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Expert consensus on moving towards a value-based healthcare system in the Netherlands: a Delphi study

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7 3 **Expert consensus on moving towards a value-based healthcare**
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15 7 **Corresponding author:**

16 8 Gijs Steinmann

17
18 9 Erasmus School of Health Policy and Management, Erasmus University Rotterdam

19
20 10 PO Box 1738, Rotterdam, 3000 DR, The Netherlands

21
22 11 steinmann@eshpm.eur.nl

23
24 12 +32 484 61 89 50
25
26 13

27
28 14 **Co-authors**

29 15 Diana Delnoij,¹ Hester van de Bovenkamp,¹ Rogier Groote,² Kees Ahaus¹
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31 16

32
33 17 ¹Erasmus School of Health Policy and Management, Erasmus University Rotterdam, Rotterdam,
34 The Netherlands

35 18
36 19 ²University of Groningen, Faculty of Economics and Business, Groningen, Nederland.
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28 **Abstract**

29 **Objectives:** While the uptake of value-based health care (VBHC) is remarkable, uncertainty
30 prevails regarding the most important actions and practices in establishing a value-based
31 healthcare system. In this paper, we generate expert consensus on the most important aspects of
32 VBHC.

33 **Design:** The Delphi technique was used to reach consensus on the most important practices in
34 moving towards a value-based healthcare system.

35 **Setting and participants:** A Dutch expert panel consisting of nine members participated in a two-
36 round survey.

37 **Primary and secondary outcome measures** We developed 39 initial items based on the
38 pioneering literature on VBHC and recent health policies in the Netherlands. Experts rated the
39 importance of each item on a 4-point Likert scale. Experts could change items or add new ones as
40 they saw fit. We retained items that were rated (very) important by $\geq 80\%$ of the panel.

41 **Results:** After two survey rounds, 32 items (72%) were included through expert consensus.
42 Experts unanimously agree on the importance of shared decision-making, with this item uniquely
43 obtaining the maximum score. Experts also reached consensus on the importance of outcome
44 measurements, a focus on medical conditions, and full cycles of care. No consensus was reached
45 on the importance of benchmarking.

46 **Conclusion:** This paper provides new insight into the most important actions and practices for
47 establishing a value-based healthcare system in the Netherlands. Interestingly, several of our
48 findings contrast with the pioneering literature on VBHC. This raises the question whether
49 VBHC's widespread international uptake indicates its actual implementation, or rather that the
50 original concept primarily serves as an inspiring idea.

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Strengths and limitations of this study

- Using the Delphi technique, this study explores expert opinion on the most important practices in moving toward a value-based healthcare system.
- The study reveals that Dutch experts agree on the importance of multiple aspects from the original literature on value-based health care, yet they also blend in additional concepts (e.g. shared decision-making), while bypassing others (e.g. benchmarking).
- Although the selection of experts was appropriate for the purpose of this study, the results may have limited generalisability.

1. Introduction

Value-based health care (VBHC) is a highly topical concept within many healthcare systems.[1-3] The concept was pioneered by Michael Porter and Elizabeth Teisberg, who propose an overarching goal for all stakeholders in health care: to optimize value for patients.[4] Thus far, however, it remains relatively unclear how to transition this popular idea into the actual establishment of a value-based system – despite Porter’s attempts to outline just that.[4-7]

Several studies report fragmented and muddled efforts to implement VBHC.[8-10] Some scholars attribute these instances to the “high level of abstraction” and “vagueness” in which VBHC was originally described.[9] Although we recognize that VBHC is an abstract concept, we believe its muddled implementation can at least partially be explained by its multifaceted composition.

VBHC was developed as a strategy that aims to inform all stakeholders in healthcare systems.[4] It is an extensive concept with far-reaching implications: its goal is to “transform health care.”[4(p4)] In a value-based system, all stakeholders share a common objective: value for patients – with value defined as a patient’s health status (outcomes) divided by the resources it took to achieve that status (costs). Importantly, Porter and Teisberg argue, value can only be understood at the level at which it is created: in addressing a medical condition, over full cycles of care.[4(p5,99-105)] Providers should thus realign their organizational structures, forming integrated practice units which focus on one or a few related medical conditions and cover full care cycles.[4(p167-77)] Payment structures should move away from fee-for-service arrangements towards bundled payments, with single prices covering (the costs of) full treatment cycles.[4(p265-67)]. Perhaps most importantly (according to these scholars) providers should actively engage in benchmarking: they should systematically measure, report and compare their outcome data. This

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3 97 would fuel value-based competition, and enable patients, payers, providers and policymakers to
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5 98 all make more value-based decisions.[4] In sum, VBHC encompasses numerous aspects and
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8 99 requires a whole range of actions and practices in order to be implemented.
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11 100 In this paper we aim to identify the relative importance of the various aspects of this
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13 101 multifaceted concept. This is both timely and important, because although the recent uptake of
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15 102 VBHC has been described as remarkable,[3] it nonetheless remains unclear what practical steps
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17 103 should be undertaken, and what aspects should be prioritized on the road towards a more value-
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19 104 based system. In fact, as mentioned earlier, several studies report muddled implementation
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21 105 efforts,[9, 11] and it also appears that scholars employ different standards when they discuss the
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23 106 implementation of VBHC.[cf. 12-14] In addition, several scholars have stated that the way in
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25 107 which a multifaceted concept such as VBHC moves from idea to practice, is highly contingent on
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27 108 the particular intricacies within different health systems.[11, 15] Thus, uncertainty prevails when
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29 109 it comes to the actual implementation of VBHC.
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33 110 In this paper, we build on the Delphi method to identify the relative importance of various
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35 111 actions and practices in moving toward a value-based healthcare system in the Netherlands. The
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37 112 Dutch healthcare system is a particularly interesting case since it is based on regulated
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39 113 competition.[16] Moreover, the measurement and use of outcome data is increasingly becoming
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41 114 an important issue in Dutch healthcare policy.[16] Several of VBHC's aspects (as outlined by
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43 115 Porter) are thus already in place.
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47 116 Accordingly, our research question is: which aspects, actions and practices do Dutch experts
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49 117 agree on as important in moving towards a value-based healthcare system?
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2. Methods

The Delphi technique is a well-established research method to build consensus where considerable uncertainty exists, and where empirical evidence is (still) lacking.[17-20] In this study, the Delphi method was used to explore Dutch experts' consensus on the most important aspects of VBHC, and the actions and practices that will contribute to implement VBHC in the Dutch system.

