Consistency of performance indicators for cardiovascular risk management across procedures and panels

Jan van Lieshout,[1] Elvira Nouwens,[1] Margriet Bouma,[2] Cor Spreeuwenberg,[3] Michel Wensing[1]

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[1]Scientific Institute for Quality of Healthcare, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands
[2]Dutch College of General Practitioners, Utrecht, The Netherlands
[3]University of Maastricht, Maastricht, The Netherlands

Correspondence to
Mr Jan van Lieshout, Scientific Institute for Quality of Healthcare, Radboud University Nijmegen Medical Centre, PO Box 9101, 114 IQ healthcare, Nijmegen 6500 HB, The Netherlands; j.vanlieshout@iq.umcn.nl

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ABSTRACT

Introduction Delphi procedures are frequently used to develop performance indicators, but little is known about the validity of this method. We aimed to examine the consistency of indicator selection across different procedures and across different panels.

Methods Analysis of three indicator set development procedures: the EPA Cardio project, which used international GP panels; the UniRap project, a Dutch GP indicator project; and the Vitale Vaten project, which used a national multidisciplinary health professional panel and a stakeholder panel.

Results With respect to clinical indicators, consistency between procedures varied according to the origin of the indicators. In Vitale Vaten the multidisciplinary panel of health professionals validated 63% from the international EPA Cardio indicators again. From the UniRap GP set only 13% was rated valid again. Considering organisational indicators, 27 indicators were rated in both EPA Cardio and Vitale Vaten. In the Vitale Vaten project 17 indicators (63%) were validated, including eight of the nine indicators validated in EPA Cardio. Consistency between panels was moderate, giving a decisive role to the health professional panel, being the most critical.

Conclusion The consistency of selected performance indicators varied across procedures and panels. Further research is needed to identify underlying determinants of this variation.

INTRODUCTION

Indicators for assessing quality and outcomes of healthcare delivery have been developed in many healthcare systems and countries. Indicators provide healthcare professionals formative feedback to enhance learning and improvement of clinical practice.[1] They can also be used to create transparency on quality of care. Indicators should be valid and reliable, feasible, and effective with respect to their aims.[2] This implies that indicators should be developed and evaluated systematically. Some methods for indicator development, such as the Delphi-procedure, have been adopted across the world.[3]

Nevertheless, many questions remain concerning indicator quality and appropriate development methods. This paper addresses the consistency of panel evaluations of indicators, using data from three indicator development projects in cardiovascular risk management (CVRM).

The importance of the quality of care for patients with cardiovascular diseases (CVD) and those at high risk remains undisputed: the incidence of CVD is high worldwide with high morbidity, mortality, and costs. Many countries have launched large programmes to improve CVRM.[4] In The Netherlands, a multidisciplinary clinical guideline for CVRM was published in 2006.[5] In 2009 a platform of stakeholder organisations (Platform Vitale Vaten) issued a multidisciplinary guideline with recommendations on the organisation, delivery and process of care ('care standard'),[6] largely based on Wagner's chronic care model.[7] Simultaneously, a set of multidisciplinary quality indicators covering clinical and organisational aspects was developed, using a Delphi procedure with two panels: healthcare professionals and other stakeholders.

Consistency and confirmability are criteria mentioned to add to the reliability of indicator development procedures.[8] Though widely used in medical science, the Delphi procedure itself is still being studied and compared with other methods of indicator development.[9–12] Previously published Delphi procedures with different panels show variable effects and amounts of agreement between panels, challenging consistency.[13–16] It has been shown that healthcare providers especially have a decisive role in multidisciplinary procedures, depending on the influence of a single panel in a multipanel procedure. In a procedure with different panels, an indicator is usually validated when validated by all panels. This methodology leads to a core set of generally supported indicators but may be too rigid.

We aimed to examine the consistency of indicator selection across different procedures. We assessed the results of consecutive validation ratings and compared the results of two Delphi procedures with different panels. Furthermore, we examined consistency across health professional and a stakeholder panels.

METHOD

This paper is based on the analysis of the Vitale Vaten project, partly in relation to Epa Cardio and UniRap, projects in which performance indicators for CVRM were selected. The relationship between the projects and the comparisons made in this study is illustrated in the figure supplement (web). Table 1 presents some project features.

