (0.75, 0.61-0.92) and Chinese (0.68, 0.47-0.96) compared with White British. Coverage was similar in patients living in deprived and affluent areas. Prevalence of high CVD risk (QRISK2≥20%) among attendees was 4.6%. One third (33.6%) of attendees at high risk were prescribed a*

statin after Health Checks……Coverage of the programme and statin prescribing in high risk individuals was low. Coverage was similar in deprived and affluent groups but lower in some ethnic minority groups, possibly widening inequalities" taken from abstract
View abstract

Cost-effectiveness studies

Gillett M et al. (2015). The cost-effectiveness of testing strategies for type 2 diabetes: A modelling study. Health Technology Assessment 19(33): 1-80.

"*Based on the multiethnic LEADER* [Leicester Ethnic Atherosclerosis and Diabetes Risk] *population, among individuals currently attending NHS Health Checks, it is more cost-effective to screen for diabetes using a HbA1c test than using a FPG* [fasting plasma glucose] *test. However, in some localities, the prevalence of diabetes and high risk of diabetes may be higher for FPG relative to HbA1c than in the LEADER cohort. In such cases, whether or not it still holds that HbA1c is likely to be more cost-effective than FPG depends on the relative uptake rates for HbA1c and FPG*" taken from abstract
View full text

Consultation response

Mathers N (2014). *RCGP resposnse to Public Health England Consultation on 'NHS Health Check programme: priorities for research'*. Royal College of General Practitioners (RCGP), Dec 2014.

"*No clear research question or statistical analysis has been attempted for the literature review. Nor have other searches for relevant information, relating to screening for diabetes, or the effect of brief behavioural interventions, or efficacy of risk assessments been completed. The literature review is considered to be of poor quality and unable to identify the true breadth of current knowledge in relation to the Health check programme*" p2
View full text

References relating to general health checks (23)

Reviews

Lindblad A (2015). *Prevention and Management of Cardiovascular Disease Risk in Primary Care: Evidence Review of 12 Key Clinical Questions*. SUPPLEMENT TO THE CLINICAL PRACTICE GUIDELINE, Feb 2015. Cardiovascular Disease Risk Working Group, Alberta.

"*In Canada, primary care health professionals commonly perform adult periodic health exams. During these visits, cardiovascular (CV) risk factors (including age, smoking status, blood pressure, diabetes, and lipid levels) are often assessed and entered into a CV risk calculator to predict the likelihood of future cardiovascular disease (CVD). Decisions regarding treatment of dyslipidemia for patients without CVD are based primarily on global CV risk assessments or individual lipid results. It is unknown whether population based screening and assessing patients' CV risk is effective in decreasing CV mortality and overall mortality. If mass CV screening is effective in reducing future cardiovascular events (CVE) or mortality, best evidence should help clarify who should be screened, when screening should commence and optimal intervals for repeat screening*" p4
View full text

Gill SK. (2015). *Cardiovascular risk factors and disease in women*. Medical Clinics of North America 99(3): 535-552.

"*Coronary artery disease and stroke predominantly affect older women as opposed to younger women, but the risk factors that contribute to atherosclerotic cardiovascular disease risk often start in young women…..Attention should be focused on risk reduction in women of all ages. Screening for and discussing diabetes, hypertension, obesity, smoking, migraine, PCOS, and pregnancy complication history and discussing the pros and cons of hormone and statin medications are part of reducing cardiovascular risk for women*" taken from abstract
View abstract

Randomised controlled trials

Bender AM et al. (2015). *Is self-selection the main driver of positive interpretations of general health checks? The Inter99 randomised trial*. Preventive Medicine, 17th July 2015 doi:10.1016/j.ypmed.2015.07.004.

"*To investigate if the lower mortality among participants of a health check followed by lifestyle intervention of high risk persons is explained by self-selection……Mortality*

rates were highest among non-participants and lowest among participants in the intervention group, whereas mortality rates of controls were approximately the average of those of participants and non-participants……A substantial part of the lower mortality among participants in a preventive health check can be explained by confounding. The remaining lower mortality is most probably due to residual confounding, as the lower mortality was seen both for lifestyle related and non-lifestyle related diseases" taken from abstract
View abstract

Cross-sectional studies

Scholl J and Kurz P (2015). *P496: A contemporary health check-up as a one-time intervention with individual lifestyle coaching can substantially lower diabetes risk in patients with pre-diabetes - the PF study* . European Journal of Preventive Cardiology 1): S103.

