People-centred integration in a refugee primary care service: a complex adaptive systems perspective

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ABSTRACT

Purpose: Services for refugees and asylum seekers frequently experience gaps in delivery and access, poor coordination, and service stress. This paper examines the approach to integrated care within Companion House, a refugee primary care service, whose service mix includes counselling, medical care, community development, and advocacy. Like all Australian refugee and asylum seeker support services, Companion House operates within an uncertain policy environment, constantly adapting to funding challenges, and changing needs of patient populations.

Methods: Interviews with staff, social network analysis, group patient interviews, and service mapping.

Findings: Companion House has created fluid links between teams, and encouraged open dialogue with client populations. There is a high level of networking between staff, much of it informal. This is underpinned by horizontal management and staff commitment to a shared mission and an ethos of mutual respect. The clinical teams are collectively oriented towards patients but not necessarily towards each other.

Implications: Part of the service’s resilience and ongoing service orientation is due to the fostering of an emergent self-organising form of integration through a complex adaptive systems approach. The outcome of this integration is characterised through the metaphors of “home” for patients, and “family” for staff. Companion House’s model of integration has relevance for other services for marginalised populations with complex service needs.

Value: This study provides new evidence on the importance of both formal and informal communication, and that limited formal integration between clinical teams is no bar to integration as an outcome for patients.

INTRODUCTION

Australia's refugee program historically has focused on organised flows of refugees who have registered offshore for formal resettlement (Karlsen, 2015). As the number of persons displaced globally by war and conflict increases, the numbers of asylum seekers who apply for protection after entering Australia's borders have also increased, though to a smaller degree. Refugees and asylum seekers have heightened needs for health and social care, reflecting damaged health infrastructure in countries of origin, the depredations of war and displacement on the psyche, and poverty after resettlement (Phillips, 2014). Despite extensive research on refugees' health care needs, a universal health insurance system, and a free national telephone interpreter system, Australia still struggles to meet the health and social care needs of newly arrived refugees and asylum seekers (Drummond *et al.*, 2011; Riggs *et al.*, 2012; Murray and Skull, 2015).

Studies exploring deficits in refugee health care tend to call for instrumental improvements (such as better use of interpreters, or screening protocols), attitudinal changes (cultural competence, trauma-informed care) or health navigators, such as refugee health nurses, to improve transmurial care (Russell *et al.*, 2013). Each of these linear solutions has its place, but none on its own can ensure that the complexity of refugee care can be accommodated in a timely and appropriate fashion. When generalist primary health care services, such as general practices, provide on-arrival resettlement care, demands for complex, integrated care can be overwhelming for the service (Johnson, Ziersch and Burgess, 2008; Sypek, Clugston and Phillips, 2008).

In principle, multidisciplinary health services should be better-placed to meet the complex needs of refugees. However, multidisciplinary services for marginalised persons face challenges meeting high health needs with limited resources, often under stress (Dollard *et al.*, 2007). These stresses are amplified when working with marginalised populations that are stigmatised in the public and policy discourse (Phillips *et al.*, 2012). The complex contractual environment in which the non-profit sector operates can place onerous administrative burdens on resource-poor services (Lavoie, Bolton and Dwyer, 2010).

In addition to these operational constraints, there are ongoing structural challenges in refugee health care. In Australia, policies in relation to asylum seekers have undergone regular change, sometimes annually, since 1992 (Australian Human Rights Commission, 2013). Asylum seekers have variable access to Medicare, and do not have access to safety net

measures that subsidise access to health care and pharmaceuticals (Phillips, 2014). Refugee and asylum seeker populations are subject to rapid changes, reflecting new and changing conflicts, and global flows of displaced people. In 2016, for example, Australia accepted a further 12,000 refugees from Syria on top of the annual intake of 13,750 persons. Such is the growth in global conflicts that the composition of the formal refugee population in 2015 includes populations who did not figure at all in the resettled refugee population in 2010.

In a fluid policy and health environment, services must be able to rapidly adapt themselves to emerging needs. A focus on service integration through collaborative and sustainable interdisciplinary practice, service co-location, effective transitions of care outside the service, and active encouragement of community enfranchise towards the service has the potential to provide this adaptation and resilience. The organisational management literature suggests that organisations that have established high value among their stakeholder communities, and are able to maintain staff who collaborate across disciplines, do this through both formal and informal mechanisms (Cornelissen, 2014). However, descriptions of formal and informal work practice and processes vary markedly (Brown and Duguid, 1991) and there is limited evidence on how this may occur in co-located primary health care services, with health disciplines that may be less than comfortable working together, and are often under stress (Powell Davies *et al.*, 2009).

