

## Implementation of selective prevention for cardiometabolic diseases; are Dutch general practices adequately prepared?

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### ABSTRACT

**Objective:** Current guidelines acknowledge the need for cardiometabolic disease (CMD) prevention and recommend five-yearly screening of a targeted population. In recent years programs for selective CMD-prevention have been developed, but implementation is challenging. The question arises if general practices are adequately prepared. Therefore, the aim of this study is to assess the organizational preparedness of Dutch general practices and the facilitators and barriers for performing CMD-prevention in practices currently implementing selective CMD-prevention.

**Design:** Observational study.

**Setting:** Dutch primary care.

**Subjects:** General practices.

**Main outcome measures:** Organizational characteristics.

**Results:** General practices implementing selective CMD-prevention are more often organized as a group practice (49% vs. 19%,  $p = .000$ ) and are better organized regarding chronic disease management compared to reference practices. They are motivated for performing CMD-prevention and can be considered as 'frontrunners' of Dutch general practices with respect to their practice organization. The most important reported barriers are a limited availability of staff (59%) and inadequate funding (41%).

**Conclusions:** The organizational infrastructure of Dutch general practices is considered adequate for performing most steps of selective CMD-prevention. Implementation of prevention programs including easily accessible lifestyle interventions needs attention. All stakeholders involved share the responsibility to realize structural funding for programmed CMD-prevention. Aforementioned conditions should be taken into account with respect to future implementation of selective CMD-prevention.

### KEY POINTS

There is need for adequate CMD prevention. Little is known about the organization of selective CMD prevention in general practices.

- The organizational infrastructure of Dutch general practices is adequate for performing most steps of selective CMD prevention.
- Implementation of selective CMD prevention programs including easily accessible services for lifestyle support should be the focus of attention.
- Policy makers, health insurance companies and healthcare professionals share the responsibility to realize structural funding for selective CMD prevention.

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Cardiometabolic disease; prevention; organization of primary care; general practice; implementation

## Introduction

Cardiometabolic diseases (CMD) including cardiovascular diseases, diabetes mellitus type 2 (DM2) and chronic kidney disease, are the leading cause of death worldwide and account for over a quarter of mortality

in the Netherlands [1,2]. Over the next decades, the prevalence of CMD will increase even further due to a rise in life expectancy combined with a progressing unhealthy lifestyle [3]. An estimated 80% of CMD is caused by unhealthy lifestyle and therefore could be prevented [4].

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In recent years several programs for selective CMD prevention have been developed [5,6]. These programs aim to identify individuals at increased risk for CMD and to subsequently initiate and support lifestyle changes and treatment, if indicated. Given the fact that general practitioners (GPs) provide integral healthcare, have longstanding relationships with their patients and see – at least in the Netherlands – over 75% of their listed patients annually [7], they have unique opportunities to identify individuals at risk for CMD, to assess their eligibility for lifestyle intervention and to provide long-term follow-up.

The European Society of Cardiology (ESC) also acknowledges the need for adequate cardiovascular disease prevention and recommends five-yearly screening of a targeted population. In addition, the ESC guideline indicates that cardiovascular disease prevention should be delivered in all healthcare settings. In particular, GPs are proposed as key caregiver to initiate, coordinate and provide long-term follow-up for cardiovascular disease prevention [4,8].

Implementing these recommendations in daily practice is a challenge for all stakeholders involved. On the one hand, fundamental questions arise, such as whether individuals are responsible for their own lifestyle and subsequent risks and how that relates to the role of healthcare providers? On the other hand, structural challenges appear such as the consequences for the already increasing workload in general practice and the lack of adequate funding of preventive activities [9,10]. Several studies have shown that Dutch GPs consider selective CMD prevention worthwhile [8] and recognize lifestyle interventions as one of their responsibilities [11].