"*744 of 1852 men (40,2%) and 248 of 960 women (25,8%) fulfilled the criteria for pre-diabetes. Within a follow-up of 3,9 years in men and 3,5 years in women only 2,55% of men and 0,81% of women with pre-diabetes progressed to type 2-diabetes. This translates into a very low progression rate of 6,5/1000 person-years in men and 2,3/1000 person-years in women. If HbA1c 6,0-6,4% was used instead of 5,7-6,4%, the respective rates were 7,2/1000 in men and 3,8/1000 in women. A recent meta-analysis of 70 prospective studies reported a much higher progression rate from pre-diabetes to type 2-diabetes of 35/1000 up to 70/1000 person-years depending on the definition used for pre-diabetes…..In this the evaluation of a contemporary health check-up as a one-time intervention with motivational lifestyle coaching we observed an exceptionally low progression rate from pre-diabetes to type 2 diabetes, which clearly demonstrates the effectiveness of this strategy for diabetes prevention*"
View abstract

Bender AM et al. (2015). Neighborhood deprivation is strongly associated with participation in a population-based health check. PLoS ONE 10(6).

"*In this paper, we show that persons living in high-deprivation neighborhoods have significantly lower probability of participating in a population-based health check than those living in low-deprivation neighborhoods. This suggests the need to develop preventive health checks tailored to deprived neighborhoods (e.g. increasing incentives). Such studies will help answer if health checks, which are designed to meet the needs of residents in deprived neighborhoods will increase participation and prove to be effective in preventing disease*" p9
View full text

Helou TN et al. (2015). *P060: Factors affecting cardiovascular risk perception in subjects submitted to a routine health evaluation*. Circulation 131.

"…..the aim of this study was to test the association between clinical characteristics and individual's perception of CV risk….. Among asymptomatic individuals submitted to a routine medical evaluation there was a high prevalence of hypo-perception [i.e. perceived risk lower than estimated risk] *of CV risk. Aging, smoking, dyslipidemia, physical activity and the use of medications were associated with a higher chance of risk hypo-perception. Thus, subjects in these conditions may benefit from a more careful risk orientation on health check-ups*" taken from abstract
View abstract

Mao Y and Mai Y (2015). Annual health check-up improves awareness, treatment, and control of diabetes. Diabetes 64: A685-A686. Conference: 75th Scientific Sessions of the American Diabetes Association Boston, MA United States.

"*A cross-sectional survey was carried out in all active and retired petrochemical employees (8,186) aged 40 years or older. Each participant has received a full medical check-up annually at least 5 years, including a face to- face questionnaire interview and measurement of fasting blood glucose (FBG) and lipids …..A total of 7,532 attended for screening. The overall prevalence of diabetes was 10.1%, 10.7% in male and 9.0% in female (P=0.021). The overall prevalence of prediabetes was 15.7% according to ADA criteria (16.5% in male vs. 14.2% in female, P=0.009); and the prevalence of prediabetes was only 1.8% in both sex according to WHO/IDF criteria. Among all participants with diabetes, 83.6% were aware of the diagnosis, 63.0% were receiving treatment, and 66.4% had FBG controlled. High prevalence of diabetes and prediabetes were found in this stable middle-aged employees population. Only less than 20% total subjects with diabetes were undiagnosed*" taken from abstract
No freely available online abstract

Robbins CL et al. (2015). *Outcomes of cardiovascular disease risk factor screening and referrals in a family planning clinic*. Journal of Women's Health 24(2): 131-137.

"*Female patients at a North Carolina Title X clinic were screened for CVD risk factors (n=462) and 167/462 (36.1%) were rescreened one year later. Clinical staff made protocol-driven referrals for women identified with newly diagnosed CVD risk factors…..The majority of women in need of referrals for CVD risk factors received them. Few women completed referrals. Future research should examine barriers and facilitators of referral care among low-income women*" taken from abstract
View abstract

Nana-Goar Pogosova N et al. (2015). P541: Evaluation of the efficacy of cardiovascular prevention in the framework of the World Heart Day. European Journal of Preventive Cardiology 1): S115.

