

RESEARCH ARTICLE

Open Access

The implementation of national action program diabetes in the Netherlands: lessons learned

Lieke G. M. Raaijmakers^{1*}, Stef P. J. Kremers¹, Nicolaas C. Schaper², Inge de Weerd³, Marloes K. Martens⁴, Arlette E. Hesselink⁴ and Nanne K. de Vries⁵

Abstract

Background: Over the past decade, the National Action program Diabetes (NAD) was implemented in the Netherlands. Its aim was to introduce the Care Standard (CS) for diabetes by means of a specific implementation plan and piloting in several regions. This study aimed to provide insight into the implementation of the NAD as, coupled with the introduction of the CS, it may function as an example for similar approaches in other countries.

Methods: A series of quantitative studies (participants 2010: N = 1726, participants 2013: N = 1370 & participants pilot regions 2013: N = 168) and qualitative studies (participants 2010: N = 18 and participants 2013: N = 4) was conducted among health care professionals (HCPs). In addition, two quantitative studies were conducted among type 1 and 2 patients (participants 2010: N = 573; participants 2013: N = 5056).

Results: Overall, positive changes in diabetes care were detected in the period 2010 – 2013. In 2013 significantly more HCPs were familiar with the CS (43.7 versus 37.6 %) and more HCPs perceived themselves to be working largely or completely in accordance with the CS (89.2 versus 79.0 %) than in 2010. A comparison of the results in specific pilot regions with the rest of the country revealed that HCPs in these regions scored significantly more positively on implementation and appreciation of the CS. This positive trend was reflected by the high levels of reported patient satisfaction and involvement in treatment. HCPs who were in possession of the CS had significantly better scores on the implementation of several elements of the CS than HCPs who were not in possession of the CS.

Conclusion: The CS has become more prominent and embedded in daily health care practice. In retrospect the CS has provided momentum for the realization of various processes relating to the wider implementation of standards to improve the care for people with other chronic diseases in the Netherlands. Experiences with the NAD and CS underline the need to move towards an integrated multidisciplinary approach of diabetes care worldwide.

Keywords: Diabetes, Care standard, Implementation

Background

Diabetes is a multifactorial health problem that requires a multidisciplinary approach to prevention and treatment. As in most industrialized countries, Dutch health care faces the challenge of guaranteeing continuity and quality of care for the growing number of people with diabetes. For this reason multiple changes in diabetes care have been introduced in recent years. A national integrated, programmatic approach to chronic diseases has

laid the foundation for providing multidisciplinary care in a seamless manner in the Netherlands [1–3]. Two important elements of this approach are the Care Standard (CS) (also see Additional file 1 of the Netherlands Diabetes Federation (2011)) for diabetes developed by the Netherlands Diabetes Federation (NDF) and the bundled payment approach for financing [3]. A CS differs from clinical guidelines, in that it is a general framework outlining the services and treatment to be delivered to people with a specific condition on an aggregate level; clinical guidelines on the other hand describe the content of medical care in more detail, including what, why and when care should be provided [2,4,5]. Furthermore,

* Correspondence: lieke.raaijmakers@maastrichtuniversity.nl

¹Department of Health Promotion, NUTRIM School for Nutrition, Toxicology and Metabolism, Maastricht University Medical Centre+, Maastricht, The Netherlands

Full list of author information is available at the end of the article

a CS is intended to provide health care professionals (HCPs), patients, researchers and funding bodies with a specification of the components of diabetes care, general treatment goals, and tools to evaluate the quality of care, also including paramedical treatment and prevention [6]. The Dutch Diabetes Association (DVN) and the NDF have together produced a version of the CS (the *Zorgwijzer*) especially for patients with diabetes, which explains what they can expect from their health care providers.

In the Netherlands, the CS functions as a general framework which overarches the guidelines of individual professional groups and focuses on a multidisciplinary approach to diabetes prevention and care. In addition, although not originally developed for this purpose, the CS is used as a purchasing instrument in the Dutch bundled payment approach for integrated chronic care [1]. This approach has laid the foundation for delivering and funding diabetes care in accordance with the CS and has also partly led to the development of so-called care groups.

