# Key dimensions of collaboration quality in mental health care service networks

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Received: 1 March 2018 / Revised: 4 October 2019 / Accepted: 20 December 2019

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# Abstract

Appropriate care delivery for patients with severe mental illness (SMI) requires a high level of collaboration quality between primary, mental health, and social care services. Few studies have addressed the interpersonal and inter-organizational components of collaboration within one unique study setting and it is unclear how these components contribute to overall collaboration quality. Using a comprehensive model that includes ten key indicators of collaboration in relation to both components, we evaluated how interpersonal and inter-organizational collaboration quality were associated in 19 networks that included 994 services across Belgium. Interpersonal collaboration was significantly higher than inter-organizational collaboration. Despite the internal consistency of the model, analysis showed that respondents perceived a conflict between client-centered care and leadership in the network. Our results reveal two approaches to collaborative service networks, one relying on interpersonal interactions and driven by client needs and another based on formalization and driven by governance procedures. The results reflect a lack of strategy on the part of network leaders for supporting client-centered care and hence, the persistence of the high level of fragmentation that networks were expected to address. Policy-makers should pay more attention to network formalization and governance mechanisms with a view to achieving effective client-centered outcomes.

**Keywords** Health care reform; mental health services; intersectoral collaboration; deinstitutionalization; delivery of health care, integrated; community health networks

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### Background

The appropriate delivery of health care for people with multiple, complex needs and long-term conditions is one of the cornerstones of current health policies and planning (Butt, Markle-Reid, & Browne, 2008; Davy et al., 2015; Kodner & Spreeuwenberg, 2002). It requires a good level of collaboration between professionals from different backgrounds, medical, e.g. psychological, and social. It may also require organizational coordination between services of different kinds: in- and outpatient primary care, secondary care, and social care. In the specific context of mental health care, collaboration is

needed to provide continuity of care across professionals and service types. Continuity of care is particularly important for patients with chronic, severe mental illness (SMI). It has been seen as one of the major issues of mental health care delivery since the deinstitutionalization process (Burns et al., 2009). Indeed, in community-based systems, care is often delivered within a range of small, specialized services with separate administrative and policy sectors and diverse funding schemes (Morrissey et al., 1994, 2002; Sparer, France, & Clinton, 2011), which are supposed to collaborate. Although interprofessional care has been associated with better health outcomes compared to individual care (Lemieux-Charles & McGuire, 2006), particularly in mental health care (Archer et al., 2012; Reilly et al., 2013), research on effective components of health care collaboration is still inconclusive (D'Amour, Ferrada-Videla, San Martin Rodriguez, & Beaulieu, 2005; Dowling, Powell, & Glendinning, 2004; El Ansari, Phillips, & Hammick, 2001; McCovery & Matusitz, 2014; Reeves et al., 2011; San Martín-Rodríguez, Beaulieu, D'Amour, & Ferrada-Videla, 2005; Schofield & Amodeo, 1999; Tippin, Maranzan, & Mountain, 2017).

Collaboration quality in health care delivery depends on a complex process, which implies actions and outcomes at different levels: individual (patients, service users, families, and clinicians and other professionals in health care), intra-organizational (interprofessional and multidisciplinary teamwork), inter-organizational (between different services), and contextual (at the policy and system levels) (San Martín-Rodríguez et al., 2005). Within health and social care services, collaboration also involves the relationships that exist between professionals with a socio-clinical role, who are actually delivering care, and organizational leaders and managers (Raney, Lasky, & Scott, 2017), who are managing administrative regulations and funding schemes (Breton, Haggerty, Roberge, & Freeman, 2012; McDonald, Davies, & Harris, 2009; Willem & Gemmel, 2013). In organizational sociology, the collaboration required of professionals and services that are on the same hierarchical level, e.g. clinicians with different backgrounds, has been referred to as "horizontal integration", while collaboration between social and clinical

professionals and managers has been referred to as "vertical integration" (Axelsson & Axelsson, 2006). Vertical integration would be mainly achieved through formal and bureaucratic mechanisms, while horizontal integration would be based more on informal, mutual adjustments. Axelsson uses the term "co-operation" to describe a type of collaboration in which both vertical and horizontal integration are maximized, i.e. both inter-organizational and informal, formal, interpersonal components of collaboration. Formal, inter-organizational components of collaboration would include information exchange procedures and leadership, while informal, interpersonal components would include shared goals and trust (D'Amour et al., 2005). Furthermore, collaboration is a process in which stakeholders (individuals and organizations) aim to reach a certain level of integration while also preserving a certain level of autonomy. However, few studies have addressed collaboration while taking into account both its interprofessional and inter-organizational components. Moreover, very few studies have addressed collaboration across multiple services of different kinds (Reeves et al., 2011). Therefore, it is unclear whether it is possible to maximize both interpersonal and inter-organizational components of collaboration simultaneously.

