

# A quality management model for integrated care: results of a Delphi and Concept Mapping study

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## Abstract

**Objective.** The objective of this study is to identify the elements and clusters of a quality management model for integrated care.

**Design.** In order to develop the model a combination of three methods were applied. A literature study was conducted to identify elements of integrated care. In a Delphi study experts commented and prioritized 175 elements in three rounds. During a half-a-day session with the expert panel, Concept Mapping was used to cluster the elements, position them on a map and analyse their content. Multi-dimensional statistical analyses were applied to design the model.

**Participants.** Thirty-one experts, with an average of 8.9 years of experience working in research, managing improvement projects or running integrated care programmes.

**Results.** The literature study resulted in 101 elements of integrated care. Based on criteria for inclusion and exclusion, 89 unique elements were determined after the three Delphi rounds. By using Concept Mapping the 89 elements were grouped into nine clusters. The clusters were labelled as: 'Quality care', 'Performance management', 'Interprofessional teamwork', 'Delivery system', 'Roles and tasks', 'Patient-centeredness', 'Commitment', 'Transparent entrepreneurship' and 'Result-focused learning'.

**Conclusion.** The identified elements and clusters provide a basis for a comprehensive quality management model for integrated care. This model differs from other quality management models with respect to its general approach to multiple patient categories, its broad definition of integrated care and its specification into nine different clusters. The model furthermore accentuates conditions for effective collaboration such as commitment, clear roles and tasks and entrepreneurship. The model could serve evaluation and improvement purposes in integrated care practice. To improve external validity, replication of the study in other countries is recommended.

**Keywords:** integrated care, quality management model, Delphi method, Concept Mapping, quality improvement

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## Introduction

Over the past decade the integration of care has gained increasing attention from managers, health care workers, policymakers and researchers in many countries as a strategy to improve health care delivery [1–4]. Integrated care refers to a coherent and co-ordinated set of services, which are planned, managed and delivered to individual service users across a range of organizations and by a range of co-operating professionals and informal carers [3]. The focus on integrated care stems from the growing fragmentation and supply-oriented approach in health care, which resulted in discontinuity,

duplication and absence of responsibility for the whole continuum of care. There is a widespread belief that integration of care is necessary to respond to these deficiencies and that integration will enhance client satisfaction, quality of life, efficiency and outcomes and will decrease costs [5–8]. Integrated care appears in a variety of forms such as 'shared care', 'continuing care', 'disease management', 'transmural care', 'comprehensive care' or 'intermediate care', and is required when the services of separate agencies and individual professionals do not cover all the demands of multiple-problem clients [3, 9].

Though widely acknowledged and pursued, the development of integrated care has proven to be a difficult task.

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Developers struggle with the question as to which elements are essential for realizing, improving, innovating and sustaining integrated care. Although much research has been done on integrated care, the studies address specific settings or patient groups and have partially incompatible conclusions [10]. A review of 31 disease management studies showed routine reporting and feedback loops, evidence-based guidelines, collaborative practice models and process and outcome measurement as the most frequently implemented elements. These results are, however, only based on programmes for patients with asthma and/or diabetes mellitus [11]. Another review of integrated care programmes reported the elements of self-management support, clinical follow-up, case management, feedback and education, multi-disciplinary care teams and care pathways [12]. The Chronic Care Model (CCM), which describes elements associated with better care outcomes for chronically ill patients, names the elements of community, the health system, self-management support, delivery system design, decision support and clinical information systems as essential ingredients [13, 14].

Evidence-based or expert-based quality management models can support quality improvements in health care. A quality management model is defined as a model for a structured systematic process for creating organization-wide participation in the planning and implementation of continuous quality improvement [15]. However, present health care, quality management models do not have integrated care as the dominant focus. The frequently used expert-based EFQM (European Foundation for Quality Management) Excellence model primarily focuses on the level of the organization, while for integrated care interorganizational collaboration is essential [16]. The Dutch version of the EFQM Excellence model does define five developmental phases of organizational growth, with the fourth phase defined as 'chain-oriented'. However, a further refinement of activities or elements within this developmental phase remains unexplored [17]. The evidence-based CCM focuses on care co-ordination within and across organizations in its 'health care organization' component, but the overall model has the levels of the community, organization, practice and the patient as its focal point [13, 14].

The lack of a consistent set of elements and a generic quality management model for integrated care provides the mainspring for this study. The aim is to assemble knowledge on elements of integrated care and to construct a generic quality management model for integrated care, based on these elements, that covers multiple patient groups and integrated care settings. The research questions are: (i) What are important elements for developing (realizing, improving, innovating and sustaining) integrated care? (ii) How can these elements be logically grouped and labelled in order to construct a quality management model for integrated care?

