# The Integration of Mental Health and Social Care Services in Emergency Situations. The Case of the 2016 Earthquake in the Marche Region

*In the field of healthcare, the tendency to seek organizational models based on the integration of all social and healthcare services emerges, as demonstrated by the WHO guidelines. In the Italian healthcare system, this has led to the creation of local integration systems that involve the definition of protocols and formal relationships between centers that provide social and healthcare services. Catastrophic events, such as earthquakes or floods, cause rapid and unexpected changes that undermine the planned structure of the inter-organizational structure. Existing network configurations must quickly adapt to the new situation. Our work presents the results of a study involving ASUR (Azienda Sanitaria Unica Regionale) Marche in the province of Ascoli Piceno, which was hit by the 2016 earthquake, and the University of Urbino Carlo Bo, aimed at studying the evolution of the structure of the inter-organisational network linking the centres involved in providing social welfare services in the field of mental health, as a consequence of the seismic event.*

## Introduction

The ability to realize specific objectives for complex organizations, such as social and healthcare centers, relies on the collaboration and coordination of a certain number of subjects and units that differ in their cognitive orientations, the knowledge and languages they use, their technical specializations, and the values that guide their actions. This differentiation becomes manifest when heterogeneous behaviors of these kinds make interorganizational relationships difficult, in particular (Shortell e Kaluzny, 2000).

In the specific case of mental health, there is a need for the provision a wide range of social and healthcare services, with specialized centers delivering both residential and outpatient treatment, with continuity. To ensure a high level of integration between these centers, it is necessary to provide coordination mechanisms and cooperation contexts (Provan *et al*., 2004).

In order to monitor the level of integration of social and health care and ensure the high performance of service provision, it is important to study the relationships between the different actors, especially since they can become critical due to the intensity and complexity of interdependencies. As such, the study of the relational structure can become an advantageous tool, enabling the identification of those coordination mechanisms which are established at an operational level, but which have not been designed or foreseen. Detecting these mechanisms can help to develop a greater awareness of the characteristics of cooperation between social actors (Clemente, 2013; 2023).

The relational approach, based mainly on Social Network Analysis (SNA), allows us to focus our attention on the structure of the emergent links between the various actors involved in organizational action. Studies that follow this approach draw on the assumption that the behavior of actors also depends on

the opportunities and constraints made available by the structure of relationships (Freeman, 1979; Granovetter, 1985).

What happens when an unexpected, catastrophic event occurs? Organizations must redefine their roles within interorganizational systems, renegotiating collaborations in a context that changes suddenly and unexpectedly. Sudden, unanticipated changes triggered by the disastrous event can undermine the planned structure of interorganizational relationships. Existing network configurations must quickly adapt to this new situation. Consequently, there is a need to engage in unplanned actions and rethink the ways in which the network is managed. The groups of units that must respond to the emergency are not established in advance, but are formed rapidly, according to the experiences that develop in the first moments of the event (Denning, 2006).

Starting from these premises, this article seeks to answer a set of related questions. How does the structure of relationships change immediately after a catastrophe (here we refer to a seismic event)? What happens when the emergency phase ends? Is the structure of relationships maintained or does it return to the pre-emergency configuration? Which conditions determine greater resilience for service delivery centers?

To answer these questions, this study focuses on the interorganizational network of centers providing social and mental health welfare services in the province of Ascoli Piceno, in the Marche region of Italy. Specifically, we examine changes in the structure of this network after the province was hit by a destructive earthquake in 2016.

## Literature Review

The literature contains several uses of SNA to study structures of mental health and social organizational networks (Kapucu *et al*., 2017). In these applications, we find some approaches that interpret the concept of network integration differently. The operationalization methods of SNA depend on contextual factors, including the nature of the centers involved and the specific objectives of the respective analyses, therefore making it difficult to find a shared and standardizable solution.

For this reason, in the area of mental health services, various solutions have been proposed to address the challenge of “measuring” the extent of network integration.

First, it is worth highlighting that the conceptual meaning of network integration is based on that of dyadic integration, that is, the degree of connection between two organizations. In our case, this is measurable in terms of the intensity of the exchange of patients, information and resources. The greater the number of exchanges, both in terms of frequency and type, the better the level of integration (Raeymaeckers and Kenis, 2015).