Positive associations have been found between various aspects of practice organization and quality of cardiovascular risk management and DM2 care. Structured collaboration, such as cooperation with a practice nurse [12,13] working in multidisciplinary teams [14,15], collaboration in GP-groups [15,16], education in cardiovascular risk management for practice nurses [17] and logistic support (e.g. recall system and records on risk factors) [15,17–19] all improve outcomes of chronic care and prevention programs for CMD. Other factors that might determine successful CMD prevention are the availability of defined care pathways for CMD [20] including easily accessible lifestyle interventions [10,17,21,22] and sufficient financial support [10,23]. However, so far it is unclear to what extent these aforementioned organizational factors – which are the preamble to successful implementation – are present in Dutch general practices.

Therefore, the aim of this observational study is to assess the organizational preparedness of Dutch general practices and the facilitators and barriers for CMD prevention in general practices currently implementing selective CMD prevention.

## Materials and methods

### Study design

The study was divided into two parts:

1. An observational study comparing organizational characteristics between practices currently participating in a CMD prevention program (index practices) and a sample of reference practices.
2. A descriptive study on the delivery of CMD prevention, including facilitators and barriers for performing CMD prevention in the index practices

### Participants

#### *General practices currently implementing selective CMD prevention (index-practices)*

This group consists of 37 practices, with in total 117 participating GPs, that consented to participate in the INTEGRATE study.

The INTEGRATE study aims to evaluate the (cost)-effectiveness of programmed selective CMD prevention among primary care patients aged 45–70 years.

All index practices carry out a CMD prevention program including a tailored lifestyle intervention. Details about the design of the INTEGRATE study and the CMD prevention program have been published elsewhere [24].

#### *Representative sample of Dutch general practice (reference practices)*

Data on reference practices were derived from two publications of the Netherlands Institute of Health Services Research (NIVEL); the 2015 report of the GP register and the 2015 evaluation of the Dutch GP forecasting report [25,26].

NIVEL's GP register covers data of all GP practices in the Netherlands ( $n=5045$  in 2015) with regard to basic organizational aspects and healthcare delivery, such as personal characteristics of GPs, practice characteristics, cooperation with other healthcare professionals, participation in chronic care groups and availability of supportive staff. These data are updated annually by Dutch GPs themselves.

The data used for the 2015 evaluation of the Dutch GP forecasting report were derived from different data sources. Among others, the NIVEL's GP register (1567 GP practices updated their profile in 2014) and the website of NHG (Dutch College of general practitioners) Practice Accreditation (NPA) were used. An additional questionnaire was sent to a random sample of 1180 GPs in the Netherlands with questions concerning topics like prevention, accessibility of GP care, cooperation with other healthcare professionals and coordination of primary care.

### Data collection

For both index and reference practices, we used data about characteristics of their practice organization (Table 1). In the index practices we collected additional information on the delivery of CMD prevention, including facilitators and barriers for performing CMD prevention (Table 2).

### Index practices

At baseline (before the start of the INTEGRATE study) questionnaires were sent to all index practices containing 47 pre-structured questions on practice characteristics, the participation in chronic disease management programs for DM2, cardiovascular risk management and chronic obstructive pulmonary disease (COPD) and collaboration with other healthcare professionals within the practice (Table 1).

In the questionnaire sent to the index practices we also collected information on aspects of practice organization which have been associated with improved cardiovascular risk management and DM2 care (structured collaboration, training of staff and logistic support), performance of preventive activities, such as attitudes toward preventive activities, access to lifestyle intervention services and barriers for implementing selective CMD prevention (Table 2).