In Belgium, the health system is highly fragmented (Gerkens & Merkur, 2010) and lacks care provision, regulation, and financing mechanisms that would facilitate effective interorganizational collaboration (Hofmarcher, Oxley, & Rusticelli, 2007). The Belgian healthcare system is a regulated-market system of healthcare coverage, in which hospitals and community, health, and social care services are mostly independent, for-profit or not-for-profit publicly funded organizations, operating under a compulsory social insurance scheme. Users as well as clinicians and providers have extensive decision-making autonomy for treatment and referral (Gerkens & Merkur, 2010; Paris, Devaux, & Wei, 2010). In addition, providers and clinicians are loosely regulated by public authorities. This type of healthcare system contrasts with National Health Systems (NHS), e.g. those in the United Kingdom and Scandinavian and Southern European countries, where public authority regulation is stronger and one single provider is usually responsible for most services in one geographical area (Paris et al., 2010). However, since 2011, Belgium has been reforming its mental-health care policy by establishing service networks. Service networks are loose but formal agreements between different services and providers in a selected geographical area. The main objectives of networks are to deliver care in the community and to decrease the resort to hospitals, to support patients' social integration and recovery, and to improve continuity of care by sustaining collaboration across services for the delivery of mental-health care ("Guide vers de meilleurs soins en santé mentale", 2010). The program theory for the reform is schematized in Figure 1.

To achieve these objectives, the newly established networks were provided with network coordinators and were asked to develop tools and mechanisms to foster collaboration at the user and service levels. In contrast to similar programs developed elsewhere (Leatt, Pink, & Guerriere,

2000; Raney et al., 2017), however, the Belgian reform favored a bottom-up approach and allowed voluntarily participating care providers to operationalize the program's principles, while leaving regulation and financing mechanisms unchanged (Nicaise, Dubois, & Lorant, 2014). Therefore, it is not clear whether the main objectives of the reform can be achieved simultaneously (Nicaise et al., 2014), nor is it clear whether the objectives enjoy the same level of support among all stakeholders (Lorant, Grard, & Nicaise, 2015). For that reason, the Belgian service networks are an interesting case study to examine how to foster effective collaboration by professionals with different backgrounds and working in different services. In this study, we applied D'Amour's conceptual model to evaluate (i) the quality of collaboration between professionals from different services providing care to SMI patients in the Belgian networks, and (ii) how inter-individual and inter-organizational components of collaboration quality were associated.

Figure 1 The program theory of the mental health care reform in Belgium: the four overarching aims and the conceptual structure of the service networks.



Source: Guide vers de meilleurs soins en santé mentale par la réalisation de circuits et de réseaux de soins (2010). Brussels: SPF Santé Publique.

# Methods

## Study setting

In 2014, 19 service networks were established, covering about two thirds of Belgium. Each network was promoted, and partially funded by a

voluntarily participating psychiatric hospital, which was free to include any type of service and to develop its own organizational and governance mechanisms. Networks included services for primary care, community mental health, outreach, community rehabilitation, social care, sheltered accommodation, and self-help, as well as psychiatric wards in psychiatric and general hospitals. A detailed analysis of the theory underlying the reform program was presented elsewhere (Lorant et al., 2015; Nicaise et al., 2014). The 19 networks contained a total of 994 services. Because of the policy process, service networks differed greatly in terms of size (number of services included) and composition (service types) (Lorant, Nazroo, & Nicaise, 2017) (See Table 2).

Within the framework of an evaluation study, the 994 services were invited to participate in an online survey. The survey contained different sections, including items on service and staff characteristics, such as professional backgrounds and access criteria, the frequency and nature of contacts with other services in the network, and the collaboration quality questionnaire. Services were invited to complete the survey during a staff meeting, in order to gather the expertise and views of all relevant staff members. Services were, however, free to decide on their internal process for survey completion.

