

Volume 14, 25 September 2014

Publisher: Igitur publishing

URL: <http://www.ijic.org>

Cite this as: Int J Integr Care 2014; Jul-Sep; URN:NBN:NL:UI:10-1-114794

Copyright: 

Submitted: 4 July 2013, revised 4 September 2014, accepted 9 September 2014

Research and Theory

Instruments to assess integrated care: a systematic review

Anne Marie Lyngsø, Cand.Scient.Soc., PhD Student, Department of Integrated Healthcare, Bispebjerg University Hospital, Bispebjerg Bakke 23, DK-2400 Copenhagen, Denmark

Nina Skavlan Godtfredsen, MD, PhD, Department of Respiratory Medicine, Hvidovre University Hospital, Kettegaard Allé 30, DK-2650 Hvidovre, Denmark

Dorte Høst, PT, MPH, Department of Integrated Healthcare, Bispebjerg University Hospital, Bispebjerg Bakke 23, DK-2400 Copenhagen, Denmark

Anne Frølich, MD, PhD, Department of Integrated Healthcare, Bispebjerg University Hospital, Bispebjerg Bakke 23, DK-2400 Copenhagen, Denmark

Correspondence to: Anne Marie Lyngsø, Cand.Scient.Soc., PhD Student, Department of Integrated Healthcare, Bispebjerg University Hospital, Bispebjerg Bakke 23, DK-2400, Copenhagen, Denmark, Tel: +45 3531 6055, E-mail: Anne.Marie.Lyngsoe@regionh.dk

Abstract

Introduction: Although several measurement instruments have been developed to measure the level of integrated health care delivery, no standardised, validated instrument exists covering all aspects of integrated care. The purpose of this review is to identify the instruments concerning how to measure the level of integration across health-care sectors and to assess and evaluate the organisational elements within the instruments identified.

Methods: An extensive, systematic literature review in PubMed, CINAHL, PsycINFO, Cochrane Library, Web of Science for the years 1980–2011. Selected abstracts were independently reviewed by two investigators.

Results: We identified 23 measurement instruments and, within these, eight organisational elements were found. No measurement instrument covered all organisational elements, but almost all studies include well-defined structural and process aspects and six include cultural aspects; 14 explicitly stated using a theoretical framework.

Conclusion and discussion: This review did not identify any measurement instrument covering all aspects of integrated care. Further, a lack of uniform use of the eight organisational elements across the studies was prevalent. It is uncertain whether development of a single 'all-inclusive' model for assessing integrated care is desirable. We emphasise the continuing need for validated instruments embedded in theoretical contexts.

Keywords

integrated care, systematic literature review, measurement instruments, organisational elements

Introduction

Integrated care has been on the health-care agenda since the 1970s. During the past two decades, there has been a rapidly growing interest in how to develop

better and more cost-effective health systems focusing on its impact [1]. This increasing focus on integrated care as a means of improving the performance of health systems is widespread in Europe, North America and other parts of the world [2]. In essence,

integrated care can be seen as a demand-driven response to what generally ails modern-day health care [3,4].

The proportion of elderly persons above 65 years of age is increasing in Western countries, and the demographic trend seems set to continue. This is coupled with an increase in the proportion of individuals with one or more chronic conditions, and, accordingly, the delivery of appropriate care for these persons requires a paradigm shift from episodic, short-term interventions, characteristic of acute conditions, to long-term, comprehensive care. Those with chronic conditions often require complex and continuous interventions spanning professions, sectors and political levels [3,5,6].

The need for integrated care contrasts strongly with the accelerating specialisation and division of labour within the health-care system predominantly arising from medical development. This development necessitates health-care personnel acquiring more in-depth medical knowledge, usually at the cost of knowledge of closely related specialities. Despite specialisation having several advantages, including better and safer job performance, it also has disadvantages. First, organisational fragmentation complicates the management of organisational units. Second, professionalisation combined with decentralisation reinforces a cultural fragmentation that preserves ‘tribal values’, making it difficult to develop and share common values among the health-care personnel. Consequently, optimal collaboration and coordination between professionals and sectors in delivering integrated care have become key in providing high-quality care. To guide the further implementation of integrated care models, there is an urgent need for evaluations that can help assess whether the proposed models support integration and high-quality care. While such evaluations are important for practitioners and researchers, they are crucial for the managers charged with the process of implementing and sustaining integrated care [7,8].

Different measurement instruments have been developed to measure the level of integration of diverse forms of services and networks within the health-care system [8,9]. To support development of evidence in the area of integrated care, systematic literature reviews are central for various reasons. First, knowledge of existing instruments can avoid new ones being developed, particularly if a measurement instrument exists that can be transferred and adapted to new settings. Second, if new instruments must be developed, it is essential to obtain input about what these should or should not contain and how they should appear. Finally, there is mounting evidence of the potential of systematic reviews to serve as tools for evidence-

based decision making for health planners and policy-makers [10].

A systematic literature review of health science – and business databases up until January 2007 revealed a substantial lack of high-quality studies and standardised instruments to evaluate integration outcomes [11]. Further, despite numerous papers on the subject, no universal definition or concept of integration was found. Another recent review performed a literature search up until April 2008 revealing 24 different measurement instruments of integrated care in 24 published articles [12]. The authors suggest various measurement criteria to guide future research and highlight the importance of validating and simplifying the existing instruments. Moreover, it is central that a measurement instrument cover the most important organisational elements supporting integrated care in chronic conditions. However, to our knowledge, no previous review has analysed the influence of the organisational elements in the conceptualisation of integrated care. Accordingly, to support the review process, we searched for evidence on important organisational elements.

Purpose

The purpose of this systematic review is to identify studies on currently available instruments to measure the level of integrated care across health-care sectors.

The following research questions were set up for the review:

1. Which measurement instruments exist for measuring the level of integrated care across health-care sectors?
2. What organisational elements are most commonly included in the published measurement instruments?
3. How do the identified organisational elements correlate with those stated as important for creating integrated care elsewhere in the literature?
4. What are the similarities and differences of the published measurement instruments?