## Method

In order to develop the quality management model in a systematic way, a combination of literature study, Delphi methodology and Concept Mapping was applied. In this way

evidence-based and expert-based knowledge was combined in order to achieve full richness of the model. The use of qualitative and quantitative (statistical) analyses is a sound base for generating empirical conceptual frameworks of complex concepts [18].

## Literature study

A literature study on elements of integrated care was performed in order to make use of the available knowledge and international perspectives. An element of integrated care was defined as an activity focusing on the development (realization, improvement, innovation or sustainability) of integrated care, based on the quality continuum of Feussner *et al.* [19]. The Pubmed and Cochrane databases were searched on recent reviews (1997–February 2007) in English or Dutch with search terms 'integrated care', 'shared care', 'co-ordinated care', 'disease management', 'transmural care', 'comprehensive care' or 'intermediate care' and (quality) model. To include multiple sources doctoral theses, evaluation reports and frequently used quality management models were also studied [1, 2, 4–7, 10–14, 20–31]. To ensure that the list of elements was sufficient, three steps were taken. Firstly, the research team reviewed the list of included literature. Secondly, the list of elements was reviewed and refined in multiple rounds by three researchers experienced in integrated care research until consensus was reached on the elements and each element description. Lastly, before entering the Delphi study the list of elements was reviewed by two experienced integrated care project leaders in order to optimize content validity.

## Delphi study

A Delphi study was carried out to improve, complete and restrict the list of elements from the literature study [32, 33]. A Delphi study is a robust method that uses expert judgements, and compares these judgements in several rounds with the aggregate judgements of other participating experts, until consensus on prespecified criteria is reached [34]. The experts were selected on: multiple years of experience with integrated care, experience with multiple and different patient groups or integrated care settings, and expert knowledge based on research, implementation projects or practice experience. We generated a list of Dutch experts by tracking publications, conferences on integrated care, national networks and suggestions of contacted experts. Before approaching each expert we sought to strike a balance between expertise and dominant background in the total group. Eventually, out of the 35 approached experts 31 persons agreed to participate (see Table 1 for characteristics). Thereby, recommended panel size of 30 participants was reached [35]. The four rejections were all due to unavailability as people were on leave. All the experts received information about the aim of the study and the Delphi procedure.

The experts were consulted in three anonymous Delphi rounds. Each time the experts received an Excel sheet with

**Table 1** Characteristics of Delphi panel experts

| Characteristics     | Category                               | Expert group<br>(N = 31) |
|---------------------|--|--------------------------|
| Gender              | Male                                   | 42%                      |
|                     | Female                                 | 58%                      |
| Age (years)         | Min–max                                | 27–63                    |
|                     | Average (SD)                           | 44.71 (9.13)             |
|                     | < 40                                   | 26%                      |
|                     | 40–50                                  | 52%                      |
|                     | > 50                                   | 22%                      |
| Years of experience | Min–max                                | 2–25                     |
|                     | Average (SD)                           | 8.89 (5.48)              |
|                     | < 5                                    | 19%                      |
|                     | 5–10                                   | 55%                      |
|                     | > 10                                   | 26%                      |
| Source of expertise | Research                               | 13%                      |
|                     | Research and practice                  | 3%                       |
|                     | Implementation programmes              | 29%                      |
|                     | Research and implementation programmes | 26%                      |
|                     | Practice                               | 3%                       |
|                     | Practice and implementation programmes | 26%                      |
|                     | Dominant background                    | Professional             |
|                     | Organizational/health sciences         | 48%                      |

the elements by e-mail with the instruction to rate the importance of each element for developing integrated care. Response categories were: Not important (0), moderately important (1), important (2) and very important (3). This Likert rating scale was used to avoid a tendency to score ‘in the middle’. The second question was: ‘Do you have suggestions to reformulate this element?’ In addition, the experts had the opportunity to add new elements. As conferred with methodologists, an element was included after each round if >80% of the experts judged it as important or very important, and excluded if >50% judged an element as not or moderately important. The rationale for the cut-off scores was firstly to be certain of keeping an element which have a high agreement on importance (>80%). Secondly, to be cautious about eliminating an element (>50%) so as not to miss a topic, and thirdly to make sufficient use of the option of reformulation. The suggested reformulations were analysed individually by the three researchers and reformulated on the basis of consensus between them. These reformulated items were presented in the next round together with the new and unchanged elements, while showing the average group percentage that had scored important/very important in the previous round. This Delphi procedure delivered a final list of elements

for the design of a quality management model for integrated care.

**Concept Mapping**

The elements resulting from the Delphi study were used as input for a Concept Mapping session with the same expert panel (only one person was not available). Concept Mapping is an exploratory consensus procedure for modelling conceptual frameworks based on specific elements, and was developed by Trochim [36]. The procedure is highly structured and combines experts’ sorting techniques with multi-dimensional scaling and cluster analyses [37]. The statistical procedures were fixed as an algorithm of the computer program ARIADNE, version 2.0. The systematic stepwise approach and the statistical analyses contribute to a high internal validity of the generated cluster maps [37, 38].