"*The aim was to assess the effectiveness of a previously recommended lifestyle changes and/or lipid-lowering medications. 2392 patients participated in the campaign, of this 835 patients (during health-checks in the first quarter of 2014) were diagnosed to have coronary heart disease and 1557 patients - high CVD risk (>5% risk according to the high-risk countries SCORE scale). More than half of patients reported that they followed a low-fat diet, up to 16% noted that they had increased their physical activity, although less than 1.5% gave up smoking. Every third patient without coronary heart disease has been recommended statins*" taken from abstract
View abstract

Neumann S et al. (2015). *Diabetes screening and prevention in a large chemical company*. [German article, English abstract]. Deutsche Medizinische Wochenschrift 140(10): e94-e100.

"*From April 2011 to June 2013 12.114 employees participated in the general health check offered by the medical department (2.530 women, 9.584 men). All participants filled out a questionnaire named Findrisk a scientifically validated questionnaire which focuses on risk factors for diabetes. Furthermore, the blood glucose and the HbA<inf>1c</inf> of the participants have also been checked in a laboratory test…..We found out that diabetes prevention within the workplace setting is helpful to detect prediabetes and diabetes earlier than family doctors outside the company are able to do. Occupational physicians have the opportunity to inform the employees on risks for lifestyle diseases at an early stage when they are still healthy (primary prevention). For secondary prevention surveillance and clearance examination can be easily combined with screening tests for diabetes*" taken from abstract
View abstract

Cohort studies

Fischbacher C (2014). *Using routine data to monitor population level interventions: the example of the Keep Well health check programme in Scotland*. European Journal of Public Health, Volume 24, Issue suppl 2. DOI:http://dx.doi.org/10.1093/eurpub/cku165.034

"*These data provide evidence against any large population impacts on CVD from targeted health check programmes. It is not clear whether this apparent lack of health impact is due to insufficient programme intensity, difficulties with population engagement or incomplete adherence in the target population*" taken from abstract
View abstract

Wu TY et al. (2015). *Differences in mortality rates between frequent and occasional participants of periodic health check-ups: An observational study and propensity analysis*. European Geriatric Medicine 6(4): 297-302.

"*We aimed to compare mortality of frequent and occasional participants of the annual health examination in Taiwan…..Occasional participants had higher mortalities as compared to frequent participants. This trend persisted after propensity matching. There was an inverse relationship between health examination participation and all-cause, cancer and cardiovascular mortalities*" taken from abstract
View abstract

Service evaluation

Arain I (2015). *Keep Well in NHS Highland. Mid-term evaluation of the Keep Well programme in NHS Highland*. NHS Highland Keep Well Programme Steering Group, Jan 2015.

"*This report presents the findings from a process evaluation perspective and measures the performance and impact of the local KW intervention. The purpose of the evaluation is to inform decision makers and practitioners about how the programme is working and whether the programme has started making an impact. The overall aim is to develop, refine, test and explain Keep Well programme theories and the approaches applied in tackling health inequalities in CVD locally*" p11
View full text

Zakir Abbas S et al. (2015). *The effectiveness of using the workplace to identify and address modifiable health risk factors in deprived populations*. Occup Environ Med doi:10.1136/oemed-2014-102743. July 2015.

"*Low-paid local government employees from socially and economically deprived areas in North-East England were invited to attend a free health check. Health checks were conducted within working hours and close to their worksite, and included assessment of a range of lifestyle and health-related risk factors, including those associated with cardiovascular disease (CVD)……635 (20% response rate) employees in the target age group (≥40 years) attended the first check. Most health risk markers improved in those (N=427) attending both health checks, as did the mean CVD risk score (t=2.86, p=0.004)……This workplace programme had a positive impact on cardiovascular health, but attendance rates were low. These findings suggest that workplace health screening activities may have the potential to improve health in a group often considered hard to reach by other routes, but do not offer a straightforward solution in overcoming barriers to access for such subgroups within the working population*" taken from abstract
View abstract

Young J and Wyper C (2015). *Delivering Keep Well Health Checks within General Dental Practices.* Int J Integr Care 2015; vol 15, 27th May, Annual Conf Suppl; URN:NBN:NL:UI:10-1-117078.

"*Delivery of the health Check is effective and beneficial to patients and staff within GDP's* [general dental practices]*, as it provides a seamless transition between health care professionals and patients, that is not only holistic but individually tailored. Delivery of the health check within GDP's has been shown to be appropriate, as people with Periodontal disease are at greater risk of developing CVD than those without…..People appreciate the opportunity to proactively address their health and found the GDP's to be a suitable venue as they did not associate it with being unwell…..Personal engagement (either face to face or telephone), rather than a written invitation ensured that patients attended their appointments*" taken from abstract
View abstract

Tamura T and Kimura Y (2015). *Specific health checkups in Japan: The present situation analyzed using 5-year statistics and the future*. Biomedical Engineering Letters 5(1): 22-28.