# The collaboration quality scale

comprehensive model for One assessing collaboration in health care settings was developed by D'Amour and colleagues (D'Amour, Goulet, Labadie, San Martin-Rodriguez, & Pineault, 2008). Through an extensive literature review and several case studies, they eventually identified ten key indicators of collaboration quality. These indicators are related to four dimensions, two at the level of inter-individual relations and two at the level of inter-organizational relations. The two inter-individual dimensions of collaboration quality are: "shared goals and vision", i.e. the existence of common goals, mainly oriented toward the patient's needs and preferences, and "internalization", which refers to trust and mutual acquaintanceship between care professionals. The two inter-organizational dimensions are related to the "formalization" of collaboration, i.e. the existence of explicit tools and procedures used to support collaboration, and "governance" procedures that foster clear orientation of action and a sense of belonging. This model makes it possible to assess both the interpersonal and the

inter-organizational components of collaboration quality at the same time. A collaboration quality scale, based on D'Amour's model, was developed by Nuño Solinís and colleagues (Nuño Solinís, Berraondo Zabalegui, Sauto Arce, San Martín Rodríguez, & Toro Polanco, 2013) and was validated regarding its internal consistency and construct validity (Roberto Nuño Solinís et al., 2013). We included this scale in the online questionnaire for the purpose of evaluating the development of collaboration quality in the newly established networks of services. The scale included ten items, i.e. the ten key indicators of collaboration quality identified by D'Amour and colleagues. The ten indicators and their definitions are presented in Table 1. The ten indicators belong to four dimensions: shared vision, internalization, formalization, and governance. Shared vision and internalization covered components of interpersonal collaboration, while formalization and governance covered components of interorganizational collaboration. In the scale, each indicator of collaboration quality was rated from 0 to 3: 0 indicating that the component of collaboration was totally absent, 1 that it was potential or latent, 2 that it was partially developed, and 3 that it was active.

# Analyses

The purpose of the analyses was to evaluate the quality of collaboration across services in the newly established networks, in particular how collaboration quality was influenced by the interorganizational dimension of the service network. Collaboration quality was assessed by descriptive statistics, i.e. mean and standard deviation of each of the ten indicators of collaboration quality at the level of each service, at the level of service types, and at the level of the 19 networks. The mean differences across the four dimensions of collaboration quality were assessed with paired Student t-tests. Mean differences between the interpersonal and inter-organizational components of collaboration quality were calculated and were investigated with ANOVA across service types and networks. Cronbach's a was calculated to assess the overall consistency of D'Amour's model and the contribution of each indicator to the overall consistency. Polychoric

| Inter-organisational           | Interpersonal dimensions         |
|--------------------------------|----------------------------------|
| dimensions (IO)                | (IP)                             |
| Governance (G)                 | Shared goals and vision (S)      |
| Centrality                     | Client-centred orientation       |
| Refers to the existence of     | There is a complex structure     |
| clear and explicit direction   | of interests involving a         |
| that is meant to guide action. | variety of different types of    |
|                                | allegiance: to the clientele, to |
|                                | the profession, to the           |
|                                | organisation, to private         |
|                                | interests With respect to        |
|                                | adjustments are required         |
|                                | focussing on client-centred      |
|                                | collaboration                    |
| Leadership                     | Goals                            |
| With respect to                | Refers to professional values    |
| collaboration, leadership is   | in the form of common            |
| shared by the different        | goals, with particular           |
| partners and is subject to     | reference to the consensual      |
| wide agreement; all partners   | and comprehensive nature         |
| must be able to participate in | of the goals. Sharing            |
| decision-making.               | common goals is an essential     |
|                                | point of departure for a         |
|                                | collaborative undertaking.       |
| Collaboration loads to now     |                                  |
| activities and necessarily     |                                  |
| entails changes in clinical    |                                  |
| practice. Therefore,           |                                  |
| collaboration cannot take      |                                  |
| hold without a                 |                                  |
| complementary learning         |                                  |
| process and without support    |                                  |
| to this learning process.      |                                  |
| Connectivity                   |                                  |
| There are places for           |                                  |
| discussion and for             |                                  |
| individuals                    |                                  |
| organisations. It allows for   |                                  |
| rapid and continuous           |                                  |
| adjustments in response to     |                                  |
| problems of coordination.      |                                  |
| Formalization (F)              | Internalization (I)              |
| Formalisation tools            | Mutual acquaintanceship          |
| Formalisation is an            | Professionals must know          |
| important means of             | each other personally and        |
| clarifying the various         | professionally if they are to    |
| partners' responsibilities and | develop a sense of belonging     |

how to a group and succeed in

There are many types of It includes the knowledge of

practice.

setting common objectives.

each other's values and level

of competence, disciplinary

frame of reference, approach

to care, and scope of

negotiating

protocols,

systems,

responsibilities are shared.

formalised tools: inter-

organisational agreements,

professionals, it is important

to know what is expected of

etc.

information

For

**Table 1** D'Amour's conceptual model ofcollaboration (D'Amour et al., 2008).

them and what they can expect of others. Information exchange Refers to the existence and appropriate use of an information infrastructure to allow for rapid and complete exchanges of information between professionals.