Conceptual framework

Despite the interest in integrated care, conceptual diversity within the field is vast and is a barrier to understanding and creating integrated care, both in theory and in practice, and to monitoring the processes of integration [13]. In this review, the definition of integrated care stated by Kodner and Spreeuwenberg [1] is used: ‘Integration is a coherent set of methods and models on the funding, administrative, organisational, service delivery and clinical levels designed to create connectivity, alignment and collaboration within and between the cure and care sectors. The goal of these methods and models is to enhance quality of care

and quality of life, consumer satisfaction and system efficiency for patients with complex, long-term problems cutting across multiple services, providers and settings. The result of such multi-pronged efforts to promote integration for the benefit of these special patients groups is integrated care' [1]. Even today, the knowledge of the factors affecting integrated care is incomplete, making it difficult to state what actually creates integrated care and, hence, how best to monitor the processes of care and with which indicators [13]. As highlighted in the definition above, this review builds on the idea that integrated care is not only created by the presence of a single mechanism but by the combination of numerous integrated activities operating at different levels. This belief is consistent with an early consensus in the integration literature, stating that a comprehensive measurement approach needs to consider multiple dimensions, components and perspectives on integrated care [9].

As highlighted in the aforementioned definition of integrated care, integration is a means to improve the quality of health services (in relation to quality of care and quality of life). With this in mind, Donabedian's framework on quality of medical care was used in the further selection process of measurement instruments. The framework is divided into the following aspects: structure, process and outcome; with the first two dimensions considered as main features of integration [3,14]. The outcome of medical care, expressed in terms of hospital readmission rates, functional status level and survival rates, has been frequently used as an indicator of quality of medical care. In the literature on integrated care, the purpose is often to test whether case management and disease management programmes can lower costs and improve patient outcomes. The aims of these studies are not to integrate the full range of health-care services and measure to what extent this has been done, but to investigate whether these programmes can lower costs and improve patient outcome [15]. For this reason, only instruments measuring structural and process aspects were included in the review. Structure is concerned with such things as the adequacy of facilities and equipment: the qualifications of medical staff and their organisation [14]; process concerns how the work is done: work routines, communication between staff members and user involvement. Care coordination is a way of achieving integration at the micro-level by ensuring that service users experience seamless care. Despite the importance of the perspective, it gives limited insight into the integration of services at both the system and organisational level. In addition to the structure and process, the review included instruments with a cultural perspective that also take into account the meaning of shared beliefs, norms and values [16].

Methods

Inclusion criteria

As underlined above, integrated care is a nested concept inasmuch as it can be defined and analysed from many perspectives. In addition, the strategies used to create integrated care depend on the characteristics of the patient group and the specific challenges patients face in obtaining appropriate, quality care. In this review, the focus was on measurement instruments directed towards individuals with an ongoing treatment need.

Thus for review inclusion, the respondent group had to be persons working within the health-care system, either holding an administrative position or being part of the front-line staff.

Articles analysing only patients' perceptions of coordination were not included.

For review inclusion, each article had to meet the following inclusion criteria:

- Include a measurement instrument measuring the level of integration across health-care sectors (articles focusing on only collaboration within health – and social-care sectors, such as primary care, hospitals or community-based services, were excluded).
- Include a measurement instrument focusing on the combination of numerous integrating activities (articles focusing on only the presence and use of clinical guidelines were excluded).
- Include an instrument measuring structural, process and/or cultural aspects of integrated care.
- Include a measurement instrument focusing on the organisation of the treatment of individuals with an ongoing treatment need.
- Include a measurement instrument with a respondent group consisting of persons working within the health-care system either holding an administrative position or being part of the front-line staff.

Search strategy

The health science literature (PubMed, CINAHL, PsycINFO, Cochrane Library and Web of Science) for the years 1980–2011 was searched for relevant articles. In addition, personal emails were sent to experts in the field in search of additional articles or reports. Publications written in English, Danish, Swedish and Norwegian were included. Articles written in other languages would have been included if an English abstract existed. To identify relevant search terms, systematic reviews and other articles on integrated care were searched [1–3,8,9,11]. The use and combination of words and Medical Subject Headings terms for PubMed are shown below. A similar search strategy

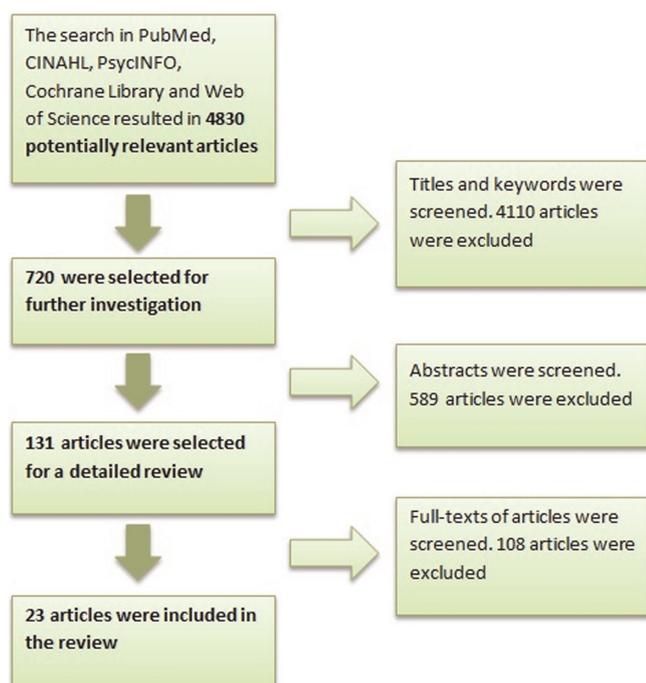


Figure 1. The review process.

was used for all databases. All search strategies and databases were developed and searched together with a medical research librarian.