Within this approach, insurers purchase the services and care described in the CS from a general contractor called a care group, which ends up in a bundled payment contract. These care groups are relatively new to the health care system and have been established to improve the quality of chronic care [7]. A care group consists of several health care providers that form a legal unit. Based on the bundled payment contract, the care group takes clinical and financial responsibility for all assigned patients in diabetes care and in turn subcontracts individual care providers (e.g. general practitioner, dietician, internist etc.) or delivers parts of the services in relation to the various components of diabetes care itself [1]. The Dutch health care insurance system is based on a 'semi-free market system'. Health care insurers and providers can negotiate about the prices of some health care services. The ultimate goal of this system is that health care providers are driven to work as efficiently as possible, and that health care insurers compete with each other on the basis of prices, without sacrificing equity, quality and transparency. Most of health care in the Netherlands can be classified as 'primary' care or 'secondary care'. This care also falls under European law. Primary care is directly accessible for patients. In the Dutch health care system the general practitioner plays a central role in primary care and can be seen as a gatekeeper who determines whether a patient needs specialist care. Secondary care involves care provided by medical specialists in hospitals. These specialists provide treatment in an outpatients' department or to patients who are hospitalized. Medical specialists are either employed by the hospital or work self-employed under contract. Usually patients need a referral from the general practitioner when they need secondary care.

The Netherlands can be regarded as unique in the use of Care Standards [4]. The CS for diabetes was the first one to be developed by the NDF in April 2003 and the NDF took a leading role in the implementation of this CS [2,8]. The NDF unites associations of patients and of important HCPs. In 2007 the NDF started a project to update the CS, which was widely announced in professional journals and at conferences and through contacts with NDF members. In 2009, the NDF started the National Action program Diabetes (NAD) (2009–2013), the main objective of which was the systematic nationwide implementation of the Care Standard [9]. The NAD was conducted with funding (€ 10 million) from the Dutch Ministry of Health, Welfare and Sport [9]. The NAD comprises five subthemes based on an inventory and analysis of problem areas in the field: 'Prevention', 'Position of the patient and client', 'Quality, organization and knowledge', 'Rules and funding' and 'E-communication and IT facilities'. These subthemes are, accidentally, in line with the concepts of the Expanded Chronic Care Model, a framework that can be used to optimize the provision of care for patients with chronic diseases, to decrease the burden of the disease and to prevent its occurrence through population based health promotion [10]. The model also advocates integrated care, disease management and the use of evidence-based care guidelines [11].

The implementation of the CS and *Zorgwijzer* was supported by several national communication strategies and a regional implementation approach in five pilot regions [12]. The national strategies that facilitated the implementation of the CS and *Zorgwijzer* were aimed at knowledge, attitude and behavior of various target groups (i.e. patients, HCPs and government, health insurers and employers) [12]. The main objectives were to inform HCPs and patients about the existence of the CS and its associated benefit, and to make the CS easily accessible online. In addition, the implementation of the CS was facilitated through the development of more than 50 products which were related to the NAD themes, based on existing barriers in practice. Examples of these products include the 'National Transmural Appointment (LTA)' guideline and the 'E-diabetes set'. The NDF selected five pilot regions in the Netherlands to initially implement several of these products with the objective of improving them and then implementing them nationally in the future [12].

Simultaneously with the development and implementation of the CS for diabetes, the organization of diabetes care in the Netherlands has undergone several other changes, which have also influenced diabetes care and should be discussed here to provide a complete picture. First, the update of the CS in 2007 coincided with the development of the previously described bundled payment approach [1]. The purchase function of the CS within this approach is primarily used on the level of care groups and

the CS has become embedded in the Dutch health care system as a result of this function. The CS serves as a financial incentive in the negotiations with health insurers, making these more structured since care has to be delivered and purchased in accordance with the norm. Second, the bundled payment approach has partly led to the development of so called care groups, as previously described. The CS is used for purposes related to the organization and quality of care. The care groups often appear to develop their own Care Standards and guidelines, but these are typically based on the CS to make them more generalizable to the national norm. Third, over the past decade, vertical substitution of care has taken place, i.e. the transfer of tasks between care-providers with different levels of expertise [13]. In many general practices the care for diabetes patients is delegated to specialized practice nurses or diabetes nurses who are supervised by the general practitioner. These trained nurses are specialized in care for chronic diseases such as diabetes and can play an important role in educating patients and encouraging overall adherence to treatment [14]. Moreover, standardized diabetes care, delivered by a specialized diabetes nurse, has been shown to be a good alternative to standard care by an internal medicine physician or general practitioner, with comparable results after one year in terms of treatment goals, and even better results in terms of patient goals and cost-effectiveness [15]. However, a reported negative side effect of this transfer of care is that the expertise of general practitioners in diabetes care is decreasing [16].