Network integration is determined by a comprehensive view of all dyadic relationships (Provan e Lemaire, 2012). For this reason, the first indicator that is taken into consideration to understand integration is “density”, which is based on the proportion of existing ties as compared to all possible ones

(Provan e Sebastian, 1998). At the same time, it has been demonstrated that the ability to ensure the effectiveness of collaboration between nodes which provide complementary and necessary services, avoiding the dispersion of energy and resources, requires centralized coordination (Raeymaeckers and Kenis, 2015). According to Provan and Kenis (2008), however, if the number of nodes is great, it is difficult – if not impossible – to adopt a form of shared governance; as such, the need emerges to have one or more centers that can coordinate activities. Networks should therefore be "centralized". For this reason, network integration has come to be evaluated by taking into account both the level of interconnection between organizations and the extent to which they are integrated and coordinated through a central authority (Morrissey *et al*., 1994). In addition to density measurement, it is therefore also necessary to calculate the values of network centralization and node centrality (Freeman, 1979).

Nevertheless, in the domain of social and health care systems, the many organizations have different organizational cultures (Tomelleri e Lusardi, 2017), creating therefore great difficulty in administering and coordinating them through a single center. In essence, these systems consist of groups of homophilous organizations that share objectives, values, work practices and skills. Moreover, node differentiation is an important aspect in social and health care systems, as it allows users the provision of varied, complementary services. Consequently, however, a conflict can emerge between the goals of full care coverage, which would require node differentiation, and care integration, which would require coordination (Nicaise, 2013). High differentiation is usually accompanied by low centralization, as it is difficult to coordinate centrally activities that span different organizational cultures (Bazzoli *et al*., 1998). For this reason, the ability to integrate services can be a priority, and this can rely on understanding the level of connection between heterophile groups. Thus, the problem of how to identify groups arises. Scholars have essentially adopted two strategies. The first one identifies each group by exploring relational characteristics, applying methods based on SNA, such as the classification and analysis of overlapping cliques (Provan and Sebastian, 1998) and the detection of structurally equivalent positions (Morrissey *et al*., 1994; Davis *et al*., 2012).

The second strategy identifies groups through a "reasoned choice", creating classes of nodes based on the attributes of individual organizations, and especially those attributes that distinguish the different types of service provided (Lorant *et al*., 2017; Nicaise *et al*., 2013). We can essentially label this process as "qualitative", since the definition of equivalent groups is based on a series of information that is collected through documents and discursive interviews.

SNA has also been applied to disaster studies (Varda *et al*. 2007), particularly with the aim of evaluating the efficiency of interorganizational communication during and after catastrophic events (Tierney 2019; Perrow, 1999; Kapucu, 2006; Robinson *et al*. 2006; Comfort and Haase, 2006). Sociological research has mainly focused on the dynamics of the social networks which are mobilized to provide relief and assistance to populations affected by disasters

(Varda *et al*., 2009), but there are no studies that analyze the disruptions that a disaster can cause in formalized and pre-existing interorganizational networks.

This article aims to analyze the impact that a disastrous event, such as an earthquake, has had on an interorganizational network providing social and mental health services. It does so by comparing the network's level of social and healthcare integration between: 1. the pre-earthquake period, 2. the emergency period, immediately following the earthquake, and 3. the period after the emergency. We aim to help to increase understanding of the transformation processes of interorganizational networks by exploring how these networks react to unexpected events and identifying the conditions that favor or inhibit integration.

The results may help to comprehend the processes that regulate the relationship between structure and agency, by investigating how institutional pressures, contingent conditions and the reactions of social actors develop and interact.

## The Social and Mental Health System of Ascoli Piceno

Social and healthcare services in the area of mental health are provided by the Healthcare System, which is both public and private, and by territorial administrative social institutions called Social Territorial Areas (ATS, acronym of Ambiti Territoriali Sociali), organizational entities that are part of local Municipalities. The public healthcare service is divided into two distinct organizational nuclei, each of which has several centers: the Department of Mental Health (DSM, acronym of Dipartimento di Salute Mentale) and the Complex Tutelary Care Unit (UCCT, acronym of Unità Complessa Cure Tutelari). Both are divided into two territorial districts: the coastal one and the inland one.

The DSM provides all services relating to the diagnosis and treatment of mental illnesses, including both hospital and community services. Each district is coordinated by a unit called the Mental Health Centre (CSM, acronym of Centro di Salute Mentale).

The centers that are part of the UCCT provide rehabilitation services for individuals with mental health impairments, as well as social, professional and scholastic integration.

In addition to these two groups, there are four ATSs that are responsible for planning and coordinating social services. The ATSs have much less homogeneous organizational structures than the health centers, without central coordination, as they belong to different municipalities.