EPA cardio project

The EPA Cardio project is described elsewhere.[17] In summary, GP panels from nine European countries (total n=101) rated 202 indicators for CVRM in

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Table 1 Characteristics of the EPA Cardio, Vitale Vaten and UniRap project

	EPA Cardio	Vitale Vaten	UniRap
Procedure	Two-round Delphi procedure	Clinical indicators: one-round scoring Organisational indicators: two-round Delphi procedure	Successive discussion rounds
No of panels and composition	Nine GP panels	A multidisciplinary health professional panel and a stakeholder panel.	Experts, representatives of GP information technology user organisations, stakeholder organisations, final approval by professional GP organisations
Setting	Nine countries in Europe (Austria, Belgium, Finland, France, Germany, The Netherlands, Slovenia, UK, Switzerland)	The Netherlands	The Netherlands

primary care in two Delphi rounds. This resulted in a set of 35 clinical and nine organisational indicators, including primary prevention and risk management in patients with established CVD or diabetes.

UniRap project

A Dutch College of General Practitioners (DCGP) working group developed indicators for the Uniform Reporting Project (UniRap), as part of a project to create one national indicator set for GP care.[18] The UniRap indicator set consisted of 17 indicators on established CVD and six concept indicators on primary prevention of CVD. The goal of UniRap was to provide indicators that met the criteria of content validity based on the CVRM guideline, and were feasible: GPs should be able to deliver the data from their medical record system for internal and external use. A set of indicators was discussed in an expert group and, in order to make them feasible, with representatives of GP information technology user organisations. Consequently, these indicators had little room for nuances. Various stakeholder organisations provided comments on draft sets, leading to revisions and a final set that was approved by the Dutch professional GP organisations.

Vitale Vaten project

In the Vitale Vaten project, indicators for CVRM were selected in a two-round Delphi procedure, involving multidisciplinary panels of health professionals and stakeholders from The Netherlands. Table 2 presents the panel's composition. As this project has not been published elsewhere, it will be described in more detail.

All participants were related to the Platform Vitale Vaten, an initiative of the Dutch Heart Association and many national stakeholders to improve CVRM. A major activity of the Platform was the development of a so-called 'care standard,' recommendations on the organisation of CVRM, complementary to the multidisciplinary clinical guideline of which key elements were included in the care standard. Simultaneously, performance indicators were developed. The board of the Platform recruited and motivated participants for the indicator selection procedure. All correspondence was via email.

The initial list of 58 clinical indicators presented in this project comprised two previously developed sets: the 35 EPA Cardio clinical indicators, and the 23 UniRap indicators. Clinical indicators were presented in the first Delphi round only.

The 74 organisational indicators presented in the first round of the Vitale Vaten project came from three sources. The 27 indicators on organisation presented in the original EPA Cardio list were all included. Furthermore, 38 indicators were formulated on the basis of the draft version of the care standard and nine on the basis of the DCGP's vision on care. Finally, five additional indicators were formulated based on comments in the first Delphi round.

Participants assessed the necessity of the clinical indicators, defined as 'necessary to deliver and record in the patient's medical record.' Organisational indicators were assessed regarding clarity ('expressed in clear, precise and unambiguous language') and necessity in the first round. Here, panellists had room to formulate comments and additional indicators. The panellists received feedback on the first-round necessity results and scored the organisational indicators in the second round regarding necessity and feasibility ('availability of data on a consistent, comparable and reliable basis'). Necessity, clarity and feasibility were defined exactly the same as in EPA Cardio. All scores were on a scale from 1 to 9.

Table 3 shows the response rates of the panels. Because two out of five responding stakeholders did not score the clinical indicators, this selection was based on the results of the health professional panel only. Clinical indicators were validated when they had a median necessity score of 7, 8 or 9 with agreement, meaning that 80% of respondents scored 7 or higher.

Organisational indicators were validated if the second-round necessity score in both panels met the criteria as described for clinical indicators. Furthermore, both panels should rate the indicators feasible without disagreement. Indicators were rated feasible when the median score was 7, 8 or 9; less than one-third of the scores had to be 1, 2 or 3 in order to conclude that there was no disagreement. There was no preset maximum number of indicators.

