'Health professional networks as a vector for improving health care quality and safety. A systematic review. Cunningham *et al.*

Appendix Table A: Reviewed studies: objective, participants, study dates, context and findings

Study (No.=26)/ [Database]	Objective [Quality Area]	Participants, Study Date	Context	Findings
Calloway et al., 1999[51] *[Medline]*	Compare rural service systems and urban systems in coordinating and structuring services. *[integration]*	**Participants**: mental health professionals - key informants of each area's public mental health, developmental disabilities and substance abuse programs. **When**: 1994 (rural); 1989,1991 (urban)	USA; 2 rural mental health networks: North Carolina, 4 urban mental health networks: Cincinnati, Toledo and Columbus, Ohio, and Baltimore, Maryland.	• Continuum of care for people with severe mental disorder involved more specialised mental health providers in urban systems. • Service relationships between all specialised mental health providers: more likely to occur in rural than urban areas.
Carpentier et al., 2008[41] *[Web of Science]*	Explore practitioners' perspectives to understand dynamics influencing relationships between the assistance networks for seniors. *[patient-centred]*	**Participants**: dementia care providers. **When**: 2003	Canada; Montreal; 7 dementia provider groups.	• Players' profiles, internal structures and external links determined the quality of the practitioner-caregiver interface. • Beneficial factors: heterogeneity of professional groups and establishment of contacts in early stages of dementia.
Chase, 1995[27] (29) *[Cinahl]*	Describe the social context in which the critical care clinical judgment in nursing occurs. *[safe]*	**Participants**: nurses, physicians. **When**: 1990	USA; north-eastern teaching hospital's 11-bed open heart ICU; a 10-bed general surgical ICU.	• Nurses and physicians were organised in parallel hierarchies of nurses and physicians providing a system of multiple checks to prevent judgement lapses by either nurse or physician.
Cott, 1997[49] *[Embase; Web of Science]*	Describe the structure of multi-disciplinary long-term care teams' professional relationships. *[interdisciplinary teamwork]*	**Participants**: nursing, non-nursing professionals on five teams. **When**: 1995	Canada; multi-level geriatric care facility, metropolitan Toronto.	• Any teamwork effects in increasing participation in decision-making by health professionals other than medicine were limited to a group of higher status professionals.

Study (No.=26) / [Database]	Objective [Quality Area]	Participants, Study Date	Context	Findings
Creswick & Westbrook, 2007[28] *[Medline]*	Examine how staff in a hospital renal ward seek medication advice. *[safe]*	**Participants**: doctors, nurses, allied health staff, administrative personnel. **When**: 2005	Australia; renal ward, metropolitan teaching hospital, Sydney.	• There was a relatively low level of advice-seeking about medication-related decisions and tasks. • Most communication occurred within professional groups. • Medication advice was sought from several key individuals in the ward both within and across professional groups.
Creswick et al., 2009[29] *[Medline]*	Examine problem-solving, medication advice-seeking, and socialising professional networks. *[safe]*	**Participants**: doctors, nurses, allied health staff, administrative personnel. **When**: 2007	Australia; emergency department, metropolitan teaching hospital, Sydney.	• In all 3 networks, individuals were more closely connected to colleagues in their own professional groups. • The most densely connected network was the problem-solving network, then the medication advice network, followed by the socialising network.
Fattore et al., 2009[42] *[Medline]*	Study the impact of collaboration initiatives on drug expenditure in a Local Health Authority (LHA). *[efficient]*	**Participants**: GPs. **When**: 2001-2004	Italy; GPs in 2 districts, Empoli LHA, Tuscany region.	• Centrality of GP in his or her network (social capital) had a small or insignificant effect on meeting expenditure targets. • For social influence, there was a significant relationship between the performance of peers to whom the GP was connected and the GP's ability to meet the LHA's drug target. • The higher density district showed lower variation in expenditures.
Garrett & McDaniel, 2001[30] *[Medline; Web of Science]*	Explore relationships in hospital-based units, of nurse characteristics, and perceptions of work climate with professional burnout. *[safe]*	**Participants**: nurses. **When**: ~2000	USA; full-time nurses, 493-bed acute care, mid-western hospital.	• Perceived environmental uncertainty and social climate perceptions were associated with burnout. • A positive social climate protected workers from negative effects of crisis.
Gold et al., 2008[47] *[Medline]*	Study relationships among organisations collaborating to reduce racial and ethnic disparities in health care. *[equitable]*	**Participants**: health plans, sponsor or support organisations. **When**: 2005-2006	USA; National Health Care Collaborative of large health plans.	• SNA identified the central role of sponsor and primary support organisations and a few health plans in forming the network core, highlighting a potential weakness with centralised support in the network structure.