Between 24 August and 31 October 2016, a series of seismic shocks hit a part of the province of Ascoli Piceno, particularly the predominantly mountainous internal area, spanning a terrain of approximately 25,000 residents. Many buildings were damaged, causing part of the population to move towards the coastal area. The earthquake hit the inland health district and three ATSs. Some centers were forced to move to other buildings, due to the damage caused by the earthquake, though they continued their activity.

Following the 2016 seismic event, a temporary operational unit was set up to deal with the emergency, named "Equipe sisma" (earthquake team). It was active from March 2017 until February 2018. The personnel of the Equipe combined units of staff from the DSM and the UCCTs, with the addition of five units of fixed-term staff, who finished their service when the team disbanded.

## Methods

This study is based on the comparison of the network structures that were configured in three-time intervals: 2015, 2017 and 2019. These correspond respectively to the period before the earthquake, the period immediately after the earthquake and the period after the emergency. This comparative study uses the tools of Social Network Analysis (SNA). SNA allows us to represent an interorganizational network through a graph, a mathematical object composed of nodes connected to each other by lines, called "edges". In this study, the nodes represent the centers that provide social and healthcare services in the field of mental health.

The centers were identified on the basis of data provided by the Psychiatric Services Information System (SISP) database. This database contains coded units corresponding to the various centers belonging to the DSM or to private structures affiliated with the public health system, which offer residential services for people with mental disorders. Subsequently, other centers providing mental health and social services were added: the UCCT centers, the four ATSs of the province of Ascoli Piceno and two centers that deal with pathological addictions that are part of the public health system. Furthermore, from interviews with the center managers, three other private affiliated centers were identified that collaborate mainly with the UCCTs. Overall, this resulted in 43 centers, which constitute the nodes of the network.

Subsequently, we defined two types of interorganizational tie, which connect the various units, based on the studies found in literature (Lorant *et al*., 2017; Nicaise *et al*., 2013; Davis *et al*., 2012; Lemieux *et al*., 2005):

1) sending and/or receiving referrals;
2) participation in regular meetings between the staff working in the centers.

To operationalize the first type of tie, data from the SISP database was used. This data records all the services provided by the centers belonging to the DSM and affiliated private centers. In essence, a tie is recorded between two units if they have provided services to the same patient. To identify user referrals involving the centers that do not appear in the SISP, semi-structured interviews were carried out with the heads of the units of the DSM, UCCTs and ATSs, in which they were asked to indicate the centers with which they shared

patients. When discrepancies emerged, the study integrated archive data, as this was considered more reliable than the interviews.

Data used to operationalize the second type of tie – i.e., those concerning participation in regular meetings – was collected exclusively through interviews with the managers of the centers, who were asked: 1) for a list of centers with which they meet regularly; 2) how long meetings lasted, on average; and 3) the number of meetings in a year. Only ties declared by both nodes were included (see Morrissey *et al*. 1997; Nicaise *et al*., 2013). A weight was attributed to each tie, represented by the number of annual meetings estimated by the interviewees. When these estimates did not coincide, an average of the two was recorded.

The data collected refers to the years 2015, 2017 and 2019. To evaluate the level of network integration and any variations caused by the earthquake emergency (and in its wake), a multiplex network was analyzed, that is, one formed by multiple links. For this network, an edge was added to two nodes only if they were linked both by the exchange of users and by the presence of regular meetings. The multiplex link reflects a greater commitment between the structures – an effective collaboration and sharing of activities – therefore it can be used to quantify the level of integration. Indeed, a mere referral from a center may not represent a meaningful inter-agency relationship; this may also indicate a lack of coordination between the agencies involved or an uncoordinated care approach, also known as "dumping." Combining referral data with information on regular meeting defines stronger relationships, therefore implying a greater commitment to the working relationship and concrete collaboration between the different centers (Morrissey *et al*., 1997; Provan and Mildraw, 2001; Nicaise *et al*., 2013; Lorant *et al*., 2017).

In order to understand how social actors react to sudden changes and how their actions contribute to the development of network structures, qualitative interviews were conducted with the managers of the various centers, asking how they experienced and reacted to the dramatic events of the earthquake (see Fuhse and Mützel, 2011). A total of 17 interviews were conducted. Each subject was asked to fill out – in dialogue with the interviewer – two relational questionnaires: one on taking charge and one on regular scheduled meetings. Each questionnaire collected information for the years 2015, 2017 and 2019, as previously specified. At the end of the questionnaire, a semi-structured interview was carried out with respondents, enabling greater detail on certain relational aspects and clarity regarding the context of the organization during the emergency.