Trust

Professionals must have trust in each other's competences and ability to assume responsibilities. Trust reduces uncertainty. Professionals use the results of collaboration to evaluate each other and build trust.

correlations and principal component analysis were performed in order to assess how indicators were associated with each other in the context of this study. Associations were controlled for service types. In another part of this study, published elsewhere (Lorant et al., 2017), we also assessed the structural properties of the networks using Social Network Analysis. Therefore, we also performed a linear regression analysis with the total collaboration quality score (i.e. the total score from the ten indicators) as the dependent variable and the network structural properties as the independent covariates, in order to assess whether collaboration quality was associated with the network structure. All statistical operations were performed using SAS 9.3.

#### Results

#### Participation

Participation in the service survey is reported in Table 2. Of the 994 services that were members of the 19 networks, 523 filled out the online questionnaire (participation rate: 53%). About two thirds of the questionnaires were completed by service managers and one third by staff with a clinical background. Participation by services differed greatly across networks, ranging from 25% to 96%. Nevertheless, 15 of the 19 networks had a participation rate higher than 50%. Participation also differed according to service types. In particular, participation rates were low in social care and self-help groups (38%); they were highest in outreach teams (78%) and sheltered accommodation services (71%). **Table 2** Participants in the service survey, per network and service type, Belgium, mental health network reform 2014, (n = 523).

| Network        | Number   | of Number          | of Rate of      |
|----------------|----------|--------------------|-----------------|
|                | services | that participating | g participation |
|                | are meml | bers services      | (%)             |
| 1              | 103      | 26                 | 25              |
| 2              | 118      | 81                 | 69              |
| 3              | 21       | 18                 | 86              |
| 4              | 29       | 8                  | 28              |
| 5              | 36       | 20                 | 56              |
| 6              | 11       | 8                  | 73              |
| 7              | 36       | 15                 | 42              |
| 8              | 34       | 28                 | 82              |
| 9              | 41       | 21                 | 51              |
| 10             | 55       | 36                 | 65              |
| 11             | 34       | 20                 | 59              |
| 12             | 62       | 40                 | 65              |
| 13             | 78       | 33                 | 42              |
| 14             | 67       | 34                 | 50              |
| 15             | 78       | 40                 | 51              |
| 16             | 30       | 20                 | 67              |
| 17             | 103      | 33                 | 32              |
| 18             | 41       | 29                 | 71              |
| 19             | 17       | 13                 | 76              |
| Per service ty | ype      |                    |                 |
| Primary Care   | 129      | 53                 | 41              |
| Community      | 116      | 75                 | 65              |
| Mental Health  |          |                    |                 |
| Outreach       | 87       | 68                 | 78              |
| Community      | 120      | 61                 | 50              |
| Rehabilitation |          |                    |                 |
| Social Care    | 247      | 93                 | 38              |
| Psychiatric    | 78       | 51                 | 65              |
| Hospital Units |          |                    |                 |
| Psychiatric    | 62       | 28                 | 45              |
| Wards in       |          |                    |                 |
| General        |          |                    |                 |
| Hospitals      |          | -                  |                 |
| Sheltered      | 82       | 58                 | /1              |
| Accommo-       |          |                    |                 |
| dation         |          | 20                 | <i></i>         |
| Psychiatric    | 33       | 20                 | 61              |
| Nursing        |          |                    |                 |
| Homes          | 01       | 0                  | 20              |
| Self-nelp      | 21<br>10 | 8                  | 38              |
| Other          | 19       | 8<br>502           | 42              |
| TOTAL 1        | 994      | 525                | 53              |
| Per responde   | ent type | 240                |                 |
| Managers       |          | 348                | 66.5            |
| Clinicians     |          | 169                | 52.5            |
| Other/         |          | 6                  | 1.2             |
| Unknown        |          | 500                | 100             |
| TOTAL          |          | 523                | 100             |