**Table 1.** Characteristics of index practices and reference practices.

Characteristic	Index practices N = 37	Reference practices N = 5045	p Value
<i>Type of practice (%)<sup>a</sup></i>			
Single-handed practice (1GP)	27	41	.000*
Practice with 2 GPs	24	40	–
Group practice/Health Care Centre ( $\geq 2$ GPs)	49	19	–
Training practice for GP trainees	62	38	.004
Dispensing practice	11	7	.327
<i>Practice setting (%)<sup>a</sup></i>			
Rural†	38	31	.157*
Rural–urban fringe	16	17	–
Urban	46	42	–
	N = 37	N = 1567	
<i>Quality of care (%)<sup>b</sup></i>			
Accreditation by NPA††	73	55	.031
Participating in chronic care group	89	81	.293
Previous participation in scientific research	78	46	.000
<i>Digital and health-related services (%)<sup>b</sup></i>			
Consultations out of office hours	35	n/a	–
E-consultations available	68	49	.031
Practice website available	97	n/a	–
<i>Healthcare professionals in general practice (%)<sup>b</sup></i>			
Practice nurse	97	80	.006
Lifestyle coach	16	n/a	–
Dietician	51	46	.515
Physiotherapist	35	40	.617
Psychologist	41	34	.391
<i>Involved in chronic disease management (%)<sup>b,†††</sup></i>			
Diabetes mellitus	100	99	1
Chronic obstructive pulmonary disease	94	75	.008
Cardiovascular risk management	82	55	.002

<sup>a</sup>NIVEL. Cijfers uit de registratie van huisartsen peiling 2015 [2015 report of the GP-register] [25].

<sup>b</sup>NIVEL. De Toekomstvisie Huisartsenzorg 2022, waar staat de huisartsenzorg anno 2014? [The evaluation of the 2015 Dutch GP forecasting report] [26].

\*p Value for categorical variable.

†Rural: <1000 addresses per km<sup>2</sup>; Rural–urban fringe: 1000–1500 addresses per km<sup>2</sup>; Urban >1500 addresses per km<sup>2</sup>.

††To receive accreditation by the NPA, practices have to meet at least 23 quality standards regarding practice policy, recording, monitoring and improving quality of care, practice organization, patients experiences and professional behavior.

†††Chronic disease management programs are defined as care programs in which cooperation agreements have been made between GPs and local healthcare providers concerning the programs' content and distribution of responsibilities. In the Netherlands, these programs are funded by healthcare insurance companies and can be offered if the practice is united in a chronic care group.

Abbreviations: GP: general practitioner; n/a: not available.

**Table 2.** Preventive activities of practices committed to selective CMD prevention.

Characteristic	Index practices (N = 37)
<i>Activities in case of increased CMD risk (%)</i>	
Individual treatment plan	89
Standard follow-up by practice	89
Structured consultations between practice nurse and GP	51
Occasional consultation between practice nurse and GP according to agreements	35
Verbal information during consultation	100
Written information given	97
Website references given	57
<i>Practice nurse training in cardiovascular risk management or diabetes care (%)</i>	
0 times per year	14
1–2 times per year	11
>2 times per year	75
<i>Lifestyle support service within general practice (%)</i>	
Smoking cessation	97
Weight management/healthy food sessions	30
Exercise programs	14
<i>Community-based lifestyle services (%)</i>	
Practice is well informed about lifestyle services	59
Written overview of available lifestyle services	54
Access to information about lifestyle services during consultation	62
Written information about lifestyle services on the website	22
<i>Barriers for programmed CMD prevention in general practice (%)</i>	
Insufficient staff/time	59
Financing	41
Patients have no need for prevention	19
Insufficient scientific evidence for the effect of selective CMD prevention	8
Lack of motivation for preventive activities	3
Lack of cooperation between parties involved	5
No clear overview of preventive activities available	8
No hampering factors reported	5
<i>Motivation for prevention (means, SD)</i>	
Interest in prevention of general practice	7.8 (0.55)
Staff commitment to preventive activities	7.6 (0.79)
Organization of cardiovascular prevention	7.5 (0.95)

CMD: cardiometabolic disease; GP: general practitioner.

The questionnaire was based on the 2015 evaluation of the Dutch GP forecasting report questionnaire and on the questionnaire applied by NIVEL in the 2010 pilot evaluation study of selective CMD prevention [26,27]. The person in the practice who was most involved with the planned implementation of the CMD prevention program filled out the questionnaire (GP, practice nurse or practice assistant).