The review process

From the five databases, 5123 articles were identified; with 4830 when duplicates were removed. After reviewing the titles, 720 abstracts were reviewed by the investigator and a coinvestigator; from those abstracts, 131 articles were selected for full review (Figure 1).

Results

Shared features and differences

The inclusion criteria were met by 23 articles. To systematise our findings, we extracted details from each article using a set of criteria outlined from the literature [17,18]. We considered a criterion fulfilled if it was explicitly stated in the article.

Table 1 covers reference [19–41] and includes name of first author and year of publication, research objective, construct of interest, type of measurement instrument, patient group and respondent group.

In general, we found no unified or commonly agreed-upon measurement instrument (Table 1). Instead, the diversity of approaches to measure integration across health-care sectors was wide for most of the analysed criteria. When looking at the criterion *construct of interest*, it becomes clear how complex it is and how many

different aspects and levels it includes. Thus, functional, clinical and system integration are all being measured in the instruments identified.

The methods used to measure integration varied widely between questionnaire survey data, inpatient data/clinical files analysis and different qualitative methods such as interviews, observations and workshops. However, the combination of methods is that most widely used.

For the patient group, there is a difference in the identified instruments regarding level of specification. Some instruments have only patients with a specific disease as target population, whereas others incorporate a number of hospitals or organised delivery systems. This is important to bear in mind when discussing the possibilities of transferring and adapting the instruments to new settings.

In line with the inclusion criteria, the respondent groups also vary and include policy-makers, system and operating unit managers, administrators, physicians/front-line staff and representatives or coordinators from each service within the different sectors.

Table 2 shows a further analysis of the identified measurement and includes defined construct; theoretical framework; defined level of analysis; and structural, process and cultural aspects. These criteria are derived from Strandberg-Larsen et al. 2009 [12].

The multi-dimensionality in the construct of interest from Table 1 underlines the need for a clear definition of the construct being measured within each article and the presence of a theoretical framework. As shown in Table 2, almost all the measurement instruments have defined the construct being measured, but only 15 articles have explicitly described the use of a theoretical framework. The level of analysis is stated in all articles. When looking at the different aspects measured, most studies include both structural and process aspects, whereas the inclusion of cultural aspects was present in only 7 of the 23 measurement instruments. Overall, only four instruments described all six criteria defined as central for a measurement instrument [23,26].

Organisational elements

In relation to the second aim of this review, we identified eight different organisational elements within the 23 measurement instruments. Table 3 shows each of the organisational elements in the left column and presents a further description of their content in the right column. When compared with other reviews in the field of integrated care, the elements are very similar.

To further analyse the use of each element, all articles were screened. Table 4 shows which elements are

Table 1. Measurement instruments published in scientific journals for measurement of integrated health care or related concepts

References	Research objective	Construct of interest	Type of measurement instrument	Patient group	Respondent group
Ahgren and Axelsson [19]	To describe the conceptualisation and validation of a practical model for measurement, which can be used by managers to implement and sustain integrated care	Functional aspects of clinical integration	Questionnaire – data on integration were collected in self-assessment forms	Local Health Care: diseases of frequent occurrence, which means that they are dealing with large but relatively few patient groups	The managers of the different health care centres
Brazil et al. [20]	To present an evaluative framework for defining and measuring service co-ordination; identify gaps in and challenges to the co-ordination of a SCC (Supportive Cancer Care) system	Service co-ordination	Mixed methods research approach; mailed questionnaire, face-to-face structured interviews	Cancer patients	Regional cancer centre administrators, administrators and front-line staff of community-based supportive care services, physicians and supportive care network co-ordinators and health planners
Browne et al. [21]	To introduce a new measure of human service integration that quantifies the extent, scope and depth of the effort. It identifies which sectors, services or agencies are connected and collaborating well with each other and which sectors and/or agencies in the network could enhance their collaborative efforts	Intra- and inter-sectorial service integration	Telephone interview, web-form, in-person, or during workshops	Families and young children (Networks of services involved in promoting Healthy Babies and Healthy Children)	Representatives or coordinators from each service from each sector
Burns et al. [22]	To investigate the degree to which the processes of integrating physicians and hospitals are closely linked to the structure and context of integrated delivery system; three emergent processes of integrating: right sizing the physician panel in an integrated delivery system, physician compensation and incentive systems, and physician leadership development programmes	Structural integration and integrative processes	Qualitative interviews	99 hospitals	Hospital executives
Devers et al. [23]	To develop measures of three types of integration that occur in vertically integrated health systems	Functional integration, physician system integration, clinical integration (focuses on intermediate outcome or process measures)	Questionnaire	9 organised delivery systems	Appropriate personnel in the system and operating unit offices

Continues

Table 1. (Continued)

References	Research objective	Construct of interest	Type of measurement instrument	Patient group	Respondent group
Dobrow et al. [24]	To develop a measure of cancer services integration (CSI) that can inform clinical and administrative decision makers in their efforts to monitor and improve cancer system performance	Service integration	Review, key-informant interviews, focus-groups, questionnaire	Patients receiving different cancer services	Cancer system leaders, cancer care system clinicians, administrators
Fletcher [25]	To develop a method for measuring the integration of care for patients visiting a setting involving multiple providers	Continuity, coordination and integrated care (intra-organisational integration)	Medical record	The patients included were among those seen in the Department of Medicine's Polyclinic Practice, where patients receive both ongoing care and consultations, usually for multiple, relatively complicated medical problems	Medical record
Gillies et al. [26]	To measure perceived levels of clinical integration, physician system integration and functional integration along with the perceived effectiveness of these activities	Integration, functional integration, physician system integration, clinical integration	Questionnaire	9 health care systems participating in the Health Systems Integration Study (HSIS)	System and operating unit managers
Gulmans et al. [27]	Develop an evaluation approach that takes into account the multiple communication links and evaluation perspectives inherent to integrated care settings	Patient care communication	Patient questionnaire, in-depth interviews with patients, focus group meetings with professionals	Used the integrated care setting of cerebral palsy as an illustration	Patients and health care professionals
Hébert et al. [29]	To develop a method to measure the implementation of specific components of an Integrated Service Delivery system for the frail elderly	Implementation of Integrated Service Delivery System	Interviews, focus groups, surveys, documentation analysis, participating observation, management data monitoring and clinical files analysis	People who meet the following criteria: over 65 years old, present with moderate to severe disabilities, show good potential for staying at home, need two or more health care or social services	Policy-makers, managers and clinicians as well as clients and informal caregivers
Henrard et al. [28]	To build a service delivery integration index based on organisational structure and process-centred features of home care supply and to study its validity and to apply it to home care services of several European cities	Service delivery integration; structural organisational integration and process-centred integration	Data from the "the Aged in Home care" ad-hoc study, questionnaire, client data	Older persons receiving home care	Persons of the 11 countries in charge of the programme
Lukas et al. [30]	To provide a conceptual model for understanding how organisations move from short-term performance improvements to sustained,	Integration structures	Semi-structured interviews, document analysis; strategic plans, improvement team work plans, team and organisational	12 health care systems	Managers, clinical front-line staff and general staff