During the session each expert was asked to individually cluster the elements (with a maximum of 12 clusters) and gave names to the clusters. The cluster exercise was supported by a computerized groupware system (Meetingworks 6.5), in which each expert had his/her own laptop with a prepared sheet. The data generated by the 30 experts were stored in a database and used for the statistical procedure, which was carried out by ARIADNE in three steps [39].

Firstly, the point map was calculated by using multi-dimensional scaling. The scaling procedure positioned each element on a two-dimensional map with four poles. Elements which are located close to each other carry a similar meaning, whereas elements far apart from each other are not related. Secondly, the co-ordinates of the point map were used to conduct hierarchical cluster analyses. After reviewing several cluster maps by following the recommended procedure [36], the nine cluster solution represented the conceptual framework best. The third step was the labelling and description of the clusters. The 30 experts were divided into nine groups based on ‘background’ and ‘years of experience’. Each group discussed one cluster, analysed the elements and generated a cluster label and description for the cluster. The findings were discussed in plenary. To analyse similarities or differences between panel subgroups, additional principal component analyses were calculated.

**Results**

**Literature and Delphi study**

The literature study resulted in 101 elements and revealed an emphasis on organizational aspects such as agreements on patient logistics, protocols, co-ordinative interventions and information flows. During the three Delphi rounds, no experts were lost, resulting in a response rate of 100% in each round (Table 2). During each round, approximately half the elements were presented, leaving the others excluded or presented (reformulated) for the next round. In the first round 17 of 38 suggested new elements were inserted for round 2 on account of duplicate suggestions or elements

**Table 2** Delphi panel results

| Response ( <i>n</i> = 31)         | Round 1      | Round 2     | Round 3     |
|-----------------------------------|--------------|-------------|-------------|
|                                   | 100%         | 100%        | 100%        |
| Elements (numbers)                | 101          | 49          | 25          |
| Included                          | 51% (52)     | 53% (26)    | 44% (11)    |
| Excluded                          | 17%          | 4%          | 56%         |
| Rephrased                         | 24%          | 27%         | 0           |
| Unchanged                         | 8%           | 16%         | 0           |
| New elements                      | 17           | 4           | 0           |
| Priority                          | 3131 scores  | 1519 scores | 775 scores  |
| Very important                    | 30%          | 26%         | 25%         |
| Important                         | 44%          | 52%         | 50%         |
| Moderately important              | 20%          | 20%         | 23%         |
| Not important                     | 6%           | 2%          | 2%          |
| New elements (total)              | 38           | 8           | 3           |
| Average/expert (SD)               | 1.23 (1.50)  | 0.26 (0.82) | 0.10 (0.54) |
| Min–max                           | 0–5          | 0–4         | 0–3         |
| Reformulation suggestions (total) | 292          | 68          | 40          |
| Average/expert (SD)               | 9.42 (12.71) | 2.19 (3.00) | 1.29 (2.58) |
| Min–max                           | 0–56         | 0–12        | 0–13        |

already existing in the first set. In the second round four new elements were suggested, and none in the final round. Only a small percentage of the elements (range 2–6%) were classified as ‘not important’. The average number of reformulated suggestions varied per expert, and decreased over the three rounds. Eventually 89 elements were included, with a priority score between 1.79 and 2.94 (Table 3).

### Concept Mapping

The first analytical step resulted in a two-dimensional point map with the elements positioned in a circumplex structure shape, with no elements in the centre of the map and a majority of the elements positioned on the west and south-eastern poles. The hierarchical cluster analyses and review of the cluster maps resulted in a nine-cluster representation (Fig. 1). The additional analyses of sort similarities between experts finally showed values between 0.64 and 0.87 (average 0.75), representing a high similarity in clustering. Further analyses of correlations between two panel subgroups (research experience or not and professional background or not) also showed high correlations (0.83 research–no research, 0.84 professional–not professional), which indicate that these characteristics did not influence the results significantly.

Based on the (sub)group discussions the labels of the clusters were defined as: ‘Quality care’, ‘Performance management’, ‘Interprofessional teamwork’, ‘Delivery system’, ‘Roles and tasks’, ‘Patient-centeredness’, ‘Commitment’, ‘Transparent entrepreneurship’ and ‘Result-focused learning’. Average priority scores per cluster range from 2.43 (Quality care, SD 0.20) to 2.16 (Result-focused learning, SD 0.13). The nine clusters with their elements are described in Table 3.