Analysis

To examine the consistency of indicator selection procedures we assessed the results on the clinical indicators from the Vitale

Table 2 Panel composition in the Vitale Vaten procedure

Healthcare professional panel		Stakeholder panel	
3	General practitioners	3	Members of patient organisations
2	Internists	2	Representatives of health insurance companies
2	Cardiologists	2	Platform members
1	Neurologist	1	Dutch Heart Foundation
1	Vascular surgeon	1	Dutch diabetes federation
1	Pharmacist	1	Health department
1	Medical psychologist	1	Health inspectorate
1	Nurse practitioner vascular care	1	DCGP, prevention specialist
1	Dietician	1	Expertise centre on quality review in healthcare and welfare
1	Manager primary care centre	1	The Netherland Organisation for Health Research and Development
1	Physiotherapist	1	Director integrated Care department

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Table 3 Response rates in the Vitale Vaten two-round Delphi procedure

	No of participants (%)	
	Healthcare professionals n=15	Stakeholders n=15
Round 1	10 (67)	5 (33)
Round 2	11 (73)	9 (60)

Vaten project. As previously developed sets were the starting-point, the percentages of indicators validated reflected agreement and were taken as a measure for consistency.

In addition, we compared the validity rating results of the list of 27 organisational indicators rated in both EPA Cardio and Vitale Vaten.

To examine consistency of indicator selection across panels, we compared the results from the health professional and stakeholder panels scoring the organisational indicators in Vitale Vaten.

RESULTS

Consistency across indicator selection procedures

Table 4 focuses on the Vitale Vaten set of clinical indicators. The panel selected 25 indicators, including three out of 23 from the UniRap indicators (13%) and 22 out of 35 from the EPA Cardio set (63%). Table 5 presents the clinical indicators selected in Vitale Vaten.

Table 6 focuses on the Vitale Vaten set of organisational indicators. In general, 46 out of 79 indicators were selected. From the list of 27 indicators also presented in EPA Cardio, the Vitale Vaten panels validated 17 indicators (63%). In EPA Cardio, nine indicators from this list were selected; eight indicators were validated in both procedures. Table 7 shows these indicators with the results from EPA Cardio and Vitale Vaten. On the web, we present all organisational indicators validated in Vitale Vaten, ordered by origin.

Consistency across health professionals and stakeholders

Table 6 also shows the results of the two Vitale Vaten panels separately. The stakeholder panel selected 59 out of the 79 indicators (75%), while the health professional panel selected 46 indicators (58%), all included in the stakeholder set.

DISCUSSION

Main findings

This study showed, first, that clinical and organisational indicators for CVRM, selected by international panels of general practitioners (EPA Cardio), were reasonably well validated by a multidisciplinary panel of health professionals in one country (Vitale Vaten). Conversely, indicators previously selected by a national GP working group (UniRap) were not validated.

Second, the study showed high consistency between health professionals and stakeholders (Vitale Vaten) regarding organisational indicators. Health professionals were most critical in their selection.

Interpretation

Several studies compared different consensus procedures showing consistency;[19–22] other studies focused on quantifying the results of Delphi rounds, for instance assessing the result of each round.[23–25] Research on Delphi procedures with different panels shows variable results depending on the validation criteria. Hardy *et al* accepted indicators when validated by at least one panel.[13] In EPA Cardio, nine national GP panels validated 30–61% of the indicators.[17] In a procedure with 11 different stakeholders panels rating indicators on primary mental healthcare services, agreement within panels was very high but low between panels.[14] Indicators had to be validated by all panels, effectively giving physicians most influence. Comparing the results of healthcare managers and family physicians rating indicators of quality of primary care in the UK managers gave significantly higher ratings.[16] In summary, the inclusion criteria in a multipanel Delphi procedure determine the final set, often giving a decisive role to the most critical panel.

Table 4 Clinical indicators selected by a multidisciplinary panel of health professionals by origin of the indicators

	No	No (%) of indicators rated valid by multidisciplinary panel of healthcare professionals
Uniform Reporting Project set, The Netherlands	23	3 (13)
International EPA Cardio set	35	22 (63)
Total	58	25 (43)

We can only speculate on the factors underlying the variable consistency of Delphi procedures regarding clinical indicators. Considering the EPA Cardio indicators, low consistency might be expected, due to the international perspective on general practice only. On the other hand, EPA Cardio was rigorous, because the procedure ensured that indicators were excluded if not assessed highly necessary in all countries. The reasonable consistency between EPA Cardio and Vitale Vaten may also reflect the fact that CVRM mostly is a primary care activity, so the perspectives of health professionals from other backgrounds may not have changed much, compared with GPs only.