We recruited our expert panel through purposive sampling. Ten experts were selected based on their known or stated expertise regarding value-based health care and the Dutch healthcare system. Nine panel members completed the first survey round: four females and five males who, at the time of the study, averaged nearly 23 years of experience in their current professional field, with eight out of nine members counting >10 years of experience. Additionally, these experts all have significant experience working with VBHC inspired initiatives, either through their profession within a hospital (n=5) or through their collaboration with healthcare organizations as consultants or academic researchers (n=4).

We created an initial list of 39 items (available on request). The bulk of these items were derived from the pioneering literature on VBHC.[4, 6, 21-24] We complemented this with several items that – particularly within Dutch health policy – are strongly related to VBHC. Accordingly, these items were extracted from policy documents that directly deal with one or more aspects of VBHC (e.g. outcome measurements).[25-27] These complementary items are warranted, since our study builds on the notion that the implementation of VBHC will vary between health systems and socio-political regions.[11, 15] Examples of item descriptions are: “assessing the quality of a treatment cycle by measuring the achieved health status”; “creating integrated practice units (IPUs)”; and “learning from relating data on outcomes to data on costs of healthcare.”

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3 142 Our expert panel completed questionnaires during a two-round Delphi survey, in which
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5 143 they rated each item according to “*how important you deem this item in moving towards a value-*
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7 144 *based healthcare system?*” Scoring occurred on a four-point Likert scale: “very important” (1),
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9 145 “important” (2), “moderately important” (3), “not important” (4). The first survey was sent out in
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12 146 December 2017, the second in January 2018. Panel members were given three weeks to complete
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15 147 each questionnaire.

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17 148 In line with previous Delphi studies,[28] we retained items after each round that were rated
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19 149 as “very important” (1), or “important” (2), by at least 80% of the experts, and excluded those
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22 150 rated as “not important” (4), or only “moderately important” (3), by more than 50% the experts.
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24 151 We expect the distribution of scores to be skewed towards agreement on importance. Therefore,
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26 152 our threshold for agreement on importance ($\geq 80\%$ scores very important or important) is higher
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28 153 than for agreement on non-importance ($> 50\%$) scores moderately or not important.

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31 154 Importantly, after rating and item, each expert was asked whether they had suggestions to
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33 155 reformulate that particular item. Additionally, by the end of the survey round, experts also had the
34
35 156 possibility to add new items to the list, as they saw fit. Suggested additions and reformulations
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38 157 would become part of the next survey round. The second survey round, therefore, consisted of
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40 158 both the reformulated and unchanged items that scored between inclusion and exclusion, plus the
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42 159 newly suggested ones from round one.

160 **Patient and public involvement statement**

161 Within this study, there has been no involvement from patients or members of the public in the
162 design, conduct, reporting, or dissemination plans of the research.

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3. Results

Table 1 shows the flow of our Delphi study. Of the 10 experts that were recruited, 9 (90%) agreed to participate and completed the study. Our analysis of the second round of questionnaires revealed missing data regarding one of the panel members; we therefore omitted this expert's data for the entire second round (80% response rate).

Table 1. Results survey rounds 1 and 2

Response	Round 1 (90 %)	Round 2 (80%)
Number of Items	39	18
Included	20 (45%)	12 (66,7%)
Excluded	6 (13,6%)	0 (0%)
<i>Input for round 2 (n=18):</i>		<i>Discordance:</i>
Reformulated	8 (18,2%)	0 (0%)
Unchanged	5 (11,4%)	6 (33,3%)
New	5 (11,4%)	0 (0%)

As the table shows, twenty items were included in the first round, i.e. rated as important (2) or very important (1) by at least 80% of the panel members. Additionally, six items were rated “moderately important” (3) or “not important” (4) by more than 50% of the experts and were therefore excluded. This entails that *no* consensus was reached on 13 of our initial 39 items. These items thus became part of the second round, as did 5 new items put forth by panel members.

In the second round of our Delphi study, another twelve items were included, bringing the total number of included items to 72,7% (32 out of 39+5). See Table 2 for an overview of all 32 items that were included through expert consensus after two survey rounds. No consensus was

180 reached on six items (see table 3 for an overview). However, in the second survey round experts
 181 did not suggest new items, nor did they suggest any reformulations – thus indicating saturation
 182 was reached.

183

184 *Table 2. Included Items (#1-#44) according to their mean importance score (\bar{x}), standard deviation (s) and*
 185 *round of inclusion (1 or 2)*

186

\bar{x}	s	Round	item	Item description
1,00	0,00	1	#26	Involving patients in the shared decision-making process (regarding treatment options etc.) as much as possible.
1,11	0,33	1	#21	Standardizing performance measures for full treatment cycles of medical conditions, rather than for individual treatments/procedures.
1,22	0,67	1	#4	Organizing delivery of care around full treatment cycles of medical conditions, rather than around individual procedures.
1,33	0,50	1	#28	Using patient reported outcome measures (PROMs) to evaluate the provision of care.
1,33	0,50	1	#34	Using dashboards or scorecards to assess and visualize performance.
1,38	0,52	2	#43	Learning to optimize the relationship between health outcomes and costs.
1,38	0,52	2	#23	Assessing the quality of the provided care based on the patients' recovery process after treatment(s).
1,44	0,73	1	#12	Delivering a desired and sustainable outcome from a patient's perspective, rather than an optimal outcome from a practitioner's perspective.
1,44	0,73	1	#9	Including a patient representative in the improvement team in order to ensure expert input from the patient perspective.
1,44	0,73	1	#20	Reducing the amount of performance measures that are used.
1,44	0,73	1	#35	Learning from relating data on outcomes to data on costs of healthcare.
1,50	0,53	2	#5	Developing a technological/digital platform that can be used to view data and share data with others, with the aim of improving the provision of care.
1,56	0,53	1	#27	Establishing clear and realistic expectations for patients.
1,56	0,53	1	#16	Reducing waste (e.g. the waste of time, material and/or staff capacity).