A next step in the Concept Mapping procedure was the analyses of the cluster map to define the four poles. This analyses of the clusters’ content and their positions on the map by three researchers resulted in the following poles: ‘Effective collaboration’, ‘Organization of care’, ‘Quality care’ and ‘Results’. The more northern clusters on the map broadly correspond with the operational level in integrated care (such as providing client-centred information), and the more southern clusters with the strategic level in integrated care settings (e.g. signing collaboration agreements). The elements with the highest priority scores mainly cover organizational aspects of client-focused integrated care. No elements from the ‘Result-focused learning’ and ‘Commitment’ clusters are in the top 10 priority scores.

## Discussion

### Reflection on the study and study limitations

It proved to be a useful strategy to combine the results of a literature study, a Delphi procedure and Concept Mapping to construct a base for a quality management model on integrated care. In accordance with Franklin and Hart [33] we found that starting from a list of elements extracted from the literature instead of a blank sheet proved to be an efficient approach during the Delphi rounds. It provided a point of origin for the experts and limited the randomness of an open-end dialogue. Most elements were confirmed and the number of new added elements was limited and saturated after three rounds. Content review of excluded elements by three of the researchers also showed that these elements were

**Table 3** Nine cluster description and their elements

| PS  | SD   | Rank   | Nr | Element description   |
|---|------|--|----|---|
| <i>Cluster 1. Patient-centeredness, nine elements, average PS 2.23, SD 0.22</i> |      |  |    |   |
| 2.66  | 0.60 | 4  | 40 | Providing understandable and client-centred information   |
| 2.36  | 0.84 | 27   | 3  | Collaboratively offering client information of the care partners  |
| 2.35  | 0.66 | 30   | 86 | Designing care for clients with multi- or co-morbidities  |
| 2.31  | 0.75 | 35   | 68 | Using self-management support methods as a part of integrated care  |
| 2.23  | 0.76 | 43   | 14 | Implementing care process-supporting clinical information systems   |
| 2.13  | 0.62 | 63   | 84 | Flexible adjustment of integrated care corresponding to individual clients' needs                         |
| 2.10  | 0.75 | 67   | 1  | Developing a front office: single entry point for client information                                      |
| 1.97  | 0.48 | 83   | 74 | Using a protocol for the systematic follow-up of clients  |
| 1.94  | 0.57 | 86   | 78 | Developing care programmes for relevant client subgroups  |
| <hr/>   |      |  |    |   |
| Cluster description   |      | This cluster is about developing integrated care and information flows tailored to specific (sub)groups of patients. Elements focus on integrated patient and care process supporting information such as front offices, self-management support or information systems, and delivering care adjusted to individual needs (e.g. multi-morbidity)   |    |   |
| <i>Cluster 2. Delivery system, 18 elements, average PS 2.26, SD 0.32</i>        |      |  |    |   |
| 2.94  | 0.25 | 1  | 2  | Reaching agreements on referrals and transfer of clients through the care chain                           |
| 2.84  | 0.45 | 2  | 4  | Reaching agreements on procedures for information exchange  |
| 2.71  | 0.53 | 3  | 17 | Using a single client-monitoring record accessible for all care partners                                  |
| 2.46  | 0.62 | 14   | 69 | Reaching agreements on procedures for the exchange of client information                                  |
| 2.42  | 0.76 | 18   | 10 | Developing connections between databases of partners in the care chain                                    |
| 2.38  | 0.66 | 25   | 6  | Offering case management for clients with complex needs   |
| 2.32  | 0.48 | 33   | 20 | Reaching agreements on chain logistics (e.g. waiting periods and throughput times)                        |
| 2.32  | 0.70 | 34   | 27 | Using shared client treatment and care plans  |
| 2.26  | 0.73 | 40   | 23 | Using uniform client-identification numbers within the care chain   |
| 2.19  | 0.73 | 47   | 9  | Reaching agreements among care partners on the consultation of experts and professionals                  |
| 2.07  | 0.63 | 69   | 7  | Reaching agreements among care partners on managing client preferences                                    |
| 2.06  | 0.77 | 73   | 30 | Reaching agreements among care partners on scheduling client examinations and treatment                   |
| 2.05  | 0.75 | 74   | 32 | Reaching agreements among care partners on discharge planning   |
| 2.00  | 0.68 | 80   | 21 | Developing criteria for the inclusion and throughput of clients in the care chain                         |
| 1.97  | 0.60 | 82   | 24 | Reaching agreements among care partners on providing care to waiting-list clients                         |
| 1.95  | 0.71 | 84   | 15 | Bringing specialized nurses into action through the care chain  |
| 1.94  | 0.57 | 85   | 26 | Reaching agreements on linking clients to outside resources or community care partners                    |
| 1.79  | 0.65 | 89   | 34 | Developing criteria for assessing clients' urgency  |
| <hr/>   |      |  |    |   |
| Cluster description   |      | Chain and client logistics, co-ordination mechanisms and procedures for streamlining the care process for the whole care chain is the main focus of this cluster. The reaching of all agreements (e.g. logistics, sharing expertise), procedures (e.g. information exchange) or tools (e.g. care plans) in the care chain that are necessary from the client's initial entry into the care chain until the final contact are reflected in this cluster |    |   |
| <i>Cluster 3. Performance management, 16 elements, average PS 2.32, SD 0.14</i> |      |  |    |   |
| 2.55  | 0.57 | 9  | 12 | Defining performance indicators to evaluate the results of the integrated care delivered                  |
| 2.50  | 0.63 | 12   | 13 | Providing feedback to care partners on transfers  |
| 2.44  | 0.67 | 15   | 55 | Gathering client-related performance data (health status, quality of life)                                |
| 2.42  | 0.50 | 19   | 53 | Gathering data on client logistics (e.g. volumes, waiting periods and throughput times) in the care chain |
| 2.41  | 0.76 | 20   | 31 | Using feedback and reminders by professionals for improving care  |
| 2.40  | 0.62 | 23   | 82 | Reaching agreements about the uniform use of performance indicators in the care chain                     |
| 2.39  | 0.56 | 24   | 24 | Monitoring successes and results during the development of the integrated care chain                      |
| 2.33  | 0.60 | 31   | 31 | Establishing quality targets for the performance of the whole care chain                                  |
| 2.32  | 0.48 | 32   | 32 | Monitoring and analysing mistakes/near-mistakes in the care chain   |
| 2.27  | 0.59 | 38   | 38 | Using a systematic procedure for the evaluation of agreements, approaches and results                     |
| 2.25  | 0.63 | 42   | 42 | Monitoring client judgements and satisfaction for the whole care chain                                    |