Continues

Table 1. (Continued)

References	Research objective	Construct of interest	Type of measurement instrument	Patient group	Respondent group
Mares et al. [31]	organisation-wide patient care improvements To measure the integration of services	Service integration – in the study data are presented on three client-level measures of service integration, and two measures of system-level integration	performance measures, and communication materials Interviews and data from the national performance outcome evaluation of the HUD/HHSVA	Chronically homeless adults	Clients (chronically homeless adults), key informants
Minkman et al. [32]	To assemble knowledge on elements of integrated care and to construct a generic quality management model for integrated care – the model has the potential to serve evaluation and improvement purposes in integrated care practice	Integrated care	Literature study, Delphi methodology (expert judgements and comparison of the judgements in several rounds) and concept mapping	No specific patient group – the study generates a conceptual model	Experts within the field
Minkman et al. [33]	To explore how local integrated care services are developed in the Netherlands, and to conceptualise and operationalise a development model of integrated care	Integrated care	Literature study, Delphi methodology (expert judgements and comparison of the judgements in several rounds), concept mapping + a questionnaire	No specific patient group	Experts within the field
Morrissey et al. [34]	To assess levels of systems integration (to characterise the integration or “connectedness” of service delivery arrangements and to identify areas where coordination may be improved, and, ultimately to assess the effectiveness of alternative delivery models	System performance and integration	Structured interviews	Homeless persons with serious mental illness	Agency directors, programme directors, clinicians, administrators or other staff
Morrissey et al. [35]	To evaluate if implementation of system-change strategies lead to better integration of service systems	System integration and project centred integration	Structured observations, interviews	Homeless persons with serious mental illness	Agency directors or chief executive officers, programme directors, case managers or outreach workers, therapists or mental health professionals, administrators or other staff
Newhouse et al. [36]	To examine the level of service integration within Maryland hospitals and service differentiation across the hospital system or	Service integration and service differentiation	Inpatient data and organisational responses to the American Hospital Association Annual Survey for 1998	Patients discharged from Maryland Hospitals with a diagnosis that grouped to DRG 127 (heart failure)	Extracted data

Continues

Table 1. (Continued)

References	Research objective	Construct of interest	Type of measurement instrument	Patient group	Respondent group
	network and its effect on heart failure patient clinical and economic outcomes				
Pirkis et al. [37]	To illustrate a conceptual framework for developing, implementing and evaluating programmes concerned with linkages	Collaboration	Interviews, workshops, review of programme documentation, examination of complaints/incidents databases	People with mental illness	Steering committee and Partnership Project personnel
Reilly et al. [38]	To measure the degree of integration of health and social service provision, as well as inter-professional team working; (1) to capture the extent to which Old Age Psychiatry Services in Northern Ireland are more integrated than those in England, (2) to test whether jointly administered social and health services are more likely to promote collaborative and multi-disciplinary working and (3) to explore what factors contribute to more integrated practices	Operational integration	Self-administered postal structured questionnaire	People receiving old age mental health services	Consultants responsible for old age mental health services in England and Northern Ireland
Siotte et al. [39]	To measure the achieved intensity of inter-professional collaboration among Quebec CHCCs and to identify the organisational and professional factors fostering or limiting interdisciplinary collaboration CHCC (community health care centres)	Inter-professional collaboration	Postal survey: questionnaire	People within the CHCC in Quebec (the Elderly Home Care Programme, the Youth and Family Care Programme, the Ambulatory Walk-in Clinic Programme, and the Specialised Adult Care Programme)	Programme coordinators
Strandberg-Larsen et al. [40]	To compare primary care clinicians' perceptions of clinical integration and three sub-aspects in two health care systems and to examine the association between specific organisational factors and clinical integration within each system	Clinical integration	Questionnaire	People receiving primary care	Primary care clinicians
Suter et al. [41]	To determine the performance of the SCHC (South Calgary Health Centre) and to establish the value of the evaluation framework used in measuring organisational performance of an integrated service delivery model	Functional integration, clinical integration and community integration	Interviews, document review, questionnaire, referral tracking	People within the South Calgary Health Centre in Canada	Planners, decision-makers, managers, staff, clients, community members

Table 2. Overview of the criteria met for each of the identified measurement instruments