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4	1,56	0,73	1	#13	Ensuring the general safety of patients when undergoing treatment.
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6	1,63	0,52	2	#2	Striving to make individual health insurance as affordable as possible.
7					
8	1,63	0,74	2	#41	Describing the care process in care pathways, in which the goals and the "evidence-based" key interventions (who does what, and at what time) are established.
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11	1,63	1,06	2	#1	Providing or aiming to provide universal coverage (health insurance).
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14	1,67	0,71	1	#17	Creating integrated practice units (IPUs)
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16	1,67	0,71	1	#6	Assigning a data or business intelligence manager (or team) who focusses on collecting and analyzing existing data from patient records.
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19	1,67	0,71	1	#14	Avoiding over and underuse of healthcare services.
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21	1,67	1,00	1	#22	Assessing the quality of a treatment cycle by measuring the achieved health status.
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24	1,67	1,00	1	#30	Structuring payments for healthcare so that they cover the costs of a full cycle of care, rather than having separate payments for individual procedures.
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27	1,75	0,71	2	#7	Developing a standardized step-by-step plan (roadmap) that healthcare providers can use to transition into value-based providers.
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30	1,75	0,71	2	#8	Appointing a change manager (an expert in the field of value-based health care) who helps healthcare providers transition into "value-based" providers.
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34	1,75	1,04	2	#29	Using patient reported experience measures (PREMs) to evaluate the provision of care.
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36	1,78	0,67	1	#10	Using a patient's physical well-being in assessing the outcome of healthcare delivery.
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38	1,78	0,67	1	#38	Creating predictive models that enable medical specialists to provide information concerning a patient's future health status.
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41	2,00	0,50	1	#25	Choosing and adapting indicators from ICHOM sets (standardized outcome measurements for various medical conditions).
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45	2,00	0,53	2	#44	Identifying and removing the barriers raised by privacy legislation that obstruct the path towards value-based healthcare delivery.
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48	2,00	0,93	2	#11	Using the patient's mental well-being as an outcome indicator in assessing healthcare services.
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51	2,00	0,93	2	#42	Striving to standardize outcome indicators in such a way that different groups of patients can be compared with one another.
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188 Table 2 shows the 32 items that are included based on their consensually perceived importance in
 189 moving towards a VBHC system. The items are rank ordered, first by average score (\bar{x}), secondly
 190 by standard deviation (s). The table also displays whether items were included in round 1 or 2.
 191 According to experts, the most important practice in moving towards VBHC in the Netherlands is
 192 to involve patients in shared decision-making. Experts unanimously agree on the high importance
 193 of this item (#26). Other high ranking items on which experts agree are: to standardize performance
 194 measures for full treatment cycles of medical conditions (#21); to organize delivery of care around
 195 these full treatment cycles (#4); to use patient reported outcome measures (PROMs) for evaluating
 196 care provision (#28); to use dashboards or scorecards to assess and visualize performance (#34);
 197 to learn how to optimize the relationship between health outcomes and costs (#43); and to assess
 198 the quality of care based on the patients' recovery process after treatment(s) (#23).

199 After two rounds of questionnaires, six items remained on which no consensus could be
 200 reached. In other words, these items were neither rated (very) important by $\geq 80\%$ of the experts,
 201 nor were they rated moderately or not important by $\geq 50\%$. These six items are shown in Table 3.

202 *Table 3. Items with expert discordance after two survey rounds, according to their mean importance score*
 203 *(\bar{x}) and standard deviation (s).*

\bar{x}	s	item	Item description
1,63	1,19	#31	Applying an incentive structure that stimulates providers to improve outcomes of care, rather than increasing volume.
1,75	0,89	#18	Updating and reformulating protocols and regulations iteratively in order to improve the quality of care.
1,88	0,83	#24	Assessing the quality of a treatment cycle based on the sustainability of a patient's health.
1,88	0,83	#39	Comparing the data of different IPU's or multidisciplinary teams in order to benchmark performance.
2,00	0,76	#37	Revising and reformulating existing measures continuously, and continuously developing new measures that are used to evaluate healthcare delivery.

2,38	0,92	#40	Basing the payment of healthcare services on the actual costs, and not on pre-arranged rates.
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205 Experts did not reach consensus on the idea that the payment of healthcare delivery should be
206 based on actual costs, rather than predetermined price rates (#40). Our panel also could not agree
207 on the importance of the continual revision and improvement of standardized measures (#37), and
208 the same applies to the repeated revision of general protocols and regulations (#18). Additionally,
209 no consensus was reached on the importance of benchmarking based on outcome data (#39).
210 Disagreement also remained regarding the issue of quality assessment based on the sustainability
211 of a patient's health (#24). Similarly, experts did not agree on the importance of incentivizing
212 providers to improve their treatment outcomes (#31).

213

214 **4. Discussion**

215 Our Delphi study identified expert consensus on the relative importance of aspects, actions and
216 practices in moving toward a value-based healthcare system. Consensus was reached on 32 items
217 that are deemed important (table 2). In round 2, no new items were put forth, and there were also
218 no suggestions for reformulation, thus indicating that saturation was reached. In the second round,
219 six items remained on which experts did not agree sufficiently for either inclusion or exclusion.