(continued)

Table 3 Continued

| PS   | SD   | Rank  | Nr | Element description   |
|--|------|---|----|---|
| 2.23   | 0.72 | 45  | 45 | Gathering financial performance data for the care chain   |
| 2.19   | 0.65 | 48  | 48 | Making transparent the effects of the collaboration on the production of the care partners                |
| 2.19   | 0.65 | 50  | 50 | Monitoring whether the care delivered corresponds with evidence-based guidelines                          |
| 2.18   | 0.58 | 53  | 53 | Establishing quality targets for the performance of care partners   |
| 1.98   | 0.63 | 81  | 81 | Installing improvement teams at care-chain level  |
| <hr/>  |      |   |    |   |
| Cluster description  |      | Measurement and analyses of the results of the care delivered in the care chain is the central theme of this cluster. Elements address performance targets at all levels, monitored by the standardized use of indicators. Indicators address client outcomes, client judgments, organizational outcomes and financial performance data. (Near) mistake analysis, feedback mechanisms and improvement teams are used to improve and manage the level of performance |    |   |
| <i>Cluster 4. Quality care, five elements, average PS 2.43, SD 0.20</i>                |      |   |    |   |
| 2.65   | 0.49 | 5   | 76 | Systematically assessing the needs of the clients in the care chain                                       |
| 2.55   | 0.57 | 8   | 11 | Developing a multi-disciplinary care pathway  |
| 2.43   | 0.57 | 16  | 45 | Involving client representatives in improvement projects in the care chain                                |
| 2.40   | 0.62 | 21  | 8  | Using evidence-based guidelines and standards   |
| 2.12   | 0.60 | 64  | 60 | Involving client representatives by monitoring the performance of the care chain                          |
| <hr/>  |      |   |    |   |
| Cluster description  |      | This cluster contains elements that focus on the design of a multi-disciplinary care pathway throughout the care chain, based on evidence-based guidelines and standards and clients' needs and preferences. A needs assessment of the specific client group is required for this purpose, combined with the involvement of client representatives in designing, improving and monitoring the integrated care   |    |   |
| <i>Cluster 5. Result-focused learning, 12 elements, average PS 2.16, SD 0.13</i>       |      |   |    |   |
| 2.37   | 0.62 | 26  | 46 | Stimulating a learning culture and continuous improvement in the care chain                               |
| 2.27   | 0.73 | 37  | 38 | Defining and assessing the characteristics of the collaboratively delivered care                          |
| 2.26   | 0.77 | 41  | 57 | Making transparent the benefits of the collaboration for each care-chain partner                          |
| 2.23   | 0.76 | 44  | 16 | Collaboratively assessing bottlenecks and gaps in care  |
| 2.17   | 0.70 | 55  | 83 | Sharing knowledge among care partners about effectively organizing sustainable integrated care            |
| 2.16   | 0.69 | 58  | 71 | Striving towards an open culture for discussing possible improvements for care partners                   |
| 2.14   | 0.73 | 60  | 66 | Learning by the exchange of information among professionals about the care process                        |
| 2.13   | 0.62 | 61  | 72 | Integrating incentives for rewarding the achievement of quality targets                                   |
| 2.11   | 0.85 | 65  | 52 | Using knowledge and information for directing and co-ordinating the care chain                            |
| 2.11   | 0.50 | 66  | 88 | Using collaborative education programmes and learning environments for the professionals of care partners |
| 2.03   | 0.55 | 79  | 58 | Linking consequences to the achievement of agreed goals   |
| 1.88   | 0.47 | 88  | 70 | Collaborative learning in the care chain in order to innovate integrated care                             |
| <hr/>  |      |   |    |   |
| Cluster description  |      | A learning climate of striving towards continuously improved results in the care chain is this clusters central theme. The elements address essential ingredients for improvement: defining goals for collaboration, identifying bottlenecks and gaps in care, and ways of learning and exchanging knowledge in an open atmosphere. Incentives are used to reward improved performance  |    |   |
| <i>Cluster 6. Interprofessional teamwork, three elements, average PS 2.30, SD 0.29</i> |      |   |    |   |
| 2.61   | 0.50 | 6   | 42 | Defining the targeted client group  |
| 2.26   | 0.73 | 39  | 18 | Working in multi-disciplinary teams   |
| 2.04   | 0.80 | 76  | 28 | Reaching agreements on the availability and accessibility of professionals                                |
| <hr/>  |      |   |    |   |
| Cluster description  |      | This cluster represents interprofessional teamwork for a well-described client group. The defined client group is the target to be reached by collaborating professionals, working in well-organized multi-disciplinary teams in the care chain   |    |   |