### Reference practices

Data on practice characteristics, such as practice type and setting were derived from the 2015 report of the GP register [25].

The 2015 evaluation of the Dutch GP forecasting report [26] was used as data source on quality of care, such as the percentage of practices accredited by the NPA and their participation in a chronic care group. To receive accreditation by the NPA, practices have to meet at least 23 quality standards regarding practice policy, recording, monitoring and improving quality of care, practice organization, patient experiences and professional behavior. In addition, this evaluation report was used for data on digital and health-related services, cooperation with other healthcare

professionals and participation in chronic disease management programs for DM2, cardiovascular risk management and COPD.

### Statistical analysis

#### Practice characteristics of index and reference practices

Descriptive statistics were used to present the practice characteristics of index and reference practices and were presented as percentages. Due to our relatively small number of index practices ( $n = 37$ ), a two-tailed binomial test was used for dichotomous outcomes and a chi-square test for categorical outcomes to compare the characteristics of the index practices with the reference practices.

#### Preventive activities of index practices

Descriptive statistics were used to present the preventive activities of index practices and were presented as percentages.

Statistical analyses were performed using STATA version 14.0 (StataCorp, College Station, TX).

## Results

### *Practice characteristics*

Characteristics of index practices and the reference practices are presented in [Table 1](#). Index practices were more often organized as group practices as compared to the reference practices (49% vs. 19%,  $p = .000$ ) and were more likely to teach GP trainees (62% vs. 38%,  $p = .004$ ). The practice location did not differ between index practices and reference practices, with one third located in a rural setting. Index practices more often participated in scientific research (78% vs. 46%,  $p = .000$ ) and a significantly higher proportion was accredited by the NPA (73% vs. 55%,  $p = .003$ ).

The number of listed patients per full-time GP was comparable. In the Netherlands the average practice size is 2350 patients per full-time GP (Data not shown).

### *Collaboration and participation in chronic disease management*

Index practices more frequently employed supportive nursing staff. In nearly all index practices (97%), at least one practice nurse was trained in giving lifestyle advices, compared to 80% of the reference practices ( $p = 0.006$ ). The percentage of practices participating in a chronic care group was comparable (89% vs. 81%, respectively). All index practices and all reference practices participating in a chronic care group provided a disease management program for DM2 patients. Index practices were more likely to also participate in chronic disease management programs for COPD and cardiovascular risk management (94% vs. 75%,  $p = .008$  and 82% vs. 55%,  $p = .002$ , respectively) (displayed in [Table 1](#)).

### *Preventive activities of index practices*

In the majority of the index practices (89%), patients received an individual treatment plan and standard follow-up by the practice nurse or GP in case of an established increased CMD risk. In 86% of the index practices, the practice nurse and GP closely collaborated in the follow-up care once an increased CMD risk was detected. Three quarters of the practice nurses received additional education in cardiovascular risk management and/or DM2 care more than twice a year, and 86% of the practice nurses attended a training at least annually. Nearly all practices (97%) offered a smoking cessation program within their practice. Lifestyle support services, such as body weight control/dietary advice and physical exercise programs

were offered in 30% and 14% of the index practices, respectively. In total, 41% of the index practices indicated not to be up-to-date with the available community-based lifestyle services and 46% had no written overview of these services available, but only 8% indicated this as a barrier for implementation.

In the self-rated questionnaire, index practices scored on average a 7.8 (SD 0.55), on a scale of 0–10, for their overall interest in prevention and preventive activities. An average of 7.6 (SD 0.79) was scored for staff commitment and a 7.5 (SD 0.95) for practice organization regarding CMD prevention.

Limited availability of staff/lack of time (59%) and insufficient financing (41%) were reported as most important structural barriers for the implementation of selective CMD prevention (displayed in [Table 2](#)).

## Discussion

### *Summary of results*

General practices willing to participate in a selective CMD prevention program are more often organized as group practices and are better organized with respect to chronic disease management as compared to the reference practices. They are motivated for CMD prevention and seem to be ‘frontrunners’ of Dutch general practices considering the degree in which they participate in chronic disease management programs, the fact that most of them are accredited by the NPA, and their participation in scientific research. Despite their adequate practice organization, almost half of these practices lack an overview of available community-based lifestyle support services.