UniRap indicators were not very successful in Vitale Vaten, showing little consistency between procedures. Explanations may be that they were specifically for general practice or that development was very much driven by the possibility of registering the indicators in GP information systems with computerised extraction. Additionally, EPA Cardio indicators were formulated with nuances in contrast to the UniRap indicators, formulated in terms of measurability in electronic patient records. Furthermore, new insights in the prevailing guideline, reflected in the UniRap clinical indicators, may not been well known or accepted yet. Finally, UniRap indicators focus more on (proxy) outcome, a choice that is always debatable.

Regarding the organisational indicators rated in EPA Cardio and Vitale Vaten, consistency between procedures was high. Eight out of 17 indicators validated in Vitale Vaten were in the EPA Cardio set of nine indicators. As expected, the two-panel procedure was more liberal: it is of course more difficult to have understanding in nine country panels. Surprisingly, the one indicator from the EPA Cardio set not validated in Vitale Vaten was about offering flu vaccination to high-risk patients, a long-existing practice. The health professional panel did not agree on necessity.

The high consistency between health professionals and stakeholders regarding their selection of organisational indicators may reflect active involvement of all participants in the Platform Vitale Vaten. Consistency varied noticeably with the origin of the indicators. Many indicators validated by stakeholders, but not by health professionals, were derived directly from the care standard text. These indicators considered innovations such as an individual treatment dossier, and an explicitly appointed central care giver. The stakeholders validated all these

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Table 5 Vitale Vaten set of clinical indicators

	Clinical indicators	Origin
1	Percentage of patients with established CVD with a record of smoking status	UniRap
2	Percentage of patients with established CVD with anticoagulant or antiplatelet drugs prescribed	UniRap
3	Percentage of patients with established CVD in the practice population at the end of the reporting period (denominator is the practice population)	UniRap
4	For patients with CVD (CHD, stroke, TIA or PVD) there is a record of smoking status in the past 15 months except those who never smoked	EPA Cardio
5	For patients with diabetes there is a record of blood pressure at least once in the last 15 months	EPA Cardio
6	For patients prescribed antihypertensive medication for diagnosed hypertension there is a record of blood pressure at least once in the last 15 months	EPA Cardio
7	For patients with established CVD (CHD, stroke, TIA or PVD) there is a record of blood pressure at least once in the last 15 months	EPA Cardio
8	For patients with diabetes there is a record of their cholesterol (general/total, high-density lipoprotein and low-density lipoprotein) at least once in the last 15 months	EPA Cardio
9	For patients with CVD (CHD, stroke, TIA or PVD), there is a record that antiplatelet therapy (aspirin, clopidogrel or equivalent) at least 75 mg daily has been offered unless contraindicated	EPA Cardio
10	CVD risk assessment includes smoking status	EPA Cardio
11	CVD risk assessment includes blood pressure	EPA Cardio
12	CVD risk assessment includes personal history of diabetes	EPA Cardio
13	For patients with CVD, blood plasma glucose is tested at diagnosis	EPA Cardio
14	For patients with diabetes, there is a record of smoking status in the past 15 months except for those who have never smoked whose smoking status should be recorded at least once	EPA Cardio
15	For patients with diabetes, there is a record of their weight or body mass index at least once in the last 15 months	EPA Cardio
16	For patients with CVD (CHD, stroke, TIA or PVD), there is a record of their weight or body mass index at least once in the last 15 months	EPA Cardio
17	For patients with diabetes, there is a record that diet advice has been offered at least once in the last 15 months	EPA Cardio
18	For patients with CVD (CHD, stroke, TIA or PVD), there is a record of their cholesterol (general/total, HDL and LDL) at least once in the last 15 months	EPA Cardio
19	All patients with CVD (CHD, stroke, TIA or PVD) should have their systolic blood pressure controlled to <140	EPA Cardio
20	All patients with CVD (CHD, stroke, TIA or PVD) are offered a statin	EPA Cardio
21	For patients who have had a myocardial infarction, there is a record that a β blocker has been offered (unless a contraindication or side-effects are recorded)	EPA Cardio
22	CVD risk assessment includes age	EPA Cardio
23	CVD risk assessment includes gender	EPA Cardio
24	CVD risk assessment includes diabetes status	EPA Cardio
25	For patients with diabetes, there is a record that specific advice about lifestyle was offered at least once in the last 5 years	EPA Cardio

CHD, coronary heart disease; CVD, cardiovascular disease; PVD, peripheral vascular disease; TIA, transient ischaemic attack.

indicators; the healthcare professionals only validated five out of seven indicators about the dossier. This gave the health professionals a decisive role, in agreement with previous studies.[14 16] Probably, results would have changed with a central question about concordance between indicators and recommendations instead of necessity.