"…..a new screening and interventional program specifically targeting metabolic syndrome commenced in April 2008. This program targeted individuals in the age group 40-74 years. The program sought to prevent the risk of development of lifestyle-related diseases. In this review, we analyze 5-year statistical data, discuss the efficiency of the screening program, and offer a brief explanation of the applicability of information communication technology (ICT)" taken from abstract
View full text

Zhong X et al. (2015). *Getting a grip on NCDs in China: An evaluation of the implementation of the Dutch-China Cardiovascular Prevention Program*. International Journal of Behavioral Medicine 22(3): 393.

"*An evaluation of the program's implementation was undertaken with both program participants and CHSC* [community health service centers] *staff…..The screening questionnaire was completed by 9067 participants in seven demonstration communities. Thirty percent of these individuals were categorized as high risk according to their scores. About one third of these individuals returned for further clinical and laboratory tests. Almost half of those re-screened participated in lifestyle education classes. Program participants and community health staff provided mostly positive feedback about the program. Conclusions: While the program proved acceptable and feasible for delivery by CHSCs and by program participants, additional strategies are required to improve future uptake of both screening and subsequent lifestyle education by those at high risk*" taken from abstract
View full text

Zou G et al. (2015). *Evaluation of a systematic cardiovascular disease risk reduction strategy in primary healthcare: an exploratory study from Zhejiang, China*. Journal of Public Health 37(2): 241-250.

"*Using the Asian Equation, we selected subjects aged 40–74 years with a calculated 10-year CVD risk of 20% or higher from the existing resident health records and research checkup. The subjects were provided, as appropriate, with the low-dose combination of CVD-preventive drugs (antihypertensive drugs, aspirin, statin), lifestyle modification and adherence strategies monthly. The intervention was piloted for three months in 2012, preceding the conduct of a cluster-based randomized controlled trial (RCT)……A total of 153 (40%) subjects were recruited, with an average total 10-year risk of CVD of 28.5 ± 7.9%. After intervention, the appointment rate was up to 90%. An upward trend was observed for the use of CVD-preventive drugs. The smoking rates significantly reduced from 38 to 35%, with almost no change for salt reduction. The systolic blood pressure (BP) and diastolic BP decreased slightly…....Our cluster-based RCT will provide the highest level of evidence for the policy development of preventing CVD in a rural PHC of China*" taken from abstract
View full text

Case-finding

Kirke AB et al. (2015). *Systematic detection of familial hypercholesterolaemia in primary health care: A community based prospective study of three methods*. Heart Lung and Circulation 24(3): 250-256.

"*Three methods of case detection were tested: pathology laboratory database search, workplace health checks and general practice database search…..Pathology database detected the greatest number of clinical FH (51 of 86, 59.3%) and mutation positive participants (8 of 11, 72.7%)……Screening within primary health care was successful in detecting participants with FH. An integrated case detection model combining screening of pathology and GP databases is proposed*" taken from abstract
View abstract

Modelling studies

Kim S et al. (2015). *Life satisfaction and use of preventive health care services*. Health Psychology 34(7): 779.

"*In models adjusting for sociodemographic factors, each standard deviation increase in life satisfaction was associated with a higher likelihood that people would obtain a cholesterol test. Further, women with higher life satisfaction were more likely to obtain a mammogram–x-ray or pap smear and also regularly check their breasts for lumps, whereas men were more likely to obtain a prostate exam…..Higher life*

satisfaction was associated with higher use of several preventive services. A growing body of randomized controlled trials targeting life satisfaction has shown that levels of life satisfaction are modifiable. Thus, if these findings are replicated, life satisfaction may provide an important target for interventions aimed at enhancing preventive behaviors and health" taken from abstract
View abstract

Feasibility studies

Pears S et al. (2015). *Development and feasibility study of very brief interventions for physical activity in primary care*. BMC Public Health 15(333): (8 A-(8 A.