## Results

To evaluate the level of integration of the network and any variations before and after the earthquake, the multiplex network was analyzed – that is, the network formed by multiple ties. As mentioned above, for each pair of nodes, a link was added only if they are connected both by user referrals and regular meetings (cf. Figures 1, 2 and 3). The weight of each edge is determined by the number of meetings held in a year. It is assumed, indeed, that the strength of the relationships is determined by the frequency of meetings – which increase

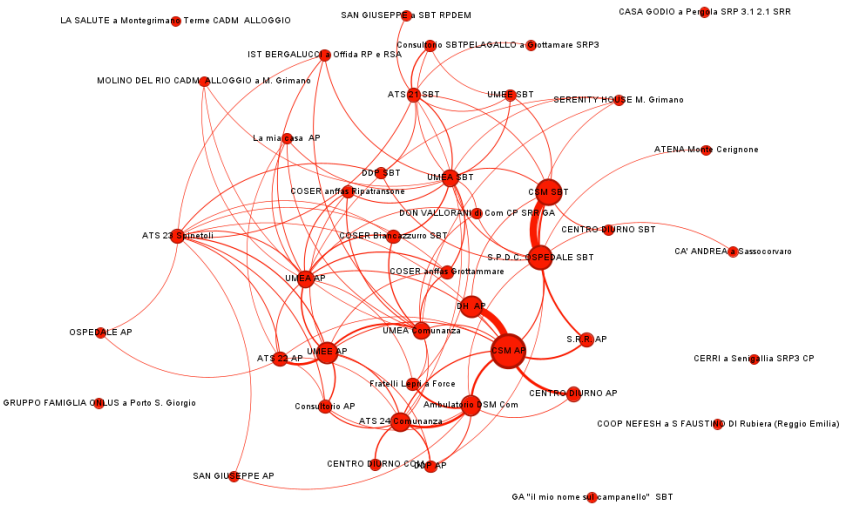
in mutual knowledge and trust – rather than by the referral and exchange of patients.

From the comparison of the multiplex networks, no major differences emerged between the three years. The most marked difference concerns the value of the weighted average degree,[1] which increased by 2.51% in 2017 and by 3.22% in 2019 (Table 1).

**Table 1.** *Multiplex network. Values calculated with Gephi software*

| | **2015** | | **2017** | **2019** |
|---|---|---|---|---|
| Density | 0,107 | | 0,107 | 0,110 |
| Weighted average degree | 83,256 | | 85,349 | 88,093 |
| Number of edges | 97 | | 97 | 99 |

**Figure 1.** *Multiplex graph, year 2015, processed with Gephi software. The size of the nodes is determined by the value of the weighted degree*




[1]«The weighted degree of a node is the sum of the weights of the edges incident with the node» (Zhang *et al*., 2000), the simple degree is the sum of the edges incident with the node.

**Figure 2.** *Multiplex graph, year 2017, processed with Gephi software. The size of the nodes is determined by the value of the weighted degree*

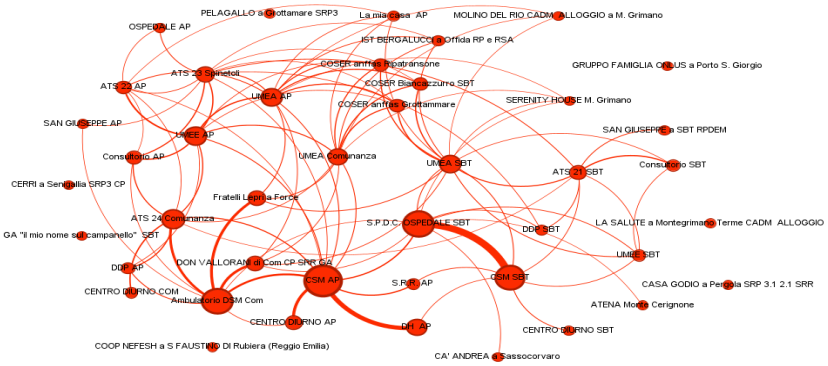
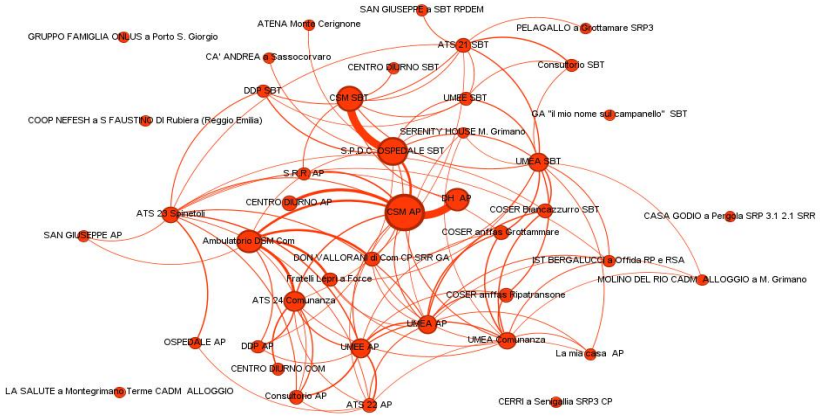