#### Collaboration quality

In Table 3, the ten indicators of D'Amour's model of collaboration quality are presented in ascending order of score. The overall score for quality of collaboration within networks was 1.8 ( $\pm$  0.73) out of 3, indicating a moderate, partially developed level of collaboration quality. The

indicator that received the highest score was client-centered orientation (2.17  $\pm$  0.70), while the lowest score was for formalization tools (1.34  $\pm$  0.76). Leadership was the indicator that showed the greatest dispersion  $(1.53 \pm 1.08)$ . Globally, the indicators reflecting the interpersonal component of collaboration, i.e. shared vision and internalization, were scored significantly higher than those reflecting collaboration at the interorganizational level, i.e. governance and formalization (2.00  $\pm$  0.61 vs 1.66  $\pm$  0.81; t = 16.78, p < .0001). The difference between the two components was not associated to service types, but was significantly associated to networks (F = 2.49, p = .0007). Therefore, the total collaboration quality score was regressed on the network structural properties. Collaboration quality was significantly and negatively associated with the betweenness centralization of the networks (Standardized beta = -0.147, t-test = -2.62, p =.009), i.e. a network structure where one service tended to broker relationships with all other services (see Figure 2).

**Table 3** Key indicators of collaboration quality, mean, standard deviation, and correlation to the total Cronbach's  $\alpha$ , mental health network reform 2014 (n = 523).

| - 1:           | <b>D</b> ! |      | 0.1  | 0 1 1                 |
|----------------|------------|------|------|-----------------------|
| Indicator      | Dimension* | Mean | Std  | Correlation to        |
|                |            |      |      | total Cronbach's      |
|                |            |      |      | $\alpha$ with deleted |
|                |            |      |      | variable              |
| Formalization  | IO – F     | 1.34 | 0.76 | 0.80                  |
| tools          |            |      |      |                       |
| Leadership     | IO – G     | 1.53 | 1.08 | 0.81                  |
| Centrality     | IO – G     | 1.67 | 0.80 | 0.79                  |
| Support for    | IO – G     | 1.75 | 0.79 | 0.79                  |
| innovation     |            |      |      |                       |
| Information    | IO – F     | 1.80 | 0.64 | 0.79                  |
| exchange       |            |      |      |                       |
| Mutual         | IP – I     | 1.82 | 0.55 | 0.79                  |
| acquaintance-  |            |      |      |                       |
| ship           |            |      |      |                       |
| Connectivity   | IO – G     | 1.91 | 0.76 | 0.79                  |
| Trust          | IP – I     | 2.00 | 0.52 | 0.80                  |
| Goals          | IP – S     | 2.02 | 0.67 | 0.79                  |
| Client-centred | IP – S     | 2.17 | 0.70 | 0.83                  |
| orientation    |            |      |      |                       |
| TOTAL          |            | 1.80 | 0.73 | Cronbach's            |
|                |            |      |      | $\alpha = 0.80$       |

\* The ten key indicators of collaboration quality are classified into two dimensions of interpersonal (IP) relationships: Internalization (I) and Shared goals (S); and two dimensions of inter-organizational (IO) relationships: Governance (G) and Formalization (F).

D'Amour's model of collaboration quality showed a good internal consistency (Cronbach's

 $\alpha = 0.80$ ). However, client-centered orientation was the indicator that contributed least to the total (Cronbach's  $\alpha = 0.83$  with the indicator deleted, see Table 3). As expected, bivariate, polychoric correlations showed that all the indicators of collaboration quality were strongly correlated with each other (data not shown). However, correlations revealed one exception: leadership and client-centered orientation were not correlated with each other.





Figure legend: Each dot represents a service network. The size of dots varies according to network size (i.e. the number of services included).

**Table 4** Factor loadings of key indicators of collaboration quality, mental health network reform 2014 (n = 523).

| Indicator              | Dimension* | Factor    | 1 Factor    | 2   |
|------------------------|------------|-----------|-------------|-----|
|                        |            | (38% of   | the (11% of | the |
|                        |            | variance) | variance)   |     |
| Goals                  | IP – S     | 0.65      | -0.17       |     |
| Client-centred         | IP – S     | 0.30      | 0.65        |     |
| orientation            |            |           |             |     |
| Mutual acquaintance-   | IP - I     | 0.65      | 0.32        |     |
| ship                   |            |           |             |     |
| Trust                  | IP - I     | 0.54      | 0.23        |     |
| Centrality             | IO – G     | 0.71      | -0.16       |     |
| Leadership             | IO – G     | 0.55      | -0.56       |     |
| Support for innovation | IO – G     | 0.71      | -0.26       |     |
| Connectivity           | IO – G     | 0.68      | -0.06       |     |
| Formalization tools    | IO – F     | 0.62      | 0.07        |     |
| Information exchange   | IO – F     | 0.67      | 0.29        |     |
| Kaiser's $MSA = 0.88$  |            |           |             |     |

Bartlett's test:  $\chi 2 = 1261.87$  (p < 0.0001, df = 45)

\*The ten key indicators of collaboration quality are classified into two dimensions of interpersonal (IP) relationships: Internalization (I) and Shared goals (S); and two dimensions of inter-organizational (IO) relationships: Governance (G) and Formalization (F).