220 Our most eye-catching finding concerns the consensus on the importance of shared
221 decision-making (SDM). Experts unanimously rated this particular item (#26) as “very important”
222 in moving towards a value-based healthcare system – which demonstrates a unique level of
223 agreement, unmatched by any other item in this study. Interestingly, SDM is by no means a
224 fundamental aspect within the pioneering literature on VBHC.[4-6, 22] In contrasts to SDM, which
225 specifically concerns the deliberate discussion of treatment options, this body of work emphasizes

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3 226 the value-adding options patients have (or should have) in choosing amongst healthcare providers.
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5 227 Recently, it has been argued that the original VBHC concept, and the framework of market-based
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7 228 choices on which it rests, deemphasizes patients' personal values in life.[3] Perhaps our panel's
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9 229 unanimous agreement indicates that the incorporation of SDM may add a more personal dimension
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11 230 to VBHC – which has been advocated by some scholars.[29]
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15 231 In addition, multiple items reveal that experts agree on the importance of recognizing *full*
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17 232 *care cycles for medical conditions* as the relevant level of analysis in health care. This applies to
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19 233 the organization of healthcare delivery (#4 & 17), its performance measurements (#21), and its
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21 234 payment structures (#30). This resonates with the literature on VBHC, particularly with the work
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23 235 of Porter, who repeatedly states that value in health care is created at the level of medical
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25 236 conditions, over full cycles of care.[4, 6, 30]
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29 237 Several items on which consensus was reached relate to the importance of outcome
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31 238 information (e.g. #22, 25, 28). Our panel agreed, for instance, that it is important to assess the
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33 239 quality of a treatment cycle by measuring the achieved health status (i.e. outcomes) of patients
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35 240 (#22). This overall emphasis on outcome measurement also corresponds with the literature.[4, 22,
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40 242 Regarding outcomes, this correspondence may seem relatively straightforward, since the
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42 243 central tenet of VBHC is that all stakeholders must aim to improve value for patients, with value
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44 244 defined as health outcomes per unit of costs.[4, 7] However, our panel did *not* display similar
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46 245 correspondence regarding costs – the denominator of value ($value = \frac{outcomes}{costs}$). Dutch experts thus
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48 246 appear to prioritize measuring outcomes over measuring costs, which may reflect other studies that
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50 247 indicate that when VBHC is being implemented, the costs of care attain relatively little attention.[8,
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249 One of the items on which our panel did not agree concerns the importance of comparing
250 and benchmarking provider's performance data (#39). Accordingly, and strikingly, experts did not
251 reach consensus regarding the importance of one of the most foundational aspects of VBHC-
252 theory:

253 Providers need to be compared on results, and excellent providers rewarded with more patients.
254 Information about results [outcomes versus costs], which is appropriately risk adjusted, must
255 become the critical driver of behavior in the system – by referring physicians, by health plans,
256 by patients, and by providers themselves. [4(p102)]

257 Faced with the challenge to establish a value-based system in the Netherlands, it appears that
258 although Dutch experts agree on the importance of multiple aspects of Porter's original
259 conceptualization of VBHC, they also blend in additional concepts (e.g. SDM), while bypassing
260 others (e.g. benchmarking). It will require additional research, however, to determine the extent to
261 which our study represents the range of Dutch expert opinion on this issue.

262 **4.1. Limitations**

263 One potential limitation of this study is that our panel consisted entirely of *Dutch* experts.
264 However, we were interested in the implementation of VBHC in the Dutch system, and it therefore
265 made sense to invite Dutch experts to participate. Accordingly, this has enabled us to demonstrate
266 how, in the Netherlands, VBHC is being adapted and blended with other concepts such as shared
267 decision-making. Additionally, experts might have been influenced by the particular items that
268 were first presented to them, and this could have affected their scoring. To counterbalance this
269 potential bias, however, experts could reformulate existing items, while also being able to suggest
270 new ones as they saw fit – both of which they did (see table 1).

4.2. Conclusion

In this paper we identified expert consensus on the relative importance of a variety of concepts and practices for moving towards a value-based healthcare system. Accordingly, our study provides additional insight regarding several important steps within the implementation of VBHC – a topical concern within many healthcare systems. However, our study also reveals considerable contrast with the pioneering literature on VBHC. Perhaps our results, based on a Dutch expert panel, are a precursor to a process of implementation of VBHC in the Netherlands that deviates from the original concept – which has been observed elsewhere.^{8,9} In such circumstances, some scholars have questioned whether VBHC is actually being implemented or, upon closer look, primarily serves as an inspiring idea.³¹

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365 **Contributors**

366 GS: data analysis and interpretation, drafting and completing the manuscript. DD: drafting and
367 completing the manuscript. HB: assisted in drafting and completing the manuscript. RG: assisted
368 in study design, data collection; KA: study design, assisted in data collection, assisted in
369 interpretation of data, assisted in drafting and completing the manuscript. All authors read and
370 approved the final manuscript.

371

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376

377 **Competing interests**

378 The fourth author, DD, is professor at the Erasmus University Rotterdam while also employed at
379 Zorginstituut Nederland (National Health Care Institute), which partially funds this research.

380

381 **Ethics approval**

382 Dutch legislation on Medical Research Involving Human Subject (WMO) does not require
383 ethical approval for this project, as the research would not contribute to clinical medical
384 knowledge and no participation by patients or use of patients' data was involved. All participants
385 gave informed consent before taking part in the study.

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387 **Data sharing statement**

388 The data set that was analyzed for this study is available from the corresponding author upon
389 reasonable request.

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Expert consensus on moving towards a value-based healthcare system in the Netherlands: a Delphi study

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7 3 **Expert consensus on moving towards a value-based healthcare**
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15 7 **Corresponding author:**

16 8 Gijs Steinmann

17
18 9 Health Care Governance, Erasmus School of Health Policy and Management, Erasmus University
19
20 10 Rotterdam

21
22 11 PO Box 1738, Rotterdam, 3000 DR, The Netherlands

23 12 steinmann@eshpm.eur.nl

24
25 13 +32 484 61 89 50
26
27 14

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29 15 **Co-authors**

30
31 16 Diana Delnoij,¹ Hester van de Bovenkamp,¹ Rogier Groote,² Kees Ahaus³
32
33 17

34
35 18 ¹Health Care Governance, Erasmus School of Health Policy and Management, Erasmus University
36
37 19 Rotterdam, Rotterdam, the Netherlands

38 20 ²Department of Operations, Faculty of Economics and Business, University of Groningen,
39
40 21 Groningen, the Netherlands.