**Figure 3.** *Multiplex graph, year 2019, processed with Gephi software. The size of the nodes is determined by the value of the weighted degree*



To detect the degree of social and healthcare integration, the study adopted the strategy used by Nicaise *et al*. (2013), based on the evaluation of connections between groups of homophilous organizations. In particular, the relationship between the cohesion and internal centralization of each group, as well as the inter-group density, were analyzed, since the degree of integration depends on the level of connection between internally centralized heterogeneous groups.

From this analysis, it is possible to identify three main groups of structures that offer services for people with mental health problems. The first group includes the DSM facilities, which offer all services related to the diagnosis and treatment of mental illnesses.

The second group is made up of the structures of the UCCTs, which provide services for the rehabilitation and social and scholastic integration of patients who have been in difficulty and/or have disabilities. Like the DSM, it is a part of the health system, but it is aimed at a more varied user base: not only those with psychiatric problems, but all those people who live with forms of disability.

Finally, the third group is composed of ATSs, organizational articulations that belong to territorial authorities, generally associations of municipalities, which plan and coordinate social services. The four ATSs in the Ascoli Piceno province have organizational structures that are much less homogeneous than the centers of the health system: they do not have central coordination, as they belong to different bodies.

*The DSM Network*

The DSM network is composed of a central nucleus of units belonging to the public health system and seventeen private residential centers that accept patients with mental health problems, some of which are located outside of the province of Ascoli Piceno, and, in one case, even outside the Marche region. The private centers constitute the periphery of the network and many of them do not have strong ties with the other nodes, that is, characterized by both the exchange of patients and regular meetings between the staff. Most of these do accept patients, but they do not have regular interactions with the public health service's centers. This situation remains constant in all three years. In total, the nodes of the network are 29.

The centralization value[2] is quite high, both in 2015 (0.31) and in 2019 (0.32), while it decreases in 2017 (0.21): this means that there is centralized coordination with respect to shared activities, while this weakens in the emergency period. In the latter, there is a slightly more marked tendency to establish direct relationships between the units, with less mediation by the coordinating nodes. The most central nodes, with the largest numbers of connections, are the two Mental Health Centers (CSM) and the hospital center (SPDC, acronym of Servizio Psichiatrico di Diagnosi e Cura) (Table 2). The two CSMs constitute

[2]The centralisation index describes the extent to which a network's cohesion is organized around particular focal points (Scott, 2000).

the two territorial coordination points, as they have strong links with the units located in their own territorial area: the CSM of Ascoli Piceno with the units located in Ascoli Piceno and the CSM of San Benedetto del Tronto with the units located in the coastal area. The value of the simple degree of the SPDC is higher than the values of the two CSMs, while that of the weighted degree is lower. This means that it has less regular but more widespread relations, doubtless also tied to the fact that it is the only hospital facility in the entire province.

**Table 2.** *Centrality values of the DSM network nodes, calculated with the UCINET software*

| | **2015** | | | **2017** | | | **2019** | | |
|---|---|---|---|---|---|---|---|---|---|
| **Strutture** | **Simple degree** | **Weighted degree** | **Normalized degree** | **Simple degree** | **Weighted degree** | **Normalized degree** | **Simple degree** | **Weighted degree** | **Normalized degree** |
| CSM AP | 5 | 460 | 35,39 | 5 | 355 | 27,31 | 5 | 485 | 37,31 |
| CSM SBT | 4 | 312 | 24 | 4 | 277 | 21,31 | 4 | 282 | 21,69 |
| S.P.D.C. OSPEDALE SBT | 7 | 283 | 21,77 | 7 | 294 | 22,62 | 7 | 332 | 25,54 |

*The UCCT Network*

The UCCT network is made up of a total of 10 units, which are part of the complex network including three UMEA (Multidisciplinary Unit for Adulthood ) centers – located in San Benedetto del Tronto, Ascoli Piceno and Comunanza – two UMEE (Multidisciplinary Unit for Children) centers, two clinics in Ascoli Piceno and San Benedetto del Tronto, and three private centers that are affiliated with the National Association of Families and People with Cognitive Disabilities and Neurodevelopmental Disorders (ANFASS). The density value of the UCCT network equates to 0.45, and this remains constant over time. This network is smaller than the DSM network. A high density corresponds to a modest centralization (0.15 in 2015, 0.14 in 2017 and 0.14 in 2019). These values depend on the fact that the number of nodes is small and that there are direct links between the centers located in the same territorial area.