In this study we adopted the WHO definition of integrated health services as “health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, coordinated across the different levels and sites of care within and beyond the health sector, and according to their needs throughout the life course” (World Health Organisation, 2016). We viewed integration from two perspectives: as an organisational process, and as a service or system outcome for the consumer or patient. In the former, integration refers to the clinical and administrative coordination and collaborative work undertaken by individuals and teams to deliver services in an ‘integrated way’, and can be conceptualised or described in terms of the processes or interactions which are enacted to achieve clinical goals, or improve service access or system efficiency. In the latter, integration is perceived from the standpoint of the patient’s orientation and reflects the connectivity, alignment and coherence of the lived experience of service utilisation (Kodner and Spreeuwenberg, 2002).

One theoretical, if not programmatic, approach which offers a means of aligning these challenges and potentially disparate perspectives is offered by complex adaptive systems (CAS) theory. Complex adaptive systems are characterised by large numbers of elements which interact dynamically with rich, non-linear effects (complexity), and are capable of learning or evolving from historical memory (adaptation). They have non-discrete boundaries, feedback loops and demonstrate emergence and self-organisation even while individual agents may follow simple transactional rules without an apparent awareness of the overall system (Lansing, 2003). A health care organisation which was a CAS would function through a great deal of communication and collaboration, little hierarchical organisation, and staff members who were able to generate innovation as a result of weak ties within and without the system (Sturmberg, O'Halloran and Martin, 2012); that is, the individual parts (or teams, in a multidisciplinary service) are adaptive, responsive to changes within the services and outside.

Changing environments are constitutive features of all refugee health services. A CAS conceptual lens enables us to focus on this constantly changing environment rather than editing it out in the research process, as "white noise". It enables us to draw together both the organisational processes of integration, focusing particularly on communication, core attractors, and changing team conformations, with the patient's perspective on integration as a service outcome – capturing the impact of this adaptation, team boundary negotiation, and interconnectedness on patients' reading of the people-centredness of the service.

Health care researchers have been critiqued for the enthusiastic relabelling of all health care organisations as complex adaptive systems (Paley, 2007), in the absence of detailed case study analysis. Research in this area has focused on policy innovations (Ssengooba, McPake and Palmer, 2012) or professional work within a larger institution (Nugus *et al.*, 2010) that use complex systems thinking, or theoretical pieces about whole-of-system change (Sturmberg, O'Halloran and Martin, 2012; Paina and Peters, 2012). The slow progress of integrated care has been attributed, in part, to failure in fostering non-linear complex adaptation across the health system (Tsasis, Evans and Owen, 2012).

This paper presents a case study of a comprehensive refugee primary care service, using a CAS perspective. It analyses the processes of integration between staff, teams, and patients, and the larger health sector, and explores the role of formal and informal interactions and relationships in shaping integration as an outcome.

METHODS

Setting. Companion House (CH) is an integrated primary care service for refugees and asylum-seekers in the ACT, with a client base of approximately 1300 people and a current staff of 28 part-time, full-time and sessional workers. CH is part of the Forum of Australian Services for Survivors of Torture and Trauma, and is the only one of the eight member services to incorporate a medical service. Its service mix includes counselling, medical, community development, and casework. It also provides education and training for stakeholder organisations, such as hospitals, volunteer groups, the police and social services. The largest team is the counselling team, which at the time of the study had six members who between them worked four full time equivalent (FTE) positions. The seven doctors in the medical team worked regular part-time hours for a total of 1.3 FTE positions. The two nurses worked 1.6 FTE positions. CH has a relatively stable staff, with low levels of staff turnover. The service has received awards for its integrated primary care service (ACT Medicare Local, 2014) and has been cited in best practice reviews (Woodland *et al.*, 2010).

Data collection. We used rapid appraisal methodology previously developed and tested in general practice (Phillips *et al.*, 2014). Research staff undertook a series of visits to the service over a nine month period. A bounded social network survey was administered to all staff members, using a modification of the Integration of Human Services Measure (Browne *et al.*, 2007), seeking to describe the reciprocal dyadic problem-solving relationships, which make networks within the service. Each staff member indicated for each of their colleagues on a scale of 0-4 if they would approach to help them solve or manage problems related to the care for patients with complex needs, whether that person would seek them out for problem-solving, and whether this occurred through formal (case management meetings, regular team meetings) or informal mechanisms or interactions (unplanned, or ad hoc conversations or meetings between staff conducted as needed). Figure 1 shows the tool.