(continued)

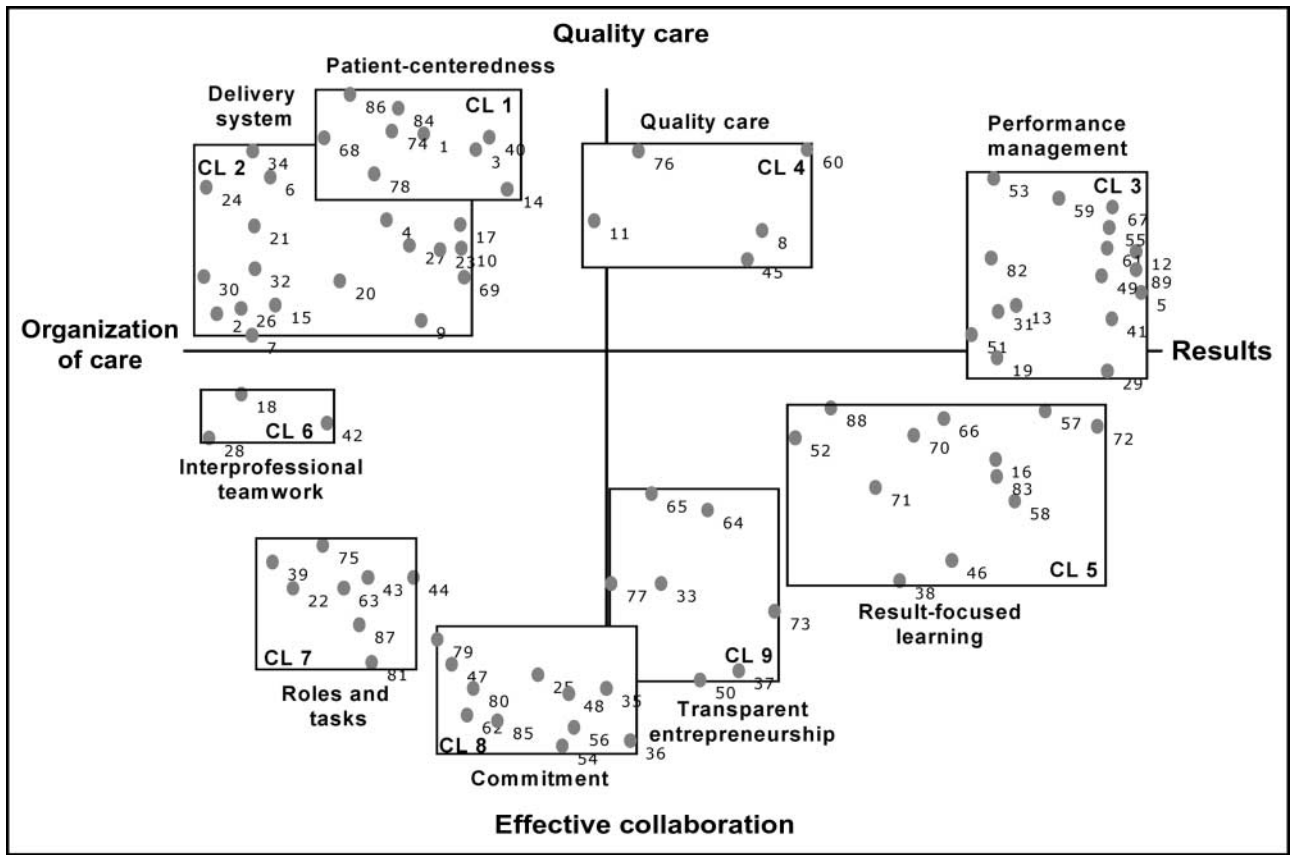
Table 3 Continued

| PS   | SD   | Rank  | Nr | Element description  |
|--|------|---|----|--|
| <i>Cluster 7. Roles and tasks, eight elements, average PS 2.26, SD 0.20</i>              |      |   |    |  |
| 2.55   | 0.57 | 10  | 22 | Reaching agreements among care partners on tasks, responsibilities and authorizations                      |
| 2.55   | 0.57 | 11  | 63 | Achieving adjustments among care partners by means of direct contact                                       |
| 2.36   | 0.61 | 29  | 44 | Ensuring that professionals in the care chain are informed of each other's expertise and tasks             |
| 2.20   | 0.79 | 46  | 87 | Installing a co-ordinator working at chain-care level  |
| 2.18   | 0.58 | 52  | 39 | Establishing the roles and tasks of multi-disciplinary team members  |
| 2.13   | 0.67 | 62  | 75 | Realizing direct contact among professionals in the care chain   |
| 2.07   | 0.63 | 72  | 81 | Reaching agreements on introducing and integrating new partners in the care chain                          |
| 2.05   | 0.75 | 75  | 43 | Directing the care chain by appointing a limited number of persons with co-ordinating tasks                |
| <hr/>  |      |   |    |  |
| Cluster description  |      | The need for clarity about each other's expertise, roles and tasks in the care chain is reflected in this cluster. Effective collaboration at all levels, with new partners and by allocating co-ordinating roles are the main components   |    |  |
| <i>Cluster 8. Commitment, 11 elements, average PS 2.20, SD 0.18</i>                      |      |   |    |  |
| 2.49   | 0.63 | 13  | 35 | Defining the ambitions and aims of the collaboration in the care chain                                     |
| 2.43   | 0.57 | 17  | 47 | Signing collaboration agreements among care partners   |
| 2.40   | 0.62 | 22  | 54 | Assuring the leadership commitment of the partners involved to the care chain                              |
| 2.29   | 0.53 | 36  | 79 | Describing the tasks and authorities of leaders, co-ordinators and advisory boards in the care chain       |
| 2.19   | 0.82 | 49  | 56 | Establishing dependencies among care partners  |
| 2.17   | 0.86 | 54  | 36 | Guiding the care chain by emphasizing a collaborative commitment   |
| 2.16   | 0.73 | 56  | 62 | Structural meetings of leaders of care-chain organizations   |