There are several explanations for the results concerning innovative issues. We assume that the presence of supportive evidence may be an important motivation for the necessity rating. As opposed to the enormous amount of clinical evidence in CVRM, evidence on organisational aspects is sparse, and new concepts obviously lack evidence, as developments and opinions precede research evidence. This may be a reason for panellists to reject these indicators. On the other hand, similar concepts used in diabetes care are evaluated positively.[26 27] Our results show that healthcare professionals are yet not willing to accept indicators on important elements of the chronic care model as the basis for patient empowerment, supporting self management and clarifying central care givers' tasks in CVRM. Competition between indicators cannot explain the results: all indicators were rated separately without a maximum. Anyhow, results suggest that a Delphi procedure with health professionals is less suitable to select indicators concerning innovative organisational concepts. Other methods may be more appropriate, like expert meetings. On the other hand, as the Vitale Vaten projects show, stakeholders seem less suitable to rate clinical indicators.

Strengths and weaknesses

Clinical indicators presented in Vitale Vaten were the result of former selection procedures (EPA Cardio and UniRap), and a list of organisation indicators was presented identically formulated in identical procedures (Vitale Vaten and EPA Cardio). These are the strengths of this study. Nevertheless, the study should be regarded explorative and further research into underlying factors for consistency of Delphi procedures is needed. A limitation was that the response rates were not maximal, in particular of the stakeholders.

Table 6 Organisational indicators selected by panels of healthcare professionals and stakeholders by origin of the indicators

		No (%) of indicators rated valid		
	No	Healthcare professional panel	Stakeholder panel	Both panels
Indicators formulated on the basis of the care standard	38	22 (58)	32 (84)	22 (58)
International EPA Cardio set	27	17 (63)	18 (67)	17 (63)
Indicators formulated on the basis of the DCGP's vision on care	9	5 (56)	7 (78)	5 (56)
Added after round 1	5	2 (40)	2 (40)	2 (40)
Total	79	46 (58)	59 (75)	46 (58)

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Table 7 Results of EPA Cardio and Vitale Vaten considering the list of 27 organisational indicators presented in both procedures