While the NAD was running, a series of quantitative and qualitative studies was conducted among large samples of Dutch diabetes care professionals and diabetes patients [16–19]. The aim of the present paper is to place this series of studies in a broader perspective in order to provide insight into the implementation of the NAD, which besides its evaluative function may also provide an example for similar approaches in other countries. The specific research questions addressed in this study were: 1) To what extent are professionals familiar with the CS and how do they appreciate the CS? 2) What changes are seen in familiarity with and working conform the CS and appreciation of the CS between 2010 and 2013? 3) How was the implementation of the CS evaluated in the NAD pilot regions? 4) Is possession of the CS associated with better quality of care? 5) What facilitators and barriers do HCPs experience in diabetes care?

Methods

In 2010, two cross-sectional studies were performed, in which questionnaires were distributed among all HCPs involved in diabetes care [20] (i.e. general practitioners, practice nurses, diabetes nurses, dieticians, physiotherapists, internal medicine physicians, pediatricians and

pharmacists; $N = 1726$) and type 1 and type 2 diabetes patients ($N = 573$) [18,21]. In addition to the published results of this study [18,21], independent t-tests were conducted to determine significant differences in the implementation of several elements of the CS between HCPs who were in possession of the CS and HCPs who were not in possession of the CS. In 2013 similar questionnaire-based monitoring studies were conducted among 1370 HCPs and 5056 type 1 and 2 diabetes patients [22]. To compare the results of the 2010 and 2013 studies, two sample t tests were used to test a selection of questions with average scores. In addition two proportion z tests were carried out on a selection of questions with percentage scores.

In addition, 18 semi-structured interviews with HCPs working in primary and secondary care (i.e. general practitioners, practice nurses, diabetes nurses, dieticians, physiotherapists, internal medicine physicians and pharmacists) were held between November 2010 and January 2011 [16]. Participants were randomly selected from the database of the quantitative study conducted among HCPs in 2010 [17,21]. The results of these interviews are already published [16,18]. In March and April 2014, four semi-structured interviews were held with directors/managers of care groups or collaborations of health care centers. Data of these interviews were not previously published and analyzed for the purpose of this paper using the NVivo qualitative research software package, version 8.0.

The implementation process of the NAD products in the five pilot regions was evaluated by means of focus group interviews among HCPs and the region coordinator involved in the implementation of several NAD products in each region. In addition, one focus group interview was conducted with the NAD implementation team to assess success and failure factors related to the implementation of the NAD products and one with the developers of one of the core NAD products (i.e. e-diabetes set). In total seven focus group interviews were conducted. The questionnaire study among HCPs in 2013 was also conducted among HCPs in the pilot regions ($N = 168$). The results of these studies were only reported in Dutch [23].

For a detailed description of the recruitment and measurement instruments of the separate studies we refer to the studies of Raaijmakers et al. [16–18,21] and Martens et al. [19,23]. Ethical approval for the included studies was not required under Dutch law [24]. This paper adds to the already published results (in Dutch) of the studies described and additional analyses on the data were conducted which are not described elsewhere.

Results

Implementation of the CS

Overall, positive changes in the implementation of the CS and diabetes care were detected between 2010 and

2013. To illustrate this, in 2013 significantly more HCPs were familiar with the CS than in 2010 (Table 1). Additionally, in 2013 significantly more HCPs perceived themselves to be working largely or completely in accordance with the CS and more HCPs considered the CS to be largely or completely the norm for high quality care. We also found significant differences with regard to the implementation of specific elements of the CS (Table 1) [22].

The positive trend among HCPs was also reflected by the results of the studies among patients. Overall, diabetes patients were satisfied with their contact with their caregiver(s) (mean scores ≥ 7.8 (scale 1–10)) and perceived a high degree of involvement in their treatment (mean scores ≥ 4.1 (scale 1–5)); no significant differences were detected in the 2010–2013 period. Patients' familiarity with the *Zorgwijzer* had significantly increased by 2013. However, the Individual Care Plan (i.e. an integral part of the CS which supports patients in their self-regulation and consists of mutual agreements between patients and their care givers about the goals of diabetes treatment) appeared to be used less often in 2013 [22].