*The ATS network*

The ATS network – which is responsible for managing social interventions in the territory – has a very different configuration compared to the health service networks, and it consists of merely 4 nodes. First of all, it can be observed that the centralization values are close to 0 in all the periods considered (0.06 in 2015, 0.05 in 2017 and 0.012 in 2019). This is down to the lack of a coordi-

nation framework, since each has its own organizational structure in connection to the local authority to which it belongs. There is therefore a certain level of heterogeneity with respect to organizational management.

*Intra- and inter-cluster density*

As seen above, the ability to integrate services can be evaluated by quantifying the level of connection between heterogeneous groups with respect to the nature of services offered and the broader organizational culture. To achieve this, it is therefore important to analyze the relationship between the density within the groups and the density between the groups. The groups that we can consider homogeneous are those of the DSM, the UCCTs and the ATSs. The nodes that represent private structures were not considered in this analysis, both because they are characterized by a different organizational culture with respect to public structures, and because they are located on the periphery of the network.

As mentioned, the level of integration is understood as the capacity for inter-group connection, especially between healthcare services and social assistance. For this purpose, the relationship between internal group density – measured by calculating the weighted average of networks – and the density *between* groups – measured through the "density by group" function provided by UCINET – is taken as an indicator of integration. The results of this calculation are presented in table 3 (Nicaise *et al*., 2013).

**Table 3.** *Multiplex Network. Values calculated with UCINET*

| | **Intra cluster density- Average ties strength** | | |
|---|---|---|---|
| **Structures** | **2015** | **2017** | **2019** |
| DSM group | 71 | 58,18 | 77 |
| UCCT group | 20,83 | 17,17 | 18,3 |
| ATS group | 6,25 | 6,25 | 3,75 |

| | **Inter cluster density - Average ties strength** | | |
|---|---|---|---|
| **Structures** | **2015** | **2017** | **2019** |
| DSM - UCCT | 10,43 | 10,5 | 10,5 |
| DSM - ATS | 17,25 | 19,63 | 21,25 |
| UCCT - ATS | 18,33 | 19 | 15,92 |

The data shows that the ATSs have a much lower internal density than the inter-group density, while, on the contrary, the DSM has a much higher intra-group density. This makes evident the fact that the ATSs do not actually constitute a homogeneous group; rather, each node has specific organizational practices and rules, linked to the local context, and it is totally autonomous from the other ATSs from a management point of view, as there is no coordination center.

From a longitudinal perspective, what emerges is that between 2015 and 2017 the internal density of both the DSM and the UCCT groups decreases. The relationship between the DSM and the UCCTs remains constant over the three years considered, while the relationship between the DSM and the ATSs strengthen in 2017 and again in 2019, and the one between the UCCTs and the ATSs is consolidated in 2017, but it subsequently weakens in 2019.

In conclusion, in the period immediately following the earthquake, the relationships between the centers of the healthcare and social welfare systems intensify and become more widespread. This intensity is consolidated between the DSM and the ATSs in 2019, while it significantly decreases between UCCT and ATSs.

If we verify the role of each node within the network, by analyzing the centrality values of the most active nodes (Table 4), it becomes evident that, in 2017, on average, betweenness[3] decreases, because the relationships are more widespread.