41
42 22 ³Health Services Management & Organisation, Erasmus School of Health Policy and
43
44 23 Management, Erasmus University Rotterdam, Rotterdam, the Netherlands
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29 Abstract

30 **Objectives:** While the uptake of value-based health care (VBHC) is remarkable, uncertainty
31 prevails regarding the most important actions and practices in establishing a value-based
32 healthcare system. In this paper, we generate expert consensus on the most important aspects of
33 VBHC.

34 **Design:** The Delphi technique was used to reach consensus on the most important practices in
35 moving towards a value-based healthcare system.

36 **Setting and participants:** A Dutch expert panel consisting of nine members participated in a two-
37 round survey.

38 **Primary and secondary outcome measures:** We developed 39 initial items based on the
39 pioneering literature on VBHC and recent health policies in the Netherlands. Experts rated the
40 importance of each item on a 4-point Likert scale. Experts could change items or add new ones as
41 they saw fit. We retained items that were rated (very) important by $\geq 80\%$ of the panel.

42 **Results:** After two survey rounds, 32 items (72%) were included through expert consensus.
43 Experts unanimously agree on the importance of shared decision-making, with this item uniquely
44 obtaining the maximum score. Experts also reached consensus on the importance of outcome
45 measurements, a focus on medical conditions, and full cycles of care. No consensus was reached
46 on the importance of benchmarking.

47 **Conclusion:** This paper provides new insight into the most important actions and practices for
48 establishing a value-based healthcare system in the Netherlands. Interestingly, several of our
49 findings contrast with the pioneering literature on VBHC. This raises the question whether
50 VBHC's widespread international uptake indicates its actual implementation, or rather that the
51 original concept primarily serves as an inspiring idea.

52 **Strengths and limitations of this study**

- 53 • Using the Delphi technique, this study generates expert consensus on the most important
54 actions and practices in moving toward a value-based healthcare system.
- 55 • By revealing 32 actions and practices this research operationalizes value-based health care,
56 a highly abstract and multifaceted concept.
- 57 • Although the selection of experts was appropriate for the purpose of this study, the results
58 may have limited generalisability.
- 59 • The importance attached to specific aspects of value-based health care may be subject to
60 change, with some attaining relatively more or less importance depending on a particular
61 timeframe.
- 62 • Experts could reformulate existing items and also suggest new ones, this enabled
63 participants to express their personal (re)interpretation of value-based health care.

1. Introduction

Value-based health care (VBHC) is a highly topical concept within many healthcare systems.[1-3] The concept was pioneered by Michael Porter and Elizabeth Teisberg, who propose an overarching goal for all stakeholders in health care: to optimize value for patients.[4] Thus far, however, it remains relatively unclear how to transition this popular idea into the actual establishment of a value-based system – despite Porter’s attempts to outline just that.[4-7]

Several studies report fragmented and muddled efforts to implement VBHC.[8-10] Some scholars attribute these instances to the “high level of abstraction” and “vagueness” in which VBHC was originally described.[9] Although we recognize that VBHC is an abstract concept, we believe its muddled implementation can at least partially be explained by its multifaceted composition.

VBHC was developed as a strategy that aims to inform all stakeholders in healthcare systems.[4] It is an extensive concept with far-reaching implications: its goal is to “transform health care.”[4(p4)] In a value-based system, all stakeholders share a common objective: value for patients – with value defined as a patient’s health status (outcomes) divided by the resources it took to achieve that status (costs). Importantly, Porter and Teisberg argue, value can only be understood at the level at which it is created: in addressing a medical condition, over full cycles of care.[4(p5,99-105)] Providers should thus realign their organizational structures, forming integrated practice units which focus on one or a few related medical conditions and cover full care cycles.[4(p167-77)] Payment structures should also be aligned with value, with bundled payments for full cycles (or episodes) of care [4(p265-67)]. Perhaps most importantly (according to these scholars) providers should actively engage in benchmarking: they should systematically measure, report and compare their outcome data. This would fuel value-based competition, and

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3 98 enable patients, payers, providers and policymakers to all make more value-based decisions.[4] In
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5 99 sum, VBHC encompasses numerous aspects and requires a whole range of actions and practices
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8 100 in order to be implemented.

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10 101 In this paper we aim to identify the relative importance of the various aspects of this
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12 102 multifaceted concept. This is both timely and important, because although the recent uptake of
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14 103 VBHC has been described as remarkable,[3] it nonetheless remains unclear what practical steps
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16 104 should be undertaken, and what aspects should be prioritized on the road towards a more value-
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18 105 based system. In fact, as mentioned earlier, several studies report muddled implementation
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20 106 efforts,[9, 11] and it also appears that scholars employ different standards when they discuss the
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22 107 implementation of VBHC.[cf. 12-14] In addition, several scholars have stated that the way in
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24 108 which a multifaceted concept such as VBHC moves from idea to practice, is highly contingent on
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26 109 the particular intricacies within different health systems.[11, 15] Thus, uncertainty prevails when
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28 110 it comes to the actual implementation of VBHC.

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33 111 In this paper, we build on the Delphi method to identify the relative importance of various
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35 112 actions and practices in moving toward a value-based healthcare system in the Netherlands. The
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37 113 Dutch healthcare system is a particularly interesting case since it is based on regulated
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39 114 competition.[16] Moreover, the measurement and use of outcome data is increasingly becoming
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41 115 an important issue in Dutch healthcare policy.[16] Several of VBHC's aspects (as outlined by
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43 116 Porter) are thus already in place.

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47 117 Accordingly, our research question is: which aspects, actions and practices do Dutch experts
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49 118 agree on as important in moving towards a value-based healthcare system?

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121 2. Methods

122 The Delphi technique is a well-established research method to build consensus where considerable
123 uncertainty exists, and where empirical evidence is (still) lacking.[17-20] In this modified Delphi
124 study, we explore Dutch expert consensus on the most important aspects of VBHC, and the actions
125 and practices that will contribute to implement VBHC in the Dutch system.