Semi-structured interviews were conducted with five clinical and administrative staff, reflecting on integration processes, enablers and barriers. An oral history interview with a service leader explored narratives of success and failure over the organisation’s history. Eight guided discussion groups were held for 36 community users of the service (median age, 25 years), using five accredited community interpreters one experienced, non-accredited interpreter (Karen, Burmese, Mon, Dari, Persian, Tamil and Arabic). Participants reflected on

their experiences navigating Companion House services and the wider health sector. The facilitator actively elicited negative comments, or “ways the service could improve”. Data were recorded where available and back-translated by the interpreters.

Participants were provided with an aerial map of the room space of Companion House and asked to indicate the spaces of importance to them. Participants also drew their own health networks - those people who were important to them in providing and ensuring health care. Participants visually represented these networks using a diagram that indicated relative proximity of individuals to the patient (ego) and to other individuals (alters) in the network (Reeves *et al.*, 2014).

Analysis. Qualitative data were stored, managed and coded using NVivo 10 (QSR International). Social network data were collated using MS Excel and analysed using UCINET (Analytic Technologies) and SPSS 20 (IBM International). A graphic representation was constructed of the connectivity and density of provider networks in each service. We measured size of network, density (level of connectedness of connections in a network compared to the total connections possible), and weighting using tie strength scores. The density measure reflects whether communication pathways in the network are capable of getting information out to the network's participants. The weighting measure reflects the frequency of connection. Comparisons between formal and informal problem solving networks were conducted using paired sample analyses.

Interview transcripts were analysed by two researchers using thematic analysis, and arranged around emerging themes of communication across disciplines; organisational structures and decision-making; and the service as a “home”. These themes throw some light on two key process typical of a CAS: flexible organisational structures with fluid boundaries, which enable rapid problem-setting and problem-solving, and communication through both formal and informal channels, aiding the ability to rapidly evolve in response to changes in the environment. The third theme captures the experience of integration through two metaphors used by patients and staff (“home” and “family”). These metaphors instantiate attractors such as the shared service-based mission statement, and are operationalised through the communication and boundary negotiation of the staff members. This thematic structure was collated across maps and social network data to triangulate results and strengthen integrative conclusions (Bazeley, 2012).

RESULTS

Integration as “home” and “family”

CH clients referred to the service as a “home”. The building is constructed along one axis with an entrance at either end, connected by a broad central corridor, furnished with couches, coffee tables and a bench on which are laid groceries, clothing, or bread, donated by community members. A kitchen shared by staff and clients opens off the centre of the corridor. Visitors may sit for some time, meeting other community members.

Clients were asked to identify important places for them on physical maps of the service during the focus groups. They highlighted rooms with names or titles of the people who worked in the spaces without reference to the disciplinary background of the person and indeed many spaces are utilised by different members of the team on different days. Interestingly all areas of the building were identified by at least some clients as important to them and there were no “staff-only” areas that clients felt excluded from. The entry spaces – (i.e. shared office space occupied by several different disciplines different times, and the reception area) were the areas most frequently highlighted as important spaces in the building. These spaces were where clients are greeted and where the sense of home, shared ownership and friendliness of staff seemed appreciated by all.

Staff described their working relationships as defined by mutual respect. One interviewee referred to this as being family-like, in that “we talk every day, helping out, what needs to be done today”. Other staff members spoke of the staff’s commitment to the wider mission as a unifying feature.

...[O]ur shared purpose is to make sure that these people who are the most marginalised people have the best possible care, that we do what we can for them, at all times. And that we don't turn somebody away (Interviewee 3).

In considering the organisational mission, most staff mentioned a commitment to universal human rights and agreed about the existence of a shared ethos. Many also described a passion for their work, and recognised this same attribute in their colleagues.