| 2.08   | 0.79 | 68  | 85 | Reaching agreements about letting go care partner domains  |
| 2.07   | 0.68 | 70  | 25 | Stimulating trust among care partners  |
| 2.04   | 0.80 | 77  | 48 | Stimulating the awareness of working in a care chain   |
| 1.91   | 0.60 | 87  | 80 | Structural meetings with external parties such as insurers, local governments and inspectorates            |
| <hr/>  |      |   |    |  |
| Cluster description  |      | This cluster's focus is on collaborative commitment and ambition in the care chain. Commitment towards clearly defined goals and a collaborative ambition, apart from awareness of dependencies and domains. The commitment of leaders to the care chain and the awareness of working in a care chain are also components |    |  |
| <i>Cluster 9. Transparent entrepreneurship, seven elements, average PS 2.22, SD 0.19</i> |      |   |    |  |
| 2.59   | 0.62 | 7   | 50 | Making commitment to a joint responsibility for the final goals and results to be achieved                 |
| 2.36   | 0.61 | 28  | 33 | Using a uniform language in the care chain   |
| 2.19   | 0.65 | 51  | 65 | Reaching agreements on the financial budget for integrated care  |
| 2.16   | 0.64 | 57  | 64 | Allocating financial budgets for the implementation and maintenance of integrated care                     |
| 2.14   | 0.78 | 59  | 37 | Involving leaders in improvement efforts in the care chain   |
| 2.07   | 0.68 | 71  | 73 | Creating an open environment that encourages experiments and pilot projects                                |
| 2.04   | 0.80 | 78  | 77 | Offering a single collaborative financial contract to financing parties by the collective of care Partners |
| <hr/>  |      |   |    |  |
| Cluster description  |      | This cluster concentrates on space for innovation (experiments), leadership responsibilities for performance achievement and joint financial agreements covering the integrated care. Preconditions for entrepreneurship, including financial preconditions, are represented in the collection of elements                |    |  |

Per element average group priority score (PS), standard deviation (SD) and rank number (within 89 elements) are presented. Nr refers to the original element number which corresponds to Fig. 1.

less specific than related existing ones or were addressed as 'softer' subjects such as cultural aspects (e.g. developing an own integrated care culture with shared values).