126 We recruited our expert panel through purposive sampling. Ten experts were selected
127 based on their known or stated expertise regarding value-based health care and the Dutch
128 healthcare system. Nine panel members completed the first survey round: four females and five
129 males who, at the time of the study, averaged nearly 23 years of experience in their current
130 professional field, with eight out of nine members counting >10 years of experience regarding
131 quality improvement. Additionally, these experts all have significant experience working with
132 VBHC inspired initiatives, either through their profession within a hospital (n=5) or through their
133 collaboration with healthcare organizations (n=4). Of the five participants working in a hospital,
134 two are professors at an academic hospital, with a background in medicine; two are project leaders
135 (value-based health care); one is a manager (quality). Of those not directly employed by healthcare
136 providers, one has a managerial function at a hospital association; the remaining three work in
137 healthcare consultancy.

138 We created an initial list of 39 items (available on request). The bulk of these items were
139 derived from the pioneering literature on VBHC. [4, 6, 21-24] We complemented this with several
140 items that – particularly within Dutch health policy – are strongly related to VBHC. Accordingly,
141 these items were extracted from policy documents that directly deal with one or more aspects of
142 VBHC (e.g. outcome measurements).[25-27] These complementary items are warranted, since our
143 study builds on the notion that the implementation of VBHC will vary between health systems and

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3 144 socio-political regions.[11, 15] Examples of item descriptions are: “assessing the quality of a
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5 145 treatment cycle by measuring the achieved health status”; “creating integrated practice units
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7 146 (IPUs)”; and “learning from relating data on outcomes to data on costs of healthcare.”
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10 147 Our expert panel completed questionnaires during a two-round modified Delphi survey, in
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12 148 which they rated each item according to “*how important you deem this item in moving towards a*
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14 149 *value-based healthcare system?*” Scoring occurred on a four-point Likert scale: “very important”
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16 150 (1), “important” (2), “moderately important” (3), “not important” (4). The first survey was sent
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18 151 out in December 2017, the second in January 2018. Panel members were given three weeks to
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20 152 complete each questionnaire.
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24 153 In line with previous Delphi studies,[28] we retained items after each round that were rated
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26 154 as “very important” (1), or “important” (2), by at least 80% of the experts, and excluded those
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28 155 rated as “not important” (4), or only “moderately important” (3), by more than 50% the experts.
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30 156 We expect the distribution of scores to be skewed towards agreement on importance. Therefore,
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32 157 our threshold for agreement on importance ($\geq 80\%$ scores very important or important) is higher
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34 158 than for agreement on non-importance ($> 50\%$ scores moderately or not important).
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38 159 Importantly, after rating an item, each expert was asked whether they had suggestions to
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40 160 reformulate that particular item. Additionally, by the end of the survey round, experts also had the
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42 161 possibility to add new items to the list, as they saw fit. Suggested additions and reformulations
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44 162 would become part of the next survey round. The second survey round, therefore, consisted of
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46 163 both the reformulated and unchanged items that scored between inclusion and exclusion, plus the
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48 164 newly suggested ones from round one.
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51 165 We thus conducted a *modified* Delphi study, particularly because we did not enable experts
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53 166 to revisit the aggregate scores of each item between survey rounds [18]. Since our goal was to
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167 generate consensus, we decided that only those items on which *no* consensus was reached in the
 168 first round would be presented to the panel again in the second round.

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170 **Patient and public involvement statement**

171 Within this study, there has been no involvement from patients or members of the public in the
 172 design, conduct, reporting, or dissemination plans of the research.

173

174 **3. Results**

175 Table 1 shows the flow of our Delphi study. Of the 10 experts that were recruited, 9 (90%) agreed
 176 to participate and completed the study. Our analysis of the second round of questionnaires revealed
 177 missing data regarding one of the panel members; we therefore omitted this expert's data for the
 178 entire second round (80% response rate).

179 *Table 1. Results survey rounds 1 and 2*

Response	Round 1 (90 %)	Round 2 (80%)
Number of Items	39	18 out of which: 5 unchanged 8 reformulated 5 new
<i>Consensus:</i>		<i>Consensus:</i>
Included	20 (45%)	12 (66,7%)
Excluded	6 (13,6%)	0 (0,00%)
<i>Discordance:</i>		<i>Discordance:</i>
Reformulated	8 (18,2%)	0 (0,00%)
Unchanged	5 (11,4%)	6 (33,3%)

Newly suggested items:	5 (11,4%)	0 (0%)
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181 As the table shows, twenty items were included in the first round, i.e. rated as important (2) or
182 very important (1) by at least 80% of the panel members. Additionally, six items were rated
183 “moderately important” (3) or “not important” (4) by more than 50% of the experts and were
184 therefore excluded. This entails that *no* consensus was reached on 13 of our initial 39 items. These
185 items thus became part of the second round, as did 5 new items put forth by panel members. In the
186 second survey round, another twelve items were included by the panel members, bringing the total
187 number of included items to 32 (20+12).

188 See Table 2 below, for an overview of all 32 items that were included through expert
189 consensus after two survey rounds. No consensus was reached on six items (see table 3 for an
190 overview). However, in the second survey round experts did not suggest new items, nor did they
191 suggest any reformulations – thus indicating saturation was reached.

192 *Table 2. Included Items (#1-#44) according to their mean importance score (\bar{x}), standard deviation (s) and*
193 *round of inclusion (1 or 2)*

\bar{x}	s	Round	item	Item description
1,00	0,00	1	#26	Involving patients in the shared decision-making process (regarding treatment options etc.) as much as possible.
1,11	0,33	1	#21	Standardizing performance measures for full treatment cycles of medical conditions, rather than for individual treatments/procedures.
1,22	0,67	1	#4	Organizing delivery of care around full treatment cycles of medical conditions, rather than around individual procedures.
1,33	0,50	1	#28	Using patient reported outcome measures (PROMs) to evaluate the provision of care.
1,33	0,50	1	#34	Using dashboards or scorecards to assess and visualize performance.
1,38	0,52	2	#43	Learning to optimize the relationship between health outcomes and costs.