References	Defined construct	Theoretical framework	Defined level of analysis	Structural aspects	Process aspects	Cultural aspects
Ahgren and Axelsson [19]	✓	✓	✓	✓	✓	
Brazil et al. [20]	✓	✓	✓	✓	✓	
Browne et al. [21]	✓	✓	✓	✓		
Burns et al. [22]		✓	✓	✓	✓	
Devers et al. [23]	✓	✓	✓	✓	✓	✓
Dobrow et al. [24]	✓	✓	✓	✓	✓	✓
Fletcher [25]	✓		✓	✓		
Gillies et al. [26]	✓	✓	✓	✓	✓	✓
Gulmans et al. [27]	✓		✓		✓	
Hébert et al. [29]	✓	✓	✓		✓	
Henrard et al. [28]	✓	✓	✓	✓	✓	
Lukas et al. [30]		✓	✓	✓	✓	✓
Mares et al. [31]	✓		✓	✓	✓	✓
Minkman et al. [32]	✓		✓	✓	✓	✓
Minkman et al. [33]	✓		✓	✓	✓	
Morrissey et al. [34]	✓		✓	✓	✓	
Morrissey et al. [35]	✓		✓	✓	✓	
Newhouse et al. [36]	✓	✓	✓	✓		
Pirkis et al. [37]		✓	✓	✓	✓	
Reilly et al. [38]	✓		✓	✓	✓	
Sicotte et al. [39]	✓	✓	✓	✓	✓	✓
Strandberg-Larsen et al. [40]	✓	✓	✓	✓	✓	
Suter et al. [41]		✓	✓	✓	✓	

The four instruments meeting all criteria are highlighted in the table.

captured in each measurement instrument identified and also provides an overview of which elements are measured the most often. Most instruments contain items covering three or fewer of the organisational elements; however, a few capture six or more. The three elements used the most are IT/information transfer, commitment and incentives, and clinical care, covering such things as teams of multidisciplinary professionals, case management and clinical guidelines.

Discussion

This review identified 23 measurement instruments that aimed to fulfil the crucial role of measuring the impact of integrated care models focusing on the level of integration based on central organisational elements. Apart from identifying the measurement instruments available, the purpose of the review was to elucidate the organisational elements that most commonly appear and that are measured within the

published instruments. As in other evidence-based literature overviews in this expanding research field, it was not possible to identify a uniform instrument measuring integrated health care across different delivery systems.

The identified measurement instruments

The number of instruments identified in this review may seem low considering the growing, widespread enthusiasm for integration and focus on measuring health system performance. The review by Strandberg-Larsen et al. found 24 instruments using a slightly different search strategy, which included grey-zone literature such as academic working papers and ministerial reports [12]. About half the instruments presented in our review are also included in the aforementioned paper. However, due to the inclusion criteria and our focus on the organisational elements, we retrieved

Table 3. Essential organisational elements in building integrated care

IT/information transfer/communication and access to data	<ul style="list-style-type: none"> ● Centralised system-wide computerised patient record system; data accessibility from anywhere in the system ● Efficient information systems that enhance communication and information flow across integrated pathways ● Clear communication strategies and protocols
Organisational culture and leadership	<p>Organisational culture, values and trust</p> <ul style="list-style-type: none"> ● Common goals/shared values and vision ● Trust and respect for other care givers and organisations ● Commitment to coordinating work ● Shared decision-making and problem solving ● Shared risk/responsibility ● An integration culture institutionalised through policies and procedures <p>Leadership</p> <ul style="list-style-type: none"> ● Committed managers who are willing to lead the process ● Committed front-line staff who take ownership
Commitments and incentives to deliver integrated care	<ul style="list-style-type: none"> ● Collaborative involvement in planning, policy development and patient care delivery ● Formal agreements in place between organisations ● Procedures and activities that enable individuals and teams to work together; incentives for performance
Clinical care (teams, case management, clinical guidelines and protocols)	<ul style="list-style-type: none"> ● Teams of multidisciplinary professionals across the service pathway; clearly defined roles and boundaries of each team member; maintenance of professional autonomy ● Professionals in the care chain are informed/aware of each other's expertise and tasks ● Agreements on referrals and transfer of clients through the care chain ● Integrated clinical pathways ● Care and case management ● Existence of evidence-based clinical practice guidelines with automated tools to enforce their use
Education	<ul style="list-style-type: none"> ● Educational opportunities
Financial incentives	<ul style="list-style-type: none"> ● Creating financial and regulatory incentives that encourage cooperation among health care providers ● Pooled resources
Quality improvement/performance measurement	<ul style="list-style-type: none"> ● Commitment to quality of services, evaluation and continuous care improvement ● Structured approach to analysis of issues and how they might be addressed
Patient focus	<ul style="list-style-type: none"> ● Patient-centered philosophy; focusing on patients need ● Patient engagement and participation, i.e. patients provide input on various levels ● Commitment to the view that the patient is the customer ● Population-based needs assessment: focus on defined population

some instruments not previously discussed in reviews. Although the development of new instruments has intensified since 2000, it is still limited, and information related to implementing and evaluating integration-centred initiatives remains a relatively new area in need of further investigation on how best to capture the process of creating integrated care. Many of the identified instruments build on the same theoretical framework, and the question is whether future research will continue to build on these frameworks or develop new ways of approaching the field.

Important elements in creating integrated care

As shown in [Table 1](#), a diverse array of concepts characterises the field and highly affects the content of

the 23 instruments identified. Some organisational elements are more frequently measured across the different instruments than others, but to state which of these is the most important in the process of creating integrated care is still a complicated task. Each element proposed represents a hypothesis that has to be tested empirically. Some of these have already been proven to explain a positive variation in the process of building integrated care, but there remains a lack of evidence regarding which ones weigh higher than others.

The organisational elements of importance to integrated care identified in this review are comparable to those in other reviews in the field. Suter et al. 2009 conducted a review with the aim of summarising the current research literature on health-system integration. It highlighted 10 principles that were frequently and consistently presented as key elements for successful

Table 4. Overview of which organisational elements are measured in each of the identified measurement instruments