	EPA set	Vitale Vaten set
Infrastructure		
1. The practice should have a system for offering all patients with chronic illness (eg, established CVD: CHD, stroke, TIA or PVD—see glossary), a check-up/review at least once in the last 15 months		V
2. Patients who smoke and are recorded as being motivated to stop should be offered at least one follow-up consultation within 3 months	V	V
3. For all patients who are obese (body mass index >30 kg/m^2) there should be a record that they have been offered at least one follow-up consultation within the last 15 months		V
4. All practices should use an electronic disease classification system that can be used to create registers of patients with established CVD (CHD, stroke, TIA or PVD: see glossary) for example International classification of Primary Care, READ Codes		V
5. All practices should use an electronic disease classification system that can be used to create registers of patients at risk of CVD (hypertensives, etc)—for example, International classification of Primary Care, READ Codes		V
6. All patients at high risk (eg, chronic respiratory disease, established CVD (CHD, stroke, TIA or PVD—see glossary), chronic heart disease, chronic renal failure, diabetes, immunosuprression of any cause, residents of nursing homes, etc, anyone aged >65) should be offered flu vaccination in the preceding flu season (eg, 1 September to 31 March or 1 September to 31 December)	V	
People		
1. All GPs should attend at least one training/continuing medical education event on CVD within the last 5 years		
2. At least one general practitioner per practice should attend at least one training/continuing medical education event on CVD within the last 15 months		
3. All nurses should attend at least one training/continuing medical education event on CVD within the last 5 years		
4. At least one nurse per practice should attend AT LEAST one training/continuing medical education event on CVD within the last 15 months		V
5. General practitioners should take part in education about CVD risk factors (eg, diet, exercise, smoking) in schools		
6. Nurses should take part in education about CVD risk factors (eg, diet, exercise, smoking) in schools		
7. General practitioners should take part in local/community campaigns or actions on CVD risk prevention (eg, stop smoking campaigns, fun runs, etc)		
8. Nurses should take part in local/community campaigns or actions on CVD risk prevention (eg, stop smoking campaigns, fun runs, etc)		
Information		
1. The medical record should contain a summary list of major medical problems	V	V
2. The medical record should contain details of current actual prescribed medication	V	V
3. The medical record should contain information about intolerances and contraindications to medication	V	V
4. Information leaflets about CVD (eg, CHD, stroke, hypertension, stopping smoking, etc) should be available at the practice for patients to take home or read in the practice		V
5. Advice to patients about CVD risk factors/lifestyle should be based on using validated assessment tools (eg, food frequency questionnaire, International Physical Activity Questionnaire, etc)		
6. A CVD risk assessment tool should be integrated with the patient medical record system (eg, so that the CVD event risk score is entered directly in to the patient's medical record)		V
7. CVD risk advice (eg, about modifiable risk factors such as diet and exercise) should be integrated with the patient medical record system		V
8. Smoking status should be clearly identifiable on the paper and/or electronic record	V	V
9. The diagnosis of hypertension should be clearly identifiable on the paper and/or electronic record	V	V
10. The diagnosis of diabetes should be clearly identifiable on the paper and/or electronic record	V	V
11. The diagnosis of CVD should be clearly identifiable on the paper and/or electronic record	V	V
12. The practice has an up-to-date directory of prevention activities/organisations available locally (eg, gyms, walking group, weight-watchers, etc)		V
Quality and safety		
1. The practice should have a team meeting about quality improvement relating to CVD at least once in the last 15 months		

CHD, coronary heart disease; CVD, cardiovascular disease; PVD, peripheral vascular disease; TIA, transient ischaemic attack; v, rated valid.

The stakeholders were selected because they represented different organisations. However, some panellists were also healthcare professionals. This 'cross over' may have increased consistency between panels.

CONCLUSION

The consistency of Delphi procedures to select indicators was mixed. Several factors related to the procedures and the panel's composition could influence this. Regarding CVRM, a large number of international indicators (EPA Cardio) were validated again. This finding supports the view that rigorous international indicator selection procedures are valuable. A limitation, however, seems to be that these tend to exclude indicators reflecting healthcare delivery innovations. Another challenge is to involve stakeholders meaningfully, as we found that they did not assess clinical indicators and that their assessments of organisational indicators largely reflected those of health professionals.

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REFERENCES

1. **Solberg LI,** Mosser G, McDonald S. The three faces of performance measurement: improvement, accountability, and research. *Jt Comm J Qual Improv* 1997;**23**:135—47.
2. **Campbell SM,** Roland MO, Buetow SA. Defining quality of care. *Soc Sci Med* 2000;**51**:1611—25.
3. **Campbell SM,** Braspenning J, Hutchinson A, *et al*. Research methods used in developing and applying quality indicators in primary care. *Qual Saf Health Care* 2002;**11**:358—64.
4. **Van Lieshout J,** Wensing M, Campbell S, *et al*. Primary care strength linked to prevention programs for cardiovascular disease. *Am J Manag Care* 2009;**15**:255—62.
5. **Kwaliteitsinstituut voor de Gezondheidszorg CBO en Nederlands Huisartsen genootschap.** *Multidisciplinaire CBO-richtlijn/NHG-Standaard Cardiovasculair*