Implementation of the CS in the NAD pilot regions

The comparison of the results of the questionnaire study among HCPs in the pilot regions with the HCPs in the rest of the Netherlands revealed that HCPs in these regions scored significantly more positively on possession and appreciation of the CS than HCPs in the other regions (Table 2) [19,23]. Furthermore, HCPs working in the pilot regions perceived financial, legislative and regulation issues significantly less often as a barrier. They more often provided information and education about lifestyle to almost all or all patients and more often thought diabetes care had strongly improved [19,23].

Possession of the CS associated with better quality of care

Possession of the CS was shown to be associated with better quality of care. Professionals who were in possession of the CS (2010: 37.6 % versus 2013: 43.7 %) had significantly better scores on the implementation of several elements of the CS than HCPs who were not in possession of the CS (Table 3).

Perceived facilitators and barriers in diabetes care

The semi-structured interviews revealed several facilitators and barriers perceived by HCPs in diabetes care [18]. One of the major facilitators was the more prominent role of the practice nurses and diabetes nurses in diabetes care, as a result of the substitution of care. Other reported facilitators were benchmarking and multidisciplinary collaboration, although there is still room for improvement in collaboration with certain professional groups (i.e. dieticians, physical therapists and pharmacists), and between primary and secondary care. The bundled payment system for the funding of diabetes care and the role of the health insurers were perceived as major barriers within the health care system. Other important barriers reported by HCPs were the lack of motivation among patients and the lack of awareness among professionals of lifestyle programs and prevention initiatives for diabetes patients [18].

Discussion

Before interpreting the results of our series of studies, some methodological considerations need to be made. The cross-sectional design of the questionnaire studies in 2010 and 2013 conducted among HCPs and patients excludes causal interpretations of the associations between the study variables. Furthermore, the results of

Table 1 Significant differences in the implementation of the CS between 2010 and 2013

	2010 (N = 1726)	2013 (N = 1370)
Health care professionals	%	%
In possession of the CS	37.6	43.7
Working largely or completely in accordance with CS	79.0	89.2
Regarding the CS largely or completely as norm for high quality care	38.8	92.6
Providing education and information about lifestyle to almost all or all patients	34.8	56.9
Structural collaboration of HCPs in secondary care with primary care	24.2	32.9
Involving all patients in their treatment	54.0	71.7
Register quality indicators	72.4	84.2
Patients		
Familiarity with the <i>Zorgwijzer</i>	50.0	59.6
In possession of an Individual Care Plan	47.4	65.4

Note: all differences were significant on $p < 0.05$ level

Table 2 Significant differences between pilot regions and other Dutch regions (2013)

	Pilot regions (%) (N = 168)	Entire sample (%) (N = 1370)
In possession of the CS	51.9	43.7
Working largely or completely in accordance with CS	91.0	89.2
Regarding the CS completely as norm for high quality care	38.2	24.9
Experiencing barriers in relation to financial, legislative and regulations issues regarding care and prevention in accordance with the CS	28.8	39.6
Providing education and information about lifestyle to almost all or all patients	63.8	56.9
Experiencing strong improvements in diabetes care past 2.5 years	26.5	16.2

Note: all differences were significant on $p < 0.05$ level

our questionnaire studies are based on self-reported data, which may have led to bias, e.g. through factors related to social desirability. The strength of our studies was the use of a mixed methods design in which we conducted qualitative and quantitative studies at multiple stages of the implementation process, thus enabling triangulation. Moreover, we were able to provide insight into the implementation of the CS from the perspectives of both HCPs and patients, and we included large samples of patients and HCPs covering the full range of professions involved in diabetes care.

NAD as best practice

Looking back over the past decade, we can conclude that the focus on the implementation of the CS, through the NAD, has had positive results. Moreover, the experiences with the NAD have also provided us with a great deal of

information necessary to take further steps in implementing Care Standards for other chronic diseases both in the Netherlands and elsewhere. Accompanying the implementation of the CS with a government funded NAD may have been an example of a best practice. Although the CS was available before the start of the NAD, little effort had been put in facilitating its implementation in practice. The NAD has given the CS the attention it needed to become widely known and used among professionals and has facilitated its easy accessibility. As a result of these efforts, the CS has become more prominent and embedded in daily health care practice. The findings of our studies largely support the approach of the NAD, since professionals' appreciation and use of the CS increased in the period 2010–2013. Moreover, the implementation of several elements of the CS significantly improved, with even more positive results in the NAD pilot regions. This indicates