References	Organisational elements							
	1	2	3	4	5	6	7	8
Ahgren and Axelsson [19]			✓	✓		✓		
Brazil et al. [20]			✓	✓				
Browne et al. [21]			✓					
Burns et al. [22]		✓			✓	✓		
Devers et al. [23]	✓	✓	✓	✓	✓	✓		✓
Dobrow et al. [24]	✓	✓		✓	✓	✓		
Fletcher [25]				✓				
Gillies et al. [26]	✓	✓	✓	✓	✓			✓
Gulmans et al. [27]	✓						✓	
Hébert et al. [29]	✓			✓			✓	
Henrard et al. [28]				✓				
Lukas et al. [30]	✓	✓	✓					
Mares et al. [31]		✓		✓			✓	
Minkman et al. [32]	✓	✓	✓	✓			✓	✓
Minkman et al. [33]	✓		✓	✓	✓	✓		✓
Morrissey et al. [34]	✓		✓	✓				
Morrissey et al. [35]	✓			✓		✓		
Newhouse et al. ^a [36]								
Pirkis et al. [37]				✓			✓	
Reilly et al. [38]			✓	✓	✓			
Sicotte et al. [39]		✓	✓	✓	✓			
Strandberg-Larsen et al. [40]	✓		✓	✓				
Suter et al. [41]	✓	✓		✓	✓		✓	✓

Organisational elements	
1	IT/information transfer/communication and access
2	Organisational culture and leadership
3	Commitments and incentives to deliver integrated care
4	Clinical care (teams, clinical guidelines and protocols)
5	Education
6	Financial incentives
7	Patient focus
8	Quality improvement/performance measurement

^aIntegration is expressed as “the percent of services available at the hospital level, calculated by dividing the number of services offered by the total available services”. No organisational elements are explicitly stated in the study.

integration in the reviewed literature [10]. Thus, just as Suter and colleagues, we find that the following elements are important for building health-system integration independent of the health-care context or patient

population served: IT/information transfer, organisational culture and leadership, commitments and incentives to deliver integrated care, clinical care (teams, case management, clinical guidelines and protocols), financial incentives, quality improvement/performance measurement and patient focus. Our findings are also in line with Kodner and Spreeuwenberg’s discussion paper on integrated care [1]. In their paper, they state that a continuum of strategies – from the macro to the micro – is available to foster integrated care and address problem areas in five important domains: funding, administrative, organisational, service delivery and clinical [16]. The list of methods and instruments listed under each domain in their article is in keeping with the elements listed in Table 3 in this article. However, this is not surprising since Kodner and Spreeuwenberg’s definition of integrated care was used as a conceptual framework for our study. Considering the conceptual framework used in this review, it is clear that this in itself articulates areas of importance when identifying indicators of performance in relation to integrated care. Though, the definition of integrated care used in this review states that ‘integration is a coherent set of methods and models on the funding, administrative, organisational, service delivery and clinical levels’ and Donabedian’s framework focuses on the importance of ‘structural and process aspects’. Nevertheless, there is a great need for further research in this area. Even though the conceptual understanding of integrated care has developed, the concept remains broad, making it difficult to outline which indicators of performance and/or measures of quality are the most important and valid. As a conclusion, this means that the field of integrated care still holds challenges in supporting implementation and quality improvement because the outcome measures remain difficult to define.

In this review, the three key factors to the implementation of integrated care are IT/information transfer, commitments and incentives to deliver integrated care and clinical care (teams, clinical guidelines and protocols) (Table 4). These three factors were those represented the most strongly in the measurement instruments. In terms of adoption, it can be discussed whether the strong representation means that these factors are more important than the rest of the identified organisational elements in the process of creating integrated care. However, no studies have shown some factors to have a stronger impact than others. The reason that the three factors are included more often than others may be an expression of the fact that these factors are, in general, well implemented. Moreover, these factors may have been implemented more often in the instruments as they may be easier to measure than other elements, such as organisational culture.

In relation to how to measure the eight factors, this is done differently in the identified instruments. In relation to this, the concept of integrated care and its many definitions still play a major role. As long as there is disagreement about what the concept covers, it will be difficult to reach consensus about how to measure each factor and, hence, to assess the quality of an instrument trying to outline the level of integration based on that specific factor. Further, there is no evidence on how the different factors influence each other when they are present in combination with each other.

The importance of the different elements and the opportunity of cross-national replication

Common to the measurement instruments identified is the purpose of measuring more than one element, and in this respect, it is highly relevant to know the importance of each element to actually calculate sum scores that make sense and are useful for further operation. Additionally, the importance of the different elements may well vary depending on the country in which the evaluation is done. A related question is then whether these different instruments can effectively be replicated in the health-care systems of countries other than those where they are developed. Even though the Western countries are facing similar challenges regarding the growing number of persons with one or more chronic conditions, there are significant differences in the way chronic care services are organised, paid for and delivered. Accordingly, even though an instrument in one country has shown to be useful in tracking system progress, setting concrete goals and assessing progress towards them, a new validation is necessary for each instrument applied in a new setting [18].

The inclusiveness of the instruments

It is debatable whether a measurement instrument consisting of several elements is necessarily better than one covering only a limited number of elements. Integrated care is a complex concept with numerous embedded meanings, and building integrated care requires many different procedures at different levels of the system. Taking this into consideration, it seems the most appropriate to use instruments covering virtually all these procedures; nevertheless, being precise and explicit about the purpose and limitations of a certain evaluation is, perhaps, more important. Without this, it becomes problematic to judge whether the choice of measurement instrument actually works within the given context.

Strengths and limitations of the review

The strengths of this systematic literature review include the broad search of all concepts related to the specific construct of integrated care, the identification of organisational elements important for the establishment and evaluation of integrated care and the systematic identification of the organisational elements present in each published instrument.

That the review focused on only literature published in the scientific health-care literature can be a limitation of the study. As Armitage et al. 2009 state, the inclusion of business literature could have proved fruitful [11]. Nevertheless, we found the inclusion criterion of ‘instruments focusing on the organisation of the treatment of people with an ongoing need of treatment’ crucial in the selection of databases as these patient groups often need more advanced integration of services; hence, instruments from the business literature did not seem suitable for this review.