Study (No.=26) / [Database]	Objective [Quality Area]	Participants, Study Date	Context	Findings
Heng et al., 2005[35] [Medline]	Explore the brokerage role of hospital facilities managers. [effective]	**Participants**: Department heads of 15 different hospital departments (facilities managers). **When**: ~1999.	Australia; 700-bed tertiary referral metropolitan hospital, Sydney.	• Structural holes measurement suggested the facilities management director's network position was strategic, bridging connections between other departments, obviating structural holes in the network communications.
Lemieux-Charles et al., 2005[36] [Embase]	Examine providers' perceptions of effectiveness of 4 community-based, not-for-profit dementia networks. [effective]	**Participants**: dementia care clinicians and managers. **When**: 1999 -2002.	Canada; 4 community-based dementia care networks, with 13 to 17 care provider organisations, Ontario.	• The 4 networks differed in their perceptions of service-delivery effectiveness. • Exchanges between groups of agencies (cliques) within each of the networks were more critical than those between agencies within each network.
Lewis et al., 2008[37] [Cinahl]	Examine primary care partnerships (PCPs) as a form of network governance; analyse their network structure, network dynamics, relationships and sustainability.	**Participants:** PCP project staff, partner agency staff, Department of Human Services (DHS) regional office staff. **When**: 2002-2005.	Australia; 2 PCPs, one urban and one rural, Victoria.	• Although network structures changed over the study time, one constant was the continuing centrality of independent staff employed to manage the partnerships. • Network dynamics of the partnerships exhibited resilience over time.
Lindholm, 2006[43] [Medline]; Lindholm et al., 2003[44] [Medline]; Lindholm et al., 2004[45] [Embase]	Study the association between psychosocial work conditions, professional network, job support, social network, support, sick leave and salary, and work stress. [efficient]	**Participants**: chief manager nurses, physician clinical directors. **When**: 2000-2002.	Sweden; chief manager nurses and physician clinical directors.	• Nurse managers and clinical directors exposed to high job demands had a significantly high probability of a high level of work stress. • Available psychosocial resources, did not balance their experienced work stress against high work demands.

Study (No.=26) / [Database]	Objective [Quality Area]	Participants, Study Date	Context	Findings
Lurie et al., 2009[48] [Medline]	Apply SNA to assessing medical centre culture. [culture]	**Participants** caregiver teams, research awardee advisory committees, and research leaders. **When**: 2007	USA; an ICU, advisory committees, and research leaders, in a medical centre.	• SNA proved effective in measuring aspects of team function, interdisciplinarity of different clinical departments, and in exploring relationships between institutional leaders.
MacPhee, 2000[31] [Medline]	Contrast workplace socialisation and the types of social networks of nurses working flexible and traditional schedules. [safe]	**Participants**: nurse employees. **When**: ~1999	USA; 200-bed, metropolitan, paediatric, tertiary care facility, western United States.	• No significant differences were found in composition of the nurses' social networks. • Both nurse types belonged to peer-based networks including nurse managers.
MacPhee & Scott, 2002[32] [Embase; Web of Science]	Compare rural and urban nurses' workplace social support networks. [safe]	**Participants**: rural, urban hospital nurses. **When**: ~2001	USA; 10 rural hospitals in one region, and one urban hospital, Colorado.	• Rural nurses used peers more than managers for all types of support. • Rural and urban hospital nurses did not differ on structural aspects of support networks, nor for emotional support from peers or managers, however rural nurses expected more manager and peer guidance.
Mendel et al., 2009[33] [Web of Science]	Record the numbers and types of inter-organisational partnerships in the national patient safety domain, network dissemination capacity and changes longitudinally. [safe]	**Participants**: patient safety policy organisations. **When**: 2004, 2006.	USA; quality partnership networks.	• The number of patient safety partnerships expanded between 2004 and 2006 in all activity domains, particularly dissemination and tools development. • Network fragmentation decreased; potential for information flow increased.