Table 3 Significant differences among HCPs according to possession of the CS

	Possessions CS		Not in possession CS	
	%	Mean	%	Mean
2010	N = 538		N = 894	
Providing education and information about lifestyle to almost all or all patients	37.5		33.4	
Involving all patients in their treatment	58.5		51.1	
In possession of a written treatment protocol		4.3(range 1–5)		3.5(range 1–5)
Having put down responsibilities and competences in writing		4.1(range 1–5)		3.2(range 1–5)
Structural collaboration with(in) primary care	63.2		49.7	
Structural collaboration with(in) secondary care	30.9		23.6	
2013	N = 597		N = 769	
Providing education and information to almost all or all patients	62.3		51.2	
Involving all patients in their treatment	74.8		70.5	
Use of Individual Care Plan	29.6		21.1	
In possession of a written treatment protocol		3.8(range 1–5)		3.1(range 1–5)
Having put down responsibilities and competences in writing		3.5(range 1–5)		2.9(range 1–5)
Register quality indicators	69.6		42.5	
Structural collaboration with public health	10.2		5.5	
Structural collaboration with(in) primary care	53.2		38.6	
Structural collaboration with(in) secondary care	35.0		25.3	

Note: all differences were significant on $p < 0.05$ level

that in daily practice professionals have become more aware of the position and benefits of both the CS and the guidelines issued by their individual professional groups.

CS as flywheel

It is also clear that in the Netherlands the CS has provided momentum for the realization of various processes relating to the wider implementation of standards to improve the care for people with other chronic diseases. Multidisciplinary collaboration, registration, and use of quality indicators for the purpose of benchmarking, and substitution of care originally provided by family physicians and specialists to practice nurses and diabetes nurses, are a direct spin-off of the focus on and activities related to the implementation of the CS. The CS has created awareness of the importance of these aspects of care for chronic diseases. It seems plausible that these processes would also have come about without the focus on and efforts put into the implementation of the CS, but they would probably have taken much more time and effort. Moreover, the introduction of the Individual Care Plan and the increased focus on self-management means that the patient is now playing a more pivotal role in the treatment of their disease [25,26]. However, the question is whether changing the structure of care through the CS amongst others, also changes the care processes itself, since previous research on the effects of population-based disease management programs among Dutch care groups showed little impact of these programs on patients' health [27].

Lessons learned from the implementation of the CS

Currently there are eight Care Standards covering diabetes, COPD, obesity, vascular risk management, cardiovascular diseases/TIA, hereditary breast- and ovarian cancer and Asthma among children and adults. Furthermore, two standards are under authorization, two are in development, six are planned and proposals for two more are being explored. The CS for diabetes was the first to be completed. Experiences with the implementation of this CS can be used to aid the adoption and implementation of Care Standards for other chronic diseases in the future. The currently finished standards are published, but their implementation is not accompanied by an approach such as the NAD and appears to receive less attention than the CS for diabetes. Yet, the CS for obesity and CVRM are available for use within the bundled payment approach.

The series of studies on the implementation of the CS has taught us several key lessons. They show that implementation takes time and effort. Developing and publishing a CS does not automatically mean that it will be used in practice. Partly due to the function of the CS as

a purchasing instrument within the Dutch bundled payment approach for integrated chronic care, many policy-makers assumed that the implementation would occur automatically. However, implementation means more than the adoption and diffusion of innovations [28,29]. Research into the implementation of innovations teaches us that successful implementation of interventions requires systematic planning during the development phase and that the interventions should be made workable and integrated in everyday health care practice [30,31]. However, in practice, the implementation of innovations often seems subordinate to the development of the product itself.

Organizations currently involved in developing the Care Standards for other chronic diseases could benefit from the existing knowledge and expertise related to the implementation of the CS for diabetes and the facilitating approach used in the NAD pilot regions. Previous research into the dissemination and implementation of quality interventions, i.e. quality improvement efforts, has recognized the tendency of innovators to re-invent the wheel instead of efficiently making use of existing knowledge and insights [32,33]. One explanation for this seeming reluctance to use existing expertise in the implementation of the CS is that organizations and professionals involved in the development of the Care Standards for other diseases were not involved in the implementation process of the CS for diabetes. As a result they did not obtain ownership of the CS and a low level of ownership is expected to hamper the implementation of innovations [34].