### *Interpretation of results*

Dutch general practices committed to selective CMD prevention seem to be well organized, motivated for preventive activities and employ skilled practice nurses. These practices seem to have a – more than average – experience with chronic disease management programs for cardiovascular risk management and can, therefore, be expected to readily implement selective CMD prevention. Altogether, this provides a solid fundament for selective CMD prevention in Dutch primary care. However, being a well-organized practice is not the only condition for success. After identifying patients at increased CMD risk, adequate facilities should be available – and familiar to caregivers – to initiate and support lifestyle changes (e.g. by lifestyle intervention programs).

A close link between general practices and community-based lifestyle services is crucial for effective CMD prevention [4]. More than half of the index practices fall short in offering adequate lifestyle support services for weight management and/or exercise programs within their practice. This is worrisome since almost half of all index practices also lack an overview of available community-based lifestyle support services. These findings are more or less consistent with the study of Wyers et al. [10] who found that 62% of the respondents (i.e. GPs and healthcare professionals) were not informed about community-based lifestyle interventions. A qualitative evaluation of the National Health Services (NHS) Health check in the UK revealed the same lack of knowledge among caregivers [28].

Nowadays, lifestyle intervention programs tend to be local initiatives and due to the *ad hoc* and often temporary funding their existence is inconsistent by nature [29]. The absence of a proper reimbursement system for these services in combination with a lacking local prevention policy is contributing to an unstable and not sustainable prevention program. These circumstances could explain the unfamiliarity among healthcare professionals with these services.

Practices implementing selective CMD prevention and other healthcare professionals [10] indicate limited availability of staff/lack of time and inadequate financing as most important barriers for implementation. In the UK insufficient funding was also described as a limiting factor for implementation of the NHS health check [21].

Systematic screening of individuals potentially at risk for CMD in primary care is recommended by the ESC and selective CMD prevention, by changing lifestyle and pharmacological treatment if indicated is reported to be cost effective, even in different scenarios [4]. Dutch healthcare insurance companies however, still question the cost-effectiveness of large-scale implementation of CMD prevention programs in primary care [30]. In addition, local governments and healthcare insurance companies are hesitant to invest in prevention programs because the cost-savings from a successful intervention might not directly flow back to the funding organization: the so-called wrong-pocket problem [29]. The INTEGRATE study aims to settle this debate by determining the cost-effectiveness of selective CMD prevention [24].

Effective CMD prevention calls for long-term strategies. Once proven cost-effective it should be indicated who should take the responsibility for the structural financing of CMD prevention programs. This could either be the government (by nominating it as a

national screening program) or healthcare insurance companies.

Therefore, anchoring selective CMD prevention in primary care will require a multidisciplinary approach with constructive collaboration between healthcare professionals, policy makers and healthcare insurance companies.

### **Strengths and weaknesses**

It was possible to compare the characteristics of practices willing to implement selective CMD prevention with a representative sample of reference practices. It was a unique possibility to elucidate to what extent Dutch general practices are ready for programmed CMD prevention in organizational respect.

We compared our data to the results presented in two recently published reports conducted by NIVEL. The NIVEL data are considered to be from a representative sample. The GP register is based on a routine system that is updated annually by the Dutch general practitioners themselves. Although acceptable annual response rates, there is always a chance of selection.

Not all practice characteristics could be compared to the reference practices because data for some characteristics were not available. In addition, the questionnaire was completed by one individual per general practice and could have resulted in a not fully representative reflection of the practice. However, this person was the one who was most engaged with the prevention program. We believe there is only a small chance that these limitations have vitiated our conclusion that the index practices seemed better organized than the reference practices.