Principal component analysis of the ten indicators of collaboration quality provided a two-factor solution that explained 49% of the total variance. Factor loadings are presented in Table 4. The first factor explained 38% of the total variance. All indicators were positively correlated with factor 1. However, client-centered orientation was the indicator with the lowest loading: 0.30. The second factor explained 11% of the total variance. Several indicators were negatively correlated with factor 2. With the exception of shared goals, all the negatively loaded indicators were those relating to governance. Leadership, particularly, received the highest negative loading (-0.56). By contrast, client-centered orientation received the highest positive loading (0.65) for factor 2. Therefore, the factor analysis did not retrieve the original structure of the model. Instead, the factorial structure suggests that, in our study,

collaboration quality was driven either by governance procedures at the expense of client participation in care or by client-centered care at the expense of formal inter-organizational collaboration.

## Discussion

#### Main findings

The model of collaboration quality developed by D'Amour and colleagues (D'Amour et al., 2008) demonstrated a good internal consistency, as in previous studies (Nuño Solinís et al., 2013). Our results thus confirmed that it is an efficient tool for assessing the quality of collaboration in interorganizational settings, such as service networks. To our knowledge, this is the first time that this model has been applied to such a large sample of services. Our findings, arrived at by employing this model, suggest that there is still room for improvement in collaboration quality within the newly established mental health services networks in Belgium. These results, however, are part of a larger evaluation study and have to be considered as intermediate results within a larger study program.

Despite the internal consistency of the model, our findings indicate that *client-centered orientation* of care was both the best-rated indicator of collaboration quality and the indicator that contributed least to its total score. In particular, the quality of collaboration was rated significantly higher for the interpersonal component of collaboration, i.e. between individual professionals, such as goal sharing and trust, than for the inter-organizational, formally defined dimensions at the service and network levels, such as governance mechanisms and leadership in the network. The factorial analysis of the association across key dimensions of collaboration quality suggests that the formalization of collaboration, and particularly *leadership*, conflicts with the *client*centered orientation of care, i.e. users' preferences for treatment. Moreover, the overall score for collaboration quality tends to decrease with network centralization. Nevertheless, we have indicated elsewhere that network centralization associated with other structural was characteristics of the networks (Lorant et al., 2017). In particular, centralization tended to

increase with size, i.e. the number of services that are members of a network. These findings suggest that collaboration quality in the Belgian networks still relies on informal, interpersonal relationships, rather than on the formalized procedures that the newly established networks were supposed to develop.

### **Consistency of findings**

Although the overall consistency of the model of collaboration quality developed by D'Amour and colleagues is consistent with previous studies (Nuño Solinís et al., 2013), our analysis did not retrieve the factorial structure of the original model, i.e. the two interpersonal dimensions of collaboration ("shared goals and vision" and "internalization"), and the two interorganizational dimensions ("formalization" and "governance"). Instead, in our study, all the indicators of collaboration quality were correlated with each other, with the exception of the clientcentered orientation of care, which was: (1) not correlated with leadership in bivariate analysis, (2) loosely correlated with the first factor, and (3) strongly associated with the second factor. The first factor gathered all indicators led by governance indicators and reflects a type of "governance-driven collaboration", in contrast to the second factor, which reflects a type of collaboration driven by client-centered care orientation. Our results, thus, reveal two approaches to collaborative service networks, one that relies on interpersonal interactions and is driven by client needs and another that is based on formalization and is driven by governance procedures, particularly leadership. In our study, interpersonal dimensions of collaboration quality were valued more highly than formalized, interorganizational dimensions; the latter were perceived as opposed to a client-centered orientation of care.

On the one hand, the moderate level of collaboration quality, in particular in relation to formal dimensions of collaboration, is not surprising in newly established networks of services. In addition, due to the particularities of the Belgian health system, which is highly fragmented and allows individual services extensive autonomy in decision-making, it is very likely that service networks were designed in a way that reflected practices that already existed before the reform process (Grard et al., 2015).