Future directions

Despite the multidisciplinary character of the care described in the CS, the CS itself is disease-specific, while multimorbidity is common among (elderly) diabetes patients [35–38]. Therefore health care needs to move towards an integrated multidisciplinary approach of chronic diseases worldwide in which the patient with one or more chronic diseases is playing a more pivotal role. Although the etiology, management and prognosis of other chronic diseases are different, the organisation and quality of care need to meet the same criteria as the care for diabetes as disease management strategies are similar in most chronic diseases. Despite the international differences in health care systems, there is international consensus on the goals of treatment for diabetes and the same type and quality of care needs to be provided to patients with one or more chronic disease [6]. The Care Standards and the bundled payment approach are useful instruments in organising integrated care and stimulating multidisciplinary collaboration. Furthermore, preventive activities targeting chronic diseases need to become embedded in primary care and close

collaboration with the public domain needs to be established within such an integrated multidisciplinary approach. In 2012, prevention was added to the CS by means of an addendum. The importance of the availability of prevention and care close to patients at a local level is underpinned by the positive results and experiences with the CS for diabetes in the NAD pilot regions [19,23]. Achieving local collaboration between prevention, care and other relevant parties involved is expected to be difficult and depends on several local preconditions, such as the intentions of current municipal administrators, embedment into existing policies, political support and funding [23]. However, the force of action in multiple environmental settings and levels, compounded by the collective ability to accelerate and strengthen each other's impact, can profoundly improve the nation's health [39]. Moreover, the community approach to chronic disease prevention has a high degree of generalizability, cost-effectiveness, ability to diffuse information successfully through use of community networks, and potential for influencing environmental, regulatory and institutional policies that shape health [40].

Finally, the CS is currently mainly supply driven rather than tailored to the needs of patients [41], while we see an international and national need to abandon the one-size-fits-all approach and move towards personalized care [42,43]. To meet this need in the Netherlands, a group of experts and scientists is currently - in collaboration with the NDF- working on the development of so called 'patient profiles,' a new tool which can help HCPs to provide personalized care tailored to the needs of patients with diabetes. Within these profiles treatment-, personal- and environmental factors are taken into account when tailoring the care and treatment. The Netherlands is the first country worldwide that will start with evidence-based application of patient profiles [44].

Conclusion

In general we can conclude that the CS is now firmly embedded in the Dutch health care system and the NAD has provided momentum for the realization of various facilitating processes relating to the implementation of standards to improve the care for people with a chronic disease in the Netherlands. The experiences with the implementation of the CS for diabetes underline the beneficial value of the ongoing process in which health-care moves towards an integrated multidisciplinary approach of chronic diseases worldwide. Furthermore, organizations involved in the implementation of other Care Standards are advised to take time to embed these standards into daily practice and involve the professionals who use the CS in practice.

Additional file

Additional file 1: NDF Care Standard (Netherlands Diabetes Federation, 2011).

Abbreviations

NDF: Netherlands Diabetes Federation; CS: Care Standard; HCP: Health care professional; NAD: National Action program Diabetes.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

LR drafted the manuscript. All authors made substantial contributions to its conception and design. LR, MM, AH en SK made substantial contributions to the data acquisition. LR has conducted the analyses and all authors made substantial contributions to the interpretation of the data and have read and approved the final manuscript.

Acknowledgement

This study was conducted as part of the Dutch National Diabetes Action Program with a grant from the Diabetes Federation (project number 2010.105.1356). The authors would like to thank, Denise Barendse (HOZL), Daan Kerklaan (Zorggroep Zorroo), Edith de La Fuente (Zorg op Noord facilitaire organisatie), Guy Schulpen (Zorggroep ZIO) and Marijn Verburg (Zorggroep HOZL) for their participation in the semi-structured interviews.

Author details

¹Department of Health Promotion, NUTRIM School for Nutrition, Toxicology and Metabolism, Maastricht University Medical Centre+, Maastricht, The Netherlands. ²Department of Internal Medicine, CAPHRI School for Primary Care and Public Health, Maastricht University Medical Centre+, Maastricht, The Netherlands. ³Netherlands Diabetes Federation, Amersfoort, The Netherlands. ⁴ResCon, Research & Consultancy, Haarlem, The Netherlands. ⁵Department of Health Promotion, CAPHRI School for Primary Care and Public Health, Maastricht University Medical Centre+, Maastricht, The Netherlands.