"*The aim of this research was to identify and develop promising VBIs* [very brief interventions] *for physical activity and test their feasibility and acceptability in the context of preventive health checks in primary care……Using a two-stage approach, in which we considered the practicability of VBIs (acceptability, feasibility and cost) alongside potential efficacy from the outset, we developed a short-list of four promising VBIs for physical activity and demonstrated that they were acceptable and feasible as part of a preventive health check in primary care*" taken from abstract
View full text

Viitasaloa K (2015). *Prevention of diabetes and cardiovascular diseases in occupational health care: Feasibility and effectiveness*. Primary Care Diabetes. Volume 9, Issue 2, April 2015, Pages 96–104.

"*A health check-up including physical examination, blood tests, questionnaires and health advice was completed on 2312 employees of an airline company. Participants with elevated risk for type 2 diabetes based on FINDRISC score and/or blood glucose measurement (n = 657) were offered 1–3 additional lifestyle counseling sessions and 53% of them agreed to participate. After 2.5 years, 1347 employees of 2199 invited participated in a follow-up study……Identification of employees with cardiovascular and diabetes risk, and the low intensity lifestyle intervention were feasible in occupational health-care setting. However, the health benefits were modest and observed only for men with increased risk*" taken from abstract
View abstract

Ongoing research

Sandbæk A (2015). *Effectiveness and Cost-effectiveness of the Check Your Health Preventive Programme*. University of Aarhus

"*Check your health is a prevention intervention designed to create awareness and action on health condition with focus at physical activity at a population-level to 30-49*

years of age. It consists of a behavioural and clinical examination followed by either (I) referral to a health promoting consultation in general practice (II) targeted behavioural programmes at the local Health Centre or (III) no need for follow-up; stratified after risk-profile. The CORE trial (Check your health) aim to investigate effectiveness on health and social outcomes of the preventive health check and to establish the cost-effectiveness according to life years gained; direct costs and total health costs. A pragmatic cluster randomised controlled trial has been established to meet the aims and in total 10.600 individuals from 35 practices have been randomized in to two groups that will be invited in 2013-14 and 2017-18 respectively. The group offered the preventive health check in 2013-14 will constitute the intervention group and the group examined in 2017 - 18 the control group. A follow up of the intervention group in 2017 - 18 will provide data for the intention to treat analysis revealing the effect. Outcome measures are level of physical activity, risk of getting cardiovascular disease, sick leave and labor market attachment" taken from abstract

View details

References relating to diabetes and cardiovascular risk screening (19)

Reviews

Durao S et al. (2015). *Evidence insufficient to confirm the value of population screening for diabetes and hypertension in low- and middle-income settings*. South African Medical Journal 105(2): 98-102.

"*To assess the evidence from systematic reviews on the effect on morbidity and mortality of blanket screening for hypertension or diabetes mellitus compared with targeted, opportunistic or no screening, we searched for relevant systematic reviews and conducted duplicate study selection, data extraction and quality appraisal..... There is insufficient evidence from currently available systematic reviews to confirm a beneficial effect of blanket screening for hypertension and/or diabetes compared with other types of screening methods in low- and middle-income settings. Scarce resources are being mobilised to implement mass screening intervention for diabetes and hypertension without adequate evidence of its effects*" taken from abstract
View full text

Selph S et al. (2015). *Screening for type 2 diabetes mellitus: A systematic review for the U.S. preventive services task force*. Annals of Internal Medicine 162(11): 765-776.

"In conclusion, screening for diabetes did not improve mortality rates after 10 years of follow-up in 2 trials (32, 33) but was found to decrease mortality rates in a lifestyle intervention study with 23 years of follow-up (38). More evidence is needed to determine the effectiveness of treatments for screen-detected diabetes" p773
View full text

Sultan A et al. (2015). *Does the dentist have a role in identifying patients with undiagnosed diabetes mellitus*? Journal of the Irish Dental Association 60(6): 298-303.

"*The aim of this paper is to critically analyse the literature and determine whether screening for undiagnosed diabetes mellitus is within the dentist's scope of practice…..A PubMed/Google Scholar/Google literature search was conducted of papers published in the English language in the years 1980-2013. Over 140 articles were examined. Reference lists of key articles were also sourced and analysed. The*

most pertinent articles are presented in this review……Screening for diabetes mellitus in the dental office should only be carried out for high-risk patients in order for such screenings to be cost-effective" taken from abstract
View abstract

Randomised controlled trials

Løkkegaard T et al. (2015). *Psychological consequences of screening for cardiovascular risk factors in an un-selected general population: results from the Inter99 randomised intervention study*. Scandinavian Journal of Public Health 43(1): 102-110.