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3 You wouldn't really last in a place like Companion House unless you were
4 committed and passionate about the work. (Interviewee 2).
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9 Staff members reiterated their commitment to the values of the service and in some cases
10 described staff members who "go it alone" having been asked to leave. This affirmation of
11 commitment may be used as a device to ensure collective resilience through more difficult
12 times.
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18 *Organisational structures and decision-making.*
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21 CH has a flat management structure. Management supports other staff members to have a
22 turn at leading the service on a relieving basis, irrespective of seniority. Reception work is
23 considered so important to the "face" of the service that there is no designated receptionist.
24 Instead, staff members, apart from the sessional doctors, take turns working on reception.
25 Sharing the reception role means that all staff members have immediate experience of the
26 needs of patients and, from the patients' perspective, opens up the service as there is no
27 gatekeeper.
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33 The service has five formalised teams: counselling, community development, education and
34 outreach, advocacy, and medical. Although there are team and whole-of-staff meetings, CH
35 does not have regular cross-team meetings. Teams themselves are primarily linked through
36 team leaders who collaborate and through cross-over roles held by other team members. A
37 nurse from the medical team, for example, spends part of the week in the community
38 development team. The advocacy team includes a staff member who has worked for years as
39 a senior member of the counselling team.
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48 The beauty of this integration system [is] we all have an open kind of dialogue, we
49 can talk to the Director, we can talk to the team leader on different aspects of issues
50 and of course no one or none of the team can do everything, that's why we have to
51 cross manage the issues to some extent but not all the time.... I never see our director
52 put up a flow chart, "I'm here, you're here". But the structure we've got here is very
53 flexible as it practically functions and ...you can call the team leader as well as other
54 workers when you need to talk and there's something to be managed (Interviewee 2).
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At the time of the study there were also ten working parties comprising members from different teams, developing and implementing approaches to emergent issues from research priorities to children’s needs. These groups meet irregularly and also provide linkage across teams.

This fluid approach to collaboration has generated a collective sense-making and pragmatic problem-solving orientation that serves CH well in times of adversity or crisis. Two salient challenges faced during the course of this study were a decrease in funding relative to need, and an increase in the social and psychological needs of groups of asylum seekers. In the following passage, a staff member describes the collective generation (or ownership) of a solution to the funding shortfall.

The difficulties we’ve gone through this year have been worked out amicably. People have been asked if they’d be prepared to take a drop in the number of hours they work, so that we could keep other people. ... People chatted to one another and went, oh well, this is what we’ve got to do (Interviewee 4).

Not all boundaries at CH are fluid. Some boundaries between clinical disciplines are consciously reinforced. The medical and nursing staff belong to one team, and are separated practically and functionally from the counselling team. The counselling team keep separate notes that are not accessible to the medical team (because of the heightened sensitivity related to some refugee and asylum seeker counselling records which require meticulous protection). Before the teams communicate verbally about a patient, explicit permission is sought from the patient. On other occasions, a decision is made not to share information between medical and counselling team staff, or between members of the counselling team. Not sharing patient information occurs in situations where two members of a team are providing counselling and support for family members who may have disputed positions and each requires support and advocacy, or when patients have requested that no information be shared. Maintaining boundary observation in the former circumstance is a conscious decision that promotes staff cohesion, and in the latter circumstance respects patient autonomy. The default position,

whether or not permission is given to communicate across teams, is boundary observance between the counselling and medical teams.

The most obvious service related reason [for not emphasising clinical integration] is that we're working with different family members, so if you had a case conference about a family where there's a conflict, everyone will line up with their client or their patient and that's just how it always has been and you can end up with a lot of fracturing. Even the counsellors don't meet if they're working with different members of a conflicted family. We would put a barrier down there because they will fight just like the family. There's no way out of it. You can't escape it 'cause you've just got such different perspectives (Interviewee 6).

This disciplinary boundary separation did not exist between nurses and doctors in the medical team. Nurses work to the same protocols as doctors, and have a series of standing orders which meant that they could function independently as clinicians. Their triage function in a busy clinical service was very important, and doctors trusted that they were able to do this well. In the following quote, a doctor describes an evolving web of interconnectedness between the disciplines in the medical team, commenting on the centrality of a non-clinical worker, even while reinforcing boundaries to their role.

[What happens is] there are little reaching outs going on all over the place like a spider web. So often the nurses are going to be a bit of the lynch pin, now the interesting thing for them of course, is they're all part time too. So interestingly, sometimes Julia [administrative worker, name changed], who's not medical or nursing, is a very important person. While she doesn't know those medical and nursing details, and is very appropriately out of that, there's a lot of other stuff going on that clients, patients tell her...so she's a very, very integral part of the team (Interviewee 3).

Although clinical interaction between the medical and counselling teams was formalised and conscious of disciplinary boundaries, the two teams frequently collaborated under the

guidance of the advocacy team to assist with social needs of patients. This combination of formal and informal structural elements, with both fluid and concrete boundaries has created a service environment where clinical teams are collectively oriented *towards patients* but not necessarily *towards each other*. They are in parallel alignment with a common or shared objective rather than focused on or directed towards one another. In effect, Companion House is integrated at the organisational, service and functional levels, while not being ‘clinically integrated’ in the usual sense or exhibiting formal integration between clinical teams.