The results may, however, also reflect a lack of a strategy on the part of network leaders and commissioners for supporting collaborative client-centered care. In the literature, different definitions of the concept of service network have been proposed, with variations in terms of levels of formalization and regulation (6, 2006; Borgatti & Foster, 2003; Mandell & Keast, 2008; Provan, Fish, & Sydow, 2007). But engaging in collaborative care networks implies a radical change in care management and delivery and that needs to be made explicit (D'Amour et al., 2008; Raney et al., 2017). Collaborative care networks modify the understanding of the nature of disorders and treatment, with a view to an approach that would be more person-centered and less disorder-centered. The change also affects the patient-clinician relationship - the locus of control of health being shifted from the clinician to the patient - and the relationships between health professionals (clinicians and health managers) who are supposed to work as a team. Finally, the change also affects system-level mechanisms, such as management and funding procedures, which are supposed to become less centered on individuals and more focused on populations (Leatt et al., 2000; Raney et al., 2017; Shortell, Gillies, Anderson, Mitchell, & Morgan, 1993). With regard to mental-health care, personcentered care delivery is widely acknowledged as an essential component of evidence-based practice (Slade et al., 2014). In addition to benefits for users in terms of recovery and rehabilitation, person-centered care is also supposed to favor interprofessional collaboration by overriding differences in individuals' professional interests and backgrounds (D'Amour et al., 2008). In Belgium, before the reform process, collaboration between care professionals was only based on informal networks of interpersonal acquaintances. Therefore, it is possible that policy-makers and network leaders have not fully realized that the establishment of networks required such a change in perspective.

Although the mental-health reform supported both inter-organizational collaboration and patient-centered care orientation, results may indicate that network commissioners and providers have not fully endorsed the innovations that these networks require. In particular, organizations innovation in requires а transformational leadership style that is able to cope with the stress placed on professionals during large-scale health reforms (Aarons, Ehrhart, Farahnak, & Sklar, 2014). Support for innovation actually had the second-highest negative loading in terms of client-driven collaboration. Along with leadership, these do not seem to be the main drivers for collaboration quality in the Belgian service networks. Hence, the conflict between leadership and clientcentered care in relation to collaboration quality may also reflect the lack of a strategy, on the part of some leaders, for creating a context that supports collaborative patient-centered practice. In other words, results may reflect the persistence of the high level of fragmentation that the networks were expected to address.

Aarons (Aarons et al., 2014) also pointed to the need for congruence between providers who manage and secure funding and those mid-level leaders, e.g. health care team leaders and network coordinators, who are in charge of implementing the reform, i.e. some form of vertical integration. Hence, results may also reflect a lack of congruence between network commissioners and providers, on the one hand, and front-line health care leaders on the other hand, in particular regarding formalized procedures for collaboration. We have indicated elsewhere that the power of network providers, compared to the relative lack of power of network coordinators, was a major threat to the reform success (Nicaise et al., 2014). This statement is consistent with observations on similar reforms that were carried out elsewhere, e.g. in Canada, more than two decades ago (Fleury, 2005; Kates, 1993).

Regarding health service network governance, the literature generally suggests that centralized networks, i.e. those with a strong leadership embodied in one service that brokers relations in the network, would be more effective (Mandell & Keast, 2008; Mascia, Angeli, & Di Vincenzo, 2015; Provan & Kenis, 2008; Shortell et al., 2002; Turrini, Cristofoli, Frosini, & Nasi, 2010). Centralization would support collaboration especially when the network partners are diverse, the tasks to perform are complex, or the network users have complex needs (Leutz, 1999; Lorant et al., 2017; Mitchell & Shortell, 2000; Provan & Sebastian, 1998). However, in our study, results indicated that collaboration quality decreased with network centralization. Several elements might explain this apparent lack of consistency with the literature. On the one hand, we have indicated that centralization was correlated with network size, i.e. the number of services that were members of the network (Lorant et al., 2017). Therefore, the lower level of collaboration quality associated with centralization may simply reflect the problems posed by collaboration in larger networks. On the other hand, as respondents valued the interpersonal component of collaboration more highly than the interorganizational component, this finding might reinforce the interpretation that suggests that the formal dimensions of collaboration are still underdeveloped; this would be particularly salient in larger networks. In any case, a number of issues remain unresolved in relation to network governance and effectiveness (Leutz, 1999; Mitchell & Shortell, 2000; Turrini et al., 2010). In particular, we have also shown elsewhere that small, homogeneous, moderately centralized networks are associated with better social integration outcomes, i.e. the patient's social functioning and capacity for participation in social life, whereas large, heterogeneous, centralized networks are associated with the relational dimension of continuity of care, i.e. the therapeutic alliance and level of communication between the patient and the clinicians (Lorant, Grard, Van Audenhove, Leys, & Nicaise, 2019; Lorant et al., 2017). Although the networks created by the Belgian mental-health reform are supposed to address both objectives, the potential conflict between client-centered care and leadership may confirm that health teams find it difficult to address both objectives within a single organizational framework. Indeed, while network governance requires formalized, standardized procedures oriented toward a clearly defined target group of the population, person-centered care is based on the assumption that each individual situation may require clinicians to adapt to the peculiarities of that situation (Provan & Kenis, 2008; Willem & Gemmel, 2013). This tension remains a challenge for interorganizational, collaborative care.