"*The Inter99 study (1999 - 2006) was a randomised intervention in the general population, aiming to prevent IHD by a healthier lifestyle. We included the whole study population, independent of participation (n=60,915)…..There was no significant difference between the intervention and control groups in their use of antipsychotics, hypnotics/sedatives, antidepressants or anxiolytics…..This large, randomised intervention study supports that screening for risk factors to IHD does not increase mental distress, not even in the mentally or socioeconomically most vulnerable persons*" taken from abstract
View abstract

Peng H et al. (2015). *1570-P. Clinical decision support to enhance prediabetes screening in primary care*. Diabetes 64: A408-A409.

"*20 primary care practices within MedStar Health were randomized by cluster to usual care (no CDSS* [clinical decision support system]*), CDSS following ADA guidelines for prediabetes/diabetes screening, or CDSS following the U.S. Preventive Service Task Force guidelines for a pilot period of 2 months…..Screening and prediabetes diagnosis rates were compared…..CDSS following either guideline resulted in higher screening of patients at risk and prediabetes identification compared to usual care……Embedding CDSS within EHR workflow to enhance identification of patients at high risk of diabetes is feasible and effective, and may allow for greater diabetes prevention efforts within primary care*" taken from abstract
View abstract

Cohort studies

Black JA., et al. (2015). *Change in cardio-protective medication and health-related quality of life after diagnosis of screen-detected diabetes: Results from the ADDITION-Cambridge cohort*. Diabetes Research and Clinical Practice 109(1): 170-177.

"*867 participants with screen-detected diabetes underwent clinical measurements at diagnosis, one and five years. General HRQoL (EQ5D) was measured at baseline,*

one- and five-years, and diabetes-specific HRQoL (ADDQoL-AWI) and health status (SF-36) at one and five years….. We found little evidence that increases in the number of cardio-protective medications impacted negatively on HRQoL among individuals with screen-detected diabetes over five years" taken from abstract
View full text

Lee H et al. (2015). *Association of cardiovascular health screening with mortality, clinical outcomes, and health care cost: A nationwide cohort study*. Preventive Medicine 70: 19-25.

"*Cohort study of a 3% random sample of all Korea National Health Insurance members 40 years of age or older and free of CVD or CVD-related health conditions was conducted. A total 443,337 study participants were followed-up from January 1, 2005 through December 31, 2010…..In primary analysis, the hazard ratios for CVD mortality, all-cause mortality, incident composite CVD events, myocardial infarction, cerebral infarction, and cerebral hemorrhage comparing participants who attended a screening exam during 2003-2004 compared to those who did not were 0.58 (95% CI: 0.53-0.63), 0.62 (95% CI: 0.60-0.64), 0.82 (95% CI: 0.78-0.85), 0.84 (95% CI: 0.75-0.93), 0.84 (95% CI: 0.79-0.89), and 0.73 (95% CI: 0.67-0.80), respectively…… Participation in CVD health screening was associated with lower rates of CVD, all-cause mortality, and CVD events, higher detection of CVD-related health conditions, and lower healthcare utilization and costs*" taken from abstract
View abstract

Szymanska-Garbacz E et al. (2015). *1558–P. Poor performance of risk factors-driven screening for prediabetes*. Diabetes 64: A405.

"*5,276 diabetesfree individuals (2,963 women; 56%), aged 45-55 years, who had at least one risk factor for diabetes development took part in a nationwide diabetes screening programme. IFG was found in 1860 individuals, while normal fasting glucose (NFG) was noted in 1421 persons…..Sedentary lifestyle, family history of diabetes and newly diagnosed hypertension were similarly prevalent in both studied groups, however even when differences in prevalence of other risk factors reached statistical significance, the actual difference was relatively small, with the exception of the history of IFG as it was found almost twice as often in persons with IFG as compared to those with NFG. In conclusion, prediabetes screening programmes conducted in high risk populations should not be risk factors driven; particularly they must not be based on family history of diabetes or sedentary lifestyle as these factors are equally often present in persons with prediabetes as well as normal fasting glucose*" taken from abstract
View abstract

Cross-sectional studies

Sajid Hossain S et al. (2015). *P531: Assessing the risk for cardiovascular diseases using PROCAM/HeartScore in obese patients. A survey with 960 employees*. European Journal of Preventive Cardiology 1): S113.