### **Conclusions**

The organizational infrastructure of Dutch general practices is considered adequate for performing most steps of selective CMD prevention and practices willing to implement CMD prevention meet the majority of criteria which are assumed to be essential for adequate and effective prevention. Worrisome is the lack of knowledge about available community-based lifestyle services and the limited options for lifestyle interventions within the practices. Therefore, implementation of defined prevention programs including easily accessible services for lifestyle support should be the focus of attention. In addition, policy makers, healthcare insurance companies and healthcare professionals share the responsibility to realize sufficient and structural financing for the entire chain of CMD prevention. Aforementioned conditions should be taken

into account with respect to future implementation of selective CMD prevention.

### Ethical approval

The INTEGRATE study was considered by the UMC Utrecht Institutional Review Board and exempted from full assessment under the Medical Research involving human subjects Act.

### Disclosure statement

The authors declare to have no conflicting interests.

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### References

- [1] WHO. World Health Statistics 2016 – Monitoring Health for the SDGs. Available from: [http://www.who.int/gho/publications/world\\_health\\_statistics/2016/en/](http://www.who.int/gho/publications/world_health_statistics/2016/en/)
- [2] CBS STATLINE. Deaths; underlying cause of death (shortlist), sex, age. 2017. Available from: <http://statline.cbs.nl/Statweb/publication/?DM=SELEN&PA=7052ENG&D1=0,32,42&D2=0&D3=a&D4=0,10,20,30,40,50,60,6566&HDR=G1,G2,G3&STB=T&VW=T>
- [3] Hoeymans N, van Loon AJM, van den Berg M, et al. Een gezonder Nederland - VTV 2014 [RIVM forecasting study: a healthier Netherlands with more people living with a chronic disease]. Bilthoven (The Netherlands): RIVM; 2014.
- [4] Piepoli MF, Hoes AW, Agewall S, et al. European guidelines on cardiovascular disease prevention in clinical practice. *Eur Heart J*. 2016;37:2315–2381.
- [5] Cochrane T, Davey R, Iqbal Z, et al. NHS health checks through general practice: randomised trial of population cardiovascular risk reduction. *BMC Public Health*. 2012;12:944.
- [6] Dekker JM, Alsema M, Janssen PGH, et al. NHG-Standaard het PreventieConsult module cardiometabool NHG-standaard [Guideline for cardiometabolic prevention by Dutch college of GPs]. *Huisarts Wet*. 2011;54:138–155.
- [7] Van der Linden MW, Westert GP, de Bakker DH, et al. Tweede Nationale Studie naar ziekten en de verrichtingen in de huisartspraktijk. Klachten en aandoeningen in bevolking en in de huisartspraktijk. [2nd National Survey about diseases in primary care]. Utrecht/Bilthoven (The Netherlands): NIVEL/RIVM; 2004.
- [8] Nielen MMJ, Assendelft WJJ, Drenthen AJM, et al. Primary prevention of cardio-metabolic diseases in general practice: a Dutch survey of attitudes and working methods of general practitioners. *Eur J Gen Pract*. 2010;16:139–142.
- [9] Hollander M, Stol DM, Badenbroek IF, et al. De Impasse van het cardiometabool preventieconsult [Impasse of Dutch cardiometabolic prevention]. *Huisarts Wetenschap*. 2014;57:290–291.