Communication

Modes of communication matter in a system that is loosely connected across a range of teams, but observes disciplinary boundaries. From the staff’s perspective, Companion House has strong informal communication networks between staff members.

Informal staff networks within CH (n=25, RR=89.2%) were approximately 50% larger (21.2 cf 14.1, p<0.0001) and twice as dense as formal networks (1.498 cf 0.71, p<0.0001) (Table 1). Informal networks appear to play a critical role in problem-solving to achieve integration of care and may be more important than formally constructed networks dictated by roles or organisational structure.

Insert Table 1 about here

Figures 2 and 3 show these formal and informal problem solving networks across the organisation. In the formal network, the diagram is open and the central nodes can be identified as team leaders. The informal network is more densely populated with relational ties, to the point of being relatively crowded. It incorporates staff at different levels across the service, interacting directly with one another in multiple ways rather than just through team leaders.

Insert Figures 2 and 3 about here

The ability of staff to informally communicate with one another and with the clients is a design feature of the service. Although many of the staff work part time, and are often off-site doing outreach work, the open social spaces of the service make it easy to informally

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3 communicate with another staff member, or a patient, or to find a spare room to have a more
4 confidential conversation.
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9 If somebody sort of has a rough session they go around and they find somebody else
10 whose door is open. Like if I'm not in a session I leave my door open, and anybody
11 can come in and it's fine. (Interviewee 5)
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17 While informal communication is a strong feature of CH, this coexists with a formal
18 structure. During the project period, a formal process of meetings, at which annual plans were
19 articulated and agreed, was taking place. The policies and protocols which underpin the
20 service are regarded by staff as living documents, and they are engaged in their development.
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24 The formal and informal communication systems appear to be co-evolutionary systems that
25 have become more elaborate in response to staff, clients and service stress. In the preceding
26 few years, the work for the counselling and medical team had increased in complexity and
27 stress, as their caseload of long-term asylum seekers with few social supports increased.
28 Here, an interviewee discusses the interweaving of formal with informal communication to
29 enhance staff resilience.
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37 The counselling team meets once a fortnight, we all get external clinical supervision
38 by different suitable... by different supervisors that we deem to be suitable, and also
39 that Companion House deems to be suitable. We also will have internal supervision
40 by the team leader. Then we meet formally as a team, well formally, once a fortnight,
41 and the purposes of our team meetings are diverse, you know sharing information,
42 getting updated information on things that are important, complex case analysis...
43 reading interesting articles and discussing them, so sort of internal sort of professional
44 development....But also just particularly in the last couple of years when it's all
45 going, you know it's all so awful, [we] just debrief, we've done really quite a lot of
46 just debriefing at team meetings (Interviewee 4)
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Similar informal-on-formal support had also been established for the medical team, in response to increase in similar stressors.

That's lot more emotion than in the average general practice I would say. And it's wide ranging. I think at the moment, the dominant thought is about a lot of our [asylum seeker] lads being sent back...So there's been a lot of discussion going on between us all because of that. But I think we were also feeling it's going to be really hard, we've known these guys for a few years, knowing they're going to be sent back (Interviewee 3).

This dynamic, organic combination of formal and informal processes has enabled the emergence of a form of people-focused, needs-based integration rather than a prospective, objectified form of clinical integration which is often at the heart of efforts to seek or create integrated services. While being emergent rather than produced, this integration is both a functional process of the service and one of its outcomes.

DISCUSSION

Patients come to Companion House to ask for assistance across the breadth of their life experiences. For those services that were provided within Companion House, patients often described a service without obvious seams, with the exception, for some, of the need to have separate appointments with the counselling and medical teams. The simple spatial design of the service meant that there were no hidden or forbidden spaces for patients.

In CAS terms, the shared purpose articulated by staff is a “core attractor” that is a central system driver. The shared purpose articulates both the people-centred goals of the service, but also a commitment to inclusivity (“don’t turn somebody away”) which is a philosophical position shared by staff. At the same time the complex interplay of fluid and non-fluid boundaries, and reliance on formal and informal relationships, has enabled a shared alignment that focuses on clients and their needs rather than expectations of team members towards each other.

CAS theory suggests that services with fluid boundaries between staff are able to reconfigure themselves to develop ready responses to emerging challenges (Lansing, 2003; Ssengooba, McPake and Palmer, 2012). CH has proven itself adept at re-organising itself to meet new challenges in response to changes in the operating environment, the needs profile of potential clients, or to crises within the service itself.