The study has some limitations. One limitation is that the nature of the literature study and the use of expert knowledge cannot fully guarantee that no elements are



**Figure 1** Conceptual representation: integrated point and cluster map

missed. The expert panel included leading experts with wide and also international experience, which contributed to a broad range of aspects of the complex topic. Furthermore, the convergence of opinion, necessary to assess whether a Delphi study is 'complete', was satisfactory. To take into account that the experts may have been influenced by the prepared list of elements, they were allowed to submit new elements in every round. Another limitation for the external validity is the use of a national expert panel. Contextual factors such as the type of health care system, social values, health reform, the history of quality and the language and politics of quality would have influenced the results [40].

### Comparison with other quality management models

Our model exhibits interesting similarities with the EFQM and the CCM, although both models were developed in different contexts and use different methods. In our view, the 'Processes' and 'Personnel' clusters of the EFQM and the 'Delivery system design' and 'Clinical information systems' clusters of the CCM overlap with our 'Delivery system', 'Interprofessional teamwork' and 'Roles and tasks' clusters. In addition all the three models pay attention to results, whereas the EFQM defines four result areas and the

CCM (improved outcomes) and our model (performance management) define one cluster with several outcome categories. Somewhat different is our cluster 'Result-focused learning', whereas 'Learning and innovation' is included in the EFQM, it is not a cluster. The CCM names 'Productive interactions', but this is in between a 'Prepared proactive care team' and 'Informed and activated patients'. The stronger focus on development and learning in our model could reflect the continuous development of many integrated care programmes nowadays [3, 28]. Another difference concerns 'Transparent entrepreneurship', a cluster concerning the balance between competition and co-operation in health care and the need for entrepreneurship and innovation. This is not explicitly included in either the EFQM or the CCM; the description of the Regional Framework of the CCM does however touch upon this issue [41]. Further differences are seen in a stronger focus on effective collaboration (commitment, roles and tasks) and conditions for integrated care.

### Practical and research implications

The dedication of the experts during the study and the response rates of 100% can be seen as an indication of the study's relevance. Firstly, this refers to a practical relevance. The clusters and elements of the concept map can be used as an evaluation framework to assess integrated care

practices. As such the model may serve as a management tool to identify which elements are present, and where and how these practices can be improved.

Secondly, this study contributes to theory building. The study adds value because it generates a conceptual model of an important and complex concept, by identifying elements of it and bringing them together in clusters. The Delphi study and Concept Mapping methods suit the explorative research questions. A recommendation for further research is to conduct more empirical studies to validate the model in real practice. The external validity could be improved by replication of the study in other countries and healthcare systems. A second recommendation is to add additional perspectives, for instance by involving patient representatives. Thirdly, additional research is recommended into the development process of integrated care. Many countries struggle with the same issues when it comes to developing integrated care arrangements [8, 21]. The literature on integrated care and quality management models such as the Dutch version of EFQM and CCM describes phases of development. More research is needed to explore these phases of development further in order to add these to the model developed in this study.

## Conclusion

The goal of our study was to develop a basis for a quality management model for integrated care. Based on 89 elements which were developed in a literature and Delphi study with 31 experts, a nine-cluster model was created by using Concept Mapping. The nine clusters are 'Patient-centeredness', 'Delivery system', 'Performance management', 'Quality care', 'Result-focused learning', 'Interprofessional teamwork', 'Roles and tasks', 'Commitment' and 'Transparent entrepreneurship'. These have been located on a map with the poles of 'Effective collaboration', 'Organization of care', 'Quality care' and 'Results'. Compared with other frequently used quality management models there is some overlap, but features of integrated care such as effective co-operation and commitment get more emphasis in our model, whereas the internal validity of the model is believed to be sufficient, the external validity needs to be confirmed by replication and empirical validation.

The cluster map is the empirical basis for the quality management model and covers a broad range of aspects of integrated care. The model has the potential to serve evaluation and improvement purposes in integrated care practice. This study also contributes to theory building on integrated care by analysing this complex concept in elements and bringing them together in clusters by experts. For the last 20 years, integrated care has emerged as an internationally important topic. The continuous improvement of integrated care is a challenge of vital importance. This study is a step towards a systematic approach to do so and it is an invitation to others to increase knowledge on improving the quality of integrated care.

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