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1,38	0,52	2	#23	Assessing the quality of the provided care based on the patients' recovery process after treatment(s).
1,44	0,73	1	#12	Delivering a desired and sustainable outcome from a patient's perspective, rather than an optimal outcome from a practitioner's perspective.
1,44	0,73	1	#9	Including a patient representative in the improvement team in order to ensure expert input from the patient perspective.
1,44	0,73	1	#20	Reducing the amount of performance measures that are used.
1,44	0,73	1	#35	Learning from relating data on outcomes to data on costs of healthcare.
1,50	0,53	2	#5	Developing a technological/digital platform that can be used to view data and share data with others, with the aim of improving the provision of care.
1,56	0,53	1	#27	Establishing clear and realistic expectations for patients.
1,56	0,53	1	#16	Reducing waste (e.g. the waste of time, material and/or staff capacity).
1,56	0,73	1	#13	Ensuring the general safety of patients when undergoing treatment.
1,63	0,52	2	#2	Striving to make individual health insurance as affordable as possible.
1,63	0,74	2	#41	Describing the care process in care pathways, in which the goals and the "evidence-based" key interventions (who does what, and at what time) are established.
1,63	1,06	2	#1	Providing or aiming to provide universal coverage (health insurance).
1,67	0,71	1	#17	Creating integrated practice units (IPUs)
1,67	0,71	1	#6	Assigning a data or business intelligence manager (or team) who focusses on collecting and analyzing existing data from patient records.
1,67	0,71	1	#14	Avoiding over and underuse of healthcare services.
1,67	1,00	1	#22	Assessing the quality of a treatment cycle by measuring the achieved health status.
1,67	1,00	1	#30	Structuring payments for healthcare so that they cover the costs of a full cycle of care, rather than having separate payments for individual procedures.
1,75	0,71	2	#7	Developing a standardized step-by-step plan (roadmap) that healthcare providers can use to transition into value-based providers.
1,75	0,71	2	#8	Appointing a change manager (an expert in the field of value-based health care) who helps healthcare providers transition into "value-based" providers.
1,75	1,04	2	#29	Using patient reported experience measures (PREMs) to evaluate the provision of care.

1,78	0,67	1	#10	Using a patient's physical well-being in assessing the outcome of healthcare delivery.
1,78	0,67	1	#38	Creating predictive models that enable medical specialists to provide information concerning a patient's future health status.
2,00	0,50	1	#25	Choosing and adapting indicators from ICHOM sets (standardized outcome measurements for various medical conditions).
2,00	0,53	2	#44	Identifying and removing the barriers raised by privacy legislation that obstruct the path towards value-based healthcare delivery.
2,00	0,93	2	#11	Using the patient's mental well-being as an outcome indicator in assessing healthcare services.
2,00	0,93	2	#42	Striving to standardize outcome indicators in such a way that different groups of patients can be compared with one another.

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196 Table 2 shows the 32 items that are included based on their consensually perceived importance in
 197 moving towards a VBHC system. The items are rank ordered, first by mean (\bar{x}), secondly by
 198 standard deviation (s). The mean (\bar{x}) indicates the average score of the item (i.e. its perceived
 199 importance) according to our panel (rated by each member on a 4-point scale). An item's standard
 200 deviation (s) was primarily used to rank order items with a similar mean, and can be regarded as a
 201 secondary indicator of overall agreement among panel members. The table also displays whether
 202 items were included in round 1 or 2.

203 According to experts, the most important practice in moving towards VBHC in the
 204 Netherlands is to involve patients in shared decision-making. Experts unanimously agree on the
 205 high importance of this item (#26). Other high ranking items on which experts agree are: to
 206 standardize performance measures for full treatment cycles of medical conditions (#21); to
 207 organize delivery of care around these full treatment cycles (#4); to use patient reported outcome
 208 measures (PROMs) for evaluating care provision (#28); to use dashboards or scorecards to assess
 209 and visualize performance (#34); to learn how to optimize the relationship between health

210 outcomes and costs (#43); and to assess the quality of care based on the patients' recovery process
 211 after treatment(s) (#23).

212 After two rounds of questionnaires, six items remained on which no consensus could be
 213 reached. In other words, these items were neither rated (very) important by $\geq 80\%$ of the experts,
 214 nor were they rated moderately or not important by $\geq 50\%$. These six items are shown in Table 3.

215 *Table 3. Items with expert discordance after two survey rounds, according to their mean importance score*
 216 *(\bar{x}) and standard deviation (s).*

\bar{x}	s	item	Item description
1,63	1,19	#31	Applying an incentive structure that stimulates providers to improve outcomes of care, rather than increasing volume.
1,75	0,89	#18	Updating and reformulating protocols and regulations iteratively in order to improve the quality of care.
1,88	0,83	#24	Assessing the quality of a treatment cycle based on the sustainability of a patient's health.
1,88	0,83	#39	Comparing the data of different IPUs or multidisciplinary teams in order to benchmark performance.
2,00	0,76	#37	Revising and reformulating existing measures continuously, and continuously developing new measures that are used to evaluate healthcare delivery.
2,38	0,92	#40	Basing the payment of healthcare services on the actual costs, and not on pre-arranged rates.

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 218 Experts did not reach consensus on the idea that the payment of healthcare delivery should be
 219 based on actual costs, rather than predetermined price rates (#40). Our panel also could not agree
 220 on the importance of the continual revision and improvement of standardized measures (#37), and
 221 the same applies to the repeated revision of general protocols and regulations (#18). Additionally,
 222 no consensus was reached on the importance of benchmarking based on outcome data (#39).
 223 Disagreement also remained regarding the issue of quality assessment based on the sustainability

224 of a patient's health (#24). Similarly, experts did not agree on the importance of incentivizing
225 providers to improve their treatment outcomes (#31).

227 **4. Discussion**

228 Our Delphi study identified expert consensus on the relative importance of aspects, actions and
229 practices in moving toward a value-based healthcare system. Consensus was reached on 32 items
230 that are deemed important (table 2). In round 2, no new items were put forth, and there were also
231 no suggestions for reformulation, thus indicating that saturation was reached. In the second round,
232 six items remained on which experts did not agree sufficiently for either inclusion or exclusion.