**Table 4.** *Multiplex network. Values calculated with Gephi software*

| | Normalized Betweenness | | | Weighted degree | | | | |
|---|---|---|---|---|---|---|---|---|
| Structures | 2015 | 2017 | 2019 | 2015 | 2017 | 2019 | Increase 2017 from 2015 | Increase 2019 from 2015 |
| S.P.D.C.SBT | 12,50% | 11,70% | 12,60% | 305 | 325 | 378 | 6,56% | 23,93% |
| ATS 21 SBT | 12,80% | 8,70% | 12,00% | 87 | 100 | 86 | 14,94% | -1,15% |
| UMEA SBT | 13,60% | 11,70% | 12,70% | 145 | 169 | 166 | 16,55% | 14,48% |
| ATS 23 Spinetoli | 12,50% | 11,70% | 12,60% | 90 | 123 | 119 | 36,67% | 32,22% |
| Comunanza DSM clinic | 4,10% | 5,60% | 3,60% | 209 | 320 | 275 | 53,11% | 31,58% |
| UMEA AP | 5,50% | 5,40% | 5,40% | 150 | 180 | 163 | 20,00% | 8,67% |
| CSM AP | 9,90% | 10,10% | 11,20% | 524 | 428 | 559 | -18,32% | 6,68% |
| CSM SBT | 7,30% | 6,40% | 6,90% | 340 | 304 | 308 | -10,59% | -9,41% |
| ATS22 | 2,30% | 2,28% | 2,29% | 101 | 77 | 59 | -23,76% | -41,58% |
| ATS24 | 7,64% | 7,02% | 7,36% | 197 | 199 | 199 | 1,02% | 1,02% |

[3]Betweenness expresses the extent to which a node is "between" the various other nodes in the graph: a node with high betweenness assumes the role of "intermediation" (Freeman, 1979).

The analysis of the nodes' weighted degree highlights a general increase in 2017, with the notable exception of the two CSMs, which instead likely lost their coordination function during the crisis. A significant increase in both weighted degree and betweenness is recorded for the Comunanza clinic. This small center, which has very few staff units and is located in a mountainous and marginal area of the province, adopted a "bridging" role during the emergency, which it then partly subsequently afterwards, in 2019.

The CSM in Ascoli Piceno decreased its contacts with the other units during the emergency. This perhaps depended on the fact that, in 2015 and 2019, the CSM coordinated the DSM centers: as a result, the relationships within the DSM were enacted through the CSM. This function was partly lost during the emergency phase, when interactions developed in a more direct manner. The interviews revealed that, to deal with the emergency, a temporary operational unit was set up to deal with the emergency, named "Equipe sisma" (earthquake team). It was active from March 2017 until February 2018. The personnel of the Equipe combined units of staff from the DSM and the UCCTs, with the addition of five units of fixed-term staff, who finished their service when the team disbanded.

The differences observed could therefore be attributable, principally, to the organizational structure of the Equipe during and after the seismic event. This emergency structure established situations that were managed simultaneously by both DSM and UMEA personnel in the locations linked to earthquake response (morgues, collection centers, temporary structures for the displaced, etc.). In this context, prior bureaucratic rules that regulated interorganizational relationships under the coordination of central units were no longer followed, and this determined greater face-to-face interaction between all the operators belonging to the various DSM and UCCT centers.

«The working group was composed of colleagues from both facilities. Critical situations – for instance relating to a lack of accommodation or deaths in the family – were also addressed thanks to the presence of personnel acquired through emergency funds allocated after the earthquake. During the emergency period, the presence of groups of colleagues collectively made it possible to address the needs of the patients in a more effective and targeted way [the personnel moved where necessary]; this arose in a contingent manner due to the precariousness of the situation created by the earthquake» (UMEA AP Manager).

The interviews also testify to the fact that, after the end of the emergency phase, the CSM in Ascoli Piceno interacted less frequently with other centers, and especially with the UCCTs, despite their closer relationship prior to the earthquake. The head of the CSM of Ascoli Piceno observed a general decline in the mountain area hit by the earthquake, due to the transfer of patients towards the coastal area. Despite this, during the earthquake period, interactions with the UCCT centers remained constant, overall, thanks to a compensation effect whereby the coastal centers also took care of those patients from the mountain areas who had been forced to abandon their damaged or destroyed

homes. In this sense, the organizational structure showed positive resilience, demonstrating its ability to offset the new emergency-specific configuration.

ATS 22 in Ascoli Piceno saw a decrease in the number and intensity of relationships immediately after the earthquake and even more so after the end of the emergency, in contrast to the general trend. This ATS includes the municipalities that were most directly affected by the earthquake. As a result, due to the disaster, they lost part of their functionality, leading to a reduction in activities and, as a consequence, in the number of their interorganizational relationships. However, even when the emergency phase ends, ATS demonstrates a continued loss of part of its ability to connect with other centers, especially the UCCT with which it had a closer relationship before the earthquake.

On the contrary, ATS 23 in the town of Spinetoli increased its relational activity, mainly with the DSM. Nevertheless, the relationship between the UCCT centers located in Ascoli Piceno and this ATS overall remained deficient in 2019.