On the surface, clinical integration does not appear to be the aim of care delivery at CH. However, we observed an emergent form of organic, functional, coalescent integration that arose as self-organisation rather than through the imposition of structural drivers. This emergence and self-organisation confer some advantages of CAS including adaptability and resilience.

There are some features of CH which may limit the applicability of these findings to other services. Our group interviews did not find many examples of respondents complaining of failures by Companion House, but this may reflect a positive selection bias among participants. It is a relatively small service. While it functions recognisably as a complex adaptive system, is possible that a larger organisation would struggle to integrate and adapt using the same strategies. Several respondents noted that when communication had been mainly through informal communication, during times of service stress, some staff members felt disenfranchised. Just as Companion House found that formal communication channels allowed the co-evolution of informal problem-solving networks; in larger or more disparate services integration is likely to require the conscious employment of formal meetings and informal communication. Enlightened design of shared spaces is needed for the latter. As services grow, especially with part time staff, the central attractor – in this case, the common purpose - will need to be promoted effectively to ensure that staff stay connected and on task.

Boundary observance occurred between two of the disciplinary groups, but not between other disciplines or teams. If boundary observance were required between more teams, or more disciplines this may pose a risk to its ability to function as a CAS, unless a great deal of managerial attention is paid to fostering informal communication and creating links across the teams.

This study did not discuss integration with other services. Even within a small bounded jurisdiction like the ACT, with only two hospitals and four community health services, integration across services has required ongoing attention and concerted outreach.

Memoranda of understanding have been established across the service sector, but with

changes in staff, memoranda of understanding quickly become moribund documents. Permeable boundaries across the service sector, and personal linkages which allow informal communication as well as formal agreements are necessary and require ongoing renewal.

It is not clear how much of the effective integration discussed in this study is due to selection of staff who are predisposed to working this way. There is a need for multilevel research exploring whether individual staff attributes – for example, a group orientation, readiness to embrace change – are determinants or outcomes of complex adaptive systems. If staff characteristics are antecedent, then careful selection of those who are suited to this model may be a managerial priority.

CONCLUSION

Services for marginalised persons can become overwhelmed through a combination of fiscal instability, staff burnout and overwork. Twenty-three years after it was established, Companion House remains a stable service. It has community respect, and its staff express confidence in the service and in one another. This is despite having to respond to changing population needs, regular reconfiguration of the service, and funding challenges. The evidence of this study suggests that part of the service’s resilience is due to the fostering of an emergent self-organising form of integration through a complex adaptive systems approach.

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Integrating Care: Learning from first generation integrated primary health care centres**SOCIAL NETWORK QUESTIONNAIRE**

This questionnaire elicits information about the networks people form to do their work. In the column on the left, please rate how often you would approach each of the people you work with to help you **solve or manage problems related** to the **integration and coordination of care** for patients with complex needs. On the right, please rate how often that person might approach you for the same purpose. Please also think about whether you use **formal or informal** settings and mechanisms to do this. For example, a formal approach might be a scheduled meeting or communication over staff email. Informal mechanisms might include a brief chat in the corridor or in the break room over lunch.

FREQUENCY	YOU → THEM		PERSON	THEM → YOU		SCALE
	How often do you seek them out to problem solve		Think about the way your interactions with this person work in general terms or most of the time.	How often do they seek you out to problem solve		
	Do you do this FORMALLY?	Or INFORMALLY?	<i>Please circle your own name and leave that row blank.</i>	Do they do this FORMALLY?	Or INFORMALLY?	
0 = Never / hardly ever				Name + title 1		
			Name + title 2			
1 = Rarely			Name + title 3			1 = Rarely
			Name + title 4			
2 = Sometimes			Name + title 5			2 = Sometimes
			Name + title 6			
3 = Often			Name + title 7			3 = Often
			Name + title 8			
4 = Always / Almost always			Name + title 9			4 = Always / Almost always
			Name + title 10			
			Name + title 11			
			Name + title 12			
			Name + title 13			

Figure 1: Social network questionnaire: formal and informal problem solving networks.

Figure 2: Formal communication network for problem-solving

Figure 3: Informal communication network for problem-solving

	Formal networks	Informal networks	P value
Mean size	14.1	21.2	0.000001
Average weighting	19.018	40.215	< 0.000001
Density	0.710	1.498	< 0.000001

Table 1: Comparison of size, weighting and density of formal and informal problem-solving networks