- [10] Wyers CE, Walg CB, Vermunt PWA, et al. Verkenning als opstap naar de implementatie en evaluatie van het PreventieConsult Cardiometabool Risico [Explorative study as first step towards implementation and evaluation of programmed cardiometabolic prevention]. Maastricht (The Netherlands): University of Maastricht; 2012.
- [11] Meijer S, Hesselink A, Martens M. Leefstijlbeïnvloeding in de eerste lijn - Verkenning naar de ervaringen van zorgverleners [Lifestyle modification in primary care - experiences of caregivers]. Bilthoven (The Netherlands): RIVM; 2012.
- [12] Den Engelsen C, Soedamah-Muthu SS, Oosterheert NJA, et al. Improved care of type 2 diabetes patients as a result of the introduction of a practice nurse: 2003–2007. *Prim Care Diabetes*. 2009;3:165–171.
- [13] Russell GM, Dahrouge S, Hogg W, et al. Managing chronic disease in ontario primary care: the impact of organizational factors. *Ann Fam Med*. 2009;7:309–318.
- [14] Lobo CM, Frijling BD, Hulscher MEJL, et al. Organisational determinants of cardiovascular prevention in general practice. *Scand J Prim Health Care*. 2003;21:99–105.
- [15] De Koning JS, Klazinga N, Koudstaal PJ, et al. Quality of stroke prevention in general practice: relationship with practice organization. *Int J Qual Health Care*. 2005;17:59–65.
- [16] Landon BE, Normand SLT, Meara E, et al. The relationship between medical practice characteristics and quality of care for cardiovascular disease. *Med Care Rev*. 2008;65:167–186.
- [17] Ludt S, Campbell SM, Petek D, et al. Which practice characteristics are associated with the quality of cardiovascular disease prevention in European primary care? *Implement Sci*. 2013;8:27.
- [18] Meulepas MA, Braspenning JCC, de Grauw WJ, et al. Logistic support service improves processes and outcomes of diabetes care in general practice. *Fam Pract*. 2007;24:20–25.
- [19] Van Doorn-Klomborg AL, Braspenning JCC, Wolters RJ, et al. Organizational determinants of high-quality routine diabetes care. *Scand J Prim Health Care*. 2014;32:124–131.
- [20] Nicholas JM, Burgess C, Dodhia H, et al. Variations in the organization and delivery of the “NHS health check” in primary care”. *J Public Health (Oxf)*. 2013;35:85–91.
- [21] Ismail H, Kelly S. Lessons learned from England’s health checks programme: using qualitative research to identify and share best practice. *BMC Fam Pract*. 2015;16:144.
- [22] Godefröoij M, Spigt M, van der Minne W, et al. Implementing cardiometabolic health checks in general practice: a qualitative process evaluation. *BMC Fam Pract*. 2014;15:132.
- [23] Artac M, Dalton AR, Babu H, et al. Primary care and population factors associated with NHS health check coverage: a national cross-sectional study. *J Public Health (Oxf)*. 2013;35:431–439.
- [24] Badenbroek IF, Stol DM, Nielen MM, et al. Design of the INTEGRATE study: effectiveness and cost-effectiveness of a cardiometabolic risk assessment and treatment program integrated in primary care. *BMC Fam Pract*. 2014;15:1–10.
- [25] Van Hassel DTP, Kasteleijn A, Kenens RJ. Cijfers uit de registratie van huisartsen peiling 2015 [the 2015 report of the GP register]. Utrecht (The Netherlands): NIVEL; 2016.
- [26] Van Hassel DTP, Korevaar J, Batenburg R, Schellevis FG. De Toekomstvisie Huisartsenzorg 2022, waar staat de huisartsenzorg anno 2014? [The evaluation of the 2015 Dutch GP forecasting report]. Utrecht (The Netherlands): NIVEL; 2015.
- [27] Nielen MMJ, van der Meer V, Schellevis FG. Evaluatie pilot PreventieConsult cardiometabool risico [pilot study of a Dutch prevention program for cardiometabolic disease]. Utrecht (The Netherlands): NIVEL; 2010.
- [28] Shaw RL, Lowe H, Holland C, et al. GPs’ perspectives on managing the NHS health check in primary care: a qualitative evaluation of implementation in one area of England. *BMJ Open*. 2016;6:e010951.
- [29] Heijink R, Struijs J. Preventie in het zorgstelsel: wat kunnen we leren van het buitenland [Prevention within the health system: what can we learn from abroad?]. Bilthoven (The Netherlands): RIVM; 2015.
- [30] Zorginstituut Nederland. “Het preventieconsult” [Prevention Consultation] 2011. Available from: <https://www.zorginstituutnederland.nl/publicaties/standpunten/2011/10/26/het-preventieconsult>