# Limitations

The assessment of collaboration quality in health care services is highly dependent on the organizational and policy context. Hence, the first limitation of our study is that it is grounded in the Belgian health system and in the context of the Belgian mental-health reform. The relationship between indicators such as client-centered care, formalization, and leadership has to be understood in this specific context.

Moreover, only a longitudinal study protocol would provide sufficient information to enable us to understand how collaboration quality evolves in networks and which tools and mechanisms are likely to facilitate improvement. Our results, accordingly, have to be interpreted with caution, in particular regarding reform outcomes.

A third limitation may be the understanding of the concepts. Although each dimension and indicator was carefully defined in the questionnaire, we cannot rule out the possibility that dimensions were understood differently, according to professional backgrounds, networks, services, and other characteristics of the local context. Additionally, questions were clearly oriented toward collaboration within the network. Network boundaries, however, may be difficult to define, as only voluntarily participating services were members of the networks, and services have numerous collaborative contacts with other services that were not included in the network. Hence, contacts outside the network may have affected ratings, leading in particular to some overweighting of the importance of the interpersonal component of collaboration.

Finally, collaboration quality scores may have been biased by respondents' characteristics and other survey conditions. Firstly, although services were asked to complete the survey questionnaire during a team meeting, the respondents' roles may have influenced their perception of collaboration. To address this potential bias, we assessed the variation in scores according to the respondents' role. Two thirds of respondents were managers (coordinators, team leaders, or directors), and one third were clinicians (e.g. psychiatrists, psychologists, doctors...) (see Table 2). We found that managers tend to rate collaboration quality more highly than do clinicians (t = 3.07; p = .002), in particular regarding the key indicators relating to governance at the inter-organizational level (t = 3.46; p < .001). Hence, we might consider that the global collaboration quality is somewhat overestimated, in particular regarding governance indicators. One way to capture the personal and organizational components of collaboration with greater accuracy in further studies would be to design a multilevel study that would collect data reflecting both the views of individuals and those of services and networks. The finding that managers rate collaboration quality more highly than do clinicians further underlines the difference between the interpersonal and interorganizational components of collaboration, and the potential conflict between leadership and client-centered care orientation in the Belgian mental-health service networks.

Secondly, we found a small but significant difference in results between different networks. The variation in participation rates across networks may, thus, have affected the results. To assess this effect, we weighted the indicator scores by the inverted participation rate and recalculated the factor loadings. This operation did not, however, affect the factorial structure. Hence, it is very unlikely that the results were affected by differences in participation. Similarly, one could argue that the factorial model was determined by a specific service type. For example, the potential conflict between clientcentered care and leadership may have been perceived very differently in large inpatient settings and in small outpatient settings. To check for this potential effect, we distinguished outpatient and inpatient services, and recalculated the factor loadings for each group separately. The factorial structure in both groups, however, was identical to the structure presented in Table 4. We can, thus, also rule out the suggestion that the factorial model was determined by a specific service type.

## Conclusions and perspectives

Collaboration in health care is required for patients with long-term conditions, although the appropriate balance between interpersonal and inter-organizational components for supporting collaboration quality remains to be found. However, in terms of network governance, there is a need to disentangle the requirement for standardized collaborative procedures at the organizational and managing level from the need for personalized collaborative procedures for care delivery to users at the clinical level. Network commissioners and policy-makers should also pay more attention to service network structure, formalization guidelines, and governance rules, in order to effectively achieve the patient-centered health and social care patient-centered outcomes that collaborative networks are supposed to address. In particular, they might take into account how similar issues were addressed and the lessons learned elsewhere (CCMHI-ICCSM, 2019).

## Availability of data

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to the possibility of identifying specific services in small networks.

## **Declaration of interest**

None

## Ethics approval

The research protocol was reviewed and approved by the "Commissie Medische Ethiek" Ethical Committee, KULeuven, Leuven, Belgium, 12 October 2012, reference number B322201215206.

# Funding

The research was funded by a grant from the Federal Ministry of Health, Food Chain and Environment, 2011–2015;Belgian Federal Ministry of Health, Food Chain and Environment.

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