Received: 29 July 2014 Accepted: 19 May 2015

Published online: 03 June 2015

References

1. Struijs JN, Baan CA. Integrating care through bundled payments—lessons from The Netherlands. *N Engl J Med*. 2011;364:990–1.
2. Coordination platform. Care Standards: Care Standards in model. Report on the model of Care Standard for chronic diseases Zorgstandaarden in model. Zorgstandaarden in model (Rapport over het model voor zorgstandaarden bij chronische ziekten). The Hague: ZONMW; 2010.
3. Ministry of Health Welfare and Sport. Programmatisch approach of chronic diseases (Programmatische aanpak van chronische ziekten). The Hague: Ministry of Health, Welfare and Sport; 2008.
4. Seidell JC, Halberstadt J, Noordam H, Niemer S. An integrated health Care Standard for the management and prevention of obesity in The Netherlands. *Fam Prac*. 2012;29:153–6.
5. Zorgstandaard diabetes.nl. Verschil Zorgstandaard, richtlijn en protocol, 2013 [http://www.zorgstandaarddiabetes.nl/extrapage/verschil-zorgstandaard-richtlijn-protocol/]
6. American Diabetes Association. Standards of Medical Care in Diabetes-2013. *Diabetes Care*. 2013;136(Suppl1):S11–66.
7. Inspectorate THC. Implementation of the Care Standard Diabetes not enough progressed after four years (implementatie zorgstandaard Diabetes na vier jaar onvoldoende gevorderd). The Health Care Inspectorate: Utrecht; 2012.
8. Care Standard for good diabetes care. A first precondition for a new financing model (Zorgstandaard voor goede diabeteszorg. Een eerste voorwaarde voor een nieuw financieringsmodel), 2003 [http://www.diabeteseeland.nl/protocollen/Zorgstandaard.pdf]
9. Netherlands Diabetes Federation. National Action program Diabetes: program proposal (Nationaal Actieprogramma Diabetes Programmavoorstel). Amersfoort: NDF; 2009.