"*The aim of the present project is to apply the PROCAM and HeartScore for association of adiposity with morbidity and mortality of cardiovascular diseases in employees of different companies undergoing a cardiovascular screening program…..960 employees of different companies were investigated between May 2013 -September 2014. The cardiovascular risk was determined using the PROCAM score (allows the early detection of the risk of contracting a disease thereby providing the possibility of a timely prevention, especially in high risk groups whose disorders have not manifested clinically yet) and HeartScore (The tool for predicting and managing the risk of heart attack in Europe)……Although there was only a small percentage of obese employees (15%), the significant higher risk for cardiovascular disease was apparent in both score systems (more than double). Therefore extensive diagnostic measures in prevention are required*" taken from abstract
View abstract

Qualitative research

Legido-Quigley H et al. (2015). *Patients' knowledge, attitudes, behaviour and health care experiences on the prevention, detection, management and control of hypertension in Colombia: A qualitative study*. PLoS ONE 10(4).

"*This qualitative study explored patients' knowledge, attitudes, behaviour and health care seeking experiences in relation to detection, treatment and control of hypertension in Colombia…..Measures that should be addressed to improve hypertension management in Colombia include better communication between health care professionals and patients, measures to improve understanding of the importance of adherence to treatment, reduction of co-payments and transport costs, and easier access to care, especially in rural areas*"
View full text

Abrahams-Gessel S et al. (2015). *The training and fieldwork experiences of community health workers conducting population-based, noninvasive screening for CVD in LMIC*. Global Heart 10(1): 45-54.

"*This study sought to quantitatively assess the performance of CHW during training and to qualitatively capture their training and fieldwork experiences while conducting noninvasive screening for CVD risk in their communities…..Effective training for screening for CVD in community settings should have a strong didactic core that is supplemented with culture-specific adaptations in the delivery of instruction. The*

incorporation of expert and intimate knowledge of the communities themselves is critical, from the design to implementation phases of training. Challenges such as role definition, defining career paths, and providing adequate remuneration must be addressed" taken from abstract
View abstract

Abrahams-Gessel S et al. (2015). *Training and supervision of community health workers conducting population-based, noninvasive screening for CVD in LMIC: Implications for scaling up*. Global Heart 10(1): 39-44.

"*This study sought to report lessons learned from supervisors' experiences monitoring CHW and perceptions of other stakeholders regarding features for successful scaling of interventions that incorporate task-sharing with CHW……The criteria critical for successful scaling of CHW-led screening are consistent with evidence for scaling-up communicable disease programs*" taken from abstract
View abstract

Service evaluation

Fikri-Benbrahim N. et al. (2015). *Assessment of a screening protocol for type 2 diabetes in community pharmacy. The DiabNow Study*. Diabetes Research and Clinical Practice 108(3): e49-e52.

"The present study piloted a screening protocol for type 2 diabetes using HbA1c capillary measurement, which to our knowledge, has never been designed nor tested in the community pharmacy setting…...Regarding the strengths of the protocol, pharmacists' adherence to the first two steps of the protocol [identification of high-risk individuals using the American Diabetes Association (ADA) questionnaire and measurement of capillary HbA1c with the A1cNow+1 device] *was remarkably high. The relative simplicity and short time they involve, may explain this high adherence.The adherence to the protocol diminished in the next step, where only 62.2% of the subjects who should have visited their GP, completed the "referral" step. Based pharmacists opinions and available evidence…..this lack of adherence may be explained by communication barriers with both patients and physicians*" e51
View abstract

Modelling studies

McCoy RG et al. (2015). *Development and validation of healthimpact: An incident diabetes prediction model based on administrative data*. Diabetes 64: A347. Conference: 75th Scientific Sessions of the American Diabetes Association Boston, MA United States.

"*We…..developed the HealthImpactTM model to prospectively identify patients at risk for diabetes using only administrative data…..In the training population, we identified HealthImpact scores of 50, 75, and 90 as indicative of low, intermediate, and high risk of incident diabetes. HealthImpact had very good discrimination in the internal (c-statistic 0.8270) and external (c-statistic 0.8171) validation cohorts…..In sensitivity analysis, HealthImpact performed comparable to invasive glycosylated hemoglobin, glucose, and glucose tolerance testing in predicting incident diabetes. HealthImpact is an efficient and effective method of risk stratification for incident diabetes that does not rely on patient-provided information or lab tests, and can be used by health systems and payers that administrative data*" taken from abstract
No freely available online abstract

Basu S et al. (2015). *The Health System and Population Health Implications of Large-Scale Diabetes Screening in India: A Microsimulation Model of Alternative Approaches*. PLoS Medicine 12(5).