Another limitation to the study is that the review considered integration only within the health-care sector. Thus, it did not focus on the institutional division between health and social care and the central need for integration between these sectors. Moreover, it did not take into account the role of third sector organisations. Many persons with complex needs, long-term conditions and terminal illness need to access different health-care, social care and even housing and other services. The evidence clearly shows that these services can be fragmented, and those who need to rely on them often find that they are difficult to access and that there are inadequate links between them. To focus on only integration within the health-care sector may therefore seem inadequate. However, intra-organisational integration within each sector is in itself a marked achievement and is highly important in the process of creating integrated care between health, social care, public health, other local services and the third sector. A review focusing on only measurement tools to measure integration within the health-care system should, therefore, not necessarily be seen as inadequate.

Conclusion

This systematic literature review identified 23 measurement instruments developed to measure the level of integration across health-care sectors. As also stated by others, it has not been possible to identify a uniform instrument. Instead, the diversity of approaches to measure integration across health-care sectors seems wide and the organisational elements measured in each of the instruments vary. In this review, eight organisational elements were identified within the published

instruments, each element consisting of a number of sub-components.

The diversity between the instruments identified is first a consequence of the lack of a clear and common understanding of the concept of integrated care. Second, the diversity arises from organisational variations within the health-care systems the instruments have been developed to measure. Both courses are central for decision-makers and researchers to take into account when planning and carrying out evaluations of integration within any given health-care system.

This review provides a list and detailed evaluation of some of the current measurement instruments within the field of integrated care. As other reviews within this area, this review is useful as a core of current evidence for further exploration and development, both theoretical and methodological. The explicit assessment and evaluation of the organisational elements is also important for decision-makers and planners as an indication of which strategies and processes to prioritise and establish. Evidence remains lacking on how the various organisational elements should be weighed against each other, and variations across countries hamper the assessment. The purpose of assigning weighting factors is to aid the process of establishing work priorities, and in the process of evaluating the level of integration within a given health-care system, they should be part of the calculation used to determine an accurate overall performance rating.

The complexity of health-care systems and delivery of services makes integration a difficult task. To guide

further research in the process of achieving higher integrated health-care systems, we recommend research focusing on the following:

- Further elaboration on the concept of integrated care
- Case studies that involve closer assessment of the importance of the organisational elements in the process of creating integrated care systems
- Thorough and transparent research on how the various organisational elements must be weighed against each other
- Discussion papers on the challenge of replicating measurement instruments across different health-care settings
- Guidelines on how best to develop measurement instruments that can more effectively be replicated in the health systems of other countries
- Further validation and development of the already existing measurement instruments.

That the development of new instruments has intensified since 2000 but is still limited, shows that information related to implementing and evaluating integration-centred initiatives remains a relatively new area needing further investigation on how best to capture the process of creating integrated care.

Reviewers

Susanna Bihari Axelsson, Associate Professor of Public Health, Aalborg University, Aalborg, Denmark

Michael Rigby, Emeritus Professor of Health Information Strategy, Keele University, UK

References

1. Kodner DL, Spreeuwenberg C. Integrated care: meaning, logic, applications, and implications—a discussion paper. *International Journal of Integrated Care* 2002;2:e12. Available from: URN:NBN:NL:UI:10-1-100309.
2. Kodner DL. All together now: a conceptual exploration of integrated care. *Healthcare Quarterly* 2009 Oct;13: Spec No:6–15.
3. Grone O, Garcia-Barbero M. Integrated care: a position paper of the WHO European Office for Integrated Health Care Services. *International Journal of Integrated Care* 2001;1:e21. Available from: URN:NBN:NL:UI:10-1-100270.
4. World Health Organisation. World health report: health systems - improving performance. Geneva: WHO; 2000.
5. Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness. *The Journal of the American Medical Association* 2002 Oct 9;288(14):1775–79. Available from: <http://jama.jamanetwork.com/article.aspx?articleid=195368>.
6. Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness: the chronic care model, Part 2. *The Journal of the American Medical Association* 2002 Oct 16;288(15):1909–14. Available from: <http://jama.jamanetwork.com/article.aspx?articleid=195407>.
7. Hofmarcher MM, Oxley H, Rusticelli E. Improved health system performance through better care coordination. Paris: Head of Publications Service OECD; 2007.
8. Åhgren B. *Creating Integrated Health Care*. Göteborg: The Nordic School of Public Health; 2007.
9. Browne G, Kingston D, Grdisa V, Markle-Reid M. Conceptualization and measurement of integrated human service networks for evaluation. *International Journal of Integrated Care* 2007;7:e51. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2690905/pdf/ijic2007-200751.pdf>.
10. Suter E, Oelke ND, Adair CE, Armitage GD. Ten key principles for successful health systems integration. *Healthcare Quarterly* 2009 Oct;13(Special Issue). Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3004930/pdf/nihms1308.pdf>.