233 Our most eye-catching finding concerns the consensus on the importance of shared
234 decision-making (SDM). Experts unanimously rated this particular item (#26) as “very important”
235 in moving towards a value-based healthcare system – which demonstrates a unique level of
236 agreement, unmatched by any other item in this study. Interestingly, SDM is by no means a
237 fundamental aspect within the pioneering literature on VBHC.[4-6, 22] In contrast to SDM, which
238 specifically concerns the deliberate discussion of treatment options, this body of work emphasizes
239 the value-adding options patients have (or should have) in choosing amongst healthcare providers.
240 Recently, it has been argued that the original VBHC concept, and the framework of market-based
241 choices on which it rests, deemphasizes patients' personal values in life.[3] Perhaps our panel's
242 unanimous agreement indicates that the incorporation of SDM may add a more personal dimension
243 to VBHC – which has been advocated by some scholars.[29]

244 In addition, multiple items reveal that experts agree on the importance of recognizing *full*
245 *care cycles for medical conditions* as the relevant level of analysis in health care. This applies to
246 the organization of healthcare delivery (#4 & 17), its performance measurements (#21), and its

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3 247 payment structures (#30). This resonates with the literature on VBHC, particularly with the work
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5 248 of Porter, who repeatedly states that value in health care is created at the level of medical
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7 249 conditions, over full cycles of care.[4, 6, 30]
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10 250 Several items on which consensus was reached relate to the importance of outcome
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12 251 information (e.g. #22, 25, 28). Our panel agreed, for instance, that it is important to assess the
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14 252 quality of a treatment cycle by measuring the achieved health status (i.e. outcomes) of patients
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16 253 (#22). This overall emphasis on outcome measurement also corresponds with the literature.[4, 22,
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21 255 Regarding outcomes, this correspondence may seem relatively straightforward, since the
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23 256 central tenet of VBHC is that all stakeholders must aim to improve value for patients, with value
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25 257 defined as health outcomes per unit of costs.[4, 7] However, our panel did *not* display similar
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27 258 correspondence regarding costs – the denominator of value ($value = \frac{outcomes}{costs}$). Dutch experts thus
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29 259 appear to prioritize measuring outcomes over measuring costs, which may reflect other studies that
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31 260 indicate that when VBHC is being implemented, the costs of care attain relatively little attention.[8,
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36 262 One of the items on which our panel did not agree concerns the importance of comparing
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38 263 and benchmarking provider's performance data (#39). Accordingly, and strikingly, experts did not
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40 264 reach consensus regarding the importance of one of the most foundational aspects of VBHC-
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42 265 theory:
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47 266 Providers need to be compared on results, and excellent providers rewarded with more patients.
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49 267 Information about results [outcomes versus costs], which is appropriately risk adjusted, must
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51 268 become the critical driver of behavior in the system – by referring physicians, by health plans,
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53 269 by patients, and by providers themselves. [4(p102)]
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3 270 Faced with the challenge to establish a value-based system in the Netherlands, it appears that
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5 271 although Dutch experts agree on the importance of multiple aspects of Porter's original
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7 272 conceptualization of VBHC, they also blend in additional concepts (e.g. SDM), while bypassing
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9 273 others (e.g. benchmarking). It will require additional research, however, to determine the extent to
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11 274 which our study represents the range of Dutch expert opinion on this issue.
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15 275 **4.1. Limitations**

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18 276 One potential limitation of this study is that our panel consisted entirely of *Dutch* experts.
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20 277 However, we were interested in the implementation of VBHC in the Dutch system, and it therefore
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22 278 made sense to invite Dutch experts to participate. Accordingly, this has enabled us to demonstrate
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24 279 how, in the Netherlands, VBHC is being adapted and blended with other concepts such as shared
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26 280 decision-making. Additionally, experts might have been influenced by the particular items that
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28 281 were first presented to them, and this could have affected their scoring. To counterbalance this
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30 282 potential bias, however, experts could reformulate existing items, while also being able to suggest
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32 283 new ones as they saw fit – both of which they did (see table 1).
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37 284 **4.2. Conclusion**

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40 285 In this paper we identified expert consensus on the relative importance of a variety of concepts
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42 286 and practices for moving towards a value-based healthcare system. Accordingly, our study
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44 287 provides additional insight regarding several important steps within the implementation of VBHC
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46 288 – a topical concern within many healthcare systems. However, our study also reveals considerable
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48 289 contrast with the pioneering literature on VBHC. Perhaps our results, based on a Dutch expert
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50 290 panel, are a precursor to a process of implementation of VBHC in the Netherlands that deviates
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52 291 from the original concept – which has been observed elsewhere.[8,9] In such circumstances, some
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292 scholars have questioned whether VBHC is actually being implemented or, upon closer look,
293 primarily serves as an inspiring idea.[31]

294

295 **Contributors**

296 GS: data analysis and interpretation, drafting and completing the manuscript. DD: drafting and
297 completing the manuscript. HB: assisted in drafting and completing the manuscript. RG: assisted
298 in study design, data collection; KA: study design, assisted in data collection, assisted in
299 interpretation of data, assisted in drafting and completing the manuscript. All authors read and
300 approved the final manuscript.

301

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305 collection, analysis, and interpretation of data; nor in writing the manuscript.

306

307 **Competing interests**

308 The fourth author, DD, is professor at the Erasmus University Rotterdam while also employed at
309 Zorginstituut Nederland (National Health Care Institute), which partially funds this research.

310

311 **Ethics approval**

312 Dutch legislation on Medical Research Involving Human Subject (WMO) does not require
313 ethical approval for this project, as the research would not contribute to clinical medical
314 knowledge and no participation by patients or use of patients' data was involved. All participants
315 gave informed consent before taking part in the study.

316

317 **Data sharing statement**

318 The data set that was analyzed for this study is available from the corresponding author upon
319 reasonable request.

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