"*The current analysis suggests that no population-based mass diabetes screening option can truly be recommended at present because of the vast expected number of false-positive results. Hence, given our results, an approach that focuses on symptom-based screening, with attendant treatment improvement among already-diagnosed persons, may be more sensible than community-based mass screening. Improving instruments to reduce false-positive screens, preparing the health system for very substantial confirmatory testing demands, and identifying how to deliver efficacious treatment, are three priority areas that require urgent attention before countries experiencing rapid increases in diabetes prevalence implement large-scale community-based diabetes screening programs*"
View full text

Mbanya VN et al. (2015). *Body mass index, waist circumference, hip circumference, waist-hip-ratio and waist-height-ratio: Which is the better discriminator of prevalent screen-detected diabetes in a Cameroonian population?* Diabetes Research and Clinical Practice 108(1): 23-30.

"*We assessed and compared the strength of association and discriminatory capability of measures of adiposity including body mass index (BMI), waist circumference (WC), hip circumference (HC), waist-hip-ratio (WHR) and waist-*

height-ratio (WHtR) for prevalent SDM risk in a sub-Saharan African population. Methods: Participants were 8663 adults free of diagnosed type 2 diabetes, who took part in the nationally representative Cameroon Burden of Diabetes (CAMBoD) 2006 survey. Logistic regression models were used to compute the odd ratio (OR) and 95% confidence interval (95%CI) for a standard deviation (SD) higher level of BMI (7.3), WC (12.5), HC (11.7), WHR (0.19) and WHtR (0.08) with prevalent SDM risk…..WC was the best predictors and to some extent WHtR of prevalent SDM in this population, while BMI and WHR were less effective"
View abstract

Diagnostic test studies

Strauss SM et al. (2015). *The Potential for Glycemic Control Monitoring and Screening for Diabetes at Dental Visits Using Oral Blood*. American Journal of Public Health 105(4): 796-801.

"*In 2013 and 2014, we performed hemoglobin A1c (HbA1c) tests on dried blood samples of gingival crevicular blood and compared these with paired "gold-standard" HbA1c tests with dried finger-stick blood samples in New York City dental clinic patients……About half of the study sample had elevated HbA1c values in the combined prediabetes and diabetes ranges, with approximately one fourth of those in the diabetes range. With a correlation of 0.991 between gingival crevicular and finger-stick blood HbA1c, measures of concurrence between the tests were extremely high for both elevated HbA1c and diabetes-range HbA1c levels…… Gingival crevicular blood collected at the dental visit can be used to screen for diabetes and monitor glycemic control for many at-risk patients*" taken from abstract
View abstract

Weigl BH et al. (2015). *2727-PO. Resource and context appropriate diabetes screening: Accuracy of urine glucose test strips as a screening tool and their impact on patient population selection*. Diabetes 64: A688.

"*Given that urine glucose has practical advantages for low resource settings, the goal of this study is to compare the sensitivity and specificity of urine glucose test and evidence of complications in those testing positive to other existing diabetes screening methods……Of 1328 eligible study participants, 1315 participated in the study, 75% were female and 80% were less than 65 years. Results of all screening tests are available for 1265 patients……The urine dipstick test was significantly less accurate (0.54 (95% CI: 0.53-0.56)). The urine test identifies patients with blood glucose levels above renal threshold and at higher risk for complications*" taken from abstract
View abstract

Araneta MRG et al. (2015). *Optimum BMI Cut Points to Screen Asian Americans for Type 2 Diabetes*. Diabetes Care 38(5): 814-820.

"*We aimed to ascertain an appropriate lower BMI cut point among Asian-American adults without a prior diabetes diagnosis…….For screening purposes, higher sensitivity is desirable to minimize missing cases, especially if the diagnostic test is relatively simple and inexpensive. At BMI >=23 kg/m(2), sensitivity (84.7%) was high in the total sample and by sex and Asian-American subgroup and would miss only ~15% of Asian Americans with diabetes……The BMI cut point for identifying Asian Americans who should be screened for undiagnosed type 2 diabetes should be <25 kg/m(2), and >=23 kg/m(2) may be the most practical*" taken from abstract
View abstract