11. Armitage GD, Suter E, Oelke ND, Adair CE. Health systems integration: state of the evidence. *International Journal of Integrated Care* 2009 Jun 17. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2707589/pdf/ijic2009-200982.pdf>.
12. Strandberg-Larsen M, Krasnik A. Measurement of integrated healthcare delivery: a systematic review of methods and future research directions. *International Journal of Integrated Care* 2009 Feb 4. Available from: URN:NBN:NL:UI:10-1-100547.
13. Stein KV, Rieder A. Integrated care at the crossroads-defining the way forward. *International Journal of Integrated Care* 2009;9:e10. Available from: URN:NBN:NL:UI:10-1-100557.
14. Donabedian A. Evaluating the quality of medical care. *The Milbank Quarterly* 2005;83(4):691–729.
15. MacAdam M. Framework of integrated care for the elderly: a systematic review. Ontario: Canadian Policy Research Networks Inc.; 2008.
16. Hatch MJ, Cunliffe A. Organization theory. Modern, symbolic, and postmodern perspectives. New York: Oxford University Press Inc.; 2006.
17. Armstrong R, Waters E, Jackson N, Oliver S, Popay J, Shepherd J, et al. Guidelines for systematic reviews of health promotion and public health interventions. Version 2. Australia: Melbourne University; 2007.
18. De Vet HCW, Terwee CB, Mokkink LB, Knol DL. Measurement in medicine. A practical guide. New York: Cambridge University Press; 2011.
19. Ahgren B, Axelsson R. Evaluating integrated health care: a model for measurement. *International Journal of Integrated Care* 2005;5:e01. Available from: URN:NBN:NL:UI:10-1-100376.
20. Brazil K, Whelan T, O'Brian MA, Sussman J, Pyette N, Bainbridge D. Towards improving the co-ordination of supportive cancer care services in the community. *Health Policy* 2004;70:125–31.
21. Browne G, Roberts J, Gafni A, Byrne C, Kertyzia J, Loney P. Conceptualizing and validating the human services integration measure. *International Journal of Integrated Care* 2004;4:e03. Available from: URN:NBN:NL:UI:10-1-100340.
22. Burns LR, Walston SL, Alexander JA, Zuckerman HS, Andersen RM, Torrens PR, et al. Just how integrated are integrated delivery systems? Results from a national survey. *Health Care Management Review* 2001;26(1):20–39.
23. Devers KJ, Shortell SM, Gillies RR, Anderson DA, Mitchell JB, Erickson KL. Implementing organized delivery systems: an integration scorecard. *Health Care Management Review* 1994;19(3):7–20.
24. Dobrow MJ, Paszat L, Golden B, Brown AD, Holowaty E, Orchard MC, et al. Measuring integration of cancer services to support performance improvement: the CSI survey. *Health Policy* 2009 Aug;5(1):35–53. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2732654/pdf/policy-05-035.pdf>.
25. Fletcher RH, O'Malley MS, Fletcher SW, Earp JAL, Alexander JP. Measuring the continuity and coordination of medical care in a system involving multiple providers. *Medical Care* 1984;22(5):403–11.
26. Gillies RR, Shortell SM, Anderson DA, Mitchell JB, Morgan KL. Conceptualizing and measuring integration: findings from the health systems integration study. *Hospital & Health Services Administration* 1993;38(4):467–89.
27. Gulmans J, Vollenbroek-Hutten MMR, Van Gemert-Pijnen J, Van Harten W. Evaluating quality of patient care communication in integrated care settings: a mixed method approach. *International Journal for Quality in Health Care* 2007;19(5):281–88.
28. Henrard JC, Ankri J, Frijters D, Carpenter I, Topinkova E, Garms-Homolova V, et al. Proposal of a service delivery integration index of home care for older persons: application in several European cities. *International Journal of Integrated Care* 2006;6. Available from: URN:NBN:NL:UI:10-1-100401.
29. Hébert R, Durand PJ, Dubuc N, Tourigny A. The PRISMA Group. PRISMA: a new model of integrated service delivery for the frail older people in Canada. *International Journal of Integrated Care* 2003;3. Available from: URN:NBN:NL:UI:10-1-100315.
30. Lukas CV, Holmes SK, Cohen AB, Restuccia J, Cramer IE, Shwartz M, et al. Transformational change in health care systems: an organizational model. *Health Care Management Review* 2007 Oct;32(4):309–20.
31. Mares AS, Greenberg GA, Rosenheck RA. Client-level measures of services integration among chronically homeless adults. *Community Mental Health Journal* 2008;44(5):367–76. Available from: <http://link.springer.com/content/pdf/10.1007%2Fs10597-008-9138-7.pdf>.
32. Minkman MMN, Ahaus KTB, Huijsman R. A four phase development model for integrated care services in the Netherlands. *Bmc Health Services Research* 2009;9(42). Available from: <http://www.biomedcentral.com/1472-6963/9/42>.
33. Minkman M, Ahaus K, Fabbriotti I, Nabitz U, Huijsman R. A quality management model for integrated care: results of a delphi and concept mapping study. *International Journal for Quality in Health Care* 2009;21(1):66–75. Available from: <http://intqhc.oxfordjournals.org/content/21/1/66.full.pdf+html>.
34. Morrissey J, Calloway M, Johnsen M, Ullman M. Service system performance and integration: a baseline profile of the ACCESS demonstration sites. *Psychiatric Services* 1997;48(3):374–80. Available from: <http://ps.psychiatryonline.org/data/Journals/PSS/3464/374.pdf>.
35. Morrissey JP, Calloway MO, Thakur N, Cocozza J, Steadman HJ, Dennis D. Integration of service systems for homeless persons with serious mental illness through the ACCESS program. *Psychiatric Services* 2002;53(8):949–57. Available from: <http://ps.psychiatryonline.org/data/Journals/PSS/4350/949.pdf>.
36. Newhouse RP, Mills ME, Johantgen M, Pronovost PJ. Is there a relationship between service integration and differentiation and patient outcomes? *International Journal of Integrated Care* 2003;3:e15. Available from: URN:NBN:NL:UI:10-1-100333.
37. Pirkis J, Herrman H, Schweitzer I, Yung A, Grigg M, Burgess P. Evaluating complex, collaborative programmes: the partnership project as a case study. *Australian and New Zealand Journal of Psychiatry* 2001 Oct;35(5):639–46. Available from: <http://anp.sagepub.com/content/35/5/639.full.pdf+html>.

38. Reilly S, Challis D, Burns A, Hughes J. Does integration really make a difference? A comparison of old age psychiatry services in England and Northern Ireland. *International Journal of Geriatric Psychiatry* 2003;18(10):887–93. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/gps.942/pdf>.
39. Sicotte C, D'Amour D, Moreault MP. Interdisciplinary collaboration within Quebec community health care centres. *Social Science & Medicine* 2002;55(6):991–1003.
40. Strandberg-Larsen M, Schiotz ML, Silver JD, Frolich A, Andersen JS, Graetz I, et al. Is the Kaiser Permanente model superior in terms of clinical integration? A comparative study of Kaiser Permanente, Northern California and the Danish healthcare system. *Bmc Health Services Research* 2010;10. Available from: <http://www.biomedcentral.com/content/pdf/1472-6963-10-91.pdf>.
41. Suter E, Hyman M, Oelke N. Measuring key integration outcomes: a case study of a large urban health center. *Health Care Management Review* 2007;32(3):226–35.