Study (No.=26) / [Database]	Objective [Quality Area]	Participants, Study Date	Context	Findings
Milward & Provan, 1998[52] *[Business Source Premier]*	Examine the level of integration of 4 community mental health networks; measure structural ties in a substance-abuse prevention network. *[integration]*	**Participants**: mental health agencies; substance-abuse prevention network. **When**: 1991-1993.	USA; 4 city-based, community mental health networks, and a substance-abuse prevention network.	• Each of the 4 mental health networks was well-integrated, based on two measures – organisational links and cooperative links, but in different ways. • SNA helped identify substance-abuse network agencies that were not well-linked.
Milward & Provan, 2003[38] *[Business Source Premier]*	Examine 4 mental health networks and do a 4-year study of one of the 4 networks, to evaluate strategies of collaboration and contracting. *[integration; stability]*	**Participants**: mental health agencies. **When**: 1991-1993; 1996-1999.	USA; 4 city-based mental health networks, one with a managed care mental health network.	• Resource munificence alone did not result in an effective network, nor did resource scarcity make a network ineffective. • Network stability was the most critical variable in moderating resource impact, and was related to network effectiveness.
Mossholder et al., 2005[34] *[Web of Science]*	Relate structural, attitudinal and behavioural variables to employee turnover. *[efficient]*	**Participants**: health care employees. **When**: ~1999, ~2004	USA; large southern public medical centre.	• Employees forming a greater number of ties with co-workers were more embedded, with lower turnover. • Higher levels of interpersonal citizenship behaviour resulted in lower turnover.
Ommen et al., 2009[46] *[Medline; Web of Science]*	Analyse the relationship between job satisfaction of physicians and social capital in hospitals. *[efficient]*	**Participants**: physicians. **When**: 2002	Germany; 4 hospitals.	• Organisational social capital, in addition to professional experience and workload, significantly predicted overall job satisfaction.
Ormrod et al., 2007[53] *[Business Source Premier]*	Examine how diffusion of new work practices within a network is affected by organisational power. *[diffusion]*	**Participants**: psychiatrists and their multidisciplinary teams. **When**: ~2002-2006	UK; 3 NHS mental health clinics.	• Professional networks within psychiatry did not spread the initial clinic's therapeutic practices equally to two new sites.

Study (No.=26) / [Database]	Objective [Quality Area]	Participants, Study Date	Context	Findings
Peng et al., 2006[39] *[Web of Science]*	Examine the impact of hospital resources, network resources and centrality on hospital performance. *[effective]*	**Participants**: hospitals. **When**: 2001	Taiwan; accreditation-qualified hospitals	• Hospital resources and centrality independently affected performance, whereas network resources did not. • The higher the centrality, the better hospital performance.
Rangachari, 2008[40] *[Embase]*	Examine relationships between organisational knowledge sharing and hospital coding performance. *[effective]*	**Participants**: quality staff, medical staff and coding administrators. **When**: ~2006	USA; 4 Manhattan hospitals, New York.	• Good-coding performance was systematically associated with a knowledge sharing network structure rich in brokerage and hierarchy, rather than density.
Webster et al., 1999[50] *[Medline]*	Examine differences in leadership styles. *[interdisciplinary teamwork]*	**Participants**: mental health professionals. **When**: ~1998	USA; 8 mental health case management teams, California.	• Male leaders were the most central team members for instrumental and expressive relations – an autocratic leadership style. • Female leaders had a democratic leadership style.
West et al., 1999[55] *[Medline]*; West & Barron, 2005[54] *[Medline]*	Describe social and geographical boundaries of networks of senior nurse executives and physician leaders and managers. *[diffusion]*	**Participants**: nursing directors; medical directors. **When**: ~1998.	UK; NHS doctors and nurses in hospitals, England.	• Both groups discussed 'important professional matters' with those similar to themselves (profession, gender, age, seniority), with physicians being the more extreme. • Administrative managers held a strong 'brokerage' role. Directors of nursing were more central to their networks than medical directors, with more hierarchical networks. • Medical directors were embedded in tightly knit groups (cliques).