10. Barr VJ, Robinson S, Marin-Link B, Underhill L, Dotts A, Ravensdale D, et al. The expanded Chronic Care Model: an integration of concepts and strategies from population health promotion and the Chronic Care Model. *Hosp Q*. 2003;7:73–82.
11. Council for Public Health and Health Care. The Chronic Care Model in the Netherlands (Het Chronic Care Model in Nederland). The Hague: Council for Public Health and Health Care; 2011.
12. National Action program Diabetes. Implementatieplan 2011–2012. Amersfoort: NAD; 2011.
13. Vrijhoef HJ, Diederiks JP, Spreeuwenberg C, Wolffenbuttel BH. Substitution model with central role for nurse specialist is justified in the care for stable type 2 diabetic outpatients. *J Adv Nurs*. 2001;36:546–55.
14. Ubink-Veltmaat LJ, Bilo HJ, Groenier KH, Rischen RO, Meyboom-de Jong B. Shared care with task delegation to nurses for type 2 diabetes: prospective observational study. *Neth J Med*. 2005;63:103–10.
15. Houweling ST, Kleefstra N, van Hateren KJJ, Kooy A, Groenier KH, ten Vergert E, et al. Diabetes specialist nurse as main care provider for patients with type 2 diabetes. *Neth J Med*. 2009;67:279–84.
16. Raaijmakers LG, Hamers FJ, Martens MK, Bagchus C, de Vries NK, Kremers SP. Perceived facilitators and barriers in diabetes care: a qualitative study among health care professionals in the Netherlands. *BMC Fam Pract*. 2013;14:114.
17. Raaijmakers LGMM, M.K., Hesselink AE, De Weerd I, Kremers SPJ: The implementation of the Netherlands Diabetes Federation Care Standard for Diabetes anno 2013. *Nederlands Tijdschrift voor Diabetologie*, 2013 [http://www.rescon.nl/wp-content/uploads/2011/10/Raaijmakers-et-al-implementation-CS-diabetes.pdf]
18. Raaijmakers LG, Martens MK, Bagchus C, de Vries NK, Kremers SP. Perceptions of Dutch health care professionals regarding the Care Standard for diabetes. *BMC Res notes*. 2013;6:417.
19. Martens MK, Faassen P, Hesselink AE. Management summary: Evaluation implementation NAD products in five pilot regions. Haarlem: ResCon Research & Consultancy; 2013 [http://www.rescon.nl/wp-content/uploads/2011/10/Management-Summary_proefregios_eng.pdf].
20. NDF Care Standard diabetes type 2 (NDF Zorgstandaard diabetes type 2, 2013 [http://www.zorgstandaarddiabetes.nl/type-2/]
21. Raaijmakers LGM, Martens MK, Bagchus L, Jonkers R, Kremers SPJ. NAD monitor: research among health care professionals and diabetes patients (NAD monitor: onderzoek onder zorgprofessionals en diabetespatiënten). In: Dutch. Extensive summary in English available. Maastricht: Maastricht University; 2010.
22. Raaijmakers LGM, Martens MK, Hesselink AE, Kremers SPJ. NAD monitor 2013. Research among health care professionals and diabetes patients (NAD monitor 2013. Onderzoek onder zorgprofessionals en diabetespatiënten). In: Dutch. Extensive summary in English available. Maastricht: Maastricht University; 2013.
23. Martens MK, Faassen P, Hesselink AE. Evaluation implementation NAD products in five pilot regions (Evaluatie implementatie NAD producten in vijf proefregio's). Haarlem: ResCon; 2013.
24. Central Committee on Research Inv. Human Subjects. [http://www.ccmo.nl/].
25. Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: a review. *Pat Educ Couns*. 2002;48:177–87.
26. Reed JA, Ashton H, Hollinghurst S, Higgs ER. Diabetes self management: how are we doing? *Pract Diab Int*. 2003;20:318–22.
27. Elissen AM, Duimel-Peeters IG, Spreeuwenberg C, Spreeuwenberg M, Vrijhoef HJ. Toward tailored disease management for type 2 diabetes. *Am J Manag Care*. 2012;18:619–30.
28. Rogers EM. Diffusion of innovations. New York: Free Press; 2003.
29. Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q*. 2004;82:581–629.
30. May C, Finch T, Mair F, Ballini L, Dowrick C, Eccles M, et al. Understanding the implementation of complex interventions in health care: the normalization process model. *BMC Health Serv Res*. 2007;7:148.
31. Grol R, Wensing M. Effectieve implementatie: een model. In: Implementatie: effectieve verbetering van de patiëntzorg. Maarssen: Elsevier Gezondheidszorg; 2006.
32. Farquhar CM, Stryer D, Slutsky J. Translating research into practice: the future ahead. *Int J Qual Health Care*. 2002;14:233–49.
33. Reeves S, Fox A, Hodges BD. The competency movement in the health professions: ensuring consistent standards or reproducing conventional domains of practice? *Adv Health Sci Educ*. 2009;14:451–3.
34. Fleuren M, Wiefferink K, Paulussen T. Determinants of innovation within health care organizations: literature review and Delphi study. *Int J Qual Health Care*. 2004;16:107–23.
35. Luijckx H, Schermer T, Bor H, van Weel C, Lagro-Janssen T, Biermans M, et al. Prevalence and incidence density rates of chronic comorbidity in type 2 diabetes patients: an exploratory cohort study. *BMC Med*. 2012;10:128.
36. Marengoni A, Angleman S, Melis R, Mangialasche F, Karp A, Garmen A, et al. Aging with multimorbidity: a systematic review of the literature. *Ageing Res Rev*. 2011;10:430–9.
37. Sinnige J, Braspenning J, Schellevis F, Stirbu-Wagner I, Westert G, Korevaar J. The prevalence of disease clusters in older adults with multiple chronic diseases—a systematic literature review. *PLoS One*. 2013;8, e79641.
38. Uijen AA, van de Lisdonk EH. Multimorbidity in primary care: prevalence and trend over the last 20 years. *Eur J Gen Pract*. 2008;14 Suppl 1:28–32.
39. Institute of Medicine: Accelerating Progress in Obesity Prevention. Solving the Weight of the Nation. Washington: Institute of Medicine; 2012.
40. Sasseville N, Simard P, Mucha J: An Integrated Approach for Chronic Disease Prevention. Victoria: BC Healthy Communities, 2012.
41. Elissen AMJ. Going beyond the 'grand mean' Advancing disease management science and evidence. *PhD thesis*. Maastricht University: Department of Health Services Research; 2013.
42. NHG standard, summary Diabetes Mellitus type 2 (NHG Standaard samenvattingskaart Diabetes Mellitus type 2, 2013 [https://www.nhg.org/standaarden/samenvatting/diabetes-mellitus-type-2]
43. Handelsman Y, Mechanick JL, Blonde L, Grunberger G, Bloomgarden ZT, Bray GA, et al. American Association of Clinical Endocrinologists Medical Guidelines for clinical practice for developing a diabetes mellitus comprehensive care plan: executive summary. *Endocr Pract*. 2011;17:287–302.
44. Rutten GEHM. Patient Profiles and tailored care (Patiëntprofielen en zorg op maat) In Nationale Diabetes Dag 2014, The Hague.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