The differences between the two ATSs could derive from their different approaches to staff management and greater organizational autonomy. Interviews revealed that Ascoli Piceno's ATS has only two employees, the manager and an administrative assistant, while all of the social workers operate as precarious collaborators, making it difficult to coordinate the activities in a continuous manner. As several studies have attested (Tomelleri and Lusardi, 2017; Fazzi, 2013; Ferrario, 2009), the social worker often takes on the role of facilitator of exchanges in network dynamics.

Furthermore, all the municipalities covered by ATS 22 are located around the earthquake's epicenter, so its active offices were/are no longer operational, both during and after the seismic event, because of the significant impact of the disaster. As a result, while the health facility continued to have administrative responsibility for individual patients, the territorial structure did not. When a patient no longer resides in the territory of a specific municipality, their administrative management is transferred to the social workers of the municipality to which the s/he has (been) moved. As a result of this process, relationships with other structures in the territory are lost or absorbed by other ATSs.

## Discussion

Immediately after the earthquake, the DSM centers – which ordinarily cooperate through centralized coordination – changed their interorganizational behavior by adopting more broadly distributed collaborations, and as such central coordination became less pertinent. This allows the network to become more flexible and better adapt to situations that demand rapid change and adaptation (Comfort and Haase, 2006). After the emergency phase, there is a tendency to return to the previous situation.

However, the analysis of the level of integration between mental healthcare and social welfare services shows divergent behaviors. In our case study, a good level of resilience was expressed by the DSM, which was successfully compensated for the critical issues that emerged in the areas most af-

fected by the earthquake thanks to an organic coordination structure and the presence of multiple organizations throughout the territory which belong to a single organizational unit.

On the contrary, the ATS of Ascoli Piceno, which is located in the worst affected area, was not able to maintain the level of social and healthcare integration that it had prior to the emergency, since it lacked organizationally defined relationships with the ATS of the neighboring areas – due to the more autonomous nature of these centers. In addition, it works with many precarious staff members, which impeded the establishment of continuous relationships with other centers.

The results of this study show some differences compared to what has emerged in the literature. According to a handful of studies (Provan and Milward, 2001; Turrini *et al*., 2010; Raab *et al*., 2015), networks that normally function with non-centralized coordination are flexible and, consequently, more resilient to catastrophic events, which require rapid adaptation to new, more complex situations. On the other hand, when there are consistent, stable conditions, networks perform better with centralized management, especially when the component organizations are many. Indeed, the presence of a centralized authority, together with formal procedures that regulate interaction, facilitates the coordination of activities. Bureaucracy is more effective when tasks to be performed are stable and routine, but less so for most new or transitory tasks (Provan and Lemaire, 2012). Contrary to this, our study has shown that more centralized and formalized networks showed greater resilience in the face of a catastrophe precisely because they were able to share the difficulties of the most affected centers. This is thanks also to the fact that they maintained the administrative management of individual patients, even when those patients moved to another territory.

## Conclusion

In this paper, we have tried to investigate the impact that a disastrous event can have on an interorganizational network that provides mental health and social services, through a specific case study: the 2016 earthquake in the Marche region of Italy. We have analyzed the evolution of relationships between healthcare and social welfare organizations in relation to patient sharing and the frequency of regular meetings between staff that are affiliated to different centers. Results obtained through the use of SNA demonstrate how the structure of this network changed to adapt to new needs, as dictated by the emergency. Furthermore, the organizational structures that are typically centralized in fact had a greater capacity to maintain a high level of integration.

The use of semi-structured interviews enabled us to explain the factors which determined changes in the network's structure and the level of integration.

In conclusion, this study offers food for thought on the resilience of networks of mental health and social care services when faced with disasters,

thereby helping to identify potential interventions to maintain integration in these two fields during emergency situations. The results of this analysis can help to cultivate awareness among managers of service-provision centers regarding the importance of a dynamic monitoring system of interorganizational relations. This can, it is hoped, lead to a re-evaluation of information systems, in order to make such monitoring systematic.

This study has also met some limitations, including the fragmentation of the databases available in the healthcare sector, the absence of databases on care at the ATS level, and the lack of information regarding social cooperatives and other entities that are not formalized in the provincial welfare system. A further limitation is represented by the difficulty in quantifying regular meetings with precision, as this was reliant on estimates entrusted to the memory of the interviewees.

Finally, the reflections that emerge are based on a specific case study, hence it is difficult to generalize and expand the findings to the wider topic. It would be appropriate, however, to compare these findings to similar studies.

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