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risicomanagement 2006. Alphen aan den Rijn: Van Zuiden Communications B.V, 2006.
6. **Platform Vitale Vaten.** Zorgstandaard Vasculair Risicomanagement Deel I (voor zorgverleners) Februari 2009. http://www.vitalevaten.nl/PlatformVitaleVaten/Uploads/mID_6085_cID_5076_DEEL%20I%20zorgstandaard%20vrm%2013%20jan%2009%20def.pdf (accessed 10 Sep 2009).
7. **Wagner EH,** Austin BT, Von Korff M. Organizing care for patients with chronic illness. *Milbank Q* 1996;**74**:511—44.
8. **Hasson F,** Keeney S, McKenna H. Research guidelines for the Delphi survey technique. *J Adv Nurs* 2000;**32**:1008—15.
9. **Hung HL,** Altschuld JW, Lee YF. Methodological and conceptual issues confronting a cross-country Delphi study of educational program evaluation. *Eval Program Plann* 2008;**31**:191—8. doi: 10.1016/j.evalprogplan.2008.02.005.
10. **Wollersheim H,** Hermens R, Hulscher M, *et al*. Clinical indicators: development and applications. *Neth J Med* 2007;**65**:15—22.
11. **Campbell SM,** Braspenning J, Hutchinson A, *et al*. Research methods used in developing and applying quality indicators in primary care. *BMJ* 2003;**326**:816—19.
12. **Akins RB,** Tolson H, Cole BR. Stability of response characteristics of a Delphi panel: application of bootstrap data expansion. *BMC Med Res Methodol* 2005;**5**:37.
13. **Hardy DJ,** O'Brien AP, Gaskin CJ, *et al*. Practical application of the Delphi technique in a bicultural mental health nursing study in New Zealand. *J Adv Nurs* 2004;**46**:95—109.
14. **Campbell SM,** Shield T, Rogers A, *et al*. How do stakeholder groups vary in a Delphi technique about primary mental health care and what factors influence their ratings? *Qual Saf Health Care* 2004;**13**:428—34.
15. **Ayanian JZ,** Landrum MB, Normand SL, *et al*. Rating the appropriateness of coronary angiography—do practicing physicians agree with an expert panel and with each other? *N Engl J Med* 1998;**338**:1896—904.
16. **Campbell SM,** Hann M, Roland MO, *et al*. The effect of panel membership and feedback on ratings in a two-round Delphi survey: results of a randomized controlled trial. *Med Care* 1999;**37**:964—8.
17. **Campbell SM,** Ludt S, Van Lieshout J, *et al*. Quality indicators for the prevention and management of cardiovascular disease in primary care in nine European countries. *Eur J Cardiovasc Prev Rehabil* 2008;**15**:509—15.
18. **van Althuis TR.** Overzicht en definitie van indicatoren voor cardiovasculair risicomanagement bij patiënten met bekende hart- en vaatziekten in de huisartsenzorg. 30 juni 2008 http://nhg.artsennet.nl/uri/?uri=AMGATE_6059_104_TICH_R212795501493078 (accessed 10 Sep 2009).
19. **Shekelle PG,** Kahan JP, Bernstein SJ, *et al*. The reproducibility of a method to identify the overuse and underuse of medical procedures. *N Engl J Med* 1998;**338**:1888—95.
20. **Kadam UT,** Jordan K, Croft PR. A comparison of two consensus methods for classifying morbidities in a single professional group showed the same outcomes. *J Clin Epidemiol* 2006;**59**:1169—73. doi: 10.1016/j.jclinepi.2006.02.016.
21. **Tobacman JK,** Scott IU, Cyphert ST, *et al*. Comparison of appropriateness ratings for cataract surgery between convened and mail-only multidisciplinary panels. *Med Decis Making* 2001;**21**:490—7.
22. **Pearson SD,** Margolis CZ, Davis S, *et al*. Is consensus reproducible? A study of an algorithmic guidelines development process. *Med Care* 1995;**33**:643—60.
23. **Greatorex J,** Dexter T. An accessible analytical approach for investigating what happens between the rounds of a Delphi study. *J Adv Nurs* 2000;**32**:1016—24.
24. **Holey EA,** Feeley JL, Dixon J, *et al*. An exploration of the use of simple statistics to measure consensus and stability in Delphi studies. *BMC Med Res Methodol* 2007;**7**:52.
25. **Owens C,** Ley A, Aitken P. Do different stakeholder groups share mental health research priorities? A four-arm Delphi study. *Health Expect* 2008;**11**:418—31.
26. **Nutting PA,** Dickinson WP, Dickinson LM, *et al*. Use of chronic care model elements is associated with higher-quality care for diabetes. *Ann Fam Med* 2007;**5**:14—20.
27. **Piatt GA,** Orchard TJ, Emerson S, *et al*. Translating the chronic care model into the community: results from a randomized controlled trial of a multifaceted diabetes care intervention. *Diabetes Care* 2006;**29**:811—17.

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